Subscription

Economics and Business Review (E&BR) is published quarterly and is the successor to the Poznań University of Economics Review. The E&BR is published by the Poznań University of Economics and Business Press.

Economics and Business Review is indexed and distributed in ProQuest, EBSCO, CEJSH, BazEcon and Index Copernicus.

Subscription rates for the print version of the E&BR: institutions: 1 year – €50.00; individuals: 1 year – €25.00. Single copies: institutions – €15.00; individuals – €10.00. The E&BR on-line edition is free of charge.

Correspondence with regard to subscriptions should be addressed to: Księgarnia Uniwersytetu Ekonomicznego w Poznaniu, ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland, fax: +48 61 8543147; e-mail: info@ksiegarnia-ue.pl.

Payments for subscriptions or single copies should be made in Euros to Księgarnia Uniwersytetu Ekonomicznego w Poznaniu by bank transfer to account No.: 96 1090 1476 0000 0000 4703 1245.

ISSN 2392-1641

Economics and Business Review

Volume 3 (17) Number 1 2017

Economics and Business Review Volume 3 (17) Number 1 2017

CONTENTS

Poznań University of Economics and Business Press

Paper based publication

ISSN 2392-1641

POZNAŃ UNIVERSITY OF ECONOMICS AND BUSINESS PRESS
ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland
phone +48 61 854 31 54, +48 61 854 31 55
www.wydawnictwo-ue.pl, e-mail: wydawnictwo@ue.poznan.pl
postal address: al. Niepodległości 10, 61-875 Poznań, Poland

Printed and bound in Poland by:
Poznań University of Economics and Business Print Shop

Circulation: 230 copies

Aims and Scope

Economics and Business Review is the successor to the Poznań University of Economics Review which was published by the Poznań University of Economics and Business Press in 2001–2014. The Economics and Business Review is a quarterly journal focusing on theoretical and applied research work in the fields of economics, management and finance. The Review welcomes the submission of articles for publication dealing with micro, mezzo and macro issues. All texts are double-blind assessed by independent reviewers prior to acceptance.

The manuscript

1. Articles submitted for publication in the **Economics and Business Review** should contain original, unpublished work not submitted for publication elsewhere.
2. Manuscripts intended for publication should be written in English, edited in Word in accordance with the **APA editorial** guidelines and sent to: secretary@ebr.edu.pl**.** Authors should upload two versions of their manuscript. One should be a complete text, while in the second all document information identifying the author(s) should be removed from papers to allow them to be sent to anonymous referees.
3. Manuscripts are to be typewritten in **12' font in A4 paper** format, one and half spaced and be aligned. Pages should be numbered. Maximum size of the paper should be up to 20 pages.
4. Papers should have an abstract of not more than 100 words, keywords and the Journal of Economic Literature classification code (**JEL Codes**).
5. Authors should clearly declare the aim(s) of the paper. Papers should be divided into numbered (in Arabic numerals) sections.
6. **Acknowledgements** and references to grants, affiliations, postal and e-mail addresses, etc. should appear as a separate footnote to the author's name a, b, etc and should not be included in the main list of footnotes.
7. **Footnotes** should be listed consecutively throughout the text in Arabic numerals. Cross-references should refer to particular section numbers: e.g.: See Section 1.4.
8. **Quoted texts** of more than 40 words should be separated from the main body by a four-spaced indentation of the margin as a block.
9. **References** The EBR 2017 editorial style is based on the **6th editio**n of the Publication Manual of the American Psychological Association (**APA**). For more information see APA Style used in EBR guidelines.
10. **Copyrights** will be established in the name of the **E&BR publisher**, namely the Poznań University of Economics and Business Press.

More information and advice on the suitability and formats of manuscripts can be obtained from:

Economics and Business Review
al. Niepodległości 10
61-875 Poznań
Poland
e-mail: secretary@ebr.edu.pl
www.ebr.ue.poznan.pl

Economics and Business Review

Volume 3 (17) Number 1 2017

CONTENTS

BOOK REVIEWS

Economics and Business Review, Vol. 3 (17), No. 1, 2017: 7-37
DOI: 10.18559/ebr.2017.1.2

Agency costs of overvalued equity and earnings management in companies listed on WSE[1]

Michał Kałdoński[2]***, Tomasz Jewartowski***[2]

Abstract: The aim of the paper is to study earnings management activities of companies listed on Warsaw Stock Exchange from the perspective of Jensen's agency theory of overvalued equity (Jensen, 2005). Specifically, we analyze relations between equity overvaluation and various types of earnings management used by public companies between 2005 and 2015. We provide evidence partially consistent with Jensen's theory. Specifically, our study reveals that overvaluation intensifies income-increasing accrual earnings management activities. However, we also find that overvaluation is not followed by real transactions management activities, as opposed to previous studies based on the US market. We provide some evidence that this difference might be driven by external monitoring executed by large institutional investors.

Keywords: overvalued equity, **e**arnings management, agency costs, agency theory, corporate finance, corporate governance.

JEL codes: G10; G30; M40.

Introduction

The discrepancy between actual market prices of securities and their intrinsic values is one of the most intensively explored topics in both finance theory and empirical finance (efficient market hypothesis, behavioral finance). From the corporate finance perspective the consequences of such a discrepancy at the level of a single stock (company) are equally important as its consequences (but also possible determinants) at the market level – the main area of dispute of (neo)classical and behavioral finance. Overvaluation or undervaluation of the stock of a given company (which in itself is not contrary to the efficient market hypothesis) may induce many different managerial actions in the fi-

[1] Article received 15 December 2016, accepted 1 March 2017. This is written as part of the research project financed by the National Science Centre (Grant No. 2014/13/B/HS4/01556).

[2] Poznań University of Economics and Business, Faculty of Management, Department of Corporate Finance, al. Niepodległości 10, 61–875 Poznań, Poland; corresponding author: michal.kaldonski@ue.poznan.pl.

nancial (capital structure policy, dividend policy), investment (M&As) and operating activities.

Jensen (2004, 2005) was the first who directly presented possible threats of stock overvaluation for its future intrinsic value. Managers of overvalued companies, focused on their own interests, may try to uphold the illusion of market valuation through actions which seemingly justify it, such as excessive expansion or mergers and acquisitions, which have not been well considered, and also "fine-tuning" of reported financial results. All these actions, which Jensen calls agency costs of overvalued equity, in the long perspective lead to the substantial reduction of the stock intrinsic value.

Jensen (2004) concentrates on the consequences of overvaluation – he doesn't discuss directly its determinants, nevertheless, he refers to the market efficiency hypothesis. He emphasizes that the efficiency hypothesis does not say that all shares are accurately priced at any given moment. The fact that the market prices of particular companies' shares diverge (in both directions) from their intrinsic values does not give grounds for rejecting the market efficiency hypothesis, according to which the market, on average, accurately determines the level of stock prices. Nevertheless, Jensen (2005) admits that the problem of overvaluation may result from market inefficiency. He points out, however, that it can also occur in conditions of semi-strong market efficiency.

Jensen argues that the situation where the current market price of a share exceeds (significantly, as he points out) its intrinsic value exerts pressure on managers of such a company to take actions aimed at maintaining the illusion of a "fit" between the company's value and its current market valuation. This can be done by undertaking risky investment projects, including acquisitions of other companies, projects that are not always economically justified and are paid for with the acquiring company's overvalued shares. Furthermore, such a situation makes it possible to obtain "cheap" capital, which in turn enables the implementation of such projects. Although, in the long term, such behavior results in a decreased value, in the short term it sustains the illusion of an accurate stock valuation, justified by the company's dynamic growth.

Finally, according to Jensen, in the absence of further possibilities of artificially maintaining the illusion of accurate market valuation, executives start playing an earnings management game. Sooner or later the situation becomes untenable, and the loss in company's value significantly exceeds the loss that would be caused by an immediate disclosure of the actual company's perspectives, different from market expectations.

Empirical studies conducted on a larger sample in the US market by means of various methods support Jensen's hypothesis (Moeller, Schlingemann, & Stulz, 2005; Efendi, Srivastava, & Swanson, 2007; Marciukaityte & Varma, 2008; Chi & Gupta, 2009; Badertscher, 2011). Also studies based on surveys of chief financial officers of the biggest US companies confirm that one of the main

motivations for earnings management is "to influence stock price" (Dichev, Graham, Harvey, & Rajgopal, 2016).

Moeller et al. (2005) analyze the market's negative reaction to information about planned mergers and acquisitions. They identify a significant relation between the so called excess values of acquirers (based on Tobin's Q) and the losses following mergers and acquisitions. Furthermore, the transactions that caused the greatest losses were carried out by a small group of companies with the relatively highest values of Tobin's Q ratio.

Efendi et al. (2007) provide evidence on CEOs opportunism in an effort to support an overvalued stock price (in line with Jensen's theory of overvalued equity). They find that CEOs with substantial amounts of (in-the-money) options are more likely to issue financial statements with non-GAAP accounting irregularities.

Marciukaityte and Varma (2008), in turn, analyze market reactions to earnings-decreasing restatements. In general, their research suggests that in the case of companies which make significant restatements (of more than $100 million), the market's negative reaction is disproportionate to the correction shown. The study supports Jensen's hypothesis about expected extreme losses following restatements by overvalued companies.

Chi and Gupta (2009) directly measure the relationship between equity overvaluation and the scale of earnings management. To measure the scale of earnings management, they use the discretionary accruals (henceforth DACC) indicator, based on a modified version of the Jones model (Jones, 1991). They analyze the scale of overvaluation by decomposing the ratio of market value to book value in accordance with the model proposed by Rhodes-Kropf, Robinson, and Viswanathan (2005). The authors find a positive relation between these variables in the US market since the 1960s. Next they estimate long-term rates of return on the basis of the Jensen's alpha (the calendar-time portfolio approach), using the Fama-French three-factor model (Fama & French, 1993). They find a negative relation between the scale of earnings management and the long-term rate of return, which in itself is not a new discovery. Additionally, they demonstrate that among the most overvalued companies, those with high discretionary accruals underperform those with low discretionary accruals during the following year in terms of stocks' rates of return as well as operating performance measured with EBITDA-to-assets ratio.

Badertscher (2011) analyzes the US overvalued firms' choices of different earnings management types (mechanisms). First of all he presents evidence that the longer the firm is overvalued, the greater is the amount of total earnings management which supports Jensen's (2004, 2005) theory. He also finds that the choice of earnings management type is affected by the duration of overvaluation: managers engage in accrual-based earnings management (henceforth AM) in the early stages of overvaluation and then move to real transactions manage-

ment (henceforth RTM or RM). Finally, he observes that the longer a firm is overvalued, the more likely it is to engage in non-GAAP earnings management.

Studies conducted before Jensen's both papers also support his theory, though indirectly, at least in terms of the pressure that managers are under when trying to meet (or beat) capital market participants' expectations reflected in analysts' forecasts. A study by Degeorge, Patel, and Zeckhauser (1999) reveals that the distributions of reported quarterly earnings are asymmetric around certain thresholds, including the median of analysts' expectations, which suggests that earnings management takes place in order to meet or beat market expectations. Jensen (2004) refers directly to Degeorge et al.'s (1999) findings. He explains such behavior with research results, according to which the company is "rewarded" by the market with an extra bonus if it has achieved the expected results (thresholds). A study by Skinner and Sloan (2002) shows that otherwise companies are disproportionately severely "punished" by the market.

Misvaluation driven earnings management is observed not only in US setting. Studies conducted on other markets also reveal the relation between overvaluation and earnings management. In line with US evidence research conducted by Raoli (2013) on the sample of Italian listed companies documents that an increase in a firm's market value is associated with income-increasing earnings management. Tsai, Wu, and Chang (2012) in a study based on companies listed on Taiwan Stock Exchange reveal that overvaluation can induce various corporate financial decisions including earnings management.

On the basis of Jensen's (2004, 2005) theory and previous empirical research results we propose a hypothesis of *a positive relation between overvaluation of firms listed on the Warsaw Stock Exchange and the scale of their future earnings management*.

The rest of the paper is divided into four sections. In the first section we describe the data sources, introduce the methodology and explain the research design. The second section is devoted to research results. In the third section we provide corroborating analysis. The fourth section deals with robustness checks. The paper is closed with conclusions.

1. Data and research design

Sample description

Our research was based on an unbalanced panel of 356 non-financial companies listed on the Warsaw Stock Exchange between 2005–2015 (1,678 firm-year observations). The initial sample contained all listed companies with data available in Standard&Poors Capital IQ database. In order to calculate overvaluation and earnings management measures we excluded industries with relatively small firm representation (fewer than 15 companies per year).

Overvaluation measure

In our research we use a measure of overvaluation proposed by Rhodes-Kropf et al. (2005). Rhodes-Kropf et al. (henceforth RKRV) decompose the market to book ratio (M/B) into two components: market to "true"[3] value (M/V) and "true" value to book (V/B):

$$\textit{Market to book} \equiv \textit{Market to value} \cdot \textit{Value to book.} \tag{1}$$

The relation can be expressed in logarithms as:

$$m - b \equiv (m - v) + (v - b). \tag{2}$$

The first component ($m - v$) measures the discrepancy between market price (m) and "true" value and thus measures market misvaluation. The second component, the difference between "true" value and book value ($v - b$), measures growth opportunities of a firm. The first component can be further decomposed for any firm i in year t into two parts: firm-specific misvaluation and industry-wide misvaluation:

$$m_{i,t} - b_{i,t} = \left[m_{i,t} - v\left(\theta_{i,t};\alpha_{j,t}\right)\right] + \left[v\left(\theta_{i,t};\alpha_{j,t}\right) - v\left(\theta_{i,t};\alpha_{j}\right)\right] + \left[v\left(\theta_{i,t};\alpha_{j}\right) - b_{i,t}\right]. \tag{3}$$

The first term (firm-specific error – FIRM_ERR) is the difference between market value and fundamental value conditional on time t and industry j valuation effects: $m_{i,t} - v\left(\theta_{i,t};\alpha_{j,t}\right)$. It captures firm-specific deviations from fundamental value (contemporaneous industry-level valuation), because the v term captures all deviations common to an industry at a point in time.

The second component (IND_ERR): $v\left(\theta_{i,t};\alpha_{j,t}\right) - v\left(\theta_{i,t};\alpha_{j}\right)$ is a difference between time t fundamental value and the long-run industry-level value. The function $v\left(\theta_{i,t};\alpha_{j}\right)$ captures industry-specific valuation that does not vary over time. Thus the difference captures the valuation error caused by the deviation of contemporaneous industry-level valuation from the long-run industry-level valuation. Both components vary across firms and years because each component utilizes particular firm's accounting information that change over time. The sum of both components is treated as total valuation error (TOT_ERR).

To estimate both valuation models: $v\left(\theta_{i,t};\alpha_{j,t}\right)$ and $v\left(\theta_{i,t};\alpha_{j}\right)$ RKRV use industry-level, cross-sectional regressions of firm-level market equities on firm fundamentals: book value of equity, net income and financial leverage. In the

[3] We use the term "true" value to be consistent with the authors of the model but we make no distinction between this term and the term "intrinsic" value.

simplest version of the model only book value (*B, b*) is used as an explanatory variable of market value:

$$m_{i,t} = \alpha_{0j,t} + \alpha_{1j,t} \cdot b_{i,t} + \varepsilon_{i,t}. \tag{4}$$

To generate estimates of $v\left(\theta_{i,t};\alpha_{j,t}\right)$ and $v\left(\theta_{i,t};\alpha_{j}\right)$ RKRV use fitted values from the above equation:

$$v\left(B_{i,t};\hat{\alpha}_{0j,t};\hat{\alpha}_{1j,t}\right) = \hat{\alpha}_{0j,t} + \hat{\alpha}_{1j,t} \cdot b_{i,t}. \tag{5}$$

To get $v\left(\theta_{i,t};\overline{\alpha}_{j,t}\right)$ RKVR average over time $\hat{\alpha}_{0j,t}$ to obtain $\overline{\alpha}_{j}$:

$$v\left(B_{i,t};\overline{\alpha}_{0j};\overline{\alpha}_{1j}\right) = \overline{\alpha}_{0j} + \overline{\alpha}_{1j} \cdot b_{i,t}. \tag{6}$$

In the extensions of the basic model RKRV add net income and financial leverage as additional explanatory variables of market value. In our research we use the broadest version of RKRV model based on all three accounting measures: book value of equity, net income and leverage.

Earnings management measures

Proposing an unambiguous definition of the earnings management poses a great challenge, which is reflected in the diversity of definitions used in the literature (Ronen & Yaari, 2008, pp. 25-39). Generally, 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*" (Healy & Wahlen, 1999). This definition indicates two types of actions aimed at earnings management:

- real transactions actions, i.e. purposeful determination of deadlines for actions in the operating and investment activities (e.g. acceleration of sale, postponement of investment), which result in changes in both: cash flows and accruals;
- actions in the area of financial reporting, i.e. accrual-based earnings management which affects the reported profits, without any consequences for cash flows, resulting in the abnormal accruals in the financial reports.

It is worth to mention that US companies faced many substantial changes in the area of corporate governance, financial reporting and accounting in 2002 – after the passage of Sarbanes-Oxley Act (SOX). The main goal of SOX was to

strengthen investor protection by curbing fraudulent accounting and earnings management, after the wave of scandals, including Enron and WorldCom cases. SOX increased the transparency of financial reporting by improving audit oversight, increasing the independence of external auditors, and by forcing companies to issue annual reports on the effectiveness of internal control. Research studies revealed that SOX changed the mechanisms US companies use to manage earnings. Cohen, Dey, and Lys (2008) provide evidence that US companies switched from accrual-based to real earnings management methods after the passage of SOX. Real earnings management is supposed to be more costly, but is likely to be harder to detect.

To estimate the accrual-based earnings management we use the modified Jones model (Jones, 1991). The model was proposed by Jones to identify the US companies that managed earnings to report lower returns in order to get import reliefs from the US *International Trade Commission*. According to Jones' approach, the so-called *discretionary accruals (DACC)* are indicators of earnings management. They are defined as differences between the accruals actually observed for a given company and the expected (normal) values, which can be determined on the basis of the regression models estimated for a larger sample of companies.

In Jones' model *total accruals (TA)* as an dependent variable is correlated with the changes in the *revenues (REV)* and the value of *property, plant and equipment (PPE):*

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_i \frac{1}{A_{i,t-1}} + \beta_{1i} \frac{\Delta REV_{it}}{A_{i,t-1}} + \beta_{2i} \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}. \tag{7}$$

The parameters of the model, in which all the variables have been scaled to the value of total assets in the previous period (A_{t-1}), estimated using OLS regression (without any breakdown into industries), helped the author to determine the typical (normal) accruals level for average company. The differences between actually reported accruals and their level determined using the fitted values from proposed model testify to their discretionary character, which indicates manipulation of earnings. It should be emphasized that Jones' study was made on a relatively small sample – 23 companies representing five industries, and therefore the estimation of the coefficients of the model was made on the entire sample. The specification of Jones' model is usually slightly modified in line with the proposal of Dechow, Sloan, and Sweeney (1995): changes in sales are replaced with the differences between these changes and changes in receivables ($\Delta S - \Delta AR$).

Kothari, Leone, and Wasley (2005) propose performance-matched earnings management model based on Jones' model. They use the regression model to determine *abnormal accruals* for all companies in the industry to which the

company under analysis belongs. Then they divide these companies into quintiles in relation to the return on assets and they calculate medians of abnormal accruals for each group. They call the difference between *abnormal accruals* for a given company and the median *abnormal accruals* for the industry *performance-matched abnormal accruals*. In an alternative, simplified approach, they add return on assets, calculated as the ratio of current net income (*NI*) to the value of assets in the previous year (A_{t-1}), as an additional explanatory variable in the modified Jones' model. In our study this model was used to determine the level of abnormal accruals for each company in each year of the study.

$$\frac{TACC_{i,t}}{A_{i,t-1}} = \lambda_1 \frac{1}{A_{i,t-1}} + \lambda_2 \frac{\left(\Delta S_{i,t} - \Delta AR_{i,t}\right)}{A_{i,t-1}} + \lambda_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \lambda_3 \frac{NI_{i,t}}{A_{i,t-1}} \varepsilon_{i,t}. \quad (8)$$

The modified Jones model of discretionary accruals is often used by researchers for identifying and measuring so called within-GAAP earnings management. Badertscher (2011) uses different methods to identify and measure so called non-GAAP earnings management, concentrating on companies' restatements. In our study we focus only on within-GAAP earnings management.

To estimate real transactions earnings management we use the model proposed by Roychowdhury (2006). His research confirms – similarly to previous research by Burgstahler and Dichev (1997) – the discontinuity in the distribution of earnings reported by firms around zero level (unusually high frequencies of small positive income). The observations suggest that companies manipulate earnings to avoid losses. Contrary to previous studies, Roychowdhury concentrates not on the accrual based earnings management, but on real earnings management to avoid losses, which includes:

- sales manipulation (generating additional unsustainable sales through increased price discounts or more lenient credit terms and channel stuffing);
- reduction of discretionary expenditures (R&D expenditures, advertising, employee training, maintenance and travel expenses);
- overproduction, or increasing production to report lower COGS (with higher production levels, fixed overhead costs are spread over a larger number of units, lowering fixed costs per unit and thus lowering COGS).

All these actions contribute to artificially increased results reported by companies. Sales manipulation also leads to the drop in operating cash flow (CFO) but reduction of discretionary expenditures leads to their increase. Roychowdhury uses thus three separate proxies for real earnings management, all of which are scaled by firm size (sales or assets – current or lagged): CFO, production costs (COGS plus change in inventory) and discretionary expenditures (marketing, sales and general, R&D).

To find expected (normal) levels of all three proxies for RTM in a given firm Roychowdhury uses similar method as Jones (1991) to identify abnormal accru-

als. He uses regression analysis to build models describing a proxy (e.g. CFO) for a given industry in which the firm operates, separately for each year (industry-year models). "Normal" cash flows from operations are expressed as a linear function of sales and change in sales in the current period. To estimate the model, the following cross-sectional regression for every industry and year is used (similar models are built for production costs and discretionary expenditures):

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 \frac{1}{A_{i,t-1}} + \alpha_1 \frac{S_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}. \tag{9}$$

Abnormal levels of CFO (differences between actual levels and fitted values predicted by regression models) are treated as evidence of real earnings management by a given firm in a given year. Calculated abnormal CFO, production costs and discretionary expenditures are then used by Roychowdhury as dependent variables in a set of regressions to verify hypotheses about possible determinants of real earnings management. Roychowdhury finds that so-called *"suspect firm-years"* (firms with a relatively small positive earnings in a given year) have abnormal (lower than average) CFO, abnormal (lower than average) discretionary expenditures and abnormal (higher than average) production costs. He also finds that more indebted companies engage in RTM more, just as firms with higher MB ratios. On the contrary (but in line with expectations) he finds statistically strong evidence of a negative relation between the measures of real activities manipulation and institutional ownership.

In our research we also use all three proxies for RTM proposed by Roychowdhury (CFO, production costs and discretionary expenditures), however – due to the lacking data – we exclude R&D expenses from discretionary expenditures. Similarly to Badertscher (2011) we then use the sum of abnormal CFO (AbnCFO), abnormal production costs (AbnPROD) and abnormal discretionary expenditures (AbnDISEXP) as an overall proxy for RTM. Following Badertscher prior to summing, we multiply abnormal CFO and discretionary expenses by –1 so that higher levels of abnormal CFO and abnormal discretionary expenses proxy for higher levels of RTM. In case of abnormal production costs higher costs imply higher levels of RTM.

Research design

The study of the relation between the overvaluation level and the scale of earnings management was done using the fixed effects panel models. The research design was aimed to test the Jensen's hypothesis of agency costs of overvalued equity (Jensen, 2005), according to which overvaluation encourages managers to engage in earnings management. In order to identify the relation between the degree of overvaluation and the scale of earnings management, taking into account a number of control variables and time factor, the following regression model was used:

$$EARNINGS\ MANAGEMENT_{it} = f(TOT\_ERR_{it-1} + LR\_VB_{it-1} + \\ + Earnings\ Management\ Specific\ Control\ Variables + \\ + Corporate\ Governance\ Control\ Variables + \\ + General\ Control\ Variables + Fixed\ Firm\ Effects + \\ + Fixed\ Year\ Effects), \quad (10)$$

where: EARNINGS MANAGEMENT$_{it}$ represents, respectively, the total scale of earnings management (EM) and its components: the scale of accrual-based earnings management (AM) and real transactions management (RTM) for company *i* in time *t*. The level of equity overvaluation is proxied by the variable TOT_ERR LR_VB in turn approximates growth opportunities. The other variables include a set of control variables as well as firm and year fixed effects.

The dependent variables connected with earnings management and the basic explanatory variables related to market valuation (the scale of overvaluation and the level of growth opportunities) have been defined in the previous section. In the regression models additional control variables are taken into account, which, in light of previous empirical studies may affect the scale of earnings management (Badertscher, 2011; Chi & Gupta, 2009). Two variables were included in the group of control variables which are specific for the accrual-based earnings management: analysts' coverage measured with the number of market analysts who issue recommendations for a given company (AF) and the indicator variable for companies performing a seasoned equity offering (SEO). If more and more analysts issue recommendations for a company, the company is better monitored and its capability of distorting financial reports is restricted. In turn, when earnings are misreported (are higher than actual) for the purpose of SEO, the managers are able to raise capital at a relatively lower cost.

Nearly all studies on real earnings management confirm a strong negative correlation between the industry competitiveness degree, the company's market position and the risk of financial distress. With the growth of the competition level in the industry in which the company operates, possibilities of earnings management through interference into its operating activity get smaller. In the case of followers, the loss of the existing market position due to real type earnings management is usually more severe than in the case of market leaders. On the other hand, in the case of companies which face the threat of financial distress, real earnings management can increase the risk of bankruptcy. The competition intensity level in the industry was measured with Herfindahl index (HERF_INDX), the company's market position is proxied by its market share (MRK_SHR), and the companies threatened with financial distress have been identified by Altman's Z-score (DISTRESS).

The overall inclination to earnings management can be determined by the corporate governance mechanisms applied in companies. However, the mechanisms that are optimal for investor protection in one country could be subopti-

mal for companies in another. For example, Yasser and Al Mamun (2016) observed that in emerging markets audit committee is a less significant factor in corporate governance than suggested by many previous researchers. The results of studies on companies operating in other markets reveal that if a greater part of managers' remuneration is connected to the change of the stock price, the scale of earnings management is also greater. We control for managers stock-based compensation using a binary variable STOCK_COMP.

Nearly all studies confirm a strong relation between the scale of earnings management in the past and the present level of earnings management. Due to accruals reversals the flexibility in earnings management in the present period is restricted by the scale of earnings management in the previous periods. All accrual-based efforts are reflected in both the income statement and balance sheet. Therefore, the high level of balance sheet bloat is most often considered to be the reason for restricted flexibility in the manipulation of financial reports. In our study, we control for the flexibility in earnings management using a variable BLOAT. The variable was calculated as the difference between the net operating assets and their industry median. Apart from the degree of balance sheet bloat, also monitoring by the company auditor may decide about possible dimensions of earnings management. The extent and quality of the monitoring is usually connected with the auditor's experience and reputation. Binary variable BIGAUD represents all the companies which were audited by the Big 4/5/6 accounting firms.

Both types of earnings management can be aimed at the avoidance of loss reporting or at the desire to report the assumed earnings level. The results of studies conducted by other authors suggest that the motivation to exceed the so-called threshold values is a significant factor which explains the scale of earnings management. This was also reflected in control variables (variable MBE). Companies in which earnings per share (EPS) for a given year were higher than one of three possible threshold values, i.e. consensus of analysts, previous – year earnings and the zero value (slightly) were considered to be companies, which exceed the so-called threshold values.

Another group of control variables relates to return on equity, debt level and scale of operations. Earnings management is positively related to the return on equity (ROE). Companies, which permanently incur losses, are not really interested in earnings management. The debt level and the related motivation to avoid breach of the financial covenants are other factors which explain the scale of earnings management. This is represented by two variables: the debt level ratio calculated on the basis of the value of all financial liabilities (LEV) and the reversal of interest coverage ratio (IC). Alternatively, a negative relation between the debt level and the scale of earnings management can indicate the effect of monitoring by creditors. Large companies are the main object of interest of the majority of market players and in their case pressure to meet market expectations is greater than in the case of companies with a relatively small scale

of operations. At the same time, with the increase of the scale of operations, also the transparency of companies, broadly understood, is increased, which can significantly limit the possibilities of earnings management. The scale of operations has been measured by the natural logarithm of company assets (TA).

The last variable in the control variables group relates to the GDP growth rate (ΔGDP). Changes in the measures which approximate earnings management can be the result of changes in the overall economic situation and not due to intentional actions of company management; if a variable related to the overall economic condition were omitted from explanatory variables, wrong conclusions could be drawn.

Furthermore, in regression models related to accrual-based earnings management, variable RTM representing the scale of earnings management resulting from interference into the operations of the company has been included. A similar procedure was applied to the regression models related to real earnings management, where variable AM is used as one of the control variables. Results of the studies conducted to date on the relation between both types of earnings management are inconclusive. Some studies confirm the importance of institutional factors like market development, investor protection and legal origin in determining earnings management. Enomoto, Kimura, and Yamaguchi (2015) provide evidence that real earnings management is more often implemented to substitute for accrual-based earnings management in countries with stronger investor protection. Using cross-country data Francis, Hasan, and Li (2016) reveal that RTM increases (AM decreases) with country-level legal strength. With reference to developed markets, the substitution effect between both types of earnings management is pointed out; it is the consequence of the comparison of benefits and costs which characterize both mechanisms (Zang, 2012). But there are also studies about the emerging markets which show that both types of earnings management are used and that the relation between them is complementary (Chen, Huang, & Fan, 2012).

Apart from the variables discussed above, within the so-called corroborating analysis, a variable representing the presence of a large institutional investor in the company ownership structure was used. Monitoring by a large shareholder may significantly affect the way and scale of earnings management. Binary variable EXTMON takes value 1 for companies in which there is at least one institutional shareholder, who controls at least 5% of votes and 0 otherwise.

2. Empirical results

In order to identify possible relations between the level of overvaluation and the scale of earnings management, the entire sample was divided into quintiles – similarly to the study by Badertscher (2011) – based on the TOT_ERR measure. Subsequently, for each of the quintile portfolio, basic variables which represent

the scale of earnings managements, level of overvaluation and fundamental characteristics of companies, such as return on equity, debt level and scale of operation, were estimated. Basic variables for individual quintile portfolios are shown in Table 1. The table also shows statistics after an earlier winsorization of one percent of outliers (the 1st and 99th percentile being the border points).

Table 1. Characteristics of Quintile-Portfolios Formed by Total Valuation Error (TOT_ERR)

	Q1 (low TOT_ ERR)	Q2	Q3	Q4	Q5 (high TOT_ ERR)	All Firms	Q5- Q1 Diff.
Valuation Measures							
TOT_ERR	–0.037	–0.036	0.033	0.046	0.188	–0.091	0.225***
FIRM_ERR	–0.766	–0.285	0.017	0.339	0.932	–0.099	1.698***
IND_ERR	–0.730	–0.248	–0.016	0.294	0.722	–0.010	1.452***
General Firm Characteristics							
ROE	0.001	0.072	0.088	0.125	0.125	0.055	0.124***
LEV	0.148	0.124	0.108	0.132	0.185	0.130	0.038
TA	5.135	4.964	5.265	5.399	5.641	5.100	0.506**
Earnings Management Mechanisms							
EM	0.069	–0.080	–0.155	–0.105	–0.061	–0.102	–0.130***
AM	0.019	–0.011	–0.025	0.008	0.021	–0.004	0.002
RTM	0.050	–0.069	–0.129	–0.113	–0.082	–0.098	–0.132***
Firm-Years Obs.	339	334	332	334	339	1,678	

The table reports the equally-weighted average characteristics of quintile portfolios formed at the end of each year by Total Valuation Error (TOT_ERR). Results in the last but one column represent overall means. The last column shows differences in means between the top (Q5) and bottom (Q1) quintiles. Firm-years are the number of firm-years in each quintile and apply to all variables. A detailed description of the variables can be found in the Appendix. All continuous variables are winsorized at the 1st and the 99th percentiles.*, **, *** indicate that the observed difference between the extreme quintiles is significantly different from 0 at the 10%, 5%, and 1% levels, respectively (one-tailed).

The last column in Table 1 presents information on the differences between average values of individual variables for the extreme quintiles of the distribution (Q5 and Q1). In comparison with the companies in the bottom quintile (Q1), the companies in the top quintile (Q5) are characterized by a significantly higher level of TOT_ERR. Statistically significant differences are also found for components FIRM_ERR and IND_ERR. Moreover, if in the case of companies in quintiles Q3–Q5 we observe overvaluation, in the case of the

companies in the bottom quintile (Q1) and Q2 negative values of TOT_ERR indicate their undervaluation.

As expected, overvalued companies are characterized by a relatively higher return on equity. Interestingly, unlike the relations observed on developed markets, a greater level of overvaluation corresponds to a greater scale of operations. The statistical tests help to conclude that there are no significant differences in the debt level of overvalued and undervalued companies.

However, the most interesting conclusions from the analysis of the data presented in Table 1 relate to the values of EM, AM and RTM in the individual quintiles of distribution. The earnings management (EM) measure takes values ranging from –0.15 (Q3) to 0.07 (Q1), while its components range, respectively from –0.13 (Q3) to 0.050 (Q1) for RTM and –0.02 (Q3) to 0.02 (Q5) for AM. In the latter case, the observed differences between the top and the bottom quintiles are not statistically significant. Generally, the results of the analysis suggest that overvalued companies are characterized by a lower level of earnings management than undervalued companies. This situation is mainly due to the lower level of real earnings management.

The basic descriptive statistics for the sample are given in Table 2. An average company is not only undervalued but it is also characterized by a relatively low level of earnings management.

Table 2. Variable Distributions - Summary Statistics

	N	Mean	Median	St. Dev.	Quartile1	Quartile3
Earnings Management Mechanisms						
EM	1,678	–0.102	–0.083	0.432	–0.305	0.145
AM	1,678	–0.004	–0.008	0.116	–0.063	0.051
RTM	1,678	–0.098	–0.072	0.379	–0.268	0.111
Valuation Measures						
FIRM_ERR	1,678	–0.099	–0.128	0.708	–0.562	0.332
IND_ERR	1,678	–0.010	–0.032	0.623	–0.412	0.368
TOT_ERR	1,678	–0.091	–0.133	0.343	–0.322	0.115
LR_VB	1,678	0.203	0.216	0.542	–0.088	0.489
Earnings Management – Specific Control Variables						
AF	1,678	0.546	0.000	1.547	0.000	0.000
SEO	1,678	0.033	0.000	0.178	0.000	0.000
HERF_INDX	1,678	0.125	0.120	0.071	0.055	0.154
MRK_SHR	1,678	0.030	0.008	0.061	0.002	0.030
DISTRESS	1,678	0.513	1.000	0.500	0.000	1.000

cont. Table 2

Corporate Governance Control Variables						
STOCK_COMP	1,678	0.061	0.000	0.240	0.000	0.000
EXTMON	1,678	0.618	1.000	0.486	0.000	1.000
General Control Variables						
BLOAT	1,678	–0.002	0.000	0.291	–0.152	0.116
BIGAUD	1,678	0.247	0.000	0.431	0.000	0.000
MBE	1,678	0.563	1.000	0.496	0.000	1.000
ROE	1,678	0.055	0.073	0.299	0.014	0.149
LEV	1,678	0.130	0.097	0.139	0.023	0.187
IC	1,678	0.138	0.095	0.704	0.027	0.218
TA	1,678	5.100	5.136	1.722	4.060	6.221
ΔGDP	1,678	0.032	0.033	0.015	0.016	0.037

A detailed description of the variables can be found in the Appendix. All continuous variables are winsorized at the 1st and the 99th percentiles.

Probable differences between overvalued and undervalued companies in earnings management can be the result of the characteristics of the industry to which a given company belongs. The results of the studies conducted to date on other markets (mainly the US market) suggest that increased earnings management level occurs in companies from high litigation risk industries (Francis, Philbrick, & Schipper, 1994). If financial forecasts are not met, some investors treat that as manifestation of misleading, which can be the basis for lawsuits and damage actions. Table 3 shows industry distribution of sample companies.

Table 3. Industry Distribution of Sample Firm-Years per 4 – Digit Global Industry Classification Standard Code

Industry	4 GICS Code	Firm-Years				
		All Firms	Overvalued Firms	% of Overvalued Firms	Extreme Overvalued Firms	% of Extreme Overvalued Firms
Materials	1510	313	166	53%	88	28%
Capital Goods	2010	594	247	42%	95	16%
Commercial and Professional Services	2020	78	30	38%	15	19%
Consumer Durables and Apparel	2520	175	68	39%	42	24%
Retailing	2550	55	21	38%	17	31%

cont. Table 3

Food, Beverage and Tobacco	3020	164	62	38%	26	16%
Healthcare Equipment and Services	3510	37	22	59%	10	27%
Software and Services	4510	202	78	39%	36	18%
Technology Hardware and Equipment	4520	60	23	38%	10	17%
Total		**1,678**	**717**	**43%**	**339**	**20%**

Firm-years in the "Overvalued Firms" column represent the number of firm-years with Total Valuation Error higher than zero in each industry. Firm-years in the „Extreme Overvalued Firms" column represent the number of firm-years in the top (Q5) quintile of Total Valuation Error respectively (TOT_ERR).

It follows from Table 3 that most of the sampled companies are in the Capital Goods industry – approx. 35%. Nearly every second company in the sample is overvalued; there are more overvalued companies in two industries: Healthcare Equipment and Services and Materials. In the extreme overvalued firms group, companies in the Capital Goods and Materials industries are dominant. Their total share in the extreme overvalued firms group is over 50%. It should also be emphasized that companies in industries, which are particularly exposed to the litigation risk (Retailing, Software and Services and Technology and Technology Hardware and Equipment), constitute nearly 20% of the entire sample[4]. As regards the overvalued companies group (irrespective of the extent of overvaluation), the share is comparable. Probable impact of litigation risk on the scale of earnings management was taken into account in the regression models into which fixed effects for firms have been incorporated.

Table 4 presents results of panel regression related to the relations between the degree of overvaluation and the scale of earnings management. The models differ with respect to the definition of dependent variable and pertain to, respectively, total level of earnings management (EM), accrual-based earnings management (AM) and real transactions earnings management (RTM). The analysis of the results of the regression model estimations, in which EM is the dependent variable, reveal a negative relation between the overvaluation level and the scale of earnings management (Panel A of Table 4.). The coefficient on variable TOT_ERR, which represents the overvaluation level, is minus 0.028, however it is not statistically significant. On the other hand, the negative, statistically significant relation between variable LR_VB and EM suggests that earnings management decreases with companies' growth opportunities. From among control variables only the coefficients of the variables, which character-

[4] Biotechnology, computers, electronics and retail are the industries which are particularly expose to the litigation risk (Francis et al., 1994).

ize seasoned equity offering (SEO), industry competition level (HERF_INDX), risk of financial distress (DISTRESS), the degree of balance sheet bloat (BLOAT) and the debt level (LEV) are statistically significant. In the case of variables SEO, BLOAT and LEV we can observe their significant (positive) relation to the scale of total earnings management, while in the case of the other variables their relation to EM is negative. Basically, the direction of relations between the control variables and the total level of earnings management corresponds to the expectations, with BLOAT variable being an exception. A positive relation between the flexibility variable in accrual-based earnings management and EM can be the result of the relation of complementarity between accrual-based earnings management and real transactions earnings management specific for emerging markets.

Table 4. Regression Results of Total Earnings Management, Accruals Management, and Real Transactions Management on Valuation Errors as the Proxy for Overvaluation

	EM		**AM**		**RTM**	
	Coefficient	T- statistic	Coefficient	T- statistic	Coefficient	T- statistic
Panel A.						
Intercept	−0.224	−0.460	−0.006	−0.040	−0.167	−0.553
Valuation Measures						
TOT_ERR	**−0.028**	**−1.007**	**0.019****	**2.498**	**−0.053*****	**−2.880**
LR_VB	−0.107***	−3.687	0.007	0.882	−0.083***	−4.145
Earnings Management – Specific Control Variables						
AF	−0.003	−0.281	0.005	1.584	X	X
SEO	0.143**	2.428	0.021	1.109	X	X
HERF_INDX	−0.888*	−1.646	X	X	−0.944**	−2.367
MRK_SHR	0.956	1.604	X	X	0.497	0.905
DISTRESS	−0.058**	−2.119	X	X	−0.067***	−3.445
Corporate Governance Control Variables						
STOCK_ COMP	−0.065	−1.594	0.032*	1.706	−0.100**	−2.253
General Control Variables						
RTM	X	X	0.225***	12.23	X	X
AM	X	X	X	X	1.036***	15.18
BLOAT	0.174***	2.603	0.115***	4.469	−0.085**	−2.072
BIGAUD	−0.036	−1.047	−0.015	−1.110	0.002	0.080
MBE	−0.005	−0.269	0.013**	2.533	−0.024*	−1.961
ROE	−0.036	−0.623	−0.015	−1.213	−0.008	−0.217

cont. Table 4

LEV	0.314**	2.117	−0.011	−0.252	0.223**	2.214
IC	−0.001	−0.116	0.003	0.743	−0.006	−0.691
TA	−0.038	−0.726	−0.006	−0.407	−0.014	−0.439
ΔGDP	12.620	1.152	2.252	0.571	7.319	1.124
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	1,678		1,678		1,678	
Adjusted R^2	0.115		0.319		0.329	
Panel B.						
Intercept	−0.217	−0.431	−0.017	−0.106	−0.139	−0.447
Valuation Measures						
FIRM_ERR	**−0.029**	**−1.020**	**0.020****	**2.569**	**−0.056*****	**−2.967**
IND_ERR	**−0.022**	**−0.457**	**0.013**	**0.921**	**−0.036**	**−1.085**
LR_VB	−0.107***	−3.595	0.006	0.788	−0.081***	−3.963
Control Variables	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	1,678		1,678		1,678	
Adjusted R^2	0.115		0.319		0.329	

Results are derived from fixed effects panel models. A detailed description of the variables can be found in the Appendix. T-statistics are adjusted for heteroskedasticity and firm-level clustering using Arellano estimator. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level, respectively.

Since the relation between overvaluation and total earnings management is the resultant of relations which characterize individual mechanisms, in the next step we estimated separate regression models for accrual-based earnings management and real type earnings management. A positive and statistically significant value of the coefficient on variable TOT_ERR in the model in which AM is the dependent variable means that as the degree of firms overvaluation increases, the scale of earnings management also increases. The result is consistent with Jensen's hypothesis of "agency costs of overvalued equity", according to which firms overvaluation encourages managers to engage in accrual-based earnings management (confirmed also by previous studies).

As regards control variables, it is worth drawing attention to the positive sign of the coefficients on variable STOCK_COMP. In line with the results obtained by other authors, the relation between the stock based incentives and market valuation of companies may induce managers to distort financial reports of the companies which they manage. In turn, a positive relation between real earnings management (RTM) and accrual-based earnings management (AM) indicates the complementarity of both mechanisms. In other words, unlike in the developed markets, managers in the emerging markets use different methods of earnings management at the same time. Another interesting observation concerns variable MBE. The accrual-based earnings management is used by the companies, which are under the pressure of meeting or beating benchmarks.

However, the most interesting conclusions can be drawn from the analysis of the coefficient sign on variable TOT_ERR in RTM regression model. A statistically significant negative relation suggests that firm overvaluation contributes to the reduction of the scale of real operations leading to earnings management. At the same time, as was expected, the signs of the coefficients on control variables STOCK_COMP and MBE are opposite in relation to the signs at relevant coefficients in the regression model related to accrual-based earnings management. Interference into the operations of the company in the long run leads to the reduction in their value and, consequently, the remunerations of the managers related to market valuation of companies are also reduced. It is not surprising that companies which aim at exceeding the so-called threshold values use the real mechanisms of earnings management to a little extent. Unlike interference into the financial reports which can be done temporarily, interference into company operations must be planned well in advance, which makes the possibility of meeting the current expectations of market participants more difficult. The negative sign of the coefficient on variable BLOAT is also in line with the expectations. The scale of real earnings management is greater when the flexibility in accrual-based earnings management is smaller.

In Panel B of Table 4 the overvaluation measure (TOT_ERR) was decomposed into two components: FIRM_ERR and IND_ERR. In line with the RKRV model overvaluation or, more broadly, misvaluation of the company can be the result of: misvaluation against other companies in the industry or current misvaluation of the industry in relation to its value in the long term. As the results of the regression models in Panel B of Table 4 reveal, the relations between overvaluation and the scale of earnings management observed earlier relate to the FIRM_ERR component (in the case of variable IND_ERR the values of the coefficients are not statistically significant). This means that when a decision is made on the scale and mechanism of earnings management, managers usually are guided by the current deviations from the valuation of other companies in the industry.

3. Corroborating analysis

The results of the relation between overvaluation and real transactions management (RTM) are different than the results of previous studies on the developed markets (mainly in the US). The results of studies conducted by Badertscher (2011) indicate that overvalued companies first manipulate financial reports and subsequently, having used all available possibilities, manage earnings through interference into business operations. Therefore, it is surprising that the relation between overvaluation and real transactions earnings management is negative.

It seems, however, that this state of affairs can be explained by the results of studies on the relation between overvaluation and the stock crash risk. Liao (2013) has shown that stock crash is often preceded by earnings management due to overvaluation of company stock. Moreover, in the case of companies, which apply real earnings management, the strength of the relation is greater than in the case of companies, which apply accrual-based earnings management.

From the point of view of a single investor, negative consequences of stock crash are more painful when his stake in the ownership structure of the company threatened with stock crash is higher. At the same time, the greater the involvement of the investor, the more interested the investor is in the reduction of the scale of all operations which could harm him. Shleifer and Vishny (1986, 1997) argue that only a large investor, because of the scale of monitoring benefits, has sufficient motivation to gather information and control company managers. Monitoring and disciplining managers rather than focusing on short term profits should help make the company strategy consistent with the long term aim of company value maximization. Hu, Lin, and Lai (2016) provide evidence of a negative relation between institutional investors shareholding and earnings management in overvalued US companies. However, the efficiency of external monitoring in mitigating earnings management activities depends on the type of institutional investors (Kim, Miller, Wan, & Wang, 2016; Lel, 2016).

In the context of the studies, a large institutional investor can be considered to be particularly interested in and, at the same time, capable of reducing agency costs of overvalued equity. In our study, presence of an institutional investor controlling at least 5% of votes is represented by binary variable EXTMON. Table 5 shows estimation results of regression models, which take into account the effect of monitoring by institutional investor. In order to define the role of the large institutional investor for the scale and method of earnings management in overvalued companies, the so-called interactive variables have been used; they combine the scale of company overvaluation with the presence of a large institutional investor in its ownership structure. This procedure helps to compare the scale of earnings management in overvalued companies,

monitored by the institutional investor against the overvalued companies in which the monitoring effect does not exist, and, at the same time, against non-overvalued companies.

A positive and statistically significant value of the coefficient on variable TOT_ERR, in the model in which AM variable is the dependent variable, means that absence of a large institutional investor in ownership structure of overvalued companies favors accrual-based earnings management. The values of the coefficients on the binary variable which identifies a large institutional investor designate the difference between average value of earnings management in non-overvalued companies, monitored and non-monitored by the institutional investor. As the results of the regression models reveal, they are insignificant.

Finally, the most important conclusions can be drawn from the analysis of the sign of the coefficient on the interactive variable (TOT_ERR × EXTMON). In all the models this coefficient is negative, although in the model in which AM is the dependent variable, it is statistically insignificant. This means that in overvalued companies an external monitoring by an institutional investor limits the level of real earnings management. It is the most crucial conclusion drawn from our study.

Table 5. Regression Results of Total Earnings Management, Accruals Management, and Real Transactions Management on Total Valuation Error as the Proxy for Overvaluation – The Effect of External Monitoring

	EM		**AM**		**RTM**	
	Coefficient	T- statistic	Coefficient	T- statistic	Coefficient	T- statistic
Intercept	−0.187	−0.379	−0.005	−0.030	−0.147	−0.485
Valuation Measures and External Monitoring						
TOT_ERR	**0.020**	**0.498**	**0.020****	**2.076**	**−0.0259**	**−1.021**
EXTMON	**0.020**	**0.724**	**−0.005**	**−0.528**	**0.021**	**1.096**
TOT_ERR* × *EXTMON	**−0.086****	**−2.108**	**−0.003**	**−0.272**	**−0.048****	**−2.035**
LR_VB	−0.111***	−3.904	0.007	0.871	−0.085***	−4.331
Earnings Management - Specific Control Variables						
AF	−0.002	−0.198	0.005	1.603	X	X
SEO	0.150**	2.521	0.021	1.136	X	X
HERF_INDX	−0.845	−1.531	X	X	−0.921**	−2.302
MRK_SHR	1.0628*	1.786	X	X	0.562	1.036
DISTRESS	−0.058**	−2.185	X	X	−0.067***	−3.506

cont. Table 5

Corporate Governance Control Variables						
STOCK_ COMP	−0.067*	−1.670	0.032*	1.708	−0.101**	−2.271
General Control Variables						
RTM	X	X	0.225***	12.35	X	X
AM	X	X	X	X	1.029***	15.65
BLOAT	0.170**	2.574	0.115	4.462***	−0.085**	−2.076
BIGAUD	−0.036	−1.048	−0.015	−1.127	0.002	0.084
MBE	−0.005	−0.290	0.013**	2.492	−0.024**	−1.980
ROE	−0.035	−0.619	−0.014	−1.200	−0.007	−0.205
LEV	0.324**	2.247	−0.012	−0.264	0.229**	2.307
IC	−0.003	−0.236	0.003	0.717	−0.006	−0.743
TA	−0.045	−0.868	−0.005	−0.377	−0.019	−0.605
ΔGDP	12.146	1.089	2.220	0.560	7.068	1.079
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	1,678		1,678		1,678	
Adjusted R^2	0.122		0.319		0.333	

Results are derived from fixed effects panel models. A detailed description of the variables can be found in the Appendix. T-statistics are adjusted for heteroskedasticity and firm-level clustering using Arellano estimator. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

4. Robustness checks

The estimated regression models may be biased because of the wrong identification of overvalued companies. In line with Jensen's theory, the problem of agency costs pertains mainly to substantially overvalued firms. Therefore, in robustness tests (Table 6), instead of continuous variable TOT_ERR binary variable OVER was used, which identifies all the companies for which the value of variable TOT_ERR in a given year was in the top quintile of its distribution. These companies in Table 3 have been classified as "Extreme Overvalued Firms".

Table 6. Regression Results of Total Earnings Management, Accruals Management, and Real Transactions Management on Extreme Overvalued Equity

	EM		**AM**		**RTM**	
	Coefficient	T- statistic	Coefficient	T- statistic	Coefficient	T- statistic
Intercept	−0.325	−0.692	−0.040	−0.244	−0.167	−0.592
Valuation Measures						
OVER	**0.003**	**0.103**	**0.022****	**2.428**	**−0.037****	**−2.055**
Earnings Management - Specific Control Variables						
AF	−0.005	−0.494	0.006	1.596	X	X
SEO	0.146**	2.485	0.022	1.171	X	X
HERF_INDX	−0.908	−1.620	X	X	−0.949**	−2.293
MRK_SHR	1.159*	1.899	X	X	0.652	1.134
DISTRESS	−0.052*	−1.952	X	X	−0.059***	−3.074
Corporate Governance Control Variables						
STOCK_COMP	−0.084**	−2.024	0.032*	1.716	−0.115**	−2.482
General Control Variables						
RTM	X	X	0.224	12.20	X	X
AM	X	X	X	X	1.044***	15.57
BLOAT	0.212***	3.282	0.112***	4.505	−0.056	−1.513
BIGAUD	−0.032	−0.886	−0.015	−1.109	0.005	0.176
MBE	−0.014	−0.738	0.013***	2.659	−0.031**	−2.515
ROE	−0.029	−0.511	−0.012	−1.029	−0.007	−0.181
LEV	0.237*	0.143	−0.007	−0.161	0.165*	1.709
IC	−0.001	−0.084	0.003	0.707	−0.005	−0.628
TA	−0.012	−0.241	−0.006	−0.463	0.002	0.073
ΔGDP	11.320	10.028	3.242	0.800	4.652	0.774
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	1,678		1,678		1,678	
Adjusted R^2	0.102		0.318		0.317	

Results are derived from fixed effects panel models. A detailed description of the variables can be found in the Appendix. T-statistics are adjusted for heteroskedasticity and firm-level clustering using Arellano estimator. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

The estimation results of the regression models in Table 6 basically revealed very good correspondence with the results obtained for the basic measure of the company overvaluation. The values and signs of the coefficients on the variables which represent the status of overvalued company (OVER) indicate that overvaluation is positively (negatively) correlated with the scale of accrual-based management (real earnings management).

Apart from the problem of inprecise measurement of the key explanatory variable, robustness tests also focused on the so-called problem of reverse causality. Jensen's theory provides that overvaluation affects the scale of earnings management. The direction of the relation, however, can have an entirely different character. We cannot exclude that the earnings management activities are one of possible reasons for company overvaluation.

The method of instrumental variables is a popular solution to the problem of reverse causality in empirical finance studies. The method requires a separate estimation of the equation in which the variable suspected to be endogenous (here: TOT_ERR) is explained with instruments and other exogenous variables. In the second stage, the fitted value of TOT_ERR (estimated as the dependent variable in the first stage) must be used as an explanatory variable instead of the basic explanatory variable in the original regression model. This procedure is synonymous with the 2SLS – two stage least squares method.

The selection of the instruments is not easy. In our study, these should be variables correlated with variable TOT_ERR, and, at the same time, non-correlated with an unobservable random component. In practice, it is extremely difficult to find such variables in their pure form. Moreover, instruments, which poorly explain the endogenous variable (weak instruments) can be the reason of many additional problems. Being aware of the dangers connected with the finding of the right instruments, following other authors (e.g. Badertscher, 2011), company participation in mergers and acquisitions as an acquiring company in the last three years has been used as the instrumental variable (MA3Y). The results of the regression model in the second stage of 2SLS are presented in Table 7.

Although F statistics which tests instrument weakness are at a level lower than 10 in two of three models, they are sufficiently high to assume that even if the endogenous character is taken into account, it does not affect the conclusions on the impact of overvaluation on the scale of earnings management. At the same time, it must be emphasized that in the case of the variable, which represents overvaluation, in the model in which AM is the dependent variable, the sign of the coefficient is negative, but it is not statistically significant. In the case of the other models the signs of the coefficients on variable TOT_ERR are the same as in the case of panel regression models.

Table 7. Second Stage of Two-Stage Least Squares with Total Valuation Error as the Proxy for Overvaluation

	EM		**AM**		**RTM**	
	Coefficient	T- statistic	Coefficient	T- statistic	Coefficient	T- statistic
Intercept	0.794	1.361	0.123	1.124	0.314	0.921
Valuation Measures						
TOT_ERR	**−0.597****	**−2.296**	**−0.026**	**−0.468**	**−0.349****	**−2.515**
LR_VB	−0.445***	−2.760	−0.020	−0.567	−0.257***	−3.045
Earnings Management - Specific Control Variables						
AF	0.009	0.608	0.006	1.623	X	X
SEO	0.152**	2.123	0.021	1.027	X	X
HERF_INDX	−1.069	−1.492	X	X	−1.026**	−2.221
MRK_SHR	0.455	0.501	X	X	0.288	0.473
DISTRESS	−0.141**	−2.483	X	X	−0.110***	−3.354
Corporate Governance Control Variables						
STOCK_ COMP	−0.070	−1.381	0.031*	1.647	−0.101**	−2.134
General Control Variables						
RTM	X	X	0.219***	10.53	X	X
AM	X	X	X	X	1.089***	11.74
BLOAT	−0.106	−0.710	0.096***	2.927	−0.236**	−2.483
BIGAUD	−0.013	−0.306	−0.016	−1.112	0.018	0.531
MBE	0.020	0.785	0.015**	2.421	−0.012	−0.749
ROE	0.019	0.230	−0.008	−0.500	0.022	0.450
LEV	0.809***	2.734	0.029	0.479	0.470***	2.826
IC	−0.006	−0.363	0.003	0.541	−0.008	−0.846
TA	−0.167	−1.598	−0.018	−0.949	−0.075	−1.268
ΔGDP	−2.296	−0.674	−0.730	−0.679	0.249	0.105
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	1,678		1,678		1,678	
Adjusted R^2	0.349		0.230		0.634	
Weak instrument test (first stage F –statistics)	7.957		11.190		8.388	

Results are derived from two-stage least squares models. Reported are the second stage regression results of earnings management measures on predicted Total Valuation Error and the controls. We treat Total Valuation Error as endogenous. In the first-stage, we regress Total Valuation Error on the included control variables as well as the excluded instrument: engagement in an acquisition in prior three years. A detailed description of the variables can be found in the Appendix. T-statistics are adjusted using Arellano estimator.***, ** and * indicate significance on the 1%-, 5%- and 10%-level respectively.

Conclusions

This study tests Jensen's (2005) agency theory of overvalued equity. Specifically, we analyze relations between equity overvaluation and various types of earnings management. Jensen (2005) predicts that equity overvaluation could induce managers to engage in activities that can sustain the inflated stock price in the short run but can destroy shareholder value in the long run. We provide evidence partially consistent with this reasoning. Specifically, we provide evidence that overvaluation intensifies income-increasing accrual earnings management activities. However, we also find that overvalued firms are not accompanied by high real transactions management activities.

Equity overvaluation is thought to create the potential for managerial misbehavior, while monitoring and corporate governance curb misbehavior. We combine these two insights from the literature on misvaluation and governance to uncover whether governance can counter managerial involvement in real transactions earnings management caused by overvaluation. Specifically, we provide consistent evidence that institutional shareholders holding a large amount of stock mitigate real earnings management behavior, which suggests that these institutions are interested in long-term performance and act as monitors.

Collectively, our results complement earnings management literature which suggests that overvaluation is an important determinant of earnings management decisions. Our findings provide a further understanding of the impact of real/accruals-based earnings management on manager's earnings reporting decisions outside the United States and other Anglo-Saxon countries. To our knowledge this is the first study which suggests that within emerging markets conventional governance mechanisms like external monitoring executed by large institutional investors are able (to some extent) to mitigate the agency costs of overvalued equity.

Several studies confirm that institutional investors are not a homogenous group of investors and that it is important to distinguish them by investment objective, risk preferences, ownership etc. As these factors determine divergent monitoring incentives and ability to exert influence on earnings management, it is important to adequately identify and classify institutional investors into

different types based on the characteristics which have different agency cost outcomes. This provides fruitful opportunities for future research.

Like all empirical studies, our paper has limitations, which also provide opportunities for future research. Firstly, although the models we use are accepted in accounting and finance research they all have weaknesses. For example, how well the earnings management measures capture earnings management behavior depends on the accuracy of measurement of discretionary accruals. Moreover, the research design we use cannot precisely differentiate firms' real behavior and normal decision making. Activities considered as real earnings management may be managers' response to economic circumstances. The design incorporating an industry average based on more detailed industry classification levels can alleviate this limitation.

Secondly, the sample selected to test the models described above may face limitations, such as missing data in the earlier years and uneven distribution of firms across industries. As mentioned before, in order to calculate overvaluation and earnings management measures we excluded industries with less than 15 companies per year. Alternative research design focusing on earnings restatement, rather than regressions models and fitted values methodology, could provide more insight on the topic.

Finally, our study focuses on Poland's institutional setting. The Polish economy is relatively less dependent on the stock market. Majority of public listed companies is controlled by insiders and banks are main external financing providers for this firms. Moreover, informal channels are used as a basic tool to resolve the asymmetric information problems between insiders and banks. As a consequence, there is a limited incentive to provide highest quality public information. This means that our results may be biased toward more transparent or more stock market dependent firms. Because of different institutional setting and regulatory environment, we cannot generalize our results to all the other emerging markets.

Nevertheless, despite above described limitations we think that our findings shed light on the earnings management game in bank-based emerging economy. Our study calls for deeper research of misvaluation driven earnings management in emerging markets.

Appendix – variable definitions

Variable	Variable definition
Earnings Management Variables	
EM	sum of AM and RTM. The larger the amount of EM the more likely the firm is engaging in earnings management
AM	amount of accruals management derived from the performance-adjusted modified Jones model for year t. The modified Jones model is estimated for each 4 – Digit GICS industry and year group. The larger the amount of AM, the more likely the firm is engaging in accruals management. See Kothari et al. (2005) for complete details
RTM	amount of real transactions management, which is the sum of AbnDISEXP, AbnCFO, and AbnPROD for year t. DISEXP equals selling, general, and administrative expenses. Each component of RTM is estimated for each 4 – Digit GICS industry and year group. Prior to summing, AbnDISEXP, AbnCFO are multiplied by –1 so that higher levels of the variables proxy for higher levels of RTM. The larger the amount of RTM, the more likely the firm is engaging in real transactions management. See Roychowdhury (2006) for complete details
Valuation Measures	
FIRM_ERR	the difference between the market valuation and the valuation implied by contemporaneous industry-level valuation multiples for year t–1. The FIRM_ERR is estimated for each 4 – Digit GICS industry and year group. See Rhodes–Kropf et al. (2005) for complete details
IND_ERR	the difference between the valuation implied by contemporaneous industry-level valuation multiples and the valuation implied by long-run industry-level valuation multiples for year t-1. The IND_ERR is estimated for each 4 – Digit GICS industry and year group. See Rhodes–Kropf et al. (2005) for complete details
TOT_ERR	sum of the firm-specific valuation error and the industry-level valuation error
LR_VB	the difference between the valuation implied by long-run industry-level valuation multiples and the book value. The LR_VB is estimated for each 4 – Digit GICS industry and year group. See Rhodes–Kropf et al. (2005) for complete details
Earnings Management - Specific Control Variables	
AF	number of analysts following the firm in year t–1
SEO	= 1 if the firm engaged in a seasoned equity offering in year t, 0 otherwise
HERF_INDX	sum of the squared share of each company's sales to total sales in the same 4-digit GICS industry in year t-1. HERF_INDX ranges from 0 (perfect competition) to 1 (pure monopoly)
MRK_SHR	percentage of a company's sales to total 4-digit GICS industry in year t–1
DISTRESS	= 1 if a firm's Altman Z-score (Altman, 1968) is less than 2.675 in year t-1, and 0 otherwise. The Z-score is calculated following a modified version of Altman's Z-score that proxies for a firm's financial condition. Specifically, Z-score = 3.3(Net Income/Assets) + 1.0(Sales/Assets) + 1.4(Retained Earnings/Assets) + 1.2(Working Capital/Assets) + 0.6(Stock Price x Shares Outstanding)/Total Liabilities

Corporate Governance Control Variables	
STOCK_ COMP	= 1 if the firm used stock based compensation (options, restricted stock etc.) in year t-1, 0 otherwise
EXTMON	= 1 if the percentage of shares hold by the biggest institutional owner is more than 5% in year t-1, 0 otherwise
General Control Variables	
BLOAT	amount of balance sheet bloat. Balance sheet bloat as net operating assets in year t divided by total sales at the end of year t-1. Net operating assets are equal to operating assets minus operating liabilities. Operating assets equal total assets minus cash and short-term investments. Operating liabilities equal total assets minus short-term debt minus long-term debt minus minority interest minus preferred stock minus common equity. BLOAT is equal to the firm-specific balance sheet bloat minus the industry median balance sheet bloat
BIGAUD	= 1 if the firm is audited by a Big 4/5/6 auditor in year t, 0 otherwise
MBE	= 1 if the firm just meets or beats zero earnings forecasts or last –year earnings or analyst forecast consensus in year t–1, 0 otherwise. Just beating/meeting the zero benchmark are firm-years with earnings before extraordinary items over lagged total assets between 0 and 0.5 percent
ROE	return on equity for year t -1 computed as net income for year t-1 divided by the year t–1 average book equity
LEV	leverage ratio, calculated as short-term debt plus long-term debt in year t, scaled by total assets in year t–1
IC	inverse of the firm's interest coverage ratio, calculated as interest expense in year t, divided by operating income before depreciation in year t–1
TA	natural log of total assets in year t–1
ΔGDP	percent change in the real gross domestic product from year t

References

Altman, E.I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, *23*(4), 589-609.

Badertscher, B.A. (2011). Overvaluation and the choice of alternative earnings management mechanisms. *The Accounting Review*, *86*(5), 1491-1518. doi:10.2308/accr-10092

Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics*, *24*(1), 99-126.

Chen, C.-L., Huang, S.-H., & Fan, H.-S. (2012). Complementary association between real activities and accruals-based manipulation in earnings reporting. *Journal of Economic Policy Reform*, *15*(2), 93-108. doi:10.1080/17487870.2012.667965

Chi, J., & Gupta, M. (2009). Overvaluation and earnings management. *Journal of Banking & Finance*, *33*(9), 1652-1663. doi:10.1016/j.jbankfin.2009.03.014

Cohen, D.A., Dey, A., & Lys, T.Z. (2008). Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. *The Accounting Review*, *83*(3), 757-787. doi:10.2308/accr.2008.83.3.757

Dechow, P.M., Sloan, R.G., & Sweeney, A.P. (1995). Detecting earnings management. *Accounting Review*, *70*(2), 193-225.

Degeorge, F., Patel, J.S., & Zeckhauser, R.J. (1999). Earnings management to exceed thresholds. *Journal of Business Finance & Accounting*, *72*(1), 1-33.

Dichev, I., Graham, J., Harvey, C.R., & Rajgopal, S. (2016). The misrepresentation of earnings. *Financial Analysts Journal*, *72*(1), 22-35. doi:10.2469/faj.v72.n1.4

Efendi, J., Srivastava, A., & Swanson, E.P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, *85*(3), 667-708. doi:10.1016/j.jfineco.2006.05.009

Enomoto, M., Kimura, F., & Yamaguchi, T. (2015). Accrual-based and real earnings management: an international comparison for investor protection. *Journal of Contemporary Accounting & Economics*, *11*(3), 183-198. doi:10.1016/j.jcae.2015.07.001

Fama, E.F., & French, K.R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3-56.

Francis, B., Hasan, I., & Li, L. (2016). A cross-country study of legal-system strength and real earnings management. *Journal of Accounting and Public Policy*, *35*(5), 477-512. doi:10.1016/j.jaccpubpol.2016.06.004

Francis, J., Philbrick, D., & Schipper, K. (1994). Shareholder litigation and corporate disclosures. *Journal of Accounting Research*, *32*(2), 137-164.

Healy, P.M., & Wahlen, J.M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, *13*(4), 365-383.

Hu, S.-Y., Lin, Y.-H., & Lai, C.W. (2016). The effect of overvaluation on investment and accruals: The role of information. *Journal of Empirical Finance*, *38*, 181-201. doi:10.1016/j.jempfin.2016.06.004

Jensen, M.C. (2004). The agency costs of overvalued equity and the current state of corporate finance. *European Financial Management*, *10*(4), 549-565. doi:10.1111/j.1354-7798.2004.00265.x

Jensen, M.C. (2005). Agency costs of overvalued equity. *Financial Management*, *34*(1), 5-19. doi:10.1111/j.1755-053X.2005.tb00090.x

Jones, J.J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, *29*(2), 193-228.

Kim, I., Miller, S., Wan, H., & Wang, B. (2016). Drivers behind the monitoring effectiveness of global institutional investors: Evidence from earnings management. *Journal of Corporate Finance*, *40*, 24-46. doi:10.1016/j.jcorpfin.2016.06.006

Kothari, S.P., Leone, A.J., & Wasley, C.E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, *39*(1), 163-197. doi:10.1016/j.jacceco.2004.11.002

Lel, U. (2016). The role of foreign institutional investors in restraining earnings management activities across countries. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2223651

Liao, Q. (2013). *Overvaluation and stock price crashes: the effects of earnings management* (*PhD Thesis*). University of Texas at Arlington.

Marciukaityte, D., & Varma, R. (2008). Consequences of overvalued equity: evidence from earnings manipulation. *Journal of Corporate Finance*, *14*(4), 418-430. doi:10.1016/j.jcorpfin.2008.05.002

Moeller, S.B., Schlingemann, F.P., & Stulz, R.M. (2005). Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *The Journal of Finance*, *60*(2), 757-782.

Raoli, E. (2013). Do managers engage in earnings management to support firm's market valuation? *Corporate Ownership & Control*, *10*(2), 627-645.

Rhodes-Kropf, M., Robinson, D.T., & Viswanathan, S. (2005). Valuation waves and merger activity: the empirical evidence. *Journal of Financial Economics*, *77*(3), 561-603. doi:10.1016/j.jfineco.2004.06.015

Ronen, J., & Yaari, V. (2008). *Earnings management: Emerging insights in theory, practice, and research*. *Springer series in accounting scholarship*. New York: Springer.

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, *42*(3), 335-370. doi:10.1016/j.jacceco.2006.01.002

Shleifer, A., & Vishny, R.W. (1986). Large shareholders and corporate control. *The Journal of Political Economy*, *94*(3), 461-488.

Shleifer, A., & Vishny, R.W. (1997). A survey of corporate governance. *The Journal of Finance*, *52*(2), 737-783.

Skinner, D.J., & Sloan, R.G. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies*, *7*(2-3), 289-312.

Tsai, C.-C., Wu, C.-C., & Chang, R.-D. (2012). Effects of overvalued equity and managerial incentives on corporate policy. *Emerging Markets Finance and Trade*, *48*(sup1), 74-87. doi:10.2753/REE1540-496X4801S106

Yasser, Q.R., & Al Mamun, A. (2016). Audit committee structure and earnings management in Asia Pacific. *Economics and Business Review*, *2 (16)*(1), 66-84. doi:10.18559/ebr.2016.1.5

Zang, A.Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, *87*(2), 675-703. doi:10.2308/accr-10196