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„Agency Theory of Overvalued Equity revisited - Is there
(consistent) empirical evidence that overvalued equity
causes Earnings Management?“

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List of abbreviations

A	Assets
CA	Current Assets
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CL	Current Liabilities
COGS	Costs of Goods Sold
CRSP	Center for Research in Security Prices
DA	Discretionary Accruals
DEP	Depreciations
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EBO	Edwards-Bell-Ohlson Residual Income Model
FASB	Financial Accounting Standards Board
FIFO	First In First Out
F-RET	Future returns
GAAP	Generally Accepted Accounting Principles
IASB	International Accounting Standards Board
I/B/E/S	Institutional Brokers' Estimate System
ITC	International Trade Commission
LIFO	Last In First Out
M&A	Mergers & Acquisitions
M/B	Market-to-Book ratio
NA	Normal Accruals
NPV	Net Present Value
OLS	Ordinary Least Squares
P&L	Profit and Loss Statement
PPE	Property, Plant and Equipment
PROD	Production Level
P/V	Price to (Intrinsic) Value
r_e	Cost of Equity

IV

R&D	Research and Development
REC	Receivables
REV	Revenues
ROA	Return On Assets
SEC	Security and Exchange Commission
SG&A	Selling, General and Administrative Expenses
STD debt	Short Term debt
SOX	Sarbanes-Oxley-Act
TA	Total Accruals
TP	Tax Payables
US	United States

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1 Introduction

“We do not want to maximize the price at which Berkshire shares trade. We wish instead for them to trade in a narrow range centered at intrinsic business value... [We] are bothered as much by significant overvaluation as significant undervaluation.”¹

The Agency Theory of Overvalued Equity predicts that overvaluation can cause destructive organizational forces that massively destroy value.² In frame of the current firm environment, management's activities are influenced by investors and analysts that want their Earnings expectations to be met and beat.³ Among these organizational forces that drive manager's operational decisions ranks Earnings Management.⁴ In using Earnings Management to maintain high share prices, Managers are not only driven by expectations but also by their own wish to maximize their personal compensation through option/equity packages and other motives.⁵ In line with the Agency Theory of Overvalued Equity, this master thesis tries to find consistent empirical evidence that firms manage Earnings because of overvaluation. Additionally, since overvaluation-induced Earnings Management is expected to destroy value, the side question of the thesis deals with the problem, which approaches are valuable and applicable to reduce the magnitude of this form of Earnings Management.

The thesis is organized as follows: In the second chapter, basic knowledge about the superior use of accruals over cash-flows to manage firms is explained and definitions for Earnings Management are given. Furthermore, motives and firm characteristics that encourage Earnings Management are discussed. The second chapter ends with an explanation of the two models that are able to determine Earnings Management empirically. Firstly the cross-sectional modified Jones Model, which is currently the most used model to determine Earnings Management via Discretionary Accruals and secondly the Roychowdhury's model to detect Real Transaction Management. Both models are applied in the empirical papers that are discussed in chapter three. The third chapter contains the main findings of the thesis and starts with an analysis of the Agency Theory of Overvalued Equity.

¹ Warren Buffett, Berkshire Hathaway Annual Report, 1988 in: Fuller and Jensen (2010), p. 59.

² See Jensen (2004), p. 2-12.

³ See Richardson et al. (2002), p. 15-17.

⁴ See Jensen (2004), p. 2-12.

⁵ See Frey and Osterloh (2005), p. 98-99.

Thereafter and to the best knowledge, the methodology and contents of the four most important empirical papers on overvaluation-induced Earnings Management are discussed, evaluated and criticized regarding their capability to explain the Agency Theory of Overvalued Equity. Finally, the fourth chapter deals with approaches to reduce or avoid overvaluation-induced Earnings Management. Based on the findings of chapter three, four approaches are discussed and evaluated with the help of further empirical sources. However, the discussion is limited to major findings, since an extensive debate would provide enough material for a separate paper. At the end in chapter five, a short conclusion is given and potential fields for future research are outlined.

While the quotation of Warren Buffet shows, that some managers are aware of the dangers of overvaluation, empirical evidence suggests that most managers try to maintain overvaluation though this is found to generate huge costs in the years after Earnings have been managed.⁶ The results of the thesis show that there is consistent empirical evidence that overvaluation causes Earnings Management. None of the four papers finds evidence that overvaluation does not trigger Earnings Management. However, though there is unity on the research question, there are significant methodological differences between the papers. Most importantly, only one paper deals with all forms of Earnings Management. By focusing only on Earnings Management via Discretionary Accruals, three authors cover Earnings Management only to some extent which might reduce the explanatory power of their findings.⁷ This is especially concerning since there is evidence that other forms of Earnings Management like Real Transaction Management are becoming more important over time and partly substitute Discretionary Accrual Management.⁸

Additionally, the main section shows that management compensation, Corporate Governance, regulation and the choice of the auditing firm can reduce overvaluation-induced Earnings Management. By discussing these findings with additional literature, it is outlined that redesigning option/equity compensation packages, installing effective Corporate Governance systems with independent and competent boards, implementing Earnings Management hostile regulation like the Sarbanes-Oxley-Act that should be designed to provide for all forms of Earnings Management and employing one of the major global auditing firms might reduce the magnitude of overvaluation-induced Earnings Management in firms.

⁶ See Kothari et al (2006), p. 2-8.

⁷ See Graham et al (2005), p. 16-18.

⁸ See Zang (2012), p. 35-36.

2 Earnings Management

2.1 Accrual Accounting and Importance of Earnings

Based on the going-concern principle of firms, information asymmetries between managers and stakeholders create a demand for periodical measures of firm performance. With respect to *Dechow (1994)* earnings are regarded as an important measure of firm performance, being used in the contracting- and evaluation-process.⁹ *Ronen and Yaari (2008)* also outline the importance of earnings in the decision-making-process, in which earnings serve a wide range of stakeholders. Shareholders, creditors, regulators, employees and competitors use earnings as informational base, in order to create compensation schemes for managers or other contracts.¹⁰ Ultimately, the success of a firm depends on its ability to create cash-inflows which exceed cash-outflows. However, cash flow movements do not reflect the underlying economic activity. Consider a ship-building company with only one large order. Though the order might be very profitable over lifetime, depending on the terms of payment the firm actually might only receive one large cash-inflow at the delivery of the ship. As a result, focusing only on cash flows would lead the receivers of financial data to conclude that the firm is unprofitable over years. In order to overcome this timing and matching problem of cash flows, firms use accrual accounting to modify the recognition of revenues and expenses in earnings. The following quotation from the basic principles of the Financial Accounting Standards Board (FASB) underlines the advantage of earnings against cash flows in financial reporting.

*“Information about enterprise earnings and its components measured by accrual accounting generally provides a better indication of enterprise performance than information about current cash receipts and payments. [...] It [Accrual Accounting] recognizes that the buying, producing, selling, and other operations of an enterprise during a period, [...] often do not coincide with the cash receipts and payments of the period. [...]”*¹¹

Supporting this view, *Dechow and Skinner (2000)* outline that earnings are smoother and more informative than cash flows.¹² In their survey, *Graham et al. (2005)* find out, that executives believe earnings to be the most important figure for outside receivers of

⁹ See Dechow, P. (1994), p. 4-6.

¹⁰ See Ronen and Yari (2008), p. 10-24.

¹¹ See FASB, Statement of Financial Accounting Concepts No. 1 (1978), p. 19.

¹² See Dechow and Skinner (2000), p. 237-240.

financial data. Meeting quarterly earnings and consensus earnings forecasts by analysts is seen as essential to build credibility in capital markets.¹³ However, the attempt to deliver smooth earnings to satisfy capital markets raises new questions, which are discussed in the following section.

2.2 Accounting Quality and Earnings Management

According to *Palepu, Healy et al. (2002)* the accounting quality of a firm is shaped by three aspects. First of all, the quality of generally accepted accounting standards determines the ability of a firm to report its own true underlying business performance. Arthur Levitt, former chairman of the Security and Exchange Commission (SEC) underlines that “The flexibility in accounting allows it to keep pace with business innovations”.¹⁴

While marketing-intensive firms might convey valuable information to capital markets in capitalizing marketing expenditures, the accounting data of firms operating in other sectors would be distorted with the same treatment. International standard setting agencies like the FASB or International Accounting Standards Board (IASB) face the challenge to limit the discretion of managers while ensuring a high level of information content.

Beside the design of general standards, accounting quality can also be affected by forecast errors of management. In accrual accounting, managers continuously have to estimate future values of multiple business transactions. When assessing the default-probabilities of accounts receivables, managers face uncertainty about the future financial capability of customers to pay their bills, which might lead to accounting distortions. Forecast errors are not occurring because managers consciously influence accounting numbers but because of uncertainty about the future.

Finally, managers obtain discretion in their accounting choices, which is commonly known as Earnings Management.¹⁵ According to *Ronen and Yaari (2008)*, Earnings Management might be beneficial, pernicious or neutral in signaling the value of the firm. One example for beneficial Earnings Management is stated in *Palepu, Healy et al. (2002)*. R&D intensive firms tend to create special purpose entities to capitalize their R&D outlays, hence avoiding misconceptions in accounting standards and signaling more information to capital markets. In this context, managerial discretion can be helpful

¹³ See Graham et al. (2005), p. 1-4.

¹⁴ See Levitt, A. (1998), p. 6.

¹⁵ See Palepu, Healy et al. (2000), p. 3-5 – 3-16.

to convey information about future cash flows of the firm.¹⁶ Dharan (2003) describes the importance to distinguish between managers who engage in beneficial Earnings Management and managers who consciously use their discretion to reduce the information content of financial reporting.¹⁷ Pernicious Earnings Management conceals the value of the firm and often serves the opportunistic behavior of managers.¹⁸

One of the most quoted definitions for Earnings Management in Accounting Literature can be found in Healy and Wahlen (1999).

„Earnings Management occurs when management uses 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.”¹⁹

Based on the assumption that there is a true and observable earnings figure, managers can either engage in earnings-increasing or earnings-decreasing financial reporting. Dechow and Skinner (2000) distinguish between conservative-, neutral-, aggressive-accounting and fraud. Conservative accounting might be realized by overstating accounting expenses or understating revenue recognition and intends to reduce earnings. In contrast, aggressive accounting can be realized by understating the risks from accounts receivables or by easing the recognition of revenues and intends to increase earnings. Neutral accounting would equal an absence of Earnings Management, leading managers to display the economic truth. Apart of these accounting types, managers might engage in fraudulent behavior, violating legal accounting standards.²⁰ As quoted in Rezaee and Riley (2010), the Association of Certified Fraud Examiners defines fraud as “The intentional, deliberate, misstatement or omission of material facts, or accounting data which is misleading and, when considered with all the information made available, would cause the reader to change or alter his or her judgment or decision.”²¹ This is underlined by Arthur Levitt, who mentioned that “Abuses such as Earnings Management occur when people exploit this pliancy [accounting flexibility]. [...] This, in turn, masks the

¹⁶ See Ronen and Yari (2008), p. 25-31.

¹⁷ See Dharan (2003), p. 1-2.

¹⁸ See Ronen and Yari (2008), p. 25-31.

¹⁹ See Healy and Wahlen (1999), p. 368.

²⁰ See Dechow and Skinner (2000), p. 237-240.

²¹ See Rezaee and Riley (2010), p. 5.

true consequences of management's decisions."²² Though academics deliver a very broad definition, the given quotations show that the accounting environment as well as the general perception tends to shed light on Earnings Management in a more negative way, keeping in mind spectacular fraudulent cases like Enron and WorldCom with the burst of the Internet bubble.²³ Methods to determine Earnings Management, which are used in accounting research, are described in the following chapter. However, regardless of the legal treatment there are multiple motives to act opportunistic or mislead stakeholders about the true economic performance of the firm.

2.3 Motives / firm characteristics encouraging Earnings Management

While there are various motives for Earnings Management only some of them are used as control variables in the empirical part of the paper as discussed later. One of the most discussed reasons for Earnings Management can be found in the compensation scheme of managers. *Bergstresser and Philippon (2003)* intensively discuss the increasing importance of equity-based compensation for managers. As response to diverging interest of managers and owners of the firm, equity-based compensation increased massively in the past 15 years. However, if management compensation schemes are tied to stock-performance or certain profit-targets, managers have an incentive to choose those accounting policies that maximize their personal utility.²⁴ As discussed later in the section for approaches to reduce or avoid Earnings Management indicated by high firm valuations, *Efendi et al. (2007)* outline that especially managers in highly-valued firms with deep in-the-money stock options and equity stakes have a high incentive to maintain the value of their holdings by managing the firms earnings.²⁵

Earnings might also be managed in frame of a regulatory context. *Jones (1991)*, whose model to detect Earnings Management is of great importance in empirical Earnings Management research, showed that US-firms systematically manage earnings to benefit from import relief measurements by the United States International Trade Commission (ITC).

²² See Levitt, A. (1998), p. 6.

²³ See Healy and Palepu (2003), p. 11-15.

²⁴ See Bergstresser and Philippon (2003), p. 511-514.

²⁵ See Efendi et al. (2007), p. 668-672.

Firms consciously managed earnings downwards to transfer a worse picture of the overall profitability of the industry. The objective was to trigger tariff increases and import quotas in order to be protected from foreign competition.²⁶ Earnings Management because of regulatory backgrounds is described in various empirical studies, ranging from antitrust actions to tax considerations.²⁷

According to *Healy and Palepu (2003)* Earnings Management can also occur in corporate control contest. As discussed in *Ronen and Yaari (2008)*, acquiring firms which finance a merger with own stock might have an incentive to inflate earnings, which is in line with the demands of its shareholders from a dilution perspective. On the other hand, target firms might have an incentive to inflate earnings as well, signaling value, increasing the price or trying to win a contest for control of the firm. In various contests for corporate control, like hostile takeovers, management buyouts or other proxy fights, management might use accounting methods to influence the decision-making process of investors.²⁸

Another objective of Earnings Management might arise from the option to choose between tax-optimal or profit-maximizing accounting. *Healy and Palepu (2003)* show the opportunity for US-based firms to decrease taxes by using the LIFO-method when prices are expected to rise or to forgo this step and report higher earnings.²⁹ Moreover managers face incentives to manage earnings for other stakeholders, including employees, suppliers, customers and competitors. According to *Healy, Palepu et al. (2000)*, especially in countries like Germany where labor unions are strong, firms might use accounting discretion to step into a better position in the negotiation process. *Ronen and Yaari (2008)* also mention that firms might be interested in modifying earnings in order to signal a higher job security to their workforce. Regarding suppliers and customers, they discuss several studies which underline the aspect that Earnings Management in the long-run decreases the reputational capital of a firm. This is particularly important towards stakeholders who have an implicit contract with the firm, for instance customers who rely on the ability of the firm to deliver broken parts or suppliers who rely on the ability of the firm to pay the bill.³⁰

²⁶ See Jones, J. (1991), p. 193-197.

²⁷ See Palepu, Healy et al. (2000), p. 3-5 – 3-16.

²⁸ See Ronen and Yari (2008), p. 153-157.

²⁹ See Palepu, Healy et al. (2000), p. 3-5 – 3-16.

³⁰ See Ronen and Yari (2008), p. 180-183.

With respect to domestic and international market competition as stated in *Jones (1991)*, firms have incentives to avoid new market entrants by concealing the true profitability of the market. Additionally, firms may try to avoid an extensively disaggregated disclosure of financial data, especially when competitors are able to benefit from detailed data about margin of product lines.³¹

Regarding the liability side of the firm's balance sheet, Earnings Management motives arise from the explicit and implicit contracts with shareholders and creditors. Considering the relationship to debt holders, one motive for Earnings Management arises from the existence of debt covenants. As described in *Janes (2003)*, lenders write covenants into debt contracts in order to limit the actions of the firm and to monitor it.³² Typical covenants are interest coverage ratios (f.e. EBIT/Interest), working capital ratios (f.e. current assets/current liabilities) or net worth.³³ Violating debt covenants increases the probability of financial distress, therefore directly affecting the cost of capital.³⁴ According to *Watts' and Zimmermann's (1990)* debt-covenant hypothesis, managers tend to avoid costly covenant violations through their accounting decisions.³⁵ On the other hand, some researchers outline that higher leverage leads to higher monitoring by debt holders, therefore contributes to reduce Earnings Management activities. Debt covenant violations have been studied by a broad range of researchers and are empirically proven to trigger earnings management behavior.³⁶ Therefore leverage is used as control variable in most of the empirical papers in the main body of the paper.

Ronen and Yaari (2008) further extend the large field of capital market driven Earnings Management considerations. As shown in various studies, the development of the share price of a firm is related to earnings.³⁷ Managers have various incentives to manage earnings, ranging from the meeting and beating of investors' expectations as discussed in *Koh, Matsumoto et al. (2007)* to value-signaling aspects in the forefront of an Initial Public Offering (IPO) or Seasoned Equity Offering (SEO).³⁸

³¹ See Palepu, Healy et al. (2000), p. 3-5 – 3-16.

³² See Janes, T. (2003), p. 5-10.

³³ See Palepu, Healy et al. (2000), p. 3-5 – 3-16.

³⁴ See Prevost, p. 6-10.

³⁵ See Watts and Zimmermann (1990), p. 138-140.

³⁶ See Janes, T. (2003), p. 5-10.

³⁷ See Ronen and Yari (2008), p. 135-148.

³⁸ See Koh, Matsumoto et al. (2007), p. 1-5.

As discussed above, management compensation schemes often include equity-based payments, therefore capital market driven Earnings Management is interrelated with management compensation. However, *Jensen (2004)* shows that the share-price is not necessarily adapting to earnings management behavior, but that earnings management behavior can also follow the share-price development, especially in mispriced firms, which is discussed in the main part of the paper.³⁹

Finally, beside managerial motives there are certain firm characteristics that are empirically proven to encourage Earnings Management behavior. All of the following aspects are used as control variables in at least one paper in the empirical discussion of this paper. *Sun and Rath (2009)* discuss the impact of firm size on Earnings Management behavior. In their empirical research, they conclude that larger firms have superior accounting quality and tend to execute less Earnings Management because of the political costs associated and the higher public focus of investors, analysts and other gatekeepers.⁴⁰ Furthermore, companies which are not able to turn a loss into a small profit by discretionary accounting behavior, might be tempted to take a “big bath”. *Healy (1985)* proves that managers choose income-decreasing accruals in order to boost losses when they cannot reach the targets in their compensation schemes.⁴¹

Besides, *Richardson et al. (2002)* outline, that fast-growing firms are more likely to restate earnings than mature firms with stable cash-flows. They argue that firms with high expected future growth are under more pressure to meet and beat analysts’ forecasts.⁴² Moreover net operating assets, defined as accumulated accruals in the balance sheet, constrain the possibility of future Earnings Management. Regarding for example Property, Plant and Equipment (PPE), high cumulated depreciations limit the opportunity to further exercise aggressive depreciation policies in the future. *Barton and Simko (2002)* find that firms with larger net operating assets executed more income-increasing accruals in the past. As discussed later, accruals face a reversal effect, therefore high-net operating assets, often also referred to as balance sheet bloat, limit the firm’s ability to execute Earnings Management in the future.⁴³

³⁹ See Jensen (2004), p. 2-12.

⁴⁰ See Sun and Rath (2009), p. 1069-1072.

⁴¹ See Healy, P. M. (1985), p. 105-107.

⁴² See Richardson et al. (2002), p. 15-17.

⁴³ See Barton and Simko (2002), p. 1-3.

Altogether, there are various more firm characteristics, ranging from profitability to certain volatility measures which can be associated with Earnings Management, that are not further discussed at this point. Regardless of the motives and firm characteristic that encourage Earnings Management, *Badertscher (2011)* classifies Earnings Management mechanisms into Accrual Management within the legal-requirements of generally accepted accounting standards (GAAP), Real Transaction Management and Non-GAAP methods, which are discussed in the following section.⁴⁴

2.4 Earnings Management Mechanisms

2.4.1 Accrual Management

For a better understanding of Earnings Management it is essential to know the discretionary scope of managers in applying GAAP. Regarding the asset side of the balance sheet, managers can modify PPE, receivables, inventories and other assets. Accounting standards allow managers to estimate the useful life of assets as well as their depreciation method and their salvage value. *Bishop and Eccer (2000)* for example prove that managers execute Earnings Management by increasing the useful lifetime of long-lived assets.⁴⁵ As described in *Ronen and Yaari (2008)* much has also been written about the use of LIFO and FIFO to value inventories. In general, firms with aggressive accounting behavior will choose the FIFO-method over LIFO. With increasing purchase prices, a shift from LIFO to FIFO results in higher reported earnings due to lower costs of goods sold.⁴⁶ Receivables also offer space for accounting discretion. According to *Magrath (2002)* an over proportional increase of receivables over revenues might be an early warning sign for Earnings Management, with firms creating fictitious revenues. The value of receivables also depends on their collectability, leaving management again discretion for subjective estimations.⁴⁷

Further investigating the asset side, firms also obtain discretion in the decision of capitalizing expenses. As discussed in *Palepu, Healy et al. (2000)*, existing accounting rules allow managers to choose between capitalizing and expensing R&D outlays, depending on the development status.

⁴⁴ See *Badertscher (2011)*, p. 1496-1498.

⁴⁵ See *Bishop and Eccer (2000)*

⁴⁶ See *Ronen and Yari (2008)*

⁴⁷ See *Magrath and Weld (2002)*

However, some firms like Microsoft tend to expense all the R&D outlays, while firms like PeopleSoft capitalize and amortize their R&D outlays.⁴⁸ Regarding the probability of Earnings Management in current assets and liabilities, *Burgstrahler and Dichev (1997)* describe that firms with high level of current assets or liabilities find it less costly to manage these. Receivable intensive firms face lower costs in managing receivables than firms with initially low receivables. These findings imply that firms obtain some kind of an Earnings Management learning curve.⁴⁹

Regarding the P&L statement of a firm, the recognition of revenues also transfers discretionary scope to managers. With respect to GAAP, according to *Palepu, Healy et al. (2000)* revenues can be recognized when the service is delivered to the customer and the collection of the price in form of cash is reasonably likely. Based on these two requirements, revenue recognition might also partly be driven by the judgment of managers. *Palepu, Healy et al. (2000)* discuss the case of a construction firm, obtaining a long-term contract to build a pipeline. The firm can either use a conservative approach, recognizing all the revenues of the contract as soon as the pipeline is finished or use the percentage of completion method and recognize revenues in line with construction progress. Both methods can be legally applied within GAAP, however they lead to different earnings results.⁵⁰ Without claim of completeness, these examples underline some managerial possibilities to manage accruals within GAAP.

Following the discussion of *Badertscher (2011)*, Accrual Management is an attractive mechanism of Earnings Management. Accrual Management does not affect cash flows and therefore is not likely to have an impact on long-term firm value. On the other side accruals reverse over time. An intensive use of accruals in current periods limits the possibility to manage accruals in future periods.⁵¹ For instance, if the stated construction firm recognizes a huge percentage of revenues in the current period to boost earnings, it has to find new projects to keep revenues high in the following period. In addition, compared to other mechanisms of Earnings Management, within GAAP Accrual Management has the highest detection costs, since auditors and regulators might see through the intentions of managers.

⁴⁸ See Palepu, Healy et al. (2000), p. 7-4 – 7-7.

⁴⁹ See Burgstrahler and Dichev (1997), p. 113-115.

⁵⁰ See Palepu, Healy et al. (2000), p. 221-223.

⁵¹ See Badertscher (2011), p. 1496-1498.

As stated above, Accrual Management can also be non-GAAP conform. *Dechow and Skinner (2000)* state the early recognition of revenues though there is no reasonable possibility of collection, the backdating of sales invoices and the recording of fictitious sales and inventories as characteristic for Non-GAAP Earnings Management methods.⁵² With respect to previous research, *Badertscher (2011)* points out that Non-GAAP Earnings Management might be more difficult to detect by outsiders, thus obtaining lower detection costs than GAAP Earnings Management. Furthermore, the magnitude of Non-GAAP Earnings Management can be much higher than GAAP Earnings Management. Nevertheless due to the huge negative impact on firm value and managerial reputation in case of detection by outsiders, altogether Non-GAAP Earnings Management is the costliest Earnings Management mechanism.⁵³

2.4.2 Real Transaction Management

Roychowdhury (2006) defines Real Transaction Management as “departures from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations”.⁵⁴ On the revenue side, Real Transaction Management can include the granting of discounts to customers, in order to accelerate short-term sales to meet a certain earnings target. On the expense side, Real Transaction Management can include the postponement of R&D, maintenance or advertising outlays, in order to decrease short-term expenses. Clearly, Real Transaction Management can have a negative impact on long-term firm value, since structuring transactions to manage earnings might have an impact on future cash-flows. Clients might get accustomed to price discounts, therefore expecting these in the future as well. Delaying R&D projects to meet earnings benchmarks might lead to a loss of innovative power. In their survey about financial reporting *Graham et al. (2005)* ascertain that managers would even sacrifice positive Net Present Value (NPV) projects to meet certain earnings thresholds. In their survey, they asked CEO’s and CFO’s about their use of different within-GAAP Earnings Management methods as shown in the following chart.⁵⁵

⁵² See Dechow and Skinner (2000), p. 238-240.

⁵³ See Badertscher (2011), p. 1496-1498.

⁵⁴ Roychowdhury (2006), p. 337.

⁵⁵ See Graham et al (2005), p. 1-4.

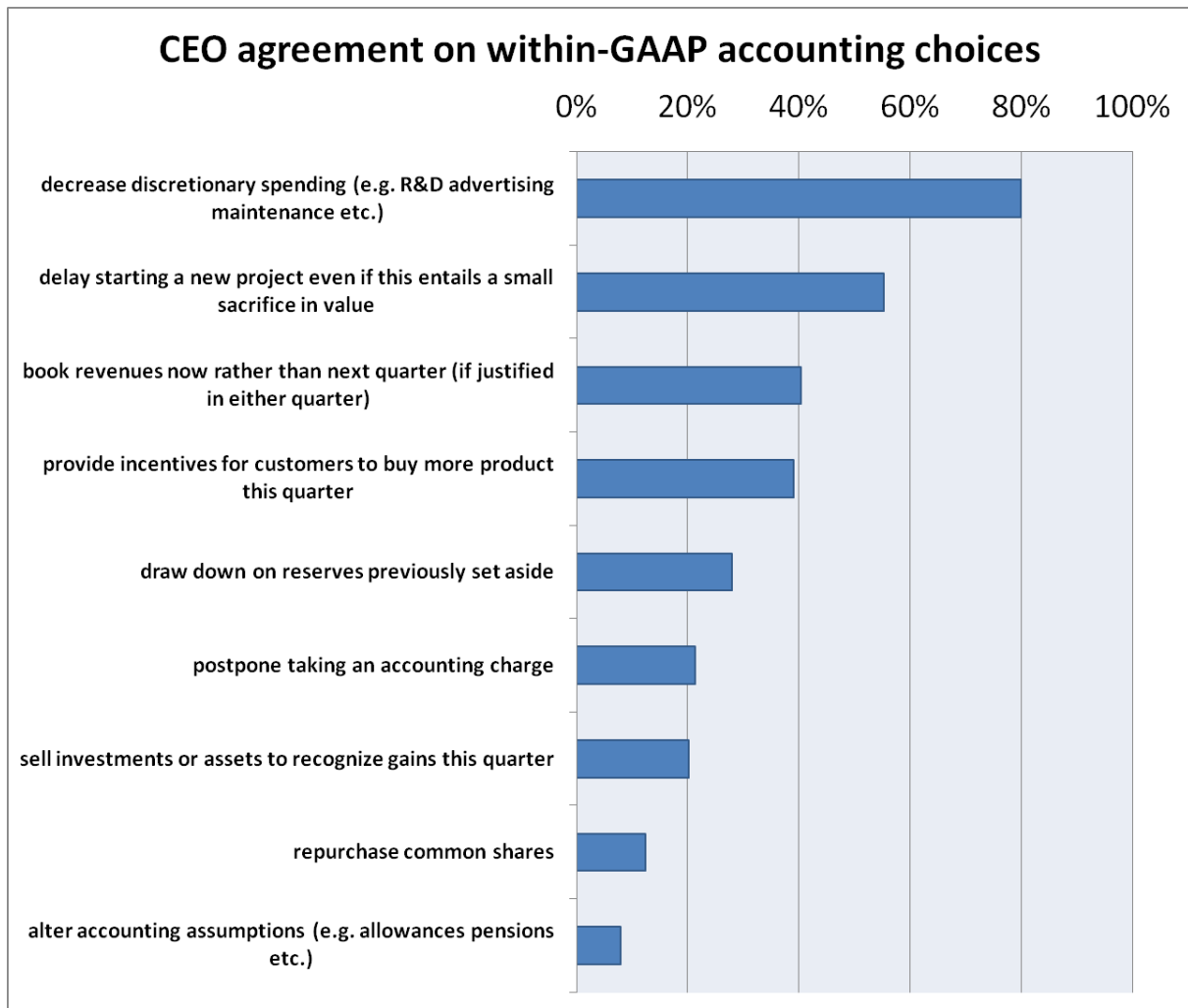


Chart 1: Empirical Evidence on Earnings Management methods

Source: See Graham et al. (2005), p. 56. [modified]

At the end of the quarter, managers prefer Real Transaction Management through decreasing discretionary spending or delaying new projects to reach certain earnings targets. Furthermore, incentives are given to customers in order to increase short-term sales. Accrual Management is mainly observed through the early recognition of revenues, the drawdown of reserves and changes in accounting estimates, for example for the formation of pension provisions.⁵⁶ However, since their investigation is based on a survey, *Graham et al. (2005)* note that the results might be biased by the response behavior of managers. On the other hand, they argue that their results might be positively influenced, since they obtain first-hand information from top-level decision makers.⁵⁷

⁵⁶ See Graham et al. (2005), p. 56.

⁵⁷ See Graham et al. (2005), p. 2-6.

From a managerial incentive perspective, *Badertscher (2011)* characterizes Real Transaction Management with extremely low detection costs, since managing transactions is almost impossible to observe by auditors or regulators. *Graham et al. (2005)* empirically show that especially in the post-Enron scandal world, managers prefer hardly detectable Real Transaction Management over within-GAAP accounting adjustments, which is in strong contrast to the existing Earnings Management research literature that is mainly focusing on Accrual Management. According to their investigation, manager's fear of regulators and capital markets increased after the Sarbanes-Oxley-Act (SOX) was passed and therefore detection costs became more important. This change in the regulatory framework made Real Transaction Management a more attractive Earnings Management method.⁵⁸ However, *Badertscher (2011)* argues that compared to within-GAAP Accrual Management, Real Transaction Management is a more costly form of Earnings Management, due to its long-term impact on cash flows and firm value.⁵⁹

Beside Accrual Management and Real Transaction Management *Healy and Palepu (2003)* classify multiple other forms of Earnings Management, ranging from the timing of the adoption of new accounting standards over the disclosure policy by showing certain items in footnotes or displaying detailed extraordinary items to transactions with related parties.⁶⁰ However, the following sections focus on the methods to detect Accrual Management and Real Transaction Management, since these are the most important methods of Earnings Management which will intensively be discussed in the main section of the paper.

2.5 Approaches to detect Earnings Management

2.5.1 Discretionary Accruals: The Jones Model

In her investigation about Earnings Management behavior as response to import relief policies in the United States, *Jones (1991)* developed a model to estimate discretionary accruals of a firm. In line with the research of *Healy (1985)*, she separates the total accruals of a firm into a discretionary component, which is expected to be influenced by decision-makers and functions as a proxy for Earnings Management and a non-

⁵⁸ See *Graham et al (2005)*, p. 16-18.

⁵⁹ See *Badertscher (2011)*, p. 1496-1498.

⁶⁰ See *Palepu, Healy et al. (2000)*, p. 221-223.

discretionary component, which displays normal accruals.⁶¹ This model and the subsequent explained modified Jones Model are among the most important research models to estimate Earnings Management by firms and are also used in the empirical articles explained in the main section of this paper. Further models were developed by Healy (1985), *de Angelo (1986)* and *Dechow and Sloan (1991)*, but lack in their explanatory power as mentioned in the next chapter.⁶²

Jones specifically focuses on import relief investigations, because in the underlying stakeholder structure the incentive to manage earnings is very high. Stakeholders monitor the selected industries very loosely and detection costs are very low. On one hand, dispersed customers who finally have to pay higher prices when foreign competition is excluded do not monitor the firm as close as other stakeholders to prevent Earnings Management. The costs of gathering information, building coalitions and lobbying simply exceed the benefits of cheaper products through enhanced competition from abroad. On the other hand the ITC as controlling government entity does not adjust accounting data as for example sophisticated investors would do. Considering her model, Jones first determines the total accruals of a firm as shown in the following equation.⁶³

$$TA_{i,t} = (\Delta CA_{i,t} - \Delta Cash_{i,t}) - (\Delta CL_{i,t} - \Delta STDebt_{i,t} - \Delta TP_{i,t}) - Dep_{i,t}$$

Chart 2: Determination of Total Accruals

Source: See Jones, J. (1991), p. 207. [modified]

Jones controls for differences between the current and prior period by looking at the changes of the balance sheet items. The delta in current assets of firm *i* in time *t* is first subtracted by the delta in cash and then by the result of delta current liabilities minus delta short term debt minus delta taxes payable. Finally depreciations of the current period are subtracted from the remaining figure. Based on the assumptions of *de Angelo (1986)*, Jones then continues to estimate total abnormal accruals of a firm, as shown in the following equation.⁶⁴

⁶¹ See Healy, P. (1985), p. 88-90.

⁶² See Guay et al. (1996), p. 83-86.

⁶³ See Jones, J. (1991), p. 201-206.

⁶⁴ See de Angelo, L. (1986), p. 409-412.

$$\Delta TA_t = (TA_t - TA_{t-k}) = (DA_t - DA_{t-k}) - (NA_t - NA_{t-k})$$

Chart 3: Estimation of abnormal total accruals

Source: See Jones, J. (1991), p. 207. [modified]

Based on the underlying assumption total accruals in the estimation period (TA_{t-k}) are defined as “normal” accruals. Jones separates her model into two stages. First the estimation period, which can be seen as the period before earnings are managed. Second the event period, in which earnings are managed. The change between TA_t (total accruals in current period) and TA_{t-k} (total accruals in estimation period) is described as abnormal total accrual (ΔTA_t). The abnormal total accrual can be separated into a discretionary component ($DA_t - DA_{t-k}$) and a non-discretionary component ($NA_t - NA_{t-k}$) whereas the former describes the effect of Earnings Management. Abnormal total accruals are expected to be triggered by the discretionary component of the equation. Therefore the average change in the non-discretionary component should be zero. Jones first assumption at this stage is that total accruals only change through the discretionary accrual component while non-discretionary accruals remain constant over time.⁶⁵

However, by assuming that total accruals only change because of discretionary accruals, the model does not take into account the economic development of a firm. Since revenues and asset structures of firms change as well, non-discretionary accruals fluctuate over time. Imagine a firm that wants to extend its product portfolio and invests in a new production line that is launched in the event period. Clearly, the investment in PPE changes the structure of accruals. Since manufacturing facilities are depreciated, comparing the old level of accruals in the estimation period with the new level of accruals in the event period would lead the reader to think that firms artificially managed accruals downwards. The assumption that changes in total accruals depend solely on changes in discretionary accruals does not hold. Jones therefore extends this descriptive approach to account for changing assets and revenues, as shown in the following equation.⁶⁶

⁶⁵ See Jones, J. (1991), p. 206-209.

⁶⁶ See Jones, J. (1991), p. 211-215.

$$TA_{i,t} / A_{i,t-1} = \alpha_i [1 / A_{i,t-1}] + \beta_{1i} [\Delta REV_{i,t} / A_{i,t-1}] + \beta_{2i} [PPE_{i,t} / A_{i,t-1}] + \varepsilon_{i,t}$$

Chart 4: Expectation Model for total accruals (Jones Model)

Source: See Jones (1991), p. 211 [modified]

The right-hand side shows the equation to determine total accruals ($TA_{i,t}$) in the estimation period, which can be interpreted as “normal” accruals. All items are scaled by lagged assets ($A_{i,t-1}$) to avoid a heteroscedastic effect. In contrast to the first equation, the Jones Model takes into consideration the operational development of a firm via changes in revenues. Jones argues, that changes in working capital are to some extent reflected in changes in revenues (ΔREV). An increase in revenues for example is often preceded by an increase in work-in-progress inventories and payables. Simultaneously, firm’s receivables increase parallel to sales if credit policies are kept constant.⁶⁷

However revenues can be managed to some extent via Real Transaction Management, for example when firms grant extraordinary discounts to increase sales. Furthermore, as discussed above the revenue recognition principle in accounting standards allows firms to shift sales within periods according to the chosen recognition method. Though Jones is being aware of this problem, she takes revenues as objective and observable indicator for the changing accrual structure of firms. *Dechow et al. (1995)* criticize that if earnings are managed upwards via an accelerated recognition of revenues without actually receiving cash, receivables increase artificially. As a result, the total Earnings Management effect in the Jones Model is reduced, because the increase in receivables is explained by an increase in discretionary revenues.⁶⁸ Beside revenues, Jones includes PPE to control for depreciations. PPE typically represents a considerable fraction of total accruals for many, especially manufacturing-intensive firms. In contrast to revenues, the absolute value of PPE and not the delta to previous periods is used, because absolute depreciations were also used in the equation above (compare chart 2). Estimating the values of α , β_1 and β_2 , Jones determines a “normal” total accrual amount for the estimation period.

⁶⁷ See Palepu, Healy et al. (2000), p. 93-95.

⁶⁸ See Dechow et al. (1995), p. 199-200.

Finally, to determine the amount of discretionary accruals in a given period (p) - the event period - Jones uses an OLS (Ordinary Least Squares) regression where a , b_1 and b_2 are the estimates for α , β_1 and β_2 . The prediction error ($u_{i,p}$) is shown in the following equation.

$$u_{i,p} = TA_{i,p} / A_{i,p-1} - a_i [1 / A_{i,p-1}] + b_{1i} [\Delta REV_{i,p} / A_{i,p-1}] + b_{2i} [PPE_{i,p} / A_{i,p-1}]$$

Chart 5: Determination of discretionary accruals (Jones Model)

Source: See Jones (1991), p. 212 [modified]

$u_{i,p}$ finally represents the discretionary accrual component in period p. In her empirical work across the full sample of US-firms which would suffer from import reliefs, Jones determines a small negative coefficient for PPE, underlining the effect of depreciation expenses on PPE. *Ronen and Yaari (2008)* outline, that the coefficient for PPE should always be negative because it represents depreciation expenses.⁶⁹

Considering revenues, Jones calculated a small positive coefficient, implicating an increase in receivables. This is consistent with the discussion in *Ronen and Yaari (2008)*, who argue that most researchers expect the coefficient to be positive. Assuming similar credit policies with suppliers and customers and profitable business where sales exceed expenses, the impact on net-working capital should be positive. Simplifying, a firm would account higher receivables than payables. Nevertheless in a case where sales are paid directly by cash and related expenses for sales have a payment target in the future, payables increase but receivables remain constant. In such a scenario, the coefficient for revenues can also become negative.⁷⁰ Observing the significance of the prediction error, Jones conducts additional statistical tests, which are not further discussed at this stage.⁷¹ Altogether the original Jones Model can be summarized as event study, where the normal accruals in period t-1 function as estimation for the normal condition of a firm. As mentioned before, the underlying assumption is that firms start to manage earnings in period t.

⁶⁹ See Ronen and Yari (2008), p. 404-407.

⁷⁰ See Ronen and Yari (2008), p. 404-407.

⁷¹ See Jones, J. (1991), p. 211-215.

However, *Ronen and Yaari (2008)* criticize the assumption that firms do not manage earnings in the estimation period. They show that Earnings Management in the estimation period occurs and limits the power of the model. In addition, samples with many young growth firms and small sample sizes can also limit the power of the model. Due to strong growth and rapidly changing business structures, firms tend to have a higher proportion of abnormal accruals which cannot be explained by discretionary accruals. Further regarding the sample selection, researchers underline the necessity to have at least 10 observations to provide reliable estimates. Since Earnings Management is an annual phenomenon, samples for the Jones Model have to include firms that exist at least 11 years, therefore most empirical samples focus on mature firms. However, mature firms might want to avoid Earnings Management in fear of a loss of reputation. This sample restriction necessity might limit the power of the model as well, especially when the Earnings Management behavior of young firms should be explained. Further limitations of the Jones Model and potential solutions to overcome these are discussed in *Ronen and Yaari (2008)*.⁷² In their empirical work about the power of Earnings Management models, *Dechow et al. (1995)* show that though its limitations are well known in literature, the original Jones Model is able to explain around one quarter of the fluctuations of accruals.⁷³

2.5.2 Discretionary Accruals: The Modified Jones Model

As a response to some weaknesses of the original Jones Model, *Dechow et al. (1995)* developed the so called modified Jones Model. The determination of “normal” accruals in the estimation period remains the same, the equation shown in chart 3 still holds. However, in the event period receivables are included to overcome the problem arising from discretionary power of managers over the recognition of revenues.⁷⁴

$$u_{i,p} = TA_{i,p} / A_{i,p-1} - a_i [1 / A_{i,p-1}] + b_{1i} [(\Delta REV_{i,p} - \Delta REC_{i,p}) / A_{i,p-1}] + b_{2i} [PPE_{i,p} / A_{i,p-1}]$$

Chart 6: Determination of discretionary accruals (Modified Jones Model)

Source: See Jones (1991), p. 212 [modified]

⁷² See Ronen and Yari (2008), p. 404-407.

⁷³ See Dechow et al. (1995), p. 199-200.

⁷⁴ See Dechow et al (1995), p. 198-200.

In contrast to the original Jones Model, delta revenues are adjusted by delta receivables, thus delivering a value for the delta cash sales. The coefficient from the estimation period is multiplied with delta cash sales. The original Jones Model assumed that management does not execute discretionary power over revenues. Contrary to that, the modified version assumes that all changes in receivables can be explained by Earnings Management. *Dechow et al. (1995)* underline, that it might be easier for firms to manage the revenue recognition process than to manage the cash inflow component of revenues, thus making the modified Jones Model superior to its original version.⁷⁵

Ronen and Yaari (2008) indicate that the different treatment in the estimation and the event period creates an inconsistency in the model and recommend using cash sales in the estimation period as well. Applying cash sales addresses the possibility, that managers use their discretionary power to manage credit sales, therefore undermining the assumption that no Earnings Management occurs in the estimation period. Using cash sales also has the statistical advantage of avoiding receivables to be in regressor and regressand at the same time. Otherwise receivables are used to explain total accruals while being part of revenues.⁷⁶

Ultimately, *Ronen and Yaari (2008)* distinguish between the time-series modified Jones Model, which uses cash sales only in the event period and the cross-sectional modified Jones Model which uses cash sales in both the estimation period and the event period.⁷⁷ In their empirical research, *Dechow et al. (1995)* compare different empirical models to detect Earnings Management and they conclude that the modified Jones model provides the best results. In line with these findings, *Guay et al. (1996)* prove in their market-oriented approach that Jones and modified Jones Model are able to detect discretionary accruals. In their approach they find consistency between the direction in which discretionary accruals are managed and the impact on accounting earnings to serve the opportunistic behavior of managers.⁷⁸ This is consistent with the empirical papers in the main section, which all use the modified Jones Model to estimate discretionary accruals of overvalued firms. However the authors prefer the cross-sectional Jones Model, since it reduces some of the limitations of the modified Jones Model as discussed above.

⁷⁵ See Dechow et al (1995), p. 198-200.

⁷⁶ See Ronen and Yari (2008), p. 404-407.

⁷⁷ See Ronen and Yari (2008), p. 404-407.

⁷⁸ See Guay et al. (1996), p. 83-86.

With respect to the use of the cross-sectional modified Jones Model in the upcoming empirical section of this paper, the use of large samples is a necessary precondition for the quality of the research. Furthermore, *Ronen and Yaari (2008)* outline that the inclusion of firm performance in the Earnings Management regression might be necessary to avoid possible misspecifications of the Earnings Management tests.⁷⁹

2.5.3 Real Transaction Management: How to detect?

In contrast to Earnings Management via discretionary accruals, which is characterized by a huge variety of different prediction models, detection of Earnings Management via structuring real transactions did not receive the same attention in accounting research so far.⁸⁰ *Roychowdhury (2006)* investigates Real Transaction Management in the operating activities of a firm. She outlines, that Real Transaction Management mostly occurs in sales manipulation, discretionary expenditures or overproduction. As discussed previously, if managers want to increase sales in one period, they can offer relaxed credit conditions or short-term discounts to enhance sales to customers. Those measures are expected to have a negative impact on cash flow from operations, since these kinds of sales are usually driven by an increase in receivables while costs of production remain.⁸¹

Badertscher (2011), whose paper is the only one in the main part of this thesis that captures the effect of Real Transaction Management, is using the following cross sectional regression to estimate the sales-related Real Transaction Management.

$$\text{CFO}_{i,t} / A_{i,t-1} = \alpha_0 / A_{i,t-1} + \alpha_1 (\text{REV}_{i,t} / A_{i,t-1}) + \alpha_2 (\Delta \text{REV}_{i,t} / A_{i,t-1}) + \varepsilon_{i,t}$$

Chart 7: Determination of sales-related Real Transaction Management

Source: See *Badertscher (2011)*, p. 1498 [modified]

⁷⁹ See *Ronen and Yari (2008)*, p. 404-407.

⁸⁰ See *Fang et al. (2008)*, p. 2-5.

⁸¹ See *Roychowdhury (2006)*, p. 338-342.

In this context, cash flow from operations (CFO) is driven by sales in the current period ($REV_{i,t}$) and the change of sales in comparison to the previous period ($\Delta REV_{i,t}$). In a first step, an industry-wide benchmark is calculated and then matched against the firm-specific CFO. The difference between industry-wide CFO and firm-specific CFO in the current period is seen as abnormal sales or sales-related Real Transaction Management.⁸²

Besides, *Roychowdhury (2006)* identifies Real Transaction Management related to discretionary expenditures. As mentioned before, discretionary expenditures are mainly Research and Development (R&D), Advertising, Administration and Selling (SG&A) expenditures. If managers want to increase earnings in the current period, they can delay R&D projects, expenditures for employee training or maintenance, which have no direct impact on sales. Reduced discretionary expenditures should have a positive effect on cash flow from operations, since cash outflows are avoided.⁸³ *Badertscher (2011)* uses the following cross-sectional regression to estimate the discretionary-expenditure-related Real Transaction Management.

$$DISEXP_{i,t} / A_{i,t-1} = \alpha_0 / A_{i,t-1} + \alpha_1 (REV_{i,t} / A_{i,t-1}) + \alpha_2 (\Delta REV_{i,t-1} / A_{i,t-1}) + \varepsilon_{i,t}$$

Chart 8: Determination of discretionary-expenditure-related Real Transaction Management

Source: See *Badertscher (2011)*, p. 1498 [modified]

Again, an industry wide benchmark is matched against firm-specific discretionary expenditures ($DISEXP_{i,t}$), delivering abnormal discretionary expenditures.⁸⁴ Finally, managers can increase earnings by enlarging production volumes. Due to the allocation of fixed overhead costs on products, increasing production volume leads to lower fixed costs per unit. This effect reduces the costs of goods sold in the current period and might lead to an increase in earnings, if the lower unit-costs are not offset by larger inventory holding costs.

⁸² See *Badertscher (2011)*, p. 1498-1500.

⁸³ See *Roychowdhury (2006)*, p. 338-342.

⁸⁴ See *Badertscher (2011)*, p. 1498-1500.

However, since an increased production might be related to higher cash-outflows, increasing production volume might lead to a negative impact on cash flow from operations.⁸⁵ *Badertscher (2011)* measures the impact of overproduction in the following cross-sectional regression.

$$\text{PROD}_{i,t} / A_{i,t-1} = \alpha_0 / A_{i,t-1} + \alpha_1 (\text{REV}_{i,t} / A_{i,t-1}) + \alpha_2 (\text{REV}_{i,t} / A_{i,t-1}) + \alpha_3 (\Delta \text{REV}_{i,t-1} / A_{i,t-1}) + \varepsilon_{i,t}$$

Chart 9: Determination of overproduction-related Real Transaction Management

Source: See *Badertscher (2011)*, p. 1499 [modified]

As before, the industry-wide level of production ($\text{PROD}_{i,t}$), which consist of the costs of goods sold (COGS) plus the increase in inventories is compared against the firm-specific level of production. Including the inventory account in production costs has the advantage that potential Earnings Management in this account, for example via delaying depreciations, is captured. Furthermore, including inventories avoids the problem arising from the different choice of FIFO or LIFO as method to determine COGS, as discussed previously. Matching industry and firm specific production finally leads to the level of abnormal production, which can be described as overproduction-related Real Transaction Management. Since sales- and overproduction related Real Transaction Management are expected to have a negative impact on cash flows and discretionary-expenditure-related a positive effect, *Roychowdhury (2006)* argues, that the net effect of all three measurements is important. Therefore *Badertscher (2011)* captures the overall effect of Real Transaction Management by multiplying negative effects with -1 and summing all three values up.⁸⁶

By now, the paper focused on theoretical aspects of Earnings Management, different kinds, definitions and roots of Earnings Management were consecutively discussed. The following section is handling investor mispricing in form of overvaluation of firms as one root of Earnings Management. The models used to estimate Earnings Management, which were described in this chapter, were chosen to create an understanding for the empirical research discussed in subsequent chapters.

⁸⁵ See *Roychowdhury (2006)*, p. 338-342.

⁸⁶ See *Badertscher (2011)*, p. 1498-1500.

3 Overvaluation as cause for Earnings Management

3.1 Agency Theory of Overvalued Equity

In the aftermath of the dotcom-bubble, when stock prices were lifted to new heights, *Jensen (2004)* developed the Agency Theory of Overvalued Equity.⁸⁷ The basis for this theory lies in the general Agency Theory of the Firm, developed by *Jensen and Meckling (1976)*. Based on the separation of ownership and control, an agency relation arises between shareholders (principals) and managers (agents). This relation causes costs, since interests of principals and managers tend to diverge.⁸⁸ Projected to the Agency Theory of Overvalued Equity, agency costs arise from the circumstance of overvaluation. Therein overvaluation is defined not by any model, but by the assumption that the value of stocks cannot be justified by any fundamental indicators.⁸⁹ In another paper, *Jensen and Murphy (2004)* define overvaluation as 100 or 1000 percent above the fundamental value of a firm.⁹⁰

Jensen (2004) argues that overvalued firms face strong organizational forces to maintain overvaluation. These forces trigger managerial behavior that is not value-maximizing for the firm as a whole, therefore generating large agency costs. When equity becomes overvalued, managers engage in more acquisitions financed by overvalued stock-swaps, issue debt and equity and tend to overinvest. They execute actions necessary to justify the market valuation towards analysts, investors and other gatekeepers. Overvaluation might even lead to the execution of negative NPV-projects to blend the market. With respect to this paper, overvaluation can also lead to the engagement in Earnings Management, in any of the previously discussed forms. Managers might use Earnings Management in their accounting numbers to communicate a more promising future of the firm.⁹¹

Evidence on the value-destroying aspect of the Agency Theory of Overvalued Equity by Earnings Management is discussed extensively in the main body of this paper. However, regarding other forms, the following chart with data by *Moeller et al. (2005)* underlines that in a period of huge overall overvaluation, shareholders of firms undertaking acquisitions were facing huge losses.⁹²

⁸⁷ See Jensen (2004), p. 2-12.

⁸⁸ See Jensen and Meckling (1976), p. 4-10.

⁸⁹ See Jensen (2004), p. 2-12.

⁹⁰ See Jensen and Murphy (2004), p. 44.

⁹¹ See Jensen (2004), p. 2-12.

⁹² See Moeller et al. (2005), p. 757-759.

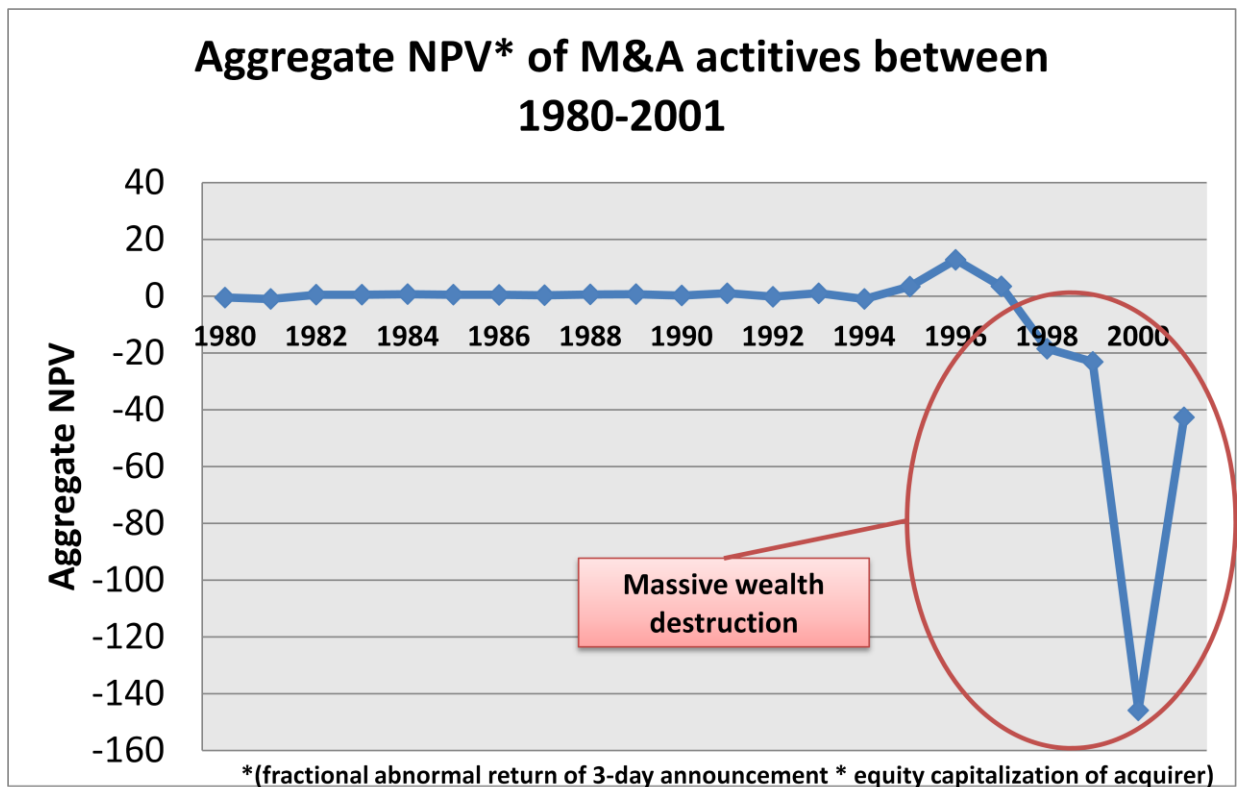


Chart 10: Yearly aggregate return of acquiring-firms shareholders – empirical verification of Agency Theory of Overvalued Equity

Source: See Moeller et al. (2005), p. 758 [modified]

Between 1998 and 2001, shareholders of firms that acquired other companies lost an aggregate 240 bn. dollar. According to *Moeller et al. (2005)*, this loss cannot be explained by a wealth transfer to shareholders of the target firms, therefore indicating a massive destruction of wealth. In line with the Agency Theory of Overvalued Equity, the conclusion is that in a period of high market valuations, managers engaged in large-scale acquisitions to justify their market valuation. The study further explains that most of the loss comes from a small number of large-loss, equity-swap financed deals by companies with high-valuations and concludes that investors recalculate the stand-alone value of the acquiring firm after the announcement of an acquisition, therefore detecting and correcting overvaluation.⁹³

While these losses can be attributed to real activities, *Gupta and Chi (2009)* discuss the negative value impact of the Agency Theory of Overvalued Equity in form of Earnings Management. By investing time and effort into managing accounting earnings, Managers face opportunity costs and might be distracted from their main tasks.

⁹³ See Jensen (2004), p. 4-6.

Furthermore, as mentioned in chapter two, managing earnings via accruals lead to a reversal effect in the future. Reversal effects can increase the volatility of firms and have an impact on the associated risk of the firm, thus increase the interest rate and lower the valuation of the firm.⁹⁴ *Karpoff et al. (2006)* further investigate the influence of lost reputation on future stock returns. A loss of reputation can be observed by deteriorating relations to customers, suppliers and other stakeholders. Firms that have to restate financial statements might lose customers who do not trust the company to operate services or fulfill warranties in the future. In money terms firms with accounting restatements lose 3,08 Dollar for every Dollar of income-increasing Earnings Management. The cost of the reputational damage is thereby 7,5 times higher than the cost for regulatory fines by government institutions.⁹⁵ Regarding the value implications of the Agency Theory of Overvalued Equity, the coming empirical section proves that even if managers can maintain a high stock price for some time by engaging in Earnings Management markets finally correct mispricing.

When managers realize that firms are overvalued, they face the choice of correcting or maintaining the situation. *Jensen (2004)* also argues that at some point the market will detect overvaluation and states further anecdotal examples like Enron or Nortel. Even though these companies might have had a healthy core value, the detection of a huge overvaluation also lead to the destruction of the sections with future growth opportunities.⁹⁶ Maintaining overvaluation is further encouraged by some of the motives discussed in chapter two. Since management compensation is increasingly tied to stock performance, managers have no incentive to correct overvaluation. Instead they have an incentive to maintain overvaluation as long as possible to keep their stock options and equity holdings high. Another aspect concerns the meeting and beating of market analysts expectations. *Skinner and Sloan (2000)* showed that firms which positively surprise markets with their earnings generate a positive abnormal quarterly return of 5.5%, while firms with negative earnings surprises obtain a negative abnormal quarterly return of -5.04%. However their research is limited to the pre-bubble time period between 1984 and 1996.⁹⁷

⁹⁴ See Gupta and Chi (2009), p. 6-7.

⁹⁵ See Karpoff et al. (2006), p. 18-20.

⁹⁶ See Jensen (2004), p. 1-12.

⁹⁷ See Skinner and Sloan (2002), p. 12.

Koh et al. (2006) find evidence that in the post-bubble world, the premium for beating market expectations has diminished, since investors became more skeptical about companies meeting and beating market expectations.⁹⁸ However, though the premium might be decreasing, it still exists and leaves managers an incentive to meet earnings forecasts.

As graphically shown in this section, Agency Costs of Overvalued Equity arising from M&A transactions are empirically proven.⁹⁹ In the subsequent sections, the empirical research on the question whether the Agency Theory of Overvalued Equity is able to explain Earnings Management as well as the associated value implications will be enlightened.

3.2 Empirical Research on Earnings Management in overvalued firms

3.2.1 Kothari et al. (2006)

Kothari et al. (2006) were initially comparing the Agency Theory of Overvalued Equity against the Investor Fixation Hypothesis to find out which theory has higher power to explain the accrual anomaly. The Accrual anomaly is an investment strategy that delivers abnormal positive returns by selling firms with high accruals short and opening a long position to buy low-accrual firms. Since the Investor Fixation Hypothesis is not important for the context of this paper, the following chapter focuses on the impact of the Agency Theory.¹⁰⁰

Kothari et al. (2006) subdivide their sample, which covers the time period of 1963 to 2004 and consists of around 156.000 firm year-observations, into accrual deciles ranging from high-accrual firms to low-accrual firms. Based on the assumptions of *Jensen (2004)*, overvalued firms tend to extend their overvaluation by managing discretionary accruals.¹⁰¹ Therefore the proportion of overvalued firms is expected to be higher in the high-accrual deciles than in the lower ones. Discretionary accruals are estimated by using the cross-sectional modified Jones Model as explained in the second chapter. Total accruals are investigated with the method explained in context of the Jones Model in chapter two, to control for the estimation error in discretionary accruals.

⁹⁸ See Koh et al. (2007), p. 1-4.

⁹⁹ See Moeller et al (2005), p. 757-759.

¹⁰⁰ See Kothari et al (2006), p. 2-8.

¹⁰¹ See Jensen (2004), p. 1-12.

However, regarding total accruals or discretionary accruals leads to the same results. For this reason the following section concentrates on the discretionary part of accruals, consistent with previous explanations to detect Earnings Management.

The paper subsequently covers time-periods of nine years, four years prior to the classification into an accrual decile (year zero) and four years after. *Kothari et al. (2006)* determine overvaluation by considering abnormal returns. Abnormal returns in the context of this paper can both be positive and negative and are defined as the difference to an average market return. In their descriptive findings, they outline that firms in the high-discretionary accrual decile have significantly higher market-to-book ratios (M/B), are smaller in terms of market capitalization and total assets and have lower leverage compared to firms in the lower deciles. These outcomes are in line with the typical firm characteristics of Earnings Management that were discussed in the second chapter. Furthermore, return on assets (ROA) is increasing consistently by moving from low-accrual to high-accrual deciles.¹⁰²

Both, high market-to-book ratios as well as an analogously to accrual-intensity increasing ROA can be interpreted as further evidence for the overrepresentation of overvalued firms in the high-accrual deciles. The following chart underlines the relation between abnormal returns and extreme accrual deciles in the nine-year time period.

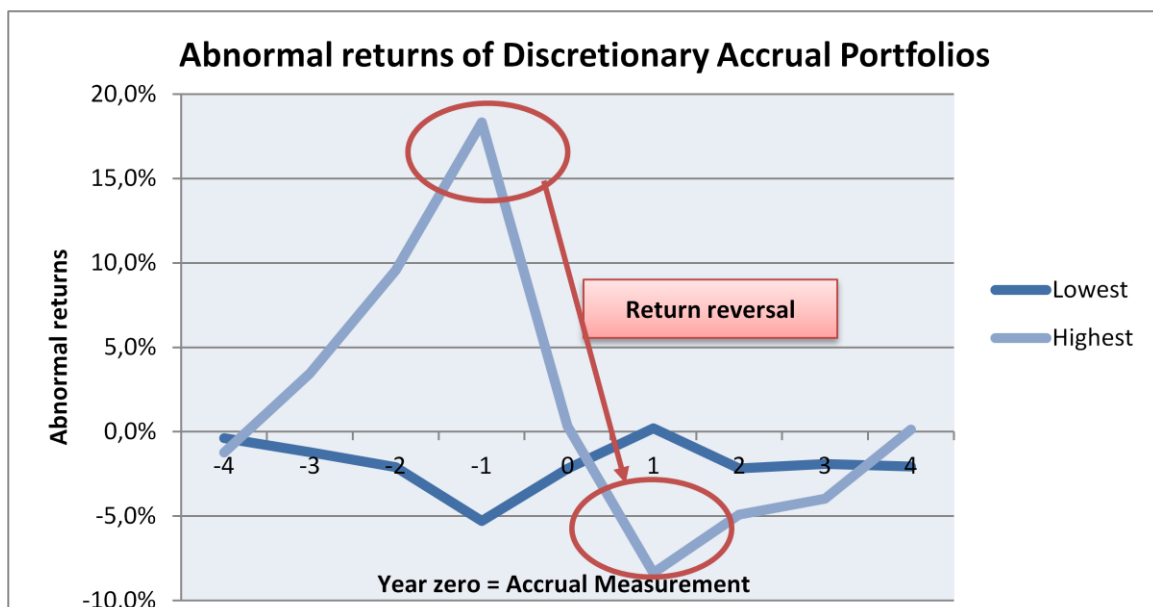


Chart 11: Abnormal returns of Extreme Deciles Discretionary Accrual Portfolios

Source: See Kothari et al. (2006), p. 53 [modified]

¹⁰² See Kothari et al (2006), p. 52-53.

The graph shows, that the decile with highest-accruals faces significantly stronger return volatility than the lowest-accrual decile. In the years prior to being classified as high-accrual decile, firms generate large positive abnormal returns up to 18.33% in year -1, thus indicating overvaluation. After year zero, there is a strong return reversal, with negative abnormal returns for years one to three. This can be interpreted as the costs of Earnings Management. As described in chapter two, accruals reverse over time.¹⁰³ Due to excessive and continuous Accrual Management to sustain overvaluation, firms might run out of Accrual Management opportunities which finally lead the market to detect overvaluation-induced Earnings Management. *Kothari et al. (2006)* find further evidence to justify the Agency Theory of Overvalued Equity. In contrast to the low-accrual deciles, high-accrual deciles face significantly higher analyst optimism, net-selling activities of insiders and distortions in investment and financing decisions.¹⁰⁴ The former two are not part of the research question and therefore not further discussed.

However, distortions in investment and financing decisions are interesting from the point of view of Real Transaction Management. Based on the assumptions of Jensen, *Kothari et al. (2006)* investigate whether overvalued firms tend to overinvest in PPE, R&D and capital assets. Therefore they compare the size-adjusted growth rates of these variables over all deciles.¹⁰⁵ The following chart shows the growth of investment activities for the highest and lowest accrual deciles.

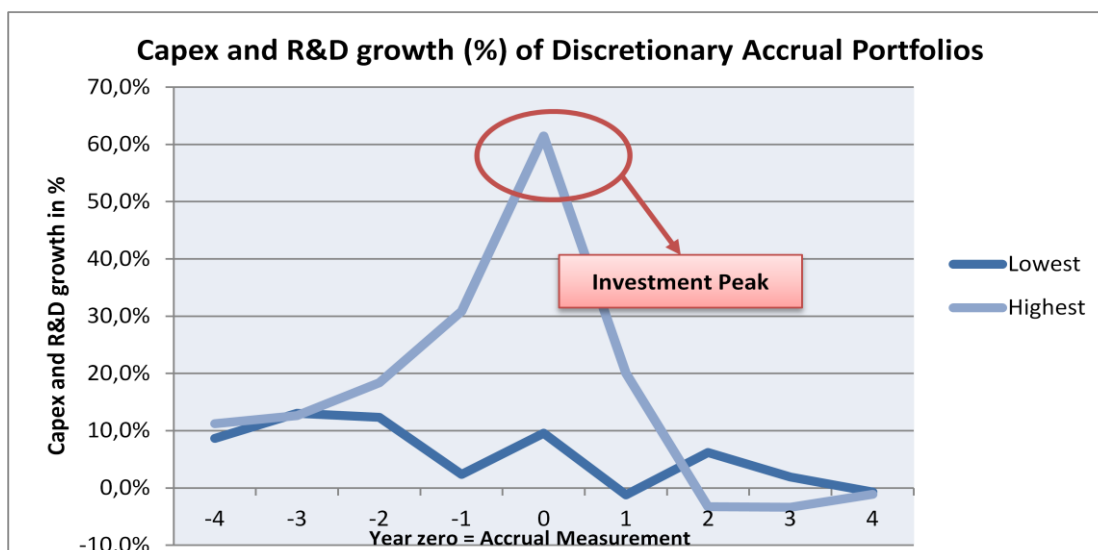


Chart 12: Capex and R&D growth of Extreme Deciles Discretionary Accrual Portfolios

Source: See Kothari et al. (2006), p. 59 [modified]

¹⁰³ See Badertscher (2011), p. 1496-1498.

¹⁰⁴ See Kothari et al (2006), p. 7-9.

¹⁰⁵ See Kothari et al. (2006), p. 32-34.

Again, the high-accrual decile has a much higher volatility than the low-accrual decile. In the year zero and before, firms spend extraordinary high levels on capex, R&D and PPE, consistent with the Agency Hypothesis from Jensen. Overlapping chart eleven and twelve would deliver almost identical slopes for the highest-accrual decile, though investment growth reaches its climax one year later than abnormal returns. This might be a proof that firms start to invest heavily as soon as abnormal returns decrease. The conclusion with respect to Earnings Management might be that firms in the sample which execute income-increasing discretionary accruals on one side do not further extend this kind of Earnings Management by Real Transaction Management. Firms that would intend to maintain high abnormal returns would logically tend to postpone investments, thus reducing the amount of investment expenditures. In contrast, increasing R&D spending, capex and so on implies that firms obviously rather engage in investing activities to maintain overvaluation. In this context, one could question whether the incentives for overvalued firms to increase spending are higher than to increase Earnings through Real Transaction Management. However, after year zero investment growth declines massively, even into negative absolute growth rates, meaning firms disinvest. This tendency could indicate that firms start to engage in Real Transaction Management in year one and the following. At this point, investments are reduced massively, seeming to underline that Accrual Management is exhausted and return reversal has to be faced by real activities.

Altogether the work of Kothari et al. has to be verified critically for its power to explain the occurrence of Earnings Management in overvalued firms. Surely, the assumption that overvalued firms are over represented in the high-accrual portfolio might hold. High market-to-book ratios as well as high preceding abnormal returns are in line with this assumption. With an instrumental variable analysis they further control if abnormal returns are effectively an evidence for overvaluation. Controlling the correlation of abnormal accruals to other factors mentioned in Jensen's Agency Theory (equity issues, acquisitions, R&D, PPE growth, etc.) they prove the validity of abnormal returns as proxy for overvaluation.¹⁰⁶ Besides, high discretionary accruals determined by the cross-sectional modified Jones Model indicate the existence of Earnings Management at all.¹⁰⁷

¹⁰⁶ See Kothari et al. (2006), p. 37-39.

¹⁰⁷ See Healy, P. (1985), p. 88-90.

Technically, by collecting a large sample set they seem to meet the requirements of the modified Jones Model as mentioned in the second chapter.

However, since Kothari et al.'s research focus is not on Earnings Management, they do not control for other factors influencing the determination of discretionary accruals. It is not clear, whether overvaluation clearly caused high-discretionary accruals or whether other factors also played a role. Additionally, the paper does not take into consideration other forms of Earnings Management, like Real Transaction Management, which is playing an increasingly important role of managements discretionary decisions.¹⁰⁸

In contrast, increasing R&D and capex in overvalued firms in year zero might suggest a contrary behavior, inconsistent with the prediction that overvalued equity causes all forms of Earnings Management. As far as their findings can be interpreted with respect to real activities, it seems to be the case that firms first engage in discretionary Accrual Management and then switch to Real Transaction Management. This assumption would be in line with the associated costs of different Earnings Management forms as discussed in the second chapter. However, since Kothari et al. do not explicitly control for other forms of Earnings Management, it would have been interesting to control the sample with Roychowdhury's Real Transaction Detection model.¹⁰⁹ The effect of crowding out overvalued-equity triggered overinvestment by Real Transaction Management will be discussed later, based on the findings of the other empirical papers.

In conclusion, Kothari et al. clearly concentrate on detecting different symptoms of the Agency Theory of Overvalued Equity with no particular focus on Earnings Management. They point out that analysts are more optimistic about overvalued firms, they show net-selling activities by overvalued firms insiders and finally they prove overvalued firms to be overinvesting. However they do not analyze the impact of overvalued equity on the Earnings Management behavior in a detailed level.

¹⁰⁸ See Graham et al. (2005), p. 56.

¹⁰⁹ See Roychowdhury (2006), p. 338-342.

3.2.2 Gupta and Chi (2009)

In contrast to Kothari et al., *Gupta and Chi (2009)* were the first ones to explicitly focus on the impact of overvaluation on Earnings Management behavior. Their paper is divided into two parts, first focusing on Earnings Management in overvalued firms and then testing whether overvalued firms face future abnormal negative returns, therefore experiencing the accrual anomaly.

Comparable to Kothari et al. their dataset covers the time period from 1964 to 2003 with around 91.000 firm year observations. Furthermore they also use the cross-sectional modified Jones Model to determine discretionary accruals. However, in their regression, they add cash-flow from operations as third residual to verify whether extreme levels of firm performance distort the data. Considering total accruals, they also use the method explained in the second chapter. Regarding the measurement of overvaluation, Gupta and Chi use a model that separates the market-to-book ratio into a firm's true value which is justified by growth opportunities and an error arising from misevaluation by the market.¹¹⁰ *Rhodes-Kropf and Viswanathan (2004)* developed the model, which is shown in the following equation.¹¹¹

$$m_{i,t} - b_{i,t} = \underbrace{m_{i,t} - v(\theta_{i,t}; \alpha_{j,t})}_{\text{firm-specific error}} + \underbrace{v(\theta_{i,t}; \alpha_{j,t}) - v(\theta_{it}; \alpha_j)}_{\text{industry-adjusted error}} + \underbrace{v(\theta_{i,t}; \alpha_j) - b_{i,t}}_{\text{long-run valuation component}}$$

Chart 12: Rhodes-Kropf Valuation Model

Source: See Gupta and Chi (2009), p. 8 [modified]

The lefthandside of the equation shows the valuation error arising from the difference between market and book value. The valuation error is then subdivided into a firm-specific, an industry-adjusted error and a long-run valuation component which is supposed to capture growth opportunities. *Rhodes-Kropf and Viswanathan (2004)* show that the model is superior to common M/B ratios to explain valuation errors in merger waves.¹¹²

¹¹⁰ See Gupta and Chi (2009), p. 1-9.

¹¹¹ See Rhodes-Kropf and Viswanathan (2004), p. 2690-2695.

¹¹² See Rhodes-Kropf and Viswanathan (2004), p. 2690-2695.

On the right side, the green term indicates the firm-specific valuation error. It is calculated by subtracting an industry valuation benchmark (v) from the market value (m) of firm i . V is a linear function wherein θ (firm-specific accounting information) and α (vector with valuation-multiples for industry j) are multiplied. The red term shows the long-run industry-valuation error. In this context, α_j represents the long-term industry valuation and matches this against the current industry valuation. Hence, differences between short-term valuation and long-term valuation in an industry are made transparent. Lastly, the book value of firm i is subtracted by the long-run industry benchmark valuation in the blue term, leading to real growth opportunities. Thus the blue term can be interpreted as fundamental valuation that is justified by growth-opportunities. *Gupta and Chi (2009)* further prove the superiority of the model by simulating investment strategies, in which they buy least-overvalued firms and sell most-overvalued firms short, which results in significant abnormal positive returns.¹¹³ With respect to Jensen's Theory of Overvalued Equity, one can say that firms are overvalued if their fundamental value is significantly exceeded due to firm and industry-specific valuation errors.

In contrast to *Kothari et al. (2006)*, Gupta and Chi also include control variables in their regression. Consistent with some of the Earnings Management motives described in chapter two, they control for firm size (logarithm of lagged book assets), the volatility of the business (standard deviation of sales), growth rates (value-to-book ratio and inventory-to-assets ratio), asset structure (intangibles to total assets ratio, net fixed assets to total assets ratio), M&A activities (dummy variable if there were M&A activities in previous three years), financial leverage (debt to equity) and firm performance (return on assets). The influence of eleven Corporate Governance indicators, ranging from ownership over board characteristics to auditor quality is investigated as well. However, by interacting these variables with the two stated valuation errors, the authors prove that governance mechanisms have little influence on the relation between overvaluation and discretionary accruals, an aspect which is further discussed later.¹¹⁴

Considering their research approach, Gupta and Chi first construct quintiles based on the total valuation error and then control the discretionary accruals of overvalued firms in the subsequent years. The following chart summarizes the most important results from their regression.

¹¹³ See Gupta and Chi (2009), p. 7-11.

¹¹⁴ See Gupta and Chi (2009), p. 7-11.

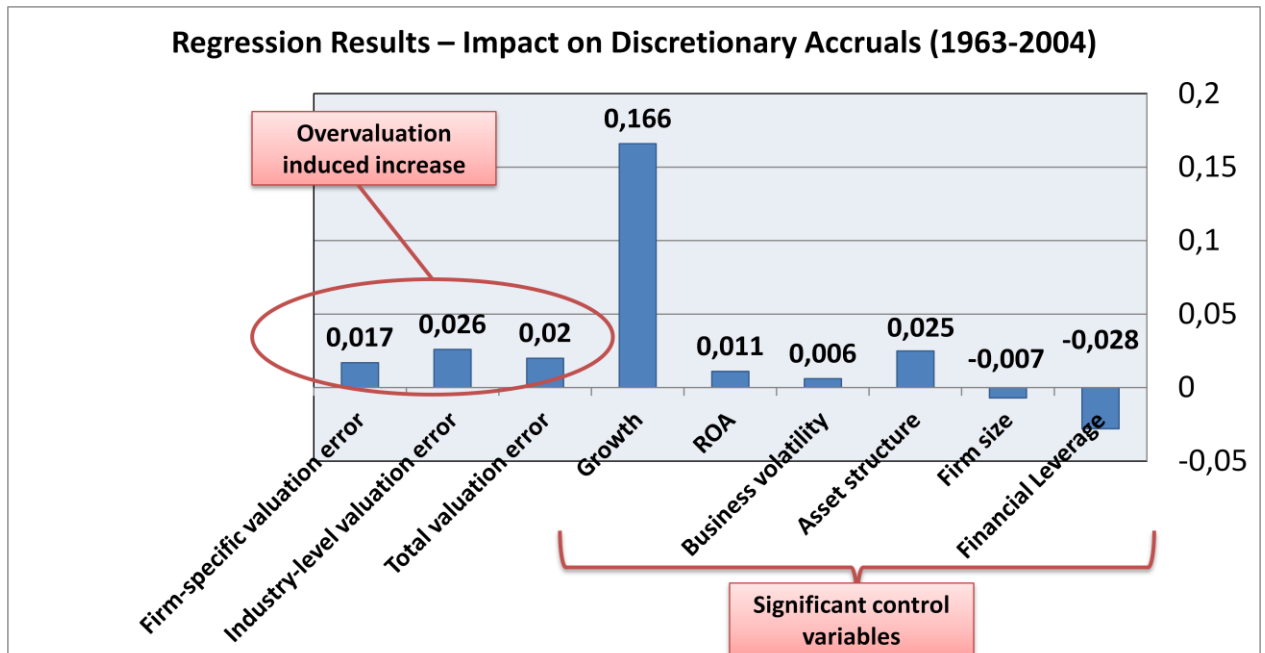


Chart 13: Overvaluation induced Impact on Discretionary Accruals

Source: See Gupta and Chi (2009), p. 32 [modified]

The chart shows that both variables for misevaluation are positive, meaning that overvalued firms increase their discretionary accruals. Interestingly, the impact of the industry-level valuation error on discretionary accruals is even more pronounced than the one of the firm-specific valuation error. Considering control variables, higher growth, ROA, business volatility and the asset structure lead to increasing discretionary accruals as well. On the other hand, larger firm size lead to decreasing discretionary accruals which is consistent with other empirical findings about political and reputational costs of Earnings Management in large firms as discussed in *Kim et al. (2003)*¹¹⁵. In contrast to the debt/equity hypothesis stated in *Watts and Zimmermann (1990)*, higher leverage had a negative influence on discretionary accruals, assuming increasing monitoring functions of debt holders.¹¹⁶ Altogether as previously observed in *Kothari et al.*, the regression results are consistent with the typical firm characteristics of Earnings Management firms that were described in the second chapter.

Beside these overall findings, Gupta and Chi divide their sample into sub periods. By considering separate 10-year time frames, Gupta and Chi find proof of a diminishing influence of both valuation errors on discretionary accruals in the last sub period.

¹¹⁵ See Kim et al. (2003), p. 1-4.

¹¹⁶ See Watts and Zimmermann (1990), p. 138-140.

In the period between 1994 and 2003 investors were able to use new information technologies, which might have reduced information asymmetries. Besides, they mention that accounting regulation increased in the last period of their sample, limiting the opportunity to manage earnings via discretionary accruals. Finally, due to the accrual reversal effect as discussed in chapter two, firm's opportunities to manage accruals might have reached exhaustible levels, forcing them to engage in Non-GAAP or Real Transaction Management. At this point, one can outline, that Gupta and Chi also find evidence for a diminishing importance of discretionary accruals relative to other methods of Earnings Management in the long run.¹¹⁷

The second aspect of the paper covers an investigation of the accrual anomaly. Gupta and Chi rank portfolios according to the intensity of their use of discretionary accruals as well as their intensity of overvaluation, resulting in 25 equal-weighted Portfolios. The portfolio containing the most-overvalued firms with highest discretionary accruals faces the highest abnormal negative future return. In general, abnormal returns decrease with intensifying overvaluation and with intensifying use of discretionary accruals.¹¹⁸ These findings are consistent with the findings of Kothari et al. The following chart underlines this aspect.

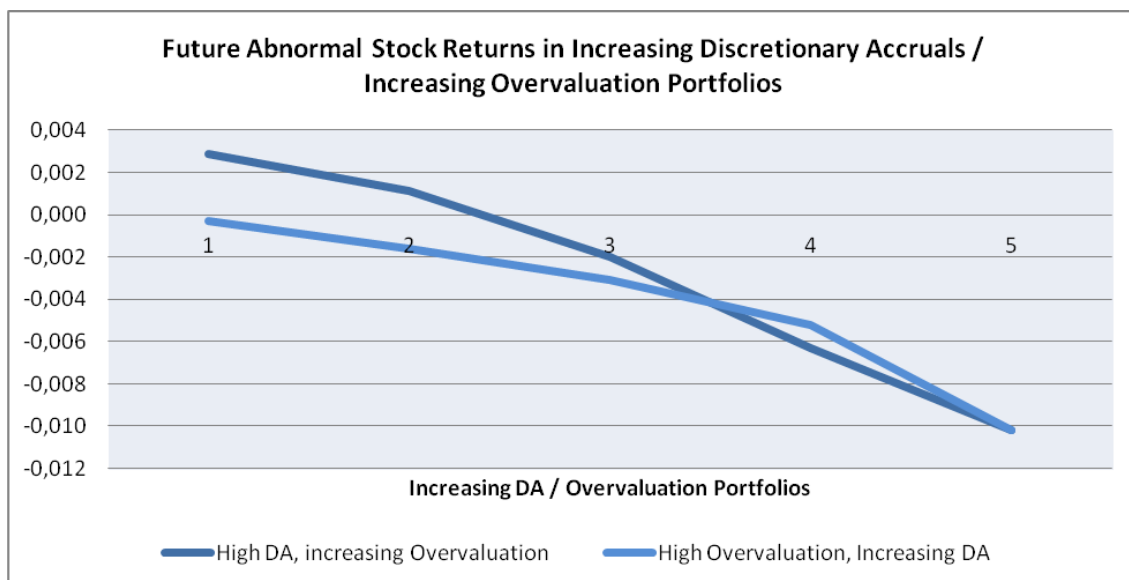


Chart 14: Future Abnormal Stock Returns in Increasing DA / Overvaluation Portfolios

Source: See Gupta and Chi (2009), p. 36 [modified]

¹¹⁷ See Gupta and Chi (2009), p. 13-14.

¹¹⁸ See Gupta and Chi (2009), p. 12-21.

The dark blue line shows the five portfolios with the highest discretionary accruals. These high discretionary accrual portfolios increase in overvaluation from one to five on the horizontal axis. It can be seen, that the future abnormal returns of portfolios with the highest discretionary accruals are decreasing with increasing overvaluation. Supporting to this, the light blue line shows the same impact for the five highly overvalued portfolios with increasing use of discretionary accruals. Their negative abnormal returns are increasing with the horizontal axis as well. Both lines prove the accrual anomaly graphically, showing that intensifying overvaluation and intensifying Earnings Management leads to negative future stock performance. Consistently, Gupta and Chi control for operating performance with comparable results. The operating performance, measured by EBITDA-to-assets ratio is decreasing with increasing overvaluation and with increasing use of discretionary accruals.¹¹⁹ This could be verified in line with the findings of Kothari et al., trying to substantiate if overvaluation leads to overinvestment and thus has a negative impact on future abnormal stock returns and future operating performance by bloating a company's asset basis.¹²⁰

Altogether, the paper of Gupta and Chi has a much higher explanatory power to prove the impact of overvaluation on Earnings Management than the previous paper of Kothari et al. The regression results underline the significant influence of overvaluation on the use of discretionary accruals. In contrast to Kothari et al, the more detailed analysis of a firm's valuation with separation of market mispricing and fundamental valuation seems to be a superior method to identify overvaluation. The inclusion of control variables underlines the impact of other factors, though compared to the following papers the list of control variables does not appear to be extensive. Besides, in line with the findings of Kothari et al, the accrual anomaly is proven. Decreasing abnormal future returns and operating performance are another empirical proof for the Agency Costs of Overvalued Equity.

However it has to be seen critical that no other methods of Earnings Management are investigated in the paper. Gupta and Chi solely focus on discretionary accruals. Though the empirical data, with decreasing use of discretionary accruals especially in the recent

¹¹⁹ See Gupta and Chi (2009), p. 12-21.

¹²⁰ See Kothari et al. (2006), p. 59.

10-year period suggest the intensifying use of Real Transaction Management and Non-GAAP Earnings Management, the authors do not control for it.

The results regarding governance mechanisms to reduce Agency Costs are discussed controversially in literature. While *Jensen and Murphy (2004)* argue that governance mechanism can decrease agency costs, Gupta and Chi believe that investors are not aware of the Agency Costs of Overvalued Equity and therefore Corporate Governance has no significant impact to control the problem in their sample.¹²¹ This aspect will be picked up in the subsequent discussions.

3.2.3 Houmes and Skantz (2010)

Houmes and Skantz (2010) explicitly outline that they investigate the influence of high valuations (not overvaluations) on Earnings Management. In measuring Earnings Management, they focus on the use of discretionary accruals. Furthermore they control for an inverse relation between cash flow from operations and earnings. Especially in highly valued firms, in which managers intend to maintain earnings on a high level, the effect of decreasing cash flows has to be compensated by increasing discretionary accruals. Additionally they investigate the role of management equity compensation and auditor quality in highly-valued firms.¹²²

In contrast to the long-term considerations of the previous papers, Houmes and Skantz cover the time-period between 1990 and 2005, with around 51.000 firm year observations. In a first step, they form three portfolios based on the valuation of firms. The first portfolio ranks the valuation sorted by lagged price-earnings (P/E) ratios, the second is sorted by lagged abnormal returns and the third by a combination of both. Since negative earnings lead to negative P/E ratios, firms with losses are excluded from the sample. In the following, the focus will be on the abnormal return portfolio since the other two portfolios exclude loss firms and therefore are not able to include all the control variables as seen later. Discretionary accruals are calculated based on the cross-sectional modified Jones Model, as experienced before. For each year, Houmes and Skantz form quintiles based on lagged valuation.¹²³ The following chart shows the regression model, including all control variables.

¹²¹ See Jensen and Murphy (2004), p. 48

¹²² See Houmes and Skantz (2010), p. 62-67.

¹²³ See Houmes and Skantz (2010), p. 66-68.

$$DA_{i,t} = \beta_0 + \beta_1 abnRET_{i,t} + \beta_2 abnRET_{i,t} * negRET_{i,t} + \beta_3 \ln ASSETS_{i,t} + \beta_4 LEV_{i,t} + \beta_5 abnBLOAT_{i,t-1} + \beta_6 LOSS_{i,t} + \beta_7 CFO_{i,t} + \beta_8 decROA_{i,t} + \beta_9 HV_{i,t} + \varepsilon_{i,t}$$

Chart 15: Regression Model of Houmes and Skantz

Source: See Houmes and Skantz (2010), p. 72 [modified]

Comparable to Gupta and Chi, Houmes and Skantz use seven (β_2 - β_9) control variables to determine the impact of other factors on Earnings Management. They outline that overvalued firms have higher incentives to report unfavorable news in order to decrease litigation risk. Therefore they include negRET as indicator variable for firms with negative abnormal current-year stock returns. Furthermore they include firm size (log of total assets), leverage (liabilities to total assets), abnormal balance sheet bloat (net operating assets to sales compared to an industry benchmark), losses (dummy variable at 1 if EBIT negative in previous year), operating cash flow (cash flow from operations to lagged assets) and earnings decreases (dummy variable at 1 if return on assets before discretionary accruals is decreasing from previous to current year). The variable highly valued (HV) indicates whether a firm is part of one of the highly valued portfolios.¹²⁴ The following chart shows the result of the regression.

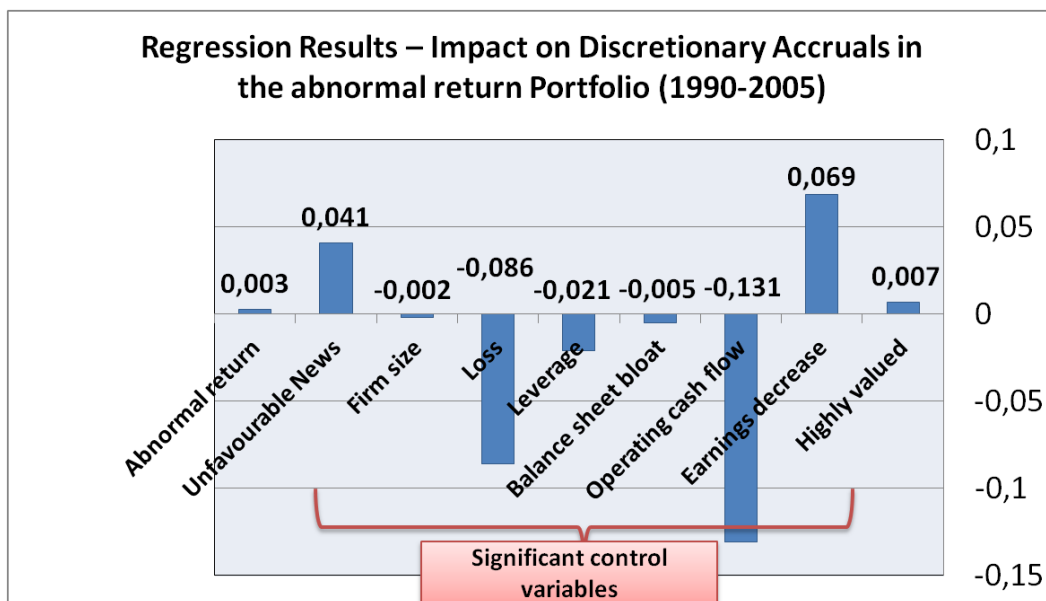


Chart 15: Regression Results of Houmes and Skantz

Source: See Houmes and Skantz (2010), p. 78 [modified]

¹²⁴ See Houmes and Skantz (2010), p. 70-72.

As seen in the previous papers, the overvaluation hypothesis is supported. A high valuation increases the use of discretionary accruals. Regarding control variables, it can be observed that decreases in earnings and unfavorable news lead to a higher use of Earnings Management. In contrast, larger firms, firms with higher leverage, firms with a high balance sheet bloat and firms with losses engage in less discretionary accrual management, thus supporting the empirical findings stated in the second chapter as well. Furthermore, the coefficient for the cash flow from operations is negative, underlining that firms with decreasing cash flows have to compensate these by higher discretionary accruals.

Beside the empirical test of the overvaluation hypothesis, Houmes and Skantz control for the impact of audit quality and management compensations schemes on the Earnings Management behavior of overvalued firms. In line with the discussion in *van Tendeloo and Vanstraelen (2008)*, firms which are audited by one of the big six auditing firms (today: big four auditing companies, at that time six) have higher accounting quality and execute less Earnings Management.¹²⁵ By including a dummy variable in an additional regression, Houmes and Skantz prove that high auditing quality weakens the impact of the operating cash flow and earnings decreases on discretionary accruals, whereas a high valuation enforces them both.¹²⁶ This aspect will be discussed further in the solution section.

In another regression model, Houmes and Skantz include variables like in-the-money-stock-options and Chief Executive Officer (CEO) equity holdings to measure the impact of management compensation on discretionary accruals. As discussed in *Efendi et al. (2007)*, managers of highly valued firms tend to have deep-in-the-money stock options and valuable equity holdings, thus incentivizing them to enforce Earnings Management to keep stock prices high.¹²⁷ Houmes and Skantz support these empirical findings by showing that the use of discretionary accruals increases with CEO's equity-at-risk. They conclude that high valuations and high equity-at-risk have a comparable impact on the Earnings Management behavior of firms and might complement themselves.¹²⁸

¹²⁵ See van Tendeloo and Vanstraelen (2008), p. 449-452.

¹²⁶ See Houmes and Skantz (2010), p. 87-89.

¹²⁷ See Efendi et al. (2007), p. 673-674.

¹²⁸ See Houmes and Skantz (2010), p. 87-89.

Altogether, analog to Gupta and Chi, Houmes and Skantz find comparable empirical evidence that supports the Agency Theory of Overvalued Equity. Clearly their regression results show that highly valued firms engage in Earnings Management. However, as both papers before, Houmes and Skantz only focus on the use of discretionary accruals. Again, neither Real Transaction Management nor Non-GAAP Earnings Management are investigated. Furthermore, measuring overvaluation via P/E ratios generates some misconceptions, since loss firms are excluded from the sample.

As mentioned before, generating a loss for various reasons might be an explicit Earnings Management strategy. Excluding loss firms in the sample might therefore limit the explanatory power of the research. This becomes particularly visible when controlling for the big bath phenomena, since both, the portfolio with P/E ratios and the combined portfolio cannot be used in the regression. Furthermore Houmes and Skantz differentiate between overvaluation and high valuation. They do not try to measure a valuation error with market benchmarks as seen in Gupta and Chi and treat high valuations as a given status without questioning the reasons for the valuation. However, high P/E ratios and abnormal returns can also be a sign of healthy growth, which is not captured by Jensen's definition of overvaluation as stated in the beginning of the third chapter. In contrast to Gupta and Chi, Houmes and Skantz also do not have a control variable that captures growth. Further interestingly, in Gupta and Chi, growth is the control variable with the highest impact on discretionary accruals, underlining that firms with high growth engage in more aggressive Earnings Management. However, this result can also be affected by the limitation of the Jones Model regarding growth firms, as mentioned in the second chapter. This raises the question why Houmes and Skantz do not include the aspect of growth in their considerations.

Considering the sample and in contrast to the previous papers, Houmes and Skantz cover a significantly smaller period of only 16 years. This is due to the fact that they include option compensation data, which is only available since recent years. Additionally, option compensation data can only be used until changes in the tax-regulation of option compensation in 2006 would distort the investigation, as discussed in *Ronen and Yaari (2008)*.¹²⁹ Furthermore, as researched in *Ofek and Richardson (2008)*, especially the period at the end of the 1990s and beginning of the new century might be biased by

¹²⁹ See Ronen and Yaari (2008), p. 89-90.

extremely high market valuations caused by the dotcom bubble, thus limiting the power of the sample for general predictions.¹³⁰

However, Houmes and Skantz try to address this problem by using dummy variables to control for the high volatility in discretionary accruals at the end of the century.¹³¹ Related to this, Houmes and Skantz are not able to detect long-term trends in Earnings Management behavior. While Gupta and Chi with their huge sample size were able to observe a decreasing use of discretionary accruals in the long-run, Houmes and Skantz's sample size rules out long-term findings. Additionally, Houmes and Skantz also do not control for the magnitude and duration of overvaluation induced Earnings Management, again in contrast to Gupta and Chi who were also investigating different levels in the use of discretionary accruals.

With respect to the use of control variables, they do not control for M&A activities, business volatility or growth, but in contrast to Gupta and Chi, they explicitly control for losses, big bath occurrence and the impact of unfavorable news. With respect to both of the previous papers, they also do not address the accrual anomaly. Especially by taking P/E as measure for overvaluation it would be interesting to investigate future stock returns to figure out whether overvaluation was induced by justified future growth opportunities or by market misevaluation. By neglecting the impact on future stock returns, Houmes and Skantz do not determine the costs of overvaluation-induced Earnings Management. Nevertheless, Houmes and Skantz are the first ones to explicitly investigate the impact of management compensation in highly valued firms, one potential solution to overvaluation-induced Earnings Management as discussed later.

3.2.4 Badertscher (2011)

Badertscher (2011) provides the most recent paper on overvaluation-induced Earnings Management and claims to be the first to research managerial behavior in choosing between different methods of Earnings Management. Moreover, the paper investigates the impact of the magnitude and the duration of overvaluation on Earnings Management behavior. Comparable to Houmes and Skantz, Badertscher's sample covers a 15-year time period between 1994 and 2008 and summates around 33.000 firm year observa-

¹³⁰ See Ofek and Richardson (2003), p. 1114-1116.

¹³¹ See Houmes and Skantz (2010), p. 66-67.

tions. Earnings Management via discretionary accruals is detected by the cross-sectional modified Jones Model, as discussed above.¹³²

Real Transaction Management is investigated via the cross-sectional regression approaches of *Roychowdhury (2006)*, as introduced in the second chapter.¹³³ Besides, Badertscher also researches Non-GAAP Earnings Management by regarding firms that had to restate financial reports because of accounting irregularities due to income-increasing Accrual Management. Covering all three Earnings Management methods as described in chapter two, Badertscher offers the broadest approach in overvaluation-induced Earnings Management research.

In contrast to the previous papers, Badertscher measures overvaluation by the Edwards-Bell-Ohlson (EBO) residual income model as used in *Frankel and Lee (1998)*.¹³⁴ The following chart shows a three period model of the EBO.

$$V_t = B_t + [(F-RET_t - r_e)/(1 + r_e) * B_t] + \\ [(F-RET_{t+1} - r_e)/(1 + r_e)^2 * B_{t+1}] + \\ [(F-RET_{t+1} - r_e)/[(1 + r_e)^2 * r_e] * B_{t+1}]$$

Chart 16: EBO valuation model

Source: See Frankel and Lee (1998), p. 290 [modified]

As described in *Frankel and Lee (1998)*, the EBO model is used to estimate the intrinsic value of a firm. The book value of a firm in each period t is multiplied by the future return on equity ($F-RET$) minus the cost of equity capital (r_e) and scaled by one plus the cost of equity. Thus, when future returns, which are taken by I/B/E/S consensus estimates for earnings per share, exceed the cost of capital, firms are able to generate residual incomes for its shareholders.¹³⁵ In line with the discussion in Frankel and Lee, the cost of equity capital is estimated with industry benchmarks derived from the model of *Fama and French (1997)*, which is not further discussed at this point.¹³⁶

¹³² See Badertscher (2011), p. 1498-1499.

¹³³ See Roychowdhury (2006), p. 338-342.

¹³⁴ See Frankel and Lee (1998), p.

¹³⁵ See Frankel and Lee (1998), p. 288-290.

¹³⁶ See Fama and French (1997), p. 164-167.

After measuring the intrinsic value of the firm with the EBO-model, Badertscher expresses overvaluation by dividing the share price of the firm through the intrinsic value (P/V). Hereupon, annual quintiles by ranking firms according to their P/V ratio are formed. The following equation shows the regression model.

$$\text{Earnings Managment}_{i,t} (\text{DA, RTM, non-GAAP}) = f(\sum \alpha_{1-5} \text{OVER}(i)_{i,t} + [\text{AF, LITIGATION, SEO, HERF_INDX, MRK-SHR, DISTRESS, BTD}] + [\text{SAL, BONUS, OWNER, UN_OPTIONS}] + [\text{BLOAT, BIGAUD, ROE, SOX, \Delta GDP}])$$

Chart 17: Regression Model of Badertscher

Source: See Badertscher (2011), p. 1499 [modified]

If a firm has been in the top-quintile with highest overvaluation for i years, the indicator variable $\text{OVER}(i)$ becomes one. The coefficients ranging from α_1 to α_5 are used to detect the duration of firms overvaluation-induced Earnings Management. If they remain positive and significant over time, firms continuously execute Earnings Management. Furthermore if the coefficient in a later period ($t+1$) increases, the magnitude of Earnings Management becomes greater. By changing the dependent variables with the different Earnings Management types, Badertscher is able to investigate whether firms change their Earnings Management methods over time.¹³⁷

Regarding control variables, Badertscher uses Earnings Management specific ones, Corporate Governance ones and general control variables, as shown in the three brackets. Earnings Management specific control variables are used, depending on which of the three Earnings Management methods is investigated. For Discretionary Accrual Management, control variables are the number of analysts (AF) following the firm as indicator of the monitoring function of markets, litigation risk (LITIGATION, indicator variable of 1 if the firm operates in an industry with high litigation risk) and seasoned equity offerings (SEO, indicator variable of 1 if equity was issued in year t).¹³⁸

¹³⁷ See Badertscher (2011), p. 1499-1501.

¹³⁸ See Badertscher (2011), p. 1499-1501.

As mentioned in the second chapter, research showed that firms tend to manage Earnings upward in the forefront of seasoned equity offerings.¹³⁹ For Real Transaction Management, Badertscher uses industry-competition (HERF_INDEX, based on Herfindahl competition index), market share (MRK_SHR) and financial distress (DISTRESS, based on *Altman's* (1968), Z-score index) as control variables.¹⁴⁰ *Zang* (2012) argues that costs for Real Transaction Management are especially high for firms that cannot afford to deviate from their optimal business strategy. Firms with a strong competitive market position and high market shares can typically afford to deviate from their optimal strategy and thus are more vulnerable to Real Transaction Management. Moreover, firms close to financial distress are also less vulnerable to Real Transaction Management, since they find it hard to survive with a strategy that consciously deviates from the optimum.¹⁴¹

With respect to previous research on Non-GAAP Earnings Management, Badertscher takes the book-tax difference (book income minus taxable income to lagged assets) as control variable for this type of Earnings Management. In line with the discussion in the second chapter and consistent to Gupta and Chi, Badertscher takes the base salary of CEO's (SAL), the share of their bonuses of their total compensation (BONUS), their equity ownership (OWNER) as well as their option grants and unexercised option holdings (UN_OWNER) as Corporate Governance Control variables. Finally, to generally control for other impacts on Earnings Management, Badertscher uses the balance sheet bloat (BLOAT, measured by net operating assets), auditor quality (BIGAUD, indicator variable of 1 if firm employs one of the eight big global auditing firms at that time) and firm profitability (measured via return on equity) as control variables. All of these variables have been discussed previously. In contrast to the previous papers, Badertscher also controls for differences in the time before and after the Sarbanes-Oxley-Act (SOX) was passed, because previous research exposed changes in accounting behavior as response to SOX. Finally, to control for the general development of the economy, Badertscher includes the growth in Gross Domestic Product (Δ GDP).¹⁴²

The following chart underlines the different Earnings Management mechanism with increasing overvaluation (Quintile 1 to Quintile 5).

¹³⁹ See Koh, Matsumoto et al. (2007), p. 1-5.

¹⁴⁰ See Altman (2000), p. 9-12.

¹⁴¹ See Zang (2012), p. 20-31.

¹⁴² See Badertscher (2011), p. 1499-1501.

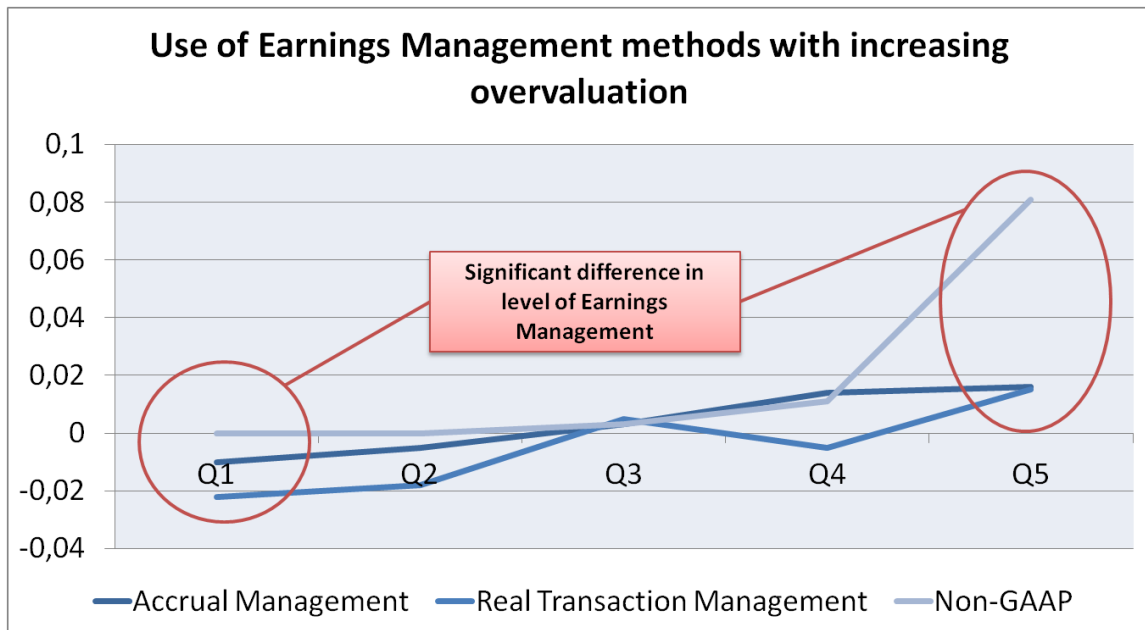


Chart 18: Use of Earnings Management methods with increasing overvaluation

Source: See Badertscher (2011), p. 1503 [modified]

The chart underlines that most overvalued firms in quintile five have a significant higher level of Earnings Management in all its forms. Especially the level of Non-GAAP Earnings Management explodes for the highest valued firms when considering the increase between quintile four and quintile five. Badertscher argues that firms running out of traditional Earnings Management methods via Accrual Management and Real Transaction Management choose even the most egregious form of Earnings Management to sustain overvaluation.

Analog to the magnitude of overvaluation, continuously overvalued firms engage in increasingly more Earnings Management. Considering the regression results, the coefficients for α , as stated above, are increasing for every additional year of overvaluation. Furthermore, the empirical results underline that once Accrual Management opportunities are exhausted due to the reversal effect described above, firms switch from Accrual Management to Real Transaction and Non-GAAP management.¹⁴³

After an average of three years being classified in Quintile five, firms increase Real Transaction Management and subsequently reduce their Accrual Management activities.¹⁴⁴ The following chart shows separate results of the main regression for Earnings Management via accruals and Real Transaction Management.

¹⁴³ See Badertscher (2011), p. 1502-1508.

¹⁴⁴ See Badertscher (2011), p. 1503-1504.

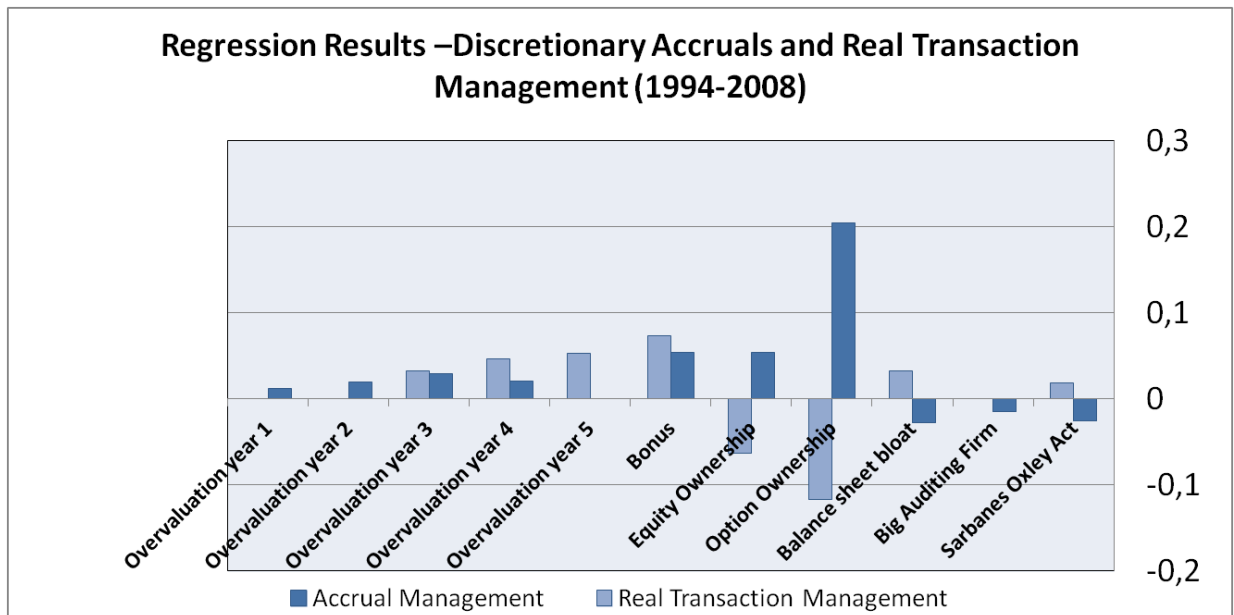


Chart 19: Regression results of Badertscher

Source: See Badertscher (2011), p. 1506 [modified]

Since only significant results are displayed, especially the results for the control variables of Non-GAAP Earnings Management are not shown. However, Non-GAAP Earnings Management has significant coefficients for the third, fourth and fifth year of overvaluation, therefore underlining that firms tend to engage in Non-GAAP Earnings Management with enduring overvaluation.

The results underline the tradeoff situation between Accrual and Real Transaction Management. After three year, firms switch to Real Transaction Management. The results for Accrual Management in year five are not significant anymore. Considering significant Corporate Governance control variables, the bonus coefficient seems to encourage both types of Earnings Management. Equity and option ownership are positively related to Accrual Management, but negatively to Real Transaction Management. Since Earnings Management via Real Transaction Management destroys firm value in the long-run, managers seem to avoid this method as soon as their compensation is tied to equity price development. As expected, balance sheet bloat, SOX and Auditing Quality are negatively related to Accrual Management, however balance sheet bloat is positively related to Real Transaction Management, implicating that firms with bloated balance sheets cannot engage in Accrual Management but seem enforce Real Transaction Management.¹⁴⁵

¹⁴⁵ See Badertscher (2011), p. 1505-1509.

Finally, Badertscher also captures the accrual anomaly by investigating annual buy-and-hold-returns for a one year and a three year period after forming portfolios. The results show, that high quintile firms significantly underperform lower quintile firms, even more pronounced in a longer time horizon, therefore proving the accrual anomaly.¹⁴⁶

Altogether, Badertscher's paper proves the Agency Theory of Overvalued Equity as well. It is shown, that overvalued firms engage in significantly more Earnings Management, regardless of the method. Measuring overvaluation via the EBO-model provides certain advantages. According to *Frankel and Lee (1996)*, the P/V ratio is superior in contrast to other valuation models in explaining stock price movements and abnormal positive future returns of low P/V firms.¹⁴⁷ However, using I/B/E/S analyst forecasts for earnings to estimate future residual incomes introduces some vulnerability to market optimism. The empirical findings of *O'Brien and Tan (2008)* underline, that especially in the period between 1996 and 2000, which is in the middle of Badertschers sample, analysts forecast, especially for certain industries, were characterized by broad overall optimism.¹⁴⁸ Thus might have biased the forecasts for future residual incomes and therefore lead to an overall higher valuation of firms.

Regarding the sample choice, Badertscher covers a small period of only 15 years, which is comparable to Houmes and Skantz, Therefore the same critique for the sample of Houmes and Skantz could be valid for this paper as well. However, with around 33.000 firm year observations for Accrual and Real Transaction Management, the sample is in line with previous papers and seems to fulfill the technical requirements of the Jones Model.¹⁴⁹ But especially for Non-GAAP Earnings Management, the sample only contains 541 restatements, thus the explanatory power of results might be biased. However, restatements do not occur frequently and the databases only cover recent periods, which technically does not allow higher sample magnitudes. Nevertheless Badertscher underlines the importance to investigate all forms of Earnings Management, since increasing and continuing overvaluation influence the Earnings Management behavior of managers.

¹⁴⁶ See Badertscher (2011), p. 1502-1503.

¹⁴⁷ See Frankel and Lee (1996), p. 7-9.

¹⁴⁸ See O'Brien and Tan (2008), p. 14-17.

¹⁴⁹ See Ronen and Yari (2008), p. 404-407.

3.3 Comparison and Conclusion of the Empirical Research

All four empirical papers clearly support the research question and find comparable evidence that Earnings Management is triggered by Overvaluation. Consistent to Jensen's Agency Hypothesis, overvalued firms try to sustain their overvaluation by increasing discretionary accruals, engaging in Real Transaction Management and finally executing Non-GAAP Earnings Management, when their opportunities to use previous methods are exhausted. However, regarding the sample choice, the systematical overvaluation and Earnings Management framework, the use of control variables and further aspects, there are significant differences between the papers which prove that the research on overvaluation-induced Earnings Management is characterized by heterogeneity and still can be improved.

Regarding the sample choice, Kothari et al. as well as Gupta and Chi examine much broader samples ranging from the 60s to the 2000s, while the other two authors only cover the 90s to 2000s. While Gupta and Chi prove an exhaustion effect of Accrual Management in the long-run, which might partly be driven by higher monitoring quality of stakeholders, Badertscher finds comparable evidence in the short run, with firms switching from Accrual Management to Real Transaction Management. Especially the investigation of a long-run behavior of overvalued firms, regarding the choice of their Earnings Management methods as observed in Badertscher, would enrich the current state of research. However Badertscher's research approach would have to be redesigned due to a lack of information about long-term development of option compensation in current databases. Furthermore, all researchers use Compustat CRSP data, thus limiting investigations to the US-market. Some researchers recently developed studies that cover the Australian market, as seen in *Coulton et al. (2011)*¹⁵⁰ and the Italian market, as seen in *Raoli (2012)*.¹⁵¹ Nevertheless, altogether the research for highly developed capital markets outside the US is to the best knowledge relatively spare. Therefore, since *Leuz et al. (2003)* find significant differences in Earnings Management behavior across countries, it might be interesting to extend the research on overvaluation induced-Earnings Management in an international context.¹⁵²

¹⁵⁰ See Coulton et al. (2011), p. 22-23.

¹⁵¹ See Raoli et al. (2012), p. 86-87.

¹⁵² See Leuz et al. (2003), p. 506-507.

Considering the measurement of overvaluation, there seems to be no clear definition of overvaluation as indicated in *Jensen and Murphy (2004)*, who argue that firms are substantially overvalued when their fundamental value is exceeded by 100 to 1000 percent.¹⁵³ By using abnormal-returns and market-to-book ratios, Houmes and Skantz and Kothari et al. examine the simplest approach. Their overvaluation data is easily available and calculable. However, market-to-book ratios might not reflect overvaluation but valuable growth opportunities as discussed in *Rhodes-Kropf et al. (2004)*.¹⁵⁴ On the other hand, Houmes and Skantz explicitly focus on highly valued firms instead of overvalued firms. In this context, market-to-book ratios can be an indicator to distinguish between lower-valued and higher-valued firms.

By using the Rhodes-Kropf valuation model, Gupta and Chi use a model that captures a valuation error in market-to-book ratios, thus they might deliver a more pronounced indicator for overvaluation. They separate the fundamental value of the firm and investigate only the impact of Earnings Management in mispriced firms. Finally, by using the EBO-model and trying to generate an intrinsic firm value, Badertscher might grasp the valuation aspect best. However by forming quintiles in relative terms, it is not clear whether firms are overvalued in absolute terms as stated by Jensen's definition. Expressing overvaluation in relative terms across a sample assumes, that firms with the highest ratios must be overvalued, regardless of their absolute valuation. Only Gupta and Chi seem to express overvaluation in absolute terms by calculating and ranking firms according to their total valuation error. However, in measuring mispricing, EBO and Rhodes-Kropf seem to deliver comparable results, as investigated in the research of *Ma et al. (2011)*, therefore no general statement about superiority of any model can be made.¹⁵⁵ Altogether, the overvaluation research is characterized by various approaches to measure overvaluation, but no homogenous method is used in all the four papers.

With respect to the Earnings Management methods, only Badertscher captures all three methods as discussed in the second chapter. Considering the measurement of discretionary accruals, all authors use the cross-sectional modified Jones Model. *Verbruggen et al. (2008)* outline in their literature review on Earnings Management that the cross-sectional approach is currently the most-applied by many researchers.

¹⁵³ See Jensen and Murphy (2004), p. 44.

¹⁵⁴ See Rhodes-Kropf et al. (2004) p. 2-5.

¹⁵⁵ See Ma et al. (2011), p. 17-20.

Furthermore, though there are some problems with the model as discussed in chapter two, research on new, more accurate models is slow in progress.¹⁵⁶

Regarding Real Transaction Management, beside the findings of Badertscher only Kothari et al. capture the effects to some extent when proving that capex and R&D expenses of high-accrual decile firms are significantly distorted compared to lower accrual decile firms. The focus on discretionary Accrual Management might be the biggest weakness of the first three papers, since Earnings Management in general cannot be captured by investigating only one of its methods as discussed in *Zang (2012)*. Zang outlines that managers tradeoff Accrual and Real Activities Management according to the costs of each method, as previously mentioned in the second chapter. Furthermore the results underline that Real Transaction Management functions as substitute for Accrual Management, an effect that has also been discussed in Badertscher.¹⁵⁷ Comparable research has been undertaken by *Cohen and Zarowin (2008)*, who proved that firms tradeoff between Real Transaction and Accrual Management around seasoned equity offerings by considering costs and the ability to manage accruals.¹⁵⁸

Further taking into consideration the overall growing importance of Real Transaction Management as described in *Graham et al. (2005)*, empirical studies on overvaluation-induced Earnings Management without considering all forms of Earnings Management might lack explanatory power.¹⁵⁹ Finally, while Non-GAAP Earnings Management research is characterized by small-samples and might be avoided by that reason, a frequently applied model by *Roychowdhury (2006)* to detect Real Transaction Management exists since 2006, therefore providing the methodological prerequisites to revisit the existing papers.¹⁶⁰

Beside these methodological aspects, it is remarkable, that firms which use Real Transaction Management to sustain overvaluation, hence for example delay R&D operations or advertising projects as observed in Badertscher, may act in contrast to Jensen's Theory of Overvalued Equity. Jensen clearly points out, that firms tend to overinvest and not to reduce investments because of their overvalued equity.

¹⁵⁶ See Verbruggen et al. (2008), p. 15-17.

¹⁵⁷ See Zang (2012), p. 35-36.

¹⁵⁸ See Cohen and Zarowin (2008), p. 2-5.

¹⁵⁹ See Graham et al (2005), p. 16-18.

¹⁶⁰ See Roychowdhury (2006), p. 338-342.

However, Badertscher underlines that firms use Real Transaction Management to sustain overvaluation when Accrual Management is exhausted, a result in sharp contrast to the findings of Kothari et al. who showed that overvalued firms tend to overinvest. Combining the findings of both authors, this might be a proof that firms overinvest in early stages of overvaluation when Accrual Management is still a proper method of managing earnings and then change their investment behavior. The negative capex growth in the two years after being overvalued as shown in Kothari et al. (chart 12) might underline this aspect and reflect the beginning of Real Transaction Management.

Apart of these aspects, the accrual anomaly is proven by all authors except Houmes and Skantz. Gupta and Chi as well as Badertscher also outline that a higher magnitude and longer duration of overvaluation-induced Earnings Management increase future abnormal negative returns as shown in chart 14. This accrual anomaly is an essential part of Jensen's Agency Theory, supporting that overvaluation is at some point detected and corrected by the market.¹⁶¹ Also, these abnormal negative returns can be interpreted as costs of overvaluation-induced Earnings Management. The results of all authors underline that stakeholders have an incentive to reduce overvaluation-induced Earnings Management, since they face huge costs.

Considering the choice of control variables, all four authors quote different other empirical papers but there seems to be no overall accepted conceptual set of relevant control variables. While the newest research by Badertscher is characterized by more than a dozen control variables, the oldest research by Kothari et al. does not apply control variables at all. Some variables like M&A activities, seasoned equity offerings or analyst coverage are only used in one paper and often obtain low statistical significance. However some control variables are used in more than one paper.

Consistent with the second chapter, Houmes and Skantz and Gupta and Chi find that certain firm characteristics like leverage and firm size are negatively associated to Discretionary Accrual Management. Furthermore, there is evidence that balance sheet bloat restricts Earnings Management via discretionary accruals. In contrast, Badertscher proves a positive association between balance sheet bloat and Real Transaction Management, further supporting his hypothesis that firms switch to other forms of Earnings Management when discretionary accruals are expected to reverse.

¹⁶¹ See Jensen (2004), p. 1-12.

With respect to the forthcoming sections about solutions of the Earnings Game in overvalued firms, the applied control variables in Houmes and Skanz and Badertscher underline that equity or option holdings by CEO's have a positive association with Earnings Management via discretionary accruals. Interestingly, CEO equity/option holdings are negatively related to Earnings Management via Real Transactions. As described in chapter two, Real Transaction Management is likely to destroy long-term firm value and therefore is a costly form of Earnings Management. As concluded in Badertscher, managers with significant equity/option holdings might not want to limit the NPV of their holdings by sacrificing long-term value.¹⁶² Finally, Houmes and Skanz and Badertscher find that the quality of auditing firms seems to play a crucial role in undermining Earnings Management. These aspects and further considerations are discussed in the forthcoming sections in more detail.

4 Approaches to limit Earnings Management in Overvalued Firms

4.1 Overview

Before discussing managerial and regulatory approaches to reduce Earnings Management in overvalued firms, it should be mentioned that managers and stakeholders might even have difficulties to ex-ante realize that a company is overvalued.¹⁶³ However, there is evidence that managers are aware of overvaluation. While *Jensen and Murphy (2004)* assume that managers generally prefer to sustain overvaluation, there is contrary evidence that managers are not just well aware that their companies are overvalued, but also try to correct this misevaluation.¹⁶⁴

Duong (2010) describes, that firms try to correct overvaluation around five years after being classified as highly-valued. They use Real Transaction Management in order to decrease production levels and spend higher discretionary expenses. Duong argues that these firms try to avoid a sudden shock situation at the market which would lead to a huge destruction of value.¹⁶⁵ However, empirical evidence on this self-correction function of managers is to the best knowledge relatively spare.

¹⁶² See Badertscher (2011), p. 1496-1498.

¹⁶³ See Houmes and Skanz (2010), p. 60-61.

¹⁶⁴ See Jensen and Murphy (2004), p. 45-49.

¹⁶⁵ See Duong, C. H. (2010), p. 3-4.

Assuming that not all managers detect and correct overvaluation, Jensen and Murphy intensively argue about different approaches to limit the Agency Costs of Overvalued Equity.¹⁶⁶ As the empirical section showed, overvaluation can cause Earnings Management. Therefore, the external correction of overvaluation might be one approach to solve the problem. *Franks and Meyer (1992)* outline that the market for corporate control functions as one mechanism to correct misvaluations and non-optimal managerial behavior.¹⁶⁷ However, in contrast to their findings, Jensen and Murphy describe that the market for corporate control fails for overvalued firms since there is a low incentive for investors to buy an overvalued firm and correct its market price. They further suggest that managers should communicate the growth prospects of a company more aggressively as firms become overvalued.¹⁶⁸ In line with that, *Fuller and Jensen (2010)*, propose that managers should realize the long-term value destruction of enduring overvaluation and therefore manage the expectations of the markets close to the intrinsic value of the firm.¹⁶⁹

If opportunities to correct overvaluation are scarce, firms should focus on internal and external mechanisms to reduce Earnings Management. In contrast to *Frey and Osterloh (2004)*, who argue that management compensation tied to equity creates questionable incentives to manage Earnings, *Jensen and Murphy (2004)* do not think that equity based compensation should be avoided in general.¹⁷⁰ This is supported by *Ronen and Yaari (2008)* who argue that the cost of Earnings Management are lower than the introduction of flat intensive schemes that are not tied to performance measures. They further argue that GAAP set a limit for the magnitude of Earnings Management.¹⁷¹ However with special respect to overvalued companies, anecdotal evidence like the case of Enron underlines that the cost of overvaluation-induced Earnings Management might be tremendous, especially when GAAP rules are neglected.¹⁷² In line with that, the paper of Badertscher outlines that overvalued firms switch to Non-GAAP activities, as soon as GAAP-conform Accrual Management and Real Transaction opportunities are exhausted. These compensation-related aspects will be discussed further in the next section.

¹⁶⁶ See Jensen and Murphy (2004), p. 47-48.

¹⁶⁷ See Franks and Meyer (1990), p. 189-192.

¹⁶⁸ See Jensen and Murphy (2004), p. 47-48.

¹⁶⁹ See Fuller and Jensen (2010), p. 59-60.

¹⁷⁰ See Frey and Osterloh (2005), p. 105-106.

¹⁷¹ See Ronen and Yaari (2008), p. 355-356.

¹⁷² See Jensen (2004), p. 175-178.

Going one step back and regarding the factors that were shown to have a negative impact on Earnings Management in the empirical section, the following chart underlines those factors that were negatively correlated to overvaluation-induced Earnings Management in the respective regressions.

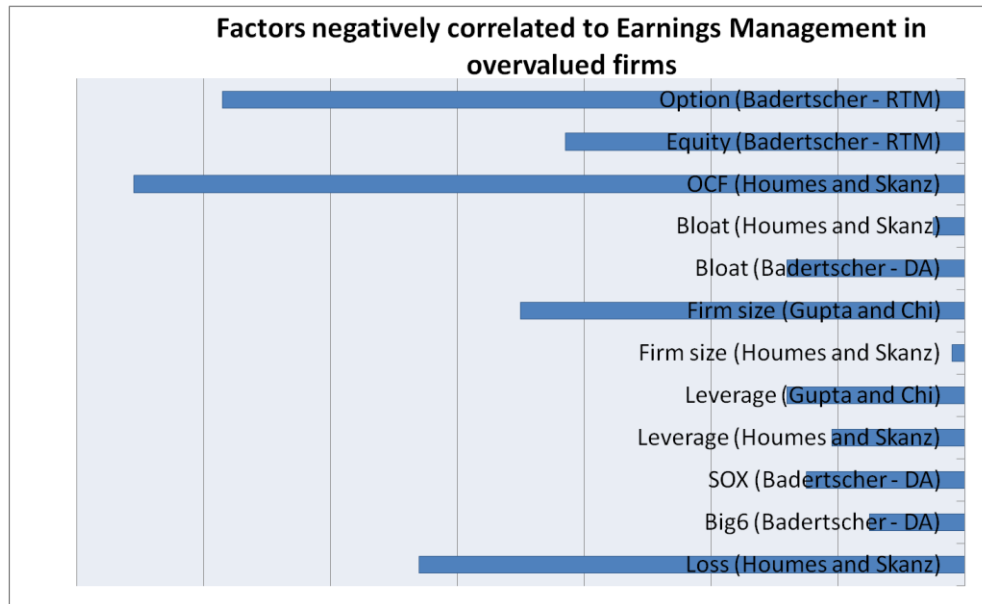


Chart 20: Factors negatively correlated to Earnings Management in overvalued firms

Source: See Badertscher (2011), p. 1506 [modified], Houmes and Skanz (2010), p. 78 [modified] and Gupta and Chi (2009), p. 32 [modified].

Obviously the mere figures cannot be compared, because all authors cover different data sets. However, their tendency is valuable in the analysis of the negative effect of certain aspects on Earnings Management. Clearly, operating cash flow, balance sheet bloat, firm size and losses are firm characteristics or financial ratios that discourage Earnings Management but are hardly changeable in the short-run and not in focus of the further discussion. The results suggest that three indicators have been observed to limit Earnings Management in overvalued firms, namely management compensation (at least with respect to the impact of Real Transaction Management), outside regulation (represented by the introduction of the Sarbanes-Oxley-Act) and outside monitoring by auditors. Besides, though there is contrary evidence in the empirical findings of Gupta and Chi as mentioned in chapter three, other empirical research suggest that Corporate Governance plays a role in reducing Earnings Management in overvalued firms.¹⁷³ These four approaches are further discussed in the forthcoming sections.

¹⁷³ See Shiue et al. (2009), p. 105-106.

4.2 Internal Mechanisms

4.2.1 Management compensation

The increasing use of equity/option-tied compensation schemes leads managers to fulfill market expectations at any cost as reported by many empirical researchers.¹⁷⁴ *Efendi et al. (2007)* are among the most influential researchers to investigate the influence of equity compensation in overvalued firms. They find that firms with managers who hold a considerable package of in-the-money stock options are significantly more likely to restate their accounting data. This likelihood is further increasing with intensifying overvaluation.¹⁷⁵

Another aspect covers the exercisability of options. Especially in the US, management option-packages exploded since the 1990s.¹⁷⁶ Selling these packages would not just directly depress share-prices, but also indirectly signal investors who closely monitor the insider trading activities of CEO's, that the stock price is overvalued. This obstacle in selling in-the-money stock options offers managers of overvalued firms another incentive to maintain overvaluation as long as possible.¹⁷⁷

Considering these aspects, *Martin (2003)* argues that equity compensation does not fulfill its original duty to align interests of shareholders and executives at all. However, it encourages managers to raise market expectations in investor meetings and conference calls, to engage in Earnings Management and acquisitions and to conceal true performance. Furthermore, Martin describes that managers have an incentive to create a huge gap between intrinsic value and market value, in order to enrich themselves through buying or selling stocks with their insider knowledge.¹⁷⁸ *Klein (2006)* finds that stock ownership of CEO's significantly increases the probability of Earnings Management.¹⁷⁹ *Frey and Osterloh (2005)* argue in the same direction, claiming that managers should be paid like bureaucrats and equity/option compensations should be abolished. They refer to other studies that fit in the time frame of the investigations by Badertscher as well as Houmes and Skantz between the 1990's and 2000's and that confirm that a higher stock-option tied remuneration of CEO's is more likely to cause fraudulent behav-

¹⁷⁴ See Bartov et al. (2000), p. 1-4.

¹⁷⁵ See Efendi et al. (2007), p. 668-670.

¹⁷⁶ See Jensen and Murphy (2004), p. 24-25.

¹⁷⁷ See Efendi et al. (2007), p. 668-670.

¹⁷⁸ See Martin, R. (2003), p. 1-2.

¹⁷⁹ See Klein, A. (2006), p. 2-3.

ior.¹⁸⁰ While Frey and Osterloh suggest a fixed salary for managers, Martin suggests to tie compensation schemes to real, observable figures like sales, costs, margins or profits. However, these figures can also be manipulated by managers as mentioned before in various examples.

In contrast to the previous authors, *Jensen and Murphy (2004)* argue that the complete elimination of equity/option based compensations would be a step backwards in executive compensation.¹⁸¹ Interestingly, the long-term findings of Gupta and Chi in the empirical section underline that managers engaged in less Discretionary Accrual Management in the 1990's though equity/option packages increased massively in that same period as mentioned above.¹⁸²

In this context, Efendi et al. underline that contracts carefully have to be balanced out regarding the positive incentives arising from alignment of management and ownership and the increased likelihood of Earnings Management.¹⁸³ Therefore, Jensen and Murphy argue that the Agency Costs generated by equity compensation schemes can be reduced by introducing minimum holding periods or by redesigning contracts with a long-term horizon.¹⁸⁴ *Van Clief and Langford Kelly (2005)* point in the same direction, underlining that the majority of option grants are free of any minimum holding requirements.¹⁸⁵

With respect to the empirical section of this paper, the findings of Badertscher support the view that equity/option compensations align the interests of managers and shareholders at least to some extent. The regression results in charts 19 and 20 suggest that managers have no incentive to destroy value, since they engage in less Real Transaction Management when their remuneration is tied to equity/option compensation. On the other hand, managers engage in more Discretionary Accrual Management if their compensation schemes contain equity/option elements. These empirical findings might underline that managers are well aware of the value-destroying nature of Real Transaction Management and therefore prefer Discretionary Accrual Management to increase their short-term compensation.

¹⁸⁰ See Frey and Osterloh (2005), p. 98-99.

¹⁸¹ See Jensen and Murphy (2004), p. 45-48.

¹⁸² See Gupta and Chi (2009), p. 13-14.

¹⁸³ See Efendi et al. (2007), p. 671-672.

¹⁸⁴ See Jensen and Murphy (2004), p. 45-48.

¹⁸⁵ See Van Clief and Langford Kelly (2005), p. 11-12.

However, introducing rigorous minimum holding periods for managers in overvalued firms might be a reasonable approach to reduce the myopic behavior of managers and therefore limit the magnitude of Discretionary Accrual Management.

4.2.2 Corporate Governance

In the empirical section of this paper, *Gupta and Chi (2007)* interact Corporate Governance variables with overvaluation indicators of their sample firms. The results show that existing Corporate Governance mechanism do not limit the use of Earnings Management in overvalued firms.¹⁸⁶

However, based on these findings, *Shiue et al. (2009)* investigate the impact of Corporate Governance on the Earnings Management behavior of overvalued firms around Seasoned Equity Offerings in Taiwan.¹⁸⁷ As mentioned in chapter two and investigated by *Cohen and Zarowin (2008)*, managers tend to increase discretionary accruals in the forefront of a SEO.¹⁸⁸ According to the Pecking Order Theory in Corporate Finance, SEO-firms are assumed to be overvalued. This is supported by the findings of *Murray and Goyal (2005)* who outline that firms tend to issue equity when their shares are overvalued.¹⁸⁹

In this setting, Shiue et al. identify the board size, the independence of board members and their competence as important Corporate Governance indicators. First they show that overvalued firms typically have weaker board independence and competence. Based on these findings they conclude that firms can reduce the Agency Costs of Overvalued Equity by increasing the percentage of independent board members and by increasing the average tenure of the board members which functions as proxy for the competence of boards.¹⁹⁰ *Xie et al. (2001)* find comparable evidence, showing that sophisticated outside directors reduce the extent of Earnings Management. In their investigation, they evaluate the sophistication of directors by their experiences in other corporations and investment banking.¹⁹¹

¹⁸⁶ See Gupta and Chi (2009), p. 7-11.

¹⁸⁷ See Shiue et al. (2009), p. 105-106.

¹⁸⁸ See Cohen and Zarowin (2008), p. 18-21.

¹⁸⁹ See Murray and Goyal (2005), p. 20-21.

¹⁹⁰ See Shiue et al. (2009), p. 108-112.

¹⁹¹ See Xie et al. (2001), p. 19-20.

Supporting these results, *Klein (2006)* finds that firms, in which only less than half of the audit committee is independent, are significantly more vulnerable to Earnings Management via discretionary accruals.¹⁹²

Regarding the board composition, *Efendi et al. (2007)* further outline that firms where the CEO obtains a double function and also holds the board chair are significantly more vulnerable to accounting restatements.¹⁹³ Klein further shows that Earnings Management is more likely to occur, if executives are also members of the compensation committee. She concludes that boards, compensation and audit committees independent from management are most effective in monitoring the firm. With respect to the equity ownership of boards, she further outlines that non-management, independent outside directors with huge equity blocks are most effective in monitoring the management and significantly decrease the likelihood of Earnings Management.¹⁹⁴

With respect to the duties and responsibilities of boards, *Jensen and Murphy (2004)* underline that the closer the management's remuneration is tied to the development of equity, the closer compensation and audit committees have to monitor the actions taken by the management.¹⁹⁵ Xie et al. further add that an increased frequency of board and audit committee meetings decreases the likelihood of Earnings Management as well.¹⁹⁶ Finally, regarding the communication function of boards to outsiders, *Jensen and Murphy (2004)* point out, that firms have to take responsibility for accurate disclosure policies that allow investors to understand the value drivers of their business. The board has to ensure that markets obtain the necessary information to calculate the fundamental value of a firm. Moreover, Jensen and Murphy suggest that boards should establish a regular communication with short sellers. Though they outline the potential benefit of understanding the actions by short-sellers, this aspect should be considered carefully, since short sellers clearly have an interest in falling security prices and therefore might intend to mislead the board.¹⁹⁷

¹⁹² See Klein, A. (2006), p. 2-3.

¹⁹³ See Efendi et al. (2007), p. 668-670.

¹⁹⁴ See Klein, A. (2006), p. 2-3.

¹⁹⁵ See Jensen and Murphy (2004), p. 48-52.

¹⁹⁶ See Xie et al. (2001), p. 19-20.

¹⁹⁷ See Jensen and Murphy (2004), p. 49-50

Altogether, the empirical findings in literature suggest that designing a Corporate Governance system that encourages independent, competent boards that emphasize their responsibility to monitor the management closely, especially when their compensation is tied to equity might be another approach to reduce overvaluation-induced Earnings Management.

4.3 External Mechanisms

4.3.1 Regulation

As shown in the third chapter, Badertscher outlines that firms change their Earnings Management behavior according to changes in regulation. In his study, as shown above, firms significantly reduce Earnings Management via discretionary accruals after new regulations in form of SOX have been passed.¹⁹⁸

In general, SOX contains widespread provisions regarding independence of committees, increased penalties for financial crimes and liabilities of managers as well as extensive auditor requirements. Thereafter, SOX is interrelated to all the other three approaches that are mentioned in this chapter. *Nting (2008)* underlines that since the introduction of SOX, Earnings Management is less likely to occur. She further describes that firm-outsiders are able to detect Earnings Management more quickly and easily. This effect on Earnings Management is explained by a higher overall monitoring capacity of market participants in the post-SOX era.¹⁹⁹ Additionally, *Li et al. (2004)* find in their event study that markets value firms that have executed extensive Earnings Management in prior years at a higher value after the introduction of SOX. This is explained by market participants that anticipate the constraining effects of SOX on Earnings Management.²⁰⁰

Cohen et al. (2007) point in the same direction, emphasizing that after the Sarbanes-Oxley act was passed, the costs for Discretionary Accrual Management increased massively, making it a less attractive Earnings Management method to managers.²⁰¹ This aspect is visualized in the next chart.

¹⁹⁸ See Badertscher (2011), 1501-1508.

¹⁹⁹ See Nting (2008), p. 201-203.

²⁰⁰ See Li et al. (2008), p. 5-6.

²⁰¹ See Cohen et al. (2007), p.

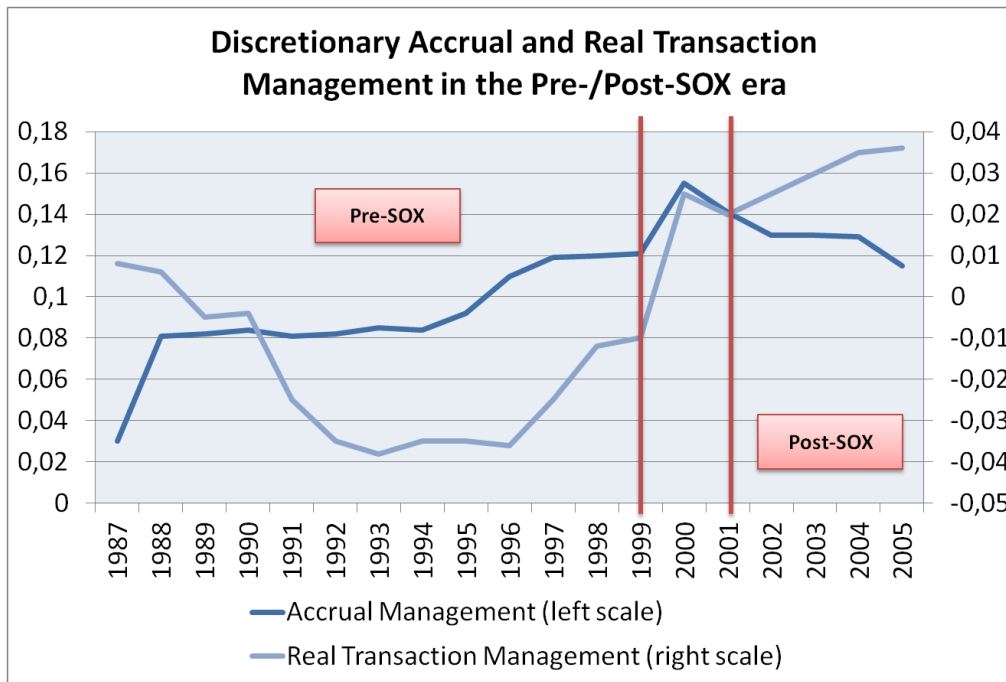


Chart 21: Discretionary Accrual and Real Transaction Management in the Pre-/Post-SOX era

Source: See Cohen et al. (2007), p. 39 and 41 [modified]

The chart underlines, that Discretionary Accrual Management increased massively with the start of increasing option compensation packages in the 1980's and further in the forefront of the introduction of SOX. On the other hand, Real Transaction Management increased massively after 1996, with a very sharp increase during the internet bubble. Importantly, after SOX was passed in 2002, Real Transaction Management seems to function as a substitute for Discretionary Accrual Management. Interestingly and with respect to the previous sections, the fraction of option compensation on the total compensation of managers developed almost simultaneously to the extent of Accrual Management in chart 21. These results suggest that increased liabilities and penalties for managers lead to less option-compensation in relative terms and further decreased the use of Discretionary Accruals.²⁰² Nevertheless, altogether regarding the case of SOX, it is questionable whether additional regulation really reduces the magnitude of Earnings Management or if it just triggers a shift to other methods that are more difficult to detect. In this context, Nting suggests that regulators should focus on taking all methods of Earnings Management into account to effectively reduce Earnings Management. However she also adds that so far there is little evidence that regulators can see effectively through the Earnings Management of firms.²⁰³

²⁰² See Cohen et al. (2007), p. 33-34.

²⁰³ See Nting (2008), p. 210-211.

4.3.2 Auditing Quality

Finally Badertscher underlines that Earnings Management can be reduced when firms employ one of the big global auditing firms.²⁰⁴

In this context, *Ebrahim (2001)* investigates the impact of auditor quality on Earnings Management. He finds, that higher auditing quality and an increasing tenure of auditing firms reduces the management of Discretionary Accruals. In literature, auditor size is typically taken as proxy for auditor quality since bigger auditing firms tend to lose more reputational capital and face high litigation costs if they are not able to detect material misstatements. Beside the mere quality, auditors with a long-term business relationship to their client are more familiar with business processes, obtain inside knowledge and finally are able to detect Earnings Management more easily.²⁰⁵ In their discussion about the role of auditors after SOX, *Ronen and Yaari (2008)* mention various indicators for auditor quality and quote additional studies that underline that the clients of big-auditors have lower level of accruals. They further outline that big-auditing firms not only tend to have a higher quality because they could lose reputational capital, but also because they are able to generate economies of scale and tend to have more resources on hand.²⁰⁶ In their study about the impact of auditing quality on Earnings Management in private firms in Europe, *Van Tendeloo and Vanstraelen (2008)* show that firms employing a big-4 auditor engage in less Earnings Management than firms that employ a smaller auditor. They further outline that in countries with stronger investor protection rights, the quality difference between small and big auditors is not as pronounced as in countries with lower investor protection rights. These results show that even in private firms, when big auditors do not face the same potential reputational losses as in public firms, auditing quality reduces Earnings Management.²⁰⁷

However, to the best knowledge, so far there is no existing study that links auditing quality to the execution of Real Transaction Management. As mentioned before, auditors might have difficulties to see through this form of Earnings Management. Therefore it cannot be excluded that firms that are monitored closely by high quality auditors substitute their Earnings Management behavior from Discretionary Accruals to Real Transaction Management, as also observed in firms that face stricter regulation policies.

²⁰⁴ See Badertscher (2011), p. 1493-1494.

²⁰⁵ See Ebrahim (2001), p. 13-14.

²⁰⁶ See Ronen and Yari (2008), p. 269-281.

²⁰⁷ See van Tendeloo and Vanstraelen (2008), p. 449-452.

4.4 Evaluation of approaches to limit Earnings Management

In the Agency Theory of Overvalued Equity, Jensen outlines that Earnings Management in overvalued firms might lead to a huge destruction of value.²⁰⁸ Based on the findings of the four empirical papers discussed above, management compensation, Corporate Governance, regulation and auditing quality have been identified as approaches to reduce the value-destroying behavior of managers of overvalued firms.

Unfortunately the specific research on approaches that limit the negative effects of the Agency Theory of Overvalued Equity is limited. Therefore mostly the general impact on Earnings Management behavior of firms has been regarded. Altogether, the increase of option compensation seems to have worsened Earnings Management by firms. As shown in the main body of this paper, overvalued firms typically faced multiple years of positive abnormal stock returns before being classified as overvalued or highly valued. These positive stock movements make it more likely that option packages of managers of overvalued firms are deeply in the money and encouraging myopic behavior.²⁰⁹

While some authors argue that flat compensation schemes should be reintroduced, the limiting impact of new regulations like SOX on the use of Discretionary Accrual Management already have an impact on the fraction of option compensation that is used to pay managers. Besides, minimum holding periods seem to attenuate the option problem. Since the empirical section showed that managers engage in less Real Transaction Management and seem to be aware of its value-destroying nature when there are paid with options, the use of options at all does not seem to be reprehensible. This conclusion is in line with Jensen and Murphy who admit that equity ownership aligns the interests of managers and owners at least to some extent.²¹⁰

Besides, independent and competent boards also have a limiting influence on Earnings Management, at least when it is measured via the use of Discretionary Accruals. The same is valid for regulation policies. The section about SOX shows, that effective regulation is able to reduce Earnings Management. However so far and to the best knowledge, regulatory policies like SOX do not take into account Real Transaction Management, which might be their biggest weakness.

²⁰⁸ See Jensen (2004), p. 2-12.

²⁰⁹ See Efendi et al. (2007), p. 671-672.

²¹⁰ See Jensen and Murphy (2004), p. 45-48.

Future regulation has to take into account the increasing importance of Real Transaction Management, even though this might be hard to detect at first glance.

Finally, the long-term employment of big auditors is proven to reduce Discretionary Accrual Management as well. Independent audit-committees should be aware of this and prefer bigger auditing firms when they intend to reduce the likelihood of overvaluation-induced Earnings Management.

5 Conclusion

The Agency Theory of Overvalued Equity predicts that overvalued firms face strong organizational forces to maintain overvaluation through financing and investment decisions and Earnings Management. This thesis contributed to the existing literature by comparing the four most extensive empirical papers on overvaluation-induced Earnings Management. All four papers show that Earnings Management can be induced by overvaluation, therefore in conclusion empirical evidence that the Agency Theory of Overvalued Equity triggers Earnings Management clearly exists. While current research on the execution of Discretionary Accruals is well developed and homogenous since all authors used the cross-sectional modified Jones Model to determine Earnings Management, research on other methods of Earnings Management like Real Transaction Management or Non-GAAP Earnings Management is limited and only conducted in one of the four papers. Altogether, the research on overvaluation-induced Earnings Management is very heterogeneous regarding the valuation models, the research design and sample sizes and the use of control variables. There seems to exist no generally accepted conceptual framework.

Furthermore, since overvaluation-induced Earnings Management can massively destroy firm value, as shown by spectacular fraud-cases like Enron and WorldCom, avoiding or reducing these costs could be one focus of future research. This thesis also contributed to the question how Earnings Management can be reduced, by discussing existing empirical evidence. In line with the findings of the four empirical papers, through redesigning management compensation schemes, enforcing effective Corporate Governance systems by employing independent and competent boards, designing effective regulatory frameworks and employing one of the market-leading auditing firms, stakeholders might be able to reduce the scale of Earnings Management.

However, existing evidence in this field is also characterized by a one-sided bias on Discretionary Accrual Management. Nevertheless, this thesis emphasizes, that factors like the accrual-reversal effect, additional regulation like SOX and new information technologies lead to a decrease of Earnings Management via Discretionary Accruals and increase the importance of Real Transaction Management. Therefore, future research has to take other Earnings Management methods into account.

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Attachements

Abstract

This master-thesis answers the question whether the Agency of Overvalued Equity is a valid explanation for the occurrence of Earnings Management in overvalued firms. The main body compares the four most important empirical papers on overvaluation-induced Earnings Management. While all four papers confirm the existence of overvaluation-induced Earnings Management, there are significant differences in their methodology. Furthermore, conceptual weaknesses like the one-sided bias on Discretionary Accrual Management as major method of Earnings Management are criticized and suggestions for further research are outlined. After answering the main research question, it is outlined that overvaluation-induced Earnings Management might lead to a huge destruction of firm value. Therefore the side research question was defined to evaluate approaches to reduce or avoid overvaluation-induced Earnings Management. Based on the findings in the four major empirical papers and based on discussions in additional sources, four approaches are identified as significant and evaluated regarding their capacity to reduce Earnings Management in overvalued firms. Finally, further potential improvements regarding the research on approaches to limit Earnings Management in overvalued firms are given.

Zusammenfassung

Die vorliegende Masterarbeit beschäftigt sich mit der Forschungsfrage, ob die Agency Theory of Overvalued Equity eine veritable Erklärung für Earnings Management in überbewerteten Unternehmen ist. Im Hauptteil werden die vier bedeutendsten empirischen Artikel über Earnings Management in überbewerteten Unternehmen verglichen und diskutiert. Während alle vier Artikel bestätigen, dass eine Überbewertung Earnings Management auslösen kann, gibt es signifikante Unterschiede in der Methodologie der vier Autoren. In diesem Zusammenhang werden potentielle Schwächen der Artikel, wie zum Beispiel die einseitige Fokussierung auf „Earnings Management via Discretionary Accruals“, aufgezeigt und Verbesserungspotentiale für zukünftige Forschung herausgestellt. Nach Beantwortung der Haupt-Forschungsfrage wird deutlich gemacht, dass Earnings Management in überbewerteten Unternehmen massiv Wert zerstören kann.

Aus diesem Grund werden in der Nebenfrage Methoden zur Reduzierung oder Vermeidung von Earnings Management in überbewerteten Unternehmen diskutiert und bewertet. Basierend auf den Ergebnissen der Haupt-Forschungsfrage und weiteren Quellen werden vier Methoden identifiziert, die potentiell Earnings Management reduzieren können. Diese Methoden werden abschließend hinsichtlich ihrer Problemlösefähigkeit bewertet und weitere Verbesserungspotentiale für zukünftige Forschung in diesem Gebiet aufgezeigt.

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