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The Impact of Income Smoothing on Firm Value after the Sarbanes-Oxley Act

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An Empirical Research on US Public Companies between 2006-2012

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Abstract

Title: The Impact of Income Smoothing on Firm Value after the Sarbanes-Oxley Act

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Purpose: To empirically investigate whether income smoothing creates or destroys value after the enactment of the Sarbanes-Oxley Act, which has tremendously changed the legal environment of income smoothing. We compare our results with pre-SOX research to conclude whether and how legislation change has affected the perception of income smoothing. Further, we make recommendations based on our research how managers should approach income smoothing.

Methodology: We use three income smoothing measures ($\rho PME, DA, \rho TACC, CFO, \sigma earnings/\sigma CFO$) to detect managers' actions to dampen the volatility of earnings. We regress them on stock return and as control variables we use the Fama French five factor model that explains stock returns. We control for industry, the 2008 financial crisis and earnings yield as well.

Empirical foundation: We collect annual data from 2004-2012 for all US nonfinancial companies from the Standard & Poor's capital IQ data base that do not have missing observations. Our balanced panel data consists of 1.882 companies and 13.174 firm-year observations.

Conclusions: Based on our results, income smoothing creates value in contrast with pre-SOX research. Our primary explanation is that SOX has changed the legal environment, in which managers are demotivated to act opportunistically. Investors regained their trust in financial reporting and do not consider managers' actions delusive. This explanation induces managers to discontinue the application of real income smoothing and return to accrual-based income smoothing. Another possible explanation is that the effect of income smoothing is determined by market uncertainty. Under high market uncertainty accrual-based income smoothing garbles information and thus destroys firm value whereas under low market uncertainty it boosts firm value. Managers should refrain from accrual-based income smoothing if market uncertainty is high, but they ought to use accrual-based income smoothing if market uncertainty is low. At last, we note that the 2008 financial crisis does not influence the perception of income smoothing according to our results.

List of abbreviations

AP – Accounts Payable

AR – Accounts Receivable

BEME - Book-to-market equity

CEO – Chief Executive Officer

COO – Chief Operating Officer

DA – Discretionary Accruals

DAV – The standard deviation of discretionary accruals

EBXI – Earnings before extraordinary items

EPS – Earnings per share

EY – Earnings yield

GAAP – Generally Accepted Accounting Principles

GPA – Gross profit to assets

IFRS – International Financial Reporting Standards

IPO – Initial Public Offering

ME – Lagged market equity

PME – Pre-Managed Earnings

PMOM – Price momentum

ROA – Return on total assets (Net Income$_t$ / Total Assets$_{t-1}$)

SEC – Securities and Exchange Commission

SOX – Sarbanes-Oxley Act

TA – Total Accruals

TACC – Lagged Total Accruals

TRA - Tax Reform Act

US – United States

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1. Introduction

1.1 Research trigger

An interesting phenomenon in behavioral corporate finance that aroused our curiosity is the increase in price as a result of positive earnings surprises (Shefrin, 2007). In other words, if earnings are beyond what the market originally expected share price rises. That sounded surprising to us since we just learned from the Valuation text book (Koller, Goedhart, & Wessels, 2010) that it is the return on invested capital (ROIC) and the growth rate that determines firm value among others and not accounting earnings. We read several arguments why earnings do not truly capture a firm's performance, however we have been taught that investors actually look at accounting earnings and make decisions based on that. But if so, an obvious consequence could be that managers just fool investors to give a rise to earnings as accounting makes it possible. But if managers want to delude investors it is a clear agency conflict; how does corporate governance deal with that? Corporate governance tries to align managers' and investors' interest through incentive schemes (Hart, 1995). The incentives are often based on earnings figures or the share price (Hall & Liebman, 1998). In either way managers are incentivized to tweak the numbers to increase earnings and through earnings to boost share price. This led us to the topic whether managers' discretion on accounting figures increases or decreases shareholders' wealth.

By looking at the Enron case, shareholders seem to be easy to deceive as they have no unbiased insight in what is happening in the company. Top executives were playing with their own board of directors and investors while making hundreds of millions in a couple of years through tweaking accounting figures. Meanwhile the whole world was praising them to be the "most innovative company" in the US. How could corporate governance or the Securities and Exchange Commission (SEC) let this happen? Why can managers just play with the numbers and make the whole world follow them? Corporate governance entrusts the board of directors to monitor managers and SEC investigates accounting fraud to prevent managers from such actions. Nevertheless, it is incredibly difficult to discern between managers' earnest intention to do good for the company and their dishonorable attempts to expropriate wealth and power for themselves. They all pretend to be cherries but some are lemons. Or are some cherries and most of them lemons? In other words, is managing

earnings generally good or bad for investors? These questions induced us to investigate the topic of income smoothing. We have found that the US administration addressed Enron and other accounting scandals with the introduction of the Sarbanes-Oxley Act (SOX), which attempts to preclude detrimental actions against all stakeholders of companies. SOX tries to prevent managers from deluding shareholders, bondholders, companies' own employees and of course the regulation. George W. Bush described SOX as*: "the most far-reaching reforms of American business practices since the time of Franklin Delano Roosevelt.''* (Bumiller, 2002). Politicians tend to exaggerate though therefore we also want to shed light on the true effectiveness of SOX. Has SOX really been a remedy?

In this paper we investigate whether managers' discretion on managing earnings is value creating or on the contrary value detrimental. We empirically estimate whether accrual-based income smoothing was value adding or value destructive between 2006 and 2012. We then compare our results with previous findings in the pre-SOX era and conclude that the perception of accrual-based income smoothing has changed over time.

1.2 Background to the study

Beidleman (1973, p. 653) defines income smoothing as: *''an attempt on the part of the firm's management to reduce abnormal variations in earnings to the extent allowed under sound accounting and management principles''*. Income smoothing is a legal right of the incumbent management to refine financial statements.

Managers either use their discretion to alter earnings by different accounting choices or they change operations for the sake of earnings targets. For example, they may shift profit from one accounting period to the other or cut back advertising cost. The former case represents accrual-based income smoothing, whereas the latter is referred to as real income smoothing. The difference between them is that accrual-based income smoothing does not influence operations and thus does not influence firm value through operations while real income smoothing does. This paper focuses on accrual-based income smoothing later on since it is highly difficult to reveal real income smoothing (Gunny K. A., 2010) let alone determine the magnitude of its effects. Instead, the focus will be given to management's discretion with respect to accounting choice within the framework of the generally accepted accounting principles (GAAP) in the United States (US). In the next paragraph, essential

definitions and the key concept of income smoothing are about to be explained to give an insight what it means in practice.

Ronen & Yaari (2008, p. 371) explain accruals:
*"**Accruals** arise when there is a discrepancy between the timing of cash flows and the timing of the accounting recognition of the transaction"*. Accruals are such items on the balance sheet that represent liabilities (e.g. Accounts Payable) or non-cash-based assets (e.g. Account Receivables) that are recorded on the balance sheet without actual payments being received or made. For example, when a firm buys materials to produce furniture the payment is not necessarily made immediately on the day of delivery, but within a certain period of time like 60 days. However, in the balance sheet the firm records this event by increasing inventory on the asset side and accounts payable on the liability side.

Accruals can be divided into discretionary and nondiscretionary accruals. First, we provide definitions for nondiscretionary and discretionary accruals and then we demonstrate how companies use discretionary accruals to manage earnings.

Definitions:
*"**Nondiscretionary accruals** are accruals that arise from transactions made in the current period that are normal for the firm given its performance level and business strategy, industry conventions, macro-economic events, and other economic factors"* (Ronen & Yaari, 2008, p. 372).
*"**Discretionary accruals** are accruals that arise from transactions made or accounting treatments chosen in order to manage earnings."* (Ronen & Yaari, 2008, p. 372).

In contrast with nondiscretionary accruals, discretionary accruals are recorded based on subjective judgement. Management, of course, is not permitted to baselessly record events in the financial statements, but certain business events are difficult to absolutely regulate and therefore the regulation allows freedom for individuals to choose between alternatives that best represent the financial status of the company.

Since managers can typically argue their accounting decisions they can use them as a way to delude shareholders, which is intuitively easily imaginable. Especially, since the Enron and WorldCom scandals that revealed that financial statements can be and sometimes are

manipulated to deceive investors. We, now, review the Enron scandal, which partly led us to investigate this topic in order to get the taste of how investors can be deceived by accounting manipulations. The following review is primarily based on the documentary by Gibney (2005).

Enron was the first firm to trade with gas and electricity, which significantly changed the newly deregulated energy market at the beginning of the 1990s. The company was growing excessively to become the 7th largest company in the US employing 21.000 people in more than 40 countries (BBC, 2002). The share price of Enron increased by 337% between January 1998 and August 2000. The company filed for bankruptcy a bit more than a year after it reached its peak share price in August 2000 (CNN, 2002).

Enron changed accounting standards and began to use market-to-market accounting, which enabled the company to book earnings based on highly subjective judgement. They booked for example profits after signing a contract to sell electricity from a power plant in 10 years even though there was no guarantee that it was going to happen. Despite all the potential opportunistic accounting opportunities in Enron's business, Arthur Andersen (Enron's audit firm) and SEC both approved market-to-market accounting. Through this new treatment the company's earnings skyrocketed to say the least.

Enron's CFO, Andrew Fastow, had to make certain that the share price continuously rises even beyond analysts' expectation. He, therefore, hid $30 billion of debt and losses via special purpose vehicles. His operations were overseen by Vinson and Elkins (Enron's law firm), and Arthur Andersen as well. Merrill Lynch, Citibank and most of the prestigious investment banks were involved in financing Enron through special purpose vehicles and in some cases assisted Enron to hide debt from its balance sheet in the hope of farfetched returns that were impossible to generate legally.

Top executives were rewarded with stock options for their services, which they all happened to exercise when it was most profitable. Just before the firm went bankrupt the major executives exercised their options in time to get out of the sinking ship. Jeffrey Skilling (COO, later CEO) was sentenced to jail for inside trading among others.

Arthur Andersen ordered its auditors to eliminate thousands of Enron related documents to obstruct the investigation (The New York Times, 2002). As these actions came to light Arthur Anderson, the oldest accounting firm in the US, fell with Enron. The company lost its reputation and reliability and closed its doors not long after Enron went bankrupt. Consequently 29.000 people lost their job.

The scandals induced the US legislation to address the issue at short notice. Investors rightfully lost their trust not only in financial statements, but investment banks, accounting firms and law companies. As a result, the Sarbanes-Oxley Act (SOX) was put into effect in 2002. SOX was meant to protect investors from garbled information. The law has been punishing false reporting harsher, and making the Chief Financial Officers and Chief Executive Officers more responsible for what is stated in the company's financial statements. The law obligated companies to establish stronger internal control. Financial statements had to include a report by an independent audit firm. In the next section, we present the purpose and the research question of the paper.

1.3 Purpose and research question

Cohen, Dey, & Lys (2008) find that earnings management changed due to the previously mentioned scandals and executives began to use substantially less accrual-based income smoothing after SOX was effective. The Graham et al. (2005) survey was conducted three years after SOX and the authors concluded that most managers were even willing to sacrifice economic value instead of altering accruals to meet earnings forecasts.

In our report, we attempt to answer the fundamental question whether income smoothing creates value or it has just been managers' false belief. We do not assume that income smoothing has either always been value-adding or has always been value-detrimental. Such scandals like the Enron case may have fundamentally changed how investors perceive income smoothing. Cohen et al. (2008) suggests that managers' earnings management strategy shifted from accrual-based to real income smoothing after SOX, which is consistent with the findings of Graham et al. (2005) who conclude that the vast majority of managers (80%) would rather choose a real income smoothing decision instead of an accounting decision. Furthermore, more than three fourth would be willing to sacrifice economic value to meet an earnings target. We compare the effects of accrual-based income smoothing

before SOX based on the results of Rountree, Weston, & Allayannis (2008) and after SOX (based on our own results) to see whether managers duly reduce income smoothing and use real income smoothing or it is only a wrong belief.

Rountree et al. (2008) conclude that income smoothing is value creating, but not due to managers' accrual-based income smoothing endeavor, but due to decreased earnings volatility. Managers' accounting manipulation is perceived value detrimental, but originally smoother earnings are priced with a premium. Thus, managers decreased firm value when engaged in earnings alternation via accruals, but increased firm value if they managed to smooth earnings otherwise. After SOX managers tended to substitute accrual-based income smoothing with real income smoothing (Cohen, Dey, & Lys, 2008).

If we find that income smoothing is value detrimental in the post-SOX period managers should not return to use discretionary accruals again. On the other hand, if income smoothing is found to increase stock returns managers should substitute their value destroying real income smoothing actions with accrual-based income smoothing. Should income smoothing be value detrimental investors ought to question financial statements. Income smoothing should then be considered suspicious, because managers would have no ground to argue that income smoothing is in the best interest of investors. Nevertheless, if income smoothing boosts stock returns investors should consider such managerial acts as business as usual. So, the main research question, is the following: How has accrual-based income smoothing affected firm value after the Sarbanes-Oxley act?

Since all publicly traded companies have to disclose their financial statements, the research topic is highly relevant to decision makers, mostly financial principals, investors and legislators.

1.4 Scope

We investigate the effects of income smoothing on firm value in the United States of America exclusively. Therefore, our conclusions are only valid to companies that operate in the US and are listed on a US stock exchange. Especially since SOX applies to US public companies. Financial companies have not been included in our sample due to their special accounting treatment, thus our conclusions on income smoothing are not applicable to them either.

1.5 Thesis outline

The paper is divided into five chapters. In chapter two, previous research on how income smoothing influences firm value is explained. We show that income smoothing affects firm value via three channels i) agency cost, ii) information asymmetry and iii) externalities. Afterwards, in chapter three the sample selection is presented. Then we expand on our discretionary accrual estimation method and exhibit our three income smoothing measures. Further, our income smoothing measure is used to explain stock returns based on the Fama French five factor model. We describe our control variables and our hypotheses on their probable effect. In the fourth chapter, we, first, present our results how income smoothing affects firm value in the post-SOX era then we analyze our results and compare them with previous findings in the pre-SOX era. In the fifth chapter we summarize our paper and draw the conclusions.

2. Literature Review

2.1 The Sarbanes-Oxley Act

The Sarbanes-Oxley Act (SOX) (2002) was a significant change in the legal framework in the United States. SOX is applicable for all publicly traded companies, private companies that prepare for an Initial Public Offering (IPO). The pre-SOX period was a time of financial crises that shed light on companies that engaged in pernicious earnings management. During an economic downfall, these events come to surface more often, or as John Kenneth Galbraith once remarked, "recessions catch what the auditors miss" (Ronen & Yaari, 2008). Now, we present the most important changes that SOX resulted in:

i. First, SOX regulates report certification by management. CEOs and CFOs are required to sign the financial statements of the company, whereby they can be hold personally accountable for the accuracy and reliability of the financial statements (Ronen & Yaari, 2008).
ii. Second, it requires public firms to strengthen their internal control systems and to report material weaknesses (Ronen & Yaari, 2008). Companies are obliged to hire an independent audit firm to review the accuracy of their financial report. The financial report is required to have a dedicated section for the accounting firm's opinion on the accuracy and reliability of the report.
iii. Third, SOX exacerbates the consequences individuals face if they violate SOX. Those, who impede the investigation process of US administration shall be fined and/or imprisoned for at most 20 years. CEOs and CFOs shall be fined up to $1 million and/or imprisoned up to 10 years if they certify non SOX compliant statements or they shall be fined up to $5 million and imprisoned up to 20 years if they deliberately acted so. SOX expresses this thus: *"Whoever willfully certifies any statement as set forth in subsections (a) [*CERTIFICATION OF PERIODIC FINANCIAL REPORTS*] and (b) [*CONTENT*] of this section knowing that the periodic report accompanying the statement does not comport with all the requirements set forth in this section shall be fined not more than $5,000,000, or imprisoned not more than 20 years, or both.''* (Sarbanes-Oxley Act, 2002, p. 806).

iv. Fourth, companies are obliged to report all off balance sheet items in their financial report.

v. Fifth, Securities and Exchange Commission (SEC) has been vested more power to investigate fraud suspicious companies. SEC also looks randomly into companies and checks whether they comport with SOX and make their finding publicly available.

According to research, SOX lead to a significant increase in audit fees paid by the companies. According to Eldridge & Kealey (2005) fees have increased by $2.3 million on average, and Asthana, Balsam & Kim (2009) show that the results of increase of audit fees are consistent with rent extraction on the part of the Big 4 audit firms. Raghunandan & Rama (2006) find that the mean (median) audit fees for fiscal year 2004 is 86% (128%) higher than the corresponding audit fees for fiscal year 2003. The costs associated with SOX were mostly covered by the companies, while the gains, increased informativeness, by the market.

Lobo & Zhou (2006) and Koh, Matsumoto & Rajgopal (2008) observe a decline in earnings management in the period following SOX. The finding of Cohen, Dey & Lys (2008) is consistent with previous literature, but at the same time they argue that real income smoothing increased following the act. The SOX opened new horizons regarding earnings management research and raised questions with respect to the effects of earnings management and market reactions to earnings management.

2.2 Income smoothing

Income smoothing is an earnings management strategy. There are countless reasons why managers are engaged in income smoothing like for instance reaching bonus targets, protect their job, provide private information for outsiders or reduce tax obligations. The various articles that deal with accrual-based income smoothing attempt to point out the motivation of income smoothing through three channels as classified by Fields, Lys, & Vincent (2001). The authors partitioned the then available literature into three categories (i) agency cost, (ii) information asymmetry, and (iii) externalities affecting non-contracting parties. In the following part of the chapter, we are going to discuss each of the possible motives and their implicit or explicit effect on firm value.

2.3 Agency cost

Since the separation of management and ownership firms face a so called agency problem. Managers (agents) are hired by owners (principals) to manage the company in the best interest of the owners. However, managers often find their own incentives and manage the company in their best interest instead. This is the root of corporate governance problem, which has long been established by previous researchers such as Adam Smith (1776) and Berle & Means (1932). Corporate governance has tried to align managers' and owners' interest through different incentives schemes. In the 1970s and 1980s, managers were incentivized to reach accounting earnings targets like earnings per share (EPS) or return on assets (ROA) to be remunerated (Fox, 1980). Later however, share options have become more popular as a way to reduce agency conflicts (Hall & Liebman, 1998).

Agency conflict does not solely arise between managers and shareholders, but between other stakeholders as well. Equity holders can transfer wealth from bondholders through various activities (Jensen & Meckling, 1976). Therefore, bondholders started to restrict firms via covenants to mitigate the conflict, which has been deemed successful by researchers such as Smith & Warner (1979).

Later on in this chapter, we are going to demonstrate how income smoothing relates to agency costs between managers and shareholders as well as shareholders and bondholders.

2.3.1 Bonus Target

Healy (1985) finds that managers tend to adjust accruals in order to maximize present and future bonus targets. He collects data from 1964-1980 for 94 large industrialized companies. Managers are remunerated based on a target figure like EPS. The higher EPS attained the higher remuneration managers are awarded until an upper threshold (bonus cap) is reached, which maximizes their pay-off. According to Healy (1985) managers decrease accruals if no present bonus increase is possible any longer and increase accruals to attain the bonus target. Healy's paper is a cornerstone in the literature of earnings manipulation for bonus payments, however one has to be cautious due to Healy's weak discretionary accrual estimation technique. Since the publication of Healy's work, discretionary accrual estimation has improved substantially, nonetheless his conclusion that managers change earnings to obtain bonus payment still holds. Holthausen, Larcker, & Sloan (1995) reviewed Healy's work

and confirmed most of Healy's finding by using a better discretionary accrual estimation technique (the modified Jones model (Dechow, Sloan, & Sweeney, 1995)). They argue one of Healy's claims though, which says that managers use discretionary accruals to lower their earnings when they can certainly not meet the earnings target. They suggest that it is induced by his weak estimation technique. Their advanced methodology indicates no such relationship whatsoever. One relatively severe problem in both of these papers is that their argumentation is based on a low number of observation. The Healy (1985) article uses only 94 and altogether 1527 firm-year observations throughout 1930-1980 whereas the Holthausen et al. (1995) article uses 443 firm-year observations between 1982-1991. Furthermore, Holthausen et al. (1995) observe mainly manufacturing companies, which questions how applicable their finding is for other industries.

Firms started to change cash based remuneration to option based remuneration (Hall & Liebman, 1998). Corporate governance literature argues that granting options to managers aligns managers and shareholders interest better (Hall & Liebman, 1998). This move changed the motivation for earnings management as well. Those managers that primarily receive the company's stock options as bonus remuneration are incentivized to increase the share price and thereby benefit more from their options. Sloan (1996) finds that firms can inflate their current earnings through aggressive accrual estimates in order to raise at least temporarily their share price. Once the share price is up, managers exercise their options, which yield more than they would without managing earnings. In their research they use all available companies in the Compustat/CRSP database for a period of 30 years – 1962 to 1993. Their estimation of accruals uses the balance sheet approach, which has been proved wrong (Collins & Hribar, 2002). Their results are, therefore, biased.

Bartov & Mohanram (2004) document similar results to Sloan (1996). They conclude that managers inflate earnings opportunistically to maximize their payout at the expense of future earnings. They question, thereby, the effectiveness of the cost reduction of option-based bonus schemes. The inferences they make are based on a sample of 1.218 companies in the period between 1992 and 2001. They estimate total accruals by the Jones model (Jones, 1991), which has substantially improved since then.

Bergstresser & Philippon (2006) provide evidence that CEOs manipulate earnings through discretionary accruals more if their incentive package includes stock options or if their remuneration is tied to share price. The authors find that high accrual periods and unusually high option execution happen simultaneously. Their paper concludes that even though CEOs likely manipulate earnings to achieve private benefits it does not mean that they destroy value. However, since investors have to be cautious and observe managers' activities more thoroughly not to be misled by them this finding seems to suggest increased agency costs. In their estimation they use the Dechow model (1995) that is an advanced version compared to the Jones model (1991). The base of their findings is solid due to their excessive sample size of 15.654 firm-year observations from the period between 1993 and 2000 and another sample of 40.517 observations from 1996 to 2001.

Burns & Kedia (2006) conclude similarly to Bergstresser & Philippon (2006) that executives use aggressive accounting to achieve higher option remuneration. The more sensitive managers' options are to share price the more probable managers engage in aggressive accounting. Their sample consists of 1.357 companies in the period between 1995 and 2001. They also find that stock option bonuses lead to misreporting the greater the convexity of CEO wealth. Thus, option targets are likely to increase agency costs as shareholders must remain cautious lest managers take earnings management one step further into misreporting and violating GAAP.

As opposed to the abovementioned studies, Das, Hong, & Kim (2013) find that managers smooth earnings because bonus incentives encourage them to do accordingly. They argue that companies appreciate income smoothing and induce managers through such remuneration contracts. Nevertheless, their inferences may be biased due to the indirect measure of income smoothing (the volatility of cash flow from operations divided by the volatility of earnings).

An investigation on the impact of SOX on the bonus remuneration of managers shows that there are noticeable differences in the pre- and post-SOX period. By reducing the flexibility in financial reporting SOX is supposed to decrease earnings management. This is expected to have an impact on bonus contracts by tying them more to changes in earnings, mostly because of the increased informativeness of earnings (Carter, Lynch, & Zechman, 2009).

Carter, Lynch, & Zechman (2009) investigate this and their results show that firms place significantly more weight on earnings' changes while making bonus contracts after SOX.

Carter, Lynch, & Zechman (2005) find that the relationship between bonus payments and nondiscretionary earnings increased significantly after SOX based on a sample of 1.180 companies and 4.193 executives. The interpretation of their finding is that bonus remuneration became more tied to earnings since the act increased the trust in the reported numbers. Nonetheless, the premium on bonus remuneration associated with income increasing discretionary accruals still remains after the act. It is important to notice that the relationship between bonus remuneration and income decreasing discretionary accruals became significantly more negative. This means that bonus payments more correctly reflect the performance in the period.

All in all, previous literature rather suggests that managers act opportunistically when engaging in income smoothing to obtain higher bonus remuneration before and after SOX. In order to reduce agency costs, firms have to monitor managers more thoroughly which is a costly process (Cornett, Marcus, & Tehranian, 2008).

2.3.2 Cost of capital

Trueman & Titman (1988) were one of the first researchers who explained income smoothing as a tool to decrease cost of capital or more precisely cost of debt in their case. They suggest that managers may smooth earnings to lower creditors' perception of the variance of the company's underlying economic performance. Li & Richie (2009) find that income smoothing companies have lower bond yields and thus lower cost of debt. Their way of estimating total accruals by using the cash flow approach makes their research superior in comparison to previous ones (Collins & Hribar, 2002) and their model for estimating discretionary accruals following Kothari, Leone, & Wasley (2005) is the most powerful at that stage of research. They confirm Trueman & Titman's conclusion and take it one step further by saying that income smoothing may be as important as liquidity in determining bond yields.

Verdi (2005) examines how *uncertainty* affects cost of equity capital. *Uncertainty* consists of five parts in his model including earnings smoothness and he finds that even though *uncertainty* increases cost of equity capital earnings smoothness actually decreases

uncertainty. Thus, his paper contributes to the literature by suggesting that earnings smoothness reduces cost of equity capital.

Chen (2013) finds that income smoothing decreases cost of equity capital alongside Verdi (2005). Her research on a 20 years period between 1988 and 2007 is based on a sample with 55.499 observations. Chen addresses larger scope of income smoothing, including both measures for the total accruals smoothing and discretionary accruals smoothing. Nevertheless, she admits that not all of the implied equity cost models gives significant coefficients. She uses two income smoothing measures, but only the Gode & Mohanram (2003) implied cost of equity model returns significant coefficients for both of the measures. The Easley & O'Hara (2004) model returns a significant coefficient for one of the measures, while the other two models find income smoothing insignificant with regard to cost of equity capital.

Francis, LaFond, Olsson, & Schipper (2004) examine seven earnings attributes like earnings smoothness among others and conclude that smoother earnings are associated with higher cost of equity capital. Their results have a strong base of 3.917 firms in 27 years, from 1975 to 2001. Nevertheless, their estimation of total accruals with the balance sheet approach should be treated with caution.

At last, McInnis (2010) also investigates the effect of income smoothing with respect to cost of equity capital, but he finds that there is no relationship between the smoothness of earnings and the cost of equity capital whatsoever. His research is based on 682.435 observations throughout 30 years between 1975 and 2006. However, his income smoothing measure, volatility of net income divided by volatility of cash flow, does not measure income smoothing directly.

2.3.3 Job protection

Fudenberg & Tirole (1995) claim that managers boost their earnings in bad times to extend their tenure. In good times, information decay encourages them to lend money for future times. The information decay theory suggests that the current earnings possess more information about future earnings than earlier earnings figures. Thus, lending money to the future is advantageous because even if managers outdo themselves in the present it is not going to help them next year if future earnings figures are unsatisfactory.

Kanagaretnam, Lobo, & Mathieu (2003) investigate whether bank managers use earnings management opportunistically to save their jobs. In their sample they include 91 banks and they gather data for the period between 1987 and 2000. They find that managers shift earnings from the future (borrow future earnings) when their firm underperforms below peers and postpone earnings (lend earnings) when their firm is expected to underperform peers in the future in order to protect their job. Specific to their research is that they don't measure income smoothing directly, but they measure the specific conditions under which managers could engage in income smoothing.

2.4 Information asymmetry

Since market players have imperfect information, financial statement play a crucial role to mitigate information asymmetry. Income smoothing is, however, not necessarily reducing information asymmetry. Extant literature is divided based on this question. In the following paragraph, we present results that claim that earnings management garbles information. After that, we present evidence that actually earnings management provides information. Eventually, we provide information how it changed in response to SOX.

Bhattacharya, Daouk, & Welker (2003) investigate earnings opacity in different countries including the US by using earnings aggressiveness, loss avoidance and earnings smoothing as measures. Their earnings smoothing measure is the correlation between total accruals and cash flow, which does not directly measure the earnings smoothing effort. They limit their model to industrial firms exclusively, which mitigates the problem of cross country differences. However, their earnings smoothing measure may yield substantially different results due to dissimilar countries especially since there are regulation differences too. They use 58.653 firm year observations across countries. The large number of observations mitigates sample heterogeneity to a certain extent in their model. They find that income smoothing actually contributes to opacity, thus it increases information asymmetry.

The authors measure earnings smoothing by the correlation of the change in accruals and change in cash flow from operations though, which does not point directly to earnings management. Leuz, Nanda, & Wysocki (2003) claim that insiders manage earnings to mask the true performance of the firm, whereby they conceal their private control benefits. For instance, insiders may shift assets from the firm to one of their family members' firm. Thus,

outsiders are exploited. If outsiders notice such events they will make actions to prevent this. Therefore, insiders try to conceal such activities to maintain private control benefits through earnings management. In this case, earning management increases information asymmetry. The authors measure earnings smoothing by the correlation of the change in accruals and change in cash flow from operations among others, which does not point directly to earnings management. They use a large sample of 8.616 companies across the period of 1990 – 1999. Jayaraman (2008) finds that the probability of informed trading is higher when earnings are smoother than cash flows and also when earnings are more volatile. When managers change earnings it becomes either more volatile or smoother than cash flows, but in both cases managers garble information because the probability of informed trading rises.

Bandyopadhyay, Huang, & Wirjanto (2011) argues that income smoothing is value detrimental because it does not reduce, but increases information asymmetry if all effects are taken into account. Their results are robust to using many different measures of income smoothing such as: correlation between discretionary accruals and pre-managed earnings, discretionary accruals volatility, earnings to cash flow volatility, total accruals volatility etc. They use a sample of all non-financial companies in the Compustat/CRSP data base, for the period between 1976 to 2007, that results in 355.166 observations. According to Yang & Zhu (2014) income smoothing increases informativeness and thus firm value under low market uncertainty. They measure market uncertainty by VIX index, which measures the volatility of S&P 500. The income smoothing measures they use are: correlation between accruals and cash flows and volatility of net income to volatility of operating cash flow. Accruals are estimated in their model based on the cash flow approach, that leads to more precise results and they use a data set with 18.229 observations. They conclude that the ambiguity-averse investors tend to mistrust the information content of smoothed earnings under volatile market circumstances. These investors have then a propensity to think that income smoothing is a way to deceive them. Thus, income smoothing decreases shareholders' wealth when the market is volatile.

As opposed to the abovementioned researchers Sankar & Subramanyam (2001) conclude that managers can use income smoothing as a tool to reveal private information, however they emphasize the importance of institutional mechanism that restrict managers' reporting

discretion. Zarowin (2002) and Tucker & Zarowin (2006) open a new chapter whether income smoothing garbles or provides information. Both papers conclude that income smoothing provides information as the current share price changes contain more information with regard to future returns when companies are more involved in income smoothing. Their results have a strong background since the measure of income smoothing they use, correlation between discretionary accruals and pre-managed earnings directly captures the possible income smoothing. The estimation of total accruals is also done by the cash flow approach, that is considered more precise. Allayannis & Simko (2009) examine whether firms with different information environment are affected by income smoothing. They use the number of analysts following as a proxy for information environment. This means that the more analysts follow a firm the less information asymmetry there is. They claim that income smoothing is only value adding for firms with low or no analyst following.

2.5 Externalities affecting non-contracting parties

In 1986, the Tax Reform Act (TRA) became effective, whereby the US corporate tax rate was reduced from 46% to 34%. This change in legislation provided a great incentive for managers to minimize taxes. Scholes, Wilson, & Wolfson (1992) find that the 812 firms in their sample saved on average approximately $0.5 million by deferring gross margin from one quarter to another. They differentiated between firms based on firm size and concluded that smaller firms are less opportunistic tax planners.

Guenther (1994) investigated whether managers exploited potential tax savings during TRA. He separated total accruals into non-current and current accruals. Current accruals (e.g. AR, AP) affect taxable income whereas non-current accruals do not. He finds that large and lowly leveraged firms were more willing to have income decreasing accruals, whereby they benefited more from the lower tax rate. He notes that management-owned firms were not necessarily engaged more in income shifting despite his original expectation.

Maydew (1997) observes how firms with net operating loss react to TRA and suggests that firms with a larger tax saving opportunity engaged more likely in income shifting, whilst highly levered firms had a lower propensity to shift income. He does not find any difference between small and large firms, which is inconsistent with the findings of Scholes et al. (1992).

Lopez, Regier, & Lee (1998) confirm previous research that firms shifted income prior to the reduced tax rate law to minimize tax expense, but opposes Scholes et al. (1992) along with Maydew (1997) that size is relevant in terms of propensity to income shifting.

Lin, Lu, & Zhang (2012) examined how firms reacted to the New Enterprise Income Tax Law in 2007, which reduced the Chinese corporate tax rate from 33% to 25% and eventually came into effect in the following year, 2008. The authors found the Chinese companies did shift income to lower their tax expense as well as US companies shown in the abovementioned studies. They estimated the amount of tax deduction to be $646.1 million.

All of the abovementioned studies resulted in tax savings, which definitely created value for companies. Nevertheless, one has to note that such opportunities are rare as the tax environment does not change every year in the US. Earnings management seems to be a useful tool to avoid taxes when regulation changes though.

2.6 Income smoothing on firm value

In the previous subchapters, it has been shown that income smoothing affects firm value through different channels such as agency cost, information asymmetry and externalities affecting third party. We now summarize what they concluded with regard to income smoothing on value and then present an article that directly measure the effect of income smoothing on firm value just like this paper. We are going to show their results.

Extant literature concerning agency costs is divided. Some suggest that earnings management increases agency cost as shareholders must monitor managers more thoroughly, whereas others argue that agency costs, on the contrary, are reduced by smoother earnings via lower cost of capital for instance. SOX regulates financial reporting more strictly, which reduces the freedom of managers to smooth earnings opportunistically. Even though current literature does not conclude explicitly that agency costs are reduced managers are monitored more thoroughly by the authorities, which probably decreases agency costs. Previous research regarding information asymmetry is inconclusive as well. One part of researchers suggest that income smoothing garbles information and thus is value-detrimental, while others argue that it provides managers' private information.

Externalities affecting third party seems to undoubtedly enhance firm value as researchers consistently prove that firms saved substantial tax expenses.

Rountree, Weston, & Allayannis (2008) divided income smoothing into three parts

Equation 1. Earnings variance breakdown

$$\sigma^2_{Earnings} = \sigma^2_{Cash\ Flows} + \sigma^2_{Accruals} + 2COV(Cash\ Flows, Accruals)$$

They try to explain firm value (proxied by Tobin's Q) with all three measures and they conclude that lower cash flow and accrual volatility are associated with higher firm value whereas more negative correlation between cash flows and accruals yields lower firm value. In their model more income smoothing measures are used such as the previously mentioned correlation between total accruals and cash flow from operations ($\rho TACC, CFO$) and earnings volatility per cash flow volatility ($\sigma earnings/\sigma CFO$). Both measures yield the same result, namely, that income smoothing does not create, but destroy value.

2.7 Hypothesis development

Extant literature approaches the effect of income smoothing on firm value from different perspectives or channels as we discussed earlier in this chapter. Previous evidence of the effect of income smoothing varies between articles. To our knowledge, nobody has investigated yet how legislation change affected the perception of income smoothing. Our hypothesis is therefore the following:

H_0: Income smoothing increases stock returns as a result of SOX.

In the next chapter, we are going to explain our methodology.

3. Methodology

3.1 Research approach

We empirically investigate whether smoother income is associated with higher stock returns. The time scope of the research is the period between 2006 and 2012. The starting period is 2006 since it took up to 2005 for all the rules to become effective. We developed the hypothesis following previous studies and we test it by using deductive approach.

In order to conclude how income smoothing affected stock returns after the SOX act, we run a regression with the five factors of Fama & French (2015), earnings yield and industry dummy as control variables and our three different income smoothing measures, the correlation between pre-managed earnings (PME) and discretionary accruals (DA) $(\rho PME, DA)$, the correlation between total accruals and cash flow from operations $(\rho TACC, CFO)$ and earnings volatility divided by the volatility of cash flow from operations $(\sigma(earnings)/\sigma(CFO))$. In the subsequent four subchapters, we are going to present i) the sample selection procedure, ii) how discretionary accruals are measured, iii) how income smoothing is detected and finally, iv) how the income smoothing measures are plugged into the regressions together with the Fama-French five factor model.

3.2 Sample selection procedure

The sample includes 1.882 US-based companies that had available annual information between 2004-2012 in the S&P Capital IQ data base. We use annual data due to previous evidence that firms smooth fiscal year earnings. Moreover, there are substantial differences in the reporting of the first three quarters and the fourth one (Das & Shroff (2002) Jacob & Jorgensen (2007)). That resulted in 13.174 firm-year observations in total. Since SOX was introduced in the USA and therefore only US based companies were selected in the sample. Financial companies were removed from the sample due to the specific legislation that they undergo. Eventually we obtained a balanced data set.

3.3 Estimation technique

The regressions are estimated with the Ordinary Least Squares method (OLS), because it is the one most widely explored and hence, the inferences are most reliable. In order to make correct inferences based on the OLS method the following assumptions must hold:

Table 1. OLS Assumptions

Number	Notation	Interpetation
1	$E(u_t) = 0$	Zero mean
2	$Var(u_t) = \sigma^2$	Constant variance
3	$Cov(u_i, u_j) = 0$	Patterns in residuals
4	$Cov(u_t, x_t) = 0$	Non-exogeneous regressors
5	$u_t \sim N(0, \sigma^2)$	Normality of residuals

Any violation of these assumptions can lead to either biased or incorrect inferences. In order to ascertain the regressions fulfill these conditions, we run tests on the data set that are presented in the subchapter Reliability and validity.

In order to come up with more precise inferences, we use a panel data set that consists of observations across both time and cross section. The panel data set is composed of cross-sectional units that in our case are different companies and provide information about certain variables over time.

According to Brooks (2008) panel data has the following advantages for researchers:

i. First, a much wider range of issues can be mitigated, in contrast with either time series or cross-sectional data.

ii. Second, the number of observations is increased. In order to examine how the relationship of certain variables develops over time, very long time series data is required, which is usually difficult to obtain. Further, Hsiao (2003, p. 3) explains the benefits of having more observations: *"Panel data usually give the researcher a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables – hence improving the efficiency of econometric estimates."*

iii. Third, panel data set can help in mitigating the potential omitted variable problem, which is a usual issue in regression specifications. The omitted variable problem can be dealt with employing one of the two classes of panel estimator approaches: the fixed or random effects model. By using these techniques, the effects of omitted variables can be captured by employing dummies in the cross-section and time period dimension that account for these effects.

The Hausman test for fixed/random effects is conducted to specify which technique is supposed to be applied to our models.

3.4 Methods for estimating total accruals

This paper differs from most of the previous literature due to its estimation of total accruals. Total accruals can be estimated by a balance-sheet or a cash flow approach. The balance sheet approach calculates total accruals by subtracting depreciation and amortization from working capital (WC), where total accruals are defined as:

Total Accruals = ΔCurrent Assets - ΔCash – (ΔCurrent Liabilities – Current portion of long-term debt) – Depreciation and Amortization

Whereas the cash flow approach computes total accruals (TA) by the variance of earnings before extraordinary items (EBXI) minus cash flow from operations.

The balance sheet approach has been widely used in the literature (Dechow, Sloan, & Sweeney (1995), Leuz, Nanda, & Wysocki (2003), Allayannis & Simko (2009), Bandyopadhyay, Huang, & Wirjanto (2011)). Nonetheless, Collins & Hribar (2002) argue that the balance-sheet approach overstates the amount of total accruals, and therefore inferences based on that model contain a serious measurement error. Hence, we use the cash flow approach following (Collins & Hribar, 2002) and other researchers (Tucker & Zarowin (2006), Rountree, Weston, & Allayannis (2008)). Note though that instead of earnings before extraordinary items we used net income as a proxy for earnings before extraordinary items. Extraordinary items such as natural catastrophes or accidents are assumed to be relatively rare, thus net income is a good proxy for it.

3.5 Measuring discretionary accruals

In this section, we present the development of the model for discretionary accrual measurement we decided to use. In the following subchapter, we expand on how to detect income smoothing.

We, first, estimate discretionary accruals to measure income smoothing. Since discretionary accruals cannot be observed directly they need to be approximated. Previous literature (Healy (1985), DeAngelo (1986), Jones (1991) Dechow & Sloan (1991)) approaches the

problem by first estimating TA then decomposing TA into nondiscretionary and discretionary accruals. The significant improvement of discretionary accrual estimation are presented in the next subchapters beginning with the Jones model.

3.5.1 The Jones Model

The Jones model (1991) uses a regression model to approximate TA. The explanatory variables are sales and gross property and equipment. The residuals of the regression equal to the amount of discretionary accruals.

The regression of the Jones Model is the following:

Equation 2. The Jones Model

$$TACC_{it} = \alpha + \beta_1(1/TA_{it-1}) + \beta_2(DSALES_{it}) + \beta_3(PPE_{it}) + \in_{it}$$

Where $TACC_{it}$ is total accruals, TA_{it-1} is total assets in year $t\text{-}1$, $DSALES_{it}$ is change in sales and PPE_{it} is property, plant and equipment.

The argumentation behind the independent variables is the following. Sales controls for the economic environment. The more a firm sells the higher accounts receivable it is going to have. In order to maintain higher sales, the inventory needs to increase to supply sales. If the inventory increases accounts payable has to rise as well. Gross property, plant and equipment controls for the nondiscretionary depreciation.

3.5.2 The Modified Jones Model

Dechow, Sloan, & Sweeney (1995) compare the then available models (Healy, DeAngelo and Jones) and conclude that the best performing model was the Modified Jones model. Their model deals with the error that the Jones model produces when sales are managed or in other words when sales cannot be considered nondiscretionary. Their improvement is the adjustment of change in revenues with change in accounts receivable $(\Delta SALES - \Delta AR)$. They suggest that the model suffers from misspecified variables since sales include a discretionary portion, and this effect is captured by the error term. The model assumes all credit sales to be discretionary and is eliminating that component from sales. By accounting only for $\Delta SALES - \Delta AR$, the model includes only the cash part of sales, which is considered

nondiscretionary. The discretionary part, AR is eliminated and is captured by the error term. The equation has the following specification:

Equation 3.The Modified Jones Model

$$TACC_{it} = \alpha + \beta_1(1/TA_{it-1}) + \beta_2(DSALES_{it} - DAR_{it}) + \beta_3(PPE_{it}) + \in_{it}$$

Where $TACC_{it}$ is total accruals, TA_{it-1} is total assets in year *t-1,* $DSALES_{it}$ is change in sales, DAR_{it} is change in accounts receivable and PPE_{it} is property, plant and equipment.

3.5.3 The Performance-Matched Modified Jones Model

Kothari et al. (2005) use performance matched discretionary accruals measures to eliminate the effect of performance on measured discretionary accruals. The idea is that firms with extreme performance (either poor or superior) engage more in income smoothing and by that possess a larger amount of discretionary accruals. Their research points out the need to control for performance. They use ROA as the measure of performance and estimate the following regression:

Equation 4. The Performance Matched Modified Jones Model

$$TACC_{it} = \alpha + \beta_1(1/TA_{it-1}) + \beta_2(DSALES_{it} - DAR_{it}) + \beta_3(PPE_{it}) + \beta_4(ROA_{it}) + \in_{it}$$

Where $TACC_{it}$ is total accruals, TA_{it-1} is total assets in year *t-1,* $DSALES_{it}$ is change in sales, DAR_{it} is change in accounts receivable, ROA_{it} is the return on assets and PPE_{it} is property, plant and equipment.

3.5.4 The Jones Modified Forward Looking Model

An extension of the Linear Modified Jones model is derived by Dechow, Richardson & Tuna (2003), which they refer to as the Jones Modified Forward Looking Model. The Jones Modified Forward Looking Model has higher explanatory power than its predecessors. The specification of the model is the following one:

Equation 5. The Jones Modified Forward Looking Model

$$TACC_{it} = \alpha + \beta_1(1/TA_{it-1}) + \beta_2(1+k)(DSALES_{it} - DAR_{it}) + \beta_3(PPE_{it}) + \beta_4(TACC_{it-1}) + \beta_5(GR\_SALES_{it+1}) + \in_{it}$$

Where $TACC_{it}$ is total accruals, TA_{it-1} is total assets in year *t-1,* $DSALES_{it}$ is change in sales, DAR_{it} is change in accounts receivable, k is the coefficient from the regression DAR_{it} = α + $kDSALES_{it}$ + $\in_{it}$, PPE_{it} is property, plant and equipment, $TACC_{it-1}$ is total accruals in year *t-1* and GR_SALES_{it+1} is the growth of sales in year *t+1.*

This model reclassifies items as discretionary or nondiscretionary to include only nondiscretionary variables in the regression. The more precisely variables are classified, the higher the explanatory power of the model is.

The first adjustment includes only the unexpected portion of the change in accounts receivable for a given change in sales as a discretionary accruals. The k coefficient is estimated from the following regression:

Equation 6. Estimation of k coefficient

DAR_{it} = α + $kDSALES_{it}$ + $\in_{it}$

The coefficient of sales k is the expected amount of change in accruals when sales change.

Their second adjustment accounts for the portion of accruals that is predictable based on previous years' accruals as nondiscretionary. Following Chambers (1999), a new variable, lagged total accruals ($TACC_{it-1}$) is added that captures the predictable component.

The third adjustment accounts for the growth of the company (GR_SALES_{it+1}) since there is a misspecification in the Jones Model that should be corrected. Growing sales result in increased inventory to supply sales, which typically requires an increase in accounts payable. Thus, total accruals increase.

3.5.5 The non-linear Modified Forward Looking Performance Adjusted Jones Model

Measuring discretionary accruals is still a 'hot' topic in research since none of the abovementioned models are sufficiently accurate. The linear specification that underlies all of them as the relationship between cash flows and accruals cannot, actually, be linear according to Basu (1997). This finding is derived from the assumption that gains and losses are recognized differently due to the accounting conservativism principle that "anticipate[s]

no profits, but all losses" (Bliss, 1924). If bad news are recognized earlier than good news, the relationship of earnings and accruals is clearly not linear since the timeliness of earnings is asymmetrical (Schroff, Venkataraman, & Zhang, 2013). Following the conservativism principle of accounting, companies would accrue for unfavorable events in a timelier manner than for favorable events. Ball & Shivakumar (2006) argue that the linear discretionary accrual models are misspecified and they propose a piecewise linear function to mitigate this problem. Their model has the following specification:

Equation 7

$$TACC_{it} = \alpha + \beta_1 X + \beta_2(VAR_{it}) + \beta_3(DVAR_{it}) + \beta_4(VAR * DVAR_{it}) + \in_{it}$$

where X is a vector of independent variables suggested to be determinants of nondiscretionary accruals, VAR is a proxy for economic gain or loss and $DVAR$ is a dummy variable that accounts whether the company is experiencing gain or loss.

Ball and Shivakumar (2006) mention four variables that can be used as proxies for economic gains and losses. The four proxies are cash flows from operations, change in cash flows from operations, industry-adjusted cash flows from operations, and abnormal returns.

This non-linear model is tested by Wan (2013) and is proven to have superior explanatory power over linear models.

In this paper, the Modified Forward Looking Jones model is applied with a crucial adjustment for the linearity assumption that significantly improves the explanatory power of the model. We further include a performance measure following Kothari, Leone & Wasley (2005). The specification of our model is the following:

Equation 8. The non-linear Modified Forward Looking Performance Adjusted Jones Model

$$TACC_{it} = \alpha + \beta_1(1/TA_{it-1}) + \beta_2(1+k)(DSALES_{it} - DAR_{it}) + \beta_3(PPE_{it}) + \beta_4(TACC_{it-1}) + \beta_5(GR\_SALES_{it+1}) + \beta_6(ROA_{it}) + \beta_7(VAR_{it}) + \beta_8(DVAR_{it}) + \beta_9(VAR * DVAR_{it}) + \in_{it}$$

Wan's (2013) proxy for economic gain or loss is abnormal return, that is calculated as the difference between the actual return and the expected return. The expected return is the return estimated with the CAPM model. The return is natural logarithm from the stock price

and this measure is accounting not for the book, but for the market value of the company. This measure is more efficient because it incorporates more information than the financial statements which present only the book value. Nevertheless, the "non-book" value that is captured by using this measure contains information about items that only have market value, but these items cannot generate accrued gains or losses (Wan, 2013). Therefore, this proxy would measure the gains/losses with error therefore we include operating cash flow as a proxy instead.

The nondiscretionary accruals are assumed to be the fitted values of Equation 8. Discretionary accruals are the difference between total accruals and nondiscretionary accruals:

Equation 9. Estimation of discretionary accruals

$$Discretionary\ Accruals = Total\ Accruals - Nondiscretionary\ Accruals$$

3.6 The detection of income smoothing

We employ three measures of income smoothing i) correlation between pre-managed earnings and discretionary accruals ($\rho PME, DA$), ii) correlation between total accruals and cash flow from operations($\rho TACC, CFO$) and iii) earnings volatility and cash flow volatility ($\sigma earnings/\sigma CFO$). In this section we are going to explain how they measure income smoothing.

$\rho PME, DA$

In the previous subchapter, we discussed the computation of discretionary accruals. Now we present how pre-managed earnings are calculated.

Equation 10 – Calculation of pre-managed earnings

$$Pre\text{-}managed\ earnings = Net\ Income - Discretionary\ Accruals$$

After calculating pre-managed earnings we compute the correlation between PME and discretionary accruals for each company using 7 observations (2006-2012). The more negative $\rho PME, DA$ the more the firm smoothes its earnings. The advantage of $\rho PME, DA$ over other measures is that it directly examines the income smoothing effort while other measures do not (Bandyopadhyay, Huang, & Wirjanto, 2011). This made $\rho PME, DA$ more

attractive to researchers and it has widely been used in the literature of accrual based earnings management (Tucker & Zarowin (2006), Bandyopadhyay, Huang, & Wirjanto (2011), Chen (2013). We consider this measure to be our most reliable.

$\underline{\rho TACC, CFO}$

Total accruals and cash flow from operation follow a similar logic. If the firm has more accruals it means that more transactions are made without any payments actually being made or received. If TACC is high cash inflows and outflows did not happen. Whenever customers clear payments cash flow increases and TACC decreases. Thus, similarly to $\rho PME, DA$ the more negative $\rho TACC, CFO$ is the more income smoothing takes place theoretically. However, this approach does not directly observe managers' deliberate action since it does not separate between discretionary and nondiscretionary accruals.

$\underline{\sigma earnings/\sigma CFO}$

Earnings are less volatile if more income smoothing takes place, because accounting smoothes the fluctuation that originally derives from the nature of business. If firms used cash-based accounting transactions would be recorded upon cash inflows and outflows, which would result in much more volatile earnings. Cash based accounting does not contain as much information about the true condition of the company as it only records past events. The problem with this measure is that it can also reflect the economic cycle or some industry/firm specific effect and does not observe managers' income smoothing action directly either just like $\rho TACC, CFO$. This measure is also widely used by other researchers such as Allayannis & Simko (2009) and Leuz, Nanda, & Wysocki (2003).

3.7 Measurement method of the effects of income smoothing

We use stock returns to estimate whether income smoothing is value adding. Each regression consists of one of the income smoothing measures ($\rho PME, DA$, $\rho TACC, CFO$, $\sigma earnings/\sigma CFO$), the Fama & French (2015) five factors, earnings yield and an industry dummy variable. The equations are presented below. The only difference between them is the income smoothing measure. If the income smoothing measures yield significant negative coefficients then the hypothesis that income smoothing creates value as a result of the SOX is not rejected.

Equation 11 – Stock return predicted by $\rho PME, DA$

$$R_{i,t+1} = \alpha_{i,t} + \gamma_{1i,t}\beta_{i,t} + \gamma_{2i,t}\ln(ME_{i,t}) + \gamma_{3i,t}\ln(BEME_{i,t}) + \gamma_{4i,t}\ln(GP\_TA_{i,t}) + \gamma_{5i,t}\ln(ASSET\_GROWTH_{i,t}) + \gamma_{6i,t}(\mathrm{EY}_{i,t}) + \gamma_{7i,t}(\mathrm{INDUSTRY}_{i,t}) + \gamma_{8i,t}(\rho PME, DA)_{i,t} + \nu_{i,t}$$

Equation 12 - Stock return predicted by $\rho TACC, CFO$

$$R_{i,t+1} = \alpha_{i,t} + \gamma_{1i,t}\beta_{i,t} + \gamma_{2i,t}\ln(ME_{i,t}) + \gamma_{3i,t}\ln(BEME_{i,t}) + \gamma_{4i,t}\ln(GP\_TA_{i,t}) + \gamma_{5i,t}\ln(ASSET\_GROWTH_{i,t}) + \gamma_{6i,t}(\mathrm{EY}_{i,t}) + \gamma_{7i,t}(\mathrm{INDUSTRY}_{i,t}) + \gamma_{8i,t}(\rho TACC, CFO)_{i,t} + \nu_{i,t}$$

Equation 13 - Stock return predicted by $\sigma earnings/\sigma CFO)$

$$R_{i,t+1} = \alpha_{i,t} + \gamma_{1i,t}\beta_{i,t} + \gamma_{2i,t}\ln(ME_{i,t}) + \gamma_{3i,t}\ln(BEME_{i,t}) + \gamma_{4i,t}\ln(GP\_TA_{i,t}) + \gamma_{5i,t}\ln(ASSET\_GROWTH_{i,t}) + \gamma_{6i,t}(\mathrm{EY}_{i,t}) + \gamma_{7i,t}(\mathrm{INDUSTRY}_{i,t}) + \gamma_{8i,t}(\sigma earnings, \sigma CFO)_{i,t} + \nu_{i,t}$$

Where $R_{i,t+1}$ is the stock return $(\ln(\frac{St}{St-1}))$, $\beta_{i,t}$ is the 5-year stock beta, $ME_{i,t}$ is lagged market equity, $BEME_{i,t}$ is book-to-market equity, $GP\_TA_{i,t}$ is gross profit to assets, $ASSET\_GROWTH_{i,t}$ is lagged growth in assets, $\mathrm{EY}_{i,t}$ is earnings yield, $\mathrm{INDUSTRY}_{i,t}$. In the following paragraphs, the control variables are going to be explained in detail.

3.7.1 The Fama and French five factor model

The contribution of Fama and French in the literature regarding explanation of stock returns continues to have distinguished attention for their latest improvements. In order to increase the explanatory power of the models, their most recent research adds two variables in addition to the three factor model that are strongly correlated with stock returns. This paper uses five variables that are suggested to be the strongest determinants of stock return.

Beta

Their first variable is beta (β), which is a widely used measure of risk. Beta is a measure of risk arising from exposure to general market movements. Beta measures the movement of a stock in comparison to the market movement (Koller, Goedhart, & Wessels, 2010). Stocks

with higher betas would have excess return over stocks with low values of beta (Koller, Goedhart, & Wessels, Valuation: Measuring and managing the value of companies, 2010).

Expectation: Beta is positively correlated with stock return

Size

The second variable in our model is size. Measure of size that is often used is the market capitalization, which is computed by multiplying the shares outstanding with their current price. The historical evidence on the effect of size goes back to the research of Banz (1981), which postulates that size explains stock returns. Fama & French (1992) publish results in line with Banz (1981) in terms of the strong explanatory power of size on stock returns. The negative relationship between size and returns can be explained with the theory of efficient market, as well. That is to say, the stocks with lower market caps are associated with higher returns because of the higher level of risk that they have (Shefrin, 2007). Theories that oppose market efficiency, such as the behavioristic one, would explain this phenomenon by mispricing of the stocks of companies with low market cap (Shefrin, 2007).

However, a strong debate evolved about the effect of size after the publication of Dijk's findings (2011). Dijk (2011) opposes previous literature by conducting a review of 30 years long research (among others Banz (1981) and Fama & French (1992)) and suggests that the effect of size on expected stock returns is insignificant.

Fama & French (2012) publish new findings in response to Dijk supporting the power of size to explain stock returns. Most recent research in this area is trying to explain size with different factors that may have an impact such as dividend yield Moor & Sercu (2013), but their research is yet to present statistically significant outcomes. We include size in our model, because we have a lack of research on the variables that explain the effect of size and excluding this variable can lead to omitted variable problem.

Expectation: Size is negatively correlated with stock return

Book to Market ratio

The third variable in our model is book-to-market ratio, which has widely proven to have strong explanatory power on stock returns. Fama & French (1992) include it in their three factor model. The intuition behind this variable is that value stocks (ones that have high

book to market value) tend to outperform growth stocks (low book to market value). This again can be explained with the theory of efficient markets, according to with high book to market companies have higher return and hence higher risk (Shefrin, 2007). Opposing theories explain this phenomena by market mispricing (Shefrin, 2007). The latest research admits the ability of book to market to explain stock returns (Bali, Cakici & Fabozzi (2013), Garcia, Mantilla-Garcia & Martellini (2014) etc.)

Expectation: Book to Market ratio is positively correlated with stock return

Gross profit to assets

The following variables GPA (gross profit to assets) and AG (asset growth) are measures of profitability and investments, respectively. These are the variables that Fama and French use in their 2015 research in addition to beta, book to market ration and size. They started exploring the explanatory power of these two variables in their earlier research (Fama & French (2006)). This paper uses the following valuation equation as a basis to explore a set of relationships between future stock returns, current book to market ratio, firm-level expected profitability and firm-level expected investment:

Equation 14. Relationship between stock returns, book-to-market ratio, profitability and investment.

$$\frac{M_t}{B_t} = \frac{\sum_{t=1}^{\infty} E(Y_{t+i} - dB_{t+i)}/(1+r)^t}{B_t}$$

Where M_t is the market value per share, B_t is the book equity per share, Y_{t+i} is equity earnings per share, dB_{t+i} is the change in book equity per share and r is the discount rate.

The challenge of the 2006 paper is to find relevant measures for profitability and investments that are related to return and negatively related to the existing variables in the model – beta, book-to-market and profitability.

Novy-Marx (2013) presents findings that indicates GPA (gross profit to assets) as a variable that is strongly correlated to stock return, and these findings are the basis for Fama and French to include this variable in their model. GPA as a measure of profitability is based on the intuition that companies with higher gross profits, offer higher stock returns.

Expectation: Gross profit to assets is positively correlated with stock return

Asset growth

The results presented by Fama & French (2006) were, nevertheless, flawed in terms of proving the explanatory power of investments on stock returns. They failed to find the strong negative relation they predicted and that left place for further research on this topic.

The negative relation between investments and return is based on the hypothesis that investors underreact the empire building implications of increased investment expenditures (Titman, Wei, & Xie (2004)). This relation was previously proven negative by Titman, Wei, & Xie (2004), so it was clear that the model is wrongly specified in some aspect.

Aharoni, Grundy & Zeng (2013) reinvestigate this model and their results suggest that Fama & French (2006) model is leading to wrong inferences since they examined per share measures of expected investment and expected profitability while the valuation formula does not hold in per share analysis. A common measure of investment is for example, asset growth which if examined as per share asset growth can mislead because of events such as share issuance or share buyback. This error can be substantial to the degree that the model is leading to wrong positive or negative sign in the model.

Fama & French (2015) acknowledge these findings and include the measures on a firm-level instead on a share level.

Expectation: Investment is negatively correlated with stock return

3.7.2 Other control variables

Earnings Yield

Earnings yield is computed as earnings to market capitalization. This variable explains stock returns in addition to the Fama and French`s set of variables. The explanatory power of earning yield on stock return is documented in Haugen & Baker (1996). Bandyopadhyay, Huang & Wirjanto (2011) include this variable in the return regression together with the measure of income smoothing and it increases the model's explanatory power. Hence, we also include it in our model. The rationale behind this variable is that companies with higher profitability yield higher returns.

Expectation: Earnings yield is positively correlated with stock return

Industry Dummy

The differences between stock returns of companies across industries have been documented widely in the literature (Biddle & Seow (1991), Waring (1996), Hameed & Mian (2014)). Since we include the companies from all industries in the S&P Capital IQ data base in our sample expect from the financial industry that have many different characteristics that might be explained with other variables, there is a large possibility to have omitted variable bias. Therefore, we include a dummy variable that accounts for the industry effect on stock returns.

Expectation: Industry dummy is correlated with stock return

Crisis Dummy

The financial crisis (2008) may have a significant effect on income smoothing and investors' perception on financial statement in general. Therefore, we include a dummy variable to ascertain that this does not drive our results.

4. Results and Analysis

4.1 Reliability and validity

In order to get the desired results, as already described, four regression were run. The first one estimates discretionary accrual, which is a variable in our income smoothing measure. The remaining three regression estimate the impact of income smoothing on firm value using different income smoothing measures. All regressions were run on panel data set with 13.174 observations. To prove the reliability and validity of the results we present the tests that were performed on the regressions.

4.1.1 Discretionary accruals regression

Normality

To test for the normal distribution of residuals, the X^2 statistic from the Jarque-Bera normality test was obtained. The results from the Jarque-Bera test show rejection of the null hypothesis of normality with probability of 0,00, therefore the distribution of residuals is non-normal. The results for the discretionary accruals regression are presented in Appendix C. Following the recommendation of Brooks (2008), a decision to stick to the OLS specification is made, since its behavior has been well research in a variety of circumstances. He also suggests that if the sample size is sufficiently large, the violation of the normality assumption will not cause any severe consequences.

Autocorrelation

For the assumption of zero covariance between the error terms over time to hold, the error terms need to be uncorrelated with each other (Brooks, 2008). To examine the autocorrelation between the error terms in the regression, we looked at the Durbin-Watson statistic. Since the statistic presents a value of 1,89, which is close to 2 we conclude that the H_0 is not rejected. It means that there is no strong evidence that there is autocorrelation in the data. The result is exhibited in Appendix B.

Multicollinearity

Multicollinearity is an issue that is faced when the explanatory variables are highly correlated with each other. To examine whether the variables used in the regressions suffer from multicollinearity, we construct a matrix of correlations between the individual variables

(Brooks, 2008). The rule of thumb for correlation being a serious problem is correlation that is larger than 0,8. Looking at our results presented in Appendix D the correlations range from -0,14 to 0,07. Hence, we conclude that no multicollinearity is present in the data set.

Heteroscedasticity

To make sure that the variance of the errors in our data set is constant or homoscedastic, we look at the graphs of the residuals from the regressions. The graph shown in Appendix E visually presents that the variance of the residuals is not constant. Hence, we find evidence of heteroscedasticity in our sample. To mitigate this problem, we choose to use the robust standard errors (Brooks, 2008) (Appendix F).

Heterogeneity

One potential drawback of using large sample of data, in our case many companies from different industries and time periods, is increasing the chances of having heterogeneity. This is caused by the specific differences between the cross-sectional and time units that are not captured by the model. Therefore, these differences cause the explanatory variables to be correlated with the non-constant terms. The heterogeneity issue can be mitigated by introducing dummy variables in cross-sectional and period dimension that will capture the specific effect caused by the differences between cross-sectional units and periods.

To the test whether heterogeneity is present in the data set, dummies are introduced in both dimensions and are tested jointly for significance. The results for the discretionary accruals regression are presented in Appendix G. The results from the "Redundant Fixed Effects", both the F-statistic and the Likelihood ratio X^2, indicate the presence of heterogeneity in both dimensions (Appendix H).

The next step after detecting heterogeneity is to specify whether fixed or random effects are more appropriate for our regressions. This is achieved by conducting the Hausman test that has the H_0 of well specified random effects.

The results presented in Appendix I show that in the cross-section dimension the random effects can be used. The Hausman test could not be run in period dimension due to lack of observations. Wooldridge (2012) presents that:

"In practice, a failure to reject [H_o] means either that random and fixed effect estimates are sufficiently close, so that it does not matter which is used, or the sampling variation is so large in the fixed effect estimates that one cannot conclude practically significant differences are statistically significant" (Wooldridge, 2012, p. 496).

Therefore, we decide to use fixed effects in the period dimension. The regression with cross-section random and period fixed effects is presented in Appendix J.

Endogeneity

Endogeneity arises when the error term and the dependent variable is correlated with each other. It leads to biased coefficient and thus unreliable inferences. Endogeneity can derive from simultaneity, omitted variables or measurement error. With regard to total accrual estimation simultaneity does not seem to cause problems as it is hard to perceive why total accruals would be codetermined with the other variables. Omitted variables may be present in our model. Panel data partially deals with omitted variable bias, however we use fixed effects in the period dimension, which raises endogeneity concerns. Measurement error may be the greatest threat to our inferences since it is extremely difficult to determine total accruals. We use an extensive sample of 1.882 companies and 13.174 firm-year observations, which mitigates measurement error to a certain extent. Nonetheless, we cannot rule out the possibility of endogeneity in our model.

4.1.2 Stock return regressions

The same tests are run on all stock return regressions. We discuss the results of stock return regression with $\rho PME, DA$ in this section. The test results for the remaining two regressions are presented in Appendix S - Appendix Z and Appendix AA - Appendix HH, respectively.

Normality

The X^2 statistic from the Jarque-Bera normality test was obtained (Appendix M) and it yielded a p value of 0,00, which provides evidence that the H_0 is rejected. In other words, the residuals are not normally distributed. However, we argued before that due to our sample size this problem is mitigated.

Autocorrelation

The Durbin-Watson test statistic is 2.27, which is, similarly to the previous case, close to 2. Hence, we conclude that the residuals are not auto correlated. The result is presented in Appendix K.

Multicollinearity

In this case, correlations between the variables vary from -0,14 to 0,05 (Appendix N). Thus, we conclude that there is no multicollinearity in the data.

Heteroscedasticity

We detect heteroscedasticity in the data by looking at the residuals graph exhibited in Appendix O. To mitigate this problem, we choose to use the robust standard errors again (Brooks, 2008). The regression with robust standard errors is presented in Appendix P.

Heterogeneity

The results suggest random effects in cross sectional dimension (Appendix Q). The Hausman test couldn't be run in period dimension due to lack of observations. Therefore, we decide to use fixed effects in the period dimension, because according to (Wooldridge, 2012), even if the test was run and the result suggests not to reject the H_0 hypothesis of random effects, we could still use the fixed effects since in practice when H_0 is not rejected they are so close to each other, so it doesn't matter which one is used.

Since the data set that we are dealing with is a balanced panel, running the effects in both dimensions at the same time is plausible (Appendix R).

Endogeneity

Endogeneity arises in our stock return regression model as well. Similarly to our discretionary accrual model, simultaneity does not seem to be present. The explanatory variables are not codetermined with stock return, but rather determine stock return. Omitted variables may drive our results. The number of variables used to determine stock returns grows with time. It is possible that there are still some variables that are left out and thus are included in the error term. Our panel data estimation technique mitigates omitted variables to a certain degree and we included other control variables to the Fama French 5 factor model too, nevertheless we cannot rule omitted variable bias out. Measurement error is not mitigated so well in panel data and some of our variables are proxies that may not be measured accurately. $\rho PME, DA$ is such a variable. If discretionary accruals are mismeasured

the correlation between them and pre-managed earnings is also biased. We measure investments as the growth in assets, which may be misleading depending on the industry concerned. Certain industries grow faster in assets whereas others invest substantially in research and development for instance but increase their assets only if R&D activities are successful. Profitability is approximated by ROA, which does not take off balance sheet items into account. For instance, if a company has operating leases or expenses R&D assets are substantially lower than for other companies, thus ROA is higher. This effect is by and large compensated by lower net income as lease expenses and R&D costs decrease net income, so the numerator of ROA. The other problem that arises with ROA is capital structure. Companies even in the same industry may vary significantly with respect to capital structure. Those companies that assume debt deduct interest expenses from earnings, whereby their net income is smaller compared to companies that are financed fully by equity. However, capital structure does not determine profitability. All in all, ROA is not a perfect measure of profitability and the measurement error deriving from it may drive our results. We cannot be certain that our models do not have endogeneity bias, but we partially deal with that by using panel data.

4.2 Regression results

Our regression results are presented first for the discretionary accruals estimation and then for the stock return estimations.

4.2.1 Discretionary accruals regression

First, we estimated total accruals as part of the discretionary accrual approximation process. The equation has a strong explanatory power as the adjusted R^2 is 72%. The results suggest that the nondiscretionary component of sales ((1+k)*ΔSales – ΔAccounts receivable) increases the amount of total accruals in line with expectations. ROA gives a raise to total accruals as well. It has the highest coefficient of 0.89. Cash flow from operations decreases total accruals, which is not surprising as whenever cash transactions are made accruals are cleared. The dummy for economic gain and loss predicts total accruals negatively, which is in accordance with our expectation since firms recognize unfavorable events in a more timely fashion. The magnitude of gain and loss has a very small negative coefficient. It suggests that when companies experience loss periods the impact on total accruals is slightly negative. The

rest of the explanatory variables have not been found significantly different from 0, thus we do not draw conclusions based on them.

Table 2 – Results from discretionary accruals regression

Dependent Variable	Total Accruals			
Explanatory variables	Coefficient	Expected sign	t-Statistic	Probability
1/Total Assets	0,0260	(+)/(-)	0,9905	0,3220
(1+k) Δsales-Δaccounts receivable	0,0213	(+)	1,9423	0.0521*
PPE	0,0003	(+)	0,0946	0,9247
Total Accrualst-1	0,0334	(+)	1,2005	0,2300
Growth in Sales	0,0010	(+)	1,0747	0,2825
ROA	0,8887	(+)	12,4996	0.0000***
Cash Flow from Operations	-0,5726	(-)	-4,5205	0.0000***
Dummy for economic gain or loss	-0,0627	(-)	-2,4689	0.0136**
Magnitude of gain and loss	0,0000	(-)	-1,8867	0.0592*
C	0,0122	(+)/(-)	0,7695	0,4416
R-squared	0,7157	Mean dependent var		-0,0796
Adjusted R-squared	0,7154	S.D. dependent var		0,2194
***,**,* significance in 1 %, 5 % and 10 % level respectively				

The fitted values from this regression are the nondiscretionary accruals, which we subtracted from total accruals to arrive at discretionary accruals. Then, the difference between earnings and discretionary accruals were taken to obtain pre-managed earnings. The correlation between pre-managed earnings and discretionary accruals was computed to attain the measure of income smoothing.

4.2.2 Stock return regressions

Our regression results are exhibited in Tables 3, 4 and 5. The control variables yielded very similar results in all three equations therefore we present their effect jointly.

The equations all yielded an adjusted R^2 around 38.4% According to our results market capitalization does not impact stock returns, which is inconsistent with Fama and French (1992) who suggest that smaller companies tend to have higher stock returns. Our results support Dijk (2011) who posits that size does not explain stock returns. Gross Profit/Total Assets boosts stock return in accordance with our expectation. Assets growth affects stock

returns negatively as investors negatively react to empire building. Earnings yield increases stock return, which is not surprising as earnings yield is a profitability measure. The industry dummy suggests that there is tangible difference between industries. Finally, all of our variables of interest predict that the more firms engage in income smoothing the higher the stock return is. The remaining variables (Book to Market Ratio and Beta) have not been found significant in our data set, therefore we refrain from drawing any further conclusions about them.

Table 3 - Results from stock return regression with $\rho PME, DA$

Dependent variable	Stock return			
Explanatory Variables	Coefficient	Expected sign	t-Statistic	Probability
Market Capitalization	0,0000	(-)	6,8365	0.0000***
Book to Market Ratio	-0,0063	(+)	-0,6562	0,5117
Beta	0,0036	(+)	0,4137	0,6791
Gross Profit/Total Assets	0,0904	(+)	5,1846	0.0000***
Assets Growth	-0,0788	(-)	-3,8488	0.0001***
Earnings Yield	0,1312	(+)	6,4716	0.0000***
Industry Dummy	0,0039	(+)/(-)	2,0456	0.0408**
ρ(PME,DA)	-0,0434	(-)	-5,2967	0.0000***
C	-0,0629	(+)/(-)	-3,1810	0.0015***
R-squared	0,3835	Mean dependent var		-0,0203
Adjusted R-squared	0,3829	S.D. dependent var		0,5689
***,**,* significance in 1 %, 5 % and 10 % level respectively				

$\rho TACC, CFO$ yields a slightly stronger coefficient than $\rho PME, DA$, which is the result of the different measurement technique, but both measures suggest that income smoothing does create value.

Table 4 - Results from stock return regression with $\rho TACC, CFO$

Dependent variable	Stock return			
Explanatory Variables	Coefficient	Expected sign	t-Statistic	Probability
Market Capitalization	0,0000	(-)	6,6549	0.0000***
Book to Market Ratio	-0,0075	(+)	-0,7724	0,4399
Beta	0,0038	(+)	0,4452	0,6562
Gross Profit/Total Assets	0,1125	(+)	6,3733	0.0000***
Assets Growth	-0,0792	(-)	-3,8384	0.0001***
Earnings Yield	0,1295	(+)	6,4282	0.0000***
Industry Dummy	0,0025	(+)/(-)	1,3097	0,1903
ρ(TACC,CFO)	-0,0829	(-)	-7,9319	0.0000***
C	-0,1051	(+)/(-)	-4,8970	0.0000***
R-squared	0,3863	Mean dependent var		-0,0203
Adjusted R-squared	0,3856	S.D. dependent var		0,5689
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Alongside the previous two income smoothing measures, $\sigma earnings/\sigma CFO$ postulates that income smoothing increases stock returns even if the coefficient is smaller than it was for the other measures.

Table 5 - Results from stock return regression wit $\sigma earnings/\sigma CFO$

Dependent variable	Stock return			
Explanatory variable	Coefficient	Expected sign	t-Statistic	Probability
Market Capitalization	0,0000	(-)	6,6644	0.0000***
Book to Market Ratio	-0,0078	(+)	-0,8099	0,4180
Beta	0,0037	(+)	0,4305	0,6669
Gross Profit/Total Assets	0,0966	(+)	5,5269	0.0000***
Assets Growth	-0,0805	(-)	-3,9062	0.0001***
Earnings Yield	0,1289	(+)	6,3399	0.0000***
Industry Dummy	0,0031	(+)/(-)	1,6747	0.0940*
σearnings/σCFO	-0,0214	(-)	-5,4339	0.0000***
C	-0,0312	(+)/(-)	-1,6090	0,1077
R-squared	0,3853	Mean dependent var		-0,0203
Adjusted R-squared	0,3846	S,D, dependent var		0,5689
***,**,* significance in 1 %, 5 % and 10 % level respectively				

4.3 Analysis

Income smoothing can affect firm value through three different channels i) agency cost ii) information asymmetry and iii) externalities. Our results examined the combined impact of these channels and showed that accrual-based income smoothing increases firm value.

According to the pre-SOX research of Rountree et al. (2008) accrual-based income smoothing decreases firm value, but lower cash flow volatility increases it. This means that business decisions that lower cash flow volatility increase firm value, while accrual-based income smoothing actually decreases firm value. This finding is especially surprising for two reasons. First, Cohen et al. (2008) find that in the pre-SOX period firms were highly engaged in managing earnings via accruals. This suggests that managers intentionally managed earnings most probably to follow their own interest instead of shareholders' interest. Second, if income smoothing was value creating through reducing cash flow volatility it induces managers to use real income smoothing instead of accrual-based. The problem with real income smoothing is that it destroys value via operations many times (Gunny K. , 2005). Managers even acknowledge that they would engage in value destructive real income smoothing to meet earnings targets in the survey research of Graham et al. (2005), which was conducted three years after SOX. Our results show on the contrary that accrual-based income smoothing does create value using $\rho\mathrm{PME,DA}$ as our primary income smoothing measure. Our results are robust to other income smoothing measures such as $\rho\mathrm{TACC,CFO}$ and $\sigma\mathrm{earnings}/\sigma\mathrm{CFO}$ that were applied by Rountree et al. (2008). Further, we controlled for the 2008 financial crisis with a dummy variable. The coefficient of the dummy variable has not been found significantly different from zero, nevertheless we cannot rule out the possibility that our results are influenced by the crisis. We found two possible explanations why our results differ from the results of Rountree et al.

i. One of the key differences that can explain the contradictory conclusions is the change in legal environment. Due to ground shaking accounting scandals (such as Enron) US administration introduced SOX, which tremendously changed income smoothing and accounting practice. SOX punishes accounting manipulation much harsher than previous legislation. SOX induced much higher scrutiny on financial reporting to reduce the possibility of managerial opportunism and made corporate

executives directly responsible for the financials presented in their report. Therefore, a possible explanation is that managers rather refrain from accounting tricks and only use accrual-based income smoothing when their motivation is unquestionable. Our results suggest that SOX has been an effective tool to prevent managers' from engaging in opportunistic accounting manipulations. SOX seem to have changed investors' perception about accrual-based income smoothing. They also appear to have regained their trust in financial reports most probably due to strong internal and external monitoring introduced by SOX. Hence, our results encourage managers to use accrual-based income smoothing instead of a potentially value detrimental real income smoothing actions.

ii. Yang & Zhu (2014) conclude that market uncertainty is a major factor that determines how income smoothing impacts firm value. Income smoothing creates value when market uncertainty, measured by VIX (Chicago Board Options Exchange Market Volatility Index), is low, but destroys value when it is high. The scope of Rountree et al. is 1988-2002 under which market uncertainty was substantially higher than during our research period (2006-2012) based on the average VIX (Yahoo Finance, 2015). Thus, another explanation why our results contradict Rountree et al.'s may be that income smoothing was value detrimental during their research period whereas our results reflect lower market uncertainty and that is the reason why we find a positive relation between income smoothing and firm value. This paper triggers the question whether market uncertainty truly determines the effect of income smoothing or not. If yes, managers are to use accrual-based income smoothing when market uncertainty is low, but should refrain from it if market uncertainty is high.

4.4 Limitations

A limitation of this paper is related to the sample selection. Namely, we have included all US companies that are available in the S&P Capital IQ database. The first limitation is that companies not included in the S&P Capital IQ database have been disregarded. Another limitation related to sample size is the exclusion of companies that have missing observations, which reduces the sample size. It also creates a form of survivorship bias since

companies that stopped operating or went private at some point in this interval are excluded.

Researchers assume that the unexplained part of total accruals is discretionary accruals and the measure of earnings management. We assume in our discretionary accruals estimation that firms did not manage earnings violating GAAP, even though such events took place in the past and presumably will happen again. Nevertheless, we believe that the number of such events is negligible and therefore will not drive our results. Further, Vladu & Pelinescu (2014) points out that the unexplained part could be driven by poor earnings quality, macroeconomic factors or inefficient management instead as well.

Our two other measures do not directly measure the effect of income smoothing. They may capture variations that have nothing to do with managers' discretion on accounting figures.

In addition, our inferences may suffer from measurement error bias, which can well be the greatest problem of earnings management research in general. Both measuring discretionary accruals and income smoothing can potentially be a result of measurement error, which would explain why studies in this field arrive at different inferences. Vladu & Pelinescu (2014) continues to argue that many papers use industry classification, whereby they disregard differences between companies in the same industry. Above all, the primary problem with industry classification when the constant coefficient is used as a benchmark. This can easily lead to biases when companies extensively vary from one another.

5. Conclusion

In this paper we investigate whether income smoothing creates or destroys value for shareholders in the post-SOX period. Income smoothing can affect firm value through different channels such as agency cost, information asymmetry and tax reduction. We examine how all these potential channels together impact stock returns. Due to accounting scandals at the beginning of the 20th century US administration put SOX into effect to preclude accounting fraud and wrongdoing. We assume that this legislation change resulted in a fundamentally different legal environment, in which managers may use their discretion over accounting choice much more carefully lest violating the law. We compare our results with pre-SOX research and attempt to explain what role SOX might have played in the perception of income smoothing.

We find that all three of our income smoothing measures ($\rho\mathrm{PME}, \mathrm{DA}, \rho\mathrm{TACC}, \mathrm{CFO}, \sigma\mathrm{earnings}/\sigma\mathrm{CFO}$) indicate that income smoothing boosts stock returns. We control for the 2008 financial crisis that could potentially drive our results, but the crisis dummy variable is not found significant. The pre-SOX research of Rountree et al. (2008) arrives at the opposite conclusion concerning accrual-based income smoothing. They posit that accrual-based income smoothing is in fact value detrimental. We provide two possible explanations for that. First, SOX could have changed managers' behavior towards accounting discretion. We argue that SOX has been such a radical change in regulation that managers reconsidered their approach towards financial reporting especially due to the much harsher consequences of accounting crime. As a result of SOX investors regained their trust in financial reports and do not expect managers to act opportunistically. This finding encourages managers to replace real income smoothing practices with accrual-based income smoothing since real income smoothing is often value destructive (Gunny K. , 2005). Second, Yang & Zhu (2014) find that income smoothing creates value as long as market uncertainty is low. But under increased uncertainty income smoothing is perceived a way to garble information and thus decreases shareholders' wealth. According to this possible explanation managers ought not to use accrual-based income smoothing when market uncertainty is high, but they preferable use accrual-based income smoothing when market uncertainty is low.

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Appendices

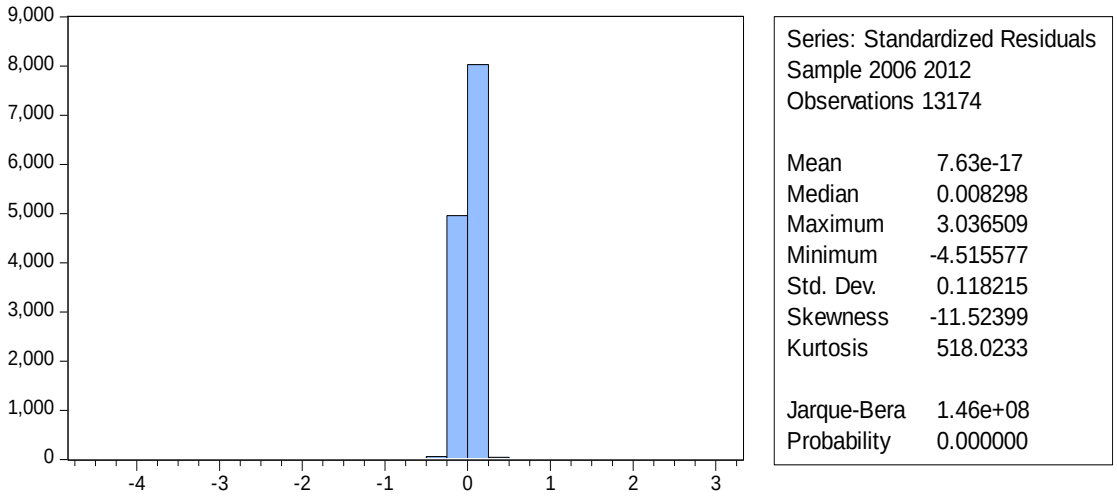
Appendix A. Discretionary accruals regression variables - Descriptive statistics

	1/Total Assets	(1+k) Δsales-Δaccounts receivable	PPE	Total Accruals$_{t-1}$	Growth in Sales	ROA	Cash Flow from Operations	Dummy for economic gain or loss	Magnitude of gain and loss
Mean	0,03	0,04	0,25	-0,08	0,10	0,01	0,07	0,85	593,42
Median	0,00	0,05	0,17	-0,05	0,06	0,04	0,09	1,00	55,20
Maximum	34,48	7,70	0,98	14,58	88,43	5,01	6,15	1,00	59725,00
Minimum	0,00	-9,84	0,00	-25,23	-71,09	-9,78	-11,27	0,00	0,00
Std, Dev,	0,33	0,34	0,23	0,43	1,26	0,29	0,22	0,36	2589,49
Skewness	86,27	-4,15	1,15	-26,71	15,54	-8,19	-9,95	-1,96	11,60
Kurtosis	8725,00	152,56	3,35	1564,53	2893,73	212,30	595,48	4,84	180,19
Jarque-Bera	41800000000	12316236	2991	1340000000	4590000000	24192468	193000000	10304	17529427
Probability	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Sum	367,40	582,99	3312,26	-998,33	1371,66	67,94	968,00	11198,00	7817700,00
Sum Sq, Dev,	1462,95	1558,31	715,86	2488,43	20880,17	1098,09	665,87	1679,62	88300000000,00
Observations	13174	13174	13174	13174	13174	13174	13174	13174	13174

Appendix B. Pooled discretionary accruals regression

Variable	Coefficient	Standard Error	t-Statistic	Probability
1/Total Assets	0,0247	0,0032	7,8506	0.0000***
(1+k) Δsales-Δaccounts receivable	0,0219	0,0030	7,1991	0.0000***
PPE	0,0007	0,0045	0,1648	0,8691
Total Accrualst-1	0,0347	0,0025	14,1265	0.0000***
Growth in Sales	0,0010	0,0008	1,2314	0,2182
ROA	0,8903	0,0050	176,8659	0.0000***
Cash Flow from Operations	-0,5824	0,0069	-84,5712	0.0000***
Dummy for economic gain or loss	-0,0607	0,0034	-17,9568	0.0000***
Magnitude of gain and loss	0,0000	0,0000	-0,9146	0,3604
C	0,0111	0,0030	3,7499	0.0002***
R-squared	0,7185	Mean dependent var		-0,0796
Adjusted R-squared	0,7183	S,D, dependent var		0,2228
S,E, of regression	0,1183	Akaike info criterion		-1,4312
Sum squared resid	184,0903	Schwarz criterion		-1,4255
Log likelihood	9437,1740	Hannan-Quinn criter,		-1,4293
F-statistic	3732,7960	Durbin-Watson stat		1,8922
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix C. Pooled discretionary accruals regression - Normality test

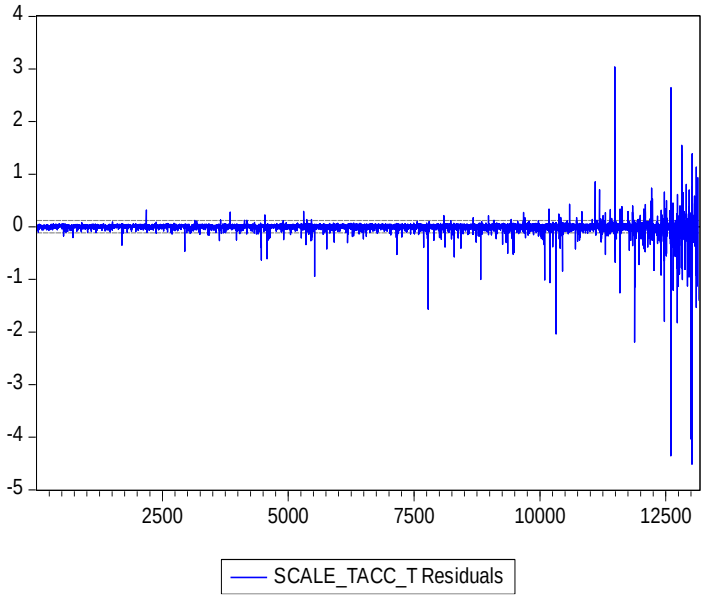


Appendix D. Discretionary accruals regression variables - Correlation matrix

Variable	1/Total Assets	(1+k) Δsales-Δaccounts receivable	PPE	Total Accrualst-1	Growth in Sales	ROA	Cash Flow from Operations	Dummy for economic gain or loss	Magnitude of gain and loss
1/Total Assets	1								

(1+k) Δsales-Δaccounts receivable	0,0217	1							
	0,0127	-----							
PPE	-0,0431	-0,0149	1						
	0,0000	0,0883	-----						
Total Accrualst-1	-0,0566	0,0449	-0,0045	1					
	0,0000	0,0000	0,6075	-----					
Growth in Sales	0,0094	0,1318	0,0060	-0,0003	1				
	0,2830	0,0000	0,4940	0,9768	-----				
ROA	-0,1785	0,1101	0,0585	0,1449	0,0171	1			
	0,0000	0,0000	0,0000	0,0000	0,0498	-----			
Cash Flow from Operations	-0,1223	0,0811	0,1058	0,2469	0,0016	0,6932	1		
	0,0000	0,0000	0,0000	0,0000	0,8575	0,0000	-----		
Dummy for economic gain or loss	-0,0994	0,0773	0,1961	0,0802	0,0054	0,3921	0,4887	1	
	0,0000	0,0000	0,0000	0,0000	0,5366	0,0000	0,0000	-----	
Magnitude of gain and loss	-0,0191	0,0072	0,0810	0,0096	-0,0026	0,0608	0,0684	0,0963	1
	0,0288	0,4091	0,0000	0,2707	0,7694	0,0000	0,0000	0,0000	-----

Appendix E. Pooled discretionary accruals regression - Residual graph



Appendix F. Pooled discretionary accruals regression - Robust standard errors

Variable	Coefficient	Standard Error	t-Statistic	Probability
1/Total Assets	0,0247	0,0251	0,9874	0,3235
(1+k) Δsales-Δaccounts receivable	0,0219	0,0106	2,0725	0.0382**
PPE	0,0007	0,0035	0,2124	0,8318
Total Accrualst-1	0,0347	0,0286	1,2134	0,2250
Growth in Sales	0,0010	0,0010	1,0662	0,2864
ROA	0,8903	0,0705	12,6235	0.0000***
Cash Flow from Operations	-0,5824	0,1259	-4,6276	0.0000***
Dummy for economic gain or loss	-0,0607	0,0253	-2,3961	0.0166**
Magnitude of gain and loss	0,0000	0,0000	-1,8032	0.0714*
C	0,0111	0,0158	0,7051	0,4808
R-squared	0,7185	Mean dependent var		-0,0796
Adjusted R-squared	0,7183	S,D, dependent var		0,2228
S,E, of regression	0,1183	Akaike info criterion		-1,4312
Sum squared resid	184,0903	Schwarz criterion		-1,4255
Log likelihood	9437,1740	Hannan-Quinn criter,		-1,4293
F-statistic	3732,7960	Durbin-Watson stat		1,8922
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix G. Discretionary accruals regression - Cross-section and period fixed effects

Variable	Coefficient	Standard Error	t-Statistic	Probability
1/Total Assets	0,0408	0,0393	1,0383	0,2992
(1+k) Δsales-Δaccounts receivable	0,0200	0,0103	1,9307	0.0535*
PPE	-0,1084	0,0366	-2,9625	0.0031***
Total Accrualst-1	0,0207	0,0188	1,1044	0,2695
Growth in Sales	0,0007	0,0009	0,8114	0,4171
ROA	0,9104	0,0745	12,2243	0.0000***
Cash Flow from Operations	-0,4489	0,1273	-3,5257	0.0004***
Dummy for economic gain or loss	-0,0870	0,0234	-3,7237	0.0002***
Magnitude of gain and loss	0,0000	0,0000	-3,6247	0.0003***
C	0,0518	0,0151	3,4304	0.0006***
R-squared	0,7800	Mean dependent var		-0,0796
Adjusted R-squared	0,7430	S.D. dependent var		0,2228
S.E. of regression	0,1129	Akaike info criterion		-1,3913
Sum squared resid	143,8630	Schwarz criterion		-0,3133
Log likelihood	11061,3000	Hannan-Quinn criter.		-1,0313
F-statistic	21,0866	Durbin-Watson stat		2,1806
Prob(F-statistic)	0,0000			
	Effects Specification			
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix H. Discretionary accruals regression - Redundant fixed effect

Effects Test	Statistic	d.f.	Probability
Cross-section F	1,6622	-1881,1128	0,0000
Cross-section Chi-square	3223,7788	1881,0000	0,0000
Period F	3,6703	-6,1128	0,0012
Period Chi-square	25,7010	6,0000	0,0003
Cross-Section/Period F	1,6711	-1887,1128	0,0000
Cross-Section/Period Chi-square	3248,2515	1887,0000	0,0000

Appendix I. Discretionary accruals regression - Cross-section Hausman test

Test Summary	Chi-Sq. Statisti	Chi-Sq. d.f.	Probability
Cross-section random	0,0000	9,0000	1,0000
* Cross-section test variance is invalid. Hausman statistic set to zero.			
** WARNING: robust standard errors may not be consistent with			
assumptions of Hausman test variance calculation.			

Appendix J. Discretionary accruals regression - Cross section random and period fixed effects

Variable	Coefficient	Stdandard Error	t-Statistic	Probability
1/Total Assets	0,0260	0,0262	0,9905	0,3220
(1+k) Δsales-Δaccounts receivable	0,0213	0,0109	1,9423	0.0521*
PPE	0,0003	0,0036	0,0946	0,9247
Total Accrualst-1	0,0334	0,0278	1,2005	0,2300
Growth in Sales	0,0010	0,0009	1,0747	0,2825
ROA	0,8887	0,0711	12,4996	0.0000***
Cash Flow from Operations	-0,5726	0,1267	-4,5205	0.0000***
Dummy for economic gain or loss	-0,0627	0,0254	-2,4689	0.0136**
Magnitude of gain and loss	0,0000	0,0000	-1,8867	0.0592*
C	0,0122	0,0158	0,7695	0,4416
	Effects Specification			
			S.D.	Rho
Cross-section random			0,0144	0,0160
Period fixed (dummy variables)				
Idiosyncratic random			0,1129	0,9840
	Weighted Statistics			
R-squared	0,7157	Mean dependent var		-0,0796
Adjusted R-squared	0,7154	S.D. dependent var		0,2194
S.E. of regression	0,1170	Sum squared resid		180,2504
F-statistic	2208,7810	Durbin-Watson stat		1,9142
Prob(F-statistic)	0,0000			
	Unweighted Statistics			
R-squared	0,7189	Mean dependent var		-0,0796
Sum squared resid	183,7824	Durbin-Watson stat		1,8833
***,**,* significance in 1 %, 5 % and 10 % level respectively				

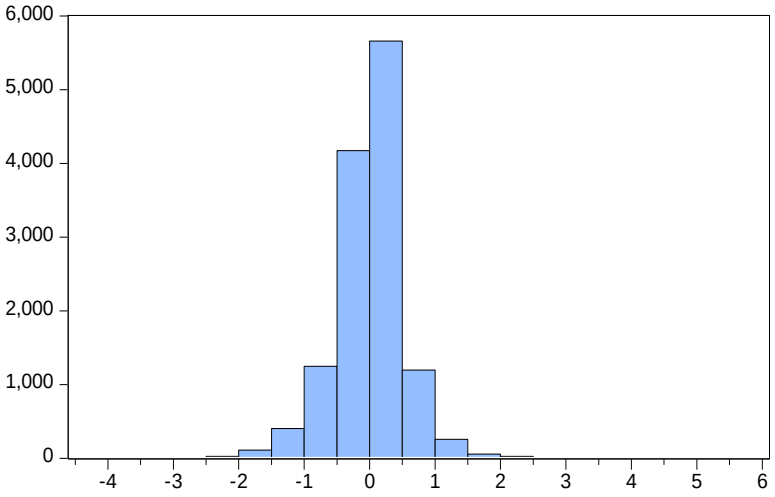
Appendix K. Stock return regression ρ(PME,DA) variables - Descriptive statistics

	Market Capitalization	Book to Market Ratio	Beta	Gross Profit/Total Assets	Assets Growth	Earnings Yield	Industry Dummy	ρ(PME,DA)
Mean	5453,8110	0,6190	1,1477	0,3995	0,0688	-0,0900	5,1865	0,0244
Median	624,0500	0,5067	1,1400	0,3269	0,0499	0,0459	5,0000	0,0158
Maximum	511887,1000	98,4387	8,8500	7,3920	4,7283	11,8983	9,0000	0,9984
Minimum	0,1030	-105,1282	-39,6000	-0,9237	-1,9627	-49,6154	1,0000	-0,9887
Std. Dev.	21803,2700	2,0192	1,1822	0,3308	0,2683	1,1068	2,0096	0,5480
Skewness	10,3513	2,3914	-21,5132	4,0985	1,8097	-23,5704	-0,2834	0,0315
Kurtosis	150,5167	1419,9040	751,7845	40,9767	24,1864	842,3677	2,6116	1,8585
Jarque-Bera	12180344	1100000000	309000000	828546	253579	388000000	259	717
Probability	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Sum	71848505,00	8154,25	15120,24	5263,30	906,05	-1186,05	68327,00	321,27
Sum Sq. Dev.	6260000000000	53709	18412	1441	948	16137	53197	3955
Observations	13174	13174	13174	13174	13174	13174	13174	13174

Appendix L. Pooled stock return regression ρ(PME,DA)

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	4,9790	0.0000***
Book to Market Ratio	-0,0158	0,0023	-6,7642	0.0000***
Beta	0,0044	0,0040	1,0993	0,2716
Gross Profit/Total Assets	0,0641	0,0143	4,4831	0.0000***
Assets Growth	-0,2210	0,0175	-12,6002	0.0000***
Earnings Yield	0,1565	0,0043	36,6054	0.0000***
Industry Dummy	0,0028	0,0023	1,1862	0,2356
ρ(PME,DA)	-0,0454	0,0087	-5,2327	0.0000***
C	-0,0309	0,0157	-1,9644	0.0495**
R-squared	0,1183	Mean dependent var		-0,0203
Adjusted R-squared	0,1178	S.D. dependent var		0,5689
S.E. of regression	0,5344	Akaike info criterion		1,5853
Sum squared resid	3759,3980	Schwarz criterion		1,5904
Log likelihood	-10433,0900	Hannan-Quinn criter.		1,5870
F-statistic	220,8612	Durbin-Watson stat		2,2726
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix M. Pooled stock return regression ρ(PME,DA) - Normality test



Series: Standardized Residuals
Sample 2006 2012
Observations 13174

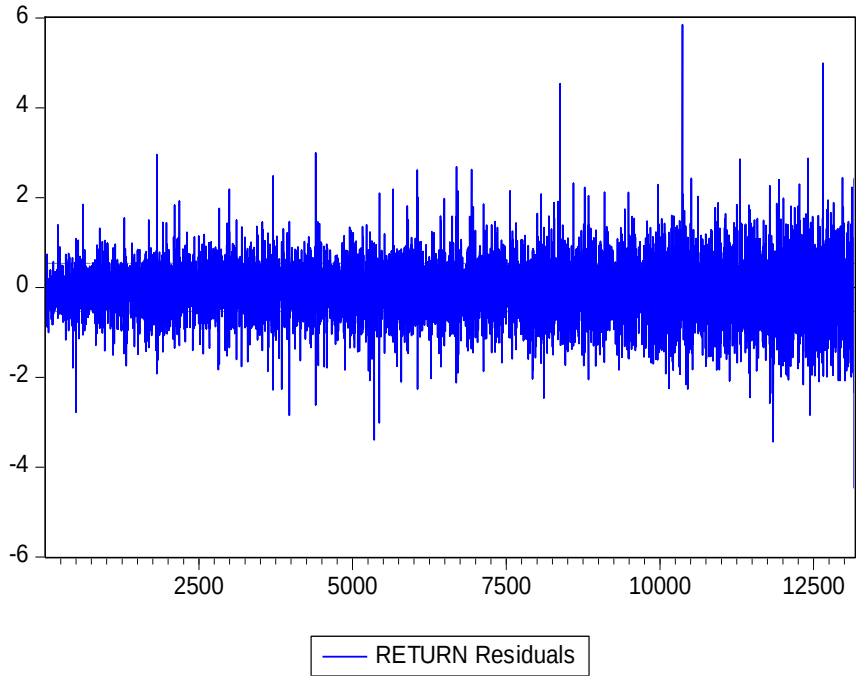
Mean	-4.70e-17
Median	0.042634
Maximum	5.846331
Minimum	-4.462488
Std. Dev.	0.534216
Skewness	-0.173921
Kurtosis	8.202930
Jarque-Bera	14925.85
Probability	0.000000

Appendix N. Pooled stock return regression ρ(PME,DA) - Correlation matrix

Variable	Market Capitalizatio	Book to Market Ratio	Beta	Gross Profit/Total	Assets Growth	Earnings Yield	Industry Dummy
Market Capialization	1						

Book to Market Ratio	-0,0283	1					
	0,0011	-----					
Beta	-0,0329	0,0169	1				
	0,0002	0,0528	-----				
Gross Profit/Total Assets	-0,0325	-0,0758	-0,0615	1			
	0,0002	0,0000	0,0000	-----			
Assets Growth	0,0310	0,0016	0,0089	-0,0576	1		
	0,0004	0,8560	0,3058	0,0000	-----		
Earnings Yield	0,0331	-0,1435	-0,0255	0,0253	0,0413	1	
	0,0001	0,0000	0,0034	0,0036	0,0000	-----	
Industry Dummy	-0,0780	0,0106	-0,0619	-0,0216	-0,0578	0,0163	1
	0,0000	0,2254	0,0000	0,0131	0,0000	0,0615	-----

Appendix O. Pooled stock return regression ρ(PME,DA) - Residual graph



Appendix P. Pooled stock return regression ρ(PME,DA) - Robust standard errors

Variable	Coefficient	Stdandard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	7,6869	0.0000***
Book to Market Ratio	-0,0158	0,0124	-1,2719	0,2034
Beta	0,0044	0,0092	0,4723	0,6367
Gross Profit/Total Assets	0,0641	0,0192	3,3301	0.0009***
Assets Growth	-0,2210	0,0244	-9,0557	0.0000***
Earnings Yield	0,1565	0,0261	5,9918	0.0000***
Industry Dummy	0,0028	0,0023	1,2275	0,2196
ρ(PME,DA)	-0,0454	0,0100	-4,5383	0.0000***
C	-0,0309	0,0228	-1,3538	0,1758
R-squared	0,1183	Mean dependent var		-0,0203
Adjusted R-squared	0,1178	S.D. dependent var		0,5689
S.E. of regression	0,5344	Akaike info criterion		1,5853
Sum squared resid	3759,3980	Schwarz criterion		1,5904
Log likelihood	-10433,0900	Hannan-Quinn criter.		1,5870
F-statistic	220,8612	Durbin-Watson stat		2,2726
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix Q. Stock return regression ρ(PME,DA) - Cross-section Hausman test

Test Summary	Chi-Sq. Statisti	Chi-Sq. d.f.	Probability
Cross-section random	0,0000	5,0000	1,0000
* Cross-section test variance is invalid. Hausman statistic set to zero.			
** WARNING: robust standard errors may not be consistent with			
assumptions of Hausman test variance calculation.			
** WARNING: estimated cross-section random effects variance is zero.			

Appendix R. Stock return regression ρ(PME,DA) - Cross-section random and period fixed effects

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	6,8365	0.0000***
Book to Market Ratio	-0,0063	0,0097	-0,6562	0,5117
Beta	0,0036	0,0086	0,4137	0,6791
Gross Profit/Total Assets	0,0904	0,0174	5,1846	0.0000***
Assets Growth	-0,0788	0,0205	-3,8488	0.0001***
Earnings Yield	0,1312	0,0203	6,4716	0.0000***
Industry Dummy	0,0039	0,0019	2,0456	0.0408**
ρ(PME,DA)	-0,0434	0,0082	-5,2967	0.0000***
C	-0,0629	0,0198	-3,1810	0.0015***
	Effects Specification			
			S.D.	Rho
Cross-section random			0,0000	0,0000
Period fixed (dummy variables)				
Idiosyncratic random			0,4513	1,0000
	Weighted Statistics			
R-squared	0,3835	Mean dependent var		-0,0203
Adjusted R-squared	0,3829	S.D. dependent var		0,5689
S.E. of regression	0,4469	Sum squared resid		2628,5580
F-statistic	584,7896	Durbin-Watson stat		2,1829
Prob(F-statistic)	0,0000			
	Unweighted Statistics			
R-squared	0,3835	Mean dependent var		-0,0203
Sum squared resid	2628,5580	Durbin-Watson stat		2,1829
***,**,* significance in 1 %, 5 % and 10 % level respectively				

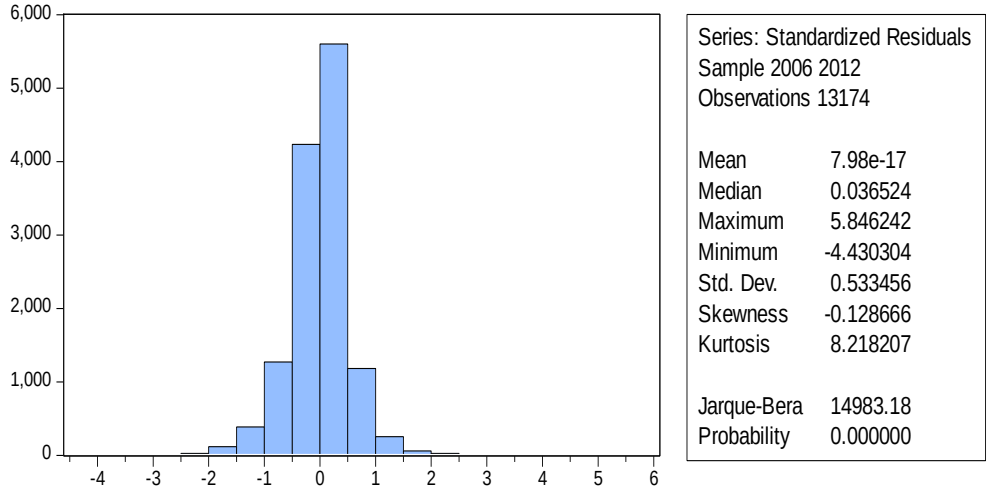
Appendix S. Stock return regression ρ(TACC,CFO) variables - Descriptive statistics

	Market Capitalization	Book to Market Ratio	Beta	Gross Profit/Total Assets	Assets Growth	Earnings Yield	Industry Dummy	ρ(TACC,CFO)
Mean	5453,8110	0,6190	1,1477	0,3995	0,0688	-0,0900	5,1865	-0,4838
Median	624,0500	0,5067	1,1400	0,3269	0,0499	0,0459	5,0000	-0,6341
Maximum	511887,1000	98,4387	8,8500	7,3920	4,7283	11,8983	9,0000	0,9639
Minimum	0,1030	-105,1282	-39,6000	-0,9237	-1,9627	-49,6154	1,0000	-0,9990
Std, Dev,	21803,2700	2,0192	1,1822	0,3308	0,2683	1,1068	2,0096	0,4654
Skewness	10,3513	2,3914	-21,5132	4,0985	1,8097	-23,5704	-0,2834	1,0004
Kurtosis	150,5167	1419,9040	751,7845	40,9767	24,1864	842,3677	2,6116	3,0958
Jarque-Bera	12180344	1100000000	309000000	828546	253579	388000000	259	2202
Probability	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Sum	71848505	8154	15120	5263	906	-1186	68327	-6374
Sum Sq, Dev,	6260000000000	53709	18412	1441	948	16137	53197	2853
Observations	13174	13174	13174	13174	13174	13174	13174	13174

Appendix T. Pooled stock return regression ρ(TACC,CFO)

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	4,7519	0.0000***
Book to Market Ratio	-0,0170	0,0023	-7,2585	0.0000***
Beta	0,0046	0,0040	1,1548	0,2482
Gross Profit/Total Assets	0,0864	0,0143	6,0605	0.0000***
Assets Growth	-0,2210	0,0175	-12,6611	0.0000***
Earnings Yield	0,1548	0,0043	36,2226	0.0000***
Industry Dummy	0,0014	0,0023	0,5900	0,5552
ρ(TACC,CFO)	-0,0822	0,0102	-8,0626	0.0000***
C	-0,0729	0,0164	-4,4350	0.0000***
R-squared	0,1208	Mean dependent var		-0,0203
Adjusted R-squared	0,1203	S.D. dependent var		0,5689
S.E. of regression	0,5336	Akaike info criterion		1,5824
Sum squared resid	3748,7070	Schwarz criterion		1,5875
Log likelihood	-10414,3300	Hannan-Quinn criter.		1,5841
F-statistic	226,1844	Durbin-Watson stat		2,2791
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix U. Pooled stock return regression ρ(TACC,CFO) - Normality test

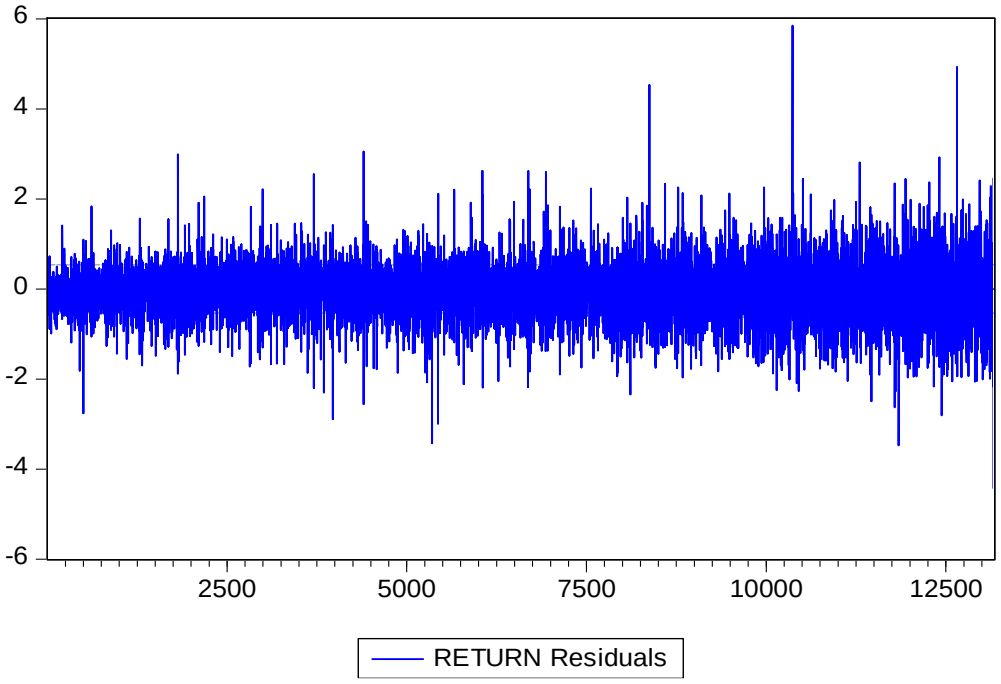


Appendix V. Stock return regression ρ(TACC,CFO) variables - Correlation matrix

	Market Capitalization	Book to Market Ratio	Beta	Gross Profit/Total Assets	Assets Growth	Earnings Yield	Industry Dummy
Market Capitalization	1						

Book to Market Ratio	-0,0283	1					
	0,0011	-----					
Beta	-0,0329	0,0169	1				
	0,0002	0,0528	-----				
Gross Profit/Total Assets	-0,0325	-0,0758	-0,0615	1			
	0,0002	0,0000	0,0000	-----			
Assets Growth	0,0310	0,0016	0,0089	-0,0576	1		
	0,0004	0,8560	0,3058	0,0000	-----		
Earnings Yield	0,0331	-0,1435	-0,0255	0,0253	0,0413	1	
	0,0001	0,0000	0,0034	0,0036	0,0000	-----	
Industry Dummy	-0,0780	0,0106	-0,0619	-0,0216	-0,0578	0,0163	1
	0,0000	0,2254	0,0000	0,0131	0,0000	0,0615	-----

Appendix W. Pooled stock return regression ρ(TACC,CFO) - Residual graph



Appendix X. Pooled stock return regression ρ(TACC,CFO) - Robust standard errors

Variable	Coefficient	Stdandard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	7,6569	0.0000***
Book to Market Ratio	-0,0170	0,0124	-1,3635	0,1728
Beta	0,0046	0,0093	0,4933	0,6218
Gross Profit/Total Assets	0,0864	0,0196	4,3994	0.0000***
Assets Growth	-0,2210	0,0247	-8,9463	0.0000***
Earnings Yield	0,1548	0,0260	5,9560	0.0000***
Industry Dummy	0,0014	0,0023	0,6111	0,5412
ρ(TACC,CFO)	-0,0822	0,0125	-6,5502	0.0000***
C	-0,0729	0,0250	-2,9133	0.0036***
R-squared	0,1208	Mean dependent var		-0,0203
Adjusted R-squared	0,1203	S.D. dependent var		0,5689
S.E. of regression	0,5336	Akaike info criterion		1,5824
Sum squared resid	3748,7070	Schwarz criterion		1,5875
Log likelihood	-10414,3300	Hannan-Quinn criter.		1,5841
F-statistic	226,1844	Durbin-Watson stat		2,2791
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix Y. Stock return regression ρ(TACC,CFO) - Cross-section Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Probability
Cross-section random	0,0000	5,0000	1,0000
* Cross-section test variance is invalid. Hausman statistic set to zero.			
** WARNING: robust standard errors may not be consistent with			
assumptions of Hausman test variance calculation.			
** WARNING: estimated cross-section random effects variance is zero.			

Appendix Z. Stock return regression ρ(TACC,CFO) - Cross-section random and period fixed effects

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	6,6549	0.0000***
Book to Market Ratio	-0,0075	0,0097	-0,7724	0,4399
Beta	0,0038	0,0086	0,4452	0,6562
Gross Profit/Total Assets	0,1125	0,0176	6,3733	0.0000***
Assets Growth	-0,0792	0,0206	-3,8384	0.0001***
Earnings Yield	0,1295	0,0201	6,4282	0.0000***
Industry Dummy	0,0025	0,0019	1,3097	0,1903
ρ(TACC,CFO)	-0,0829	0,0104	-7,9319	0.0000***
C	-0,1051	0,0215	-4,8970	0.0000***
	Effects Specification			
			S.D.	Rho
Cross-section random			0,0000	0,0000
Period fixed (dummy variables)				
Idiosyncratic random			0,4513	1,0000
	Weighted Statistics			
R-squared	0,3863	Mean dependent var		-0,0203
Adjusted R-squared	0,3856	S.D. dependent var		0,5689
S.E. of regression	0,4459	Sum squared resid		2616,8660
F-statistic	591,6015	Durbin-Watson stat		2,1917
Prob(F-statistic)	0,0000			
	Unweighted Statistics			
R-squared	0,3863	Mean dependent var		-0,0203
Sum squared resid	2616,8660	Durbin-Watson stat		2,1917
***,**,* significance in 1 %, 5 % and 10 % level respectively				

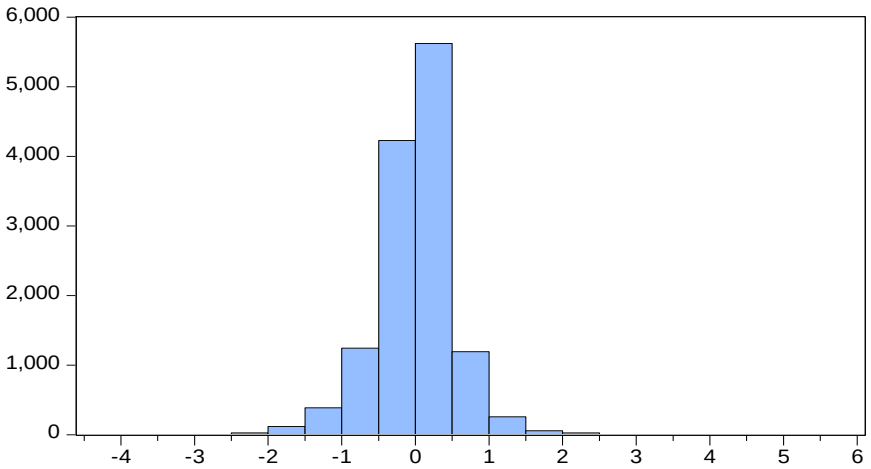
Appendix AA. Stock return regression σearnings/σCFO - Descriptive statistics

	Market Capitalization	Book to Market Ratio	Beta	Gross Profit/Total Assets	Assets Growth	Earnings Yield	Industry Dummy	σearnings/σCFO
Mean	5453,8110	0,6190	1,1477	0,3995	0,0688	-0,0900	5,1865	1,4285
Median	624,0500	0,5067	1,1400	0,3269	0,0499	0,0459	5,0000	0,9641
Maximum	511887,1000	98,4387	8,8500	7,3920	4,7283	11,8983	9,0000	23,2365
Minimum	0,1030	-105,1282	-39,6000	-0,9237	-1,9627	-49,6154	1,0000	0,0610
Std. Dev.	21803,2700	2,0192	1,1822	0,3308	0,2683	1,1068	2,0096	1,5775
Skewness	10,3513	2,3914	-21,5132	4,0985	1,8097	-23,5704	-0,2834	4,5740
Kurtosis	150,5167	1419,9040	751,7845	40,9767	24,1864	842,3677	2,6116	37,6433
Jarque-Bera	12180344	1100000000	309000000	828546	253579	388000000	259	704721,4000
Probability	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Sum	71848505,00	8154,25	15120,24	5263,30	906,05	-1186,05	68327,00	18818,6000
Sum Sq. Dev.	6260000000000	53709	18412	1441	948	16137	53197	32781,7100
Observations	13174	13174	13174	13174	13174	13174	13174	13174

Appendix BB. Pooled stock return regression σearnings/σCFO

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	4,7603	0.0000***
Book to Market Ratio	-0,0173	0,0023	-7,4075	0.0000***
Beta	0,0045	0,0040	1,1320	0,2576
Gross Profit/Total Assets	0,0706	0,0142	4,9819	0.0000***
Assets Growth	-0,2224	0,0175	-12,7164	0.0000***
Earnings Yield	0,1541	0,0043	35,8929	0.0000***
Industry Dummy	0,0020	0,0023	0,8739	0,3822
σearnings/σCFO	-0,0218	0,0030	-7,2599	0.0000***
C	0,0012	0,0164	0,0755	0,9398
R-squared	0,1200	Mean dependent var		-0,0203
Adjusted R-squared	0,1195	S,D, dependent var		0,5689
S.E. of regression	0,5339	Akaike info criterion		1,5833
Sum squared resid	3752,1960	Schwarz criterion		1,5885
Log likelihood	-10420,4600	Hannan-Quinn criter,		1,5850
F-statistic	224,4441	Durbin-Watson stat		2,2770
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix CC. Pooled stock return regression σearnings/σCFO - Normality test



Series: Standardized Residuals
Sample 2006 2012
Observations 13174

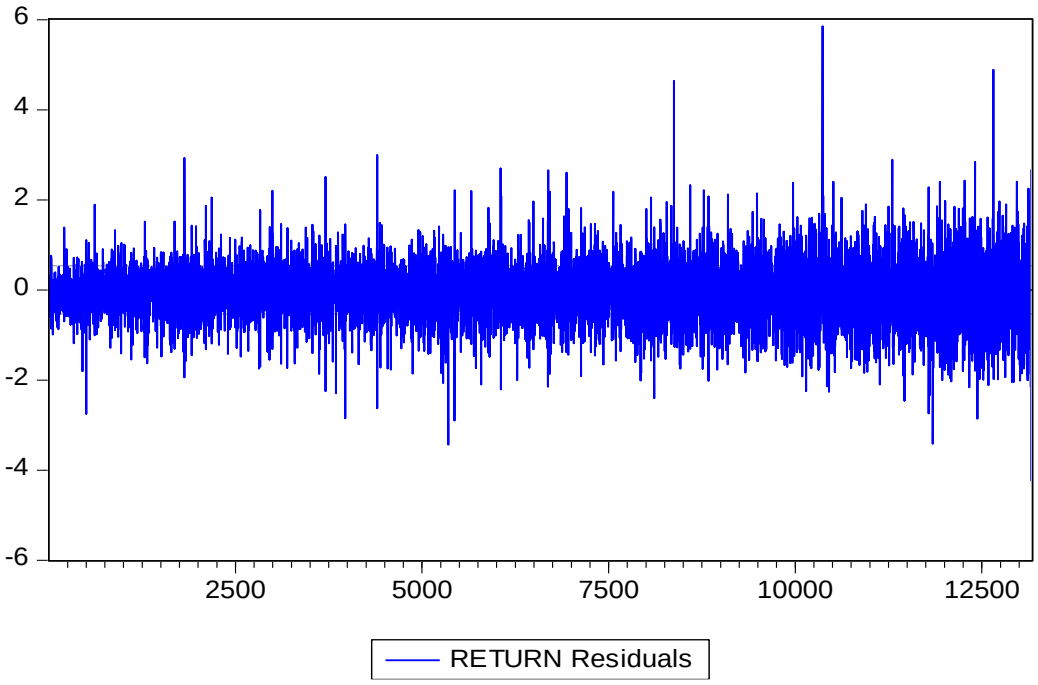
Mean	5.94e-17
Median	0.038961
Maximum	5.852461
Minimum	-4.226548
Std. Dev.	0.533704
Skewness	-0.138559
Kurtosis	8.181265
Jarque-Bera	14778.10
Probability	0.000000

Appendix DD. Stock return regression σearnings/σCFO variables - Correlation matrix

	Market Capitalization	Book to Market Ratio	Beta	Gross Profit/Total Assets	Assets Growth	Earnings Yield	Industry Dummy
Market Capitalization	1						

Book to Market Ratio	-0,0283	1					
	0,0011	-----					
Beta	-0,0329	0,0169	1				
	0,0002	0,0528	-----				
Gross Profit/Total Assets	-0,0325	-0,0758	-0,0615	1			
	0,0002	0,0000	0,0000	-----			
Assets Growth	0,0310	0,0016	0,0089	-0,0576	1		
	0,0004	0,8560	0,3058	0,0000	-----		
Earnings Yield	0,0331	-0,1435	-0,0255	0,0253	0,0413	1	
	0,0001	0,0000	0,0034	0,0036	0,0000	-----	
Industry Dummy	-0,0780	0,0106	-0,0619	-0,0216	-0,0578	0,0163	1
	0,0000	0,2254	0,0000	0,0131	0,0000	0,0615	-----

Appendix EE. Pooled stock return regression σearnings/σCFO - Residual graph



Appendix FF. Pooled stock return regression σearnings/σCFO - Robust standard errors

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	7,6312	0.0000***
Book to Market Ratio	-0,0173	0,0124	-1,3935	0,1635
Beta	0,0045	0,0093	0,4836	0,6287
Gross Profit/Total Assets	0,0706	0,0193	3,6530	0.0003***
Assets Growth	-0,2224	0,0246	-9,0245	0.0000***
Earnings Yield	0,1541	0,0262	5,8871	0.0000***
Industry Dummy	0,0020	0,0022	0,9067	0,3646
σearnings/σCFO	-0,0218	0,0047	-4,6768	0.0000***
C	0,0012	0,0223	0,0557	0,9556
R-squared	0,1200	Mean dependent var		-0,0203
Adjusted R-squared	0,1195	S,D, dependent var		0,5689
S,E, of regression	0,5339	Akaike info criterion		1,5833
Sum squared resid	3752,1960	Schwarz criterion		1,5885
Log likelihood	-10420,4600	Hannan-Quinn criter,		1,5850
F-statistic	224,4441	Durbin-Watson stat		2,2770
Prob(F-statistic)	0,0000			
***,**,* significance in 1 %, 5 % and 10 % level respectively				

Appendix GG. Stock return regression σearnings/σCFO - Cross-section Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. D.f.	Probability
Cross-section random	0,0000	5,0000	1,0000
* Cross-section test variance is invalid. Hausman statistic set to zero.			
** WARNING: robust standard errors may not be consistent with			
assumptions of Hausman test variance calculation.			
** WARNING: estimated cross-section random effects variance is zero.			

Appendix HH. Stock return regression σearnings/σCFO - Cross-section random and period fixed effects

Variable	Coefficient	Standard Error	t-Statistic	Probability
Market Capitalization	0,0000	0,0000	6,6644	0.0000***
Book to Market Ratio	-0,0078	0,0097	-0,8099	0,4180
Beta	0,0037	0,0086	0,4305	0,6669
Gross Profit/Total Assets	0,0966	0,0175	5,5269	0.0000***
Assets Growth	-0,0805	0,0206	-3,9062	0.0001***
Earnings Yield	0,1289	0,0203	6,3399	0.0000***
Industry Dummy	0,0031	0,0019	1,6747	0.0940*
σearnings/σCFO	-0,0214	0,0039	-5,4339	0.0000***
C	-0,0312	0,0194	-1,6090	0,1077
	Effects Specification			
			S,D,	Rho
Cross-section random			0,0000	0,0000
Period fixed (dummy variables)				
Idiosyncratic random			0,4513	1,0000
	Weighted Statistics			
R-squared	0,3853	Mean dependent var		-0,0203
Adjusted R-squared	0,3846	S,D, dependent var		0,5689
S,E, of regression	0,4463	Sum squared resid		2621,1760
F-statistic	589,0835	Durbin-Watson stat		2,1888
Prob(F-statistic)	0,0000			
	Unweighted Statistics			
R-squared	0,3853	Mean dependent var		-0,0203
Sum squared resid	2621,1760	Durbin-Watson stat		2,1888
***,**,* significance in 1 %, 5 % and 10 % level respectively				