Aalto University
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Cosmetic earnings management and the Governance Indicators: an international comparison

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Abstract

This study investigates the small rounding of net earnings numbers, also known as cosmetic earnings management, in an international context. Executives of companies are believed to exercise small (mostly upward) rounding of earnings figures in order to increase perception that the financial statement readers receive from earning figures. This kind of small rounding would lead to the occurrence of zeros and nines as second digit to deviate from the Benford's law, which gives the theoretical occurrence of digits in unmanaged earnings. Although not widely used in earlier literature the Benford's law offers very intuitive tool to investigate cosmetic earnings management especially in an international context.

The data of this thesis consists of income statement figures of over 35 000 companies from 43 countries over the time period 2006 – 2014. On top of the financial figures this study uses the Governance Indicators which are governance measures for countries to investigate possible institutional determinants of cosmetic earnings management.

Cosmetic earnings management appears to be worldwide phenomenon but countries do differ to the extent that companies residing in them exercise cosmetic earnings management. Out of the 43 sample countries Norway appears to be only one that doesn't show any signs of cosmetic earnings management. Using OLS regression as well as rank regression negative relationship is found between one of the cosmetic earnings management metrics and one of the Governance Indicators, the estimate for regulatory quality. This finding indicates that as the regulatory quality of a country improves cosmetic earnings management in that country increases. Other than this one negative relationship there doesn't appear to be widespread relationship between the levels of cosmetic earnings management and the Governance Indicators. Companies located in the United States appear to exercise more small rounding of turnover figures than rest of the sample countries.

Keywords earnings management, cosmetic earnings management, institutional factors, governance indicators, Benford's law

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Tiivistelmä

Tutkielma tarkastelee tuloksen pientä pyöristelyä, kosmeettista tuloksen ohjailua, kansainvälisessä ympäristössä. Yritysten johtajien uskotaan harjoittavan kosmeettista tuloksen ohjailua vakuuttaakseen tilinpäätöstietojen käyttäjät paremmasta tuloksentekokyvystä. Tuloksen kosmeettinen ohjailu johtaisi nollien ja ysien esiintymistiheyden poikkeavan Benfordin laista, joka tarjoaa teoreettisen esiintymistiheyden luvuille ohjailemattomissa tuloksissa. Tutkielma myös pyrkii valaisemaan mahdollisia institutionaalisia tekijöitä tuloksen ohjailun takana.

Kosmeettinen tuloksen ohjailu vaikuttaa olevan maailmanlaajuinen ilmiö. Maat tosin eroavat missä laajuudessa niissä sijaitsevat yhtiöt harjoittavat kosmeettista tuloksen ohjailua. Lisäksi tutkielmassa löydetään viitteitä negatiivisesta suhteesta kosmeettisen tuloksen ohjailun ja yhden hallintotavan mittarin välillä.

Avainsanat tuloksen ohjailu, tuloksen manipulointi, kosmeettinen tuloksen ohjailu, Benfordin laki, hallintajärjestelmien indikaattoorit

Table of contents

List of tables and graphs

1. Introduction

1.1. Background of the study

Earnings management is vastly researched field of financial and accounting literature. Companies, and their executives, have various motivations for exercising earnings management such as avoiding debt covenant violations, increasing their compensation from bonus plans and exceeding analyst estimates or previous year's earnings in order to receive higher return from the stock market (DeFond & Jiambalvo 1994, Healy 1985, Bartov et al. 2002). Almost 87 % of the executives themselves agree that managing earnings to meet earnings benchmarks, such as analyst estimates or last year's earnings, helps the company to build credibility with the capital market (Graham et al. 2005).

To investigate earnings management across different countries this study uses the Benford's law to find anomalous patterns in the reported earnings. The Benford's law gives the distribution of numbers as first, second, third etc. significant digit of lists of numbers that represent the relative size of similar phenomena, such as net incomes, daily trading volumes on stock exchange or market values (Nigrini & Mittermaier 1997). According to the Benford's law zero and nine should occur as a second digit 11.97 % and 8.5 % of the time, respectively. This study investigates do executives of companies exercise small rounding of numbers in order to increase perception that the financial statement readers receive from earning figures. If pre-managed net earnings of a company are for example 4.95 million (currency irrelevant) executives are probably keen to manipulate that over the 5 million threshold, since it requires manipulation of only 0.05 million (or approximately 1 %) but will change the first number from four to five.

Brenner & Brenner (1982) argued that due to limited memory capacity people tend to round number downwards even though sometimes it would be more accurate to round them

upwards which requires more short term cognitive capacity. From an accounting perspective it's quite reasonable to expect that companies would like to report (in most cases) as high profits as possible, within legal and moral limits, and take advantage of peoples cognitive shortcuts regarding their perception of numbers by rounding the net profit numbers upwards if it's possible to change the first number with relatively small effort. This kind of small rounding of earnings figures should result to distribution where zero occurs more than it should and nine occurs less than it should under the Benford's law. This would be interpreted as earnings management, or more specifically cosmetic earnings management as named by Kinnunen & Koskela (2003) in their study *Who Is Miss World in Cosmetic Earnings Management? A Cross-National Comparison of Small Upward Rounding Of Net Income Numbers among Eighteen Countries.*

One of the biggest advantages of Benford's law as a method to detect earnings management is its intuitiveness over the more traditional models used in earnings management literature such as, accrual based models and anomalous distributions around earnings thresholds such as last year's earnings or analyst estimates. For cross-country study the Benford's law offers especially suitable tool since analyst estimates from various countries might be difficult to obtain and accrual policies might vary between different countries and accounting standards.

Although earnings management have been studied in various contexts institutional factors, other than investor protection, regarding the home country of a company haven't been much emphasized in previous literature. Institutional factors such as the average of three legal variable from La Porta et al. (1998) have usually been as a control variable but not at the main interest of previous studies. Investigating the importance of reporting incentives and earnings management in European private and public companies Burgstahler et al. (2006) found that earnings management is more evident in countries with weaker legal structures and enforcement. In another cross-country study (Leuz et al. 2003) found negative relationship between legal enforcement and earnings management while investigating earnings management from the perspective of investor protection. Shen & Chih (2005) also

studied investor protection but in the often excluded banking industry and found that stronger legal enforcement actually results in more earnings management in low-income countries. So the findings of previous studies regarding an institutional factor, legal enforcement, are a bit contradictory with each other and this study tries to bring insight to earnings management and broader set of institutional factors, the Governance Indicators.

Governance comprises of the beliefs, cultures and institutions by which authority in a country is operated. The Governance Indicators which are used in this study as institutional measures of the governance in the home country of companies consists of six broad dimensions of governance; voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. These six dimensions offer insightful tool to investigate does the governance of a country have an effect to the cosmetic earnings management exercised in the companies residing there. (The Worldwide Governance Indicators (WGI) project.)

1.2. Objectives and contribution

This study has two major objectives. First this study adds to the existing accounting literature regarding international cosmetic earnings management, which is currently quite narrow. Second this study is first of its kind in regard to investigating the relationship between cosmetic earnings management and the Governance Indicators. Carslaw (1988), Thomas (1989) and Kinnunen & Koskela (2003) have used the Benford's law to detect cosmetic earnings management in a single country studies (Carslaw (1988) New Zealand and Thomas (1989) United States) and in cross-country studies (Kinnunen & Koskela (2003) 18 countries). On top of these three studies there aren't many studies which would have utilized the Benford's law in detecting cosmetic earnings management. These three studies are also 13 – 28 years old so this study offers an updated view on the use of the Benford's law in detecting cosmetic earnings management across 43 countries.

To investigate the relationship between institutional factors of a country and cosmetic earnings management this study uses the Governance Indicators which haven't been previously used in an accounting literature, at least to the author's knowledge, and overall institutional factors haven't been widely studied in earnings management literature. This study aims to fill that research gap in existing accounting and earnings management literature. The findings and results of this study can act as a reference point for future studies trying to investigate cosmetic earnings management or earnings management in general and institutional factors such as the Governance Indicators or other similar measures. Better understanding of the relationship between earnings management and institutional factors enables the consumers of financial statements better capabilities to understand the trustworthiness of them. Deeper understanding of the relationship, which future research regarding this issue might bring, also helps to give better insight to the determinants of earnings management in different institutional settings.

1.3. Structure

This thesis is organized as follows. In the section two prior literature about earnings management is introduced and reader is given broad picture of prior literature. Methods that have previously been used in earnings management literature are also introduced in the section two so that the reader can distinguish how the method of this study separates from them and offers more intuitive tool to investigate earnings management especially in cross-country context.

Section three offers overview of selected literature regarding cross-country comparison of earnings management. Hypothesis development, data and methodology are presented in section four which leads to section five where the results of this study are presented. Section six explains the main results of this study and concludes.

2. Earnings management

2.1. Definition and background

Throughout previous literature about earnings management have been defined little bit differently from time to time but one of the most used definitions is by Healy and Wahlen (1999, p. 368):

"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."

Other definitions include for example one by Schipper (1989, p. 92): "purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)."…"could occur in any part of the external disclosure process, and could take a number of forms. A minor extension to the definition would encompass "real" earnings management, accomplished by timing investment or financing decisions to alter reported earnings or some subset of it."

Even though by the time articles were published there wasn't much understanding about the prevalence of "real" earnings management, Schipper (1989) and Healy and Wahlen (1999) recognized it as part of the earnings management (Zang 2012). From the 1970s onwards earnings management literature was more concentrated on investigating the determinants of accounting choice and during the 1980s the focus changed to primarily to investigate accrual management (Beneish 2001). From the late 1990s onwards earnings management literature has seen increasing amount of real earnings management studies (Xu et al. 2007).

Real earnings manipulation, real activities manipulation from here on, is usually understood to mean actions such as increasing sales through price discounts, overproduction or reduction of discretionary expenditures, which wouldn't have been executed in normal course of operations, by the management to alter financial reporting figures in attempt to meet certain reporting goals (Roychowdhury 2006; Xu et al. 2007). Compared to accrual management real activities manipulation have effects on operating activities and potentially can even reduce firm value, since for example increasing sales through price discounts in the current period can reduce cash flows in future periods (Roychowdhury 2006; Gunny 2010).

Whereas real activities manipulation is made possible by the freedom of managers to affect their operations, accrual management is made possible by discretion given to the managers over some accounting principles, such as revenue recognition and the matching principle. Although intention of the accrual based accounting is to increase accuracy of financial reporting it also leaves room for managerial discretion that can potentially lead to inaccurate earnings reporting. (Dechow 1994)

Dechow & Skinner (2000) presented illustration about the difference of "fraudulent" accounting and earnings management (table 1). Table 1 shows that managers have several different ways to manipulate earnings even within generally accepted accounting standards (GAAP) from overly aggressive recognition of provisions or reserves and overvaluation of acquired in-process R&D in purchase acquisitions to drawing down provisions or reserves in an overly aggressive manner. Real activities manipulation, such as delaying sales and postponing R&D or advertisings expenditures, offers managers another set of tools to manage earnings. Dechow & Skinner (2000) didn't mention for example overproduction or increasing / decreasing selling, general and administrative (SG&A) expenses as ways to manipulate earnings but academics later have also acknowledged these operational choices to manage earnings (e.g. Roychowdhury 2006; Lin et al. 2006; Gunny 2010; Zang 2012). Increasing the production amounts managers can spread fixed overhead costs over a larger number of units, and thus decrease cost of goods sold (COGS), as long as there isn't any

increase in marginal cost in the current period or inventory holding costs don't offset it (Gunny 2010).

	Accounting Choices	"Real" Cash Flow Choices
	Within GAAP	
"Conservative" Accounting	Overly aggressive recognition of provisions or reserves	Delaying sales
	Overvaluation of acquired in-process R&D in purchase acquisitions	Accelerating R&D or advertising expenditure
	Overstatement of restructuring charges and asset write-offs	
"Neutral" Earnings	Earnings that result from a neutral operation of the process	
	Understatement of the provision for bad debts	Postponing R&D or advertising expenditures
"Aggressive" Accounting	Drawing down provisions or reserves in an overly aggressive manner	Accelerating sales
	Violates GAAP	
"Fraudulent" Accounting	Recording sales before they are "realizable"	
	Recording fictitious sales	
	Backdating sales invoices	
	Overstating inventory by recording fictitious inventory	

Table 1: The distinction between Fraud and Earnings Management (Dechow & Skinner 2000).

This study focuses on a specific type of earnings management called *cosmetic earnings management.* Kinnunen & Koskela (2003) are credited for labeling earnings management which involves small rounding of net earning numbers mostly upward to increase perception that the financial statement readers receive from earning figures. If pre-managed net earnings of a company are for example 4.95 million (currency irrelevant) executives are probably keen to manipulate that over the 5 million threshold, since it requires manipulation of only 0.05 million (or approximately 1 %) but will change the first number from four to five. This kind of small rounding can be also seen in our everyday lives, especially in consumer prices. More often than not a consumer faces prices such as 1.95 or 29.90, since sellers want the consumer to have as affordable perception of the product as possible. Brenner & Brenner (1982) argued that due to limited memory capacity people tend to round number downwards even though sometimes it would be more accurate to round them upwards which requires more short term cognitive capacity. From an accounting perspective it's quite reasonable to expect that companies would like to report (in most cases) as high profits as possible, within legal and moral limits, and take advantage of peoples cognitive shortcuts regarding their perception of numbers by rounding the net profit numbers upwards if it's possible to change the first number with relatively small effort.

Prior research regarding cosmetic earnings management include for example studies by Carslaw (1988), Thomas (1989) and Kinnunen & Koskela (2003) which all found evidence about rounding of net earnings. Cosmetic earnings management literature doesn't take a stand how managers decide to manage earnings in order to achieve the desired result. One could argue that managers use accrual based earnings management since accurate net earnings figures aren't available until after the reporting period has ended and real activities manipulation isn't possible. Depending on the quality of company's internal reporting company might have the option of using real activities manipulation if their estimates from internal reports indicate that the first digit of net earnings could easily be manipulated to be one larger than unmanipulated would be.

2.2. Incentives for earnings manipulation

Graham et al. (2005) conducted thorough survey of more than 400 executives to investigate which factors drive reported earnings and disclosure decisions. The survey included executives from public (87.1 %) and private (12.8 %) companies and revenues ranging from under hundred million (15.1 %) to over 5 billion (25.6 %). One of the most surprising findings of the survey is that 78 % of the executives are willing to sacrifice long-term value to smooth earnings. Executives see earnings as the key metric considered by outsiders over for example cash flows, which is in contrast with financial literature which emphasizes cash flows over earnings. Keeping cash flows constant managers prefer a lot smooth earnings, since smooth earnings are considered less risky and they ease the analyst's task of estimating future earnings. The executives think that volatile earnings command a risk premium in the market and thus they seek to smooth them, this relationship between risk premium and earnings volatility is found in previous literature (Gebhardt et al. 2001). (Graham et al. 2005)

2.2.1. Meeting or exceeding benchmarks

Burgstahler & Dichev (1997) found evidence that companies manage earnings to report positive earnings or earnings increases. According to them as much as 12 % of the companies that would have reported small earnings decreases without earnings management decided to manipulate earnings in order to report earnings increases. Even more companies, from 30 % to 44 %, used discretion to manipulate earnings in order to report positive earnings instead of small negative earnings. (Burgstahler & Dichev 1997)

Executives seem to be aware, at least unconsciously, about the study by Barth et al. (1999) which indicates that capital market rewards companies which show constant earnings increase (benchmark in this case is previous year's earnings) by higher price-earnings multiples than other firms.

On top of these two benchmarks, previous earnings and zero earnings, there are also analysts' estimates that the companies are trying to exceed (Degeorge et al. 1999). Executives aren't only managing earnings to beat analysts' estimates but they are also trying to manipulate the estimates themselves downward in order to make it easier to beat them (Brown & Higgins 2005; Bartov et al. 2002; Degeorge et al. 1999). Bartov et al. (2002) show that companies which meet or beat analysts' estimates of future earnings enjoy higher returns at stock market. Since managers manipulate both the earnings and analysts' expectations it's not widely documented in previous literature how much earnings themselves are managed to beat analysts' estimates.

86.3 % of the surveyed executives by Graham et al. (2005) agree or strongly agree that managing earnings to meet earnings benchmarks helps the company to build credibility with the capital market. Executives also understand the relationship between earnings and stock price found in previous literature, 82.2 % of surveyed executives agree or strongly agree that managing earnings to meet benchmarks helps the company to maintain or increase the stock price of the company. The study indicates that most important benchmark for the executives is same quarter last year EPS (earnings per share), 85.1 % of the executives strongly agree or agree that this metric is important. Also analyst consensus estimates of EPS for current quarter, reporting a profit and previous quarter EPS are considered important, 73.5 %, 65.2 % and 54.2 % of the executives, respectively, strongly agree or agree that these metrics are important. (Graham et al. 2005)

2.2.2. Relationships to stakeholders

Previous literature argues that executives have incentives manage earnings in order for the company to maintain good relationships also with other stakeholders than capital market, such as customers, suppliers, creditors and government (e.g. Bowen et al. 1995; Burgstahler & Dichev 1997; DeFond & Jiambalvo 1994; Boynton et al. 1992; Jones 1991; Key 1997). When purchasing a durable good consumer not necessarily just buy that product itself but also a service to keep it maintained and spare parts if the good happens to break in the future,

so they prefer a company that seems reasonable trustworthy that it can deliver those services and spare parts and won't go into bankruptcy in the near future (Bowen et al. 1995). On the other side of the table also suppliers are assumed to prefer companies which show better financials, since they decrease the probability of credit loss, increase potential future cash flows and offer better ground for higher quality products in the eyes of the end user (Bowen et al. 1995). Study by Raman & Shahrur (2008) indicates that in the business-to-business setting suppliers and customers invest more in R&D (relationship specific investments in this context) when company's earnings management is high, on the other hand they also find that customer-supplier relationships terminate sooner when the level of earnings management is high. According to the survey by Graham et al. (2005) 58.5 % of executives agree or strongly agree that they manage earnings to meet benchmarks to assure customers and suppliers that the business is on stable ground and company is worth cooperating with.

Creditors usually require debt-covenants to prevent companies, and their managers, from investment and financing decisions which would decrease the value of the debtholders claims (DeFond & Jiambalvo 1994). These debt-covenants are often tied to accounting numbers of the company, and although there isn't extensive evidence in the literature about covenants explicitly stating zero earnings, it's quite reasonable to assume that if a company reports losses its debt won't at least become cheaper and creditor will quite likely require assurance that their claims aren't in danger (Roychowdhury 2006). Study by DeFond & Jiambalvo (1994) found that companies which were violating debt-covenants had been manipulating earnings especially year before the violation. Their data includes only companies which violated debt-covenants and thus were 'failed' at manipulating earnings but it's quite possible that some companies which are close to violating terms of debt-covenants successfully manipulate their earnings in order to escape the violation. In the survey of Graham et al. (2005) 26.5 % of the executives agreed or strongly agreed that they manipulate earnings in order to avoid violating debt-covenants and 39.5 % agreed or strongly agreed that they manipulate earnings to achieve or preserve a desired credit rating. Thus it seems that debt and creditors don't offer executives as much motivation to manage earnings as capital market

and customers and suppliers. One possible explanation for this is that debt-covenants aren't so strict that they would affect the behavior of companies which aren't in distress.

Companies are mostly keen on manipulating earnings upwards in order to increase their stock price, relationship with customers and suppliers or avoiding debt-covenant violations. Sometimes companies though want to manipulate their earnings downwards for example reduce taxes or improve legislation form their point of view. Jones (1991) for example found evidence that during import relief investigation by United States International Trade Commission companies manipulated their earnings downwards in order to protect themselves from import goods. By showing weaker financials companies tried to pursue regulators to grant their industry an import relief which would protect the companies in that industry from competition overseas (Jones 1991). Key (1997) studied the television industry in the U.S. from the late 1980s to early 1990s and found that companies in that industry manipulated their earnings downwards in order to avoid more regulation from the government. That time consumers were unhappy with the excessive rate increases and poor service, among other things, by the television companies, so the government felt pressure to regulate the industry more to keep the citizens satisfied (Key 1997). To avoid increased regulation the companies in the television industry manipulated their earnings downwards to convince regulators that they are not charging excessive rates and can't even afford much better customer service with current rates (Key 1997). One could argue that these kind of earnings manipulations in order to avoid regulation are history since the world has become more open, but still there are regulated industries such as healthcare and financial sectors that could try to manipulate their earnings to affect the regulators.

Government offers also other incentive to manage earnings than affecting regulation in form of collecting taxes from the companies. Guenther (1994) finds evidence that companies decrease their earnings in response to changes in statutory corporate income tax rate brought by the Tax Reform Act of 1986. The Tax Reform Act of 1986 reduced the corporate income tax rate from 46 % to 34 % which offered quite strong incentive for the companies to postpone

their earnings from one year to the next (Guenther 1994). Earnings management was found to be especially executed in large and leveraged companies (Guenther 1994). Lin (2006) found evidence in China's developing economy framework that foreign investors there manage earnings in anticipation of changes in tax rates by making income-increasing accruals in the year before a tax-rate increase. The study indicates that the companies report on average 1.03 % higher discretionary accruals a year before the tax increase than in the year when the tax rate is increased, and with 15 % spread in the tax rate this would mean that the companies would save circa in taxes 0.15 % of their total assets (Lin 2006). Interestingly the study by Graham et al. (2005) didn't ask the executives about role of regulation and taxes in motivation to manage earnings to meet benchmarks, in footnote 11 they plead for space considerations. Although the space consideration might be valid point from them one can also assume that currently these regulation and tax motivation are somewhat less important, at least from the researches point of view, than other motives studied in their research.

2.2.3. Executive and employee compensation

As discussed in section 2.2.1. stock market rewards companies for meeting or beating earnings benchmarks such as previous year's earnings and analysts' consensus. Stock market thus offers incentives to executives, who want to please current shareholders or whose performance and income is tied to the stock price, to manage earnings. The shareholders of basically any company naturally want to make sure that executives of the company act in their interest and usually tie at least part of the compensation of executives to development of the share price (Jensen & Meckling1976). Thus high stock, and other forms of equity incentives, offered to executives quite likely increase their motivation to manage earnings (Cheng & Warfield 2005). Cheng & Warfield (2005) studied the relationship between equity incentives and earnings management and found evidence which indicates that executives with high levels of equity incentives are more likely to meet or just beat analysts' forecasts and are also less likely to report large positive earnings surprises which indicates income smoothing. Bergstresser & Philippon (2006) studied the relationship of equity incentives of CEO, chief executive officer, and earnings management and their study suggests that those CEOs whose overall compensation is more tied to development of company's share price

manage companies with higher levels of earnings management. Bergstresser & Philippon (2006) also find evidence which suggest that CEOs and other insiders sell unusually large numbers of their shares of the company during period when the accruals are high (proxy for high levels of earnings management). These periods of high accruals and unusually large share liquidations are followed by low reported earnings and stock returns (Bergstresser & Philippon 2006). This indicates that executives aren't managing earnings as much after they have liquidated part of their shares since they aren't as vulnerable to the development of the stock price as they were before.

Healy (1985) studied the relationship between executive bonus schemes and earnings management and found evidence which indicates that executives manage earnings downwards when their bonus schemes upper or lower bounds are binding. When the upper and lower bounds aren't binding the study indicates that executives manage earnings upwards (Healy 1985). Results indicate that executives which face the bounds as binding exercise earnings management since they can't increase their current period's compensation but can try to defer it to the next period and thus increase their expected future reward (Healy 1985). Holthausen et al. (1995) found a bit contradicting evidence regarding executives' bonus schemes and earnings management compared to the findings of Healy (1985). The results of Holthausen et al. (1995) indicates that executives aren't willing to take a bath when the earnings are below lower bound of bonus scheme and won't manage earnings downwards. Despite the lack of downwards earnings management at the lower bound of bonus scheme executives in that category might still be maximizing their wealth as Healy (1985) suggested according to Holthausen et al. (1995), since they might be unwilling to manage earnings downwards in fear of getting replaced or violating the firm's lending agreements. Like Healy (1985) Holthausen et al. (1995) found evidence that when the earnings are at the upper bound of bonus scheme executives manage earnings downwards, and are trying to maximize their future compensation by deferring earnings to the next period. Gaver et al. (1995) find completely contradictory evidence of earnings management at the lower bound of bonus scheme compared to findings of Healy (1985) and Holthausen et al. (1995). The results of Gaver et al. (1995) indicate that executives below the lower bound of their bonus scheme

exercise income increasing earnings management and executives above the lower bound exercise income decreasing earnings management. Gaver et al. (1995) imply that executives are more motivated by smoothness of earnings than bonus maximization. Holthausen et al. (1995) point out that the limitations of the study by Gaver et al. (1995) include for example inability to examine accruals at the upper bound, since they don't perform any tests at the upper bound, and lack of theoretical rationale why executives would be more motivated by the earnings smoothing than the bonus maximization as suggested by Healy (1985).

Guidry et al. (1999) studied the relationship between bonus schemes of business unit managers and earnings management exercised by them within U.S. division of a large multinational conglomerate that manufactures a wide range of products. Guidry et al. (1999) find evidence consistent with Healy (1985) as business unit managers not facing binding upper or lower bound are associated with income increasing earnings management. Results of Guidry et al. (1999) indicate that bonuses of business unit managers increases by over $9000 per year or 60 % over the bonus without earnings management. Compared to the studies by Healy (1985), Gaver et al. (1995) and Holthausen et al. (1995) the study by Guidry et al. (1999) offers beneficial insight to individual units and earnings management in them compared to the aggregate earnings management of the company that might be diluted by contradicting actions of different units with different situations and motives.

If the studies regarding bonus schemes and earnings management are a bit in conflict the opinions from executives are even more so. 40.1 % of the executives surveyed by Graham et al. (2005) strongly agree or agree that they manage earnings to meet benchmarks in order for their employees to receive bonuses. On the other hand also 30.3 % strongly disagree or disagree with the same statement, thus there doesn't seem to be statistical difference between those who agree and disagree with the statement (Graham et al. 2005).

2.3. Methods to detect earnings manipulation

2.3.1. Detecting accrual based earnings management

During the 1970s and early 1980s majority of the earnings management literature focused on investigating the determinants of accounting choices, and from the mid-1980s focus of the literature switched to investigation of accruals (Beneish 2001). Beneish (2001) lists three reasons for the fast growth of accrual-based studies of earnings management:

1) Generally Accepted Accounting Principles (GAAP) enable accruals to be used and if earnings are managed it's more likely to happen via accruals than via cash flow components of earnings.

2) Investigating effects of various accounting choices on earnings requires assumptions about the relative effects of those accounting choices on earnings and this induces error in the independent variable (Watts & Zimmerman 1990). This problem can be reduced by studying accruals.

3) Investors are less likely to find out about earnings management if it's unobserved component of accruals.

Accrual-based earnings management is enabled by the GAAP which are trying to make earnings as informative about the company's performance as possible mainly with the revenue recognition principle and the matching principle (Dechow 1994). On the other hand this also induces possibilities for the managers to manipulate earnings to increase their informativeness, to protect the company, for example, from debt covenant violations or for their own personal benefit if, for example, their compensation has bonus schemes based on earnings, or it's tied to the development of the company's stock price (Dechow 1994; Healy 1985; DeFond & Jiambalvo 1994; Cheng & Warfield 2005).

When investigating accrual-based earnings management researchers face the same problem that investors face, how to measure the unobservable earnings management component of accruals (Beneish 2001)? Researchers are usually trying to separate total accruals to discretionary and nondiscretionary components to investigate how much managers have affected the total accruals with their own actions regarding discretionary accruals (Dechow et al. 1995). Total accruals are usually estimated by the difference between reported earnings and cash flow from operations or by calculating them from changes in accounts receivable, inventory, accounts payable, tax payables, other current assets and adding depreciation (Healy 1985; Hribar & Collins 2002). One of the first models to investigate earnings management with accruals was developed by Healy (1985) which assumes that total accruals is the same as nondiscretionary accruals (as illustrated by Dechow et al. 1995):

$$NDA_{\tau} = \frac{\sum_{p} TA_{p}}{P}, \qquad (1)$$

where

NDA = estimated nondiscretionary accruals;
TA = total accruals scaled by lagged total assets;
p = 1,2,….P is a year subscript for years included in the estimation period; and
τ = a year subscript indicating a year in the event period.

After his model there have been several other more sophisticated models such as so called the Jones model, which itself or variation of it is quite often used in accrual based earnings management (Dechow et al. 1995; Jones 1991; Subramanyam 1996). Young (1999) illustrated the Jones model as follows:

$$\frac{TA_{ip}}{A_{ip-1}} = \alpha_i \frac{1}{A_{ip-1}} + \beta_{1i} \frac{\Delta REV_{ip}}{A_{ip-1}} + \beta_{2i} \frac{PPE_{ip}}{A_{ip-1}} + \varepsilon_{ip}, \qquad (2)$$

where

TA_{ip} = total accruals for firm i in period p;

ΔREV_{ip} = change in revenue from period p – 1 top for firm i;

PPE_{ip} = gross plant property and equipment for firm i in period p;

A_{ip-1} = beginning of period total assets for firm i; and

p = 1,…, P, estimation years immediately prior to event year t.

$$EDA_{it} = \frac{TA_{ip}}{A_{ip-1}} - \left[a_i \frac{1}{A_{ip-1}} + b_{1i} \frac{\Delta REV_{ip}}{A_{ip-1}} + b_{2i} \frac{PPE_{ip}}{A_{ip-1}}\right], \qquad (3)$$

where

EDA_{ip} = estimated discretionary accruals for firm i in period p.

Equation number 2 is used to calculate the "standard" level of total accruals and then these regression coefficients are plugged into the equation number 3 to calculate how much of the total accruals discretionary accruals account for (Young 1999). Both, time series and cross sectional regressions, often clustering industries together, have been used to calculate the "standard" level of total accruals, from where the coefficients are plugged into the equation number 3 (Jones 1991; DeFond & Jiambalvo 1994; McNichols 2000). Compared to the Healy (1985) model the Jones (1991) model is trying to account for changes in operating activity and economic environment to which managers can't much use their own discretion (Dechow et al. 1995; Young 1999).

Although discretionary accrual models are extensively used in the prior literature they have faced some criticism and improvements in measurement of earnings management is sought-after within the researchers (Holthausen et al. 1995). Discretionary accrual models seem to detect earnings manipulation reasonably well in extreme cases but lack the power to detect it even in companies known to be generally accepted accounting principles (GAAP) violators (Dechow et al. 1995; Beneish 1997; McNichols 2000). Other issue with discretionary accrual models is that discretionary accruals are known to be correlated with earnings performance,

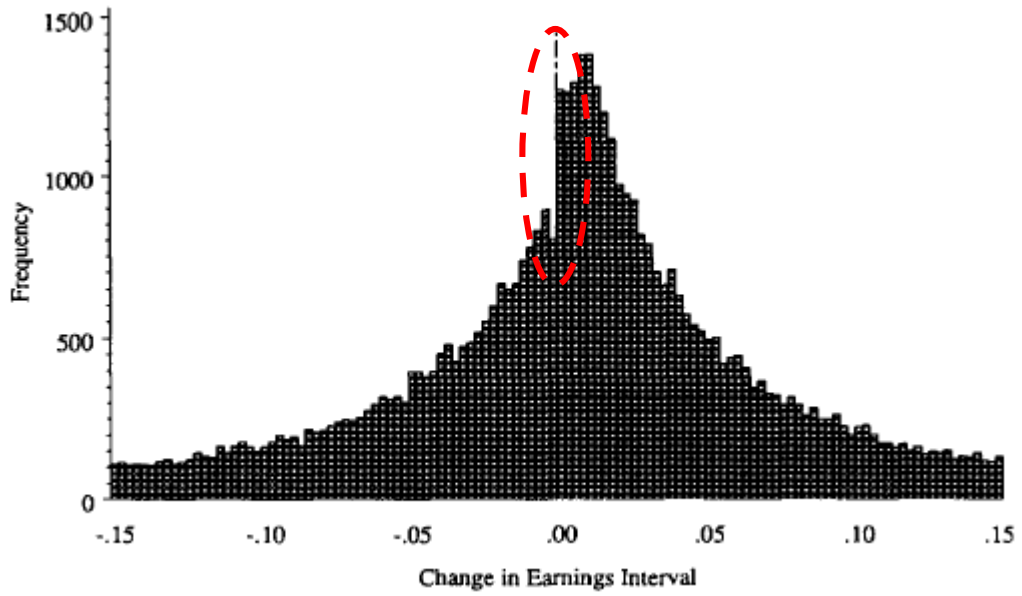
which means that highly profitable firms are easily incorrectly found to manage their earnings upwards whereas least profitable firms are easily incorrectly found to manage their earnings downwards (Dechow et al. 1995; McNichols 2000). Also calculating the "standard" levels of total accruals from the equation 2 is quite ambiguous unless researcher could identify time period where the company didn't exercise earnings management or companies with similar attributes, e.g. financial performance, economic environment etc., could be clustered together and certain degree of certainty that systematic earnings management is not exercised in any cluster (Dechow et al. 1995; McNichols 2000).

2.3.2. Detecting real activities based earnings management

Instead of managing accruals to manipulate earnings executives can affect real activities and manage earnings through them. Real activities manipulation is usually understood to mean actions such as increasing sales through price discounts, overproduction or reduction of discretionary expenditures, which wouldn't have been executed in normal course of operations, by the management to alter financial reporting figures in attempt to meet certain reporting goals (Roychowdhury 2006; Xu et al. 2007). Compared to accrual management real activities manipulation have effects on operating activities and potentially can even reduce firm value, since for example increasing sales through price discounts in the current period can reduce cash flows in future periods (Roychowdhury 2006; Gunny 2010). Executives may want to exercise real activities manipulation instead of accrual manipulation since regulators such as Securities and Exchange Commission (SEC) are stricter about aggressive accounting choices with respect to accruals and aggressive manipulation of accruals is also more likely to face class action litigation, if manipulation was revealed (Gunny 2010). Manipulation of accruals is also somewhat limited by the accounting choices regarding accruals made last year due to the reversing nature of accrual accounting (Barton & Simko 2002). When exercising accrual based earnings management executives also face ex-ante uncertainty regarding how much accrual manipulation auditors are going to accept and ex-post consequences of over aggressive accrual based earnings management can result increase in cost of capital if revealed to the public (Gunny 2010; Dechow et al. 1996). On the other hand accrual based earnings management enables executives to manage earnings after

the reporting period, when they know how much earnings management they need in order to reach their goals, whereas real activities manipulation requires that transactions are executed before the end of the reporting period (Gunny 2010).

As the researchers have faced problems with accrual based models there have emerged other tools to investigate earnings management, such as examining discontinuities in the distribution of reported earnings around for example zero earnings and last year's earnings, which can act as a starting point for more detailed research (Burgstahler & Dichev 1997):



Graph 1: Anomalous distribution of earnings example (Burgstahler & Dichev 1997). Dotted red circle indicates the area of interest (added for emphasis).

Although this kind of investigation about the discontinuity around certain threshold (such as last year's earnings or zero earnings) doesn't reveal the magnitude of possible earnings management or how it's exercised it reveals the potential companies that have exercised it and the magnitude and procedures of earnings management in those companies can be investigated separately (Beneish 2001; Roychowdhury 2006).

Roychowdhury (2006) identified potential companies that had manipulated their earnings as those whose earnings scaled with total assets at the beginning of the year are over zero but under 0.5 %, as discussed in section 2.2.1. previous literature have found that companies manipulate earnings to exceed thresholds, such as zero earnings. After finding "suspect firm-years" Roychowdhury (2006) estimated "normal" levels of cash flow from operations, cost of goods sold, inventory, production costs and discretionary expenses (defined as sum of advertising expenses, research & development expenses, selling, general and administrative expenses) with regressions for the whole sample. Example of estimating "normal" level of cash flow from operations (Roychowdhury 2006):

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \beta_1 \frac{S_t}{A_{t-1}} + \beta_2 \frac{\Delta S_t}{A_{t-1}} + \varepsilon_t, \qquad (4)$$

where

CFO_t = Cash Flow from Operation in time period t;

A_{t-1} = Total assets in time period t;

S_t = Sales in time period t; and

ΔS_t = Change in sales from time period t – 1 to t.

Abnormal cash flow from operations (and other variables of interest similarly) was defined by Roychowdhury (2006) as actual cash flow from operations minus "normal" cash flow from operations calculated with the coefficients from equation 4. After this Roychowdhury (2006) investigated how much cash flow from operations (illustrated below), cost of goods sold, inventory, production costs and discretionary expenses of suspect firm-years differed from rest of the sample with following regression:

$$CFO_t = \alpha + \beta_1 (SIZE)_{t-1} + \beta_2 (MTB)_{t-1} + \beta_3 (Net\ Income)_t + \beta_4 (SUSPECT\_NI)_t + \varepsilon_t, \qquad (5)$$

where

SIZE = logarithm of the market value of equity at the beginning of the year;

MTB = market-to-book ratio; and

SUSPECT_NI = dummy variable to one if firm-years belong to the earnings category just right of zero (earnings scaled with total assets over zero but under 0.5 %), zero otherwise.

Roychowdhury (2006) found that suspect firm-years on average had 2 % of total assets lower abnormal cash flow from operations, when considered that in the study median cash flow from operations across all firm-years was 8 % of total assets, difference is meaningful. Suspect firm-years were found to have an average 5.91 % of total assets lower abnormal discretionary expenses, which again is quite meaningful considering that median discretionary expenses for all firm-years was 37 % (Roychowdhury 2006). Median production costs for all firm-years was around 79 % of total assets, and suspect firm-years were found to have an average 4.97 % of assets higher abnormal production costs (Roychowdhury 2006). These results indicate that companies which report just above zero earning use price discounts to temporarily increase sales, reduction of discretionary expenses and overproduction to report lower cost of goods sold as tools to manage their earnings (Roychowdhury 2006).

3. International comparison of earnings management in previous literature

International differences in earnings management is researched to some extent in previous literature but not overwhelmingly. One of the main benefits of cross-country studies in earnings management literature is that they enable researchers to study the effects of for example accounting standards, legal systems and incentives provided by the capital markets to earnings management of companies due to larger heterogeneity in these variables compared to a single country studies. This though affects the interpretation of results from cross-country studies. For example, a finding that greater investor protection is associated with smaller accruals doesn't imply that that accruals are a good proxy for earnings management. The finding only suggests that accruals are a good proxy for decision usefulness associated with decisions and decision-makers subject to good investor protection. The definition of earnings management is decision-specific and in cross-country studies the decision environment is unique by design. (Dechow et al. 2010.)

Leuz et al. (2003) studied differences in earnings management across 31 different countries from the perspective of investor protection. Shen & Chih (2005) also investigated earnings management from the perspective of investor protection but also from prospect theory point of view and more notably their study industry was banking sector which is quite often excluded from other earnings management studies due to the possibly tighter regulatory oversight. Burgstahler et al. (2006) compared differences in earnings management of European public and private companies. Leuz et al. (2003) and Burgstahler et al. (2006) studies used both accrual and loss avoidance (similar technic as illustrated in graph 1) measures to indicate the magnitude of earnings management across countries whereas Shen & Chih (2005) study used only loss avoidance measures. The most similar study in previous literature to this one is by Kinnunen & Koskela (2003) titled *Who Is Miss World in Cosmetic Earnings Management? A Cross-National Comparison of Small Upward Rounding Of Net Income Numbers among Eighteen Countries*. They investigated with the Benford's law the

"winner" in cosmetic earnings management across 18 countries. Where Shen & Chih (2005) and Leuz et al. (2003) found evidence of relation between investor protection and earnings management Kinnunen & Koskela (2003) didn't not document such relation. Table 2 presents the summary of these four studies:

Authors, method(s) & time period	Results
Kinnunen & Koskela (2003) Deviations from the Benford's law 1995 – 1999	Upward rounding more frequent in the bottom line than on top of an income statement. Cosmetic earnings management decreases with spending on auditing, increases with the latitude of country's GAAP, cultural values (power distance), and the importance of management bonus schemes.
Leuz, Nanda & Wysocki (2003), Accruals, smoothness of earnings, loss avoidance 1990 – 1999	Lower levels of earnings management associated with dispersed ownership, strong investor protection and large stock markets. Earnings management also negatively associated with the quality of minority shareholder rights and legal enforcement.
Shen & Chih (2005) Loss avoidance & earnings decrease avoidance 1993 – 1999	Lower levels of earnings management associated with higher real GDP per capita. Prospect theory, due to finding that relationship between return and risk is positive for high earnings groups but negative for low earnings banks, associated with earnings management.
Burgstahler, Hail & Leuz (2006) Accruals, smoothness of earnings, loss avoidance 1997 – 2003	Private companies associated with higher levels of earnings management. Strong legal systems are associated with lower levels of earnings management in both private and public companies.

Table 2: Summary of selected studies about international comparison of earnings management.

Data of Kinnunen & Koskela (2003) consisted of time period between 1995 and 1999, almost 22 000 firms from 18 countries and approximately 87 000 earnings observations. Their proxy

for cosmetic earnings management was deviation of second significant digit's distribution from the Benford's law which states that zero should be the second significant digit approximately 12 % of the time and nine should be the second significant digit circa 8.5 % of the time. Appearance of all the other numbers falls between these two in descending order. They hypothesized that firms exercise small upward rounding of positive income numbers from example 495 000 (currency irrelevant) to 503 000 since people are known to pay more attention to the first digit of any number and round number down to preserve memory. These small rounding of companies would lead to anomalous distribution of zeros and nines in the whole sample, which could be interpreted as cosmetic earnings management.

Kinnunen & Koskela (2003) studied the differences between countries and found the "winner" of their cosmetic earnings management beauty pageant to be Spain and runner-ups Hong Kong and Singapore. "Losers" of the beauty pageant were Scandinavian countries (Denmark, Sweden and Norway) and United Kingdom where cosmetic earnings management appears to be small and not significant. They also found that certain institutional factors seem to play a role in differences of cosmetic earnings management across countries. Cosmetic earnings management seems to increase with the importance of management bonus schemes, power distance and to some extent with the latitude of country's Generally Accepted Accounting Principles. Contrary to their expectation Kinnunen & Koskela (2003) did not found relationship between cosmetic earnings management and the value relevance of earnings, the alignment of financial and tax accounting or the degree of shareholder protection. (Kinnunen & Koskela 2003.)

Leuz et al. (2003) found evidence of relationship between earnings management and investor protection. Their sample consisted of time period between 1990 and 1999, over 8 600 firms from 31 countries and approximately 71 000 firm-year observations. Their proxies for earnings management were smoothing reported operating earnings with accruals, correlation between changes in accounting accruals and changes in operating cash flow, magnitude of accruals and avoidance of small losses. These proxies for earnings management are quite

different to the one that Kinnunen & Koskela (2003) used and are quite widely used in previous earnings management literature. Leuz et al. (2003) found that top three countries of earnings management in their sample were Austria, Greece and South Korea and least the earnings were managed in Ireland, Australia and United States. Compared to the study of Kinnunen & Koskela (2003) Spain was ranked 14th (1st in Kinnunen & Koskela (2003)), Hong Kong 12th (2nd in Kinnunen & Koskela (2003)) and Singapore 8th (3rd in Kinnunen & Koskela (2003)) out of 31 countries in the study. Denmark, Sweden and Norway ranked 14th, 25th and 26th respectively and United Kingdom 24th. One of the biggest differences in the rankings is the position of Australia which was fifth in the study of Kinnunen & Koskela (2003) but second to last in the study of Leuz et al. (2003). This has been one of the problems in previous earnings management literature that different methods might bring contradictory results. Leuz et al. (2003) found relationship between lower levels of earnings management and dispersed ownership, strong investor protection and large stock markets. They also found negative association between earnings management and the quality of minority shareholder rights as well as legal enforcement, which was measured as the average score across three legal variables used in La Porta et al. (1998) which in turn are quite similar to few of the Governance Indicators used in this study. (Leuz et al. 2003.)

Shen & Chih (2005) studied earnings management in the banking industry. Their sample consisted of time period between 1993 and 1999, over 47 000 banks from 48 countries and approximately 71 000 observations. As well as Leuz et al. (2003) Shen & Chih (2005) used loss avoidance as one of the proxies for earnings management. On top of loss avoidance Shen & Chih (2005) used earnings decrease avoidance as a proxy for earnings management. Not explicitly stated in their study but based on their own tables top three earnings management countries in the study of Shen & Chih (2005) were Egypt, Netherlands and Italy. Three countries where earnings were least managed were Norway, Kenya and Mexico. Compared to the study of Leuz et al. (2003) Austria (1st in Leuz et al. (2003)), Greece (2nd in Leuz et al. (2003)) and South Korea (3rd in Leuz et al. (2003)) ranked 8th, 30th and 28th respectively out of 47 countries (one of the countries was excluded due to insufficient data for ranking orders). Although Shen & Chih (2005) used similar proxy as Leuz et al. (2003) for the measurement

of earnings management results vary between them, but Shen & Chih (2005) did focus only on the banking industry and didn't use any accrual based proxies for earnings management as Leuz et al. (2003) did. From the institutional factors Shen & Chih (2005) find that higher real GDP / capita is negatively associated with the degree of earnings management. Stronger investor protection and greater transparency in accounting disclosure are seen as key for reducing banks' incentives to manage earnings. Contrary to the study of Leuz et al. (2003) Shen & Chih (2005) find that stronger enforcement of laws, measured as the average score across three legal variables used in La Porta et al. (1998), results in more earnings management in low-income countries but not in high-income countries. Low earnings banks are found to have negative relationship between return and risk but high earnings banks the relationship is positive, which would imply that prospect theory have a role in earnings management of banks. (Shen & Chih 2005.)

Burgstahler et al. (2006) used the same proxies for earnings management as Leuz et al. (2003); loss avoidance, magnitude of total accruals, smoothness of earnings relative to cash flows and the correlation of accounting accruals and operating cash flows. Sample in the study of Burgstahler et al. (2006) consisted of time period between 1997 and 2003 and approximately 378 000 firm-year observations, including public and private companies, from 13 European countries. Privately held firms are found to exercise more earnings management than their European counterparts. Earnings management is found also to be negatively associated with strong legal systems and enforcement, which was again measured as the average score across three legal variables used in La Porta et al. (1998), as well as strong minority shareholder rights, extensive disclosure requirements and large and highly developed equity markets. Contrary to the study of Kinnunen & Koskela (2003) Burgstahler et al. (2006) found that stronger tax alignment is associated with more earnings management, effect of which is mitigated by market pressure on public firms.

4. Hypothesis development, data & methods

4.1. Hypothesis development

Earnings management is a vastly researched field and multiple studies have found evidence about the occurrence of earnings management in various different research settings. The closest study to this one is the one by Kinnunen & Koskela (2003) which also applied the Benford's law as a method to detect earnings management in international setting. The results of that study provide good hypotheses for this study. Kinnunen & Koskela (2003) found evidence about earnings management using the Benford's law, so the first hypothesis of this study goes as follows:

> ***H1.*** *Companies exercise small rounding of income statement numbers which results in deviations from the Benford's law and can be interpreted as earnings management.*

Kinnunen & Koskela (2003) also find evidence about differences in earnings management across countries and this leads to the second hypothesis of this study:

> ***H2.*** *Countries differ to the extent which companies operating in them exercise earnings management.*

The Governance Indicators as such haven't been previously been a part of earnings management research but quite similar institutional indicators have been used as control variables since La Porta et al. (1998) in various studies. The results, regarding these institutional indicators, from these studies are somewhat mixed. Whereas Burgstahler et al. (2006) and Leuz et al. (2003) found evidence about negative relationship between institutional factors and earnings management Shen & Chih (2005) didn't find relationship for high-income countries and actually is reversed for low-income countries in their study. It has to be reminded that the institutional factors in previously mentioned studies aren't the same as the Governance Indicators used in this study, which also makes it a little bit more

difficult to construct hypothesis regarding earnings management and the Governance Indicators. All this said the third hypothesis goes as follows:

> ***H3.*** *There is no relationship between earnings management and the Governance Indicators.*

Hypotheses 1 – 3 are the main hypotheses of this study and most of emphasis are put on them. Additional hypothesis is constructed based on the finding of Kinnunen & Koskela (2003) that due to more extensive opportunities for manipulation rounding of accounting numbers is much more significant on the bottom line than in the top line of the income statement:

> ***H4.*** *Rounding of accounting numbers is more persistent in the bottom line of the income statement than in the top line.*

4.2. Data

The main source of data regarding accounting numbers for this study was Bureau van Dijk's Orbis database, which consists of close to 180 million, public and private, companies worldwide. Net income and operating revenue in local currency and descriptive statistics in US dollars of 35 876 listed companies from 43 different countries from 2006 to 2014 was exported from Orbis database to MS Excel. The sample consists of all other industries than banks, insurance companies and other financial holdings (SIC codes 6000 – 6799), public administrative institutions (SIC codes above 9000) and private households (SIC code 8811). These industries are often excluded in the studies of earnings management due to the regulatory oversight banks for example face that affects their incentives to manage earnings. This study focuses on listed companies for the reason that they face similar oversight from government and investors for example, even though they might represent different geographical location. Listed companies also have motivations for earnings management that private companies won't have, such as managing earnings in order to increase price of stock as discussed in section 2.2. The 43 different countries were chosen based on availability of

net income figures available in Orbis and initial analyze of variation in governance indicators of these countries. The time frame of this study ranges from 2006 to 2014 in order to examine larger set of net income figures than just those of one year's but is limited to 2006 since years before that aren't available in Orbis. Researched net income and operating turnover figures are in local currency since this study focuses on cosmetic earnings management that involves small rounding of numbers instead of larger earnings management which could be detected in any currency. Descriptive statistics about average revenue, net income and market capitalization are presented in millions of U.S. dollars to preserve comparability between countries.

As can be expected countries differ to great extent by the listed companies located in them (see table 3). Whereas the revenue of average listed company from United States is a bit over 2 billion U.S. dollars, the revenue of average listed company from Serbia is only circa 12 million U.S. dollars. Similar characteristic is noticeable also in net income and market capitalization figures. Also sample size from each country differs significantly for example there are known revenue for 2997 (on average from 2006 to 2014) listed companies from Japan but only for 108 (on average from 2006 to 2014) listed companies from winner of Kinnunen & Koskela 2003 beauty pageant Spain.

Country	Average Revenue Mil USD	N	Average Net Income Mil USD	N	Average Market Cap. Mil USD	N
Spain	4 355	970	281,0	998	4 999	737
Germany	4 068	4 379	161,3	4 376	2 607	3 870
Switzerland	3 427	1 407	340,6	1 408	6 162	1 231
France	3 149	5 394	136,0	5 386	2 828	4 598
Italy	2 780	1 699	132,6	1 699	2 135	1 478
United Kingdom	2 478	8 718	162,5	9 290	2 382	7 869
Hong Kong	2 397	1 215	315,1	1 220	4 486	1 109
Brazil	2 174	2 204	172,3	2 205	4 077	1 646
United States of America	2 066	15 862	115,7	15 890	3 003	11 106
Japan	1 957	26 975	51,2	26 978	1 173	24 300
Norway	1 583	1 212	107,1	1 212	2 267	769
Russian Federation	1 348	5 016	143,5	5 016	4 060	1 090
South Africa	1 065	1 456	87,6	1 472	1 403	1 342
Republic of Korea	1 048	12 343	37,6	12 369	682	9 979
Chile	952	1 262	67,0	1 263	1 625	936
Sweden	895	3 291	52,6	3 298	1 384	2 077
China	804	26 932	42,1	26 955	810	14 701
Bermuda	707	4 943	35,7	4 999	678	4 409
Australia	528	9 020	28,9	11 450	556	9 862
Taiwan	527	12 855	23,3	12 861	563	9 559
Thailand	483	4 288	26,2	4 291	463	3 373
Singapore	466	4 631	28,9	4 632	501	3 962
Greece	410	1 735	7,1	1 739	266	1 579
Israel	410	2 735	17,8	2 840	470	2 399
Canada	389	5 795	8,9	9 485	333	7 139
Cayman Islands	385	6 647	27,7	6 676	774	4 738
Indonesia	367	2 842	27,7	2 843	645	2 536
Philippines	366	1 347	26,6	1 376	517	1 118
Poland	300	3 741	14,1	3 755	236	2 879
Turkey	282	1 291	15,4	1 268	547	1 569
India	266	27 667	11,0	28 299	371	22 273
Islamic Republic of Iran	264	1 453	37,3	1 455	203	1 106
Egypt	237	1 266	33,5	1 266	390	1 022
Malaysia	234	6 593	20,0	6 637	358	5 733
Pakistan	157	2 895	8,9	2 939	114	2 290
Vietnam	69	5 839	3,2	5 844	38	2 928
Ukraine	65	3 880	0,4	3 880	198	393
Sri Lanka	50	1 583	3,3	1 587	72	1 463
Bulgaria	28	999	0,6	982	32	566
Romania	25	5 837	1,5	5 844	33	2 961
Serbia	12	6 182	0,0	6 182	271	33
Bosnia and Herzegovina	9	4 665	0,1	4 665	32	125
Republic of Moldova	4	3 409	0,1	3 375	NA	0
Q1	237		8,9		270	
Median	466		28,9		560	
Q3	1 583		107,1		2 168	
std. dev	1 153		84,2		1 521	

Table 3: Descriptive statistics about average revenue, net income and market capitalization of each country in millions of U.S. dollars and sample size for each variable over time frame 2006 – 2014. Sorted by average revenue.
Q1 indicates the 25th percentile
Q3 indicates the 75th percentile

Other crucial data source for this study was The World Governance Indicators (WGI) project where the governance indicators were retrieved for each country. The World Governance Indicators consists of six broad dimensions of governance; voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. All of the dimensions are defined in their official form next:

Voice and Accountability

"Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media."

Political Stability and Absence of Violence/Terrorism

"Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism."

Government Effectiveness

"Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."

Regulatory Quality

"Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development."

Rule of Law

"Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence."

Control of Corruption

"Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests."

The World Governance Indicators are compiled from over 30 different data sources and four different types of sources: surveys of households and firms, commercial business information providers, non-government organizations and public sector organizations. The indicators, in their standard from, are normally distributed with mean zero, standard deviation of one and range approximately from -2.5 to 2.5 with higher values indicating better governance but in this study units are transformed to range approximately from 0 to 5 and higher score indicating worse governance to make results more intuitive for the reader.

Country	CC	GE	PV	RQ	RL	VA	GDP / CAP	Stocks traded
Norway	0.40	0.64	1.19	0.99	0.58	0.86	91 791	59 %
Bermuda	1.17	1.50	1.56	1.13	1.34	1.48	87 777	1 %
Switzerland	0.40	0.61	1.27	0.85	0.73	0.87	74 084	165 %
Cayman Islands	1.37	1.27	1.30	1.36	1.61	1.96	60 803	0 %
Sweden	0.18	0.49	1.41	0.83	0.54	0.92	54 399	NA
Australia	0.46	0.73	1.63	0.81	0.74	1.06	53 360	91 %
United States of America	1.24	0.95	2.06	1.06	0.87	1.38	49 680	250 %
Canada	0.40	0.71	1.60	0.81	0.69	1.12	47 400	90 %
Singapore	0.29	0.24	1.36	0.70	0.82	2.70	46 404	121 %
Germany	0.76	0.93	1.72	0.92	0.88	1.19	43 431	56 %
United Kingdom	0.94	0.94	2.10	0.76	0.74	1.21	42 309	89 %
France	1.06	1.05	1.83	1.19	0.99	1.30	41 768	61 %
Japan	0.93	0.98	1.65	1.47	1.17	1.46	39 546	102 %
Italy	2.50	2.05	2.03	1.61	2.12	1.55	36 481	77 %
Hong Kong	0.53	0.80	1.62	0.59	0.96	1.99	33 774	598 %
Spain	1.49	1.51	2.79	1.35	1.34	1.38	31 216	95 %
Israel	1.83	1.13	3.82	1.27	1.60	1.94	30 274	34 %
Greece	2.66	1.95	2.63	1.87	1.89	1.62	25 918	20 %
Republic of Korea	2.10	1.28	2.21	1.57	1.51	1.77	23 062	138 %
Taiwan	1.78	1.31	1.66	1.36	1.48	1.67	19 527	NA
Chile	1.01	1.24	1.83	1.05	1.18	1.41	12 657	19 %
Poland	2.09	1.86	1.51	1.52	1.84	1.47	12 577	14 %
Russian Federation	3.56	2.95	3.41	2.87	3.27	3.38	11 280	22 %
Brazil	2.50	2.54	2.49	2.34	2.50	1.97	9 933	35 %
Turkey	2.47	2.19	3.42	2.19	2.38	2.62	9 877	46 %
Malaysia	2.37	1.37	2.38	1.91	1.97	2.98	8 915	47 %
Romania	2.72	2.75	2.25	1.86	2.46	2.08	8 568	2 %
Bulgaria	2.71	2.39	2.17	1.85	2.60	1.98	6 732	NA
South Africa	2.41	2.11	2.52	2.14	2.39	1.92	6 663	94 %
Serbia	2.79	2.55	2.94	2.52	2.90	2.23	5 790	2 %
Islamic Republic of Iran	3.49	2.98	4.12	4.20	3.48	4.07	5 551	4 %
China	3.10	2.40	3.16	2.72	2.83	4.13	4 771	105 %
Thailand	2.82	2.31	3.93	2.31	2.70	3.00	4 619	57 %
Bosnia and Herzegovina	2.82	3.23	3.20	2.60	2.87	2.63	4 414	NA
Ukraine	3.48	3.25	2.52	3.02	3.31	2.60	3 258	1 %
Indonesia	3.25	2.70	3.35	2.90	3.14	2.57	2 830	13 %
Egypt	3.05	2.88	3.41	2.66	2.62	3.65	2 484	26 %
Sri Lanka	2.90	2.68	3.42	2.70	2.58	3.02	2 464	4 %
Philippines	3.30	2.52	4.13	2.72	3.08	2.56	2 180	12 %
Republic of Moldova	3.19	3.14	2.89	2.60	2.89	2.61	1 725	1 %
Vietnam	3.13	2.76	2.39	3.11	3.03	3.98	1 412	9 %
India	3.01	2.48	3.73	2.87	2.54	2.07	1 264	57 %
Pakistan	3.57	3.26	5.17	3.08	3.24	3.34	1 116	NA
Q1	1.01	0.98	1.65	1.06	0.99	1.41	4 619	11 %
Median	2.41	1.95	2.38	1.85	1.97	1.97	12 577	46 %
Q3	3.01	2.68	3.35	2.66	2.83	2.63	42 309	92 %
std. dev	1.08	0.89	0.94	0.86	0.91	0.89	24 422	102 %

Table 4: Descriptive statistics of the Governance Indicators for each country, GDP / capita and stocks traded. Sorted by GDP / capita

CC = Estimate for Control of Corruption
GE = Estimate of Government Effectiveness
PV = Estimate of Political Stability and Absence of Violence/Terrorism
RQ = Estimate of Regulatory Quality
RL = Estimate of Rule of Law
VA = Estimate of Voice and Accountability
GDP / Capita = Average GDP / Capita of a country 2006-2014
Stocks traded = Average stocks traded (% of GDP) 2006-2014
Q1 indicates the 25th percentile
Q3 indicates the 75th percentile

The GDP / capita figure is used as a control variable and is calculated as an average of 2006 – 2014 in current U.S. dollars retrieved from World Bank national accounts data, and OECD National Accounts data files, except for Cayman Islands where the GDP / capita in 2006 was only found from previous sources. 2010 and 2013 GDP / capita in current U.S. dollars for Cayman Islands was found in the United Nations Statistics Division's data files. Average GDP / capita of 2006 – 2014 was decided to be used to avoid possible mistakes in the data and since the Governance Indicators are describing quite gradually changing aspects of government average was deemed better control variable for them than just GDP / capita of a year. Here the GDP / capita values are in their original form but in the actual research they were changed to log form to reduce heteroscedasticity.

As can be seen in table 4 estimates of Governance Indicators vary greatly between countries, for example whereas the estimate for Control of Corruption for Sweden is only 0.18 indicating very low level corruption the estimate for same indicator for Russia is 3.56 indicating quite high corruption. Overall estimates for Control of Corruption are quite as expected; Sweden, Singapore, Norway and Australia have indicator estimates less than 0.5 and on the side of the spectrum China, Russia, India, Iran, Philippines, Pakistan, Indonesia, Vietnam, Egypt, Ukraine and Moldova have indicator estimates more than 3.0. Mean estimate for control and corruption is 2.03, which means that the sample countries in this study have better control of corruption score than the whole population. For the Political Stability and Absence of Violence / Terrorism none of the sample countries score less than 1, for example Norway has score of 1.19 and Switzerland 1.27. Iran and Philippines score again quite high scores 4.12 and 4.13 respectively. Sample's mean score for the estimate of Political Stability and Absence of Violence / Terrorism is 2.49 which means that sample countries have quite similar estimates for this Governance Indicator as the whole population.

	CC	GE	PV	RQ	RL	VA
CC	1					
GE	0.95	1				
PV	0.79	0.74	1			
RQ	0.93	0.92	0.79	1		
RL	0.97	0.96	0.77	0.95	1	
VA	0.77	0.72	0.69	0.82	0.80	1

Table 5: Correlation matrix of the Governance Indicators for the sample

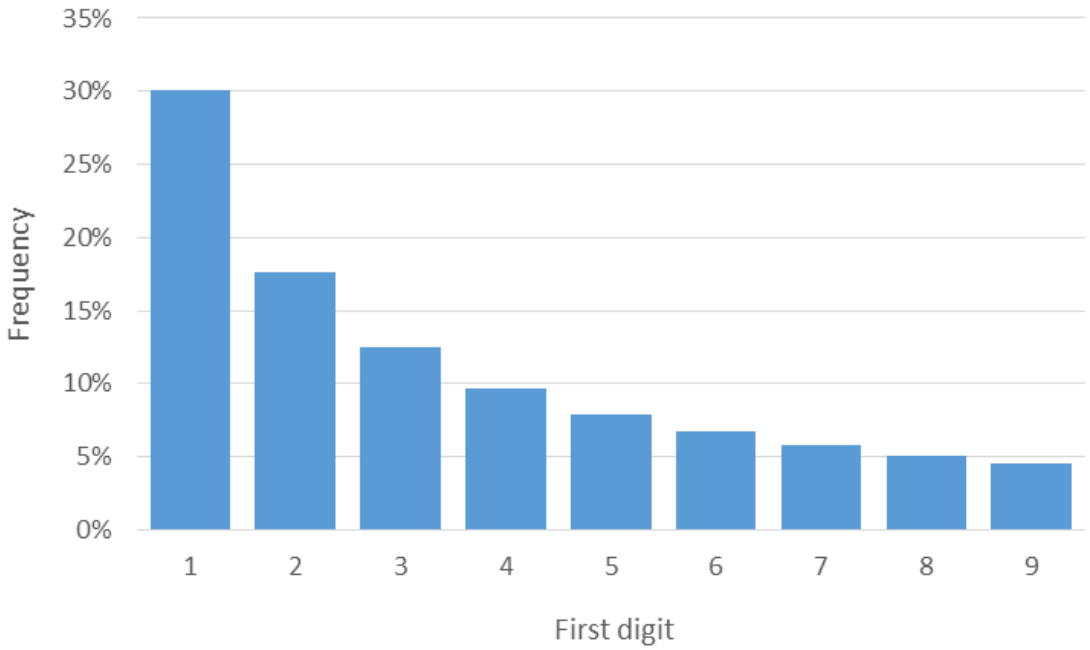
CC = Estimate for Control of Corruption
GE = Estimate of Government Effectiveness
PV = Estimate of Political Stability and Absence of Violence/Terrorism
RQ = Estimate of Regulatory Quality
RL = Estimate of Rule of Law
VA = Estimate of Voice and Accountability

Similar indicators for governance have been used for example in the study by La Porta et al. (1998). In that study similar indicators are averaged together, since they have quite strong correlation with each other. In results section similar type of averaging is also done for the indicators in this study since as can be seen from see table 5, most of them are highly correlated with each other.

4.3. Method

Proxy for earnings manipulation in this study is the same as for example in the study of Carslaw (1988) and Kinnunen & Koskela (2003), deviations from the Benford's law. During the late 19th century astronomer and mathematician Simon Newcomb made a discovery that the first volumes of the tables of logarithms of his institution were more worn than the following volumes. This implied that people made more frequent consultations for numbers starting with 1 or 2 than for numbers starting with 8 or 9. Independently from Newcomb's work Frank Benford made same notion about the same tables of logarithms and in his article 1938 he composed numerous sets of data, from physical constants to baseball results, and showed that the appearance of the first significant digit followed a particular distribution, which is now known as the Benford's law. First significant digit of a number means its

leftmost non-zero digit, for example the first significant digit of the number 587 is 5 and the first significant digit of 0.312 is 3. (Sandron & Hayford 2002.)



Graph 2: Distribution of first significant digit under the Benford's law.

Under the Benford's law first significant digit is approximately 30.1 % of the time 1 and only approx. 4.6 % of the time 9, appearance of all the other numbers fall between these two in descending order as can be seen from graph 2. The Benford's law applies to lists of numbers that represent the relative sizes of similar phenomena, such as net incomes, daily trading volumes on stock exchange or market values. Examples outside of financial context could include population of countries or cities. The list of numbers should not have a subjective minimum or maximum cut-off point such as "companies with revenue over one million" in case of list of revenues. The Benford's law doesn't apply to lists of numbers which are formed by human though such as supermarket prices or Automated Teller Machine withdrawals neither the law apply to assigned numbers such as telephone numbers, car license plate numbers or personal identification numbers. (Nigrini & Mittermaier 1997.)

The formula for the frequency under the Benford's law of any given first significant digit can be written as follows (as cited in Sandron & Hayford 2002):

$$F_d = log_{10}(1 + 1/d), \qquad (6)$$

where

F_d = The frequency of the first significant digit d.

Similarly the formula for the frequency under the Benford's law of any given second significant digit can be written as follows (modified from Nigrini & Mittermaier 1997):

$$F_{d_2} = \sum_{d_1}^{9} log_{10}(1 + (1/d_1 d_2)), \qquad (7)$$

where

F_{d_2} = The frequency under the Benford's law of the second significant digit d_2, and

d_1 = first significant digit.

Hill (1995) made the interesting notion about the properties of significant digits that they are not independent as one might expected but dependent. For example the unconditional probability that the second significant digit is two is approximately 10.9 % but given that the first number is one the conditional probability of the second significant digit being two is approx. 11.5 %.

Formulas for the significant digits beyond these two mentioned above are not in the scope of this study but the following table from Nigrini (1996) illustrates how the distribution of the digits starts to get closer to uniform distribution as the digit of interest gets farer away from the first digit:

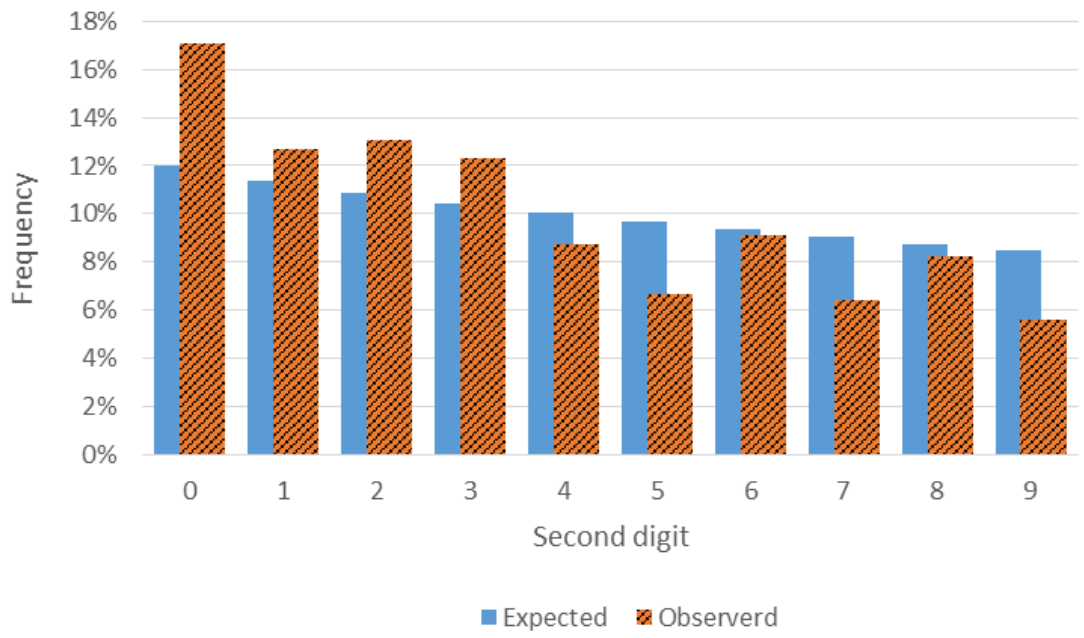
	Digit									
	0	1	2	3	4	5	6	7	8	9
As 1st		30.10 %	17.61 %	12.49 %	9.69 %	7.92 %	6.70 %	5.80 %	5.12 %	4.58 %
As 2nd	11.97 %	11.39 %	10.88 %	10.43 %	10.03 %	9.67 %	9.34 %	9.04 %	8.76 %	8.50 %
As 3rd	10.18 %	10.14 %	10.10 %	10.06 %	10.02 %	9.98 %	9.94 %	9.90 %	9.86 %	9.83 %
As 4th	10.02 %	10.01 %	10.01 %	10.01 %	10.00 %	10.00 %	9.99 %	9.99 %	9.99 %	9.98 %

Table 6: Expected frequency of digits as first, second, third and fourth significant digit under the Benford's law (Nigrini 1996).

As can be seen from the table 6 the difference of expected frequency of one and nine as first significant digit is over 25 percentage points but as fourth significant digit the difference is only approximately 0.03 percentage point. The drop in the expected frequency of one is already quite significant between the first and second digit as it falls from approx. 30.1 % to approx.11.4 % and nine also almost doubles its expected occurrence as it rises from approx. 4.6 % to approx. 8.5 % when changing the point of interest from the first digit to the second.

One of the biggest advantages of Benford's law as a method to detect earnings management is its intuitiveness over the models presented in section 2.3. Accrual based models, as explained in the section 2.3.1. usually requires the researchers to separate discretionary and non-discretionary parts of the accruals and this is usually done with quite crude models. Compared to this the Benford's law offers very intuitive tool to detect earnings management as it gives the researchers the theoretical "pure" frequency of numbers and the observed frequency can be compared to this. As explained in the section 2.3.1. previously extensively used accrual based models have also faced criticism for inefficiency to detect earnings management properly in less than extreme cases. Compared to methods regarding beating thresholds, such as zero profits or analyst estimates (see graph 1), the Benford's law enables investigation of larger set of companies, since the sample of interest isn't limited to only companies just beating zero profits or analyst estimates but includes all of the companies which potentially have exercised earnings management to change the first digit of their earnings figures. For cross-country study the Benford's law offers especially suitable tool since analyst estimates from various countries might be difficult to obtain and accrual policies might vary between different countries and accounting standards.

Carslaw (1988) was the first one to use the Benford's law in accounting context (Nigrini & Mittermaier 1997). Carslaw (1988) studied the occurrence of second significant digit in positive income numbers of New Zealand listed companies. He hypothesized that companies would prefer to round for example unmanaged net profit of 296,563 New Zealand Dollars (NZD) to 302,560 NZD since people usually pay more attention to the first significant digit of a number and prefer to round the number down even though it would be more logical to round number up (Carslaw 1988). This would lead to the fact that the list of net profits would show abnormally high frequency of zero as second significant digit and abnormally low frequency of nines as second significant digit (Carslaw 1988).



Graph 3: Expected frequency of second significant digit under the Benford's law and observed frequency in net income numbers of New Zealand companies (Carslaw 1988).

Carslaw (1988) did found evidence that zero occurs more often than it should under the Benford's law and that nine occurs less than it should, statistically significantly at 1 % and 10 % level respectively (see graph 3). As reader notes distribution of second significant digit

under the Benford's law is much closer to uniform distribution than distribution of the first significant digit which was illustrated in graph 2. Under the Benford's law second digit is approximately 12 % of the time zero and approximately 8.5 % of the time nine, occurrence of all the other numbers falls between these two in descending order.

Following the studies by Carslaw (1988) and Kinnunen & Koskela (2003) this study uses anomalous distribution, compared to the theoretical proper distribution obtained from the Benford's law, of second significant digit as a proxy for earnings management. Although this method haven't been used as much in previous literature to detect earnings management as for example accrual based or loss avoidance (and related) methods it offers intuitive tool to study earnings management especially between various countries which may differ to some extent in the accounting principles and procedures. To investigate does the deviation of observed frequency of second significant digit from its expected frequency is statistically significant the following z-statistic formula from Kinnunen & Koskela (2003) is used:

$$z_{SD} = \frac{f_{SD}^{observed} - nProb(SD)}{\sqrt{nProb(SD)[1 - Prob(SD)]}}, \qquad (8)$$

where

$f_{SD}^{observed}$ = observed frequency of second digit SD,
n = the sample size, and
$Prob(SD)$ = expected frequency of second digit SD.

To investigate is the whole distribution of observed second significant digits significantly different than its expectation under randomness the following Chi-square statistic formula with 9 degrees of freedom from Kinnunen & Koskela (2003) is used:

$$\chi^2 = \sum_{SD=0}^{9} \frac{|f_{SD}^{observed} - nProb(SD)|^2}{nProb(SD)}, \qquad (9)$$

To measure appearance and magnitude of cosmetic earnings management in each country and in order to measure its association with the Governance Indicators this study uses three metrics developed by Kinnunen & Koskela (2003), which vary in breadth of cosmetic earnings management measurement:

$$CEM1 = \frac{f_{SDP0}^{observed}}{n_p} - Prob(SD0), \qquad (10)$$

$$CEM2 = \frac{f_{SDP0}^{observed}}{n_p} - Prob(SD0) + Prob(SD9) - \frac{f_{SDP9}^{observed}}{n_p}, \qquad (11)$$

$$CEM3 = \frac{f_{SDP0}^{observed}}{n_p} - Prob(SD0) + Prob(SD9) - \frac{f_{SDP9}^{observed}}{n_p} + \frac{f_{SDN9}^{observed}}{n_N} - Prob(SD9) + Prob(SD0) - \frac{f_{SDN0}^{observed}}{n_N}, \qquad (12)$$

where

$f_{SDP0}^{observed}$ = Observed frequency of zeros as second digit in positive net income figures,

n_p = Sample size of positive net income observations,

$Prob(SD0)$ = Occurrence of zero as second digit under the Benford's law,

$Prob(SD9)$ = Occurrence of nine as second digit under the Benford's law,

$f_{SDP9}^{observed}$ = Observed frequency of nines as second digit in positive net income figures,

$f_{SDN9}^{observed}$ = Observed frequency of nines as second digit in negative net income figures,

$f_{SDN0}^{observed}$ = Observed frequency of zeros as second digit in negative net income figures, and

n_N = Sample size of negative net income observations.

CEM1 (equation 10) simply measures the percentage unit deviation (expected to be surplus) of zeros as second significant digit in positive net income figures from the occurrence of zeros under the Benford's law.

CEM2 (equation 11) adds to CEM1 the percentage unit deviation (expected to be deficit) of nines as second significant digit in positive net income figures from the occurrence of nines under the Benford's law. This metric is based on the expectation that cosmetic earnings management in positive net income figures is exercised especially by rounding nines up to zeros.

CEM3 (equation 12) takes into account also negative net income figures by adding to CEM2 the percentage unit deviation of zeros and nines as second significant digit in negative net income figures from the occurrence of zeros and nines under the Benford's law. This metric is based on the expectation that cosmetic earnings management is exercised in reverse in negative net income figures by rounding zeros as second significant digit up to nines, as this would soften the blow of net losses.

Cosmetic earnings management metrics, CEM1, CEM2 and CEM3, are calculated for each country separately and thus cosmetic earnings management can be investigated in relation to institutional factors such as the Governance Indicators here. This possible association between cosmetic earnings management and the Governance Indicators is researched with ordinary least square (OLS) regression models:

$$CEM1_y = \alpha + \beta_1(CC.EST)_y + \beta_2(GE.EST)_y + \beta_3(PV.EST)_y + \beta_4(RQ.EST)_y + \beta_5(RL.EST)_y + \beta_6(VA.EST)_y + \beta_7(GDP/Cap)_y + \beta_8(Stocks\ traded)_y + \varepsilon_y, \quad (13)$$

where

$CEM1_y$ = CEM1 for country y,

α = coefficient,

$CC.EST_y$ = Estimate for Control of Corruption for country y,

$GE.EST_y$ = Estimate of Government Effectiveness for country y,

$PV.EST_y$ = Estimate of Political Stability and Absence of Violence/Terrorism for country y,

$RQ.EST_y$ = Estimate of Regulatory Quality for country y,

$RL.EST_y$ = Estimate of Rule of Law for country y,

$VA.EST_y$ = Estimate of Voice and Accountability for country y,

GDP/Cap_y = Average GDP / Capita of a country 2006-2014 as a control variable for country y (control variable),

Stocks traded = Value of shares traded as a % of GDP (control variable),

and

ε_y = error term for country y.

Equation 13 is also calculated similarly for the two other cosmetic earnings measures, CEM2 and CEM3.

As discussed in the section 4.2. several of the Governance Indicators are highly correlated with each other, most notably estimates for control of corruption, government effectiveness, regulatory quality and rule of law. To mitigate this problem in the regression experienced in equation 13, another regression model is constructed:

$$CEM1_y = \alpha + \beta_1 \left(\frac{CC.EST_y + GE.EST_y + RQ.EST_y + RL.EST_y}{4} \right)_y + \beta_2 (PV.EST)_y + \beta_3 (VA.EST)_y + \varepsilon_y, \quad (14)$$

This regression model (equation 14) is quite similar to the previous one expect that estimates for control of corruption, government effectiveness, regulatory quality and rule of law are averaged together and treated as a single variable for any given country. All of these four estimates also concentrate more on the quality of governance in the country and to which extent people have faith in and act by the norms of society than the other two estimates which deal more with accountability and stability. One can hypothesize that quality of governance in any country will also affect to some degree for example to the auditing quality of that country. Also the people's faith in the norms of society can be considered to have an association with the degree that external financial documents can be trusted, i.e. how much they might include earnings management.

5. Results

5.1. Overview of the results

First the overview of cosmetic earnings management across all the sample firms and 43 countries is presented in the table 7. Top panel of the table 7 gives the overview picture of cosmetic earnings management of net sales and it's quite in line with the results of Kinnunen & Koskela (2003). This sample seems to have bigger surplus of zeros, 0.81 %, as Kinnunen & Koskela (2003) had surplus of 0.35 %. The deficit of zeros in this sample, 0.18 %, is in the same ballpark that Kinnunen & Koskela (2003) had (deficit of 0.22 %). Whereas Kinnunen & Koskela (2003) didn't have any significantly different from zero results for digits 1 – 8, this sample has significant deficit of 0.17 % of threes and fours. The sample in this study regarding net sales figures is almost three times larger than equivalent in the study of Kinnunen & Koskela (2003) and as Thomas (1989) noted comparing z-statistics across studies with different sample sizes can be misleading.

As can be seen from middle panel of the table 7 cosmetic earnings management is quite persistent throughout the sample firms and countries. In the net profits significantly more zeros are observed than expected and on the other hand nine occurs significantly less than it should under the Benford's law. Throughout the sample it also looks like that companies manipulate not just nines upwards to zeros but also to ones. Also sixes, sevens and eights seem to be manipulated upwards to convey better earning figures. Although the deviation of sixes, sevens and eights is statistically speaking significantly meaningful caution has to be exercised when comparing z-statistics as stated previously. The magnitude of deviation of zeros and nines from the expected frequency presented here is quite in line with the study of Kinnunen & Koskela (2003). The surplus of zeros in net profits presented in the table 6 is circa 1.33 percentage units and in the study of Kinnunen & Koskela (2003) it was 1.30 percentage units. The deficit of nines in this sample is a bit less than it was in the study of Kinnunen & Koskela (2003), here it's circa 0.49 percentage units and in their study it was 0.61 percentage units.

	Second significant digit										
All 43 countries	0	1	2	3	4	5	6	7	8	9	Total
Expected frequency	11.97 %	11.39 %	10.88 %	10.43 %	10.03 %	9.67 %	9.34 %	9.04 %	8.76 %	8.50 %	100 %
Net sales											
Number of observations	31 628	28 250	26 652	25 399	24 402	23 945	22 867	22 196	21 520	20 588	247 447
Observed percentage	12.78 %	11.42 %	10.77 %	10.26 %	9.86 %	9.68 %	9.24 %	8.97 %	8.70 %	8.32 %	100 %
Percentage unit deviation	0.81 %	0.03 %	-0.11 %	-0.17 %	-0.17 %	0.01 %	-0.10 %	-0.07 %	-0.06 %	-0.18 %	0.0
z-value/Chi-square	12.44	0.42	-1.74	-2.69	-2.79	0.11	-1.69	-1.21	-1.11	-3.21	167
Prob	0.00	0.68	0.08	0.01	0.01	0.91	0.09	0.22	0.27	0.00	0.00
	***			**	**					**	***
Net profit											
Number of observations	23 824	20 794	19 419	18 594	17 410	17 158	16 442	15 916	15 283	14 346	179 186
Observed percentage	13.30 %	11.60 %	10.84 %	10.38 %	9.72 %	9.58 %	9.18 %	8.88 %	8.53 %	8.01 %	100 %
Percentage unit deviation	1.33 %	0.21 %	-0.04 %	-0.05 %	-0.31 %	-0.09 %	-0.16 %	-0.16 %	-0.23 %	-0.49 %	0.0
z-value/Chi-square	17.29	2.86	-0.58	-0.74	-4.42	-1.35	-2.39	-2.33	-3.46	-7.50	363
Prob	0.00	0.00	0.56	0.46	0.00	0.18	0.02	0.02	0.00	0.00	0.00
	***	**			***		*	*	***	***	***
Net loss											
Number of observations	10 010	9 274	8 808	8 444	8 121	7 872	7 808	7 296	7 284	7 183	82 100
Observed percentage	12.19 %	11.30 %	10.73 %	10.29 %	9.89 %	9.59 %	9.51 %	8.89 %	8.87 %	8.75 %	100 %
Percentage unit deviation	0.22 %	-0.09 %	-0.15 %	-0.14 %	-0.14 %	-0.08 %	0.17 %	-0.15 %	0.11 %	0.25 %	0.0
z-value/Chi-square	1.96	-0.85	-1.40	-1.36	-1.32	-0.79	1.68	-1.53	1.14	2.56	21
Prob	0.05	0.40	0.16	0.17	0.19	0.43	0.09	0.13	0.26	0.01	0.01
	*									*	*

Table 7: Overview of cosmetic earnings management across the sample companies and countries.

Expected frequency = expected percentage proportion of given second significant digit under the Benford's law

Percentage unit deviation = observed percentage minus expected percentage under the Benford's law

z-value = in the digit column the standard normal statistic for the equality of observed and expected frequency of second significant digit

Chi-square = in the total column the Chi-square statistic for equal observed and expected distributions with 9 degrees of freedom

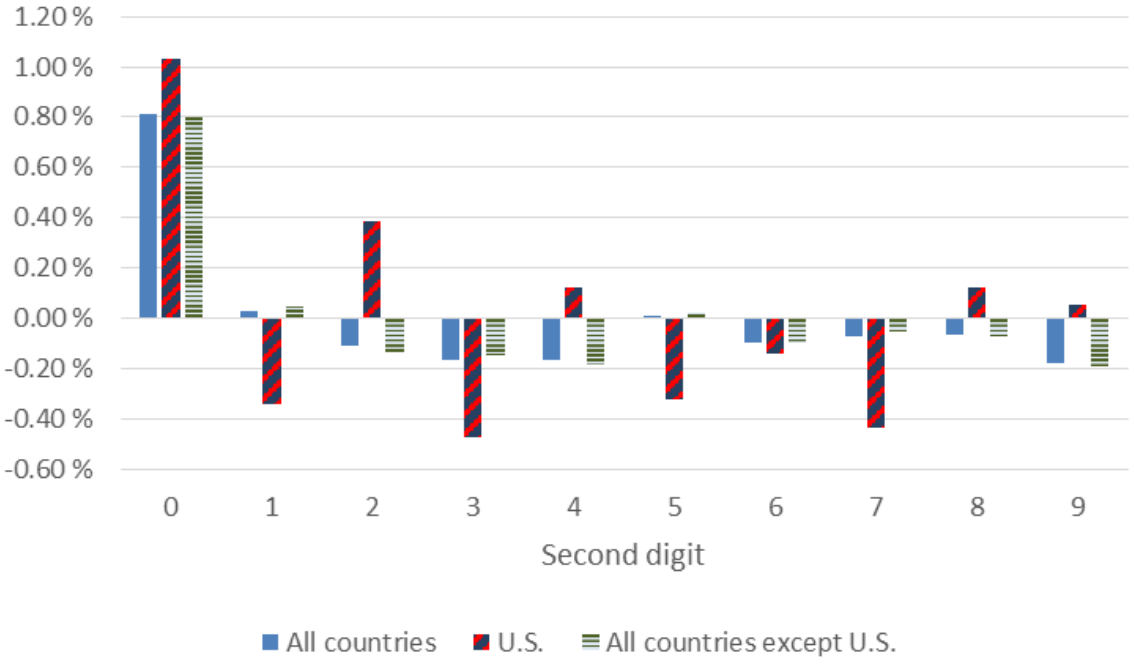
*Prob = two tailed significance level of z-value / Chi-square: * (at least 5%), ** (at least 1%), *** (at least 0,1%).*

Interestingly it appears that fours are also manipulated to one way or another. In the sample of Kinnunen & Koskela (2003) companies were found to report more fives as second significant digit than expected under the Benford's law, but in the sample of this study that is evident so the deficit of fours can't be explained solely by that. One could argue that some companies would prefer to manipulate four down in order to have "reserves" for following years on the other hand some companies probably would like to manipulate four to at least five in order to reach the halfway milestone to a larger figure, as was the case in the sample of Kinnunen & Koskela (2003).

The deviations from expected frequencies in net losses is presented in the bottom panel of the table 7. As can be seen from that there aren't visible pattern how companies manipulate their net losses. Zeros and nines both have a small surplus, and other digits, except sixes and eights, have a deficit. Based on the aggregate data one of the metrics, CEM3, doesn't seem to apply very well to this sample, since it's calculated on the assumption that the cosmetic earnings management would be reversed in net losses (surplus of nines and deficit of zeros). CEM3 for each country is still calculated and used in the latter parts of results section, but it's not emphasized and caution has to be exercised when interpreting results regarding that metric. It shall be noted that the total observations of net losses and net profits calculated together is larger than net sales observations. Apparently for some reason Odin database has net profit / net loss figures for some companies but not their net sales figures. This shouldn't affect the findings of this study.

Based on the deviations presented in the table 7 the H1 hypothesis can be confirmed since as shown especially in the middle panel of the table (net profits) zeros occur more often than they should and nines appear less often. The table 7 also confirms the H4 hypothesis since the deviations of zeros and nines appears to be larger in the net profits than in the net sales and thus companies appear to exercise more manipulation in the bottom line of the income statement than in the top line.

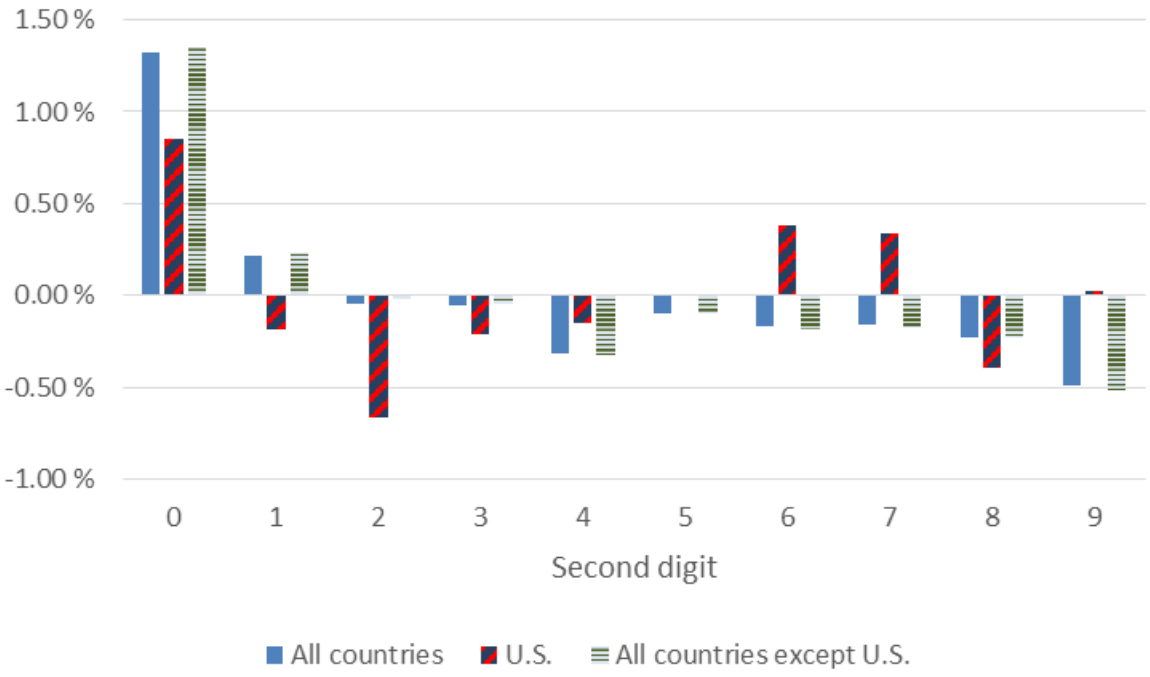
Kinnunen & Koskela (2003) compare in their study cosmetic earnings management in United States and elsewhere, since almost half of their sample's observations are from U.S. Even though in this study U.S. doesn't account for as much of the sample similar comparison is provided.



Graph 4: Percentage unit deviations of second digit in net sales.

U.S. observations have larger surplus of zeros than rest of the sample which is in line with the study of Kinnunen & Koskela (2003), but in their study the surplus for U.S. observations was below 0.5 % and in the sample of this study it's over 1 %. In the study of Kinnunen & Koskela (2003) U.S. observations have larger deficit of nines than the rest of the sample whereas in the sample of this study U.S. observations actually have surplus of nines as rest of the sample has deficit. Compared to the rest of the sample in this study U.S. observations have deficit of ones and surplus of twos and fours as rest of the sample have surplus of ones and deficit of twos and fours. This finding is also in line with the results of Kinnunen & Koskela (2003). In the sample of this study U.S. observations have larger deficit of threes, sixes, and sevens than rest of the sample. In fives U.S. observations have deficit whereas rest

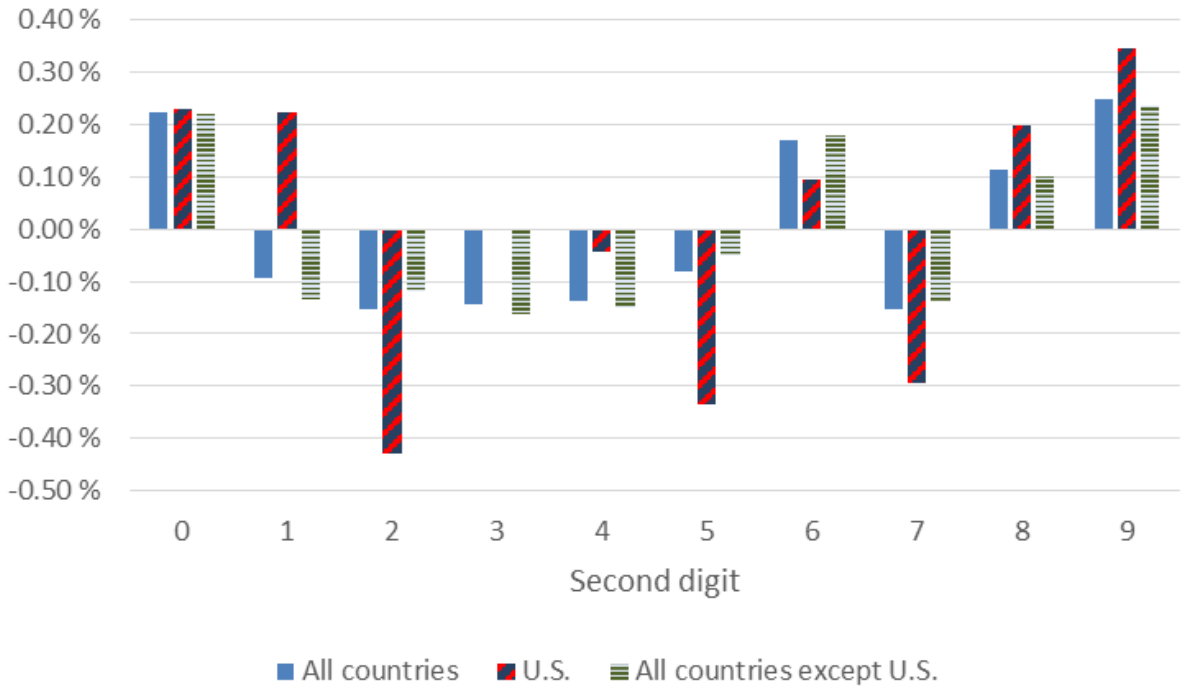
of the sample has small surplus and in eights U.S. observations have surplus whereas rest of the sample have deficit.



Graph 5: Percentage unit deviation of second digit in net profits.

In the graph 5 percentage unit deviation of second digit in net profits is presented for the whole sample, U.S. and all countries except U.S. Surplus of zeros is smaller in the U.S. observations, as it was also in the study of Kinnunen & Koskela (2003), there difference just wasn't as big as it's in this sample . Surprisingly there's also a small surplus of nines in the U.S. observations, which wasn't the case in the study of Kinnunen & Koskela (2003) where the deficit of nines was larger for the U.S. observations than for the rest of the sample. For the U.S. observations largest deficits occur in two and eight, 0.66 % and 0.39 %, respectively. In the study of Kinnunen & Koskela (2003) number two had second biggest deficit after nines in the U.S. observations but number eight had surplus. Largest surplus, after zero, for U.S.

observations occurs in six and seven, where the rest of the sample have deficits and in the study of Kinnunen & Koskela (2003) U.S. observations also had deficits.



Graph 6: Percentage unit deviation of second digit in net losses.

In the graph 6 percentage unit deviation of second digit in net losses is presented for the whole sample, U.S. and all countries except U.S. From here it's quite apparent that the third CEM metric, CEM3, isn't working as hypothesized. Cosmetic earnings management isn't reversed in this sample as it was in the sample of Kinnunen & Koskela (2003).

Country	CEM1	CEM2	CEM3	avg rank
Spain	0.037 (4)	0.050 (3)	0.077 (1)	2.7
Ukraine	0.050 (2)	0.056 (2)	0.062 (5)	3.0
Bosnia and Herzegovina	0.048 (3)	0.044 (4)	0.061 (6)	4.3
Egypt	0.024 (6)	0.035 (6)	0.064 (4)	5.3
Cayman Islands	0.024 (7)	0.035 (7)	0.046 (9)	7.7
Greece	0.017 (15)	0.034 (8)	0.067 (3)	8.7
Hong Kong	0.021 (11)	0.034 (9)	0.049 (7)	9.0
Poland	0.024 (5)	0.028 (10)	0.025 (18)	11.0
South Africa	0.020 (12)	0.021 (21)	0.075 (2)	11.7
Bulgaria	0.058 (1)	0.086 (1)	-0.007 (39)	13.7
China	0.017 (17)	0.021 (20)	0.046 (10)	15.7
Malaysia	0.019 (14)	0.027 (11)	0.021 (22)	15.7
Bermuda	0.014 (23)	0.024 (16)	0.039 (12)	17.0
Australia	0.015 (20)	0.024 (18)	0.026 (16)	18.0
Indonesia	0.019 (13)	0.024 (15)	0.014 (26)	18.0
Chile	0.021 (10)	0.039 (5)	-0.017 (40)	18.3
Taiwan	0.011 (26)	0.020 (24)	0.047 (8)	19.3
Thailand	0.023 (8)	0.024 (17)	0.007 (34)	19.7
France	0.023 (9)	0.019 (26)	0.016 (25)	20.0
Israel	0.008 (31)	0.024 (14)	0.023 (20)	21.7
Sri Lanka	0.011 (27)	0.018 (27)	0.040 (11)	21.7
Russian Federation	0.017 (16)	0.026 (12)	-0.005 (38)	22.0
Serbia	0.014 (22)	0.021 (22)	0.018 (23)	22.3
Sweden	0.016 (18)	0.021 (23)	0.012 (28)	23.0
Canada	0.012 (24)	0.026 (13)	0.008 (33)	23.3
India	0.014 (21)	0.020 (25)	0.010 (31)	25.7
Brazil	0.012 (25)	0.023 (19)	0.000 (36)	26.7
Turkey	0.016 (19)	0.012 (33)	0.012 (29)	27.0
Philippines	0.008 (33)	0.003 (38)	0.036 (14)	28.3
Romania	0.007 (34)	0.012 (31)	0.022 (21)	28.7
Islamic Republic of Iran	0.006 (35)	0.002 (40)	0.037 (13)	29.3
Singapore	0.003 (41)	0.012 (32)	0.027 (15)	29.3
Republic of Korea	0.008 (32)	0.010 (34)	0.017 (24)	30.0
Germany	0.009 (28)	0.016 (28)	0.001 (35)	30.3
Japan	0.004 (39)	0.010 (35)	0.024 (19)	31.0
Vietnam	0.006 (38)	0.002 (39)	0.025 (17)	31.3
Pakistan	0.006 (37)	0.016 (29)	0.010 (30)	32.0
United States of America	0.008 (29)	0.008 (36)	0.009 (32)	32.3
Republic of Moldova	-0.001 (42)	0.005 (37)	0.013 (27)	35.3
Italy	0.006 (36)	0.013 (30)	-0.054 (43)	36.3
Switzerland	0.008 (30)	0.000 (42)	-0.036 (42)	38.0
United Kingdom	0.004 (40)	0.002 (41)	-0.003 (37)	39.3
Norway	-0.017 (43)	-0.026 (43)	-0.029 (41)	42.3
Q1	0.008	0.012	0.008	
Median	0.014	0.021	0.021	
Q3	0.021	0.027	0.040	

Table 8: CEM metrics for each country.

In the parenthesis is presented each country's rank in given metric, rank 1 implying largest cosmetic earnings management in given metric.
'avg rank' indicates the average rank of the country in the three CEM metrics.
Sorted by the average rank.
Q1 indicates the 25th percentile
Q3 indicates the 75th percentile

Table 8 shows the different CEM metrics for each country, the rank of each country in given metric and also the average rank of a country in all the three CEM metrics. As a reminder CEM1 (equation 10) was calculated as a percentage unit deviation of observed frequency of zeros from the expected frequency under the Benford's law (positive values indicating surplus of zeros). The highest score in CEM1 is Bulgaria's 0.058 which means that net income figures of Bulgarian companies have a 5.8 percentage unit surplus of zeros compared to the Benford's law. Next in the CEM1 metric are Ukraine and Bosnia & Herzegovina with 5.0 and 4.8 percentage unit surplus, respectively. The lowest score for CEM1 metric is Norway's -0.017 which actually indicates that net income figures of Norwegian companies have a 1.7 percentage unit deficit of zeros, which in turn is against the hypothesis of this study regarding the deviation of expected and observed frequency of zeros. The next lowest scores are by Moldova and Singapore -0.1 and 0.3 percentage units, respectively.

As equation 11 showed CEM2 is calculated by adding the deviation of observed frequency of nines from the expected frequency to the CEM1 (deficit of nines being positive value). Assuming that companies round nines as second significant digit to zeros CEM2 should be larger than CEM1 and for 33 countries out of 43 it is. The highest score in CEM2 is also by Bulgaria 0.086 indicating a total of 8.6 percentage unit of zeros and nines from the expected frequency under the Benford's law. Next two countries in the CEM2 rankings are Ukraine and Spain with 5.6 and 5.0 percentage unit total deviations, respectively. The CEM2 scores for all of these countries are higher than their CEM1 scores, indicating that cosmetic earnings management occurs in these countries as expected. The lowest score in CEM2 is again by Norway, -0.026, indicating a total negative deviation of 2.6 percentage units. For some reason it seems that Norwegian companies have less than expected zeros but more than expected nines. It appears that Norwegian companies manipulate zeros as second significant digit down to nines for some reason which might be related to minimizing taxes or other aspect outside the scope of this study. The next two lowest scores in CEM2 belong to Switzerland and United Kingdom 0.000 and 0.002, respectively. Since the score of CEM2 for both of these countries are smaller than their CEM1 it appears that for some reason their observed frequency of nines is above the expected frequency.

CEM3 (equation 12) adds the assumed surplus of nines and deficit of zeros in negative income figures to the CEM2 metric. Table 7 showed us that it's not very suitable for the whole sample but for 22 out of 43 countries it works as hypothesized, indicating that the cosmetic earnings management is reversed in net losses (i.e. companies are rounding zeros as second significant digit down to nines). Now Spain ranks the highest with a score of 0.077 indicating 2.7 percentage unit increase to the CEM2 and 7.7 percentage unit total deviation when surplus of zeros and deficit of nines in positive income figures and deficit of zeros and surplus of nines is added together. Other top three countries in the CEM3 metric are South Africa and Greece with scores of 0.075 and 0.067, respectively. For all of these three countries CEM3 works as hypothesized. The lowest scores for CEM3 are by Italy, Switzerland and Norway, -0.054, -0.036 and -0.029, respectively. For all of these countries CEM3 is smaller than CEM2, indicating that metric isn't working for them as hypothesized.

From the table 8 H2 hypothesis can be confirmed since countries differ to quite great extent in the CEM metrics. In every metric at least one country has a negative value and largest values are over 0.05. Also the difference between first and third quartile is over 0.013 in all of the metrics.

5.2. Regression results

Regression results for CEM1 are presented in table 9. Results for each of the Governance Indicators without any control variables are in columns A-F. Column G is the result of model presented in equation 13 where all of the six Governance Indicators are as independent variables and GDP / capita and stocks traded (not available for Sweden, Taiwan, Bulgaria, Bosnia and Herzegovina, Pakistan) are control variables. Column H is the result of model presented in equation 14 where four (control of corruption, government effectiveness, regulatory quality and rule of law) of the Governance Indicators are averaged together, due to high correlation with each other, and two other Governance Indicators are on their own.

As a reminder to the reader the estimates for the Governance Indicators are transformed here so that the higher value of estimate means poorer governance.

Excluding constants three coefficients from all of the models have a significantly non-zero value with at least 10 % confidence level. In the column B estimate for government effectiveness have a significant value of 0.004, meaning that lower government effectiveness would lead to higher cosmetic earnings management. With one unit higher estimate of government effectiveness, magnitude which separates Poland and Iran, country's CEM1 would be 0.4 percentage point higher meaning similar change in the deviation of zeros from the Benford's law.

	CEM1							
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Constant	0.010 **	0.008	0.013 **	0.115 **	0.008 *	0.013 **	0.010	0.015 **
	(0.029)	(0.101)	(0.030)	(0.024)	(0.090)	(0.023)	(0.802)	(0.020)
CC	0.003						0.000	
	(0.137)						(0.996)	
GE		0.004 *					0.004	
		(0.061)					(0.681)	
PV			0.001				-0.002	-0.004
			(0.656)				(0.966)	(0.289)
RQ				0.002			-0.008	
				(0.363)			(0.291)	
RL					0.004 *		0.008	
					(0.093)		(0.512)	
VA						0.001	-0.001	-0.003
						(0.566)	(0.845)	(0.413)
AVG (CC;GE;RQ;RL)								0.009 **
								(0.045)
GDP / CAP							-0.001	
							(0.940)	
Stocks traded							0.000	
							(0.537)	
R^2	0.053	0.083	0.005	0.020	0.067	0.008	0.128	0.106

Table 9: Regression results for CEM1.

38 observations for model in G column, 43 for all others.
Number below coefficient is the p-value.
* (at least 10%), ** (at least 5%), *** (at least 1%).

Similar change in CEM1 occurs if rule of law estimate is increased one unit, magnitude which separates Israel and Egypt. When the regression model from equation 13 is executed with all the Governance Indicators and both of the control variables none of the coefficients have significantly non-zero value. With the regression model from equation 14 where the estimates for control of corruption, government effectiveness, regulatory quality and rule of law are averaged the coefficient for this averaged variables receives a value of 0.009 with significance level of at least 5 %. This implies that if the average of the above mentioned estimates increases by one unit the CEM1 score would be 0.9 percentage point higher meaning similar change in the deviation of zeros from the Benford's law. Across the different models R^2 is quite modest, even at its best it's just circa 12.8 % and mostly under half of this. Similarly to table 9 regression result for CEM2 are presented in the table 10:

	CEM2							
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Constant	0.016 ***	0.014 **	0.020 **	0.020 ***	0.015 **	0.020 ***	0.010	0.022 **
	(0.009)	(0.030)	(0.013)	(0.004)	(0.027)	(0.008)	(0.851)	(0.011)
CC	0.003						0.000	
	(0.280)						(0.998)	
GE		0.004					0.010	
		(0.182)					(0.459)	
PV			0.001				0.001	-0.004
			(0.847)				(0.776)	(0.423)
RQ				0.001			-0.021 *	
				(0.230)			(0.063)	
RL					0.003		0.010	
					(0.241)		(0.537)	
VA						0.001	0.002	-0.004
						(0.806)	(0.753)	(0.482)
AVG (CC;GE;RQ;RL)								0.009
								(0.136)
GDP / CAP							0.000	
							(0.966)	
Stocks traded							0.000	
							(0.802)	
R^2	0.029	0.043	0.001	0.001	0.033	0.002	0.156	0.058

Table 10: Regression results for CEM2.

38 observations for model in G column, 43 for all others.
Number below coefficient is the p-value.
* (at least 10%), ** (at least 5%), *** (at least 1%).

Coefficients from the regression models regarding CEM2 have quite similar magnitude as in the table 9 but only one of them is statistically significant at least 10 % level. That's the coefficient for the regulatory quality estimate in the "full" regression model with all the other Governance Indicators and control variables and it receives negative value of 0.021 with at least 10 % significance level. Negative value implies that poorer regulatory quality would lead to smaller earnings management, even though this sounds somewhat counterintuitive prior research has reasoned similar phenomena in investor protection (see Dechow et al. 2010 footnote 62). Once again the R^2 scores for the regression models are quite modest, even at its best it's just circa 15.6 % and mostly under third of this.

Regression results for CEM3 are presented in table 11:

	CEM3							
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Constant	0.010	0.008	0.007	0.007	0.008 **	0.001	-0.007	0.002
	(0.291)	(0.404)	(0.557)	(0.478)	(0.049)	(0.911)	(0.947)	(0.881)
CC	0.006						0.001	
	(0.153)						(0.968)	
GE		0.007					0.156	
		(0.138)					(0.536)	
PV			0.006				0.003	-0.001
			(0.212)				(0.763)	(0.924)
RQ				0.008			-0.002	
				(0.126)			(0.926)	
RL					0.007		-0.016	
					(0.152)		(0.630)	
VA						0.010 **	0.012	0.010
						(0.048)	(0.269)	(0.208)
AVG (CC;GE;RQ;RL)								0.000
								(0.992)
GDP / CAP							-0.001	
							(0.971)	
Stocks traded							0.000	
							(0.548)	
R^2	0.049	0.053	0.038	0.056	0.049	0.092	0.134	0.092

Table 11: Regression results for CEM3.

38 observations for model in G column, 43 for all others.
Number below coefficient is the p-value.
* (at least 10%), ** (at least 5%), *** (at least 1%).

Coefficients from the columns A – F are a bit higher than in the tables 9 and 10 but only the coefficient for voice and accountability estimate is statistically significant at least 5 % level, as it receives the value of 0.010. Implying that one unit higher estimate for voice and accountability, magnitude separating Thailand and Iran, would increase the CEM3 score by 1 percentage point. But as previously stated CEM3 metric isn't working as expected, at least for the whole sample and various countries, so too much emphasis shouldn't been laid into the results in the table 11. R^2 results are once again fairly modest, even though in most cases they are a bit higher than in the table 10.

Based on the regression results from the tables 9 – 11 it appears that the Governance Indicators doesn't explain the variation in cosmetic earnings management between countries. Intuitively one would assume that better governance would lead to smaller levels of cosmetic earnings management but one could argue that with very poor governance executives would no longer need to exercise earnings management because they are fully entrenched (see Dechow et al. 2010 footnote 62). So it might be that there are two opposing forces regarding the relationship between cosmetic earnings management and the Governance Indicators. In some countries poorer governance might increase cosmetic earnings management and in some it might reduce it, and that's why this study isn't able to find meaningful relationship between cosmetic earnings management and the Governance Indicators.

5.3. Correlation and rank regression results

As the main regression models of this study fail to produce as much meaningful results as desired, additional tests are provided. First of which is simple correlation matrix between all three CEM metrics and all of Governance Indicators:

	CC	GE	PV	RQ	RL	VA
CEM1	0.230	0.289	0.070	0.142	0.259	0.090
CEM2	0.169	0.208	0.030	0.035	0.183	0.039
CEM3	0.222	0.230	0.194	0.237	0.222	0.303

Table 12: Correlation matrix between CEM metrics and the Governance Indicators.

Table 12 reveals, as suspected based on the regression results that the CEM metrics and the Governance Indicators aren't highly correlated with each other. CEM1 receives highest correlation with the estimate for government effectiveness and even that is just 0.289. Lowest correlation CEM1 has with the estimate for political stability and absence of violence, only 0.07. CEM2 has across the board less correlation with the governance indicators than CEM1 but also has the highest correlation with the estimate for government effectiveness and lowest also with the estimate for political stability and absence of violence, 0.208 and 0.03 respectively. CEM3 has highest correlation with the estimate for voice and accountability and lowest with the estimate for political stability and absence of violence, 0.303 and 0.194 respectively.

Also rank regression models are tried to find is there a relationship between CEM metrics and the Governance Indicators. In this study a rank regression model is meant to mean a regression where a country's rank in CEM1 (and in CEM2) is the dependent variable in the model and the country's rank in the Governance Indicators are the independent variables. As the CEM3 metric seemed not be working in the sample of this study as expected (see graph 6) rank regression results for that metric aren't reported here. Control variables, GDP / capita and stock traded, are dropped in the rank regression results since they failed to have significant values in the regular regression models and thus doesn't appear to control for much in the sample of this study. CEM metrics are ranked as presented in the table 8, where the country with the highest score for example in CEM1 receives the rank of one, the second highest rank of two and so on. The estimates for the Governance Indicators are also ranked in similar manner where the country with highest score (indicating poorest governance based

on that indicator) for example in the estimate for rule of law receives the rank of one, the second highest rank of two and so on.

The results from the rank regressions aren't presented but overall the results from rank regressions doesn't provide much more to the original regression results. Rank regression regarding CEM2 metric confirms the negative relationship between it and the estimate for regulatory quality, when all of the Governance Indicators are present. On the other hand rank regressions also confirm the results from original regressions that CEM metrics and the Governance Indicators don't have very significant relationship across the board and the H3 hypothesis cannot be rejected.

6. Conclusion

This thesis was set out to research cosmetic earnings management in an international context and investigate does it have a relationship with the Governance Indicators. Countries appear to differ by the extent to which companies located in them exercise cosmetic earnings management. Although the sample of this study is only 43 countries and all of the continents aren't equally represented cosmetic earnings management can be quite well described as a worldwide phenomenon. Although this study fails to find conclusive evidence about the relationship between cosmetic earnings management and the Governance Indicators some evidence was found about negative linkage between the CEM2 metric and the estimate for regulatory quality.

The estimate for regulatory quality is supposed to "capture perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development." (The Worldwide Governance Indicators (WGI) project). The negative relationship found in this study between the CEM2 metric and the estimate for regulatory implies that as the country's governance improves regarding regulatory quality cosmetic earnings management in the companies increases as well. Although negative linkage between cosmetic earnings management and basically any of the Governance Indicators seems counter intuitive one could argue that as the government improves the environment in which private companies operate through policies and regulations consumers of financial statements also trust the figures more which in turn enables companies to exercise cosmetic earnings management. The exact mechanism by how the regulatory quality possible affects the cosmetic earnings management is beyond the scope of this study and is left for future research.

Another finding of this study is that the companies located in the United States appear to exercise more cosmetic earnings management in net sales figures than the companies in rest of the 42 sample countries. It might be that the U.S. companies face more pressure from the capital markets to constantly increase their sales and this leads the executives to use more

discretion in the top line of the income statement. Another explanation could be that the auditors and regulators in U.S. focus more on the other lines of the income statement and don't notice small rounding of numbers in the net sales line of the income statement. The reasons why U.S. companies appear to exercise more cosmetic earnings management in the top line of the income statement is left for future research.

One of the limitations of this study and its findings is regarding the method used to detect cosmetic earnings management. The explicit assumption of this study is that list of unmanaged earnings would obey the Benford's law, at least regarding the second significant digits, since the deviations from the Benford's law is interpreted as a cosmetic earnings management in this study. The Benford's law has previously been used in an accounting context as well as to investigate cosmetic earnings management so the explicit assumption that unmanaged earnings follow the Benford's law is quite reasonable for this study. Another assumption of this study is that companies are interested in manipulation earnings figures and not for example earnings before interest and taxes. It might be that in some contexts the consumers of financial statements are more interested about the operating figures of the company compared to the earnings figures and if companies acknowledge this they might want to manipulate those operating figures. This assumptions is especially important in this study since the expectation is that companies want to manipulate their earnings in a manner which increases the first significant digit by one. If companies were more interested manipulating for example earnings before interest and taxes figure it could go unnoticed in this study if interests and taxes are large enough to make the first digit of earnings smaller than that of earnings before interest and taxes. Even though individual companies might be interested to manipulate other than earnings figures this study has a sample size of almost 180.000 (net profit) observations and companies for the most part at least are interested in manipulating earnings figures or manipulate operational figures which also result the first digit of earnings to be one larger than that of unmanipulated earnings.

This study has investigated the relationship between cosmetic earnings management and the Governance Indicators and can act as a reference point for future research regarding other studies from similar context. One of the suggestions for future research is to investigate whether companies possibly manipulate also operational figures such as earnings before interest and taxes and does the governance of the country have an effect which line of the income statement companies manipulate. Another suggestion for future research is to investigate do cosmetic earnings management and other institutional factors then the Governance Indicators have a relationship.

7. References

Barth, Mary E., John A. Elliott, and Mark W. Finn. "Market rewards associated with patterns of increasing earnings." *Journal of Accounting Research* (1999): 387-413.

Barton, Jan, and Paul J. Simko. "The balance sheet as an earnings management constraint." *The accounting review* 77.s-1 (2002): 1-27.

Bartov, Eli, Dan Givoly, and Carla Hayn. "The rewards to meeting or beating earnings expectations." *Journal of Accounting and Economics* 33.2 (2002): 173-204.

Beneish, Messod D. "Detecting GAAP violation: Implications for assessing earnings management among firms with extreme financial performance." *Journal of accounting and public policy* 16.3 (1997): 271-309.

Beneish, Messod D. "Earnings management: A perspective." *Managerial Finance* 27.12 (2001): 3-17.

Bergstresser, Daniel, and Thomas Philippon. "CEO incentives and earnings management." *Journal of financial economics* 80.3 (2006): 511-529.

Bowen, Robert M., Larry DuCharme, and David Shores. "Stakeholders' implicit claims and accounting method choice." *Journal of accounting and economics* 20.3 (1995): 255-295.

Boynton, Charles E., Paul S. Dobbins, and George A. Plesko. "Earnings management and the corporate alternative minimum tax." *Journal of Accounting Research* (1992): 131-153.

Brenner, Gabrielle A., and Reuven Brenner. "Memory and markets, or why are you paying $2.99 for a widget?" *Journal of Business* (1982): 147-158.

Brown, Lawrence D., and Huong N. Higgins. "Managers' forecast guidance of analysts: International evidence." *Journal of Accounting and Public Policy* 24.4 (2005): 280-299.

Burgstahler, David, and Ilia Dichev. "Earnings management to avoid earnings decreases and losses." *Journal of accounting and economics* 24.1 (1997): 99-126.

Burgstahler, David C., Luzi Hail, and Christian Leuz. "The importance of reporting incentives: Earnings management in European private and public firms." *The accounting review* 81.5 (2006): 983-1016.

Carslaw, Charles APN. "Anomalies in income numbers: Evidence of goal oriented behavior." *Accounting Review* (1988): 321-327.

Cheng, Qiang, and Terry D. Warfield. "Equity incentives and earnings management." *The accounting review* 80.2 (2005): 441-476.

Dechow, Patricia M. "Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals." *Journal of accounting and economics* 18.1 (1994): 3-42.

Dechow, Patricia M., and Douglas J. Skinner. "Earnings management: Reconciling the views of accounting academics, practitioners, and regulators." *Accounting Horizons* 14.2 (2000): 235-250.

Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. "Detecting earnings management." *Accounting review* (1995): 193-225.

Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. "Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the sec*." *Contemporary accounting research* 13.1 (1996): 1-36.

Dechow, Patricia, Weili Ge, and Catherine Schrand. "Understanding earnings quality: A review of the proxies, their determinants and their consequences." *Journal of Accounting and Economics* 50.2 (2010): 344-401.

DeFond, Mark L., and James Jiambalvo. "Debt covenant violation and manipulation of accruals." *Journal of accounting and economics* 17.1 (1994): 145-176.

Degeorge, Francois, Jayendu Patel, and Richard Zeckhauser. "Earnings management to exceed thresholds*." *The Journal of Business* 72.1 (1999): 1-33.

Gaver, Jennifer J., Kenneth M. Gaver, and Jeffrey R. Austin. "Additional evidence on bonus plans and income management." *Journal of accounting and Economics* 19.1 (1995): 3-28.

Gebhardt, William R., Charles MC Lee, and Bhaskaran Swaminathan. "Toward an implied cost of capital." *Journal of accounting research* 39.1 (2001): 135-176.

Graham, John R., Campbell R. Harvey, and Shiva Rajgopal. "The economic implications of corporate financial reporting." *Journal of accounting and economics* 40.1 (2005): 3-73.

Guenther, David A. "Earnings management in response to corporate tax rate changes: Evidence from the 1986 Tax Reform Act." *Accounting Review* (1994): 230-243.

Guidry, Flora, Andrew J. Leone, and Steve Rock. "Earnings-based bonus plans and earnings management by business-unit managers." *Journal of Accounting and Economics* 26.1 (1999): 113-142.

Gunny, Katherine A. "The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks*." *Contemporary Accounting Research* 27.3 (2010): 855-888.

Healy, Paul M. "The effect of bonus schemes on accounting decisions." *Journal of accounting and economics* 7.1 (1985): 85-107.

Healy, Paul M., and James M. Wahlen. "A review of the earnings management literature and its implications for standard setting." *Accounting horizons* 13.4 (1999): 365-383.

Hill, Theodore P. "The significant-digit phenomenon." *The American Mathematical Monthly* 102.4 (1995): 322-327.

Holthausen, Robert W., David F. Larcker, and Richard G. Sloan. "Annual bonus schemes and the manipulation of earnings." *Journal of accounting and economics* 19.1 (1995): 29-74.

Hribar, Paul, and Daniel W. Collins. "Errors in estimating accruals: Implications for empirical research." *Journal of Accounting research* (2002): 105-134.

Jensen, Michael C., and William H. Meckling. "Theory of the firm: Managerial behavior, agency costs and ownership structure." *Journal of financial economics* 3.4 (1976): 305-360.

Jones, Jennifer J. "Earnings management during import relief investigations." *Journal of accounting research* (1991): 193-228.

Key, Kimberly Galligan. "Political cost incentives for earnings management in the cable television industry." *Journal of accounting and economics* 23.3 (1997): 309-337.

Kinnunen, Juha, and Markku Koskela. "Who is miss world in cosmetic earnings management? A cross-national comparison of small upward rounding of net income numbers among eighteen countries." *Journal of International Accounting Research* 2.1 (2003): 39-68.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. ”Law and finance.” *Journal of Political Economy* 106 (1998): 1113-1155.

Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki. "Earnings management and investor protection: an international comparison." *Journal of financial economics* 69.3 (2003): 505-527.

Lin, Kenny Z. "The impact of tax holidays on earnings management: An empirical study of corporate reporting behavior in a developing-economy framework." *The International Journal of Accounting* 41.2 (2006): 163-175.

Lin, Shu, Suresh Radhakrishnan, and Lixin Nancy Su. "Earnings management and guidance for meeting or beating analysts' earnings forecasts." *Available at SSRN 928182* (2006).

McNichols, Maureen F. "Research design issues in earnings management studies." *Journal of accounting and public policy* 19.4 (2000): 313-345.

Nigrini, Mark J. "A taxpayer compliance application of Benford's law." *The Journal of the American Taxation Association* 18.1 (1996): 72.

Nigrini, Mark J., and Linda J. Mittermaier. "The use of Benford's law as an aid in analytical procedures." *Auditing* 16.2 (1997): 52.

Raman, Kartik, and Husayn Shahrur. "Relationship-specific investments and earnings management: Evidence on corporate suppliers and customers." *The Accounting Review* 83.4 (2008): 1041-1081.

Roychowdhury, Sugata. "Earnings management through real activities manipulation." *Journal of accounting and economics* 42.3 (2006): 335-370.

Sandron, Frédéric, and Sarah R. Hayford. "Do populations conform to the law of anomalous numbers?" *Population (english edition)* (2002): 755-761.

Schipper, Katherine. "Commentary on earnings management." *Accounting horizons* 3.4 (1989): 91-102.

Shen, Chung-Hua, and Hsiang-Lin Chih. "Investor protection, prospect theory, and earnings management: An international comparison of the banking industry." *Journal of Banking & Finance* 29.10 (2005): 2675-2697.

Subramanyam, K. R. "The pricing of discretionary accruals." *Journal of accounting and economics* 22.1 (1996): 249-281.

Thomas, Jacob K. "Unusual patterns in reported earnings." *Accounting Review* (1989): 773-787.

Watts, Ross L., and Jerold L. Zimmerman. "Positive accounting theory: a ten year perspective." *Accounting review* (1990): 131-156.

Xu, Randall Zhaohui, Gary K. Taylor, and Michael T. Dugan. "Review of real earnings management literature." *Journal of Accounting Literature* 26 (2007): 195.

Young, Steven. "Systematic measurement error in the estimation of discretionary accruals: an evaluation of alternative modelling procedures." *Journal of Business Finance & Accounting* 26.7-8 (1999): 833-862.

Zang, Amy Y. "Evidence on the trade-off between real activities manipulation and accrual-based earnings management." *The Accounting Review* 87.2 (2012): 675-703.