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Master Thesis

The Application of EBITDA for Performance Measurement, and Factors Influencing it

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Executive Summary

This thesis is based on firm observations from Oslo Børs in the period from 2011 to 2015, and studies the use of EBITDA in the firms' annual reports and if there are any factors influencing this use.

We apply the modified Jones model to estimate earnings management through accruals, and use this to generate a variable for earnings management which we insert into a multiple linear regression model for measuring the use of EBITDA. However, we found inconclusive results about earnings management and the use of EBITDA.

Further, we examine other factors that we expected to have an influence on EBITDA. We found evidence that firm size and decreasing cash flow were significantly different from zero at the 1% level (99% confidence interval) and 10% level (90% confidence interval) respectively, suggesting that these variables do affect the use of EBITDA in the annual reports. The remaining factors did not provide any evidence towards the use of EBITDA in the annual reports (financial reporting). However, we assess the tendencies in conjunction with our hypotheses regarding prior expectations. Furthermore, we see that the different sectors explain approximately 10% of the total variation in the regression model.

We experience that the use of EBITDA or other pro forma earnings measures vary between firms but also for a firm from year to year. Further, it is unclear what EBITDA contains, making it difficult to interpret and compare with other firms' EBITDA.

Foreword

This thesis is our final assignment in our master's degree in Business Law, Tax and Accounting, at Handelshøyskolen BI.

The thesis has demanded much time and effort, and at times it has been challenging. However, it has been interesting and educational as well. Specially to see the connection between theory and practice. The process has let us use the theory learned from our years at BI to connect our research question with relevant theory and standards. We have applied knowledge from accounting, business law, statistics and finance as well.

We are grateful to Pål Berthling-Hansen for being our supervisor, and for his contributions during the semester.

We would also like to express our sincere thanks and appreciation to Jeff Downing for his availability and solid contributions, as well as help with the statistical and theoretical aspects of the thesis.

Oslo, 15/8-2017

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Frode Helleren   Christian Flacké Stige

Table of Contents

List of Figures and Tables

1. Introduction

In our thesis, we would like to investigate the use of "Earnings Before Interest, Taxes, Depreciation and Amortization", from now on referred to as EBITDA, as a financial performance indicator for operating performance in companies' financial reports, and in conjunction with "Earnings Management".

The reason for our interest on the matter is that EBITDA is influenced by management decisions and because of this it might not be reflecting the underlying economic reality sufficiently. After all, accounting data is meant to serve as a source of valuable decision-making information (Stenheim and Blakstad, 2012). The use of EBITDA as a performance measure is widely criticized and questioned because of its ambiguous nature and irregular approach. Furthermore, there is little or no research linking EBITDA to earnings management or other factors, which our thesis will aim to provide.

During the 1980's there was a trend showing EBITDA as revenue. Companies started taking on large amounts of debt to complete large acquisitions, which led to lower results because of large interest payments. Instead they used EBITDA to show how good the business was going, because EBITDA is as stated above; earnings before interest, tax, amortization and depreciation. The large acquisitions resulted in increased amortization due to goodwill. However, using EBITDA as performance measure neglected that impact on the firm's earnings.

WorldCom, one of the world's largest telecom companies during the 1990s, took advantage of the properties of EBITDA by inappropriately capitalizing normal business operating expenses in order to inflate depreciation. This transformation inflated their earnings massively, but later the firm was convicted of fraud (Gross, 2002).

Corresponding to the WorldCom case, Harvard Business Review posted an article in 2009 named "How EBITDA Can Mislead" (www.hbr.org). This article states just how easy EBITDA can be managed to post better results than what the underlying economic reality is. For example, a simple change in the depreciation plan from five to eight years might lead to large differences in a firm's earnings.

This change in depreciation means a firm can turn negative earnings into positive earnings overnight (Knight, 2009).

Warren Buffett, one of the most influential persons in finance, is skeptic to the use of EBITDA in financial reports (Beshore, 2014). Warren Buffett said: "People who use EBITDA are either trying to con you or they're conning themselves", cited by Brent Beshore. Buffets vice chairman in Berkshire Hathaway, Charlie Munger, also share this negative view towards the use of EBITDA. He is wary of what is hiding behind the EBITDA. He emphasizes the importance of breaking down the numbers to see what EBITDA is really showing.

Recently there was a good example in media when Yara International revealed its fourth quarter results for 2016. The firm focused on how its EBITDA will improve in the coming years, while the news media, E24 (2017) stated that Yara reported disappointing results.

1.1 Presentation of the Research Question

Prior to our research, we expect that companies that are financially struggling, e.g. sustaining loss or decreases in revenue, will focus more on referring to EBITDA both in terms of forecasting and review of past performance in the annual reports, e.g. in the letter to shareholders and outlook. We think this might be a way of turning the attention away from an economic loss or bad/disappointing results.

Further, we expect that companies that are performing poorly also are more inclined to engage in earnings management through managing the firm's accruals. We will therefore investigate whether there is a link between the use of EBITDA in annual reports and earnings management. Additionally, we identify a set of chosen factors, of which we assume might have an impact on how much a firm is focusing on EBITDA as a performance indicator in terms of how many times the firms refer to it in the annual reports. Our research question is as follows:

Are firms that are engaging in earnings management more inclined to refer to EBITDA as a performance indicator in its financial reporting? Further, what other factors are influencing the use of EBITDA?

1.2 Overview of EBITDA References in Annual Reports

In this section, we provide an overview of the number of times EBITDA is referred to in the annual reports of each firm, as well as the average amount each sector refers to EBITDA in their annual reports.

Table 1 shows the total amount of times EBITDA is referred to in the annual reports, sorted by sectors from Oslo Børs. We have not accounted for the amount of times EBITDA is referred to in the notes, as this is subject to be audited. Note that there are firms that are both delisted and listed during the period from 2011 to 2015. However, it seems to be a balance of firms entering and exiting, so that any unbalance is mitigated.

Table 1: Total amount of EBITDA references from 2011-2015

	Times EBITDA is referred to in the annual reports by each sector				
	2011	**2012**	**2013**	**2014**	**2015**
Energy	176	227	235	265	253
Materials	87	110	76	84	102
Industrial	137	155	201	299	284
IT Telecom	144	159	167	181	198
Consumer Staples	88	65	53	42	67
Consumer Discretionary	161	148	101	130	131
Real Estate	22	22	19	2	4
Healthcare	15	33	10	17	28
Total	**830**	**919**	**862**	**1020**	**1067**

Table 2 shows the average number of times EBITDA is referred to in the annual reports across all firms in each sector, and gives an overview of how frequent each sector refers to EBITDA. The consumer discretionary sector has the highest average due to one outlier in the data set, Schibsted, which referred to EBITDA in the range between 52 and 93 times during the five years. The reason for Schibsted's high amount of EBITDA references is that the firm uses EBITDA as a metric in every different country-segment. The real estate sector has few EBITDA references, but is also a small sector with fewest observations (only 3 firms). The total average over the five years is quite stable.

Table 2: Average frequency of EBITDA references from 2011 to 2015

	Average EBITDA references				
	2011	**2012**	**2013**	**2014**	**2015**
Energy	2.89	3.72	3.85	4.27	4.08
Materials	17.4	13.75	9.5	10.5	12.75
Industrial	4.89	5.54	6.7	9.06	9.16
IT Telecom	6.86	7.23	6.42	7.24	8.25
Consumer Staples	4.89	3.82	3.79	3.5	5.58
Consumer Discretionary	20.13	24.67	16.83	21.67	16.38
Real Estate	3.14	3.14	3.17	0.4	0.8
Healthcare	1.36	3	1.11	1.89	3.11
Total	**7.7**	**8.11**	**6.42**	**7.32**	**7.51**

Both tables give an indication of how different sectors are referring to EBITDA, and the change between and within each sector.

1.3 Approach

The first chapter of our thesis is about presenting the topic of our research, our interest in it and set the outline for our thesis. In this part of the thesis we also present our main research question.

In the second chapter, we look at relevant theories for earnings management and pro forma earnings measurement. The theoretical background will be discussed by assessing academically recognized research papers and the implications the results might have for our thesis. This part of the thesis will connect our research question to relevant theory so that our research has a theoretical foundation.

Further, in chapter three we specify the hypotheses we are testing in our research. The hypothesis specifications are supported by relevant theory and designed purposefully with respect to the assumptions made.

Chapter four comprises the empirical methods that are applied in our research. In this section information about the data and modifications made are discussed. Furthermore, we discuss choice of research design and how the models are fitted, including a descriptive overview of our sample.

In chapter five we present the results from the statistical tests, followed by an assessment of how the results should be interpreted, and the implications the results might have for further research. Finally, we conclude our findings with respect to the hypotheses we have tested.

2. Theory

2.1 Earnings Management Defined

Before we connect EBITDA to earnings management we would like to define earnings management. We have used Healy and Wahlen's (1999) definition from their article "A Review of Earnings Management Literature and Its Implications for Standard Setting", which defines earning management as:

> "Earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting numbers (Healy and Wahlen, 1999, p.368)."

The definition does not identify a clear boundary to what is legal and what's not, and therefore there are large gray areas. These grey areas might occur when managers choose to maximize their own gain, e.g. incentive to focus on a financial ratio to reach a goal and/or receive a bonus. Since the definition is broad and vague, the definition also captures the flexibility in accounting choices that are allowed. For example, IFRS 13 states how fair value should be measured and what techniques to be used, but not when to measure fair value (www.iasplus.com).

Leases are another example that show flexibility within IFRS. Leasing can either be operational or financial. The firm can therefore choose either to capitalize the asset or recognize it as an expense. From 2019, IFRS 16 will be applicable worldwide, and it will not be possible to distinguish between operational and financial leasing (IFRS, 2017). However, this does not affect our objective since we are analyzing data from 2010 to 2015.

2.2 Introduction to Earnings Management

When assessing earnings management, it is common to separate between real earnings management and accounting based earnings management. Real earnings management occurs when the management chooses to change the firm's policy e.g. investment policy, stop paying dividend, or choose not to do any R&D investment to improve its results (Scott, 2012). Schipper (1989) also describe the same thoughts on how to differentiate between the two types. She states the difficulty to distinguish between decisions the management makes whether it is to maximize the share values or purely to manage the earnings. Doing real earnings management can be hurtful for the firm in the long term, but there might also be reasons for the management to choose this direction. In our thesis, we are focusing on accounting based earnings management. There are primarily two different paths we are focusing on: the use of discretion to influence the results and the choice of accounting principles (Ronen and Yaari, 2008). The firm can use discretion of influence with depreciation-models. The accounting principles can be whether the firm choose to capitalize or recognize the asset as an expense. This can occur for leases as described above.

Earnings manipulation is a term often associated with decisions that are illegal, i.e. earnings mismanagement. Illegal manipulation is an act that is done, on purpose, in such a way that the manipulator gets his/her way often via a scheme. Earnings manipulation, which are proven actions to produce better earnings, e.g. by avoiding taxes or falsely report earnings that do not exist. In our thesis, we are not focusing on the legal aspect of earnings management. Hence, we will not discuss the legal aspect any further.

2.3 Pro Forma Earnings

EBITDA is commonly used by investors to analyze the operating financial performance of a firm but also, by some, used as an indicator of a firm's cash flow. This is because EBITDA does not include non-operating effects such as interest expenses, tax expenses, and large non-cash items like amortizations and depreciations. However, using EBITDA for analysis purposes might be deceptive since firms with high leverage and high level of investments might have large interest payments and high depreciations and amortizations, thus net income will

be considerably lower. Although, this is not always the case. For example, real estate firms might have large investments but real estate is depreciated at a considerably lower rate than machines and equipment are, due to longer life cycle. This indicates that EBITDA does not have much informational value, since the underlying items vary from firm to firm. Some of the skepticism related to EBITDA is that it isn't regulated by Generally Accepted Accounting Principles (GAAP) nor International Financial Reporting Standards (IFRS) which makes it possible for managers to influence this measure.

With the flexibility that lies within an annual report, firms can choose many different ratios and figures to highlight their earnings. This different ratios or figures are often called "pro forma earnings". Pro forma earnings are not regulated by IFRS, and companies can therefore choose what to include in such numbers. EBITDA is a pro forma earnings metric and this might be one reason not all companies report this. Doyle, Lundholm and Soliman (2003) found evidence in their studies in 2003 that companies which report pro forma earnings exclude non-recurring expenses and other non-cash expenses to show solid earnings.

Pro forma earnings cannot be compared across firms or in some cases it is not even comparable within the same firm over time or across different operating segments (Grant and Parker, 2001). Grant and Parker (2001) states that EBITDA and other pro forma earnings metrics are more applicable for future earnings estimates. Difficult financial positions are one reason companies choose to report EBITDA. Also, companies with high capital investments which require depreciation expenses and write-downs. Grant and Parker also highlight why pro forma earnings, such as EBITDA, are problematic for the investors and in the market. The first is no standardization of the calculations. This implies firms might include cash from one time charges or write-downs, and other times choose not to include the accounting posts. The second reason EBITDA is problematic is that no additional information is provided (Grant and Parker, 2001). This leads firms to define EBITDA in a way that suits their opinion and helps them to reach certain goals. This range in definitions and pro forma assumptions used by firms is evident from the materials we have come across during our research; where some firms report EBITDA, while others use EBITA or EBITDAX. EBITDAX is earnings before interest, depreciation, amortization and exploration expenses.

Lougee and Marquardt found evidence in their studies that companies with low earnings (based on GAAP) are more likely to use and disclose pro forma earnings compared to other firms (Lougee and Marquardt, 2004).

The paper written by Bhattacharya, Black, Christensen and Larson in 2003 is particularly interesting because they found that 80% of companies reporting pro forma earnings "meet" or "exceed" analysts' forecasts, but just 39% of the firms "meet" or "beat" forecasts based on GAAP operating income (Bhattacharya et al., 2003).

2.4 Income Smoothing

Income smoothing is defined by Ronen and Yaari (2008, p. 317) as "the dampening of fluctuations in the series of reported earnings" and distinguish between real and artificial smoothing. Real smoothing is managed through production and investment decisions so that the volatility of earnings is reduced. Artificial smoothing, which is what we are interested in, is managed through accounting decisions. J. J. Gaver, K. M. Gaver, and J. R. Austin (1995) and Burgstahler and Dichev (1997) found evidence of earnings management consistent with income smoothing.

In the research paper "Earnings management to avoid earnings decreases and losses" by Burgstahler and Dichev (1997), studied whether companies managed reported earnings to avoid decreases and losses. The motivation for this study was the emphasis many CEOs had on consistent increases in earnings, or at least not having earnings decreases, which led to the suspicion that company directors manage the reported earnings to avoid earnings decreases.

Burgstahler and Dichev (1997) refers to a paper written by Carla Hayn (1995) where she found a point of discontinuity in earnings, meaning that she found a concentration of cases where earnings were just above zero but few cases where small losses were sustained, which suggested that companies that were in danger of zero earnings engaged in earnings management to avoid losses and decreases in earnings.

Burgstahler and Dichev (1997) found evidence that cash flow from operations and changes in working capital were used to manipulate earnings. Additionally, they found a strong negative correlation (-0.41) between cash flow from operations and changes in working capital, implicating that observations with the highest cash flow from operations are the observations with the lowest changes in working capital. Burgstahler and Dichev (1997) refer to a possible explanation that in cases where firms increase cash sales, which affects cash flow from operations, in turn will decreases non-cash working capital because of a reduction in inventory.

2.5 Motivation and Incentives

When researching earnings management, it is important to consider what the motivational factors are contributing to companies engaging in earnings management. Based on earlier research, Healy and Wahlen (1999) distinguish between motivations from the capital market, government regulation and contracting motivations.

2.5.1 Capital Market Motivations

Accounting information is used by investors and analysts to estimate the intrinsic value of a firm. In turn, this can create incentives for managers to strengthen the result with the use of earnings management to allure investors to invest.

When investigating earnings management, it is important to acknowledge that information asymmetry between management executives and users of the financial reports exist. Information asymmetry exist when the insiders of a firm, that is in most cases management executives, know more than the outsiders, that is shareholders and other stakeholders of the respective firm. This information asymmetry leads to inside information that is not available for the public. One of the reasons for this is that managers can execute discretionary judgment in financial reporting.

Healy and Wahlen (1999) states that if financial reports are to show relevant and appropriate information for specific companies, accounting standards must allow managers to execute judgment in financial reporting. This enables managers to

choose appropriate methods, estimates, and disclosures that are representative in showing their firm's underlying economic reality, which could increase the informational value for stakeholders. However, management decisions in financial reporting opens for earnings management, since managers might choose estimates and reporting methods that shows the firm's underlying economic reality inaccurately. This is a type of information asymmetry which can result in the adverse selection problem (Scott, 1999), where managers are selecting what information to disclose and to whom the information is disclosed to. This is where financial reporting plays an important role. Scott (1999) distinguish between "Efficient Market Price of Firm" and "Fundamental Value of Firm".
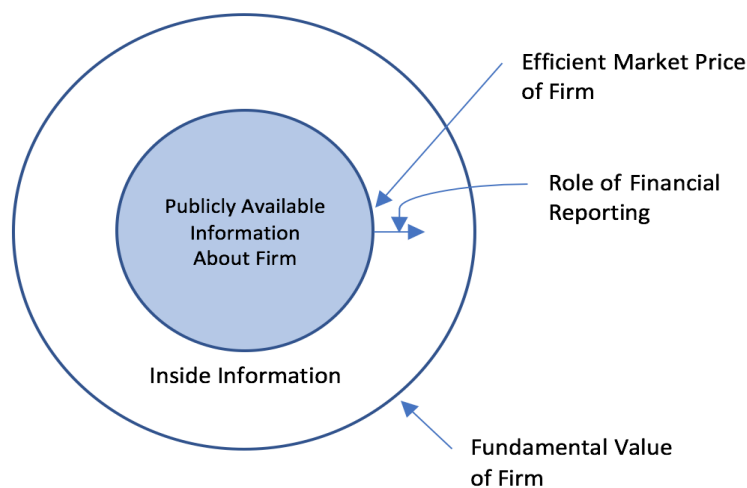
Figure 1: Inside information and the role of financial reporting (Scott, 2012)

The efficient market price is supposed to reflect the information that is known to the public, whereas the fundamental value of the share is defined as "the value it would have in an efficient market if there is no inside information" (Scott, 2012, p. 126). What separates efficient market price from fundamental value of a firm is inside information, which is shown in figure 1. Financial reporting plays the role of making the inside information public.

In our thesis, we are only investigating firms listed on Oslo Børs (OSE), and since public firms have stronger incentives to provide valuable information to shareholders and other stakeholders to attract investors, it is reasonable to believe that the gap between efficient market price and fundamental value is less than in the case of private companies.

2.5.2 Government Regulations

Government regulations are often divided into two different types: industry-specific regulations and antitrust regulations (Healy and Wahlen, 1999). Industry-specific regulations mainly concern the banking, insurance, and the utility industries. Banks that are close to minimum capital requirements tend to understate write-offs, overstate loan provisions, and recognize abnormal realized gains on securities portfolios (Moyer 1990 cited in Healy and Wahlen, 1999). Collins, Shackelford and Wahlen (1995) found evidence that approximately half of their sample consisting of banks, used several options to manage regulatory capital. This is also supported by Adiel (1996), where he found frequent use of earnings management for insurance companies. In both cases the government regulations give incentives towards earnings management.

Firms also have incentives to manage earnings to avoid antitrust investigations. Political consequences give firms incentives to manage earnings such that the firm looks less profitable (Watts and Zimmerman, 1978). Earnings management also occurs when firms are seeking subsidiaries or when firms need protection. Healy and Wahlen (1999) refers to research by Cahan (1992), Key (1997) and Jones (1991) to show that companies being investigated by antitrust institutions report a decrease in revenue and abnormal accruals or defer income that year.

2.5.3 Contracting Motivations

Every firm has many different contractual relationships with different stakeholders, making the firm behavior affected by the terms and covenants of those contracts. In conjunction with earnings management, manager compensation contracts and lending contracts with creditors are often discussed.

2.5.3.1 Compensation Contracts

To explain the problem of compensation contracts, the principal-agent approach is appropriate. The principal agent problem arises when a principal (e.g. CEO of a firm) hires a person to act on the firm's behalf. This could be a accountants, auditors, or other persons who have an incentive that do not align with that of the firm or CEO. The person therefore take actions that maximize his own gain, often

by managing earnings in order to get as much profit as possible himself. Earnings management might occur because the agent gets a cut of the profit or a bonus when a goal is reached. Therefore, it is always a possibility for an agent to not act according to what is in the best interest of the firm but rather focus on what is in the best interest for him- or herself. Adam Smith also highlighted the principal agent problem in 1776, where he explained that problems can occur when managers or other persons in a firm manage money that is not their own (Jensen and Meckling, 1976).

Richard A. Lambert (1984) found evidence in his research paper "Income Smoothing as Rational Equilibrium Behavior" that, in correspondence with the principal-agent theory, the optimal compensations scheme is where the principal causes the manager to smooth the firm's income (Lambert, 1984). This is coherent with the theory around the chapter 2.4 about income smoothing. Narayanan (1996) discovered that the agents often underinvest in long term projects due to short term incentive plans (Narayanan, 1996). This could lead to agents choosing to manage earnings, thereby boosting the EBITDA if this is the performance metric they are measured by and compensated in accordance to the in the short term.

In the article "CEO incentives and earnings management" written by Bergstresser and Philippon (2006), they found that CEOs have incentives towards earnings management when they have interest in the firm's share price. The more incentives the managers have towards bonuses and compensation plans, the more they are willing to adjust methods and numbers to reach those incentives. Bergstresser and Philippon also states that in periods with high accruals the CEOs will sell and offload stocks to maximize their payoff. Also, if CEO's compensation is based on firm value, accruals is used more frequently compared to no/low incentives.

2.5.3.2 Lending Contracts and Debt Covenants

Lending contracts are often restricted by covenants, such as restrictions on interest coverage or other ratios that are supposed to secure the creditors receiving repayment for lending money to a firm. Sweeney (1994) found evidence for earnings management for firms that had violated their covenants. However, since the sample consisted of firms that already had violated their covenants, this indicates that the sample firms did not specifically engage in earnings management to avoid violating the covenant. An alternative explanation is that the changes were made so that the covenant would not be violated in the future (Healy and Wahlen, 1999).

Defond and Jiambalvo (1994) also studied a sample of firms that had violated their covenants. However, they found that the sampled firms accelerated earnings one year ahead of the covenant violation, with the following interpretation that the firms engaged in earnings management when close to their lending covenants.

Healy and Wahlen (1999) refers to Healy and Palepu (1990) and E. DeAngelo, H. DeAngelo and D. Skinner (1994) who studied whether firms close to dividend constraint changed accounting methods, estimates, or accruals to avoid holding back dividends or having to engage in costly restructuring decisions. However, they found little evidence of earnings management, and that financially struggling firms managed cash flows by reducing dividend payments instead.

2.6 Positive Accounting Theory

Positive accounting theory concerns actions and choices of accounting policies performed by a firm, or how managers will act when new accounting standards are being interpreted (Scott, 2012). The positive component in positive accounting theory means an attempt to make good decisions. Positive accounting theory emphasizes that managers are given some flexibility to choose from a set of accounting policies. Hence, this creates flexibility to new or unanticipated circumstances.

Watts and Zimmerman (1986) formulated three hypotheses about positive accounting theory. They underline that managers act opportunistically, i.e. by choosing the accounting policies that maximize their own interest, rather than the firm's interest. The three hypotheses are:

- The bonus plan hypothesis
- The debt covenant hypothesis
- The political cost hypothesis

These hypotheses concern that firm want to account for as much earnings as possible in a given period. Despite this aspect of positive accounting theory, there are also reasons for managers and firms not to boost their earnings in a given period. Firms can therefore manage their earnings through accruals, which makes it more difficult to detect that the earnings have been managed.

2.7 Models for Measuring Earnings Management

In our thesis, we have chosen to measure earnings management by discretionary accruals and we will therefore elaborate more on the most used models for this.

2.7.1 Healy (1985)

Healy (1985) found a quite easy model for measuring earnings management in his article "The Effect of Bonus Schemes on Accounting Decisions". He made a model that has discretionary accruals equal total accruals divided by total assets in year t-1. Healy assumed that the non-discretionary accruals that followed the regression were noise because the average lead to zero. This lead to the predicted

residuals also equaling zero (Chen, 2010). The model is therefore quite simple. The models imply that if total accruals equal zero then there is no earnings management present, and opposite if total accruals are not equal to zero.

The problem with this model is when measuring earnings management in short periods and the sum of total non-discretionary accruals is not zero, then the model does not hold. The formula for discretionary accruals ("DA") is as follows:

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t}} \quad (1)$$

where "TA" is Total Accruals and "A" is assets.

2.7.2 DeAngelo Model (1986)

DeAngelo (1986) did not assume that non-discretionary accruals were noise as Healy did, but rather an arbitrary adaption (Chen, 2010). The model found that for a random firm the non-discretionary accruals in period *t* is equal to the non-discretionary accruals in period *t-1*. This implies that the difference between non-discretionary accruals between two periods is the discretionary accruals which is the EM for a firm.

$$DA_{i,t} = \frac{TA_{i,t} - TA_{i,t-1}}{A_{i,t}} \quad (2)$$

where "DA" is Discretionary accruals, "TA" is total accruals and "A" is assets.

This model is mostly used when a comparable study of efficiency of different models of discretionary accruals is researched (Ronen and Yaari, 2008). The model in its original form has a poor ability to detect earnings management (Bartov, Gul, and Tsui, 2001).

2.7.3 Jones Model (1991)

The third model for measuring earnings management with the use of accruals is the Jones Model (Jones, 1991). The Jones model is one of the most used model for measuring earnings management from discretionary accrual. The Jones Model predict discretionary accruals based on the independent variables such as change in revenue and fixed assets. All variables are scaled by total assets in previous year (Chen, 2010).

The Jones model assumes that companies do not engage in earnings management before the analysis in year zero (Ronen and Yaari, 2008). The Jones model requires at least two periods to perform the calculations, therefore the model requires panel data. The model is also prone to small sample sizes as this would weaken the explanatory power of the tests since this generates big standard errors. Also, this could lead to mistakenly accepting the null hypothesis that earnings management is not present (type 2 error). Formula for total accruals (TA):

$$\frac{TA_{i,p}}{A_{i,p-1}} = \alpha_1\left(\frac{1}{A_{i,p-1}}\right) + \beta_1\left(\frac{\Delta \, REV_{i,p}}{A_{i,p-1}}\right) + \beta_2\left(\frac{PPE_{i,p-1}}{A_{i,p-1}}\right) + \varepsilon_{i,p} \tag{3}$$

where "A" is assets, "REV" is revenue, and "PPE" is property, plant and equipment. Formula for discretionary accruals (DA) is:

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \left[a_{1,i}\left(\frac{1}{A_{i,t-1}}\right) + b_{1,i}\left(\frac{\Delta REV_{i,t}}{A_{i,t-1}}\right) + b_{2,i}\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) \right] \tag{4}$$

where a, b1, and b2 are OLS-estimates from equation (3). In Jones' research paper "Earnings Management During Import Relief Investigations" she found a model that on average explained 23.2 % of the variance (Jones, 1991). If discretionary accruals have a negative sign, this implies that the firm is using discretionary accruals to force down reported net income, and vice versa if the sign is positive.

2.7.4 Modified Jones Model (1995)

The next model that measures discretionary accruals is the Modified Jones model which were presented by Dechow, Sloan and Sweeney inn 1995 (Dechow, Sloan and Sweeney, 1995). The modified Jones model is a continuation of the Jones model with handling of accounts receivable (Ronen and Yaari, 2008). The modified Jones model has the same equations as the Jones model to start with, but solving for non-discretionary accruals with estimates from the Jones model and the inclusion of accounts receivable. The model can be used with either time-series/panel data or cross-sectional data. The model below is the general equation, but there are many different versions of it.

$$NDA_{i,p} = \hat{\alpha}_{1,i}\left(\frac{1}{A_{i,p-1}}\right) + \hat{\alpha}_{2,i}\left[\frac{\Delta REV_{i,p} - \Delta REC_{i,p}}{A_{i,p-1}}\right] + \hat{\beta}_{2,i}\left(\frac{PPE_{i,p}}{A_{i,p-1}}\right) \qquad (5)$$

where "NDA" is non-discretionary accruals, "A" is assets, "REV" is revenue, "REC" is receivables and "PPE" is property plant and equipment. The $\hat{\alpha}_{1,i}$ and $\hat{\alpha}_{2,i}$ and the $\hat{\beta}_{2,i}$ are OLS estimates from the Jones model.

Dechow et al. (1995) stress that the modified Jones Model does not consider that extreme financial performances and high growth will expectedly have another level of accruals than in a normal situation. This can be the case in initial public offerings and large acquisitions. However, we find this model fitting the purpose of our thesis the best, and being suitable for detecting earnings management.

2.7.5 The Performance-Matching Model

The last model, the performance-matching model, was developed by Kothari, Leone and Wasley in 2005. Their research aimed to find a non-linear relationship between performance and normal accruals. The model uses either the Jones model or the Modified Jones model as a baseline. The performance-matching model seeks to compare or match a firm against another firm (that is comparable) to see whether the use of EBITDA is more frequently used than the control-firm. The model therefore reveals atypical earnings management, that is; earnings management that exceeds the normal use of earnings management for those firms. Kothari et.al. suggests that ROA should be the matching variable given firms in

the same market, rather than earnings growth, size or earnings yield (Kothari, Leone and Wasley, 2005).

$$\frac{\widehat{NDA}_{i,p}}{A_{i,p-1}} = \alpha_0 + \hat{\alpha}_1 \left[\frac{1}{A_{i,p}}\right] + \hat{\beta}_1 \left[\frac{\Delta REV_{i,p} - \Delta AR_{i,p}}{A_{i,p-1}}\right] + \hat{\beta}_2 \left[\frac{PPE_{i,p}}{A_{i,p}}\right] + \delta_1 ROA_{i,p-1} \quad (6)$$

where $ROA_{i,p-1}$ is the lagged rate of return on assets. The performance-matching model generates stronger results than the Jones model according to Ye (2006). Ye found that the R^2 increased with 3.04% compared to the Jones model (Ye, 2006).

The model assumes that accruals are connected to the performance of the firm. The model also depends on finding comparable firms. Since our sample is quite small in numbers of firms and a short span of years, we found it difficult to use this model to gain improved results.

3. Hypotheses

In this section of the paper we will highlight different hypotheses and our approach towards the rest of the paper. Again, we must stress the important note of this research, which is the limited sample size resulting from the manual data collection of EBITDA references in annual reports. This will have some notable implications, which will be discussed in chapter 5, for how the statistical results should be interpreted.

Furthermore, another important note concerning the hypotheses we are testing, is that due to the lack of earlier research on our topic, the hypotheses are mainly based on reasonable assumptions and related theories.

3.1 Earnings Management and EBITDA

EBITDA is, as explained in section 2.3, a pro forma way of showing earnings. This indicates that firms can choose to use EBITDA in their financial reports, except for in the notes or in the income statement as those are regulated and need to be audited. When a firm needs new investors and/or creditors they need to show solid financial statements. Hence, firms might manage their earnings and show EBITDA to appear better and not show the underlying economic reality. By measuring earnings management with the use of discretionary accruals we want to find out whether firms who engage in earnings management refer to EBITDA more often in their annual reports. The hypothesis is supported by research done by Doyle, Lundholm and Soliman (2003), where they found evidence that firms reporting pro forma earnings exclude important and non-negligible expenses.

EBITDA can be manipulated by capitalizing an asset or recognizing it as an expense for management to maximize their own gain. This is somewhat closely related to the idea of earnings management as it is dependent on managements' decisions. We expect that discretionary accruals (totdacc) are negatively correlated with the dependent variable (lnEBITDAreferences).

We therefore wish to see if there is evidence, or at least any tendencies, that the level of earnings management is correlated with the use of EBITDA in the financial reporting. Since negative discretionary accruals mean that reported net

income is being forced downwards, we expect that if a firm has negative discretionary accruals or if it is decreasing, the firm is more inclined to refer to EBITDA since it will, in most cases, be higher than net income. Cases of negative earnings management might be for tax evasion purposes or "taking a bath". "Taking a big bath" occurs when a firm must report a loss, the managers might as well report a large loss in step to "clear the decks" (Scott, 2012). If the management decide to "take a bath" this will, because of accrual reversal, enhance the probability of profits in the future.

H1: Firms with negative earnings management are more likely to refer to EBITDA.

3.2 Capex to Total Assets

When looking at EBITDA of a firm, depreciation is in most cases the largest component that is subject to managerial decision making. Of course, changing the depreciation plan will directly affect the depreciation of a firm's assets and in turn affect EBITDA, and that is something one must consider when assessing the EBITDA of a firm. A more subtle way to influence EBITDA through depreciation of assets is for a firm to buy its assets instead of leasing them. However, finding the information about a firm's leasing agreements is difficult in terms of what a firm discloses about its leases. This varies between firms and the information must in most cases be collected manually.

Therefore, we make an approximation by looking at the capital expenditures (CapEx[1]) of each firm scaled its total assets. We expect that as CapEx increases, the times EBITDA is referred to will also increase, since this will lead to an increase in the depreciation expense which in turn reduces net income. This might be a step in "taking a big bath" (Jordan and Clark, 2011), lowering the benchmark for a firm's performance so that improving the financial performance again is easier and higher management compensation is acquired. CapEx also accounts for write downs and impairments, which affects EBITDA directly.

H2: Firms with higher CapEx are more inclined to refer to EBITDA.

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[1] CapEx/Ta = (Δtotal fixed assets - depreciations - write downs and impairment)/TA

3.3 Decrease in Cash Flow

Our next hypothesis is regarding cash flow. Our interest in cash flow is supported by the research done by Burgstahler and Dichev (1995), where they found that companies manipulate cash flow from operations in such a way that they avoid small losses and make adjustments to achieve a small positive cash flow instead. This is not directly applicable in our case. However, Burgstahler and Dichev's research shows that cash flow from operations can be manipulated to some degree.

Firms have the opportunity to recognize sales before the transaction actually takes place, that is; before the firm has received payment. Since our interest is on the use of EBITDA, this also relates to cash flow since EBITDA is by some stakeholders used as a proxy for cash flow from operations. Although, this is not accurate because of the high degree of flexibility in EBITDA. Cash flow indicates how much cash the firm generates in a given period. Some firms manage their earnings by including credit sales that have not been recognized yet (Burgstahler and Dichev, 1997). Our expectation is that firms with a decrease in cash flow is more likely to refer to EBITDA.

H3: Firms with a decrease in cash flow is more likely to report a more frequent use of EBITDA

3.4 Leverage

A firm's leverage affects EBITDA through interest expenses and through lower taxes because of tax shield. An increase in debt will in most cases reduce net income more than the savings from tax shield because of higher interest expenses. This leads to our expectation that a firm that has a high debt level will turn the attention towards EBITDA instead of net income. Therefore, we expect a positive correlation between a firm's leverage, here represented by total debt relative to total assets (TD/TA).

H7: Firms with higher leverage refer more to EBITDA.

3.5 Working Capital

Working capital represents a firm's operating liquidity. Hence, a measure of a firm's short-term financial health. Therefore, a positive working capital indicates that a firm can handle their short-term debt at default. Working capital is a variable often used to achieve earnings goals, and thereby used to manage earnings (Gode, Pole and Singh, 2007). Hence, working capital could be used as a metric to see whether a firm engages in earnings management, often with the use of accruals. Dechow, Richardson and Tuna (2003) found that if a firm reported discontinuity in their earnings distribution this was subject to earnings management with respect to the flexibility that lies within accruals.

Burgstahler and Dichev (1997) found reasonable evidence that working capital is used to manage earnings, and thereby a positive relationship between increased working capital and earnings management. Also, the increase in working capital for companies with smaller profits was higher than companies with small losses. Hence, there is a positive shift in the provisional distribution for firms directly under zero and the cases directly above zero. Burgstahler and Dichev's results are not surprising since the relationship between working capital accruals and earnings management is well known and positive (Dechow, Richardson and Tuna, 2003).

Previous research by Spathis from 2002, in a study about detecting false financial statements in Greece used working capital, scaled by total assets, as an independent variable when comparing firms that has given false financial statements and those who have not. Spathis (2002) found that firms with low WC/TA, indicating that the firm might have a current ratio problem, are more prone to manage their earnings. This is also supported by previous studies such as by Bonner, Palmrose and Young from 1998 where low WC/TA indicates a concern for the firm's financial status and thereby is more often prone to earnings management. These studies support our interest to see whether a firm's level of working capital could be affecting the use of EBITDA in the annual reports.

With respect to the discussion on the previous page, we expect that firms with low working capital to total assets refer more to EBITDA than firms with high working capital. We imagine that a high and strong working capital, scaled by total assets, is likely to have a negative relationship with the number of EBITDA references.

H5: Firms with low WC/TA are more likely to refer to EBITDA.

3.6 Decreasing Revenue

Prior to the research, we have done in this thesis, we expected that firms that were financially struggling will focus more on EBITDA in terms of number of references to EBITDA in the annual reports. To measure this, we use an indicator variable that is equal to 1 if the firm had had a decrease in revenue in a financial year. We expect that companies that are experiencing a decrease in revenue will refer more to EBITDA and use the "help" from interests, taxes and depreciations. We expect a positive correlation between a decrease in revenue and the dependent variable.

H6: Firms that have experienced a decrease in revenue are more likely to refer to EBITDA.

3.7 Total Assets (size)

The next hypothesis we are eager to discover is whether the size of the firm means more references to EBITDA. Our initial research has shown that the largest firm (total assets) does refer to EBITDA more often in their annual reports. Our thesis is investigating the use of EBITDA and factors that might influence the frequency of EBITDA. Therefore, we would like to see if there is a connection between the size of the firm and the frequency of references to EBITDA.

The larger the firm is the more complex the annual report gets. Meaning that larger firms often includes different operating segments and divide the financial statements according to the respective segments. This is one reason that the larger the firm, the more frequent use of EBITDA might exist.

Prior research of size and earnings management indicates that the larger the firm the more inclined management is to manage earnings to avoid decrease in earnings for medium and large firms (Burgstahler and Dichev, 1997).

Therefore, we believe that size of a firm might be influencing the use of EBITDA, and that larger firms are more likely to use EBITDA to appear stronger than the underlying reality.

H8: Larger firms are more likely to refer to EBITDA.

3.8 Depreciation

When looking at EBITDA, depreciations has an obvious influence. Since an increase in depreciation will reduce net income, we expect that firms that have increasing depreciation will refer more to EBITDA, drawing attention away from net income.

H10: Firms with higher degree of depreciation as a proportion of total assets, will use EBITDA more in the financial reporting.

3.9 Sectors

Our last hypothesis is whether the use of EBITDA in the annual reports differs from sector to sector. Our initial research showed differences regarding the use of EBITDA in capital intensive sectors. The energy, materials, and the industry sectors are characterized by having a large degree of fixed assets, and therefore large depreciation and amortization expenses occur. Hence, they might be more inclined to refer to EBITDA.

We therefore expect capital intensive sectors, except the real estate sector, will refer more often to EBITDA in their annual reports, or at least that there are differences between the sectors in using EBITDA in the financial reporting.

H10: The use of EBITDA as a financial performance indicator in financial reporting varies between sectors.

3.10 Regression Model

All the independent variables discussed above will be included in a multiple linear regression model, which is as follows:

ln EBITDA References = β_0 + β_1 Total Accruals + β_2 CapExtoTA + β_3 Decrease in CF + β_4 Leverage + β_5 WC/TA + β_6 Decrease in Revenue + β_7 ln TA + β_8 Depreciation/TA +β_9 IT & telecom + β_{10} industrial +β_{11} Consumer Staples+ β_{12} Consumer Discretionary + β_{13} Materials + β_{14} Health Care +β_{15} Real Estate

where "CF" is Cash Flow, "WC" is Working Capital, and "TA" is Total Assets.

The independent variable is the logarithm of the times a firm will refer to EBITDA as a financial performance measure in the annual reports. We have normalized the dependent variable to the logarithmic scale because of big differences in how many times a firm refers to EBITDA. The coefficients are estimated using ordinary least squares method (OLS).

4. Empirical Method

4.1 Research Design

In our final model, we have chosen to work with a multiple linear regression model. This is because it does not exist any model, from our knowledge, that seek to find a relationship between EBITDA or other pro forma earnings and the factors affecting the use of such performance indicators. Multiple linear regression is simple to interpret because of a structure of linear relationships between a dependent variable and independent variables. Consequently, our research is not based on earlier research, hence we find it suitable to use this kind of model to study if there are any tendencies regarding the use of EBITDA in financial reporting and the factors behind it.

However, we also try to connect earnings management to the use of EBITDA in financial reporting, and to estimate earnings management we apply the modified Jones model. We found this model to be the most appropriate model for our earnings management part, as it captures the change in receivables as well as property plant and equipment (PPE). The PPE variable can be seen in conjunction with EBITDA as these assets will be depreciated, indicating a change in EBITDA. This is a well-known model for detecting earnings management through estimation of discretionary accruals. Dechow, Sloan and Sweeney (1995) tested frequently used models for detecting earnings management and found that the modified Jones model was the most appropriate model in detecting earnings management. We use this as a hypothesis variable in our final multiple regression model. This is elaborated upon in section 3.1.

4.2 Data

This study mainly consists of data from companies on Oslo Børs provided by Centre for Corporate Governance Research's (CCGR) database of selected variables relevant to this study's purpose from the period 2010-2015. Oslo Børs as of june 2017 consists of 188 companies. Additionally, we have manually collected information about whether a firm is referring to EBITDA or similar pro forma performance measures in each firm's financial reports from 2011 to 2015. Some firms are using other pro forma performance measures, e.g. EBITDAX which

includes exploration expenses. Performance measures similar to EBITDA are treated as the same, since these measures are not regulated and thus assessed differently by each firm. We have not accounted for the EBITDAs from the notes of the annual reports, as they are obligated to be revised by the auditor.

4.3 Sample

Oslo Børs consist of twelve different sectors, equity certificates, energy, materials, industrials, consumer discretionary, consumer samples, health care, finance, information technology, telecommunication services, utilities and real estate (Oslo Børs, 2017). In our sample, we have consolidated IT- and Telecom firms into the same group, as they are quite similar, but mostly because these two sectors are very small. Telecom consists only of two companies, NextGentel Holding and Telenor.

In the sample selection, we have excluded companies in the financial and equity sectors, such as banks and insurance companies, as this is normal due to the properties of such firms (Healy and Wahlen, 1999). The utility sector was also dropped because of a high degree of regulations (Healy and Wahlen, 1999), which means that firms in this sector might have incentives to report lower earnings or decrease in profit to benefit from the regulators (Burgstahler and Dichev, 1997). The sample contains 219 companies, that is; 219 companies that have been traded on Oslo Børs the past five years. Some companies have been merged or delisted, while others have been listed during the years. Our sample contains 733 observations with a span of five years.

Initially, we analyzed accounting data from each firm, but after comparing this dataset with consolidated dataset we found that consolidated group data yielded approximately 300 more observations, which is crucial considering the limited sample size we are analyzing. After checking the dataset further, we found that accounting data was missing a lot of observations concerning firm revenue. We therefore base our study on consolidated group data from each firm on Oslo Børs. The sample size is still somewhat limited and small, meaning that we are not expecting to find any significant causality. For example, we do not expect to find evidence that companies are referring more to EBITDA because of a higher level

of earnings management, i.e. the level of discretionary accruals, but rather that companies where earnings management is clearer, refers to and focus more on EBITDA as a financial performance indicator.

Table 3: Total sample of firms Listed on Oslo Børs or Oslo Axsess

All firms listed on Oslo Børs or Oslo Axess (2010-2015)		1092
Dropping Data		
Dropping firms listed on Oslo Axess	-154	
Dropping financial and equity companies	-184	
Total observations dropped		-357
Extreme values of CAPEXtoTA		-8
Extreme values of TDtoTA		-68
Remaining observations in sample		**659**

As table 3 shows we have a total of 659 observations in our sample after dropping financial companies, such as banks and insurance companies or other financial institutions. Since we are using the Modified Jones model we are looking at discretionary accruals (DACC), that is the residuals from the model. We have dropped residuals that are located beyond the interval of one to negative one.

The biggest reason for our small data sample is that we have collected and counted the EBITDA references for all companies listed on Oslo Børs, and therefore limited ourselves by going through six years of annual reports.

We are dropping companies listed on Oslo Axess because this is less strict than Oslo Børs and the companies are often smaller and do not qualify for listing on Oslo Børs (Magma, 2007). Oslo Axess is less strict with acquisition date, that is related to historical and market values. We have therefore dropped these companies to ensure that our sample consist of companies with the same accounting principles.

In our sample, all companies are reporting according to IFRS. IFRS was made mandatory starting in 2005 for all companies, which also have a duty to report consolidated annual reports (Magma, 2007). This means we do not have to account for differences in accounting principles. The change could have led to large changes in the financial statements and annual reports, but it will not

influence our sample since the differences should have been diluted.

When looking through the observations of each variable, we found 68 extreme values of total debt-to-total assets (TDtoTA). We found that this was because of missing observations but also due to firms that went bankrupt, i.e. non-recurring events.

4.3.1 Currency

The data we received from CCGR did not report accounting numbers in one explicit currency, because firms can present numbers in the currency where the business is linked. Hence, the firms report numbers either as Norwegian Krone (NOK), Euro (EUR), or US Dollar (USD).

The Norwegian Accounting Act from 1998 paragraph 3-4, tells us that firms were forced to present accounting numbers in NOK, but in 2005 this was changed so companies could report numbers in the currency where their operations were located, also known as the functional currency (Regnskapsloven §3-4).

This may imply some complications for our sample, as we have firms reporting in NOK, USD and EUR. We have adjusted for this by lagging the first model by total assets.

$$TACCt/At - 1 = \alpha(1/At - 1) + \alpha2(\Delta REV - \Delta REC)/At - 1 + PPEt/At - 1 + \varepsilon t$$

Further, when developing the final model where we use logarithm of total assets as a size-indicator (indicator/dummy variable) and a variable for the change in working capital. We transform the size-indicator to a logarithmic scale, so that the problem of extreme observations is mitigated.

In this model, the different currencies are problematic. To adjust for this, we collected the exchange rates from 2010 to 2015 at year end, and converted all observations that were EUR and USD to NOK. Otherwise, the size-indicators would not have been comparable. Items from the income statement have been converted by the average exchange rate for the period, whereas balance sheet

items are converted using the exchange rates at year end for each financial year.

4.4 Modification of the Data

In order to have a satisfactory dataset we have had to modify the dataset. Since our sample consist observations from 2010 to 2015, we have a quite small sample. We have focused on consolidated financial statements instead of accounting data. This gave us a bigger dataset because most companies were part of a group.

We have, as mentioned in the chapter above, merged the IT and Telecom sectors, which are somewhat closely related and similar in terms of their assets and infrastructure, so that we get a sector with more observations instead of two small sectors.

We have also modified the utility-sector, which included only four companies during our research period. We changed the firm Infratek and Scatec from utility to industry as the firm offers services in project management, construction and electricity. The utility sector, ultimately consisting only of Hafslund, was disregarded because of the regulated market and incentives towards reporting low revenue or decrease in profitability (Burgstahler and Dichev, 1997).

The dependent variable lnEBITDAreferences was generated by the logarithm of one plus EBTIDAreference. This were done to deal with extreme observations and large outliers. We added by one so that observations equal to zero were included, since we use the logarithmic scale.

4.5 The Modified Jones Model

In this section, we provide the regression results from the modified Jones model, which is used as a component for earnings management in the final multiple linear regression model where we aim to find tendencies and correlation between EBITDA references and a set of chosen factors.

Table 4: Descriptive statistics of discretionary accruals

	Mean	Variance	Std. Dev	Min	Max	Median	N
DACC_ittelecom	-0.0397	0.0262	0.1619	-0.302	1.3029	-0.0583	81
DACC_energy	-0.0427	0.0529	0.23	-0.184	1.638	-0.1365	121
DACC_industrial	0.0298	0.0098	0.0991	-0.3803	0.748	0.0224	118
DACC_consumerstaples	-0.0182	0.0072	0.0848	-0.246	0.182	-0.009	55
DACC_consumerdiscr	-0.1198	0.0005	0.0217	-0.1604	-0.0658	-0.1242	37
DACC_materials	-0.0417	0.0082	0.0907	-0.1332	0.3808	-0.0624	29
DACC_healthcare	0.0904	0.0441	0.21	-0.424	0.8158	0.0622	30
DACC_realestate	-0.0646	0.0101	0.1003	-0.3412	0.0254	-0.0392	24

The table above show the distribution of discretionary accruals scaled by last year's assets for each sector. The discretionary accruals (DACC) are derived from the predicted residuals from total accruals (see appendix 9.1 for calculations of total accruals (TACC)). The table shows that the healthcare sector has on average 17.29% discretionary accruals. The healthcare sector has few observations, only 31, which is sufficient, but fairly low. Further, the healthcare sector has a wide span, meaning the sample is quite scattered. The real estate and consumer discretionary sectors have negative discretionary accruals indicating that there are negative earnings management. Hence, firms in real estate and consumer discretionary use income decreasing adjustments. For the remaining sectors, we see a connection between the mean and median, indicating that earnings management occurs.

Finally, the discretionary accruals, DACC (predicted residuals), are summarized to one independent variable. We use the regression results from the modified Jones model to compare to what degree the sectors on Oslo Børs use EBITDA as a financial performance indicator in financial reporting, i.e. the annual reports.

5. Results

5.1 Final Model

Our model has an explanatory power (R^2) of 20.90%. This means the model explains almost 21% of the variation in EBITDA use, which is generally a quite low score for a model's explanatory power. However, this is not surprising since we have developed a model which has not been tested before. A high R^2 is not a goal in itself, but we see that our independent variables are interrelated with the use of EBITDA in financial reports.

The final model has indicator variables for each sector. If we were to exclude the sector variables we got a R^2 of only 10.60% (see appendix 9.5). This is a decrease of 10.30 percentage points, meaning the different sectors explain 50% of the use of EBITDA in annual reports.

The correlation between the dependent variable (EBITDAreferences) and the independent variables varies between -0.21 and 0.29 (see appendix 9.2). This implies that some of the variables tend to fluctuate together, both in the same and the opposite direction as the use of EBITDA. The logarithm of total assets (lnTA) is the variable with the highest correlation. This is in line with our initial thoughts, greater total assets increase firms' willingness to use EBITDA as performance measure. The variable with the highest negative correlation is the working capital scaled by total assets (wctoTA) which has a correlation of -0.21. This implies that higher working capital to total assets has a negative effect on EBITDA references in annual reports. The rest of the variables will be discussed below.

Table 5 on the next page shows all variables' mean, variance, standard deviation, min, max, median and number of observations as well. What we see from the table is that extreme observations and large outliers have been adjusted by applying scaling techniques, such as the logarithmic scale and by normalizing some of the variables to ratios. The variables decreasing cash flow (decrease_cf) and decreasing revenue (decrease_rev) are indicator variables, meaning they take a value of 1 if there has been a decrease in cash flow and revenue and 0 otherwise.

Table 5: Descriptive statistics of final model

	Mean	Variance	Std. Dev	Min	Max	Median	N
logEBITDAreferances	1.487	1.335	1.155	0	4.542	1.698	385
DACC_energy	-0.021	0.129	0.114	-0.424	0.816	0	659
CAPEXtoTA	-0.044	0.064	0.253	-2.647	0.743	-0.019	494
TDtoTA	0.522	0.047	0.218	0.001	1.923	0.532	659
lnTA	21.369	3.933	1.983	17.193	27.612	21.266	659
deprtoTA	0.05	0.003	0.058	0	0.62	0.037	599
wctoTA	0.119	0.057	0.239	-1.563	0.968	0.103	496
decrease_cf	0.275	0.199	0.447	0	1	0	659
decrease_rev	0.251	0.188	0.434	0	1	0	659

5.1.1 Earnings Management and the Use of EBITDA

Table 6: Total discretionary accruals

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Intervall]	
totdacc	-0.061895	0.3214874	-0.19	0.847	-0.69119987	0.5682086

The independent variable *totdacc* is the sum of all sectors' discretionary accruals, i.e. the degree of earnings management, from 2011 to 2015. The negative coefficient indicates that only a negative level of discretionary accruals will increase the times EBITDA is referred to by a firm. Negative discretionary accruals mean that net income is being forced down. Discretionary accrual is not significantly different from zero with a p-value of 0.847, meaning it does not provide any evidence that earnings management affects the use of EBITDA in the financial reporting.

Although, the coefficient's negative sign is in line with our expectation, i.e. in the case of negative earnings management (discretionary accruals), net income is being forced down so that the firm will turn its attention to EBITDA (lnEBITDAreferences increases), all other variables held constant.

5.1.2 CapEx to Total Assets

Table 7: Capital expenditures scaled by total assets

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Interval]	
CAPEXtoTA	0.1842656	0.1365386	1.35	0.177	-0.0833451	0.4518763

We needed to reduce the sample by approximately 10 observations because the independent variable CAPEXtoTA had some extreme observations, giving the coefficient a negative value, which was due to lack of data. After adjusting for the extreme observations, we now have a more suitable sample and a coefficient that make economic sense.

Capital expenditures scaled by total assets is a measurement of how intensive capital expenditures for a firm have been. Our hypotheses indicated higher CapEx should lead to a more frequent use of EBITDA. We see that the coefficient is positive (0.184), indicating that larger capital expenditures lead to a small increase in the number of EBITDA references. The coefficient's size means that an increase by one unit in CapEx scaled by total assets leads to a 20.23% increase in EBITDA use. However, the variable is not significantly different from zero at any reasonable level, that is at least the 10% level (p-value of 0.177). Therefore, we cannot confirm our hypothesis that more investments lead to a more frequent use of EBITDA, but we see a tendency in the sign of the coefficient.

Capital expenditures are reducing the net income through higher depreciation. Since higher capital expenditures means that the firm has bought new tangible assets or improved existing tangible assets, it will increase the depreciation expense recorded by the firm. Depreciation, impairment and write downs affect the result of a firm by weakening the net income. This is in accordance with our hypothesis since a firm is more likely to pivot the attention away from net income and therefore rather refer to pro forma metrics such as EBITDA.

5.1.3 Decrease in Cash Flow

Table 8: Decrease in cash flow

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Intervall]	
decrease_cf	-0.1099237	0.0579346	-1.9	0.058	-0.2234734	0.0036261

From the stated hypothesis about decrease in cash flow, we expected that firms that are experiencing a decrease in cash flow are more likely to refer to EBITDA in their financial reports. However, from our model, we find the opposite effect and we see that this variable is significantly different from zero at the 10% level, i.e. with a confidence interval of 90%, with a p-value of 0.058. The coefficient indicates that if a firm has a decrease in cash flow, this will decrease the use of EBITDA by approximately 11.6%. Note that the variable is an indicator variable taking the value of 1 if a firm experienced a decrease in cash flow and zero otherwise.

This contradicts our hypothesis showing the opposite effect of what we expected. We cannot find an explanation for this result. However, we see an opposite effect with regards to the level of working capital, which is loosely connected to Burgstahler and Dickev's (1997) findings, although that was in conjunction with earnings management.

5.1.4 Leverage

Table 9: Total debt scaled by total assets

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Interval]	
CAPEXtoTA	0.1842656	0.1365386	1.35	0.177	-0.0833451	0.4518763

The variable for leverage is total debt divided by total assets (TDtoTA). We see from the table that the independent variable is not significantly different from zero at any reasonable level, that is at least at the 10% level, with a p-value of 0.394. Leverage is positively correlated (0.16) with the dependent variable, indicating a weak uphill (positive) linear relationship.

Despite the statistical significance (with a confidence interval of 90%), we see from the coefficient that the direction is of what was predicted in our hypothesis, i.e. that if a firm's debt level, or leverage, increases the firm will in turn use EBITDA more in the financial reporting. The reason for this is not unambiguous, as leverage often represents the risk of the firm but also since there are other motives for a firm to use EBITDA in the financial reporting, e.g. debt covenant requirements regarding the EBITDA of a firm. An increase in interest expenses due to higher leverage affects net income directly, leading to our suspicion that highly leveraged firms will focus more on EBITDA compared with net income.

5.1.5 Working Capital

Table 10: Working capital scaled by total assets

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Intervall]	
wctoTA	-0.2481489	0.2272245	-1.09	0.275	-0.6935008	0.1972029

Working capital scaled by the firm's total assets have a negative impact on the EBITDA references according to our research. Firms with a weak or small working capital are therefore more likely to manage their earnings through recognizing earnings early, e.g. by recognition of credit sales. Since a strong working capital, or at least a positive working capital means the firm is meeting their obligations when they are due.

The correlation between the working capital and the dependent variable is also negative (-0.227), meaning an increase in working capital will lead to a decrease in the number of EBITDA references. The negative correlation between the dependent and independent variable is reasonable, showing a tendency for the variables to fluctuate in opposite directions.

The p-value is 0.275, which is not significantly different from zero at any reasonable level and therefore we cannot conclude that lower and weak working capital leads to a more frequent use of EBITDA in financial reports. However, we see tendencies that our hypothesis does hold, that firms with small amounts of working capital are more inclined to refer to EBITDA in their financial statements.

5.1.6 Decrease Revenue

Table 11: Decrease in revenue

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Intervall]	
decrease_rev	-0.07022	0.0640094	-1.1	0.273	-0.1956761	0.0552362

Our hypothesis was that a struggling firm with decrease in revenue, would increase the focus and frequency of EBITDA references in its financial statements. Decrease in revenue means the firm is not "meeting" or "beating" previous year's results, which could indicate that managers would focus more on EBITDA in order to appear better. The variable is an indicator variable that takes the value 1 if the firm had decrease in revenue and zero otherwise.

The coefficient is negative, indicating that decreasing revenue and EBITDA references fluctuate in opposite directions. Hence, if a firm has a decrease in revenue, the amount of EBITDA references decreases by 6.7%. The correlation between the number of EBITDA references and decrease in revenue is negative by -0.022, stating they tend to move in the opposite direction of each other. The correlation is relatively low, meaning that the relationship between the two is not strong. In fact, they are nearly independent of each other. This means that a decrease in revenue and the use of EBITDA do not affect one another.

The p-value for decrease in revenues is 0.273, meaning that the variable is not significantly different from zero at any reasonable level. This means that we have no evidence for our hypothesis, which is that if a firm has a decrease in revenue it will refer to EBITDA more often in the annual reports.

5.1.7 Total Assets (size)

Table 12: Logarithm of total assets

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Interval]	
lnTA	0.1339867	0.0414711	3.23	0.001	0.0527048	0.2152687

Total assets, i.e. a firm's size, have in earlier research shown that larger firms have more incentives towards engaging in earnings management (Burgstahler and Dichev, 1997). The larger the firm is, the more it depends on showing good solid revenue streams or other metrics. This is to attract new investors and keep the current stakeholders satisfied. Further, big firms will do what it takes to avoid a decrease in earnings, and hence, refer more frequently to EBITDA, thereby pivot the attention from a decreasing revenue.

We have scaled the variable of total assets with the use of the natural logarithm transformation. On a statistical manner, this helps us normalize the variable. Total assets in our sample are right skewed, and by taking the logarithm of the variables, the sample becomes more normally distributed. This means we maintain the OLS assumptions that errors are normally distributed. Substantially, we use the logarithm of total assets to be able to make sense of the data. That is, a change in a variable (here total assets) can often be more multiplicative than additive. E.g. if a firm has total assets of 20 000 and add 5 000 of new assets, this increase will be large for this firm but not for firms with higher total assets. Without scaling by the logarithm, we would get large total assets for some firm and negligible for another firm.

The coefficient is positive, showing that one percent change in lnTA leads to a 13.4% increase in the EBITDA use. A positive coefficient for lnTA means that larger and higher total assets leads to a more frequent use of EBITDA in the annual reports. The correlation between lnEBITDA and lnTA is also positive, with a correlation of 0.29 indicating a slightly positive linear relationship. This implies the variables tend to shift in the same direction, when total assets get bigger, the use of EBITDA also increases.

The p-value is 0.001, which means it is significantly different from zero at the 1% level, i.e. with a confidence interval of 99%. Therefore, we can conclude that our hypothesis hold, that larger firms are more inclined to refer to EBITDA. Note that one of the reasons for this might be that some large firms present the results by the different segments they operate in, meaning that EBITDA is repeated multiple times.

5.1.8 Depreciation

Table 13: Depreciation to total assets

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Interval]	
deprtoTA	0.6162991	0.7021141	0.88	0.38	-0.7598192	1.992417

Depreciation is one of the most important components when considering EBITDA. Depreciation is under the influence of management decisions, since discretion is allowed, e.g. the depreciation period can be changed so that the cost of depreciation changes. The variable for depreciation is normalized by dividing depreciation by total assets, so that extreme observations are mitigated.

From the table, we observe that the variable for depreciation is not significantly different from zero at the 10% level, giving no evidence to our hypothesis. Yet, looking at the coefficient we observe that the positive sign is as expected, meaning that an increase in depreciation increases the use of EBITDA. The correlation between depreciation (divided by total assets) and the dependent variable (lnEBITDAreferences) is slightly negative (-0.0151), which means, somewhat surprisingly, that these variables are almost independent of each other.

5.1.9 Sectors

Table 14: How different sectors use EBITDA

Variable	Coefficient	Std. Err	z	P>|z|	[95% Conf. Intervall]	
ittelecom	0.3630633	0.298701	1.22	0.224	-0.2223799	0.9485066
industrial	0.2069778	0.2496543	0.83	0.407	-0.2823356	0.6962912
consumerstaples	-0.2392659	0.3196234	-0.75	0.454	-0.8657161	0.3871844
consumerdiscr	0.7939016	0.3765495	2.11	0.035	0.0558781	1.531925
materials	0.3753916	0.4158905	0.9	0.367	-0.4397388	1.190522
healthcare	-0.1204796	0.4030744	-0.3	0.765	-0.9104908	0.0665316
realestate	-0.8100658	0.4011264	-2.02	0.043	-1.596259	-0.0238726

As our initial research showed, there were differences between sectors in the use of EBITDA. We have chosen the energy sector as our reference group, so that we interpret the coefficient of each sector against the energy sector. We used the energy sector as reference group because this sector has the largest number of observations, which reduces the standard error and confidence intervals.

We see that consumer staples, healthcare and real estate have negative coefficients, indicating that these sectors refer less to EBITDA than the energy sector. We know the difference between sectors has a big influence on our sample, as sectors explain over 10% of the variance in our model. From our model, we see that the IT and telecom sector as well as industry, consumer discretionary and materials have a positive sign, meaning that they tend to refer more often to EBITDA than the energy sector. Hence, the more capital intensive sectors are more inclined to refer to EBITDA. Capital intensive firms tend to have large fixed assets and therefore also have large depreciation and amortization expenses. This is in accordance with our initial thoughts, but we did not expect consumer discretionary to be more inclined to refer to EBITDA compared with the energy sector. The consumer discretionary sector is also significantly different from zero at the 5% level (p-value of 0.035), indicating that this sector is more inclined to refer to EBITDA in their financial reports. The real estate sector is also significantly different from zero at the 5% level (p-value of 0.043). However, for the real estate sector our sample is quite small, containing only 24 observations over the 5-year span. The rest of the sectors are not significantly different from zero at any levels.

The correlation matrix (see appendix 9.2) between the variables have the same sign as the coefficients, indicating that some sectors leads to increased use of EBITDA in financial rapports. It is interesting that the energy sector has a negative correlation with the use of EBITDA. However, the correlation is -0.0008 indicating that they are nearly independent.

The results for the sector variables indicates that our hypothesis hold to some degree, because we see differences across sectors. Since the rest of the sectors are not significant on any level we cannot conclude that their coefficient sign and correlation is correct. However, we see that different sectors include the use of EBITDA in different ways, and that the capital-intensive sectors, except the real estate sector, do refer more often to EBITDA than the energy sector.

6. Limitation and Further Research

In this thesis, our aim was to investigate whether earnings management and a set of other factors is influence the use of EBITDA in the annual reports (financial reporting) or not. To do this, we observed data from all the firms on Oslo Børs (OSE) from 2011 to 2015. The time series is limited due to the manual data collection process regarding the use of EBITDA in annual reports. Accordingly, finding evidence for our hypotheses became difficult because of the small sample size. For further research the sample size should be extended to other stock markets in other countries. This would enable tests between comparable firms on different stock markets.

Furthermore, research and development expenses (R&D) should be examined. This was considered but due to lack of sufficient data concerning this was not included in our research. Additionally, in accordance with theory about management compensation and incentives, this could be interesting to consider. However, our dataset was not sufficient on the matter, hence it was not examined any further.

Regarding our choice of applying a multiple linear regression model, this method was chosen because of its intuitive and interpretable properties. For further research, other methods should be assessed. It could be that a logistic regression model could be appropriate to measure a firm's probability of using EBITDA. However, we found it difficult to fit our research question to a logistic regression model.

Moreover, as mentioned in the results, the variable for leverage should be assessed further with respect to tax benefits but also convertible bonds or listed corporate bonds, as this can explain changes in a firm's debt.

Capital expenditures (CapEx) has been approximated using data from CCGR. Since decisions whether capital expenditures should be capitalized or expensed are due to management decisions, this should be assessed further.
It is also worthwhile to mention that there are uncertainty regarding amortization expenses, because of different interpretations on the matter. In some cases,

amortization is related to debt down payment, whereas in other cases amortization is linked to capital expenses of intangible assets, e.g. patents, goodwill, or brand recognition. We did not consider this because the data from CCGR did not provide enough information about the distinctions.

7. Conclusion

The main purpose for our thesis is to research the use of EBITDA in financial reports. To our knowledge, this topic has not been studied before, which meant we needed to find appropriate models by ourselves and collect data about EBITDA manually from all the annual reports for each firm from 2011 to 2015. This was a time-consuming task, which limited our possible sample size vastly. Further, this meant that finding any evidence for our hypotheses became limited.

We wanted to see whether earnings management had an impact on the use of EBITDA. By applying the modified Jones model to estimate a component for earnings management, i.e. the degree of discretionary accruals (totdacc), we used this as an independent variable in a multiple linear regression model where the use of EBITDA was the dependent variable. However, we could not find any evidence to support our hypothesis, namely that negative earnings management would increase the use of EBITDA in the financial reporting (annual reports). The variable for earnings management was not statistically significant but the tendency in terms of the sign of the coefficient was in line with our expectations.

From the rest of the hypotheses we found that the size of a firm (lnTA) is significantly different from zero at the 1% level (99% confidence level). Indicating that the larger the size of the firm is, the more likely it is to refer to EBITDA in its financial statements. This was in line with what we expected from our hypothesis about firm size. Further, decrease in cash flow was significantly different from zero at the 10% level, meaning that firms with decreasing cash flow refer more often to EBITDA. However, this was not in accordance with our hypothesis.

From our thesis, we experience that the use of EBITDA and other pro forma earnings measures varies between firms but also for a firm from one year to another. Further, it is unclear what EBITDA contains, making it difficult to interpret and compare against another firm's EBITDA. Therefore, these issues must be considered when examining EBITDA and pro forma earnings reported in the financial statements.

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9. Appendix

9.1 Derivation of calculations used to estimate total discretionary accruals:

$$TACC = \Delta CA - \Delta Cash - \Delta CL + \Delta DCL - Depr$$

$$\frac{TACC_t}{A_{t-1}} = \alpha_1 \left(\frac{1}{A_{t-1}}\right) + \alpha_2 \left[\frac{\Delta Rev_t - \Delta Rec_t}{A_{t-1}}\right] + \alpha_3 \left[\frac{PPE_t}{A_{t-1}}\right] + \varepsilon_t$$

$$\frac{NDACC_t}{A_{t-1}} = \hat{\alpha}_1 \left(\frac{1}{A_{t-1}}\right) + \hat{\alpha}_2 \left[\frac{\Delta Rev_t - \Delta Rec_t}{A_{t-1}}\right] + \hat{\alpha}_3 \left(\frac{PPE_t}{A_{t-1)}}\right)$$

$$DACC_t = TACC_t - NDACC_t$$

TACC = total accruals

CA = current assets

CL = current liabilities

DCL = debt current liabilities

Depr = depreciation

A = Assets

Rev = Revenue

Rec = Receivables

PPE = Power Plant and Equipment

NDACC = Non-discretionary Accruals

DACC = Discretionary Accruals

9.2 Correlation matrix

	lnEBITDA	ittelecom	industrial	consumerst~s	consumerdi~r	materials	healthcare	realestate	energy
lnEBITDA	1.0000								
ittelecom	0.0506	1.0000							
industrial	0.0509	-0.2401	1.0000						
consumerst~s	-0.1044	-0.1556	-0.1979	1.0000					
consumerdi~r	0.1727	-0.1238	-0.1575	-0.1021	1.0000				
materials	0.1225	-0.1099	-0.1397	-0.0906	-0.0721	1.0000			
healthcare	-0.1714	-0.1140	-0.1449	-0.0940	-0.0748	-0.0663	1.0000		
realestate	-0.1808	-0.0990	-0.1259	-0.0816	-0.0649	-0.0576	-0.0598	1.0000	
energy	-0.0008	-0.2473	-0.3145	-0.2039	-0.1622	-0.1439	-0.1493	-0.1297	1.0000

9.3 Regression matrix
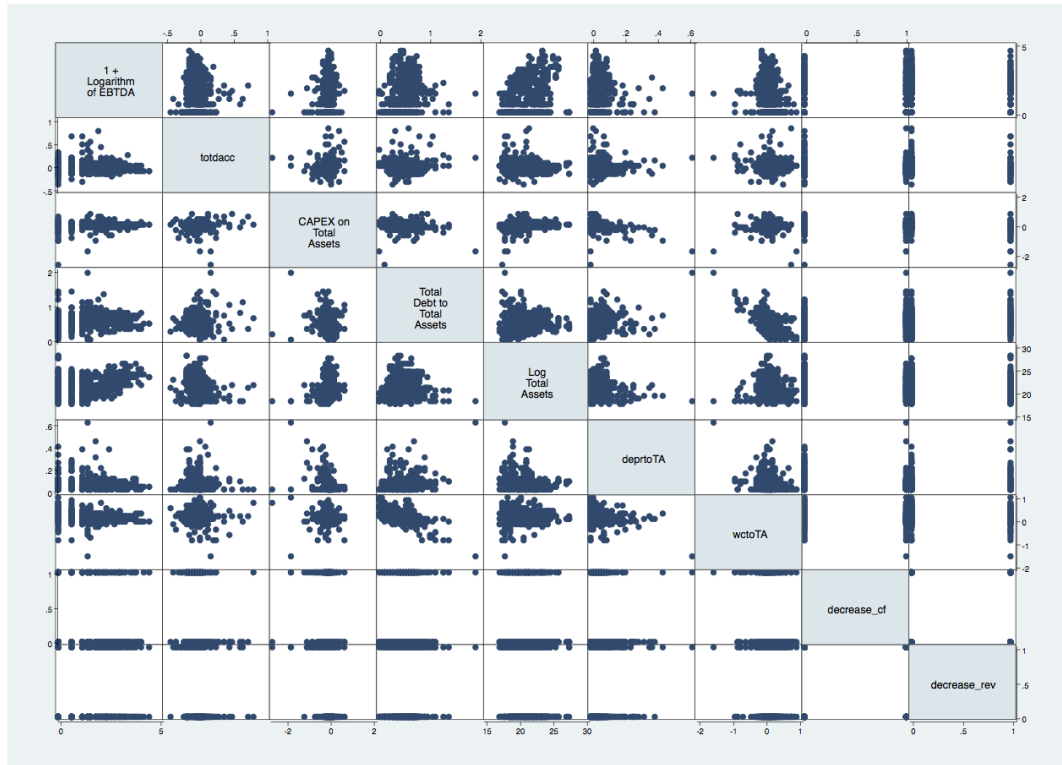
9.4 Stata output from final model

R-sq:					Obs per group:	
within	= 0.0383				min =	1
between	= 0.2194				avg =	3.6
overall	= 0.2090				max =	5
					Wald chi2(15) =	45.03
corr(u_i, X)	= 0 (assumed)				Prob > chi2 =	0.0001

lnEBITDA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
totdacc	-.061895	.3214874	-0.19	0.847	-.6919987	.5682086
CAPEXtoTA	.1842656	.1365386	1.35	0.177	-.0833451	.4518763
TDtoTA	.2299039	.2698915	0.85	0.394	-.2990737	.7588815
lnTA	.1339867	.0414711	3.23	0.001	.0527048	.2152687
deprtoTA	.6162991	.7021141	0.88	0.380	-.7598192	1.992417
wctoTA	-.2481489	.2272245	-1.09	0.275	-.6935008	.1972029
decrease_cf	-.1099237	.0579346	-1.90	0.058	-.2234734	.0036261
decrease_rev	-.07022	.0640094	-1.10	0.273	-.1956761	.0552362
ittelecom	.3630633	.298701	1.22	0.224	-.2223799	.9485066
industrial	.2069778	.2496543	0.83	0.407	-.2823356	.6962912
consumerstaples	-.2392659	.3196234	-0.75	0.454	-.8657161	.3871844
consumerdiscr	.7939016	.3765495	2.11	0.035	.0558781	1.531925
materials	.3753916	.4158905	0.90	0.367	-.4397388	1.190522
healthcare	-.1204796	.4030744	-0.30	0.765	-.9104908	.6695316
realestate	-.8100658	.4011264	-2.02	0.043	-1.596259	-.0238726
_cons	-1.543447	.9186039	-1.68	0.093	-3.343877	.2569838

9.5 Stata output from final model without sectors

```
R-sq:                                      Obs per group:
    within  = 0.0391                                min =          1
    between = 0.1198                                avg =        3.6
    overall = 0.1060                                max =          5

                                           Wald chi2(8)     =      28.79
corr(u_i, X)   = 0 (assumed)               Prob > chi2      =     0.0003
```

lnEBITDA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
totdacc	-.0958515	.3196791	-0.30	0.764	-.7224111	.5307081
CAPEXtoTA	.2035591	.1361304	1.50	0.135	-.0632516	.4703698
TDtoTA	.2232251	.2685671	0.83	0.406	-.3031568	.749607
lnTA	.1221493	.0404697	3.02	0.003	.0428301	.2014685
deprtoTA	.7245166	.7002382	1.03	0.301	-.6479251	2.096958
wctoTA	-.2561256	.2272509	-1.13	0.260	-.7015292	.1892779
decrease_cf	-.1037374	.0578656	-1.79	0.073	-.2171519	.0096772
decrease_rev	-.0702539	.0639499	-1.10	0.272	-.1955935	.0550857
_cons	-1.19983	.8782759	-1.37	0.172	-2.921219	.5215589