

THE VALUE RELEVANCE OF ALTERNATIVE PERFORMANCE MEASURES: EVIDENCE FROM THE OSLO STOCK EXCHANGE

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Abstract

How to cite this paper: Stenheim, T., Beckman, A. N., Olsen Valltoft, C., & Madsen, D. Ø. (2018). The value relevance of alternative performance measures: Evidence from the Oslo Stock Exchange. *Journal of Governance & Regulation*, 7(4), 27-41. http://doi.org/10.22495/jgr_v7_i4_p4

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ISSN Print: 2220-9352
ISSN Online: 2306-6784

Received: 14.09.2018
Accepted: 17.12.2018

JEL Classification: M4, M1, M41, M40
DOI: 10.22495/jgr_v7_i4_p4

Companies disclose alternative performance measures (APMs), either to provide useful information to the market, or strategically in order to mislead the market. Using traditional price and return regressions, this study examines the value relevance of APMs and whether such measures are more value relevant than financial statement measures. The sample consists of the 100 largest companies listed on the Oslo Stock Exchange with quarterly data from 2012 to 2016. We find APMs to be value relevant for investors on the Oslo Stock Exchange. Furthermore, we conclude that APMs are more value relevant than financial statement measures. However, this finding should be interpreted with caution since the results are of limited statistical significance. Overall, the findings of this study suggest that companies disclose APMs to inform rather than mislead the market.

Keywords: Alternative Performance Measures, Non-GAAP Earnings, Pro Forma Earnings, Value Relevance

1. INTRODUCTION

1.1. Alternative Performance Measures

Alternative Performance Measures (APMs) are adjusted financial measures, which differ from those defined in applicable financial reporting frameworks (e.g. US GAAP or IFRS). APMs are financial measures adjusted for expenses related to, for example, restructuring or mergers and acquisitions, which company managements claim to be one-time and non-recurring events (Bradshaw & Sloan, 2002). The managements of companies usually disclose APMs in headlines, narratives, or in tables in annual and quarterly reports, as well as in presentations to investors and other company stakeholders.

In theory, the purpose of financial reporting is to provide useful and relevant information to investors and other stakeholders (Scott, 2015). A company's financial reports should disclose a company's financial position and help predict future cash flows. However, according to Dyrnes and

Pettersen (2012), the frequent APM disclosures by Norwegian companies can be interpreted as an indication that the applicable financial reporting frameworks are too focused on reliability and accuracy, and, hence, in practice lack usefulness when it comes to the prediction of future cash flows.

There are two reasons why companies choose to disclose APMs. First, APMs may reduce information asymmetry and provide useful information to investors. Second, APMs can provide an overly optimistic portrait of earnings, and can be used strategically and opportunistically to mislead investors about the profitability of the company (Entwistle, Feltham, & Mbagwu, 2010). Since there is considerable flexibility in terms of how APMs are calculated and presented, the assessment of which items to include and exclude is made subjectively by company managements.

APMs have been criticized in several ways. For example, critics argue that the comparability between different periods and different companies is low and that APMs are being used to improve the

bottom line. Reinforcing this argument is the finding that APM adjustments almost always lead to improved earnings numbers (Bradshaw & Sloan, 2002).

Company managements' arguments for disclosing APMs are that these measures provide supplemental information which reflects the company's continuing operations, and is more useful to investors (e.g. Norsk Hydro ASA, 2017; Statoil ASA, 2017; Telenor ASA, 2017). While APMs are meant to supplement financial statement measures and not replace them, Mary Jo White, the former Chair of the US Securities and Exchange Commission (SEC), is concerned that APMs have become a key message to investors (White, 2016). White (2016) mentions that issues such as: "lack of consistency", "individually tailored" APMs, and "cherry-picking" are all potentially problematic. Due to the criticism levelled at APMs, regulators such as SEC, the European Securities and Markets Authority (ESMA), and the International Accounting Standards Board (IASB) have put APM disclosures high on the agenda for discussion.

In addition to the criticism made by regulators, APMs have been put under the critical spotlight by the financial press. For example, Financial Times Lex (2016, May 2) mentioned that adjusted earnings from the Standard and Poor's (S&P) 500 companies exceeded earnings reported in the financial statements by one-third in 2015. At that point, the difference between the financial statement measures and APMs had not been greater since the financial crisis of 2008 (Financial Times Lex, 2016, May 2). Another concern discussed in the Financial Times, is companies' use of APMs that bear no relation to financial statement measures, and that APMs are sometimes closer to fantasy than reality (McLennahan, 2017, January 6).

Even though APMs have been subjected to much criticism and controversy, several studies in the accounting literature paint a different picture of the usefulness of APMs. For example, there is a considerable body of evidence showing that APMs have a predicted association with share prices, i.e. they are considered to be "value relevant." In fact, studies find that APMs are actually significantly more value relevant than financial statement measures (e.g. Bhattacharya, Black, Christensen, & Larson, 2003; Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003; Entwistle et al., 2010).

1.2. Purpose and contribution

In light of the frequent and extensive disclosures of APMs by company managements in Norway, this study sets out to investigate whether APMs are value relevant for investors on the Oslo Stock Exchange. While there are several studies examining the value relevance of APMs in a US context (e.g. Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003; Entwistle et al., 2010), to the best of our knowledge, there are no previous studies on the value relevance of APM in Norway using company reported quarterly data. Therefore, this paper contributes by providing new insights into the value relevance of APMs for investors on the Oslo Stock Exchange.

This study sets out to answer the following two research questions:

Research Question 1: Are APMs value relevant for investors on the Oslo Stock Exchange?

Research Question 2: Are APMs more value relevant than financial statement measures?

1.3. Structure

This article proceeds as follows. Section 2 describes the concept of value relevance. Section 3 defines the APM concept and provides a review of previous studies on APMs. Section 4 describes our methodology, which includes a presentation of our research questions, hypotheses, samples and variables, in addition to how to measure value relevance. Section 5 presents the findings from our estimated regressions. Section 6 discusses our results in light of extant research. Finally, Section 7 concludes, and outlines limitations and ideas for follow-up studies.

2. VALUE RELEVANCE

2.1. What is value relevance?

Value relevance studies comprise an important part of capital market-based accounting research (CMBAR). CMBAR includes other topics such as tests of market efficiency, research on earnings response coefficients, and fundamental analysis and valuation research (Kothari, 2001: 107). The first evidence of the effect of earnings on share returns was found by Ball and Brown (1968) and Beaver (1968) in their investigations of the information content of earnings announcements. More recent studies on value relevance focus on the usefulness of financial information by examining the association between financial measures and share prices (Barth, Beaver, & Landsman, 2001; Francis & Schipper, 1999; Holthausen & Watts, 2001).

In value relevance literature, financial information can be defined as value relevant if it has a predicted association with share prices (Barth et al., 2001). Francis and Schipper (1999) provide four different definitions of value relevance. The first defines value relevance as the profits achieved by using accounting-based trading rules. The second definition considers financial information as value relevant if it is directly or indirectly used in a valuation model. Using this definition as a basis, value relevance can be measured by the ability of earnings to predict future dividends, future cash flows, future earnings, or future book values (Francis & Schipper, 1999). The third definition defines value relevance as the financial information's ability to change the total information in the market, whereas the fourth defines value relevance as the ability of financial reporting to capture or summarize useful information, that may affect share prices (Francis & Schipper, 1999). Both the third and fourth interpretation measure value relevance as the statistical association between financial information and share prices or returns (Francis & Schipper, 1999). As the intention of this paper is to investigate the ability of net earnings and alternative performance measures to capture and summarize the information for setting market prices, the latter definition of value relevance is applied here.

2.2. The assumption of market efficiency

Value relevance studies typically employ the assumption of efficient capital markets (Aboody, Hughes, & Liu, 2002; Fung, Su, & Zhu, 2010; Holthausen & Watts, 2001). Fama (1970) divided capital market efficiency into three states: strong, semi-strong and weak. Assuming a strongly efficient market would entail that the market has access to and captures all private and public information in share prices. Consequently, there are no information asymmetry and no need for companies to develop financial statements (Stenheim, 2012). With a weak form of efficiency, it would be difficult to investigate the value of relevance since the relationship between share prices, and accounting measures would be random. In a semi-strong efficient market, share prices reflect all publicly available information. Ball and Brown (1968) and Beaver (1968) found the assumption of market efficiency to be reasonable. However, studies have found that capital markets are inefficient regarding accounting issues such as post-earnings announcements and market-to-book ratios (Beaver, 2002). Despite these findings, it is necessary to have at least some degree of market efficiency when studying value relevance in order to be able to interpret the results correctly (Barth et al., 2001; Fung et al., 2010; Holthausen & Watts, 2001).

3. ALTERNATIVE PERFORMANCE MEASURES

3.1. What is alternative performance measures?

Alternative performance measures (APMs) are adjusted financial numbers, which differ from those defined in applicable financial reporting frameworks (e.g. US GAAP; IFRS). APMs are in the academic literature, financial press, and by managers sometimes referred to as “non-GAAP earnings”, “pro forma earnings”, “street earnings”, and “non-IFRS earnings”. ESMA (2016) defines an APM as “a financial measure of historical or future financial performance, financial position, or cash flows, other than a financial measure defined or specified in the applicable financial reporting framework”.

It has become common practice for companies in the US and Europe to disclose APMs as supplemental information in their annual and quarterly reports. APMs often exceed their comparable earnings measures from applicable financial reporting frameworks because managers often exclude or adjust for certain expenses (Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Isidro & Marques, 2015). When deriving APMs it is common to exclude restructuring charges, write-downs, research and development expenditures, merger and acquisitions costs, mandatory stock compensation expenses, and certain results from subsidiaries (Bradshaw & Sloan, 2002). These excluded items are often considered by the management as “unusual”, “non-recurring”, “non-cash”, or “special items” (Bradshaw & Sloan, 2002).

There are two main reasons to report APMs according to the APM literature and the financial press: to reduce information asymmetry between the company and the market participants or to obtain benefits from employing strategic reporting (Entwistle et al., 2010). The company managements generally argue that APM better express companies’

financial reality than financial statement measures (e.g. Norsk Hydro ASA, 2017; Statoil ASA, 2017; Telenor ASA, 2017), and thus reduces information asymmetry. This claim is supported by several studies finding APMs to be more value relevant than financial statement measures (e.g. Bradshaw & Sloan, 2002; Entwistle et al., 2010).

3.2. Regulation of alternative performance measures

SEC started to regulate APMs in the US by adopting the Sarbanes-Oxley Act in 2002. The first regulations in the early 2000s required public companies to present APMs with their most directly comparable financial statement measures along with a reconciliation between the measures (SEC, 2003). SEC (2016) issued new Compliance and Disclosure Interpretations (CDIs) in 2016 regarding APMs.

Compared to the US, there has been little regulation of APMs in Europe until 2016. ESMA (2016) issued mandatory guidelines for APM disclosure in regulated information published in Europe on or after July 3rd, 2016. The ESMA (2016) guidelines apply to APM in the quarterly and annual reports. They also apply to other published regulated information, for example, ad-hoc disclosures.

3.3. Value relevance of alternative performance measures

Bradshaw and Sloan (2002) studied the relative value relevance of earnings from financial statements and I/B/E/S estimates, using quarterly company observations from 1986-1997. The I/B/E/S estimates are considered good proxies for APMs, and exclude various non-recurring items that are included in financial statement measures. When comparing the earnings coefficients and explanatory power, Bradshaw and Sloan (2002) found evidence of a significant increase in the value relevance of APMs reported by analysts, whereas the value relevance of financial statement measures decreased in the same period. Brown and Sivakumar (2003) drew a similar conclusion in their study, using quarterly data from 1989-1997. By using S&P’s measure of EPS and I/B/E/S estimates to study the relative value relevance, Brown and Sivakumar (2003) conclude that APMs reported by managers and analysts are more value relevant than the S&P measure of EPS.

Bhattacharya et al. (2003) investigated APMs disclosed in companies’ press releases, operating earnings from financial statements and I/B/E/S estimates for EPS from January 1998 to December 2000. Around earnings announcement dates, they investigated short-window abnormal returns and found evidence suggesting that APMs are significantly more informative to investors than operating earnings reported in financial statements. Bhattacharya et al. (2003) also found evidence that I/B/E/S estimates are more value relevant than financial statement measures, which is consistent with the findings from other studies (e.g. Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003). These sources of evidence suggest that investors perceive APMs reported by managements and analyst estimates to better represent “core earnings” than financial statement measures (Bhattacharya et al., 2003).

Albring, Cabán-García, and Reck (2010) investigated the value relevance of APMs using the S&P's measurement of core earnings which use the same exclusions for all companies in the S&P index. Albring et al. (2010) found APMs to be significantly associated with share prices and returns, i.e. APMs are value relevant. Furthermore, their findings suggested that APMs are more value relevant than financial statement measures. Albring et al. (2010) mentioned that their result is limited to the investigated S&P measures of core earnings, but suggest that the findings to some extent can be generalized to other definitions of APMs.

Entwistle et al. (2010) explored the value relevance of management reported APMs, analyst reported APMs, and earnings from the financial statements in the period 2000-2004. Moreover, the study examined which earnings measures were the most value relevant. Entwistle et al. (2010) conducted both price and return regressions, and collected APMs reported in press releases for S&P's 500 companies, I/B/E/S estimates and financial statement measures. All three earnings measures were found to be value relevant. Furthermore, the APMs reported by management were significantly more value relevant than I/B/E/S earnings, and both these earnings measures were more value relevant than financial statement measures (Entwistle et al., 2010). The findings by Entwistle et al. (2010) suggest that managers disclose APMs to inform and not to mislead the market. In addition, they suggest that managements have a better understanding of companies continuing operations than analysts, and communicates this through APM disclosures. Brown and Sivakumar (2003) made a similar argument and suggested that managements' desire to provide the market with more value relevant information through APM disclosures. Moreover, Brown and Sivakumar (2003) also suggest that permanent earnings, such as APMs reported by managements and analysts are more value relevant than transitory earnings.

4. METHODS AND DATA

4.1. Research questions and hypotheses

Two research questions are investigated:

1. Are alternative performance measures value relevant for investors on the Oslo Stock Exchange?
2. Are alternative performance measures more value relevant than financial statement measures?

APM disclosures receive criticism from the financial press and regulators, which claim that APM disclosures are done with strategic intent to mislead investors. Isidro and Marques (2015) found evidence from Europe indicating that managements use APM disclosures to "meet or beat" strategic benchmarks. In addition, researchers have found that APM-earnings almost always exceed financial statement earnings (Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Isidro & Marques, 2015), which supports the criticism that APMs are used with strategic intent. Another view is that managers disclose APMs to contribute with useful information to the market and reduce information asymmetry. Removing transitory or non-cash items from permanent earnings can improve the value relevance (Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003;

Doyle, Lundholm, & Soliman, 2003). Moreover, there are several studies providing evidence that actual management reported APMs are value relevant (e.g. Bhattacharya et al., 2003; Entwistle et al., 2010). Studies also provide evidence that APM is more value relevant than financial statement measures (e.g. Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Brown & Sivakumar, 2003; Entwistle et al., 2010)

Similar to previous studies carried out in the US, we expect APMs to be value relevant for investors on the Oslo Stock Exchange, as well as more value relevant than financial statement measures. Based on the previous literature, and the ongoing discussion about APMs, our hypotheses are formulated as follows:

Hypothesis 1: Alternative performance measures are value relevant for investors on the Oslo Stock Exchange.

Hypothesis 2: Alternative performance measures are more value relevant than financial statement measures for investors on the Oslo Stock Exchange.

4.2. Research models

There are two main approaches to test for value relevance: running price regressions or return regressions. The two approaches address similar, but not exactly the same research questions. To establish if APMs are value relevant, and if APMs are more value relevant than financial statement measures, both price earnings regression and price level regression are estimated. Along with these two regression models, a return regression model is run to control for possible econometric issues that may influence on the price regression estimates. Due to a small sample size, pooled regressions will be performed when examining the three APMs and their comparable financial statement measures.

As a first step of the analysis, the simple price earnings regression will be estimated, which is derived from the earnings model by Miller and Modigliani (1966). The theoretical model underpinning this regression is based on an assumption of perfect and complete markets, which is an unrealistic assumption in capital markets. Still, it is used in the value relevance literature to identify the most value relevant earnings measures (Beisland, 2009; Holthausen & Watts, 2001). In the next step of the analysis, a price level regression is run, which is a regression model derived from the theoretical Ohlson (1995) model. This regression is one of the most common in value relevance studies, since it provides a link between share prices and accounting measures from both the balance sheet and income statement (Stenheim, 2012).

The advantage of the return regression is that it is less affected by econometric problems than price regressions (Kothari & Zimmerman, 1995). Accordingly, the return regression will be estimated as a robustness test.

4.3. Measures of value relevance

The explanatory power (R^2) is considered a measure of value relevance (Beisland, 2009; Holthausen & Watts, 2001). R^2 is a measure of how much variation

in share prices or share returns is explained by the earnings measures of interest and potential control variables. The explanatory power of the different models can be compared to determine the most value relevant earnings measures. Even though the R² comparison is a popular method in accounting research, it is not considered to be a compatible method across samples and across time (Gu, 2007). The explanatory power of a model is only related to its specific sample and underlying population, and consequently, not a suitable method across samples (Gu, 2007). To avoid problems with R² comparisons, data will only be collected where both the APM and its comparable financial earnings measures are available. Consequently, each subsample will consist of the same company-quarter observation for the APM and its comparable financial statement measure. When adding variables to a model, R² will typically increase; hence, adjusted R²s will be compared since it adjusts for the number of variables included in the model (Stock & Watson, 2012).

In addition to R², this study will investigate whether the earnings measures are helpful to explain share prices. An earnings measure can be considered value relevant if the earnings coefficient is significantly different from zero (Holthausen & Watts, 2001). We will test if the difference in the earnings coefficients is statistically significant and test the null hypothesis; that there is no difference between the competing models' coefficients.

Vuong (1989) developed a likelihood-ratio test for model selection and non-nested hypotheses that are commonly used in value relevance studies (e.g. Entwistle et al., 2010; Stenheim, 2012). The Vuong (1989) test will be used to test if the difference between two models' explanatory power is statistically significant. The test provides a Z-statistic for the two competing models, the first model is preferred if the Z-statistic is significantly positive and the second model is preferred if the Z-statistic is significantly negative.

4.4. Definition of variables

The dependent variable share price (price regressions) has a lag of two months due to delayed publication of quarterly reports. According to Norwegian legislation (annulled as of January 1st, 2017), quarterly reports must be published within two months after the quarterly period has ended.

4.4.1. Variables of interest

The variables of interest are APMs as reported in the companies' quarterly reports along with the comparable reported financial statement measures. Based on availability, the financial statement measures are: Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA), Earnings Before Interest and Tax (EBIT), Earnings and Earnings per Share (EPS). EBITDA, EBIT and Earnings are divided by the number of common shares outstanding for each company. APMs are adjusted earnings numbers that are comparable to each of these financial statement measures.

To be considered an APM in this study, the quarterly reports must clearly state that the number is an adjusted financial statement number, that is,

an APM. The APMs are found in the quarterly reports, primarily in additional disclosures (notes) and in the narratives. The APMs and the corresponding as-reported financial statement numbers were often disclosed together in the same table or in the same section of the narratives.

4.4.2. Controlling for company characteristics

To avoid biased estimates and ensure that changes in share prices are due to the earnings variables of interest, and not due to omitted correlated variables, control variables are included in the regressions. The control variables are used to estimate company fixed effects, companies' earnings characteristics and information environment. The value relevance literature has identified several proxies for timeliness and predictability of earnings and some of these will be applied.

In accordance with Entwistle et al. (2010), this study controls for the interest in companies and information environment by including the variable; analyst (Thomson Reuters Datastream variable EPS1NET) as a proxy for analyst followers in the models. This variable is measured as the total number of analyst estimates available in Datastream for each company. The control variable, analyst, is included in the regression as the logarithm of the number of analyst followers for the particular company. This variable also serves as a control for company size (Entwistle et al., 2010). When examining different variables, analyst has a high correlation with other commonly used control variables for scale, such as market value and total assets (Beisland, 2009; Francis & Schipper, 1999).

Growth and risk are determinants of price change, and therefore affect the predictability of share prices (Holthausen & Watts, 2001; Kothari, 2001). To control for growth, the commonly used proxy, market-to-book ratio (Thomson Reuters Datastream variable PTBV) (Ettredge, Kwon, Smith, & Zarowin, 2005) is included as the variable growth in the regression models. To control for companies' financial risk, the proxy leverage ratio (Thomson Reuters Datastream variable WC08221), which is total debt in percent of total capital, is included in the regressions. A company with a relatively high leverage ratio will typically have more risk due to a higher level of debt financing.

When determining control variables, previous literature on value relevance (e.g. Holthausen & Watts, 2001; Kothari, 2001), as well as APM studies (e.g. Entwistle et al., 2010), are consulted. Data were collected from Datastream, but some control variables were unavailable for the Norwegian market, or on a quarterly basis, and therefore not used in this study. The number of analyst followers for each company was not available in Datastream for many companies listed on the Oslo Stock Exchange, and analyst estimates (analyst) in Datastream were the best available substitutes. There were also some problems finding variables to use as proxies for risk available on a quarterly basis. The variable leverage ratio was mainly chosen because it explains a lot of company risk, but also partly due to availability.

4.5. Data and sample

In this study, the hypotheses will be tested using data from the 100 largest companies on the Oslo Stock Exchange measured in market value per May 15th 2017. The APMs and their most comparable financial statement measures are handpicked from companies' quarterly reports and/or presentations in the period 2012 to 2016. The actual sample size was 760 company quarterly observations (Table 1).

Table 1. Data and sample

<i>Quarterly observations</i>			
Total observations	2000		
Bank and Insurance companies	-380		
Company observations not reporting APM of interest	-820		
Observations with deviating fiscal year end	-20		
Missing company observations	-20		
<i>Total sample size</i>	760		
<i>Subsample:</i>	<i>EBITDA-APM & EBITDA</i>	<i>EBIT-APM & EBIT</i>	<i>EPS-APM & EPS</i>
Total sample size	760	760	760
Observations, not containing variable of interest	-543	-467	-504
Missing data for price variable	-3	-2	-2
Missing data for control variables	-6	-5	-4
Outliers	-6	0	0
<i>Subsample total</i>	<i>202</i>	<i>286</i>	<i>250</i>

To make comparison possible, the data were collected exclusively where APMs and their comparable and relevant financial statement measures are disclosed and vice versa. Banks and insurance companies were excluded from the samples since they use deviating accounting principles. In addition, companies without fiscal year-end at 31st of December were excluded. These exclusions are commonly made to avoid biased

estimations (Beisland, 2009; Kothari & Zimmerman, 1995). There were 820 quarterly reports with no disclosure of APMs.

Our observations are divided into three subsamples, with 202 EBITDA-APM and EBITDA observations, 286 EBIT-APM and EBIT observations, and 250 EPS-APM and EPS observations. There were six outliers excluded from the EBITDA-APM/EBITDA subsample.

When sampling book value of equity, shares outstanding, and control variables, the Thomson Reuters Datastream database is used. Some observations were excluded from the sample because of missing control variables. Because the companies included in this study were reporting in different currencies, the Qanda currency converter was used to convert all measures to Norwegian kroner (NOK).

5. RESULTS

5.1. Descriptive statistics

Table 2 shows the summary statistics for the variables of interest along with control variables for each subsample.

As expected, the EBITDA-APM mean of 4.33 is higher than the EBITDA mean of 4.29, and the EPS-APM mean of 1.19 is higher than the EPS mean of 0.63. The EBIT-APM mean, however, is lower than the EBIT mean of 2.25 and 2.36, respectively. This is surprising, considering the criticisms that APMs are used for strategic reasons and tend to exceed financial statement measures (Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Isidro & Marques, 2015).

Table 3 contains the correlation matrices for the earnings measures and control variables. The correlation matrix with EBITDA-APM, EBIT-APM, EPS-APM, and their comparable financial statement measures are presented in Panel A, Panel B and Panel C, respectively.

Table 2. Summary statistics

<i>Panel A: EBITDA-APM and EBITDA</i>						
	<i>Observations</i>	<i>Mean</i>	<i>Median</i>	<i>Standard deviation</i>	<i>Min</i>	<i>Max</i>
Price	202	102,61	61,13	101,68	0,8	422
EBITDA-APM	202	4,33	2,22	5,1	-4,99	34,15
EBITDA	202	4,29	1,95	5,81	-7,45	37,02
BVE	202	54,76	33,96	64,43	1,05	274,22
growth	202	2,08	1,49	1,54	0,2	7,42
leverage ratio	202	33,79	28,46	22,79	0	96,54
analyst	202	2,46	2,56	0,96	0	3,58
<i>Panel B: EBIT-APM and EBIT</i>						
	<i>Observations</i>	<i>Mean</i>	<i>Median</i>	<i>Standard deviation</i>	<i>Min</i>	<i>Max</i>
Price	286	72,64	49,86	62,36	0,8	359
EBIT-APM	286	2,24	1,28	2,88	-1,74	18,62
EBIT	286	2,33	1,23	3,45	-8,04	19,5
BVE	286	36,93	34,26	25,6	1,82	120,29
growth	286	1,93	1,61	1,16	0,23	7,42
leverage ratio	286	30,82	33,57	13,85	0	55,57
analyst	286	2,43	2,4	0,75	0	3,66
<i>Panel C: EPS-APM and EPS</i>						
	<i>Observations</i>	<i>Mean</i>	<i>Median</i>	<i>Standard deviation</i>	<i>Min</i>	<i>Max</i>
Price	250	91,1	60,38	88,65	0,8	4,22
EPS-APM	250	1,18	0,68	3,12	-16,5	13,1
EPS	250	0,63	0,37	4,83	36,83	14,56
BVE	250	61,33	36,54	68,99	-20,9	352,04
growth	250	1,68	1,33	1,69	-10,48	7,39
leverage ratio	250	31,75	29,75	21,88	0	109,22
analyst	250	2,61	2,64	0,71	0	3,66

Table 3. Correlation matrices

Panel A: EBITDA-APM and EBITDA							
	Price	EBITDA-APM	EBITDA	BVE	growth	leverage ratio	analyst
Price	1						
EBITDA-APM	0,7681*	1					
EBITDA	0,7380*	0,9024*	1				
BVE	0,7638*	0,7702*	0,7251*	1			
growth	0,4430*	0,1404*	0,1242*	-0,0918	1		
leverage ratio	0,0133	0,1667*	0,1741*	-0,1017	0,0604	1	
analyst	0,3703*	0,4082*	0,3694*	0,4157*	-0,0961	-0,0512	1
Panel B: EBIT-APM and EBIT							
	Price	EBIT-APM	EBIT	BVE	growth	leverage ratio	analyst
Price	1						
EBIT-APM	0,6950*	1					
EBIT	0,6206*	0,8067*	1				
BVE	0,6948*	0,8049*	0,5984*	1			
growth	0,4973*	0,1577*	0,2039*	-0,0232	1		
leverage ratio	-0,0689	0,0176	-0,0163	0,0582	-0,317*	1	
analyst	0,1512*	0,2899*	0,1563	0,4565*	-0,2376*	0,2101*	1
Panel C: EPS-APM and EPS							
	Price	EPS-APM	EPS	BVE	growth	leverage ratio	analyst
Price	1						
EPS-APM	0,5576*	1					
EPS	0,4285*	0,5707*	1				
BVE	0,6758*	0,4667*	0,2654*	1			
growth	0,3200*	0,1453*	0,1380*	-0,0766	1		
leverage ratio	-0,1342*	-0,3479*	-0,2672*	-0,0692*	-0,322*	1	
analyst	0,4285*	0,3554*	0,1092*	0,3596*	-0,0209	-0,0994	1

5.2. Value relevance of alternative performance measures

Based on the hypotheses and sample size, pooled regressions are run to test *Hypothesis 1*. The price earnings regression and price level regression (Ohlson, 1995) have been estimated for each APM, with and without control variables. All regressions in section 5.2 have been estimated with Huber-White-sandwich robust standard errors (Huber, 1967; White, 1980) because this method can correct for minor problems with heteroscedasticity, normality, and large residuals.

5.2.1. Price earnings regressions controlling for company characteristics

Table 4 presents the estimated price earnings regression with control variables that are known to affect the price earnings model. The APM-coefficients are all positive, and statistically significant at the 1 percent level. The coefficient on EBITDA-APM, EBIT-APM and EPS-APM are 13.73, 13.12 and 13.22, respectively. Non-tabulated results show that similar associations appear when control variables are excluded from the regressions.

The adjusted R² is 72.71 percent, 63.84 percent and 45.07 percent for EBITDA-APM, EBIT-APM and EPS-APM, respectively when controlling for company characteristics. The adjusted R² suggests that the price earnings regressions are improved after including control variables. The adjusted R²s are significantly different from zero, and therefore support *Hypothesis 1*, but the explanatory power might be unusually high due to scale effects (Barth & Clinch, 2009; Gu, 2007). A variance inflation factor

(VIF) test has been conducted for the three models and no severe problems with multicollinearity were found.

5.2.2. Price level regression controlling for company characteristics

Table 5 presents the estimated price level regressions, which are commonly used in value relevance research (Barth et al., 2001; Holthausen & Watts, 2001; Kothari, 2001). The APM-coefficients and the BVE-coefficients are all statistically significant at the 1 percent level. The estimated coefficients on EBITDA-APM, EBIT-APM and EPS-APM are 8.82, 8.35 and 8.79, respectively. For the price level regressions, the earnings coefficients are lower, because share prices are also explained by the book value of equity.

The coefficient on EBITDA-APM, EBIT-APM and EPS-APM is 3.06, 2.76 and 6.57, respectively. The coefficient on EBITDA-APM and EBIT-APM are both statistically significant at the 10 percent level, and the EPS-APM coefficient is statistically significant at the 1 percent level. Non-tabulated results show that the coefficients of the main variables are somewhat more significant when the regressions are run without control variables (significant at the 1 percent level). The explanatory power is 86.50 percent, 75.48 percent and 66.48 percent for the regression with EBITDA-APM, EBIT-APM and EPS-APM, respectively. These adjusted R²s are very high, which can be due to econometric problems, such as scale effects (Barth & Clinch, 2009; Gu, 2007). The VIF test showed no indication of problems with multicollinearity in the three models. The adjusted R²s and APM-coefficients support *Hypothesis 1*; APM is value relevant for investors on the Oslo Stock Exchange.

Table 4. Price earnings regressions controlling for company characteristics: APM

Model specification:			
(1)	Price = $\beta_0 + \beta_1$ EBITDA-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ		
(2)	Price = $\beta_0 + \beta_1$ EBIT-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ		
(3)	Price = $\beta_0 + \beta_1$ EPS-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ		
Variable	(1) Price	(2) Price	(3) Price
Intercept	-21.853 (16.18)	-21.203*** (7.90)	-64.860*** (23.27)
EBITDA-APM	13.727*** (1.53)		
EBIT-APM		13.119*** (1.72)	
EPS-APM			13.220*** (2.80)
growth	24.085*** (3.08)	23.128*** (3.03)	16.204*** (5.44)
leverage ratio	-0.524** (0.26)	0.193 (0.16)	0.630*** (0.16)
analyst	13.269*** (5.00)	5.728** (2.58)	35.742*** (7.03)
Adjusted R-squared	0.7271	0.6384	0.4507
F-test	104.07***	64.86***	13.11***
Observations	202	286	250
<i>Standard errors in parentheses</i>			
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>			
Definition of variables:			
EBITDA-APM	Earnings Before Interest, Tax, Depreciation and Amortisation per share disclosed as an APM		
EBIT-APM	Earnings Before Interest and Tax per share disclosed as an APM		
EPS-APM	Earnings and Earnings per share disclosed as an APM		
growth	Price to Book as proxy variable for growth		
leverage ratio	Total debt in percent of total capital as a proxy for financial risk		
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size		

Table 5. Price level regressions controlling for company characteristics: APM

Model specification:			
(1)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBITDA-APM + β_3 growth + β_4 leverage ratio + β_5 analyst + ϵ		
(2)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBIT-APM + β_3 growth + β_4 leverage ratio + β_5 analyst + ϵ		
(3)	Price = $\beta_0 + \beta_1$ BVE + β_2 EPS-APM + β_3 growth + β_4 leverage ratio + β_5 analyst + ϵ		
Variable	(1) Price	(2) Price	(3) Price
Intercept	-61.736*** (12.04)	-36.241*** (7.07)	-63.330*** (14.61)
BVE	1.040 *** (0.12)	1.539*** (0.18)	0.698*** (0.07)
EBITDA-APM	3.061 * (1.78)		
EBIT-APM		2.758* (1.47)	
EPS-APM			6.573*** (1.55)
growth	32.218 *** (3.10)	26.548*** (2.72)	19.456*** (6.32)
leverage	0.132 (0.19)	0.288** (0.12)	0.487*** (0.17)
analyst	9.184 *** (3.17)	-5.805** (2.77)	21.402*** (5.31)
Adjusted R-squared	0.8650	0.7548	0.6648
F-test	249.60 ***	77.55***	51.08***
Observations	202	286	250
<i>Standard errors in parentheses</i>			
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>			
Definition of variables:			
BVE	Book Value of Equity per share		
EBITDA-APM	Earnings Before Interest, Tax, Depreciation and Amortisation per share disclosed as an APM		
EBIT-APM	Earnings Before Interest and Tax per share disclosed as an APM		
EPS-APM	Earnings and Earnings per share disclosed as an APM		
growth	Price to Book as proxy variable for growth		
leverage	Total debt in percent of total capital as a proxy for financial risk		
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size		

5.3. Value relevance of APMs and financial statement measures

To test *Hypothesis 2*, pooled regressions have been run with the APMs of interest and their comparable financial statement measures. To determine if APMs are more value relevant than their comparable financial statement measures, the relative explanatory power and the estimated coefficients have been examined. All regressions in section 5.3 are estimated with Huber-White-sandwich robust standard errors (Huber, 1967; White, 1980), to control for minor problems with; heteroscedasticity, normality and large residuals.

5.3.1. Price earnings regressions – EBITDA-APM & EBITDA

Table 6 presents the estimated price earnings regressions, including EBITDA-APM and EBITDA, with and without control variables. The coefficients in model (1) and (2), without control variables are positive and statistically significant at the 1 percent level. The results show that EBITDA-APM has the highest coefficient on 15.32, compared to the EBITDA coefficient on 12.91 for model (1) and (2), respectively. This can be interpreted as one unit increase in EBITDA-APM increases the share price

with 15.32 NOK, and one unit increase in EBITDA increases share price with 12.91 NOK. Kothari and Zimmerman (1995) called this the basic price-earnings ratio. The difference between the EBITDA-APM coefficient and the EBITDA coefficient is statistically significant at the 5 percent level, supporting *Hypothesis 2*.

Considering the relative value relevance, the estimated price earnings regressions indicate that EBITDA-APM is the most value-relevant. The adjusted R2s for model (1) and (2) are 58.80 percent and 54.23 percent, respectively. The Vuong (1989) Z-statistic of 0.68 indicates that model (1) with EBITDA-APM is better than model (2) with EBITDA; however, the Z-statistic is not statistically significant.

When controlling for company characteristics, the earnings coefficients are still positive and statistically significant at the 1 percent level in model (3) and (4), with EBITDA-APM and EBITDA, respectively. The APM-coefficient is the highest at 13.73 compared to the EBITDA coefficient at 11.39. The difference between the two earnings coefficients is slightly insignificant at the 10 percent level. The adjusted R2s for model (3) and (4) are 72.71 percent and 70.27 percent, respectively. The Z-statistic of 0.43, when testing the two price earnings models including control variables, is positive towards EBITDA-APM, but not statistically significant.

Table 6. Price earnings regressions: EBITDA

<i>Model specification:</i>				
(1)	Price = $\beta_0 + \beta_1$ EBITDA-APM + ϵ			
(2)	Price = $\beta_0 + \beta_1$ EBITDA + ϵ			
(3)	Price = $\beta_0 + \beta_1$ EBITDA-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
(4)	Price = $\beta_0 + \beta_1$ EBITDA + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
Variable	(1) Price	(2) Price	(3) Price	(4) Price
Intercept	36.331*** (6.83)	47.175*** (7.46)	-21.853 (16.18)	-26.132 (16.45)
EBITDA-APM	15.323*** (1.20)		13.727*** (1.53)	
EBITDA		12.911*** (1.42)		11.385*** (1.60)
growth			24.085*** (3.08)	25.385*** (3.04)
leverage ratio			-0.524 (0.26)	-0.513 (0.26)
analyst			13.269*** (5.00)	18.029*** (5.34)
Adjusted R-squared	0.5880	0.5423	0.7271	0.7027
F-test	161.92***	83.03***	104.07***	82.31***
Observations	202	202	202	202
Vuong Z-statistic	0.6753		0.4278	
P-value	0.4995		0.6688	
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
<i>Definition of variables:</i>				
EBITDA-APM	Earnings Before Interest, Tax, Depreciation and Amortization per share disclosed as an APM			
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization per share as disclosed in financial statements			
growth	Price to Book as proxy variable for growth			
leverage ratio	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

5.3.2. Price level regressions – EBITDA-APM & EBITDA

The estimated price level regressions with EBITDA-APM and EBITDA are presented in Table 7.

All coefficients are positive, and statistically significant at the 1 percent level in model (1) and

(2). The coefficient for EBITDA-APM is higher than EBITDA at 8.21 and 6.80, respectively. The adjusted R2s at 65.95 percent and 65.14 percent for model (1) and (2), respectively, suggesting very little difference in value relevance. This is supported by the highly insignificant Vuong (1989) Z-statistic of 0.26.

The earnings coefficients in model (3) and (4), when controlling for company characteristics, are positive and statistically significant at the 10 percent and the 5 percent level, respectively. The coefficients are 3.06 and 2.90 for EBITDA-APM and EBITDA,

respectively. The adjusted R2s are almost equal when comparing model (3) and model (4), at 86.50 percent and 86.85 percent, respectively. The Vuong (1989) test has a slightly negative and not statistically significant Z-statistic of -0.47.

Table 7. Price level regressions: EBITDA (Part I)

Model specification:				
(1)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EBITDA-APM} + \epsilon$			
(2)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EBITDA} + \epsilon$			
(3)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EBITDA-APM} + \beta_3 \text{growth} + \beta_4 \text{leverage ratio} + \beta_5 \text{analyst} + \epsilon$			
(4)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EBITDA} + \beta_3 \text{growth} + \beta_4 \text{leverage ratio} + \beta_5 \text{analyst} + \epsilon$			
Variable	(1)	(2)	(3)	(4)
	Price	Price	Price	Price
Intercept	27.881*** (5.28)	31.766*** (5.26)	-61.736*** (12.04)	-61.016*** (11.69)
BVE	0.668*** (0.12)	0.761*** (0.11)	1.040*** (0.12)	1.035*** (0.10)
EBITDA-APM	8.821*** (1.75)		3.061 (1.78)	
EBITDA		6.795*** (1.44)		2.902** (1.31)
growth			32.218*** (3.10)	32.290*** (2.98)
leverage ratio			0.132 (0.19)	0.116 (0.18)
analyst			9.184*** (3.17)	9.489*** (3.13)
Adjusted R-squared	0.6595	0.6514	0.8650	0.8685
F-test	315.04***	277.08***	249.60***	261.57***
Observations	202	202	202	202
Vuong Z-statistic		0.2606		-0.4729
P-value		0.7944		0.6363
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
Definition of variables:				
BVE	Book Value of Equity per share			
EBITDA-APM	Earnings Before Interest, Tax, Depreciation and Amortisation per share disclosed as an APM			
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation per share as disclosed in financial statements			
rowth	Price to Book as a proxy variable for growth			
everage ratio	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

5.3.3. Price earnings regressions – EBIT-APM & EBIT

Table 8 presents the estimated simple earnings regressions with EBIT-APM and EBIT, with and without control variables. In model (1) and (2), all coefficients are positive and statistically significant at the 1 percent level. EBIT-APM has the highest coefficient of 15.04 compared to the EBIT coefficient 11.23. When considering model (3) and (4), including control variables, the EBIT-APM coefficient 13.12 and the EBIT coefficient 9.11, are both statistically significant at the 1 percent level. In the models with and without control variables, the difference between the EBIT-APM and EBIT coefficients is statistically significant at the 1 percent level.

The estimated coefficients suggest that EBIT-APM is more value relevant than EBIT, supported by the relative adjusted R2s in the estimated price earnings regressions. The explanatory power of model (1) and (2) are 48.12 percent and 38.30 percent for EBIT-APM and EBIT, respectively. The Vuong (1989) test favours model (1) with Z-statistic 1.59, however, it is slightly insignificant at the 10 percent level. The explanatory power of model (3)

and (4) are 63.84 percent and 55.20 percent for EBIT-APM and EBIT, respectively. The Vuong (1989) test comparing model (3) and (4) favours EBIT-APM with the Z-statistic of 2.05. The Z-statistic is statistically significant at the 5 percent level. These findings are relatively strong considering the sample size, and support *Hypothesis 2*; APM is more value relevant than financial statement measures.

5.3.4. Price level regressions – EBIT-APM & EBIT

Table 9 presents the estimated price level regressions with EBIT-APM and EBIT. In model (1) and (2), the estimated coefficients are positive and significant at the 1 percent level. The coefficients are 8.35 and 5.78 on EBIT-APM and EBIT, respectively. The coefficients suggest that EBIT-APM is more value relevant than EBIT, but the difference between the two coefficients is not statistically significant. The adjusted R2s are 53.18 percent for model (1), and at 54.49 percent for model (2). Considering the relative value relevance, this suggests a very small difference in favour of EBIT. The Vuong (1989) test comparing model (1) and (2) is not statistically significant.

Table 8. Price earnings regressions: EBIT

Model specification:				
(1)	Price = $\beta_0 + \beta_1$ EBIT-APM + ϵ			
(2)	Price = $\beta_0 + \beta_1$ EBIT + ϵ			
(3)	Price = $\beta_0 + \beta_1$ EBIT-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
(4)	Price = $\beta_0 + \beta_1$ EBIT + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
Variable	(1) Price	(2) Price	(3) Price	(4) Price
Intercept	38.875*** (3.53)	46.411*** (3.64)	-21.203*** (7.90)	-35.684*** (10.48)
EBIT-APM	15.041*** (2.07)		13.119*** (1.72)	
EBIT		11.231*** (1.57)		9.105*** (1.36)
rowth			23.128*** (3.03)	24.093*** (3.17)
verage ratio			0.193 (0.16)	0.208 (0.18)
analyst			5.728** (2.58)	14.088*** (3.38)
Adjusted R-squared	0.4812	0.3830	0.6384	0.5520
F-test	52.69***	51.23***	64.86***	59.28***
Observations	286	286	286	286
Vuong Z-statistic	1.5854		2.0490	
P-value	0.1129		0.0405	
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
Definition of variables:				
EBIT-APM	Earnings Before Interest and Tax per share disclosed as an APM			
EBIT	Earnings Before Interest and Tax per share as disclosed in financial statements			
rowth	Price to Book as a proxy variable for growth			
verage	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

Table 9. Price level regressions: EBIT

Model specification:				
(1)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBIT-APM + ϵ			
(2)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBIT + ϵ			
(3)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBIT-APM + β_3 growth + β_4 leverage ratio + β_5 analyst + ϵ			
(4)	Price = $\beta_0 + \beta_1$ BVE + β_2 EBIT + β_3 growth + β_4 leverage ratio + β_5 analyst + ϵ			
Variable	(1) Price	(2) Price	(3) Price	(4) Price
Intercept	19.334*** (4.04)	13.837*** (3.88)	-36.241*** (7.07)	-37.846*** (6.69)
BVE	0.936*** (0.20)	1.227*** (0.13)	1.539*** (0.18)	1.566 (0.12)
EBIT-APM	8.346*** (2.49)		2.758* (1.47)	
EBIT		5.775*** (1.44)		2.667*** (0.91)
growth			26.548*** (2.72)	26.117*** (2.59)
leverage ratio			0.288** (0.12)	0.288** (0.12)
analyst			-5.805** (2.77)	-5.226** (2.65)
Adjusted R-squared	0.5318	0.5449	0.7548	0.7625
F-test	56.73***	65.71***	77.55***	84.48***
Observations	286	286	286	286
Vuong Z-statistic	-0.5437		-1.1487	
P-value	0.5866		0.2507	
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
Definition of variables:				
BVE	Book Value of Equity per share			
EBIT-APM	Earnings Before Interest and Tax per share disclosed as an APM			
EBIT	Earnings Before Interest and Tax per share as disclosed in financial statements			
rowth	Price to Book as proxy variable for growth			
leverage ratio	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

Model (3) and (4) are controlling for company characteristics with EBIT-APM and EBIT, respectively. The estimated EBIT-APM coefficient is 2.76, which is

statistically significant at the 10 percent level and the EBIT-coefficient is 2.67, which is significant at the 1 percent level. The adjusted R2s are 75.48

percent for model (3) and 76.25 percent for model (4), which suggests that EBIT is slightly more value relevant; hence, not supporting *Hypothesis 2*. The Vuong (1989) test is not statistically significant.

5.3.5. Price earnings regressions – EPS-APM & EPS

Table 10 presents the estimated price earnings regressions with EPS-APM and EPS.

Model (1) and (2) are estimated regressions on EPS-APM and EPS, respectively, without control variables. The earnings coefficients 15.83 and 7.86 on EPS-APM and EPS, respectively, are statistically significant at the 1 percent level. The APM coefficient is the highest, and the difference between the two earnings coefficients is statistically significant at the 1 percent level.

After including control variables, the earnings coefficients are still positive and statistically significant at the 1 percent level in model (3)

and (4). The EPS-APM coefficient in model (3) is the highest at 13.22 compared to the EPS coefficient at 6.77. The difference between the two earnings coefficients is statistically significant at the 5 percent level.

Considering the relative value relevance, the price earnings regressions indicate that EPS-APM is more value relevant than EPS. The adjusted R2 for model (1) is at 30.81 percent compared to 18.03 percent for model (2). The Vuong (1989) test supports that EPS-APM is more value relevant with the positive Z-statistic 1.99, statistically significant at the 5 percent level. The adjusted R2 when including control variables is at 45.07 percent for model (3) compared to 40.79 percent for model (4). The Vuong (1989) test has a positive Z-statistic which favours the APM-model, but this test-result is not statistically significant. The estimated earnings coefficients in model (1) to (4), and the explanatory power of model (1) and (2) support *Hypothesis 2*.

Table 10. Price earnings regressions: EPS

Model specification:				
(1)	Price = $\beta_0 + \beta_1$ EPS-APM + ϵ			
(2)	Price = $\beta_0 + \beta_1$ EPS + ϵ			
(3)	Price = $\beta_0 + \beta_1$ EPS-APM + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
(4)	Price = $\beta_0 + \beta_1$ EPS + β_2 growth + β_3 leverage ratio + β_4 analyst + ϵ			
Variable	(1)	(2)	(3)	(4)
	Price	Price	Price	Price
Intercept	72.347*** (5.82)	86.166*** (5.32)	-64.860*** (23.27)	-86.520*** (21.09)
EPS-APM	15.832*** (2.75)		13.220*** (2.80)	
EPS		7.858*** (2.14)		6.774*** (1.84)
growth			16.204*** (5.44)	16.361*** (4.34)
leverage ratio			0.630*** (0.16)	0.426** (0.18)
analyst			35.742*** (7.03)	50.816*** (7.95)
Adjusted R-squared	0.3081	0.1803	0.4507	0.4079
F-test	33.16***	13.52***	13.11***	23.29***
Observations	250	250	250	250
Vuong Z-statistic	1.9866		0.7285	
P-value	0.0470		0.4663	
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
Definition of variables:				
EPS-APM	Earnings Per Share disclosed as an APM			
EPS-APM	Earnings Per Share as disclosed in financial statements			
rowth	Price to Book as proxy variable for growth			
verage ratio	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

5.3.6. Price level regressions – EPS-APM & EPS

The estimated price level regressions for EPS-APM and EPS, with and without control variables, are presented in Table 11. The models have positive and statistically significant earnings coefficients at the 1 percent level. In the basic model (1) and (2), the coefficients are 8.79 and 4.92 on EPS-APM and EPS, respectively. The size of the coefficients suggests that EPS-APM is more value relevant, and the difference between the earnings coefficients is statistically significant at the 1 percent level. The explanatory power of model (1) with EPS-APM is at 52.79 percent, and 51.96 percent in model (2) with EPS. The Vuong (1989) test comparing model (1) and (2) has a Z-statistic of 0.22, which is highly insignificant.

When controlling for company characteristics, the estimated EPS-APM-coefficient is 6.57 in model (3), which is higher than the estimated EPS-coefficient 4.23 in model (4). The higher EPS-APM coefficient suggests that EPS-APM is more value relevant than EPS, but the difference between the two earnings coefficients is slightly insignificant. The adjusted R2 at 66.48 percent for model (3) and the adjusted R2 at 67.63 percent for model (4), suggest that model (4) has slightly more explanatory power. The Vuong (1989) Z-statistic is -0.53 in favour of model (4), but not statistically significant. The earnings coefficients in model (1) to (4), suggest that EPS-APM is more value relevant than EPS; however, this is not supported by the relative adjusted R2s.

Table 11. Price level regressions: EPS

Model specification:				
(1)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EPS-APM} + \epsilon$			
(2)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EPS} + \epsilon$			
(3)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EPS-APM} + \beta_3 \text{growth} + \beta_4 \text{leverage ratio} + \beta_5 \text{analyst} + \epsilon$			
(4)	Price = $\beta_0 + \beta_1 \text{BVE} + \beta_2 \text{EPS} + \beta_3 \text{growth} + \beta_4 \text{leverage ratio} + \beta_5 \text{analyst} + \epsilon$			
Variable	(1) Price	(2) Price	(3) Price	(4) Price
Intercept	38.824*** (5.07)	40.371*** (5.83)	-63.330*** (14.61)	-73.886*** (15.86)
BVE	0.683*** (0.08)	0.777*** (0.10)	0.698*** (0.07)	0.736*** (0.10)
EPS-APM	8.792*** (1.76)		6.573*** (1.55)	
EPS		4.915*** (1.09)		4.227*** (1.01)
growth			19.456*** (6.32)	19.520*** (5.84)
leverage ratio			0.487*** (0.17)	0.438** (0.17)
analyst			21.402*** (5.31)	27.070*** (6.42)
Adjusted R-squared	0.5279	0.5196	0.6648	0.6763
F-test	74.28***	60.95***	51.08***	59.38***
Observations	250	250	250	250
Vuong Z-statistic		0.2171		-0.5310
P-value		0.8281		0.5955
<i>Standard errors in parentheses</i>				
<i>Significance levels: * p<0.10, ** p<0.05, *** p<0.01</i>				
Definition of variables:				
BVE	Book Value of Equity per share			
EPS-APM	Earnings Per Share disclosed as an APM			
EPS	Earnings Per Share as disclosed in financial statements			
growth	Price to Book as proxy variable for growth			
leverage ratio	Total debt in percent of total capital as a proxy for financial risk			
analyst	Logarithm of number of EPS analyst estimates provided in the Datastream database as a proxy for information environment and size			

6. DISCUSSION

There are several studies examining the value relevance of alternative performance measures (APMs). Most of these are conducted on US data (e.g. Bhattacharya et al., 2003; Bradshaw & Sloan, 2002; Entwistle et al., 2010). To the best of our knowledge, we are the first to study the value relevance of APMs in the form of EBITDA, EBIT and EPS in Norway.

Based on previous literature, we expected APMs reported by firms listed on the Oslo Stock Exchange to be value relevant (*Hypothesis 1*), and more value relevant than comparable financial statement measures (*Hypothesis 2*). We got strong support for *Hypothesis 1*, but somewhat weaker support for *Hypothesis 2*. The explanatory power, which is considered to be a measure of value relevance (Barth et al., 2001; Entwistle et al., 2010; Francis & Schipper, 1999; Holthausen & Watts, 2001), is significantly different from zero supporting *Hypothesis 1*. Hence, APMs are value relevant. However, the explanatory power in the estimated price regressions is high, which might be due to econometric problems such as scale effects (see e.g. Barth & Clinch, 2009; Gu, 2007). The APM coefficients strengthen the evidence that APMs are value relevant, since they are significantly different from zero, in accordance with incremental-association studies (Holthausen & Watts, 2001).

When investigating which earnings measure being the most value relevant (*Hypothesis 2*), there were some problems of weak statistical significance. This was not entirely unexpected, considering the small sample size. The most interesting findings, supporting *Hypothesis 2*, were the price earnings regressions where the relative explanatory power in

favour of EBIT-APM was statistically significant. The price earnings regressions' relative explanatory power was also statistically significant in favour of EPS-APM. This was, however, not the case for the price level regressions including book value of equity as additional explanatory variable.

To further examine the relative value relevance, the difference in estimated coefficients were tested. The results showed that the APM coefficients were statistically larger than the financial statement measure coefficients, in all except for one price earnings model. For the price level regressions, however, the difference is statistically significant in only one case. Still, in sum, these findings are supportive of *Hypothesis 2*, but weak when considering the statistically insignificant results for the price level models.

The results suggest that the APMs reflect information that is found price relevant by the investors, which indicates that reporting of APMs is a good supplement to financial statement measures and is informing rather than misleading investors. This is supported by Entwistle et al. (2010), who find evidence that APMs are more value relevant than both financial statement measures and analyst forecast estimates.

The price models used in this study are based on the assumption of linearity. This assumption can be violated if there are omitted variables correlated with share prices, and consequently result in biased coefficients and R² estimates (Stock & Watson, 2012). Barth and Clinch (2009) identify possible scale effects in capital market-based accounting research where a company's size can affect other aspects such as the restructuring of equity, the persistence of economic returns, and how likely they

are to survive negative earnings. Trying to avoid these effects, the price models were estimated with variables divided by the number of shares, which according to Barth and Clinch (2009) is an effective proxy for scale effects, resulting in less biased estimates. Proxies for growth, financial risk, size and information environment were included, to avoid biased results due to possible omitted correlated variables. Furthermore, the regressions were estimated with robust standard errors to control for some of the scale effects arising from heteroscedasticity (Huber, 1967; White, 1980). However, the adjusted R²s might still be somewhat inflated due to econometric problems.

The estimated return regressions have been conducted as a robustness test, because return regressions, according to Kothari and Zimmerman (1995) are less subject to severe econometric problems than the price regressions. The estimated return regressions provided weak results. Return regressions are most appropriate when considering new accounting information that is presented to the market within the return interval. However, price regressions are better suited to test the hypotheses in this study, since book value and earnings measures summarize information relevant when forecasting a company's future performance (Barth & Clinch, 2009). The second robustness test which involves testing three months lag in share prices, ensures that the market has sufficient time to react to the earnings announcements in the main models with two months lag in share prices. When considering the earnings coefficients and explanatory power of the estimated regressions, the robustness test provides similar results as the regression using a two-month lag in share prices. This confirms that a two-month lag is a sufficient time for the market to respond to earnings announcements.

7. CONCLUSION

7.1. Main findings

This study has examined whether alternative performance measures (APMs) are value relevant and whether APMs are more value relevant than financial statement measures. Pooled regressions have been estimated with quarterly data from the 100 largest companies listed on the Oslo Stock Exchange, from 2012 to 2016. The variables of interest were the

APMs for EBITDA, EBIT, EPS and their comparable financial statement measures.

We find APMs to be value relevant for investors on the Oslo Stock Exchange. However, when considering whether APMs are more value relevant than financial statement measures, we find mixed results. The price earnings model supports our expectations that APMs are more value relevant than financial statement measures for EBIT and EPS. In the price level model, the relative value relevance is not statistically significant in favour of either APMs or financial statement measures. Our expectation that APMs are more value relevant than financial statement measures is supported by the two price regressions' estimated coefficients for EBIT and EPS. However, both models provide inconclusive results for EBITDA. Therefore, we cautiously conclude that APMs are more value relevant than financial statement measures for investors on the Oslo Stock Exchange.

As noted in this paper, critics of APM claim that APMs are used for strategic reasons, and can be misleading for investors. Another view is that APM reporting can be seen as an indication that financial statement measures are lacking usefulness. Our findings support the second view and suggest that companies disclose APMs to inform rather than to mislead the market.

7.2. Limitations and further research

The study has several limitations, which should be kept in mind when interpreting the results. The relatively small sample size is the most profound limitation and may have contributed to the weak statistically significant results. The Oslo Stock Exchange is a small equity market with approximately 200 listed companies, and because of time constraints and the effort involved in hand-picking data, we were only able to collect data from the 100 largest companies. A larger sample would presumably result in more statistically significant findings. Finally, this study examined only Norwegian listed companies, and therefore, the study also has limitations in terms of the generalizability of the results. A suggestion for future research would, therefore, be to increase the sample size by including more companies from the Oslo Stock Exchange. Another suggestion is to include companies from other stock exchanges to enhance generalizability.

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