1 INTRODUCTION

An anomalous relationship between publicly available financial statement information and future abnormal stock returns has been well, if not indisputably, established since it first appeared in the Ball and Brown (1968) study. The topic continues to attract the interest of researchers and especially during the last decade the daunting amount of published research bears witness to the perceived importance of the subject.

Ball and Brown (1968) are the first to document the predictive properties of corporate earnings for future abnormal stock returns. McKibben (1972) extends the topic by including price to earnings and dividend payout ratios in his analysis. Ou and Penman (1989) take a step forward by integrating a large collection of accounting variables into one measure that is utilized for the purpose of forecasting future excess returns. They find that publicly available historical fundamental information does indeed make possible the prediction of future earnings and excess returns. These findings are confirmed by other studies of the US market conducted by Holthausen and Larcker (1992), Lev and Thiagarajan (1993), and Abarbanell and Bushee (1997, 1998). Charitou and Panagiotides (1999) report corresponding findings for the UK market. Further, Martikainen et al. (1993), Booth et al. (1996, 1997), Kallunki (1996), and Kallunki and Martikainen (1997) document similar findings for the Finnish stock market.

This paper contributes to prior research in two major ways. First, ever since the study of Ou and Penman (1989), the annual change, or first derivative, of accounting variables has been rather routinely used without further discussion, *implying* that investors expect no change from one period to another in the investigated accounting variables. The present study provides evidence indicating that for some accounting variables investors expect past changes to persist and therefore interpret new changes in the context of past changes. More specifically, the empirical findings indicate that the second derivatives of some accounting variables contain information incremental to the information contained in the first derivatives of the same accounting variables. Second, the seemingly infinite question of whether the connection between publicly available financial statement information and future abnormal stock returns actually represents market inefficiency, or simply risk premium, is tackled with a new methodology. The analysis leads to the conclusion that some of the investigated accounting variables that show a significant connection with future abnormal returns actually proxy changes in company risk, whereas others contain new information that is priced by the market with a delay.

The paper is organized as follows: section 2 introduces the hypotheses; section 3 discusses the accounting variables; section 4 describes the data set; section 5 presents the results; section 6 presents a summary of the study.

2 HYPOTHESES

The paper investigates two novel hypotheses; one regarding how investors interpret new accounting information and the other regarding how to control for the joint-hypothesis problem.

2.1 A conditional information interpretation hypothesis

The use of the first derivative[1] of accounting variables to forecast future abnormal returns implies an assumption of the market expecting a zero change in accounting variables. If the value of an accounting variable is constant, the accounting variable provides neutral information about future returns and about otherwise either positive or negative information. Using the first derivative of accounting variables hence implies that, for instance, an increase in sales between periods t–1 and t will be interpreted by the market as a positive signal, and consequently that zero growth is expected.

However, conventional wisdom and empirical evidence[2] suggests that that the growth between period t–2 and t–1 is a more widespread expectation for the growth for the period t–1 to t, than is zero growth. For instance, in this setting the sales accounting variable is interpreted to be a positive signal if the growth during the period t–1 to t exceeds that of the period t–2 to t–1. Consequently, the assumption implies that the second derivative of the accounting variable contains information that will be priced by the market. The second derivative[3] of accounting variable S at time t is constructed according to the following specification:

$$\Delta^2 S_t = ((S_t - S_{t-1})/|S_{t-1}|) - ((S_{t-1} - S_{t-2})/|S_{t-2}|) \quad (1)$$

It seems clear that we cannot expect this assumption to hold for all accounting variables. For example, for accounting variables that are constructed as relative measures, and hence are expected to be stable[4], the first derivative can be expected to contain more information with respect to future abnormal returns than the second derivative. However, in order to not restrict the empirical analysis excessively, we will not attempt to discriminate between the two types of accounting variables ex-ante.

1 The first derivative ΔS_t is in this paper defined as $\Delta S_t = (S_t - S_{t-1}) / |S_{t-1}|$, and is hence a scaled first derivative. Further, the denominator is in absolute value, as it may take negative values.

2 For instance Bernard and Thomas (1990) find that investors behave as they would expect seasonally differenced earnings growth to be positively auto-correlated.

3 The second derivative is not scaled – as the first derivative – since scaling easily would yield extreme values due to small denominators.

4 For instance Return On Invested Capital (ROIC). Lev (1969) suggests that the industry mean should be the equilibrium level for any financial ratio.

2.2 Market inefficiency versus the risk shift hypothesis

The market inefficiency hypothesis argues that the anomalous connection between publicly available financial statement information and future abnormal stock returns is a consequence of stock prices gradually adapting to new financial statement information[5]. The risk shift hypothesis, on the other hand, argues that the observed abnormal returns are in fact simply risk premiums induced by changes in company risk, which are signaled by new financial statement information. The difficulty of these hypotheses is one of empirical verification.

Consider a certain accounting variable S_t for a specific company at a certain disclosure date t. According to the risk-shift hypothesis, if the market is efficient and the investigated accounting variable S_t proxies for changes in company risk we should witness:

I) statistically significant parameter estimate for accounting variable S_t estimated against disclosure day t abnormal returns
II) statistically significant parameter estimate for accounting variable S_t estimated against abnormal returns for the time period t+1 to t+X, where $X > 0$
III) *inverse signs* for the parameter estimates in I) and II)

Assume that new financial statement information is released to the market at time t and that accounting variable S_t indicates an increase in the risk of the company. As indicated by the risk-shift hypothesis, the expected return to the company stock will increase due to the increased risk and hence, on the assumption of market efficiency, generate future returns that exceed the expected returns indicated by the old benchmark that anticipates less risk. However, investors will also immediately at date t discount the company stock with a higher discount rate and thus generate returns for date t that are less than the expected returns indicated by the old benchmark. Thus in this case we should witness negative abnormal returns for disclosure date t and positive cumulative abnormal returns for future periods (t+1 to t+X). In the case of reduced company risk, the inverse is expected under the risk-shift hypothesis. It should finally be stressed that the methodology naturally also holds for parameter estimates showing signs inverse to those expected (possibly indicating a correlation with some unknown variable).

The methodology proposed above should hence account for the joint-hypothesis problem[6], which emerges due to long return windows in association[7] type studies. This is true since

5 The market is hence "adaptively efficient" as discussed by Daniel and Titman (2000), but inefficient according to the Fama (1970) semi-strong criteria.

6 As Fama (1970) points out, tests for market efficiency are always *relative* to some asset-pricing model. Consequently, we can never be certain of whether observed deviations from expected returns represent market inefficiency or simply misspecification of the asset-pricing model. Fama (1991) argues that *short* (a few days) window event studies are the most robust tests with respect to the joint-hypothesis problem, as the expected returns for a

if the information disclosed at date t correlates with later disclosed information indicating changes in risk, an efficient market should immediately at date t discount the expected new information about changes in risk into the price of the stock.

To strengthen the validity of the methodology, we also investigate cumulative abnormal returns prior to and including the disclosure dates (t–30 to t, t–14 to t and t–7 to t). It is then possible to control for the possibility that risk shifts occur before disclosure dates due to information leakages before the official disclosure of new information.

3 ACCOUNTING VARIABLES

Two collections of accounting variables are created to reflect changes in company economic performance. The first accounting variable collection builds upon earlier US research, and the second accounting variable collection is constructed to fit Finnish financial statement data. Both collections include company earnings and five other accounting variables.

3.1 The Abarbanell and Bushee accounting variable collection

The defined accounting variables are intrinsically a subset of the ones used by Abarbanell and Bushee (1998)[8]. The accounting variables used by Abarbanell and Bushee (1998) are originally identified by Lev and Thiagarajan (1993) by searching a wide array of financial newspapers and publications for factors that are generally perceived to express quality of earnings. Lev and Thiagarajan (1993) justify a guided search procedure by arguing that the selected accounting variables have an "intuitive appeal to students and practitioners" and by that we then avoid the problem of highly counter-intuitive accounting variables that may correlate with other unidentified variables[9]. The accounting variables are listed in Table 1 and briefly described according to the guidelines of Lev and Thiagarajan (1993) and Abarbanell and Bushee (1998).

short period of time can be expected to be negligible compared to the rather large price reactions. Event studies with longer event windows however suffer from the joint-hypothesis problem.

7 Collins and Kothari (1989) classify earnings-returns studies into event studies and associative studies. They define event studies as studies that, by using a short event window of (in general a few days), seek to isolate the stock price reaction per se to new earnings information. Associative studies, on the other hand, are defined as studies that investigate stock returns during longer periods after the announcement of new financial statement information. Associative studies hence allow investors to take part of and react to incremental information, which might correlate with the initial information, that is disclosed after the initial information disclosure.

8 Mathematical adjustments were made to the definitions of the signals in order to accommodate for calculating the second derivatives of the signals. The signal collection is applied on Finnish data with as few adjustments as possible, even though the information content of for instance the Effective Tax Rate is somewhat questionable, in order to produce a benchmark to the other accounting variable collection, which is created to fit Finnish accounting data.

9 For instance, Ou and Penman (1989) find the rather counterintuitive Sales / Total Cash to be highly significant.

TABLE 1. Accounting variables included in the Abarbanell and Bushee accounting variable collection.

Accounting variable	Definition
Earnings	Net Income[10]
Inventory	Sales / Inventory
Accounts Receivable	Sales / Accounts Receivable
Gross Margin	Gross Margin / Sales
Effective Tax Rate	Taxes / EBT
Labor Force	Sales / Employees

A relative increase in sales to inventory is interpreted as a predictor of a rise in future earnings. When inventories grow faster than sales, it is interpreted as a predictor of a fall in future earnings as it suggests difficulties in generating sales. Inventory increases in relation to sales imply that earnings will decline in the future as the company seeks to lower inventory levels. Relative increases in inventories may also suggest that the company has slow moving or obsolete inventories that will be written off in the future and thereby not generate cash flows.

A relative increase in sales to accounts receivable is interpreted as a predictor of a rise in future earnings. Decreases in sales to accounts receivable may signal difficulties in generating true sales, which generally triggers credit extensions. Furthermore, when accounts receivable grow faster than sales, it might also be a signal of problems in collecting outstanding receivables and thereby of approving credit extensions.

A relative increase in the gross margin relative to sales is interpreted as a predictor of a rise in future earnings and vice versa. The gross margin is in general a good measure of the firm's input and output prices, which reflect fundamental underlying factors such as competition and operating leverage. Thus this accounting variable should be a good indicator for the company's long-term performance.

A relative increase in the effective tax rate not attributable to permanent factors, such as changes in the tax laws, is interpreted as a predictor of a rise in future earnings and vice versa. This intuition springs from the belief that an increase in the effective tax rate indicates reduced possibilities for deducting prior losses from current earnings due to several subsequent profitable periods[11].

10 Net income is defined as reported earnings adjusted for the effect of extraordinary expenses and extraordinary income.

11 Since 1.1.1993 losses may be deducted from profits during the ten following fiscal years in Finland. Before that, losses could be deducted during the five following fiscal years.

The labor force accounting variable measures the change in sales per employee and is intended to reflect changes in both the number of employees and the efficiency of labor. Financial analysts generally comment favorably on announcements of labor force reductions, as these are seen as decisive means of improving the profitability of the company and hence enhancing future earnings. Increased sales per employee when the number of employees is constant implies increased efficiency and improved future earnings.

Four of the accounting variables used by Abarbanell and Bushee (1998) are excluded from this study for various reasons. The excluded accounting variables and the reasons for their exclusion are presented in Table 2.

TABLE 2. Abarbanell and Bushee (1998) accounting variables that are excluded from the study.

Accounting variable	Reason for exclusion
Capital Expenditures	Not compulsory information in Finland
Selling and Administrative Expenses	Not compulsory information in Finland
Earnings Quality	Not available (LIFO versus FIFO)
Audit Qualification	Not meaningful in Finland (all companies listed on the HSE are unqualified)

3.2 The Laitinen accounting variable collection

The accounting variable collection is constructed according to the guidelines of the very extensive work of Laitinen (1990) in the field of bankruptcy prediction in Finland[12]. The aim is to create a collection of accounting variables which fits the Finnish equity market and which combines different dimensions of company performance. The selected accounting variables are defined in Table 3 and briefly discussed below.

TABLE 3. The Laitinen accounting variable collection.

Accounting variable	Definition
Earnings	Net Income
Quick ratio	(Cash + Short-Term Securities + Accounts Receivables) / Current liabilities
Dynamic Liquidity	Cash Surplus 2[13] / Sales
Capital Structure	Shareholders' equity / (Shareholders' equity + Current liabilities + long-term liabilities)
Return On Assets	EBIT / Average total assets
Sales	Sales

12 Refer to Laitinen (1990): 194–244 for a summary of the alternative accounting variables.
13 Cash Surplus 2 is defined as the operating cash flow (sales subtracted by fixed and variable costs).

The quick ratio accounting variable expresses a change in the ability of a company to meet its current liabilities, thus expressing the short-term liquidity dimension of the company. Depending on whether the accounting variable is viewed from a bankruptcy or an agency cost perspective, the accounting variable may be either positive or negative. From a bankruptcy perspective an increase in short-term liquidity is viewed as a positive indication, as it decreases the probability of bankruptcy on account of the failure of a company to meet its short-term debt commitments and hence increases the expected future earnings. From an agency cost perspective an increase in short-term liquidity may increase the risk of the excessive consumption of perks by management.

The dynamic liquidity accounting variable expresses the long-term liquidity dimension of the company. The dynamic liquidity accounting variable expresses the ability of the company to generate cash flows from sales and is hence expected to be positively associated with company earnings quality. Dynamic liquidity can be expected to be an important determinant of company value due to the connection with cash flows, which in turn are widely used in valuation.

The capital structure accounting variable expresses the change in equity relative to total capital and thus represents the solidity dimension of the company. Again, the accounting variable can be expected to be either positive or negative depending on whether the accounting variable is viewed from a bankruptcy or agency cost perspective. From a bankruptcy perspective an increase in solidity is seen as a positive indication for value, as it decreases the probability of bankruptcy and hence increases the expected future earnings. From an agency cost perspective, on the other hand, an increase in solidity might increase the risk of excessive consumption of perks by management.

The return on assets accounting variable expresses the change in earnings relative to average total assets before the payment of interest and taxes. This accounting variable thus represents the profitability dimension of the company. The information contained in the return on assets accounting variable differs from that contained in company earnings, as earnings might change both due to changes in profitability and changes in sales. The return on assets accounting variable is expected to be positively associated with company value and thus a positive correlation is also expected between the accounting variable and abnormal returns.

The sales accounting variable expresses the change in sales. This accounting variable thus represents the growth dimension of the company. Since company earnings are a function of sales and the sales margin, we expect the sales accounting variable to be positively correlated with company value and abnormal returns.

4 DATA SET

Company disclosure data for the years 1994 through 1999 are investigated. All of investigated companies have fiscal years ending in December and are listed on the Helsinki Stock Exchange (hereafter HEX).[14] The stock price data set is obtained from the Datastream information service and is corrected for splits and dividends by reinvesting the proceeds in the stocks. Financial statement data for the years 1991–1998 is obtained from the Department of Accounting at the Swedish School of Economics and Business Administration, Helsinki.

Exact disclosure dates for all companies for the years 1994–1999 are obtained from HEX. Exact disclosure dates are used instead of a proxy of monthly accuracy, which is routinely implemented in prior research[15], as the methodology discussed below for evaluating the risk-shift hypothesis requires an exact identification of the disclosure dates.

To ensure the maximal validity of the investigated data sample, each observation has to satisfy three criteria:

I) A value for each of the defined accounting variables.
II) Return data sufficient for estimating the market model and the cumulative abnormal returns.
III) Valid values for the defined accounting variables with respect to the other observations[16].

The eventual data sets contain between 190 and 217 observations, depending on the specification for the data set.

4.1 Financial reporting on the HEX

On the HEX companies can opt for disclosing preliminary financial statement information as standard exchange news bulletins. In general, the preliminary financials include projected company earnings, sales and some management comment. However, the majority of companies do not release any financial statement information before the full annual report is disclosed[17]. The full annual report is simultaneously disclosed at an in advance announced date and time through the HEX and other media.

14 Inactive companies are allowed for in the sample so as to reduce the risk of a possible survivorship bias.
15 See for example Holthausen and Larcker (1992), Lev and Thigarajan (1993), and Abarbanell and Bushee (1998).
16 Extreme observations are eliminated by mechanically removing all observations deviating more than 2.57 standard deviations from the mean of the variable (the extreme 1% in a normal distribution). Corresponding measures are taken by for instance Lev and Thiagarajan (1993).
17 During the years 1997–1999, only 16.7% of the disclosed audited financial statements were preceded by the disclosure of preliminary financials.

The disclosure dates employed in this study are the dates when the full annual report is disclosed, thus disregarding any announcement of preliminary company financials. Hence, we can be certain that all the data employed in the accounting variables actually is available on the investigated disclosure dates. The measurement error arising from disregarding any announcement of preliminary company financials can be viewed as rather small, as 1) announcements of preliminary company financials are rather uncommon on the HEX and 2) the information contained in these announcements is very limited and further varies from company to company.

4.2 Abnormal returns

Expected returns are calculated according to the market model methodology[18]. For each stock and disclosure date, daily dividend and split adjusted returns for the 730 calendar days[19] preceding each disclosure date are first OLS regressed against corresponding return data for the HEX Portfolio Index[20]. The expected returns are then cumulated for each stock and event window by implementing the market model estimates and event window returns[21] for the HEX Portfolio Index. Cumulative abnormal returns are finally calculated by subtracting expected returns for each stock and event window from the corresponding observed returns.

Monthly[22] cumulative abnormal returns are calculated to gain a fairly detailed and accurate picture of the pricing process. Event day (0), 7 and 14 day cumulative abnormal returns are also calculated to enable an evaluation of the market inefficiency versus the risk shift hypotheses[23]. Cumulative abnormal returns are further calculated for three periods preceding and including the disclosure dates by moving the event windows backward in time (–30 days, –14 days and –7 days) in order to be able to identify possible information leaks before the investigated disclosure dates. It is important to note that –30, –14, –7 and event (0) day cumulative abnormal returns include disclosure date abnormal returns, whereas all other cumulative abnormal returns exclude disclosure date abnormal returns.

18 See Campbell et al. (1997): 149–180.
19 A minimum of 730 * 5/7 * 95% = 495 daily return observations is required for each market model. Return data is hence required for 95% of the weekdays in order to form a valid market model.
20 The HEX Portfolio Index is a value weighted index where all companies listed on the main list of the Helsinki Stock Exchange are represented. However, the weight of any individual company is limited to 10% thus eliminating the dominance of a few big companies listed on the HEX (especially Nokia).
21 Disclosure date cumulative abnormal returns are only included in the 0 day cumulative abnormal returns. Other (7day to 360 day) cumulative abnormal returns are aggregated from the day after the disclosure date.
22 One month is defined as 30 calendar days. All time periods in this study are measured in calendar days.
23 Indeed neither 7 nor 14 day cumulative abnormal returns should be required for investigating the hypotheses as only the event day cumulative abnormal return is needed per definition. However, 7 and 14-day cumulative abnormal returns are calculated so as to be able to observe "adaptively efficient" features with regard to incorporating shifts in risk.

5 RESULTS

Both accounting variable collections are OLS regressed against the cumulative abnormal returns for each of the earlier specified time horizons[24]. The procedure is repeated for both the 1st derivative and 2nd derivative specifications[25]. Hence, altogether 2 * 2 * 18 = 72 models are estimated.

5.1 First Derivative Specification Models

The first derivative specification models for the Abarbanell and Bushee accounting variable collection are defined as

$$CAR_{t,\,t+n} = \alpha + \beta_1 \Delta\text{Earnings} + \beta_2 \Delta\text{Inventory} + \beta_3 \Delta\text{Accounts Receivable} + \beta_4 \Delta\text{Gross Margin} + \beta_5 \Delta\text{Effective Tax Rate} + \beta_6 \Delta\text{Labor Force} \quad (2)$$

where Δ denotes the first derivative, or the annual change, and $CAR_{t,\,t+n}$ denotes cumulative abnormal returns during time period t to t+n. The first derivative specification models for the Laitinen accounting variable collection are defined as

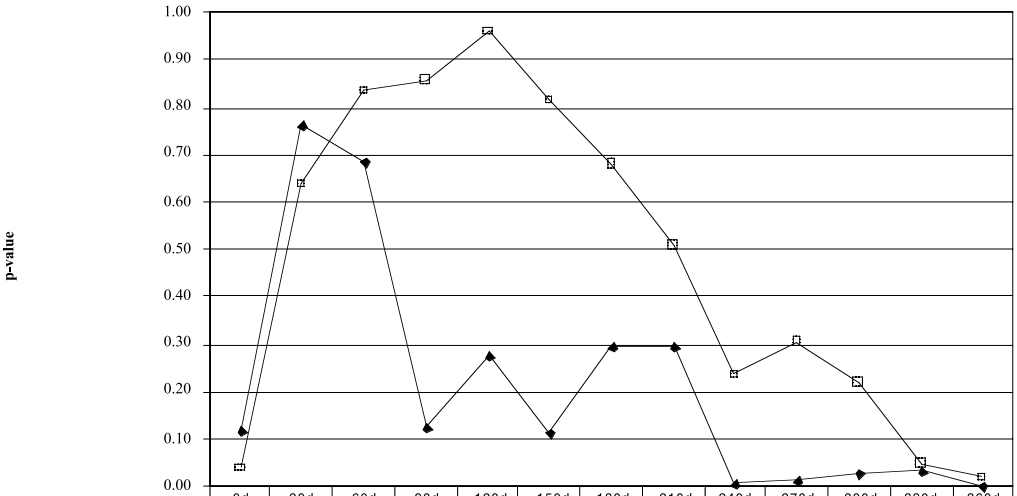
$$CAR_{t,\,t+n} = \alpha + \beta_1 \Delta\text{Earnings} + \beta_2 \Delta\text{Quick ratio} + \beta_3 \Delta\text{Dynamic Liquidity} + \beta_4 \Delta\text{Capital Structure} + \beta_5 \Delta\text{Return On Assets} + \beta_6 \Delta\text{Sales} \quad (3)$$

where Δ denotes the first derivative, or the annual change, and $CAR_{t,\,t+n}$ denotes cumulative abnormal returns during time period t to t+n.

Both first derivative specification models show that a significant connection between the first derivatives of the investigated accounting variables and future abnormal returns are observed on the Finnish stock market during the investigated period (Figure 1). Both models show significant or very significant F-statistics for 330 days and 360 days abnormal returns. Further, the Laitinen model also shows significant F-statistics for 240, 270 and 300 days abnormal returns. The results suggest that the market prices the information in the Laitinen accounting variable collection in a timelier manner than it prices the information in the Abarbanell and Bushee accounting variable collection.

24 The two signal collections are regressed separately, since combining the two collections into one model would result in econometric problems with multicolinearity as they contain signals that partly express the same information (for instance Gross Margin in the Abarbanell and Bushee signal collection and Return On Assets in the Laitinen signal collection). Furthermore, the purpose of this study is explicitly to compare the 1st and 2nd derivative specifications of the *same* signal collection, not that much to compare the two signal collections.

25 In this study the *levels* of the accounting variables are not included into the analysis in order to ensure the congruency of the study with central earlier research, e.g. Abarbanell and Bushee (1998).



	0d	30d	60d	90d	120d	150d	180d	210d	240d	270d	300d	330d	360d
Abarbanell and Bushee	0.04	0.64	0.84	0.86	0.96	0.82	0.68	0.51	0.24	0.30	0.22	0.05	0.02
Laitinen	0.12	0.76	0.69	0.13	0.28	0.12	0.30	0.29	0.01	0.01	0.03	0.03	0.00

FIGURE 1. Significance of first derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the first derivatives of two collections of accounting variables. CARs are measured around the disclosure of annual reports (t = 0). 30 to 360 day CARs exclude disclosure date ARs whereas 0 day (event day) CARs include disclosure date ARs. Expected returns are estimated by implementing market models that are estimated for 730 calendar days of daily returns for each company and disclosure date separately. The p-value for the F-statistic for each model is plotted in the graph and reported in the table below the graph. The number of observations equals 217 for the Abarbanell and Bushee models and 202 for the Laitinen models.

For both models the F-statistic is most significant for the 360-day cumulative abnormal returns. This finding is very much as expected, as Abarbanell and Bushee (1998) document the strongest connection between the disclosure of new financial statement information and 11 month abnormal returns[26]. This is an observation that probably can be explained by positive autocorrelation in the information of company annual reports. More specifically, positive (negative) annual reports are followed by positive (negative) annual reports, which are priced by the market approximately after 360 days (when the following annual report is disclosed). In other words, the accounting variables for year Y predict accounting variables for year Y+1. The phenomenon is discussed by Lev (1989) in the context of company earnings.

26 It is here worth noting that Abarbanell and Bushee (1998) use March 1 as a proxy for the true disclosure dates, which means that they document the strongest connection for a time period that is in fact on average (a few weeks) more than 11 months.

Also worth noting is that the F-statistic for the Abarbanell and Bushee model is significant with respect to disclosure day (0 day) cumulative abnormal returns, indicating a possibility of risk-shifting. However, a closer examination of the parameter estimates is required to enable any further conclusions.

5.2 Second derivative specification models

The second derivative specification models for the Abarbanell and Bushee accounting variable collection are defined as

$$CAR_{t,\,t+n} = \alpha + \beta_1\Delta^2\text{Earnings} + \beta_2\Delta^2\text{Inventory} + \beta_3\Delta^2\text{Accounts Receivable} + \beta_4\Delta^2\text{Gross Margin} + \beta_5\Delta^2\text{Effective Tax Rate} + \beta_6\Delta^2\text{Labor Force} \quad (4)$$

where Δ^2 denotes the second derivative, or the annual change of the change (equation 1), and $CAR_{t,\,t+n}$ denotes cumulative abnormal returns during time period t to t+n. The second derivative specification models for the Laitinen accounting variable collection are defined as

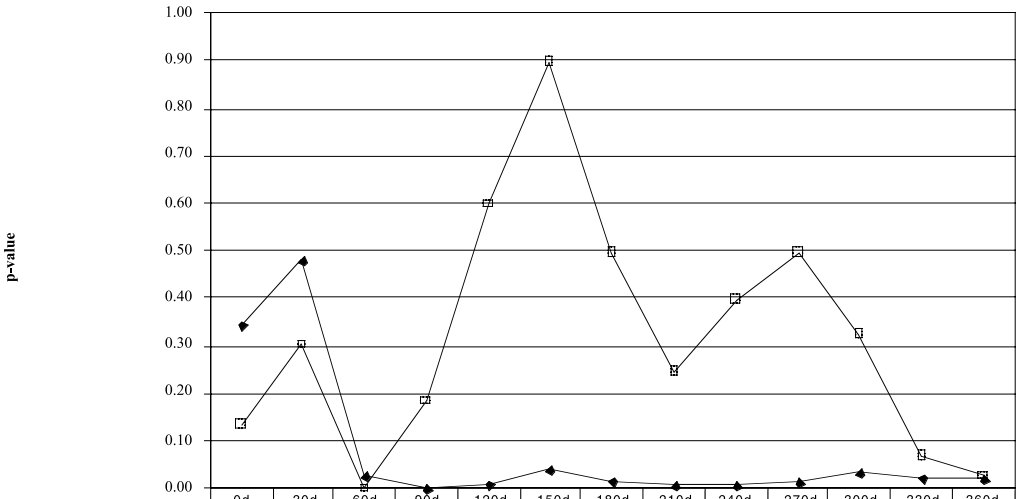
$$CAR_{t,\,t+n} = \alpha + \beta_1\Delta^2\text{Earnings} + \beta_2\Delta^2\text{Quick ratio} + \beta_3\Delta^2\text{Dynamic Liquidity} + \beta_4\Delta^2\text{Capital Structure} + \beta_5\Delta^2\text{Return On Assets} + \beta_6\Delta^2\text{Sales} \quad (5)$$

where Δ^2 denotes the second derivative, or the annual change of the change (equation 1), and $CAR_{t,\,t+n}$ denotes cumulative abnormal returns during time period t to t+n.

The results for the second derivative specification models are indeed very interesting. The F-statistic for the Laitinen model is significant or very significant for 60 to 360 day cumulative abnormal returns (Figure 2). The corresponding is true for the Abarbanell and Bushee model with regard to only 60 and 360 day cumulative abnormal returns.

The evidence suggests that the information contained in the second derivatives of the Laitinen accounting variables is uniformly priced by the market 60 days after the disclosure date and that the information indicates persistent changes in the valuation equilibriums of the investigated companies. A possible, certainly even plausible, explanation for this result is that the second derivatives of the Laitinen accounting variables contain information that is confirmed by Q1 interim reports, and hence priced after 60 days when Q1 figures are disclosed. It is important to notice here that the lag between annual reports and Q1 interim reports is actually approximately 60 days, since the reporting lag is approximately 2 months for annual reports, but approximately 1 month for interim reports.

The findings for the Abarbanell and Bushee accounting variables on the other hand indicate that the second derivatives contain information that is priced after 60 days, but that these



	0d	30d	60d	90d	120d	150d	180d	210d	240d	270d	300d	330d	360d
Abarbanell and Bushee	0.13	0.30	0.00	0.18	0.60	0.90	0.50	0.25	0.40	0.50	0.33	0.07	0.03
Laitinen	0.35	0.48	0.03	0.00	0.01	0.04	0.02	0.01	0.01	0.01	0.03	0.02	0.02

FIGURE 2. Significance of second derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the second derivatives of two collections of accounting variables. CARs are measured around the disclosure of annual reports (t = 0). 30 to 360 day CARs exclude disclosure date ARs whereas 0 day (event day) CARs include disclosure date ARs. Expected returns are estimated by implementing market models that are estimated for 730 calendar days of daily returns for each company and disclosure date separately. The p-value for the F-statistic for each model is plotted in the graph and reported in the table below the graph. The number of observations equals 197 for the Abarbanell and Bushee models and 190 for the Laitinen models.

changes in company value then are reversed. Explaining this observation is somewhat of a challenge. However, one possible explanation is that the information contained in the second derivatives of Abarbanell and Bushee accounting variables is strengthened by Q1 interim reports, but that this information is not strong enough to create persistent changes in the valuations of the companies. Also worth noting is that the 360 day F-statistic is significant, as in the case of the first derivative Abarbanell and Bushee accounting variable collection (possibly indicating autocorrelation in the information of annual reports).

Summing up, the findings suggest that the second derivatives of accounting variables contain information incremental to the information contained in the first derivatives of the accounting variables. We thus find evidence in favor of the conditional information interpretation hypothesis.

5.3 Parameter estimates for the first derivative specification models

The parameter estimates for the first derivative specification models (Table 4) reveal two major features. First, the accounts receivable accounting variable of the Abarbanell and Bushee collection shows *significantly positive* parameter estimates for 330 and 360 day cumulative abnormal returns and a *significantly negative* parameter estimate for 0 day cumulative abnormal returns, hence pointing towards risk shifting according to the methodology presented earlier. Further, it is interesting to note that the accounts receivable parameter estimate for –14 day cumulative abnormal returns is also significantly negative, indicating the possibility that the information leaks into the market before the official disclosure. The signs of the parameter estimates for 330 and 360 day cumulative abnormal returns are hence as expected, an increase in sales to accounts receivable being viewed as a good news by investors. However, the significantly negative parameter estimate for 0 day cumulative abnormal returns points to that the accounts receivable variable, picks up some dimension of risk, hence supporting the risk-shift hypothesis regarding the receivable variable.

Second, the sales accounting variable of the Laitinen collection shows significant negative parameter estimates for 240 to 360 day cumulative abnormal returns, but insignificant parameter estimates for all other periods. The sign of the parameter estimate is opposite to that expected, hence indicating a correlation with some unidentified significant variable. Nevertheless, as no correction for risk can be observed, the observation indicates a delayed reaction to new information.

The parameter estimates for the earnings accounting variable are consistently insignificant for the different models, which might at first glance strike as a somewhat surprising observation. However, Booth et al. (1997) report evidence of that Finnish firms' reported earnings contain less information than their US counterparts, due to the more extensive earnings manipulation possibilities in Finland, but that financial statement information beyond reported earnings contains significant information about future returns in excess of equilibrium returns. Seen in this perspective, the insignificance of the earnings accounting variable seems to be in line with earlier research.

5.4 Parameter estimates for the second derivative specification models

The parameter estimates for the second derivative specification Abarbanell and Bushee accounting variable collection models (Table 5) further confirm both risk shifting and delayed pricing of new information. The parameter estimate for the accounts receivable accounting variable displays a significant reversal of signs, as in the case of the first derivatives, hence possibly indicating risk shifting. Furthermore, the effective tax rate accounting variable shows significantly negative parameter estimates for 60 and 90-day cumulative abnormal returns,

TABLE 4. Estimated parameters for first derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the first derivatives of two collections of accounting variables. CARs are measured from the disclosure of annual reports (t = 0) for periods succeeding disclosure of new information (7 to 360 days) and up to the disclosure date for periods preceding disclosure of new information (–30 to –7days). –30 to 0 day CARs include disclosure date ARs whereas other periods' CARs exclude disclosure date ARs. Expected returns are estimated by implementing market models that are estimated on 730 calendar days of daily returns for each company and disclosure date separately. P-values equal to or less than 0.05 are marked with bolded font. The number of observations equals 217 for the Abarbanell and Bushee models and 202 for the Laitinen models.

Abarbanell and Bushee	-30 days		-14 days		-7 days		0 days		7 days		14 days		30 days		60 days		90 days	
1st Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.0129	0.18	0.0100	0.13	0.0086	0.09	-0.0021	0.53	0.0003	0.92	0.0011	0.82	-0.0049	0.46	-0.0300	**0.00**	-0.0031	0.82
Earnings	0.0072	**0.03**	0.0039	0.08	0.0031	0.07	0.0012	0.61	-0.0008	0.50	-0.0012	0.50	-0.0008	0.74	-0.0013	0.71	-0.0012	0.80
Inventory	-0.0181	0.65	0.0064	0.81	-0.0094	0.64	0.0093	0.54	-0.0052	0.73	-0.0219	0.29	-0.0214	0.43	-0.0297	0.47	-0.0053	0.93
Accounts Receivable	-0.0188	0.61	-0.0619	**0.01**	-0.0144	0.45	-0.0199	**0.04**	0.0217	0.12	0.0118	0.54	-0.0276	0.27	0.0052	0.89	-0.0415	0.44
Gross Margin	-0.0074	0.25	-0.0028	0.51	-0.0002	0.96	0.0106	0.05	0.0074	**0.00**	0.0053	0.11	0.0043	0.32	-0.0026	0.69	-0.0100	0.28
Effective Tax Rate	0.0008	0.59	0.0002	0.87	-0.0003	0.69	0.0002	0.52	0.0002	0.79	0.0002	0.80	-0.0002	0.81	-0.0012	0.42	-0.0002	0.94
Labor Force	-0.0338	0.53	0.0346	0.34	0.0189	0.49	0.0373	0.18	0.0087	0.67	-0.0003	0.99	-0.0015	0.97	0.0701	0.21	-0.0181	0.82

Abarbanell and Bushee	120 days		150 days		180 days		210 days		240 days		270 days		300 days		330 days		360 days	
1st Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-0.0367	**0.02**	-0.0502	**0.01**	-0.0684	**0.00**	-0.0955	**0.00**	-0.1112	**0.00**	-0.1452	**0.00**	-0.1825	**0.00**	-0.1729	**0.00**	-0.1496	**0.00**
Earnings	0.0012	0.83	0.0017	0.79	-0.0011	0.87	-0.0022	0.78	-0.0037	0.68	-0.0039	0.69	-0.0040	0.72	-0.0064	0.63	-0.0069	0.65
Inventory	-0.0337	0.60	-0.0778	0.30	-0.0951	0.24	-0.0489	0.60	-0.1422	0.19	-0.1012	0.39	-0.1318	0.31	-0.1938	0.22	-0.2887	0.12
Accounts Receivable	0.0054	0.93	0.0305	0.66	0.0421	0.58	0.0906	0.30	0.1816	0.07	0.1890	0.08	0.2318	0.05	0.4028	**0.01**	0.4283	**0.01**
Gross Margin	-0.0045	0.67	-0.0092	0.44	-0.0170	0.20	-0.0265	0.08	-0.0231	0.19	-0.0271	0.15	-0.0304	0.15	-0.0356	0.17	-0.0324	0.27
Effective Tax Rate	0.0009	0.72	0.0011	0.69	0.0001	0.97	0.0004	0.90	0.0002	0.96	0.0003	0.95	0.0001	0.98	-0.0022	0.71	-0.0017	0.80
Labor Force	-0.0546	0.53	-0.0541	0.59	-0.0152	0.89	-0.0092	0.94	-0.0967	0.51	-0.1035	0.52	-0.1244	0.48	-0.2066	0.34	-0.4368	0.08

Laitinen	-30 days		-14 days		-7 days		0 days		7 days		14 days		30 days		60 days		90 days	
1st Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.0200	0.08	0.0118	0.13	0.0103	0.07	-0.0020	0.58	0.0027	0.54	0.0005	0.93	-0.0030	0.69	-0.0157	0.13	0.0192	0.20
Earnings	0.0050	0.22	0.0008	0.76	-0.0007	0.73	-0.0006	0.68	-0.0011	0.49	-0.0007	0.73	-0.0007	0.79	-0.0012	0.75	-0.0003	0.96
Quick ratio	0.0087	0.88	0.0179	0.64	0.0143	0.61	0.0079	0.62	-0.0181	0.40	-0.0535	0.05	-0.0321	0.38	-0.0626	0.22	-0.1174	0.11
Dynamic Liquidity	0.0007	0.81	-0.0001	0.97	0.0002	0.88	0.0000	0.96	-0.0006	0.56	-0.0005	0.69	-0.0025	0.18	-0.0002	0.93	-0.0014	0.70
Capital Structure	-0.0251	0.61	-0.0081	0.81	-0.0049	0.84	0.0055	0.72	0.0052	0.78	0.0015	0.95	-0.0041	0.90	-0.0343	0.45	-0.0959	0.14
Return On Assets	0.0175	0.28	0.0239	**0.03**	0.0300	**0.00**	0.0159	**0.01**	0.0074	0.23	0.0001	0.99	0.0060	0.57	-0.0070	0.64	-0.0087	0.68
Sales	-0.0978	0.13	-0.0437	0.32	-0.0448	0.17	-0.0190	0.35	-0.0186	0.46	-0.0095	0.77	-0.0439	0.30	0.0072	0.90	-0.1317	0.12

Laitinen	120 days		150 days		180 days		210 days		240 days		270 days		300 days		330 days		360 days	
1st Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-0.0143	0.40	-0.0176	0.38	-0.0297	0.18	-0.0477	0.06	-0.0347	0.22	-0.0710	**0.02**	-0.1044	**0.00**	-0.0675	0.13	-0.0275	0.59
Earnings	0.0015	0.81	0.0042	0.55	0.0005	0.95	-0.0003	0.97	0.0037	0.71	0.0057	0.60	0.0070	0.57	0.0083	0.60	0.0107	0.55
Quick ratio	-0.1540	0.07	-0.2027	**0.04**	-0.1768	0.10	-0.1810	0.14	-0.2562	0.07	-0.2495	0.11	-0.2514	0.15	-0.1383	0.52	-0.2809	0.26
Dynamic Liquidity	-0.0003	0.94	-0.0020	0.68	-0.0019	0.72	-0.0009	0.88	0.0025	0.72	0.0049	0.52	0.0064	0.46	0.0090	0.41	0.0071	0.57
Capital Structure	-0.0594	0.42	-0.0914	0.29	-0.0878	0.35	-0.1373	0.21	-0.2583	**0.04**	-0.2400	0.08	-0.2250	0.14	-0.3668	0.06	-0.3630	0.10
Return On Assets	-0.0067	0.78	-0.0053	0.85	0.0049	0.87	-0.0048	0.89	-0.0245	0.54	-0.0405	0.36	-0.0521	0.30	-0.0860	0.17	-0.0879	0.22
Sales	-0.1422	0.14	-0.2036	0.07	-0.2181	0.08	-0.2078	0.15	-0.4333	**0.01**	-0.4440	**0.01**	-0.4568	**0.02**	-0.5302	**0.04**	-0.9424	**0.00**

which leaves room for interpretation. A possible explanation is that investors initially over-react to the information but that the over-reaction then is reversed due to the disclosure of Q1 interim reports.

The Quick Ratio accounting variable of the second derivative specification Laitinen collection shows significantly negative parameter estimates for 60 to 360 day cumulative abnormal returns, but insignificant parameter estimates for all other periods. As no correction for risk can be observed, the observation appears to be a delayed response to new information that persistently alters the valuation equilibrium. Furthermore, the parameter estimates for the earnings accounting variable with respect to 60 and 90-day cumulative abnormal returns are significantly negative. The sign of the parameter estimate is negative, indicating either that investors interpret the accounting variable from an agency cost perspective or that the accounting variable correlates with some unidentified significant variable. A further possibility is that investors interpret an increase in the increase (positive second derivative) of the Quick ratio as a signal of the company preparing an acquisition, which is on average viewed as negative news by the market.

Finally, it should be stressed that the accounting variables indicating delayed pricing of new information are *not* equal for the first and the second derivative specifications. The evidence thus suggests that the second derivatives of some of the investigated accounting variables contain information incremental to that contained in the first derivatives of the investigated accounting variables. The empirical findings thereby lend support to the conditional information interpretation hypothesis.

5.5 Model diagnostics

All models are checked for multicolinearity by computing both the coefficient of correlation between the independent variables and the R^2 statistic for each independent variable regressed against the other independent variables.

The first derivative Abarbanell and Bushee models shows little evidence of multicolinearity with correlation coefficients peaking at 0.52 and a maximum R^2 of 32.1%. Corresponding values for the first derivative Laitinen models are 0.57 and 38.3%. The second derivative Abarbanell and Bushee models display correlation coefficients peaking at 0.47 and a maximum R^2 of 26.4%. Corresponding values for the second derivative Laitinen models are 0.33 and 16.1%. We cannot hence detect any severe problems with multicolinearity for neither the first derivative nor the second derivative specification models.

Only the first derivative Abarbanell and Bushee 0 day cumulative abnormal return model shows heteroskedastic residuals, of the altogether 72 models subjected to the Breush and Pagan (1979) test. The Abarbanell and Bushee 0 day cumulative abnormal return model is re-

TABLE 5. Estimated parameters for second derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the second derivatives of two collections of accounting variables. CARs are measured from the disclosure of annual reports (t = 0) for periods succeeding disclosure of new information (7 to 360 days) and up to the disclosure date for periods preceding disclosure of new information (–30 to –7days). –30 to 0 day CARs include disclosure date ARs whereas other periods' CARs exclude disclosure date ARs. Expected returns are estimated by implementing market models that are estimated on 730 calendar days of daily returns for each company and disclosure date separately. P-values equal to or less than 0.05 are marked with bolded font. The number of observations equals 197 for the Abarbanell and Bushee models and 190 for the Laitinen models.

Abarbanell and Bushee	-30 days		-14 days		-7 days		0 days		7 days		14 days		30 days		60 days		90 days	
2nd Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.0093	0.33	0.0084	0.17	0.0086	0.06	-0.0015	0.60	0.0022	0.53	-0.0009	0.85	-0.0111	0.06	-0.0246	**0.01**	-0.0034	0.81
Earnings	-0.0035	0.12	-0.0011	0.45	-0.0006	0.58	-0.0017	**0.01**	0.0000	0.98	0.0016	0.14	0.0013	0.37	-0.0022	0.33	-0.0030	0.36
Inventory	-0.0065	0.83	0.0053	0.79	-0.0152	0.31	0.0080	0.38	-0.0002	0.99	-0.0025	0.87	0.0052	0.79	0.0365	0.25	0.0394	0.38
Accounts Receivable	0.0040	0.89	-0.0369	**0.05**	-0.0152	0.26	-0.0153	0.07	0.0148	0.15	0.0132	0.33	-0.0165	0.35	0.0424	0.14	0.0317	0.44
Gross Margin	-0.0009	0.83	0.0012	0.68	0.0018	0.41	0.0015	0.27	0.0024	0.14	0.0006	0.77	0.0032	0.26	0.0037	0.43	0.0029	0.66
Effective Tax Rate	-0.0024	**0.01**	-0.0003	0.61	-0.0003	0.46	0.0002	0.48	-0.0005	0.10	0.0004	0.33	0.0005	0.40	-0.0028	**0.00**	-0.0027	**0.04**
Labor Force	0.0201	0.67	0.0338	0.27	0.0371	0.10	0.0014	0.92	0.0190	0.27	0.0222	0.33	0.0226	0.45	0.0463	0.34	-0.0289	0.67

Abarbanell and Bushee	120 days		150 days		180 days		210 days		240 days		270 days		300 days		330 days		360 days	
2nd Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-0.0319	**0.04**	-0.0459	**0.01**	-0.0617	**0.00**	-0.0782	**0.00**	-0.0975	**0.00**	-0.1268	**0.00**	-0.1669	**0.00**	-0.1474	**0.00**	-0.1451	**0.00**
Earnings	-0.0020	0.57	0.0009	0.82	-0.0013	0.77	-0.0012	0.81	0.0063	0.29	0.0064	0.32	0.0067	0.34	0.0078	0.37	0.0038	0.71
Inventory	0.0158	0.75	-0.0252	0.65	-0.0265	0.67	-0.0029	0.97	-0.0567	0.49	-0.0369	0.67	-0.0595	0.54	-0.1206	0.32	-0.2172	0.12
Accounts Receivable	0.0637	0.16	0.0710	0.17	0.1033	0.07	0.1423	**0.03**	0.1713	**0.02**	0.1671	**0.04**	0.2107	**0.02**	0.3458	**0.00**	0.4101	**0.00**
Gross Margin	0.0059	0.41	0.0019	0.81	0.0002	0.98	-0.0043	0.68	-0.0069	0.56	-0.0093	0.47	-0.0127	0.37	-0.0188	0.28	-0.0134	0.51
Effective Tax Rate	-0.0011	0.41	0.0008	0.64	-0.0016	0.36	-0.0018	0.37	0.0004	0.85	0.0000	0.99	-0.0007	0.81	-0.0011	0.74	-0.0050	0.21
Labor Force	0.0002	1.00	0.0118	0.89	0.0233	0.81	0.0542	0.62	-0.0058	0.96	-0.0026	0.98	0.0001	1.00	0.0534	0.77	0.0810	0.71

Laitinen	-30 days		-14 days		-7 days		0 days		7 days		14 days		30 days		60 days		90 days	
2nd Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.0103	0.30	0.0098	0.12	0.0088	0.07	-0.0025	0.35	-0.0003	0.94	-0.0034	0.46	-0.0138	**0.03**	-0.0257	**0.01**	-0.0050	0.70
Earnings	-0.0069	**0.01**	-0.0004	0.78	-0.0001	0.93	-0.0013	**0.05**	-0.0013	0.14	0.0022	0.05	0.0026	0.09	-0.0055	**0.02**	-0.0068	**0.04**
Quick ratio	-0.0025	0.96	0.0018	0.96	0.0117	0.65	0.0161	0.25	-0.0031	0.87	-0.0154	0.53	-0.0208	0.52	-0.1250	**0.01**	-0.2418	**0.00**
Dynamic Liquidity	-0.0010	0.62	-0.0005	0.68	-0.0008	0.38	-0.0001	0.90	-0.0003	0.72	-0.0003	0.78	0.0002	0.88	0.0000	0.99	0.0012	0.66
Capital Structure	0.0041	0.91	0.0077	0.74	-0.0125	0.48	0.0110	0.26	-0.0040	0.76	-0.0123	0.47	-0.0351	0.12	0.0151	0.65	-0.0216	0.65
Return On Assets	0.0053	0.41	0.0003	0.94	0.0025	0.42	0.0017	0.33	0.0029	0.21	-0.0011	0.71	0.0006	0.87	0.0022	0.72	0.0103	0.22
Sales	0.0439	0.32	0.0542	0.06	0.0226	0.29	0.0132	0.26	0.0171	0.28	0.0009	0.96	-0.0178	0.52	0.0074	0.86	-0.0891	0.13

Laitinen	120 days		150 days		180 days		210 days		240 days		270 days		300 days		330 days		360 days	
2nd Derivative	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-0.0299	**0.03**	-0.0440	**0.01**	-0.0584	**0.00**	-0.0838	**0.00**	-0.1083	**0.00**	-0.1435	**0.00**	-0.1836	**0.00**	-0.1776	**0.00**	-0.1735	**0.00**
Earnings	-0.0062	0.08	0.0006	0.87	-0.0039	0.38	-0.0046	0.35	0.0057	0.32	0.0048	0.43	0.0032	0.63	0.0031	0.70	-0.0063	0.53
Quick ratio	-0.2133	**0.00**	-0.2427	**0.01**	-0.3063	**0.00**	-0.3715	**0.00**	-0.4254	**0.00**	-0.4046	**0.00**	-0.4095	**0.00**	-0.5514	**0.00**	-0.6747	**0.00**
Dynamic Liquidity	0.0035	0.22	0.0047	0.15	0.0037	0.31	0.0054	0.18	0.0057	0.22	0.0084	0.09	0.0096	0.08	0.0104	0.12	0.0085	0.30
Capital Structure	0.0408	0.43	0.0247	0.68	0.0562	0.40	0.0781	0.29	0.0962	0.26	0.0662	0.46	0.0696	0.49	0.0917	0.45	0.1564	0.30
Return On Assets	0.0135	0.14	0.0008	0.94	0.0016	0.89	-0.0003	0.98	-0.0080	0.59	-0.0106	0.51	-0.0114	0.52	-0.0129	0.55	-0.0001	1.00
Sales	-0.0663	0.29	-0.0956	0.19	-0.0837	0.30	-0.0495	0.58	-0.1196	0.24	-0.1101	0.32	-0.0942	0.44	-0.0836	0.57	-0.2056	0.26

estimated using the White (1980) heteroskedasticity-consistent covariance matrix before reporting.

5.6 Economic implications

Clearly, the economic implications of the results are at best vague; the analysis is done entirely in sample and the economic interpretation of the parameter estimates are unclear. However, the adjusted R^2 statistics (Appendix A) shed some light over the economic significance of the results. At least two interesting features emerge from the statistics; 1) the statistics seem rather stable for different return horizons, and 2) the levels of the adjusted R^2 statistics are initially fairly high for the 2nd derivative models. The stability of the statistics can be seen as important, as it diminishes the risk of the regressions catching up random patterns for a specific time horizon. Hence, as the relation between the information contained in the accounting variables and future cumulative abnormal returns appears to be rather stable through time, it seems possible that the regressions are in fact catching up some at least partly persistent structure. Furthermore, keeping the in-sample bias in mind, explaining roughly 8% of the 60–90 days CARs using historical accounting data only, seems as a decent achievement. In summary, out-of-sample tests are with out doubt needed to enable any even remotely conclusive analysis of the economic implications of the investigated models.

6 SUMMARY

This paper investigates the stock market's reaction to annual reports of Finnish companies. The study documents two new properties of the financial statement information pricing process.

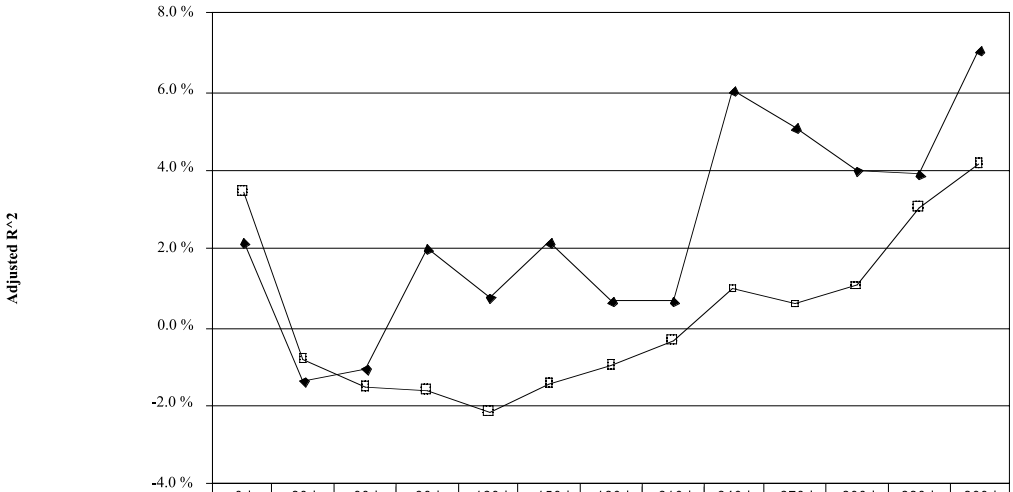
The first property relates to how investors interpret new financial statement information. The study suggests that the second derivatives of the investigated accounting variables provide significant information – different from the information contained in the first derivatives – which is priced by the stock market. Further, the empirical evidence suggests that the information contained in the second derivatives is timelier priced by the market than the information contained in the first derivatives. We explain this finding by that second derivatives contain information that is confirmed by Q1 interim reports and hence priced with a lag of approximately 60 days.

The second property relates to two central hypotheses that in earlier literature have been offered as explanations for the anomalous connection between publicly available financial statement information and future abnormal returns. The new methodological approach used in this study lends support to both the risk-shift hypothesis and the market inefficiency hypothesis.

More specifically, this study shows that some accounting variables proxy for risk, while others contain information that is uniformly priced by the market with a delay. This finding emphasizes the importance of a solid methodology for detecting the pricing of risk. ■

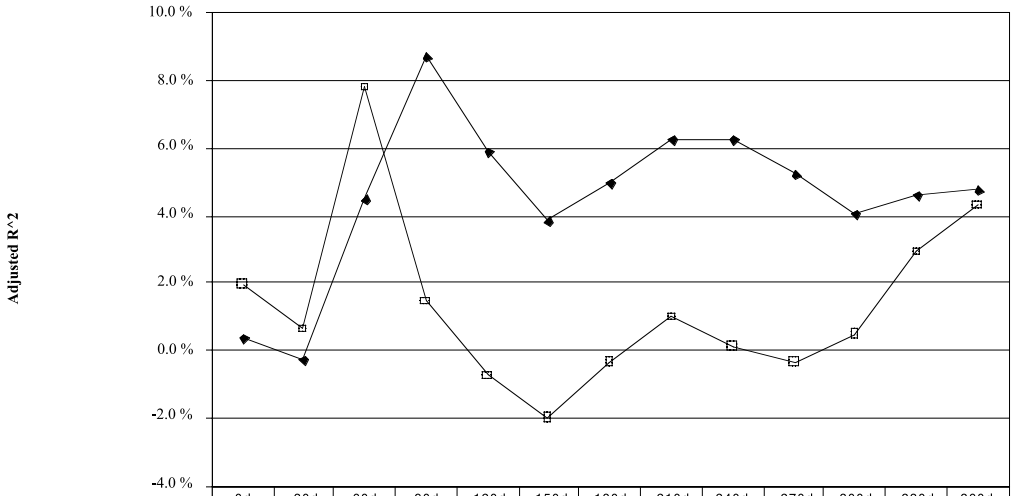
APPENDIX A

FIGURE 3. Adjusted R^2 of first derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the first derivatives of two collections of accounting variables. CARs are measured around the disclosure of annual reports (t = 0). 30 to 360 day CARs exclude disclosure date ARs whereas 0 day (event day) CARs include disclosure date ARs. Expected returns are estimated by implementing market models that are estimated for 730 calendar days of daily returns for each company and disclosure date separately. The adjusted R^2 for each model is plotted in the graph and reported in the table below the graph.



	0d	30d	60d	90d	120d	150d	180d	210d	240d	270d	300d	330d	360d
Abarbanell and Bushee	3.4 %	-0.8 %	-1.5 %	-1.6 %	-2.1 %	-1.4 %	-1.0 %	-0.3 %	1.0 %	0.6 %	1.1 %	3.1 %	4.2 %
Laitinen	2.2 %	-1.3 %	-1.0 %	2.0 %	0.8 %	2.1 %	0.7 %	0.7 %	6.0 %	5.1 %	4.0 %	3.9 %	7.1 %

FIGURE 4. Adjusted R^2 of second derivative specification models.
The connection between publicly available financial statement information and future abnormal returns (excess market model returns) is investigated by OLS regressing cumulative abnormal returns (CAR) for several time periods against the second derivatives of two collections of accounting variables. CARs are measured around the disclosure of annual reports (t=0). 30 to 360 day CARs exclude disclosure date ARs whereas 0 day (event day) CARs include disclosure date ARs. Expected returns are estimated by implementing market models that are estimated for 730 calendar days of daily returns for each company and disclosure date separately. The adjusted R^2 for each model is plotted in the graph and reported in the table below the graph.



	0d	30d	60d	90d	120d	150d	180d	210d	240d	270d	300d	330d	360d
Abarbanell and Bushee	2.0 %	0.6 %	7.8 %	1.5 %	-0.7 %	-2.0 %	-0.3 %	1.0 %	0.1 %	-0.3 %	0.5 %	3.0 %	4.3 %
Laitinen	0.4 %	-0.3 %	4.5 %	8.7 %	5.9 %	3.9 %	5.0 %	6.3 %	6.3 %	5.2 %	4.1 %	4.6 %	4.8 %

APPENDIX B

TABLE 6. List of investigated companies.
The list is compiled according to the current (22.4.2003) industry specification of Helsinki Stock Exchange. Companies that have been de-listed before 22.4.2003 are assigned an industry that corresponds to the old industry.

Company	Industry (list)	Company	Industry (list)
Kemira	Chemicals	Fiskars	Metal and Engineering
Orion	Chemicals	KCI konecranes	Metal and Engineering
A-rakennusmies	Construction	Kone	Metal and Engineering
Lemminkäinen	Construction	Metra	Metal and Engineering
Tulikivi	Construction	Nordic aluminium	Metal and Engineering
Espoon sähkö	Energy	Outokumpu	Metal and Engineering
Fortum	Energy	Ponsse	Metal and Engineering
Länsivoima	Energy	Rautaruukki	Metal and Engineering
Atria	Food Industry	Raute	Metal and Engineering
Chips	Food Industry	Rocla	Metal and Engineering
Hartwall	Food Industry	Starckjohann	Metal and Engineering
HK ruokatalo	Food Industry	Aspo	Multi-Business
Huhtamäki	Food Industry	Biohit	NM List
Lännen tehtaat	Food Industry	Amer-yhtymä	Other Industries
Olvi	Food Industry	Exel	Other Industries
Raision tehtaat	Food Industry	Hackman	Other Industries
Metsä-serla	Forest Industry	Isko	Other Industries
Stora Enso	Forest Industry	Kyro	Other Industries
Stromsdal	Forest Industry	Marimekko	Other Industries
UPM-Kymmene	Forest Industry	Metsä tissue	Other Industries
Balansor	I List	Nokian renkaat	Other Industries
Benefon	I List	Rapala Normark	Other Industries
Efore	I List	Sanitec	Other Industries
Elecster	I List	Suunto	Other Industries
Honkarakenne	I List	Tamfelt	Other Industries
Incap	I List	Jaakko Pöyry group	Other Services
Kasola	I List	Lassila & Tikanoja	Other Services
Kauppakaari	I List	Novo group	Other Services
Kekkilä	I List	Rakentajain konevuokraamo	Other Services
Kesla	I List	YIT-yhtymä	Other Services
Kontram	I List	Datafellows	Telecommunication and Electronics
Kylpyläkasino	I List	Eimo	Telecommunication and Electronics
Larox	I List	Elcoteq	Telecommunication and Electronics
Markkinointi viherjuuri	I List	HPY	Telecommunication and Electronics
Martela	I List	Instrumentarium	Telecommunication and Electronics
Neomarkka	I List	JOT automation group	Telecommunication and Electronics
Panostaja	I List	Keski-Suomen puhelin	Telecommunication and Electronics
PI-consulting	I List	Nokia	Telecommunication and Electronics
Plandent	I List	Perlos	Telecommunication and Electronics
Pohjois-Karjalan Kirjapaino	I List	PMJ automec	Telecommunication and Electronics
Saunatec	I List	Sonera	Telecommunication and Electronics
Suomen helasto	I List	Stonesoft	Telecommunication and Electronics
Suomen säästäjien kiinteistöt	I List	SysOpen	Telecommunication and Electronics
Tervakosken puuhamaa	I List	Tampereen puhelin	Telecommunication and Electronics
Turkistuottajat	I List	Teleste	Telecommunication and Electronics
Turun arvokiinteistöt	I List	TH Tiedonhallinta	Telecommunication and Electronics
Vaahto group	I List	Vaisala	Telecommunication and Electronics
Yleiselektroniikka	I List	Kesko	Trade
Castrum	Investment	Rautakirja	Trade
Citycon	Investment	Stockmann	Trade
Finvest	Investment	Suomen SPAR	Trade
Interavanti	Investment	Tamro	Trade
Julius Tallberg-kiinteistöt	Investment	Birka line	Transport
Norvestia	Investment	Finnair	Transport
Polar	Investment	Finnlines	Transport
Sponda	Investment	Ford	Transport
Technopolis	Investment	Neptun Maritime	Transport
Alma media	Media and Publishing	Partek	Transport
Ilkka	Media and Publishing	Viking line	Transport
Janton	Media and Publishing		
Talentum	Media and Publishing		
WSOY	Media and Publishing		

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