USE OF INTERIM EARNINGS INFORMATION ON THE HELSINKI STOCK EXCHANGE

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Abstract

In this paper we study how the market uses the information on current and past interim earnings. Our hypothesis is that investors focus on a comparison of year-to-year changes in interim earnings. We provide further evidence on how the market acts in the face interim earnings announcements in an emerging market. The data is based on the Finnish market covering the years 1992-2002. We found, consistent with Ball and Bartov [1], evidence that investors underestimate the magnitude of the serial correlation in interim earnings. The results suggest that investors use, at least in part, a seasonal random walk model when forming earnings expectations.

JEL classification: D23; D82; G18

Keywords: anomalies, time series forecasts, emerging capital markets

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1. Introduction

An essential part of financial accounting is a firm's communication with outside interest groups, especially with the capital markets. Earnings announcements provide market participants with one public information source with which to evaluate the performance of a firm. The response of market actors to interim and annual accounting earnings announcements has interested practitioners and academics alike for decades. The major issue has been the use of these disclosures in the marketplace.

There has been a lot of discussion and research whether investors use all the earnings information available when assessing the value of the company. For example, Rendleman, Jones and Latané [32] and Bernard and Thomas [2] report that investors base their interim earnings expectations, at least in part, on year-to-year changes in interim earnings (called a naïve earnings expectation model). In other words, investors seem not to take full advantage of the interim earnings information available on the market. However, Ball and Bartov [1] find these conclusions somewhat ambiguous and design a test which provides new, more accurate, insight into the phenomena. They show, among other things, that the market does not act as if using a naïve earnings expectation model. However, the magnitude of the serial correlation in quarterly earnings is underestimated. Consistent with Maines and Hand [28], Brown and Han [7] find that when firms' quarterly earnings follow a simple autoregressive (*AR1*) process, their stock prices do not fully reflect the implications of current earnings for future earnings. Liang [27] suggests and finds evidence that underreaction to current earnings surprises is due to investors' overconfidence in their private information and underconfidence in public announcements.

This paper studies the market's use of information on current and past interim earnings applying Finnish data. Specifically, we focus on whether and to what extent investors are aware of the autoregressive process of interim earnings. This study contributes to the existing body of literature in the following respects. Firstly, there are very few studies in which interim earnings announcements are analyzed based on Finnish data.[1] However, the Finnish stock market, with its thin and unequally distributed trading volumes, provides a suitable forum to study the robustness of previous findings produced in other stock markets (e.g. the US). Also the institutional setting in Finland differs considerably from the setting in the US. These differences could have an impact also on the relevance of earnings figures for investors' decision making. Historically the importance of investors has been better recognized in the Finnish accounting regulations [24]. Also the activity of foreign investors in the Helsinki Stock Exchange has increased during the research period. In order to illustrate the development in the stock market we can look at the percentage of foreign ownership (market values) at two points of time. In October 1994 foreign ownership in terms of the market value of Helsinki Stock Exchange firms was 30.7% while in October 2003 the respective figure was 61.8%. The relative ownership of foreigners has roughly doubled.

Secondly, post-earnings announcement drift is evidenced worldwide, also in Finland [24,29]. However, despite the increased understanding of the phenomenon, the explanation for the drift is still incomplete [25]. One research approach tackling the earnings anomaly is to study whether the markets fully recognize the potential serial correlation in earnings time series as in Ball and Bartov [1], which investigated mature markets.

The remainder of the paper is organized as follows. In the next section the Ball and Bartov [1] methodology is described briefly. The data and sample are presented in the third section. The measurement and empirical model are presented in the fourth section. The empirical results are presented in the fifth section. Finally, the sixth section concludes the study.

2. Ball and Bartov's [1] methodology

Prior research [3] shows that innovation in terms of the unexpected portion of current earnings is approximately a linear function of lagged quarterly earnings innovations:

$$SUE_0 = b_0 + b_1 SUE_{-1} + b_2 SUE_{-2} + b_3 SUE_{-3} + b_4 SUE_{-4} + \varepsilon_0 \qquad (1)$$

where *SUE*s are standardized unexpected earnings. Usually b_1, b_2, b_3, are positive, and b_4 is negative and ε_0 is a random disturbance term. Explanatory variables are the changes in earnings relative to the equivalent quarter last year, detrended and scaled by the standard deviation.

According to Ball and Bartov [1] when the market fully understands the *SUE* process, then the stock price response, CAR_0, to earnings innovation, ε_0, is:

$$CAR_0 = \alpha + \beta\varepsilon_0 + \omega_0 \qquad (2)$$

where $\beta > 0$ and ω_0 is white noise. We can solve ε_0 in Eq. (1) and substitute ε_0 from Eq. (1) for ε_0 in Eq. (2) resulting in Eq. (3) below

$$CAR_0 = \alpha\text{-}\beta b_0 + \beta SUE_0 - \beta b_1 SUE_{-1} - \beta b_2 SUE_{-2} - \beta b_3 SUE_{-3} - \beta b_4 SUE_{-4} + \omega_0 \qquad (3)$$

In the empirical form of the model, if CAR_0, is regressed on *SUE*s, we have the following model:

$$CAR_0 = k + a_0 SUE_0 + a_1 SUE_{-1} + a_2 SUE_{-2} + a_3 SUE_{-3} + a_4 SUE_{-4} + u_0\,. \qquad (4)$$

If investors are fully aware of the magnitude of serial correlation in *SUE*, then $k = \alpha - \beta b_0$, $a_0 = \beta$, $a_1 = -\beta b_1$, $a_2 = -\beta b_2$, $a_3 = -\beta b_3$, and $a_4 = -\beta b_4$. Certain implications can be made based on the magnitudes as well as signs of the regression coefficients in equation (4). First, if investors are unaware of the *SUE* process expressed in Eq. (1), they may form (naïve) interim earnings expectations from year-to-year changes for interim earnings. That is, CAR_0 is independent of lagged *SUE*s because investors respond only to the current *SUE* and they ignore serial correlation of the complete *SUE* process. If this is the case, regression coefficients for these lagged *SUE*s would be close to zero. In other words, the pricing process of unexpected earnings would be inefficient. Alternatively, *SUE*s can have significant coefficients in Eq. (4) but the magnitude can be too low or too high relative to the *observed* serial correlation in the *SUE* process. If estimated coefficients are too small (for example $a_1 < -\beta b_1$), then the market systematically underestimates the magnitude of serial correlation in *SUE*. As said, also the opposite (overestimation) can occur.

3. Data and sample selection

The sample of HSE-listed firms (*main list*) is selected from the period 1992-2002 using the following criteria: i) availability of daily return indices in HSE's indices file from 281 days preceding to 30 days following the date of each interim earnings announcement, ii) availability of at least four consecutive interim earnings announcements with the same reporting period for the firm, iii) availability of the market value of the equity for the company at the end of the previous year in the HSE's *Annual report* and *Fact book* [10-17,19-21], and iv) banks, as well as investment and insurance companies are excluded because they follow different accounting practices in Finland.

The first criterion is employed in order to calculate risk-adjusted returns. The second criteria must be fulfilled in order to calculate lagged unexpected earnings. In the final sample there must be at least three observations available for the company. In Finland there is no public data source for interim earnings. However, the number of listed companies is relatively low: 65 at the beginning of the sample period. Thus the interim earnings data is collected from the firms. The third criterion defines the data needed to scale the variables. A total of 287 announcements released by 40 companies fulfil all the sampling criteria. The main reason for the rather low number of observations in the final sample was the lack of the previous year's comparative earnings figures due to changes in interim reporting periods.

Typically the calendar year and the fiscal year of a firm are the same, resulting in clustered interim earnings releases in June and in October if two interim reports per year are released. If only a six-month report is released, it is typically released in August. Information transfers among firms are likely to occur, especially within the same industry, which may cause cross-sectional trading dependencies. However, the firms in the sample represent quite a wide variety of industries, which reduces potential problems with announcement-time clustering. The firms which have interim earnings available can be characterized as stable, large and actively traded on the HSE.

The frequency of reporting has increased. During 1992, our first sample year, about 60% of the HSE-listed firms published at least two interim reports[2]. The corresponding figure for 1997 was about 80%. Recently, legislation stipulates that firms should make three interim earnings reports (quarterly reporting). Furthermore, the rules of the HSE require firms to announce to the public the date(s) on which their interim report(s) will be released. The interim earnings disclosure dates of the firms are provided by the HSE. The content of the interim reports during the research period was regulated by the recommendations concerning interim reports and by the Securities Markets Act. The current legislation and regulation of interim reports in Finland conform with EU practices.

The Securities Markets Act has changed during the research period with respect to insider trading. Before July 26, 1996 short-term trading (six months) by insiders was prohibited. An amendment to the Securities Markets Act abolished the 6-month trading rule and the public insider register was introduced. According to the Act an individual who is considered to be an insider is obliged to announce to the public all changes in his/her stockholdings. In addition, the HSE has issued rules on trading by insiders in listed companies restricting, for example, pre-announcement trading.

4. Measurement and empirical models

4.1 Measurement of unexpected earnings

The literature has presented several ways to measure unexpected earnings since Ball and Brown [2]. Frequently, the previous year's earnings are employed as a proxy for expected earnings. Estimating unexpected earnings as the change relative to the previous year assumes that annual earnings follow a random walk time-series process, i.e. shocks to annual earnings are considered to be permanent and there are no competing information sources available to the market. However, in the presence of transitory components in earnings, the previous year's earnings are a poor proxy for the current year's expected earnings. For this reason, changes in earnings are also a poor proxy for unexpected earnings [8,9,30]. The presence of a transitory component in earnings implies a lower slope coefficient between returns and unexpected earnings compared to a situation where earnings are purely permanent. This is also widely documented in prior research. The finding that earnings appear to explain only a small fraction of the total variation in returns has led to much discussion [26].

When the (seasonal) random walk model for earnings is sensitive to the above-mentioned shortcomings, more timely proxies for expected earnings are called for. An example of a more timely proxy for expected earnings is analysts' mean (or consensus) earnings forecast. By comparing reported (actual) earnings to analysts' mean earnings forecast, one can obtain a proxy for the (average) information content of an announcement. In other words, we can infer how much new, previously unknown, information the release of interim report brings to the market. Unfortunately, due to the emerging nature of the Finnish stock market, analysts' earnings forecasts for interim earnings were not available. In the literature [4,8] the following measure for unexpected earnings is common:

$$UE_{it} = \frac{INC_{it} - INC_{it-1}}{MV_{it-1}} \quad (5)$$

where INC_{it} is income before extraordinary items and taxes for firm *i* during interim report period *t*, INC_{it-1} is income before extraordinary items and taxes for firm *i* during the corresponding interim report period of the previous year, and MV_{it-1} is the market value of the company at the end of the previous year. The model assumed that earnings (*E*) follow a seasonal random walk model. This means that $E[E_t] = E_{t-1}$ meaning that the difference $E_t - E_{t-1}$ is unexpected earnings. In order to take into account firm-specific differences in the earning generation process, the unexpected earnings are standardized by the standard deviation of the company's earnings with the same length of reporting period. Thus, we have standardized unexpected earnings

$$SUE_{it} = \frac{UE_{it}}{Std(UE_i)} \quad (6)$$

The lagged *SUE*s are based on seasonal lags.

4.2 Measurement of information content of an announcement

Several types of statistical models have been employed to measure the information content of an information event. In principle the information content can be measured by observing the price reactions in the semi-strong form efficient market for the unexpected earnings. Examples of price reaction models include beta-adjusted returns, mean-adjusted returns, and market-adjusted returns. However, according to Brown and Warner [5,6] the event study results obtained via these models are substantially very much the same [23].

Daily returns were used for stocks listed on the HSE[3]. The returns, covering the years 1991 - 2002, were calculated as differences in logarithmic price indices, including splits, stock dividends, and new issues, as based on [22] and computed by the HSE[4]. In this study the cumulative abnormal return, *CAR*, measures the information content of the announcement. Using daily data, the market model parameters were estimated using OLS regression with 250 return days (t = -261,...,-11) prior to each announcement date t. Thus,

$$R_{it} = a_i + b_i R_{mt} + e_{it} \tag{7}$$

where R_{it} is the return on asset i at time t, a_i is the intercept term of asset i, b_i is the beta coefficient of asset i, R_{mt} is the return on stock market value-weighted portfolio m at time t and e_{it} is an error term. Thus the beta-adjusted return on day t for stock i, e_{it}, is R_{it} - (a_i + $b_i R_{mt}$). *CAR* is computed by cumulating beta-adjusted returns from the announcement day up to three (five) days after the announcement. Several firms have different classes of shares listed on the HSE. The most traded stocks are selected for analyses. The maximum weight for a firm's share is 10% in the portfolio index.

4.3 Empirical models

The adaptation of Ball and Bartov's [1] method in the context of Finnish interim earnings requires some adjustments. These adjustments are mainly due to the changes in legislation: the Securities Markets Act requires a quarterly reporting period since the year 2000. Before 2000 HSE-listed firms were supposed to release at least one interim report per fiscal year.

Therefore the reporting frequency has increased during the research period. Appendix 1 reports the number of interim reports with a given reporting period during each sample year.

The number of observations is much lower in our study than in Ball and Bartov's [1] study and the interim reporting period in Finland is usually longer especially in the beginning of the research period. The informed use of interim reports could have been somewhat limited during the research period. In the emerging market phase it could well be that other information besides past interim earnings are of relevance with respect to the historical development of interim earnings. In addition, firms' reporting environment deviates significantly from that in US [24]. Also characteristic of the late 1990s was the stock market boom for firms especially in high technology. The forecasting of earnings for these firms is difficult due to the lack of a stable earnings history and the lack of an adequate understanding of the earnings generation process. Thus, it is interesting to see whether investors are aware of this autocorrelation in earnings surprises discussed in the next section.

In Eq. (6) above standardized unexpected earnings, *SUE*, are defined as the difference between reported earnings and the previous year's earnings scaled by the market value of equity of the whole company at the end of the previous year and scaled by the standard deviation of the company's earnings during the same length of a given reporting period. In the spirit of Eq. (1) the relation between current unexpected earnings and lagged unexpected earnings are studied using the following regression model:

$$SUE_{it} = b_0 + b_1 SUE_{it-1} + \varepsilon_{it} \qquad (8)$$

The second step in the empirical analysis is to explore whether investors are aware of the process in unexpected earnings presented by Ball and Bartov [1]. Thus cumulative unexpected returns (*CAR*s) associated with the earnings releases, is regressed on the measures for unexpected earnings (*SUE*s) with a lag. Thus, we have the following model:

$$CAR_{it} = k + a_0\, SUE_{it} + a_1\, SUE_{it-1} + u_{it} \qquad (9)$$

In Eq. (9) above, as in Ball and Bartov [1], the dependent variable (CAR_{it}) measures the stock market response of the earnings announcement event, the first independent variable (SUE_{it}) measures the unexpected component of current earnings for year *t* and the lagged independent variables (SUE_{it-1}) measure the unexpected interim earnings for year *t-1*.

5. Empirical results

5.1 Descriptive statistics

Table 1 below presents descriptive statistics for reported earnings (*E/P ratio*) and corresponding current standardized unexpected earnings, *SUE,* for each year in the research period. Also cumulative abnormal returns (*CAR*s) for three return windows are displayed in table 1.

[insert Table 1 about here]

In general, seasonal differences in earnings are positive. The exceptions to this are the years 1996 and 2001, where average *SUEs* are negative. These are due to the record high earnings for the years 1995 and 2000 causing high forecasted earnings based on the seasonal random walk model for the years 1996 and 2001. Overall the positive *SUE*s are in line with the notion that during the research period there has been mainly a positive economic trend.

5.2 Prediction on current unexpected earnings

Table 2 reports pooled OLS regression results based on Eq. (8). The table shows that lagged (one lag) values of *SUE* predict the current *SUE*. The high statistical significance of the *F*-test value indicates that the overall model provides evidence of a linear relationship between SUE_{it} and the explanatory variables[5]. In the regression model Lag 1, SUE_{it-1} is positively related to the current *SUE*.

[insert Table 2 about here]

Consistent with Ball and Bartov [1], the results suggest that there exists a positive relationship between the current *SUE* with the lagged one. This suggests that successive unexpected earnings are autoregressive. The relation is quite strong and the regression coefficient b_1 is much larger compared to Ball and Bartov [1], where it is 0.443 in Table 1. The analyses below will be performed applying SUE_{it} and SUE_{it-1} as explanatory variables.

5.3 Incorporation of lagged unexpected earnings into current earnings expectations

Table 3 presents the results based on Eq. (9). In the table the relation between current and lagged unexpected earnings and the stock market response to interim announcements are presented. The market response is measured using three event windows: *CAR(0), CAR(0, 2)* and *CAR(0, 5)*. The evidence in table 3 suggests that historical *SUE*s are insignificantly (p>0.05) related to cumulative unexpected returns. Only the measure for current unexpected earnings, SUE_{it}, is significantly (p<0.05) related to the stock market response. In other words, the parameter estimate for a_0 is positive and significant but the estimate for a_1 is insignificant. The constant term k is insignificant suggesting that there is no systematic overlooking of a variable that would have given an additional explanation for *CAR*s.

[insert Table 3 about here]

Table 4 below compares time-series estimates with those implied by market reactions to earnings. The implied market reaction is achieved using the methodology presented in Eqs. (3) and (4). For example, implied market reactions to earnings for Lag 1, a_1, during a 6-day event window are calculated as $-a_0b_1$ being –0.660 (computed as –0.939*0.703). The observed stock market response is –0.480, which is low compared to the value implied by full recognition. This suggests that investors do not properly take into account the time-series behaviour in the previous year's *SUE*. Qualitatively the results are very similar also for other return windows. These findings support the view that investors' underestimate the magnitude of the serial correlation in interim earnings. The results suggest that investors use, at least in part, a seasonal random walk model when forming earnings expectations.

[insert Table 4 about here]

The table 4 above shows that the observed parameter values in column (5) are closer to zero than the corresponding implied values in column (4). This means that the markets are taking into account the intertemporal dependence (serial correlation) of earnings only partially. Column 6 in table 4 shows the relative difference between the observed recognition of time series behaviour (column (5)) and the implied time series behaviour (column (4)). The markets are underestimating the time series of earnings in their share valuation around the announcement. More specifically, the obtained evidence shows that the market is aware of the existence and sign of serial correlation but underestimates its magnitude. For the three-day event window the underestimation is smallest at 13.1% (=100% - 86.9%). In Ball and Bartov [1] prices incorporated approximately 45% of the serial correlation at lag 1. The higher incorporation of the serial correlation in the present study may be partly due to the different return window. In Ball & Bartov [1] CAR is computed for a three-day (-2, 0) window, where 0 is the earnings announcement day. They focused on the pre-event period. We applied three different CAR windows focusing on the event and post-event periods: (0), (0, 2), and (0, 5). It could be that at and after the event markets have better possibilities to adjust themselves to the serial correlation of earnings compare to the windows before the event.

The results show that investors are aware of the seasonal earnings process. However, the autocorrelation in unexpected earnings series is partially overlooked. The prior relevant literature in empirical finance has documented and commented on this phenomenon [35,37]. The tradition of Finnish interim earnings reporting is still somewhat young. That may give a partial explanation for the functional fixation of investors on the most recent unexpected earnings figure. It could well be that in the future, when there is a longer unexpected earnings series available, investors could digest this intertemporal earnings behaviour more fully in their investment decisions.

The results show that there is a difference between investors' actual valuation of firms and the seasonal random walk model based valuation. It is likely that investors are using all the available timely information in their firm valuation. In contrast, a seasonal random walk assumes, unrealistically, that only the activities during a specific season are relevant in the valuation.

6. Summary

In this paper we study how the market uses the information on current and past interim earnings. In line with the prior literature, we examine whether investors focus on a comparison of year-to-year changes in interim earnings and potentially underestimate the dependence of the seasonal earnings series. We provide further evidence on how the market acts in the face of interim earnings announcements in an emerging market. The data is based on the Finnish market covering the years 1992-2002. We found, consistent with Ball and Bartov [1], evidence that investors underestimate the magnitude of the serial correlation in interim earnings.

In conclusion, the results suggest that investors use, at least in part, a seasonal random walk model when forming earnings expectations. This overall finding calls for additional investigations of the reasons (firm-specific, market-specific) for the underutilization of seasonal unexpected earnings information.

References

1 Ball, R.J. and Bartov, E. (1996) How naïve is the stock market's use of earnings information? *Journal of Accounting and Economics*, Vol. 21, pp.319-337.

2 Ball, R.J. and Brown, P. (1968), An empirical evaluation of accounting income numbers, *Journal of Accounting Research*, Vol. 6, pp.159-178.

3 Bernard, V.L. and Thomas, J.K. (1990) Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, *Journal of Accounting and Economics*, Vol. 13, pp.305-340.

4 Booth, G.G., Broussard, J. and Loistl, O. (1997) Earnings and stock returns: evidence from Germany. *The European Accounting Review*, Vol. 6, pp.589-603.

5 Brown, K.C. and Warner, J.B. (1980) Measuring security price performance. *Journal of Financial Economics*, Vol. 8, pp.205-258.

6 Brown, K.C. and Warner, J.B. (1985) Using daily stock returns: the case of event studies. *Journal of Financial Economics*, Vol. 14, pp.3-32.

7 Brown, L.D. and Han, J. (2000) Do stock prices fully reflect the implications of current earnings for future earnings for AR1 firms? *Journal of Accounting Research*, Vol. 38, pp.149–164.

8 Easton, P.D. and Harris, T.S. (1991) Earnings as an explanatory variable for returns. *Journal of Accounting Research*, Vol. 29, pp.19-36.

9 Hayn, C. (1995) The information content of losses. *Journal of Accounting and Economics*, Vol. 20, pp.125-153.

10 Helsinki Stock Exchange (1993) Annual report 1992, Helsinki: Erikoispaino.

11 Helsinki Stock Exchange (1994) Annual report 1993, Helsinki: Erikoispaino.

12 Helsinki Stock Exchange (1995) Annual report 1994, Helsinki: Erikoispaino.

13 Helsinki Stock Exchange (1996) Annual report 1995, Helsinki: Erikoispaino.

14 Helsinki Stock Exchange (1997) Fact book 1996, Helsinki: Helsinki Exchanges Plc.

15 Helsinki Stock Exchange (1998) Fact book 1997, Helsinki: Helsinki Exchanges Plc.

16 Helsinki Stock Exchange (1999) Fact book 1998, Helsinki: Helsinki Exchanges Plc.

17 Helsinki Stock Exchange (2000a) Fact book 1999, Helsinki: Helsinki Exchanges Plc.

18 Helsinki Stock Exchange (2000b), Calculation of HEX indices, Helsinki: Helsinki Exchanges Plc., Available from http://www.hex.fi/.

19 Helsinki Stock Exchange (2001) Fact book 2000, Helsinki: Helsinki Exchanges Plc.

20 Helsinki Stock Exchange (2002) Fact book 2001, Helsinki: Helsinki Exchanges Plc.

21 Helsinki Stock Exchange (2003) Fact book 2002, Helsinki: Helsinki Exchanges Plc.

22 Hernesniemi, H. (1990) HEX-indeksi (HEX-index). *ETLA*, Helsinki.

23 Kallunki, J-P. (1996). Earnings-related anomalies in a thin security market: an accounting-based risk estimation approach. *Acta Wasaensia*, no. 48, Vaasa.

24 Kettunen, P. (1993). Financial accounting and reporting in Finland. *European Accounting Review*, Vol. 3, pp.592-602.

25 Kothari, S.P. (2001) Capital markets research in accounting. *Journal of Accounting and Economics*, Vol. 31, pp.105-231.

26 Lev, B. (1989) On the usefulness of earnings and earnings research: lessons and directions from two decades of empirical research. *Journal of Accounting Research*, Vol. 27, pp.153-192.

27 Liang, L. (2003) Post-earnings announcement drift and market participants' information processing biases**.** *Review of Accounting Studies*, Vol. 8, pp.321-345.

28 Maines, L. and Hand, J. (1996) Individuals' perceptions and misperceptions of time series properties of quarterly earnings. *The Accounting Review*, Vol. 71, pp.317-336.

29 Martikainen, T., Rothovius, T. and Yli-Olli, P. (1993) On the individual and incremental information content of accrual earnings, cash flows and cash dividends in the Finnish stock market. *European Journal of Operational Research*, Vol. 68, pp.318-333.

30 Martikainen, T., Kallunki, J-P., and Perttunen, J. (1997) Finnish earnings response coefficients: the information content of losses. *The European Accounting Review*, Vol. 6, pp.69-81.

31 Maynes, E. and Rumsey, J. (1993) Conducting event studies with thinly traded stocks. *Journal of Banking and Finance*, Vol. 17, pp.145-157.

32 Rendleman, R.J., Jones, C.P. and Latané, H.A. (1987) Further insights into the standardized unexpected earnings anomaly: size and serial correlation effects. *Financial Review*, Vol. 22, pp.131-144.

33 Schadewitz, H.J. (1997) Financial and nonfinancial information in interim reports. Determinants and implications. *Acta Universitatis Oeconomicae Helsingiensis*, no. A-124, Helsinki.

34 Schadewitz, H.J. and Kanto, A.J. (2002) The impact of disclosure on the market response to reported earnings. *Scandinavian Journal of Management*, Vol. 18, pp.521-542.

35 Shleifer, A. (2003). Inefficient markets: an introduction to behavioral finance. Clarendon Lectures in Economics, New York: Oxford.

36 Sponholtz, C. (2004) The Information Content of Earnings Announcements in Denmark. Working Paper Series No. 177. University of Aarhus.

37 Thaler, R. ed. (1993). Advances in behavioral finance. Russell Sage Foundation, New York, NY

38 Vieru, M. (1998) Pre-disclosure information asymmetry and information content as a means of explaining trading volume responses to interim earnings announcements in a thinly traded stock market. *Finnish Journal of Business Economics,* Vol. 47, pp.323-346.

39 Vieru, M. (2002) The impact of interim earnings announcements on the permanent price effects of trades on the Helsinki stock exchange. *Journal of Multinational Financial Management*, Vol. 12, pp.41-59.

40 Vieru, M., Schadewitz, H. and Perttunen, J. (2004) Impact of Corporate Information Releases on Ownership - Evidence with Various Investor Types. SSRN Working Paper Series. University of Oulu.

41 White, H., (1980) A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica*, Vol. 48, pp.817-838.

Appendix 1. Length of reporting period in interim reports by year.

Year	3 month	4 months	6 months	8 months	9 months
1992	0	11	1	10	0
1993	0	12	1	11	0
1994	0	14	1	13	0
1995	0	15	1	14	0
1996	0	13	1	13	0
1997	0	7	1	9	0
1998	1	5	2	7	1
1999	2	3	3	5	2
2000	15	1	17	1	16
2001	26	2	30	2	28
2002	35	2	35	2	35
Total number	79	85	93	87	82

Table 1. Descriptive statistics.

Year	*N*	*E/P ratio*	*SUE*	*CAR(0)*	*CAR(0,3)*	*CAR(0,5)*
1992	22	0.177	0.556	0.011	0.023	0.030
1993	24	0.127	1.009	0.007	-0.004	-0.012
1994	28	0.077	0.547	-0.007	-0.010	-0.014
1995	30	0.091	0.437	-0.013	-0.020	-0.023
1996	27	0.087	-0.201	-0.008	-0.007	-0.011
1997	17	0.059	0.266	-0.002	-0.005	-0.011
1998	16	0.062	0.664	-0.019	-0.037	-0.008
1999	15	0.081	0.397	0.016	0.018	0.011
2000	50	0.077	0.272	-0.008	-0.008	-0.011
2001	88	0.069	-0.020	0.012	0.026	0.032
2002	109	0.053	0.254	0.004	-0.001	-0.001
Average		0.078	0.282	0.001	0.002	0.002

Note: *SUE* is unexpected earnings measured as the difference of reported earnings and previous year earnings scaled by the market value of the company at the end of previous year and scaled by the standard deviation of the company's unexpected earnings during a given reporting period of the same length; *CAR(0)* is the information content of the announcement measured as the beta-adjusted return during the announcement day 0; *CAR(0,2)* is the information content of the announcement measured as the beta-adjusted return during days 0 to 2; *CAR(0,5)* is the information content of the announcement measured as the beta-adjusted return during days 0 to 5.

Table 2. Regression results for $SUE_{it} = b_0 + b_1\, SUE_{it-1} + \varepsilon_{it}$ (Eq. (8)).

	N	B_0	b_1	*Adj.* R^2	*F*
	426	0.0786	0.703***	0.501	427.6***
p-value		(0.247)	(0.000)		(0.000)

Note: The notations are based on the p-values adjusted for an unknown type of heteroskedasticity using [41]. * 10% risk level, ** 5% risk level, *** 1% risk level.

Table 3. Regression results for $CAR_{it} = k + a_0\, SUE_{it} + a_1\, SUE_{it-1} + \varepsilon_{it}$ (Eq. (9)).

	1-day event window		*3-day event window*		*6-day event window*	
Variable	*coefficient*	*p-value*	*coefficient*	*p-value*	*Coefficient*	*p-value*
$k*100$	0.075	(0.784)	0.071	(0.856)	0.105	(0.811)
a_0*100	0.553**	(0.015)	0.977***	(0.003)	0.939**	(0.018)
a_1*100	-0.280	(0.224)	-0.597*	(0.069)	-0.480	(0.211)
Adj. R^2	0.011		0.018		0.013	
F	3.44**	(0.033)	4.95***	(0.008)	3.74**	(0.024)

Note: N = 426. The notations are based on the *p*-values adjusted for an unknown type of heteroskedasticity using [41]. * 10% risk level, ** 5% risk level, *** 1% risk level.

Table 4. Comparison of time-series estimates with those implied by market reactions to earnings.

event window (1)	*Time-series estimate b_1* (2)	a_0 (3)	*Implied* $-a_0b_1$ (4)=-(2)*(3)	*Observed* a_1 (5)	*Relative Difference* (6)=100*(5)/(4)
CAR(0)	0.703	0.553	-0.389	-0.280	71.8%
CAR(0, 2)	0.703	0.977	-0.687	-0.597	86.9%
CAR(0, 5)	0.703	0.939	-0.660	-0.480	72.7%

Note: The market response is measured using three event windows: *CAR(0)*, *CAR(0, 2)* and *CAR(0, 5)*. The implied market reaction is achieved using methodology presented in equations (3) and (4). N=426.

[1] There are some studies which have used interim earnings data from Finland [33, 34, 38, 39] but their scope differs from that of this study.

[2] Both mandatory and voluntary interim report releases were included in the sample. This practise is supported at least by two arguments. First, there is no theory indicating that the consequences of mandatory interim reports should be somehow different compared to voluntary interim reports. Second, also empirical evidence strongly supports the view that mandatory and voluntary interim reports are very alike [33].

[3] For more information on how the index is calculated see also [18].

[4] Due to the thin trading volume a number of missing prices could cause misspecification in abnormal returns [31, 23]. However, there are findings in event studies [36, 38, 40, 36] demonstrating that the results are not in empirical studies reported to be sensitive to various return allocation procedures employed to mitigate problems associated with the thin trading.

[5] In the model only one lag is employed due to data limitation reasons detailed above in section 4.3. However, we employed also extended models where we have regressions with more lags with a significant decrease of observations. Since only the first lagged *SUE* was significant in the extended models we turn to use the model with one lag.