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Empirical Evidence on Earnings and Analysts' Earnings Forecasts

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ABSTRACT

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If the allocation of savings into investment opportunities is done well, economy can exploit new business ideas to spur innovation and create jobs and wealth in society. Thus it is in the interest of society as well as investors to determine the future earnings of a firm, because the underlying source of value for common stock is earnings. Clearly, earnings are important to stockholders because earnings provide the cash flows necessary for paying dividends in the future. Dividend discount models can also be framed by recasting dividends in terms of earnings and book values. In short, the efficiency of the market is directly linked to the quality of (expectations about future) earnings of the firms. Analysts play an important role as information intermediaries in assessing these expectations.

The thesis investigates earnings and earnings forecasts. The purpose is threefold. First, the information content of different earnings releases is investigated in a market (Finland) where taxation plays an important role in determining released earnings. Second, accuracy of analysts' earnings forecasts in such a market is compared to a big market with information driven earnings releases and well-established analyzing industry (UK). Third, the dilemma in the financial literature whether analysts' accuracy has been improving or not over the years, whether there is positive or negative bias, and whether there is over- or under-reaction, if any, to previous earnings changes, is studied, and the differences between negative and positive earnings change firms in this respect are presented.

This study is of interest to investors, analysts, corporations and legislators as well as researchers. The main findings are the following. In Finland, the Annual Account release date is important in assessing share values in regard of the earnings information. This fact should be taken into account in future studies of earnings reactions in similar markets. Next, it was found that the forecast accuracy of the analysts in UK is, or seems to be, much better than the accuracy of the analysts in Finland, but this difference can be explained by the more demanding forecasting environment in the smaller market. Finally, in the third part, the results show that problems with earnings forecasting are concentrated in negative earnings change firms, and the empirical results of whether analysts are better than time series models and whether there is negative or positive bias and over- or under-reaction, are dependent on the number of negative vs. positive earnings change firms in the research period. This is one important explanation for different results in various empirical papers in this field, and it should be accounted for in empirical research.

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1. INTRODUCTION

The purpose of this chapter is to present the motivation for the thesis. The first section proves the importance of earnings and expectations of future earnings to the well being of society through the improved allocational efficiency of the markets. The second section reviews previous research on earnings and analysts' forecasts of earnings. After these, the purpose, relevance and contribution of the thesis are stated.

1.1 Background

The allocation of savings into investment opportunities is a fundamental question for any economy. If this is done well, the economy can exploit new business ideas to spur innovation and create jobs and wealth more rapidly than would otherwise be possible. In the world today, almost all countries have adopted the market model for their economy, and capital markets play an important and increasing role in channeling financial resources from savers to business enterprises in need of capital.

The process of matching savings and business investment opportunities is complicated. Entrepreneurs have better information than savers on the value of business investment opportunities, and communication by entrepreneurs to investors is credible only up to a point, because investors know that entrepreneurs have an incentive to inflate the value of their ideas. This is also the reason why intermediaries are important in the financial markets. Intermediaries are firms whose primary business is to provide customers with financial products and services that cannot be obtained more efficiently by transacting directly on securities markets.

There are two types of intermediaries, financial and informational intermediaries. The financial intermediaries, for example venture capital firms, banks, mutual funds and insurance companies, aggregate funds from individual investors and analyze investment alternatives to make investment decisions. The informational intermediaries, for example

financial analysts, auditors, bond-rating agencies and the financial press provide investors with information on the quality of different investment opportunities.

Both types of intermediaries add value by helping investors rank investment opportunities. In this process, financial reporting is an important tool. For example, an important part of informational intermediaries' work is to add value by either enhancing the credibility of financial reports, or by analyzing the information in the financial statements. Thus, financial analysts have an important role in the dissemination and interpretation of information on the markets. In this process, a large part of their task is to forecast company earnings, and their ability to do so accurately is directly linked to the allocation of savings into investment opportunities in the economy.

This role of financial, or security, analysts is thus closely connected to the Efficient Market Hypothesis (EMH). As mentioned earlier, allocation of investment opportunities is a fundamental question for an economy. In order to achieve this properly, the market has to be allocationally efficient, so that those firms with the most promising investment opportunities have access to the needed funds. In order for markets to be allocationally efficient, they need to be both internally and externally efficient (West 1975). An internally efficient market is one in which brokers and dealers compete fairly so that the cost of transacting is low and the speed of transacting is high. The stock markets and legislators have adopted policies aimed at improving internal efficiency; primarily by setting rules and regulations that affect the design and operations of security markets. Internal market efficiency has been an object of increasing interest in recent years, and the research in this field is usually known as market microstructure.

On an externally efficient market, information is quickly and widely disseminated. This means that information is widely and cheaply available to investors and that all relevant and ascertainable information is reflected in security prices. In other words, all securities are fairly priced and offer expected returns just sufficient to compensate for the securities' risks. In this thesis the term market efficiency will henceforth be used to refer to external market efficiency.

On the other hand, expectations drive security prices. This was already obvious in the early days of investing; for example Graham and Dodd (1934) stated in Security Analysis, that "The effect of announcements of earnings on value is likely to be insignificant, unless the earnings announcement itself signals a change in the outlook for the future."

It can be shown theoretically (see Chapter 2), that the price of a security equals the present value of all future net cash flows from the security discounted by the appropriate discount rate. Also, the underlying source of value for a share of common stock are earnings (not e.g. dividends), as first shown by Miller and Modigliani (1961). Clearly, earnings are important to stockholders because earnings provide the cash flows necessary to pay dividends, even though they are not perfectly correlated. Also, the dividend discount model (Gordon and Shapiro 1956) can be framed by recasting dividends in terms of earnings and book values.

Thus, the efficiency of the market is directly linked to the quality of expectations about future earnings of the firms. The three sources of earnings expectations investors use are: First, time-series models, second, models based on firm specific and economy wide information, including forecasts by firm management, and third, analysts' expectations. The most important source in the modern financial markets is analysts' expectations, see e.g. Brown, Foster and Noreen (1985), who found that a firm's stock price is based on analysts' expectations of future earnings. This thesis will study earnings, analysts' expectations of them and how these two are reflected in the stock market.

1.2 Market reaction to earnings information

Studies on the informational characteristics of earnings can be divided into two categories: event and association studies. The idea of an event study is to investigate what kind of effect earnings announcements have on the future cash flows of firms (or, more precisely, expectations of them). Empirically this is usually done by studying the stock return reaction to the earnings announcements during a few days' "window" around the announcement day. Association studies aim to prove that the market agents learn about the

valuation-relevant events during the whole research period, which is usually up to several years. The main focus is on whether accounting earnings measurements are consistent with the underlying events and information set reflected in stock prices (Collins and Kothari 1989).

The first of the association studies was that by Ball and Brown (1968) on the US markets about return reaction to annual earnings (measured by net income and EPS). The model was based on their previous results (Ball and Brown 1967) that a great deal of the change in a firm's earnings could be explained by average change in all firms' earnings. In other words, the current year's earnings for a certain firm can be derived by regressing earnings for the firm on market wide earnings, from which a forecast error can be obtained. This forecast error represents new information to the market. The firms in the study were divided into two portfolios: those with positive and others with negative forecast errors. According to their hypotheses a positive information firm's return should be more than average and a negative information firm's return less than average. According to empirical evidence they presented, this was so. The return reaction could be seen already one year before the information release; in fact, about 85 to 90 percent of the relevant accounting information was leaked to the investors before the formal release of accounting figures. This can be explained by the fact that interim reports and statements provide investors with more timely information than the annual report. After the information release, the return reaction still continued for about two months. This phenomenon is called the "post-announcement drift", and it has been under intensive debate in the empirical literature ever since Ball and Brown (1968).

The drift means that the market "under-reacts" to financial statement information at the time it is initially disclosed. For example Foster, Olsen & Shevlin (1984) report that high abnormal returns could have been achieved by investing in stocks that had published extremely positive (that is, high unexpected earnings) information. Of course, the "abnormal" return in such studies could be due to failure to account fully for the riskiness of the strategy, but many studies, i.e. Bernard and Thomas (1989), take good care to control for this sort of risk. Bernard and Thomas verify the results of Foster et al., and state

that it is particularly puzzling because it is extremely difficult to understand how the market could completely fail to react to information as readily available as earnings data. Bernard and Thomas (1989) find that much of the drift is concentrated on the days surrounding the next quarter's announcement. This suggests that there is autocorrelation in quarterly earnings series which market fails to appreciate fully.

Joy, Litzenberger and McEnally (1977) studied the differences between the accounting earnings figures given by firm itself and figures that have been corrected to show the "true" income. They could find no differences, which is most probably due to the high correlation between the two items. Tse (1986) studied the freshness of accounting figures (in relation to release date) and found that the timelier the figures are, the better they are reflected in the stock returns. This is only natural, since after the release date, the accounting figures lose significance as new information arrives on the market.

Lev (1989) studied the usefulness of earnings to investors and found it to be limited, even though earnings information appears to be used by investors. Lev evinces various reasons for this, such as investor irrationality, i.e. noise trading or the low information content of currently reported earnings and other financial variables. The latter may be mostly due to biases induced by accounting measurement and valuation principles. Since them, more and more studies have concentrated on the incremental and relative usefulness of accrual and cash based earnings numbers, e.g. Ismail and Kim (1989) and Sudarsanam and Fortune (1989). The empirical results are contradictory, however, probably because definitions of cash flows vary between studies, from simple net income plus depreciation to more refined versions. The first such study was done by Beaver and Dukes (1972), who used three different earnings measurement figures. The accrual earnings were more closely associated with abnormal stock returns than the cash flow variable (earnings before deferrals plus depreciation, depletion and amortization). They also isolated those cases in which the two data items (positive unexpected accrual earnings and negative cash flow changes) conflicted with each other and stated that neither was clearly superior.

Harmon (1984) used six fund flow measures and three income numbers to study market reaction. He found that the accrual earnings were more strongly correlated with the market reaction than were funds flows, although the relationship was relatively tenuous. Harmon (1984) used six funds flow measures and three income numbers to study market reaction. He found that the accrual earnings were more strongly correlated to the market reaction than were funds flows, although the relationship was relatively weak.

Ball, Kothari and Watts (1990) studied the economic determinants of earnings and their effect on stock returns. They found statistically reliable evidence of positive association between earnings changes, risk changes and equilibrium expected return changes. They conclude that the risk changes observed from a period of one year before to one year after the earnings change affect securities' expected returns, conditional on earnings changes. Further, they state that those changes explain a portion of the post-earnings-announcement drift, however, still leaving abnormal returns, which are not consistent with market efficiency or the hypothesis concerning market under-reactions to earnings information.

Stice (1991) studied the role of the information release forum. Because in the USA some firms file their 10-K (annual) or 10-Q (quarterly) forms with the Securities and Exchange Commission (SEC), which is public information, several days before the corresponding earnings announcement appears in the *Wall Street Journal* (WSJ), he was able to study whether the price and volume reactions to those announcements occur on the SEC filing date or on the subsequent WSJ announcement date (at least four days in his study). Stice suggests that there is no significant market reaction at the SEC filing date, even though the filing was the first public announcement of earnings for the quarter, even if there was a market reaction to the subsequent WSJ earnings announcement. In contrast to this, Wright and Groff (1986) presented evidence that the existence of a market reaction does not depend on how information is made public.

Cooper, Day and Lewis (2001) found that the leading analysts (identified by a measure of forecast timelines) have a greater impact on stock prices than the following analysts, and that the latter group is able to improve their accuracy by imitating the forecasts of superior

analysts. They also found that abnormal trading volume is a noisy measure of analyst performance. Finally, Cooper, Day and Lewis (2001) showed that forecast revisions by timeliness leaders can be classified as informative and uninformative conditional upon the lead analyst's previous forecast and the current consensus forecast. Elgers, Lo and Pfeiffer (2001) found that the delayed security price adjustment to earnings announcements is due to market's failure to incorporate information in analysts' forecasts about future earnings.

1.3 Earnings forecasts

This chapter will present previous research done on earnings and earnings forecasts. The literature on analysts' earnings forecasts is reviewed in different phases. The most important aspect of a forecast, the accuracy, is investigated first. Next, the bias, i.e. whether expectations are optimistic or pessimistic on average, and the revisions, i.e. the recalculation of earnings forecast as more information becomes available, are reviewed. The dispersion, i.e. to what degree analysts agree or disagree about the future earnings, and analysts following, in other words, how many analysts follow a certain company, are reviewed. This chapter also includes previous research on the effect of analysts' expectations' on share prices.

When reading this chapter it must, as always, be born in mind that the data used in each study is subject to criticism, see for example Abarbanell and Lehavy (2000a). They studied various data sources from First Call, Zacks and I/B/E/S, which are the three major forecast data providers, and Compustat. They found that significant changes in mean and median analysts' forecast errors coincide with periods when forecast data providers' procedures for accumulating and recording data changes, and that about 60% of the observed decline in mean optimism in recent years is attributable to data providers' procedures to exclude items from reported earnings.

1.3.1 Accuracy of earnings forecasts

In this section, research on the accuracy of time series models of earnings per se is reviewed first, after which analysts' forecasts are reviewed. How these two behave in relation to each other is reviewed next. Finally, research on managements' own expectations is considered.

1.3.1.1 Accuracy of time series models of earnings

Forecasting of earnings has been under intensive and increasing investigation in the financial literature for 40 years, during which many different forecasting models have been studied. Little (1962) showed that British firms' annual earnings follow a random walk process. On US data, Ball and Watts (1972), Albrecht, Lookabill and McKeown (1977) and Watts and Leftwich (1977) provided evidence that Box-Jenkins ARIMA models are not more accurate in predicting annual earnings than the random walk model in a holdout period. Later, Lee and Chen (1990) argued that temporary, short-run and long-run structural changes are commonplace, and that ARIMA models can be improved by incorporating such changes in the model and thereby allowing it to provide more accurate earnings forecasts.

Brooks and Buckmaster (1976) argued that annual earnings with extreme year to year changes are better described by a mean-reverting model, such as ARIMA (0,1,1) or integrated moving average IMA(1,1). However, according to Kendall and Zarowin (1990), the rejection of the random walk model is not limited to cases of extreme earnings' changes. They did not, however, provide predictive evidence in a holdout sample, i.e. models were not tested against each other in the forecasting period.

However, it is possible to generate a more accurate annual earnings forecast model than the random walk model, but it calls for other information in addition to the time-series of past annual earnings. This information set includes quarterly earnings time series, firm's stock price and financial statement data, such as the book rate of return. For the first item,

Hopwood (1982) showed that already before the first quarterly report is released, one can use a model to forecast the individual quarterly earnings for the whole year, which will, when summed, equal an annual earnings forecast which is more accurate than models based on annual earnings numbers.

In recent years, interim reports have become more and more important on the stock market. When considering interim reports, one must remember that there is typically a seasonal component to a firm's earnings. There is an ongoing debate in the literature on which of the following three models best describes the other systematic patterns of the data: an autoregressive model (Foster 1977), a moving average model (Watts 1975) or a combined autoregressive moving average model (Brown and Rozeff 1979). If the criterion lies in the forecasting ability of future quarterly earnings, the existing evidence supports the third model (Bathke and Lorek 1984). Bathke and Lorek (1984) also found that the fourth fiscal quarter had higher forecast errors than the others, which is probably due to a fourth-quarter 'dumping' process by which accruals and deferrals on an interim basis are brought into correspondence with the annual figures. This causes a random shock, a noise component, in the time series.

Beaver, Lambert and Morse (1980,1987), Collins, Kothari and Rayburn (1987) and Freeman (1987) showed that the random walk model could be improved by incorporating the stock price into the model. Specifically, if earnings variability is large relative to stock price variability, a composite model (using both random walk and price information) is more accurate than the random walk model alone, as shown by Shroff (1999). This is in line with the finding of Brown et al. (1985) that a firm's stock price is based on analysts' expectations (of future earnings).

The random walk model can also be improved by including the book rate of return in the model, in advance of past stock price, as suggested by Freeman, Ohlson and Penman (1982). Further, Ou and Penman (1989a and 1989b) showed that other non-earnings, financial statement data could also be used to predict future earnings. However, Ball (1992) argues that the so-called financial statement information anomaly, resulting from

Ou and Penman's findings, is due to accounting ratios proxying for stocks' expected returns.

It is intuitively appealing to think that movements in the earnings of a particular firm should be related to movements in the earnings of the market and industry portfolios, because earnings are influenced by industrial and economic factors, which are, at least partly, common to all firms. Such a relationship also exists according to empirical analysis, at least to some extent (Brealey 1971). Accounting beta can be used to measure how the accounting earnings of the security covary with the accounting earnings of the market or industry portfolios. And since security prices are related to earnings, the stock market betas are also related to accounting betas. According to Beaver and Manegold (1975), accounting betas explain between 20 and 40 % of the variation observed in market betas.

Machuga and Pfeiffer (2000) found that price-based earnings forecasts are more accurate than forecasts based on financial statement analysis. However, they also found that financial analysts' forecasts are the most accurate, although for firm years with negative prior performance, the price-based model was as accurate as analysts' forecasts. For recent research, see e.g. Baber, Kim and Kumar (1999) or Terregrossa (1999) and the literature cited there.

1.3.1.2 Accuracy of analysts' earnings forecasts

The univariate time-series models have also been compared to analysts' earnings forecasts in various studies since Brown and Rozeff (1978). Most of them have found analysts to be more accurate than time series forecasts. This is true even for the most sophisticated time-series models, as shown by e.g. Lee and Chen (1990). Ramakrishnan and Thomas (1991) hypothesize that analysts are relatively better than time-series models at distinguishing among permanent, transitory and price-irrelevant earnings shocks, following Brown and Zmijewski (1987) finding that analyst's earnings forecasts are improved (compared to time-series models) in times of strikes.

This analysts' superiority follows from two sources. First, analysts have a contemporaneous information advantage, as suggested by Fried and Givoly (1982). This means that analysts use other information sources than only the time series properties of past earnings at the time of an earnings announcement. Second, analysts have a timing advantage, as suggested by Brown, Griffin, Hagerman and Zmijewski (1987a). This means that analysts use information acquired after the previous earnings announcement (that is when the time series forecast model is initiated). However, the second explanation was not found significant in the study by Fried and Givoly (1982), which used annual data, whereas Brown et al. (1987a) used quarterly data.

Brown, Richardson and Schwager (1987) showed that the analyst's advantage in forecasting annual earnings, compared to time-series models is positively related to the amount of information available (proxied by firm size), and the precision of this information (proxied by the homogeneity of analysts' expectations). According to Kross, Ro and Schroeder (1990), the analyst's advantage in forecasting annual earnings increases with the firm's earnings variability and the amount of coverage in financial media, the *Wall Street Journal*. Kim and Schroeder (1990) also showed that analysts use non-earnings information sources in their forecasts, by studying the discretionary accruals in earnings reports of firms with earnings-based bonus plans. More recently, Sougiannis and Yaekura (2001), for example, found that analysts' earnings forecasts convey information about value beyond that conveyed by current earnings, book values and dividends (see also Brown (2001a) and the literature cited there).

Booth, Brokman, Kallunki and Martikainen (1997) studied how earnings smoothing by managers affects forecast accuracy. They found that forecasts for firms that had not smoothed their earnings in the past were not as accurate as for the firms that had smoothed them. They also found that for income smoothers, the forecast errors are reduced when the forecast horizon shortens, which is not the case with non-smoothers.

Although analysts are superior in forecasting earnings, their forecasts can be improved by pooling them with time-series models, as first demonstrated by Newbold, Zumwalt and

Kannan (1987), see also e.g. Chase (2000). Such pooled models generate more accurate earnings forecasts than either analysts or time-series models individually.

Libby and Blashfield (1978) found that aggregating (equally recent) forecasts the accuracy can be improved by reducing idiosyncratic error. According to O'Brien (1988), the most recent analyst's earnings forecasts are more accurate than the consensus (mean) forecast. Also, Brown (1991) found that accuracy can be improved by discarding old earnings forecasts. In fact, he found that the most recent forecast, an average of the three most recent forecasts and the 30-day average are more accurate than the consensus (mean) forecast.

Brown (1991) also studied firm size, and found that the most recent forecast is approximately as accurate as the 30-day average for small firms, but the 30-day average is significantly more accurate than the most recent forecast for large firms. This has something to do with the fact that, compared to large firms, fewer analysts follow small firms. According to Stickel (1990, 1993), analysts' forecasts can not only be improved by updating them with publicly available data, but that such forecasts are more accurate than the most recent forecast, an average of the three most recent forecasts and the 30-day average.

Lys and Sohn (1990) provided evidence that analysts ignore information on stock prices (prior to the forecast-release date), which implies that analysts do not use all (or are inefficient in using) publicly available information.

Elton, Gruber and Gultekin (1984) examined the sources of error in analysts' forecasts. They found that less than 3 % of the typical error was due to a misjudgment about the economy, about 30 % due to misjudgment about the industry and more than 65 % of the typical error was caused by misjudgment about the firm.

On the other hand, several reasons have been suggested for analysts' "poor" performance in forecasting earnings. Bartley and Cameron (1991) found evidence that most management forecasts are not more accurate than contemporaneous analyst forecasts,

either, although there appears to be a subset of management forecasts that are more accurate. There may be agency reasons why analysts do not always maximize forecast accuracy. This may occur if the analysts have incentives to maximize the volume of trade generated by their forecasts. According to Cappstaff, Paudyal and Rees (1995) there is also a strong argument that investment analysts are reluctant to publish pessimistic forecasts where this may damage relationships with the firm, as personal contacts are possibly the most important source of information. Trueman (1990) postulates that the analysts are reluctant to significantly revise forecasts when they receive new information, because this would be a negative signal about the accuracy of the analysts' prior information.

There are also differences between analysts in their ability to forecast earnings. Stickel (1992) found that members of the Institutional Investor All American Research Team are superior. The same conclusion is also drawn by Sinha, Brown and Das (1993). In contrast to these studies, Brown and Rozeff (1980) and O'Brien (1990) found no such evidence. One explanation for this seemingly puzzling evidence is that Stickel, like Sinha et al. controlled for the forecasts' recency. Clement (1999) found that forecast accuracy is positively associated with analysts' experience and employer size, and negatively associated with the number of firms and industries followed by the particular analyst. According to McEwen and Hunton (1999), relatively more accurate analysts tend to emphasize different information items prior to issuing and earnings forecast than do less accurate analysts. Hodgkinson (2001) found that a close working relationship with the firms for which the analysts provide forecasts does not improve the accuracy of the earnings forecasts, but stimulates optimistic forecasts. Brown (2001b) also found that analysts' past forecasting accuracy is important in assessing the likelihood of more or less accurate forecasts in the future.

Chaney, Hogan and Jeter (1999) found that analysts' accuracy declines in the year following restructuring. Erwin and Perry (2000) studied the effect of foreign diversification of US firms on the accuracy of earnings forecasts. They found that post-merger analysts' prediction errors increase if the firms have expanded outside their core business segment, relative to those firms that expand within their core business. Duru and Reeb (2002) also

found that international diversification is associated with less accurate and more optimistic forecasts, because international diversification reflects the unique dimensions of forecasting difficulty that are not captured in previously identified determinants.

Harris (1999) studied the long run earnings growth forecasts, and found that their accuracy is "extremely low." Their accuracy was even worse than that of a naïve model in which earnings growth is forecast to be zero. Also, Harris (1999) found that the performance varies substantially with the characteristics of the company whose earnings are being forecast.

Lim (2001) developed a model where analysts trade off bias to improve management access and forecast accuracy. According to the model, optimal forecasts with minimum expected error are optimistically biased. The results confirmed the notion that positive and predictable bias may be a rational property of optimal earnings forecast. Mande and Ortman (2002) found that segment reporting data, although it aids financial analysts in forecasting sales of well-diversified firms, does not increase the accuracy of earnings forecasts.

1.3.1.3 Management's earnings forecasts

The management itself also makes forecasts of future earnings for the firm. These forecasts differ from those issued by security analysts on several dimensions (Foster 1986, 280): First, management forecasts are released only by a subset of firms, second, management releases typically only one forecast per year, and third, management forecasts are not always issued as point estimates.

Management forecasts are usually for one-year-ahead aggregate earnings, and the accompanying documentation of the bases of forecasting are often inadequate. The firms that release forecasts differ from other firms, e.g. disclosing firms have a less variable earnings series (Waymire 1985) and they are typically larger than non-disclosing firms

(Ruland 1979). Furthermore, the firms that disclose forecasts are more likely to do so when they have 'good news' than when they have 'bad news' (Penman 1980).

In comparing management forecasts with analysts' forecasts, Hassel, Jennings and Lasser (1988) concluded that in the weeks subsequent to, and at the time of the release of the management forecast (week 0), security analyst's consensus forecasts are less accurate than the management forecast. However, in the weeks subsequent to week 0, the forecasts made by analysts become more accurate little by little, as time goes by. This can be explained by the hypothesis that management uses earnings forecasts as a means of publicly communicating their (nonpublic) information. One must also take into account that management has the ability to influence earnings via its decisions to make their forecasts more accurate, in contrast to security analysts. Later, McNichols (1989) found that management forecasts are not systematically biased, except for one of the five years included in the study.

1.3.2 Bias of analysts' forecasts

Analysts' earnings forecasts are generally overly optimistic, as first shown by Fried and Givoly (1982). According to Butler and Lang (1991), the degree of optimism persists over time and the degree of persistence is independent of the level of the firm's earnings predictability. Francis and Philbrick (1992) provide evidence that independent analysts (Value Line analysts) are also overly optimistic. According to De Bondt and Thaler (1990), analysts overreact to extreme earnings changes and returns.

Sell-side analysts' (employed by brokerage firms) forecasts are more optimistic than bye-side analysts (employed by banks, insurance companies and pension funds for internal use of forecasts) when the firms they work for are underwriters of the securities of the companies whose earnings they estimate, as shown by Lin and McNichols (1998) or act as the companies' investment bankers, as shown by Dugar and Nathan (1992). However, according to Dugar and Nathan (1992), the stock market adjusts for this bias. Francis and

Philbrick (1993) found that analysts' earnings forecasts are more optimistic for stocks with sell and hold recommendation than buy recommended stocks.

One reason for the positive bias might thus be the sell-side pressures from brokerage firms. According to this hypothesis, only the current owners of a security are potential sellers, while all of the investors are potential buyers. For this reason, brokers concentrate on analyzing mainly "buy" companies which generate more trading than other companies. Another related hypothesis is that company management pressures analysts to issue optimistic forecasts, and favor such analysts in giving them access to management and other information. However, there is also a counter hypothesis, which states that it is in the managements' best interest to *decrease* the forecasts. This would be because positive earnings surprises increase stock prices, as argued by Alexander and Ang (1992).

Michaely and Womack (1999) studied the recommendations of brokerage analysts of the firms they have recently taken public. They found that such stocks perform more poorly than buy recommendation stocks by unaffiliated brokers around the recommendation date. They conclude that the recommendations by underwriter analysts show significant evidence of bias which the market does not fully recognize.

An "earnings guidance game" is one possible explanation for excessive optimism early in the year. In that game, analysts are said to make optimistic forecasts at the start of the year and then "walk down" their estimates towards the end of the year to a level the firm can beat. Richardson, Teoh and Wysocki (2001) found evidence of the game in the years 1992-1998, but not before that. They also found that this phenomenon is most pronounced in firms that are either net issuers of equity or in firms where managers are net sellers of stock after an earnings announcement. Further, Matsumo (2002) found that managers manage earnings upward and guide analysts' forecasts downward to avoid missing expectations at the earnings announcement.

Lim (2001) presents a model in which management prefers favorable forecasts, thus analysts issue more favorable forecasts for firms with less predictable earnings in order to

maintain favorable relations with managers. The result would be that analysts obtain access to private information and thereby improve the accuracy of the analysts' forecasts. Das, Levine and Sivaramakrishnan (1998) provided empirical evidence supporting the hypothesis, e.g. forecasts are more optimistic when earnings are less predictable.

1.3.3 Revisions in analysts' forecasts

As more information becomes available over time, analysts revise their earnings forecasts. According to Elton, Gruber and Gultekin (1981), perfect foreknowledge of revisions would generate outstanding investment returns. Even without foreknowledge, perfect or not, investing monthly in stocks with the greatest increases in earnings estimates generates significant, risk adjusted returns, as shown by Hawkins, Chamberlin and Daniel (1984).

The information content of revisions regarding stock prices, has been demonstrated first by Givoly and Lakonishok (1979) and Richards and Martin (1979). A related finding by Arnott (1985) states that the trends in consensus earnings tend to persist, and can thus be exploited on the stock markets. Abdel-khalik and Ajinkya (1982) studied the effects of both primary and secondary dissemination of information. They found that early knowledge of forecast revisions could be used to form profitable trading strategies.

Lui (1995) found that earnings forecasts for different time horizons (one and two years ahead) have information content on their own relative to each other and also incremental information relative to each other. Liu and Thomas (2000) found that traditional ERC regression R squares can be increased substantially and bias in coefficient estimations reduced by including current period forecast revisions of future period earnings (up to five years). They conclude that revisions in near term earnings forecasts, together with discount rate changes, are the two most important drivers of returns.

Bauman, Datta and Iskandar-Datta (1995) studied the long-run price responses to analysts' recommendations, and found that the market appears to be reasonably efficient in promptly

processing analysts' recommendations. Lys and Sohn (1990) studied the effect of earnings forecasts preceded by earnings forecasts made by other analysts or by corporate accounting disclosure. They found that even such individual forecasts are informative, but that the analysts' earnings forecasts in general contain only about 66% of the information reflected by security prices prior to the forecast release date.

Forbes and Skerrat (1992) found that market response to revisions issued by analysts who are located in firms acting as brokers to the company is less sensitive than when analysts are not brokers to the company. The reason for this is the possibility that market regards broker firm analysts as being subject to agency problems. These problems may reduce the reliability of broker firm analysts' forecasts of a client company's earnings.

Dowen and Bauman (1991) also found market inefficiencies related to periodic revisions in analysts' earnings estimates, and found that these inefficiencies can not be explained by the small-firm effect or by the lack of analysts forecasting the earnings of selected stocks, i.e. neglected firm effect.

A phenomenon related to analyst following is so-called herding among security analysts. Welch (2000) found that security analysts have a positive influence on the recommendations of the next two analysts, but that the influence of prevailing consensus is no stronger if the consensus accurately forecasts subsequent stock price movements. Further, he found that the consensus has a stronger influence when market conditions are favorable. See also e.g. Hong, Kubik and Solomon (2000) and the literature cited there.

1.3.4 Dispersion in analysts' earnings estimates and risk

The risk of a security is of the utmost importance, because it determines the required return of a security according to all asset pricing theories, such as CAPM or APT. However, there is still an ongoing debate as to whether a certain metric, such as beta-coefficient in the CAPM, is an appropriate risk measure. Malkiel (1982) found that dispersion in analysts' earnings forecasts, i.e. to what extent analysts agree about the future, may be a better

measure of the risk priced in equities than beta. In the same year, Peterson and Peterson (1982) also studied the empirical relation between the divergence of analysts' opinion, stock returns and security risk, but obtained contradictory results differing according to the time period examined. Since these studies, dispersion has been a subject of increasing interest in the financial literature concerning risk and return on the securities markets.

Strebel (1983) and Carvel and Strebel (1984) developed the idea further and created new ways of calculating beta incorporating measures of dispersion in analysts' forecasts. Comiskey, Walkling and Weeks (1987) studied the connection between trading volume and dispersion of expectations. They found support for the hypothesis that turnover is positively related to the dispersion of expectations, although a major portion of company turnover was left unexplained. Barron and Stuerke (1998) found that there exists a positive association between dispersion in earnings forecasts after an earnings release and informational demand on the market.

Daley, Senkow and Vigeland (1988) found that there is a positive association between the variance of analysts' forecasts and the average variance of return to maturity implied by the prices of options maturing after earnings announcement dates. L'Her and Suret (1995) found that there is a negative relationship between security returns and dispersion of beliefs, but that it is essentially confined to those securities monitored by a small number of analysts. Parkash, Dhaliwal and Salatka (1995) found that dispersion is a positive function of business risk, financial risk and ownership concentration, and is negatively related to the amount of information.

However, in using dispersion instead (or in advance) of beta or any other risk measure, is complicated because of two findings in the earnings literature (Brown 1996b). First, there is some indirect evidence that wider dispersion of forecasts would reduce risk, not increase it. This is because dispersion has been used as a deflator in calculating SUE (Standardized Unexpected Earnings) scores successfully in various research papers. If two stocks, A and B, both report 10% better earnings than expected, but A has a standard deviation of forecasts of 20% and B only 5%. In this case, A would have an SUE of only 0.5 whereas B

would have an SUE as high as 2.0. Now, A will not experience a major impact on its subsequent relative performance, whereas B will significantly outperform A. Second, the distribution of actual earnings is much wider than that of analysts' forecasts. The SUE scores should be normally distributed if the forecasts and earnings had the same distribution. However, SUE scores have fat tailed distributions. Malkiel concludes that there must be additional factors involved.

1.3.5 Analyst following

The concept of number of analysts following considers how many analysts follow a certain company, and what determines analysts' decision to initiate or terminate coverage. The related anomaly, neglected firm effect, suggests that firms attracting fewer analysts following offer higher returns compared to firms with more analysts following. This effect was first discovered by Arbel and Strebel (1982). Later, the effect was compared to other anomalies, such as firm size and PE anomalies, and Arbel (1985) found that higher returns are generated by neglected firm effect, not by firm size or PE effect.

Arbel (1985) also found that the more neglected the stock, the higher the estimation risk, and that the neglected firm effect can partially explain the January effect. Similar results have been found in numerous other studies, for example Carvell and Strebel (1987) found that the neglected firm effect is independent of the small firm effect and may even dominate it, and that the neglected firm effect remains after controlling for both the small firm effect and January effect. They conclude that the small firm effect is a proxy for the neglected firm effect.

O'Brien, Bhushan and McNichols (1990) studied analyst following and institutional ownerships and found that there is evidence of a behavioral link between analysts' decision to follow firms and differential costs and benefits of gathering information. According to them, there are more analysts following in industries with increasing numbers of firms and regulated industries. Further, they found that institutions' decisions to buy shares are associated with prior analyst following. Also, O'Brien and Bhushan (1990) showed that

the relation between analyst following and firm size is eliminated once institutional investors' decisions to hold firms in their portfolios and analysts' decisions to follow these firms are jointly determined. They also found that changes in analyst following are positively related to net entry of firms into the industry. However, contrary to earlier evidence, Rock, Sedo and Willenborg (2001) found that the number of institutional investors is inversely related with analyst following.

Although the number of analysts following is positively related to firm size and the variance of return (Brennan and Hughes 1991), and, according to most studies, negatively related to share price, it has not been found in all recent studies. For example, Beard and Sias (1997) found, using a recent sample, that, after controlling for capitalization, there is no evidence of neglect premium.

Analyst following has been studied in various connections, for example around index revisions (Chung and Kryzanowski 1997) or IPO's (Rajan and Servaes 1997). The latter found that, among other things, higher under-pricing leads to increased analyst following, and conclude that the IPO anomalies (i.e. under pricing, hot issue markets and long-run under pricing) may be partially driven by over-optimism.

Branson, Guffey and Pagach (1998) studied the initiation of sell-side analysts' decisions to initiate coverage of a firm. They found that lightly followed and previously uncovered firms experience larger price reactions than more heavily followed firms. Hong, Terence and Stein (2000) found that momentum strategies work better among stocks with low analyst coverage, and that analyst coverage is greater for stocks that are past losers than for past winners.

Barth, Kasznik, Maureen and McNichols (2001) found that analyst coverage is connected to larger R&D and advertising expenses relative to industry. Further, they found that analyst following increases with firm size, growth, trading volume, equity issuance and perceived mispricing, and that there is negative correlation between analyst following and the size of the firm's analysts' brokerage houses and the effort analysts expend to follow

the firm. According to Barth et al. (2001), the evidence indicates that analyst coverage depends on the private benefits and costs of covering a firm. Chung and Kryzanowski (2001) found that the change in the number of analysts following is positively related to change in investor demand for the stock.

1.3.6 Market reaction to analysts' forecasts

Brown et al. (1985) found that a firm's stock price is based on analysts' expectations (of future earnings). They also found that analysts' long-term earnings expectations are more valuation-relevant than their short-term earnings expectations.

Foster, Olsen and Shevlin (1984) studied the speed of response of security prices to earnings announcements. Their study involved 2053 firms from 1974 to 1981, using quarterly data. They computed an expected quarterly earnings figure for each company, from which they calculated forecast error by subtracting from actual earnings. However, this measure of surprise fails to differentiate between stocks for which large forecast errors are routine and those for which they are rare. In order to derive the important surprises, which are those that are large by historical standards, they used a measure of standardized unexpected earnings, $SUE_t = FE_t / \sigma_{FEt}$, where σ_{FEt} is the standard deviation of forecast errors for the 20 quarterly earnings of the firm prior to t.

The firms were divided into ten equal-sized groups based on the ranking of SUE from smallest (group 1) to largest (group 10). After that each firm's stock return was measured for the period from 60 days before its earnings announcement appeared in the Wall Street Journal, to 60 days after that event. During the period of 60 days before announcement, information relevant to the earnings announcement was becoming available to the market prior to the actual announcement, as expected. During two days of announcement (the day the announcement was made public and the next day when it appeared in the newspaper), the larger the size of the unexpected earnings, the larger the price movement observed. The same pattern could also be seen in the period after the announcement, 3.23 % for the tenth

group and -3.08 for the first, suggesting inefficiency on the market. This predictability of abnormal returns based on previously announced earnings is called post earnings announcement drift.

There are a few plausible explanations for the behavior of stock prices after the announcement. The cost of information transfer is one. It may take some time before new information reaches small investors and individuals, and thus there may be a period of abnormal return even after the release. In this case the price movement is also related in sign and magnitude to the nature of the announcement. Another reason may be an error in the measurement of abnormal returns, or more precisely, in the measurement of normal returns.

This phenomenon of post announcement drift has been widely studied in recent years. Attempts to explain it as compensation for risk or as a result of flaws in research design have been unsuccessful (Bernard and Thomas 1989 and Ball, Kothari and Watts 1990). It seems evident that the drift is caused by underreaction on the market to new information. Wiggings (1991) found empirical support for the hypothesis that the three-day reactions to future earnings announcements are predictable on the basis of current and past earnings. According to him this is evidence of the naive earnings expectations of investors. Bartov (1992) concludes that the delayed price reaction occurring at subsequent announcement represents a failure of the market to correctly characterize the time series properties of earnings.

According to Mendenhall (1991), the abnormal returns around earnings announcements are systematically related to previous earnings forecast revisions. Bhushan (1991) found that firms with higher drift are neglected by smart investors, who do so rationally because such stocks are too illiquid or too costly to trade. Those firms have lower levels of analyst following and institutional interest, and their stocks are primarily held by individual investors. However, Bhushan could not find any rational justification for the neglect, and thus concludes that the drift is a true phenomenon of market inefficiency.

The recent evidence shows that the usefulness of financial information (i.e. reported earnings, cash flows and book values) to investors has been deteriorating over the last two decades (Lev and Zarowin 1999). Lev and Zarowin (1999) argue that the change in firms' operations and economic conditions is not adequately reflected by the current reporting system, and conclude that accounting for intangible assets is where the system fails most seriously.

Kasznik and McNichols (2002) found that abnormal annual returns are significantly greater for firms meeting expectations after information in the current year's earnings had been controlled for. They also found that firms meeting expectations had higher earnings forecasts and realized earnings. Finally, they found that the market assigns a higher value to firms that meet expectations consistently compared to firms that meet expectations in one or two years.

1.4 Purpose, relevance and hypothesis of the thesis

The main purpose of the thesis is three-fold. First, the information content of different earnings releases is investigated on a market (Finland) where taxation plays an important role in determining released earnings. Second, the accuracy of analysts' earnings forecasts on such a market is compared to a big market with information driven earnings releases and well-established analyzing industry (UK). Third, the dilemma in the financial literature whether or not analysts' accuracy has been improving over the years, whether there is a positive or negative bias, and whether there is over- or under-reaction, if any reaction, to previous earnings changes, is studied, and the differences between negative and positive earnings change firms in this respect are presented.

This study is of interest not only to researchers but also to investors, analysts, corporations and legislators. Investors will benefit from understanding the consequences of different information content in different types of markets, which is becoming more and more important with the need for international diversification. Also, they will benefit from understanding the role and motives of analysts on the market, and how analysts forecast

earnings and with what kind of success. Analysts may benefit from realizing better what the reasons behind unsuccessful forecasts are, and how to improve forecasts. Corporations will benefit from understanding the informational needs of (different) markets and how the stock price of their company is affected by the information they release and from knowing the role and motives of analysts on the market. Also, legislators will benefit from understanding the informational needs of markets and the role of analysts in it, in order to improve the allocational efficiency of the market by amended legislation.

The three main research hypotheses of the thesis are:

1. The role of the Annual Accounts and Annual Report have information content in advance of the Preliminary Report on a market where taxation plays an important role in specifying the use of the disclosed earnings.

2. The forecasting environment explains the differences in analysts' forecast accuracy on different markets.

3. The dilemma in the financial literature whether or not analysts' accuracy has been improving over the years; whether there is positive or negative bias; and whether there is over- or under-reaction, if any, to previous earnings changes can be explained by the relation of the positive and negative earnings change firms in the sample.

The first hypothesis is based on the differences in reported earnings in Micro-Uniform (Anglo-Saxon markets like USA and UK) and Macro-Uniform (non Anglo-Saxon markets like Germany, France, Italy, Spain, Sweden and Finland) countries. In the latter, disclosed earnings are affected more by taxation considerations, and the "true" earnings can usually be calculated only if the complete Annual Accounts are available. This is usually not the case when the preliminary information is released. To study this, the Finnish data is used from the years when taxation played an even more important role than today. Nowadays, both the corporate tax rate and the possibilities for deductions have been decreased so that the informational role of released earnings has increased.

The background for the second hypothesis is the empirical finding in the financial literature that there are differences between analysts in their ability to forecast earnings. Thus, in a market with a well-established analyzing industry, analysts may be more accurate in forecasting earnings than on a market with a newly developed analyzing industry. This is studied first. However, there are probably differences between the markets in the forecasting environments, which might explain the possible differences in the accuracy of forecasts between these markets. The markets may differ not only by the nature of financial information (Micro vs. Macro-Uniform) but also on such variables as variability in past earnings, size of firm, timeliness of forecasts, etc.

The findings with regard to the above hypotheses cannot necessarily be generalized to all Macro-Uniform countries because of many other aspects affecting the results. Also, the situation will change even more in 2005, when IAS regulation will be mandatory in all EU Member States. Already at the present moment, many companies in Finland release their earnings according to both Finnish national and IAS rules.

The third hypothesis is based on the dilemma in the financial literature about many aspects of analysts' earnings forecasts. The open questions are, first, are analysts' forecasts more or less accurate than forecasts by time-series models, and ate errors increasing or decreasing over time. Second, is there an optimistic or pessimistic bias, if any? And third, is there over- or under-reaction to previous earnings changes? On the other hand, the forecasts have been found to be more accurate for firms with increasing earnings compared to firms with decreasing earnings. Thus, the relation of positive and negative earnings change firms in the sample may account for the dilemmas noted above.

1.5 Contribution of the thesis

This thesis contributes to the existing literature in several ways. The main contributions are presented in the following. First, the information content of Preliminary Announcement, Annual Accounts, Annual Report and General Meeting are investigated in Finland during a period when disclosed earnings are strongly affected by taxation considerations. Such

markets may differ in nature from Anglo-Saxon markets regarding information availability, thus the market reactions may also be different in the face of different information announcements. The differences should be taken into consideration in event-studies on such markets.

Second, the analysts' forecasting accuracy is compared in two disparate markets. The main differences are in the information availability, as well as in market structure, i.e. a large market with a well-established analyzing industry and more conservative companies vs. a newly developed market with few analysts and growth-stock oriented selection of stocks. An explanation for the differences is moreover presented.

Third, the thesis provides an explanation for many dilemmas in financial literature concerning analysts' earnings forecasts. The first of them is whether analysts' forecasts are more accurate or less accurate than forecasts by time-series models, and whether the errors increase or decrease over time. The second concerns whether there is an optimistic or pessimistic bias, or any bias at all. The third is about over- or under-reaction to previous earnings changes. The conflicting views in the literature are accounted for, how they can be taken care of and what the implications for research on these issues are.

1.6 Structure and main results of the thesis

This section provides an outline for the rest of the thesis. The theoretical background on earnings, forecasting of earnings and the efficiency of the stock market is presented in Chapter 2. The chapter starts by explaining the valuation of common stock and how dividends, earnings and cash flows corroborate one another. The required return, needed in valuation, is also discussed. Next, the various definitions of earnings are investigated, likewise what determines the growth in earnings. Earnings forecasts are also discussed as such. The concept of market efficiency is presented, and the co-existence of efficient markets and analyzing industry is explained.

Chapter 3 briefly presents the Finnish stock market environment, and explains the recent main developments. The mechanism of the Helsinki Stock Exchange (HEX) is also presented. The chapter moreover includes the presentation of earnings forecast data from Finland, and from the UK for purpose of comparison. Some preliminary findings are also presented based on these.

Chapter 4 investigates the role of Annual Accounts and Annual Report in information dissemination to the markets on a Macro-Uniform market, where disclosed earnings are affected by taxation, i.e. net income can be calculated only when the complete Annual Accounts are available. It is found that the Annual Account release date is important in assessing share values regarding the net income information. This fact should be taken into account in future studies on earnings reactions in such markets. Also, the role of General Meeting is studied. It is assumed to be important, especially for small investors, which is also reflected in the market.

Chapter 5 comprises a deliberation of whether there are differences between the analysts of a large stock market with a well-established analyzing industry, the UK, and a small one with a newly developed analyzing industry, that of Finland. This is done by comparing the absolute proportionate forecast errors between the two countries. The mean for the British firms' forecast errors is 25.8 percent, whereas for the Finnish firms' it is as much as 56.4 percent, a statistically significant difference. The source of the difference may be in the ability of analysts, or in the forecasting environment. This is studied by running a regression on the forecasting error with three explanatory variables, change in the EPS from the previous year, number of analysts following and timelines of the forecast. The results suggest strongly that, after the correction variables have been accounted for, there are no differences between the abilities of the analysts in Finland vs. UK, but the more complicated forecasting environment in Finland results in better earnings forecasts for UK firms.

Chapter 6 presents evidence on different aspects of analysts' earnings forecasts. First, the accuracy of analysts' forecast is studied. It is found that analysts are more accurate than the

random walk model when all the firms are analyzed together, except at the beginning of 1991. This would, per se, suggest that accuracy is improving. However, when firms with negative earnings changes and positive earnings changes are analyzed separately, it can be seen that analysts are unable to beat the random walk model for negative earnings change firms in the first two months of the year for which the forecast is made for according to the median of U2. If the mean is investigated, analysts are not able to beat the random walk model until the four last months of the year. For positive earnings change firms, the analysts are clearly superior already at the beginning of the year. The accuracy improves during the year, which is mostly due to improvement in the forecasts of negative earnings change firms.

Second, there is an optimism bias in analysts' earnings forecasts. However, again, this bias is evident only for negative earnings change firms. For the positive earnings change firms, there is a pessimism bias. Both biases persist for the whole year, even though they decrease in magnitude. Third, it is found that there is over-reaction in forecasts. However, for the negative earnings change firms, the reaction is much higher at the beginning of the year, from which it diminishes to non-existent at the end of the year.

Finally, it is found that the relative amount of negative earnings change firms increased at the beginning of the study period and decreased thereafter. After this is taken into account, the accuracy of the analysts cannot be said to be increasing or decreasing over years. This seems to be the most important factor explaining the increase in forecast accuracy in different years.

These results show that problems with earnings forecasting are concentrated in negative earnings change firms, and the empirical results as to whether analysts are better than time series models and whether there is negative or positive bias and over- or under-reaction, are dependent on the number of negative vs. positive earnings change firms in the research period of a particular study. This is one important explanatory factor for contradictory results in different empirical papers in this field. Thus, the relative amount of negative earnings change firms should always be accounted for when studying these questions.

Finally, Chapter 7 concludes the thesis. The main results are presented in a summary. Some directions and suggestions for further research are indicated.

2. THEORETICAL ANALYSIS OF EARNINGS, EARNINGS FORECASTS AND THE EFFICIENCY OF THE UNDERLYING MARKET

The purpose of this chapter is to present theoretical bases for earnings, earnings forecasts and the efficiency of the underlying market. The price of a security equals the present value of all future net cash flows from the security discounted by appropriate discount rate. Thus, valuation of common stock is proved to be dependent on earnings, through cash flows or dividends and risk of the security, which affects the required return. Theoretical stock valuation models, such as dividend discount model, are presented first, the connection between earnings and cash flows next, and finally an asset pricing model.

Earnings are evaluated in Chapter 2.2. First, the concept of reported earnings vs. economic or intrinsic earnings is discussed. The management of the firm has many ways of making earnings look better (or worse) than the 'true' earnings, or of being as favorable as possible for taxation purposes. Next, the earnings growth is theoretically evaluated. It can be calculated using plowback ratio and return on equity. Also, the practical aspects of earnings growth are analyzed.

Finally, in Chapter 3.3 the efficient market hypothesis is presented. Efficient market is defined as one on which the price of every security equals its investment value at all times. Fama (1970) divided the efficiency into weak form, semistrong form and strong form according to the nature of the information. In practice, the speed and the quality of a price adjustment to new information are important, i.e. a market is efficient with respect to a particular set of information if it is impossible to make abnormal profits by using this set of information to formulate trading decisions. An account is also presented how, in the presence of efficient markets, there is still room left for an analyzing industry.

2.1 Valuation of common stock

Theoretically, the price of a security equals the present value of all future net cash flows from the security discounted by appropriate discount rate. According to Gordon and Shapiro (1956), the price of a share of common stock equals the present value of expected future dividends:

$$(1) \quad P_0 = \frac{DIV_1}{(1+r)^1} + \frac{DIV_2}{(1+r)^2} + \frac{DIV_3}{(1+r)^3} + \ldots$$

where DIV_t is equal to the dividend per share after t years and r is equal to the required return on the common stock. If there is no growth on the dividend, i.e. DIV_1 is equal to DIV_2 is equal to DIV_3 and so on, the formula can be rewritten as:

$$(2) \quad P_0 = \frac{DIV_1}{r}$$

If the growth of the dividend is assumed to be constant, g, the formula can be written as follows:

$$(3) \quad P_0 = \frac{DIV_t}{(r-g)}$$

This is the (constant growth) dividend discount model, also called the Gordon (growth) model after Myron Gordon, although first developed by Williams (1938) and later rediscovered by Gordon and Shapiro (1956). In the investment industry, this model is usually used in the non-constant growth models in calculating the terminal value, i.e. the value of a stock price at horizon, after which the growth is assumed to be constant. This is based on the notion that companies typically evolve through three stages during their lifetime (Molodovsky, 1965): growth, transition and maturity.

2.1.1 Dividends, earnings or cash flows

The dividend discount model itself is theoretically sound, even though the underlying source of value for a share of common stock is earnings, not dividends, as first shown by Miller and Modigliani (1961) in their seminal paper. Clearly, earnings are important to stockholders because earnings provide the cash flows necessary for paying dividends, even though they are not perfectly correlated. However, the dividend discount model can be framed by recasting dividends in terms of earnings and book values, or in terms of free cash flows available to shareholders. If all equity effects flow through the income statement, the expected book value of equity for existing shareholders at the end of the year is equal to the book value at the beginning of the year plus expected net income less expected dividends:

(4) $DIV_t = NI_t + BVE_{t-1} - BVE_t$

where NI is the Net Income and BVE is the Book Value of Equity. Thus, by substituting this into the dividend discount formula, stock value can be rewritten (the proof can be found for example in Palepu, Healy and Bernard 2000):

(5) $P_0 = BVE_0$ + present value of expected future abnormal earnings,

where abnormal earnings are net income adjusted for a capital charge computed as the discount rate multiplied by the beginning book value of equity. Thus there is an adjustement for the fact that opportunity costs for equity are not incorporated into the accounts. The discounted abnormal earnings valuation formula is:

(6) $$P_0 = BVE_0 + \frac{NI_1 - rBVE_0}{(1+r)^1} + \frac{NI_2 - rBVE_1}{(1+r)^2} + \frac{NI_3 - rBVE_2}{(1+r)^3} + \ldots$$

The earnings based valuation model is intuitively appealing, because it states that investors should pay for the company's equity more than its book value only if the firm can earn

more on its book value than only the required rate of equity. In other words, the company should be able to earn 'abnormal earnings.' The model further implies that a firm's stock value reflects the cost of its book equity plus the net present value of future growth opportunities, i.e. cumulative abnormal earnings.

The third commonly used valuation method is the discounted (free) cash flow model. This, too, derived from the dividend discount model. Dividends can be recast as free cash flows:

(7) Dividends = operating CF - capital outlays + net CF from debt owners

where CF stands for Cash Flow. Operating cash flows to equity holders are net income plus depreciation less changes in working capital accruals. Capital outlays are capital expenditures less asset sales, and net cash flows from debt owners are issues of new debt less retirements less the after-tax cost of interest. Thus, the free cash flows to equity are:

(8) Dividends = Free cash flows to equity = NI - ΔBVA + ΔBVND

where ΔBVA is the change in the book value of operating net assets and ΔBVND is the change in the book value of net debt. Thus, the dividend discount model can be rewritten using free cash flows similarly to the abnormal earnings valuation model. Thus, the equity value is equal to the present value of free cash flows to equity holders:

(9)

$$P_0 = \frac{NI_1 - \Delta BVA_1 + \Delta BVND_1}{(1+r)^1} + \frac{NI_2 - \Delta BVA_2 + \Delta BVND_2}{(1+r)^2} + \frac{NI_3 - \Delta BVA_3 + \Delta BVND_3}{(1+r)^3} + \ldots$$

The abnormal earnings and free cash flow models are more popular among practitioners than the dividend model, probably because earnings and free cash flows are easier to forecast than dividends directly.

In order to use these models, we have to define the required return r. This will be done in the following chapter.

2.1.2 Required return

Modern portfolio theory is based on the initial developments by Markowitz (1952, 1959), who analyzed the rational behavior of an investor. He based the idea on the expected returns of stocks and the variances and the covariances of these returns. Using these models as bases, Sharpe (1964), Lintner (1965) and Mossin (1966) developed the Capital Asset Pricing Model, CAPM. According to this model, investors should pay attention only to the expected returns of the asset and the systematic risk, which is known as beta.

The following assumptions must be met about investors and the opportunity set before the CAPM can be derived (see for example Copeland-Weston 1988):

1. Investors are risk-averse individuals who maximize the expected utility of their end-of-period wealth.
2. Investors are price takers and have homogeneous expectations about asset returns that have a joint normal distribution.
3. There exists a risk-free asset such that investors may borrow or lend unlimited amounts at the risk-free rate.
4. The quantities of assets are fixed. Also, all assets are marketable and perfectly divisible.
5. Asset markets are frictionless and information is costless and simultaneously available to all investors.
6. There are no market imperfections such as taxes, regulations, or restrictions on short selling.

None of these assumptions are exactly met in reality, but despite that the model is nevertheless very fruitful in making the market behavior understandable. It also serves as a

basis for financial decision-making. Moreover, many of those strict assumptions can be relaxed without affecting the credibility of the model too much.

One important concept in the model is the market portfolio. The market portfolio is a portfolio consisting of investments in all securities where the proportion of each security is its relative market value. In practice, market portfolio is usually restricted to common stocks, although all other kinds of investments, such as bonds or real estate, should be counted in. The market portfolio is always efficient, i.e. a portfolio that has the greatest expected return for each given risk level, or the lowest risk level for each given expected return. The other concept is the capital market line (CML), which consists of alternative combinations of risk and return obtainable by combining the market portfolio with risk-free borrowing or lending. The slope of the CML is the expected return of the market portfolio minus return on riskless security divided by the risk (standard deviation) of the market portfolio.

Every individual risky security always lies below the capital market line. Every investor (under the assumptions of the CAPM) holds the market portfolio and is interested in its standard deviation. For this reason, the relevant measure of risk for a security is its covariance with the market portfolio. It follows that securities with larger values for covariance must have larger expected returns in order for investors to be willing to buy them. The relationship between covariance and expected return is known as the security market line (SML), which can be expressed as follows:

$$(10)\quad E(r_i) = r_f + (E(r_m) - r_f)\beta_i,$$

where r_i stands for the return on the common stock, r_f is the return on the risk-free security, r_m is the return on the market portfolio, and β_i can be calculated as:

$$(11)\quad \beta_i = \sigma_{im} / \sigma_m^2$$

where σim is the covariance of security i with the market portfolio, and σm^2 is the variance of the market portfolio.

The beta coefficient is just an alternative way of representing the covariance risk of security. The beta of any portfolio is the average of the betas of its component securities weighed by the securities proportions in that portfolio. The beta of the market portfolio is 1, because the SML must go through the point representing the market portfolio itself.

The beta coefficient does not describe the total risk of the security, but only its market, or systematic, risk. The second component of the security's risk is the portion not related to moves of the market portfolio, thus called the non-market, or unsystematic risk component of the security. This is non-diversifiable by nature, meaning it cannot be eliminated by means of diversification.

Thus, according to the Capital Asset Pricing Model, the expected risk premium on a stock is equal to the beta of that stock multiplied by the expected risk premium on the market:

(12) $E(r - r_f) = \beta E(r_m - r_f)$

where r is the return on security, r_f is the return on risk-free security, β is a measure of the systematic risk and r_m is the expected return on the market portfolio, an efficient portfolio containing all possible assets. The systematic risk is defined as the ratio of a security's covariance with the market portfolio to the variance of the market portfolio.

If the CAPM is a proper model for expected returns, a security with higher expected return than suggested by its risk is mispriced. This mispricing can be measured by the security's alpha, which is the difference between its expected return and an appropriate (equilibrium) expected return. Only if the alpha is zero is the security (in the opinion of the investor) priced at the right level. The alpha can be calculated from the following expression:

(13) $E(\alpha_i) = E(r_i) - (r_f - (E(r_m) - r_f)\beta_i)$.

Whether the proper asset pricing model is linear, and whether there are other factors than beta affecting the expected return of the security, remains an open question. The reason for this is that empirical testing of these models is difficult, since (ex ante) expected return is unobservable. However, the model has been tested empirically, and some of the early empirical evidence was quite promising, such as Friend and Blume (1970) or Fama and Macbeth (1973). More recent studies have proved these hopes to be a little premature (see for example, Hawawini and Michel 1984). There are a few other variables, such as price/earnings ratio, dividend yield, firm size or infrequent trading, which seem to be able to explain some of the portion of returns that are unexplained by the CAPM. In empirical testing, typically a time-series regression is written as:

$$(14) \quad r_{it} = \alpha_i + \beta_i r_{mt} + e_i,$$

where r_{it} and r_{mt} are the rates of return on the i:th security and on the market portfolio in period t, α_i and β_i are the regression coefficients and the e_i is a residual error. After this has been done, a cross-section regression of the following form is:

$$(15) \quad r_{it} = \gamma_0 + \gamma_1 \beta_i + u_i.$$

The difference between this and the theoretical CAPM is: first, in regression we use the ex-post average return as an estimate of the ex-ante expected rate of return, and second, we use an ex-post estimate of beta, not the true ex-ante systematic risk. In general, the results of the empirical tests have suffered from the following major drawbacks (Levy and Sarnat 1990). First, the intercept is much larger than the risk-free interest rate, second, γ_1 is much smaller than $(r_m - r_f)$, and third, the R^2 is quite low, with annual data around 20 % and with monthly data very close to zero.

Roll (1977) presented serious methodological criticism of the empirical tests of the model, which is known in the literature as 'Roll's critique'. He does not deny the validity of the theory, but states that the tests of the CAPM must be interpreted cautiously, by testing if

the market portfolio is ex-post efficient. However, this is impossible, since the market portfolio contains all assets, including human capital and such, which are not easily and accurately quantifiable.

2.2 Earnings

Hicks (1946) defined earnings (sometimes also called income or profits) as the amount that could be spent during a certain period while maintaining the wealth with which the period was started. Accounting earnings, however, usually ignore unrealized gains and losses in the market values of assets and liabilities. Also, accounting income allows the interests expenses to be deducted from the earnings, but not the expenses from the equity funds. This phenomenon of accounting earnings has been corrected in a performance measure called Residual Income (or Economic Value Added, EVA).

2.2.1 Reported earnings

Earnings that firms report are book, or accounting, figures. Thus they reflect a series of arbitrary choices of accounting methods, even if all firms followed the same accounting principles, which they do not. By simply adopting different accounting procedures, each firm's reported earnings can be changed substantially. For example the depreciation method used for reporting purposes directly affects earnings, even though it does not have any effect on cash flows. Further, it is quite usual for firms to calculate earnings differently for tax purposes, in which case the depreciation does affect cash flows, sometimes quite substantially. Other such things that affect earnings figures are the valuation of inventory, the procedures by which the accounts of merging firms are combined, the choice between expensing or capitalizing research and development, and so on.

Accounting data can never be absolutely accurate and faultless; there will always exist noise and bias. These can arise from three sources: first, rigidity of accounting rules,

second, random forecast errors and third, systematic reporting choices made by corporate managers to achieve their objectives.

The rigidity of accounting rules is not as big a problem in Finland as in many other countries, because the Finnish accounting legislation is based on a theory rather than on strict accounting rules. For example, the US GAAP requires firms to expense research outlays when they are incurred, even if some research expenditures clearly have future value. The Statement of Financial Accounting Standards No. 2 does not allow firms to distinguish between the two types of expenditures, leading to a systematic distortion of reported earnings. In the future, rules like these will be an increasing problem in Finland, too, as our legislation is gradually moving towards the International Accounting Standards (IAS). One of the problems in this area is for example the inability of accounting standards to accurately reflect innovative activities in the financial statements (Canibano, Garcia-Ayuso and Sanchez 2000).

Forecast errors, i.e. managers' inability to perfectly predict future consequences of their current transactions, is also a possible source of noise in accounting earnings. For example, actual defaults in receivables may be different from estimated. These errors depend on a variety of factors, such as the complexity of the business transactions, the predictability of the firm's environment, and unpredictable economy-wide changes.

Managers moreover often introduce noise and bias into accounting earnings intentionally, through their own accounting choices. There is a variety of incentives for such behavior, all of them leading to systematic influences on the firm's reporting. Watts and Zimmerman (1986) give a comprehensive list of such motives, including accounting-based debt covenants, management compensation, corporate control contests, taxation, regulatory considerations, capital market considerations, stakeholder considerations and competitive considerations.

Also, managers can choose disclosure policies that make it more or less costly for external users of financial reports to understand the true economic picture of the firm's business.

Accounting legislation stipulates only minimum disclosure requirements, voluntary reports, such as the Letter to the Shareholders, or footnotes, to describe the company's accounting policies and its current performance. In fact, according to Lang and Lundholm (1996), financial analysts pay close attention to firms' disclosure strategies.

Table 1. Official Income Statement based on the new Finnish accounting legislation, The Finnish Accounting Act.

NET SALES (TURNOVER)
Change in Finished Goods and Work-in-Progress Inventories
Production for Own Use
Other Operating Income
Materials and Services
Materials, Supplies and Goods
Outsourced Services
Personnel Expenses
Salaries and Wages
Social Security Expenses
Depreciation and Reductions in Value
Depreciation According to Plan
Reductions in Value of Fixed and Other Non-Current Assets
Exceptional Reductions in Value of Current Assets
Other Operating Expenses
OPERATING PROFIT (LOSS)
Financial Income and Expenses
Income on Investments in Group Companies
Income on Investments in Associated Companies
Income on Investments in Other Fixed Assets
Other Interest and Financial Income
Reductions in Value of Investments Held as Fixed and Other Non-Current Assets
Reductions in Value of Investments Held as Current Assets
Interest and Other Financial Expenses
PROFIT (LOSS) BEFORE EXTRAORDINARY ITEMS
Extraordinary Items
Extraordinary Income
Extraordinary Expenses
PROFIT (LOSS) BEFORE CLOSING ENTRIES AND TAXES
Closing Entries
Change in Depreciation Difference
Change in Voluntary Provisions
Income Taxes
Other Direct Taxes
PROFIT (LOSS) FOR THE FISCAL PERIOD

For the above reasons, it is of the utmost importance that the information available to investors should be both accurate and sufficient. For example, Acker, Horton and Tonks

(2002) found that the impact of FRS3 (requiring companies to publish a wider information set than before) in the UK was positive. i.e. the accuracy of analysts' forecasts was improved.

The Finnish financial reporting is based on a theory developed by Saario (1959). The main objective of Finnish financial reporting has traditionally been to determine distributable profits for the accounting period, usually one calendar year, which include interest and taxes, as well as dividends. The approach has been criticized for focusing too much on a legal definition of distributional profits, which, according to Troberg (1992), is clearly different from international norms.

The Accounting Act, the Business Income Tax Act and the Companies Act set the requirements for income statements for corporations in Finland. Listed firms also have to follow the Security Market Act and the rules and regulations of the Helsinki Stock Exchange (HEX). The legislation provides a fixed scheme for the reported earnings, but accounting conventions and principles significantly affect the figures. For this reason, firms usually follow the Business Tax Act, which gives guidelines on determining annual taxable net income and even though it is more restrictive, still leaves room for accounting conventions. Finnish financial reporting has thus been criticized for providing tax minimization rather than economic reality (e.g. Troberg 1992).

The main difference between Finland and Anglo-Saxon countries like United States and UK, is that in Finland the accounting system does not directly define the users of financial reporting in earnings, whereas in the Anglo-Saxon countries the objective of financial reporting is to provide information for economic decision-making. One important practical difference is, for example, that in the Finnish accounting system interest and taxes are defined as profit distribution, whereas according to international norms they are usually defined as expenses. Thus, in general, according to Booth, Kallunki and Martikainen (1997), Finnish accounting earnings may be considered managed earnings to a larger extent than in most other countries.

Because of this, Finnish financial analysts routinely adjust firms' reported earnings to better suit investors' needs, i.e. to reflect 'economic reality' as well as possible. The Finnish Committee for Corporate Analysis (2000) suggests the adjustments for the income statement, after which the income statement will look as follows:

Table 2. Adjusted Income Statement Format, based on expense categories, according to the Finnish Committee for Corporate Analysis (2000).

NET SALES (TURNOVER)
Other Operating Income
TOTAL OPERATING INCOME
Materials and Supplies Used
Outsourced Services
Personnel Expenses
Adjustment to Entrepreneuer's Salary
Other Operating Expenses
Increase/Decrease in Finished Goods and Work-in Progress Inventories
OPERATING MARGIN (EBITDA)
Depreciation According to Plan
Reductions in Value of Fixed and Other Non-Current Assets
Exceptional Reductions in Value of Current Assets
OPERATING RESULT (EBIT)
Income on Shares/Similar Rights of Ownership and Other Investments
Other Interest and Financial Income
Interest and Other Financial Expenses
Foreign Exchange Gains/Losses
Reductions in Value of Investments in Fixed and Other Non-Current and in Current Financial Assets
Direct Taxes
NET RESULT
Extraordinary Income
Extraordinary Expenses
TOTAL RESULT
Increase/Decrease in Depreciation Difference
Increase/Decrease in Voluntary Provisions
Adjustment to Entrepreneur's Salary
Other Adjustment to Profit
RESULT FOR THE FISCAL PERIOD

The official income statement format, unlike the old format, does not require the presentation of the gross margin and operating margin. This is clearly a change for the worse, since the information about the cost structure of the firm is not as accurate as it used to be before the new format.

The most important adjustments to income statement are explained briefly. Other operating income should not contain non-recurrent items and items of substantial value that will distort profitability comparisons or other extraordinary items. These should be transferred to Extraordinary Items. Such items in other operating expenses not associated with continuing business operations, and having an obvious impact on results or being non-recurrent should be likewise transferred. According to the new accounting act, the depreciation according to the plan should be used. However, if the depreciation does not relate to the total amount of the assets, or if the economic life of certain assets is above the recommendations of the Finnish Accounting Standards Board (KILA), the maximum depreciation provided by the Business Income Tax Act should be used. In direct taxes, if there are tax rebates or additional taxes paid for previous years, they should be included in Extraordinary Income or Extraordinary Expenses. If Extraordinary Income and Expenses include items which are part of the normal business operations and do not have the characteristics of extraordinary expenses, they should be subtracted and added to the operating expenses.

Many countries use International Accounting Standards as a benchmark for national accounting requirements, and also a number of stock exchanges also require, or permit, foreign issuers to present financial statements in accordance with International Accounting Standards. International Accounting Standards are developed through worldwide consultation with business, the investing community, national standard setters, the accounting profession and regulators. A consistent set of standards is important for companies when they communicate with investors and other stakeholders to make company results clear and comparable with each other. The objective of the International Accounting Standards is to provide information about the financial position, performance, and changes in the financial position of an enterprise that is useful to a wide range of users in making economic decisions. However, at the moment, most companies in Finland still use Finnish standards, although some companies also calculate their earnings using International Accounting Standards (IAS) and introduce them as supplementary financial statements in addition to official statements. On the other hand, Niskanen, Kinnunen and Kasanen (2000) found that local accounting standards earnings have significant value

relevance to both domestic and foreign investors, but the aggregate reconciliation to IAS earnings does not provide significant value relevance to either investor group. On the other hand, Ashbaugh and Pincus (2001) found that analyst forecast accuracy improves after firms adopt IAS.

National Generally Accepted Accounting Principles (GAAP) and International Accounting Standards have been on a convergence course but the remaining differences are still very significant. This is particularly true in the most complex areas of accounting such as financial instruments, pensions, deferred tax and business combinations.

There are three fundamental accounting assumptions in the International Accounting Standards: First, going concern, second, consistency and third, accrual. According to the standards, any departure from these is required to be disclosed and explained.

The increasing focus of International Accounting Standards is towards the capital markets, which is also true for the Finnish accounting system, but rules and guidance in this area are long overdue. The differences are explained, for instance, in Kasanen, Kinnunen and Niskanen (1992). Niskanen, Kinnunen and Kasanen (1994) present a formula for calculating the Finnish earnings from the International Accounting Standards earnings. This is given in Table 3.

As discussed earlier, there are numerous ways, and also incentives, for management to affect accounting earnings. It is debatable, then, whether accounting data itself and accounting analysis are of any use to investors. The value of accounting is indisputable, for example Collins, Maydew and Weiss (1997) found that earnings and book values jointly explain about 54 % of the cross-sectional variation in security prices. However, cash flow data seems to be much less valuable than earnings in this sense.

Table 3. Formula for calculating the Finnish net earnings from the IAS earnings.

	IAS earnings
±	Net change in untaxed reserves
+	Provision for construction project losses
+	Taxes deducted from shareholders' equity
-	Tax-free income adjustments to shareholders' equity
±	Share of affiliates' net income (net losses)
±	Unrealized exchange rate gains (losses)
+	Dividends from affiliated companies
+	Interest on capitalized lease obligations
+	Systematic (e.g. straight-line) depreciation of the revaluations of fixed assets
+	Systematic (e.g. straight-line) amortization of capital leases
+	Increase in unfunded pension obligations
-	Lease expense
±	Adjustment for manufacturing overhead
±	Adjustment for the difference between unsystematic declining-balance and systematic (e.g. straigh-line) depreciation of fixed assets
=	**Finnish net earnings**

The research in this area suggests that investors view earnings as a fairly reliable source of information, despite possible earnings management by managers. This implies that a superior accounting analysis would indeed be a valuable activity. Foster (1979) found that companies criticized in the financial press for misleading financial reporting subsequently suffered an average stock price drop of 8 %. Also, according to Teoh, Welch and Wong (1998), such firms whose managers appeared to inflate reported earnings prior to an Initial Public Offering (IPO) and subsequently reported poor earnings performance had more negative stock performance after the offer than firms with no apparent earnings management. Furthermore, according to Dechow, Sloan and Sweeney (1996), firms subject to Securities and Exchange Commission (SEC) investigation for earnings management earned 9 % negative return when the earnings management was first announced and continued to show relatively poor performance for up to two years after that.

Abarbanell and Lehavy (2000b) found that extreme income-decreasing earnings management is connected to extreme forecast optimism, and further that small pessimistic errors are associated with firm reporting discretion intended to create or conserve accounting reserves, at the same time reporting earnings that slightly beat analysts' forecasts. Lee and Choi (2000) found that over the short, but not long, forecasting horizon the ex-ante discretionary accruals are associated with forecast accuracy and the dispersion of earnings forecasts. Bartov, Givoly and Hayn (2002) found that firms meeting or beating current analysts' earnings expectations enjoy a higher return over the quarter, and that a similar phenomenon exists in cases where the expectations have been achieved through earnings or expectations management.

These findings suggest that the stock market ultimately sees through earnings management, which is eventually revealed, taken into account and thus incorporated into the stock prices. However, the evidence also suggests that an analyst who is able to identify firms with misleading accounting is able to create value for investors.

A firm's reporting strategy, the manner in which managers use their accounting discretion, is an important factor in studying the firm's financial statements, because of the manager's ability to influence financial statement data. Such a manager's ability to manipulate investor's perceptions also provides an opportunity for analysts of financial statements.

2.2.2 Estimation of earnings growth

When using the Gordon or any other similar security price model, the dividend after one year is still relatively easy to forecast. It is much more demanding, however, to forecast the other two parameters, the required return r and the growth component g. Especially in the case of growth stocks, most of the value, up to nine-tenths, comes from the present value of growth opportunities, that is, from the expectations that the company will be able to earn more than the cost of capital on its future investments.

The most tricky part is to estimate the growth component, because it entails forecasting the future earnings of a firm. This is difficult because there are in practice an infinite number of interacting factors and forces that will influence the long-term prospects of a company. These factors are not solely a result of the actions of the company itself, but are a result of underlying economic conditions, not forgetting the political and social domain, such as labor and taxation laws and policies.

Theoretically, growth can be calculated using plowback ratio and return on equity (ROE, which is equal to earnings divided by the book value of equity). Plowback ratio (or retention ratio) is the fraction of earnings retained by the firm and plowed back into new investment, which will earn the same return as other equity in the firm, the return on equity. Assuming no new capital is obtained externally, the growth g in year t can be derived in the following manner:

$$(16) \quad g_t = \frac{E_t - E_{t-1}}{E_{t-1}}$$

where E_t is equal to earnings in year t.

The earnings in year t-1 are:

$$(17) \quad E_{t-1} = BVE_{t-1} \times ROE_{t-1}$$

and the earnings in year t are:

$$(18) \quad E_t = (BVE_{t-1} + RE_{t-1})ROE_t$$

where RE_{t-1} = Retained Earnings in year t-1.

Now, assuming $ROE_t = ROE_{t-1} = ROE$, i.e. return on equity remains unchanged over the years, we can write:

$$(19)\quad g_t = \frac{RE_{t-1}}{E_{t-1}} \times ROE = p \times ROE$$

where p is the plowback ratio.

As can be seen, growth in earnings is an increasing function of both the plowback ratio and the return on equity. This is often referred to as sustainable growth rate. It means that assets, earnings and dividends all grow at this same rate.

The model can be derived further to include leverage, since it affects return on equity. After all, return on equity can be written:

$$(20)\quad ROE = ROA + \frac{D}{E} \times [(ROA - i(1-T)]$$

where ROA = (earnings + interest(1-tax rate))/ BV of Total Assets
= EBIT(1-T) / BV of Total Assets
D/E = BV of Debt / BV of Equity
i = Interest Expense rate
T = Tax rate on ordinary income.

Thus, the growth rate can be written:

$$(21)\quad g = p(ROA + \frac{D}{E} \times [ROA - i(1-T)])$$

This formula shows directly how leverage affects growth, and in practice it can be used in analyzing how restructuring, such as assets, projects, capital structure or dividend policy, affects growth.

In practice, there are several ways to estimate the growth rates. Traditionally, statistical methods, or time-series models using past earnings is probably the most common. Another possibility is to relate the estimate to the firm's fundamentals, such as retention ratio and return on equity, return on assets, leverage, profit margin, asset turnover, product line analysis, etc. as in Lev and Thiagarajan (1993). The third possibility is to rely on the analysts' expectations, which, of course, are also based on time series and fundamental analysis, at least to a certain degree. However, analysts' forecasts are, or at least they should be, more future oriented than the other methods, since analysts are continuously gathering data and information on the company, as well as from industry and economy wide effects. These methods are discussed in the next chapter.

2.2.3 Earnings forecasts

The idea of financial statement analysis is to obtain managers' inside information from public financial statement data. The business analysis is usually implemented in four steps. The first is the business strategy analysis, the purpose being to identify key profit drivers and business risks. Second comes accounting analysis, evaluating the degree to which a firms' accounting captures the underlying business reality. The third is financial analysis, used to evaluate present and past performance to assess its sustainability. The fourth step is prospective analysis, which focuses on a firm's future. The first three steps also provide the foundation for estimating the firm's intrinsic value.

Business analysis requires knowledge, time and effort to be conducted properly. This is usually too much for an individual investor, who does not necessarily have all the required resources. This has led to the rise of the analyzing industry, with investment banks and brokerage houses providing investors with necessary information. Practically all investors have access to investment information from brokerage firms, in these days more and more through the Internet. The typical full-service investment bank, such as Mandatum or Evli in Finland, has a research department with their own personnel, consisting of economists and analysts. They provide investors with recommendations to buy, hold or sell securities. These recommendations are based on the brokerage house's own forecasts of the required

return of a particular company, macroeconomic variables, and, most of all, earnings expectations, which are the key factor affecting stock prices. These earnings expectations are also given as such, for various time periods.

Most brokerage houses in Finland are "retail" houses, in the sense that they also serve individual investors, not only institutional investors. Brokerage houses also offer investors other information, although the emphasis is on recommendations. This is because brokers earn commissions based on the amount of trading that investors do. The recommendations like the information are usually "free" for customers. This may lead to a situation where "buy" recommendations dominate as opposed to "sell" recommendations.

The value of a company is determined by the expected future cash flows, not by current cash flows. Thus, the estimation of growth rates in cash flows, or earnings, is central in any valuation model. An investor can estimate the growth rates basically in three different ways: base them upon past growth, relate them to the firm's (and the economy's) fundamentals or draw on estimates made by other analysts who follow the firm. In practice, the best way is usually to combine all these and arrive at a composite growth rate.

There is a connection between past growth rates and (expected) future growth rates, but the reliability of this connection is open to debate. Also, many practical issues need to be considered, like estimation period and possible weighting of more recent years in calculating averages, dealing with negative earnings, and per share versus total earnings estimations (for firms that have issued substantial amounts of new equity during the estimation period). If per share earnings are used, questions about using primary EPS calculated using actual number of shares outstanding, or diluted EPS using potential number of shares assuming conversion of warrants and convertible bonds, will also be raised.

Earnings forecasting literature includes many papers with different forecasting models to predict earnings. Little (1962) showed that British firms' annual earnings follow a random walk process. On US data, Ball and Watts (1972), Albrecht et al. (1977) and Watts and

Leftwich (1977) provided evidence that Box-Jenkins ARIMA models are not more accurate in predicting annual earnings than the random walk model in a holdout period. Later, Lee and Chen (1990) argued that temporary, short-run and long-run structural changes are commonplace, and that ARIMA models can be improved by incorporating such changes in the model and so allowing it to provide more accurate earnings forecasts.

Brooks and Buckmaster (1976) argued that annual earnings with extreme year to year changes are better described by a mean-reverting model, thus such models, known as the ARIMA (0,1,1) or integrated moving average IMA(1,1), have been used in various studies. However, according to Kendall and Zarowin (1990), the rejection of the random walk model is not limited to cases of extreme earnings changes. They did not, however, provide predictive evidence in a holdout sample, i.e. models were not tested against each other in the forecasting period.

To summarize, the statistical models used for forecasting earnings traditionally include linear and log-linear regression models, but more sophisticated time-series models, like the Box-Jenkins models, have been used in the last few decades. The linear model using OLS regression of earnings per share against time is:

(22) $EPS_t = \alpha + \beta_t$

where EPS_t = earnings per share in time period t.

The log-linear model takes compounding into account, converting the coefficient into a percentage change by taking the natural logarithm of earnings in each period. The next step is the autoregressive integrated moving average (ARIMA) model, developed by Box and Jenkins (1976). The idea of an ARIMA model is to model a value in time series as a linear combination of past values and past errors, or shocks, and it can be adjusted for seasonality in data, such as quarterly earnings. In fact, Bathke and Lorek (1984) showed that three models are useful in forecasting quarterly earnings, and all the models are seasonal ARIMA (SARIMA) models: Foster (1977), Griffin (1977) and Brown and Rozeff (1979).

The consensus of time series models in the financial literature is that first, they do better than naive models for the next quarter, but the superiority declines with longer-term forecasts, suggesting that the estimated time series parameters are not stationary, and second, there is no single model which is dominant among the time series models in terms of minimizing forecast error. The problem in using these models in practice is that they require a lot of data in order to minimize estimation errors, and the larger the data, the less important the older observations are for the present moment and for the future.

Little (1962), and many others after him, found very little or no evidence that firms that grew fast in one period continued to grow fast in the next period. However, that dependency was found to be firm specific, determined by such factors as variability in growth rates, size of the firm, cyclicality in economy and quality of earnings.

However, it is possible to generate a more accurate annual earnings forecast model than the random walk model, but it calls for other information beyond the time-series of past annual earnings. This information set includes quarterly earnings time-series models, of a firm's stock price and financial statement data, such as the book rate of return. For the first item, Hopwood, McKeown and Newbold (1982) showed that already before the first quarterly report is released, one can use a model to forecast the individual quarterly earnings for the whole year, which will, when summed, equal an annual earnings forecast which is more accurate than the forecast obtained from the models based on annual earnings figures.

For the other financial statement data the random walk model can be improved by including the book rate of return as well as past stock price, as suggested by Freeman et al. (1982). Further, Ou and Penman (1989a, b) showed that other non-earnings financial statement data can also be used to predict future earnings. However, Ball (1992) argues that the so-called financial statement information anomaly, resulting from the Ou and Penman findings, is due to accounting ratios proxying for stocks' expected returns. This still remains an open question in the financial literature.

2.3 Market efficiency

The allocation of savings into investment opportunities is a fundamental question for any economy. If this is done well, economy can exploit new business ideas to spur innovation and create jobs and wealth more rapidly than would otherwise be possible. However, in order for markets to be allocationally efficient, they need to be both internally and externally efficient (West 1975). In an externally efficient market, information is quickly and widely disseminated, so that information is widely and cheaply available to investors and that all relevant and ascertainable information is already reflected in security prices, so that all securities are fairly priced and offer expected returns just sufficient to compensate for the securities' risks.

An internally efficient market is one on which brokers and dealers compete fairly so that the cost of transacting is low and the speed of transacting is high. Internal market efficiency has been a matter of increasing interest in recent years, and the research in this field is usually known as market microstructure. The stock markets and legislators have also adopted policies aimed at improving internal efficiency, primarily by imposing rules and regulations that affect the design and operations of security markets. Nevertheless, in this thesis the term market efficiency will henceforth be used to refer to external market efficiency, which is explained next.

2.3.1 Informational efficiency of the markets

If the markets were perfect, i.e. if there were no frictions to impede investing, the price of a security would be a good estimate of its investment value (also called intrinsic value), which is the present value of the security's future prospects estimated by using all the information currently at hand. In other words, an efficient market is defined as one in which the price of every security equals its investment value at all times. The concept of market efficiency is based on work done by Roberts (1959) and Fama (1965). Keane (1985) further stressed the importance of the two separate aspects in market efficiency; speed and the quality of a price adjustment to new information.

Fama (1970) divided efficiency into three levels of efficiency according to the set of information available:

1. The weak form of market efficiency; the information set reflected in security prices consists of previous prices (and trading volumes) of securities.
2. The semi-strong form of market efficiency; all publicly available information is included in the information set.
3. The strong form of market efficiency; all information, both public and private, is incorporated into the security prices.

In practice, this means that a market is efficient with respect to a particular set of information if it is impossible to make abnormal profits by using this set of information to formulate trading decisions. In this thesis, the semi-strong form is under investigation, because analysts, among others, are restricted to using only publicly available information (the use of insider information is prohibited by law) in their forecasts and recommendations.

Later, Fama (1991) classified market efficiency according to a huge number of empirical studies on the subject (Fama also gives a survey of recent studies in the same paper). The classification is based on the information incorporated into stock prices as follows:

1. Tests for return predictability
2. Event studies
3. Tests for private information.

The first level consists of tests on time-series predictability of stock prices as well as forecasting prices with other variables, such as cash flows or dividends. This level also includes the cross-sectional predictability of returns, i.e. tests of asset-pricing models and the anomalies discovered in the tests. The second level consists of event studies, and the third tests for private information.

According to Fama (1970), the investors generate price expectations according to a general model:

$$(23)\quad E(p_{j,t+1} \mid \Phi_t) = [1 + E(p_{j,t+1} \mid \Phi_t)]\, p_{jt},$$

Where E = expected value operator

p_{jt} = price of security j at time t

$r_{j,t+1}$ = one period return $(p_{j,t+1} - p_{jt}) / p_{jt}$

Φ_t = the set of information "fully reflected" in the price at time t.

The model gives the expected end-of-period price on security j by calculating the expected return on the securities having the same risk as security j given the information at the beginning of the period t. In other words, whatever expected return model is applied, the information set is fully utilized in determining equilibrium prices, thus investors do not ignore nor misinterpret that information in setting their return projections for the next period. Let:

$$(24)\quad x_{j,t+1} = p_{j,t+1} - E(p_{j,t+1} \mid \Phi_t).$$

Then, because equilibrium security prices "fully reflect" the information set Φ_t and thus there cannot exist any trading systems based only on information in Φ_t that has expected profits or returns in excess of equilibrium expected profits or returns, it must follow that:

$$(25)\quad E(x_{j,t+1} \mid \Phi_t) = 0.$$

This means that the sequence $\{x_{jt}\}$ is a "fair game" (Mandelbrot 1966) with respect to the information sequence $\{x_{jt}\}$. The term $x_{j,t+1}$ is the difference between the observed price and the expected value of the price at time t, projected on the basis of the information set, i.e. the excess market value of security j at time t+1. Now if:

$$(26)\quad \alpha(\Phi_t) = [\alpha_1(\Phi_t), \alpha_2(\Phi_t), \ldots, \alpha_n(\Phi_t)]$$

which is any trading system based on information Φ_t which tells the investor the amounts $\alpha_j(\Phi_t)$ of funds available at time t that should be invested in each of the n available securities. Such a system would generate total excess market value at t+1 of:

$$(27)\quad V_{t+1} = \Sigma\, \alpha_j(\Phi_t)[p_{j,t+1} - E(p_{j,t+1} \mid \Phi_t)].$$

Which has the expected value of zero:

$$(28)\quad E(V_{t+1} \mid \Phi_t) = \Sigma\, \alpha_j(\Phi_t)E(x_{j,t+1} \mid \Phi_t) = 0.$$

The information contained in the information set available depends on the form of the market efficiency being considered. If only past price (and volume) data is included, it is a question of weak-form efficiency. In the case of the semistrong form of market efficiency, all publicly available information relevant to establishing security prices is included in the Φ_t. This information consists not only of firm specific financial data published by companies or economy wide data published by government(s), but also of the information analyzed and disseminated by professional analysts. If the information set includes more than that, i.e. information known only by company or government insiders and not yet publicly released, the market is said to fulfill the strong-form efficiency.

The original work on market efficiency was later developed further by other scholars, for example Rubinstein (1975), Beaver (1981) or Latham (1986). The latter observed that a piece of information may cause offsetting revisions in individual investors' portfolios without any net effect on excess demand or prices. It would thus be feasible that two investors take precisely offsetting buy and sell actions. Therefore, Latham (1986, 40) defined efficiency relative to information set "if revealing it to all agents would change neither equilibrium prices nor portfolios". According to Ball (1994) this is advantageous, since it has a potential for linking with the theory and empirical work on trading volume, investor heterogeneity, information production and the microstructure of the trading mechanism.

Hayek (1945) characterized the information on markets so that individual investors cannot know the information of others in trading. Therefore, an investor cannot know whether and how a piece of information or belief he or she possesses has already been used by others in trading. Hence the investor is unable to know the extent to which the information or belief is already reflected in prices. An individual's trading decision is thus based not only on his or her information set and how it is processed, but also on that individual's belief about the information sets of other investors and how they process information.

Ball (1994) argues that a setting in which heterogeneity is particularly important is the provision of earnings forecasts by security analysts. He builds on the Heyekian view of stock markets reasoning for the demand for analysts' earnings expectations. Individual traders act on the basis of information that is costly for others to observe, and prohibitively costly to perfectly observe. Therefore, the price of a security incorporates information that is not fully known by any individual. At the same time, contemporaneous earnings do not incorporate all value relevant information because it is too costly to do so. It is also costly to determine the information set that is reflected in earnings and the one that is not. Thus, an individual investor has imperfect knowledge of the information that is captured in both earnings and price of the security at the time when the actual earnings number is released.

In order to decide whether to trade or not, an individual has to acquire an optimal amount of costly information about both options. The earnings-forecasting analyst is a special producer of such information. According to this model, the analyst first acquires information about the information in price. This step includes also e.g. talking to major investors about their motives to trade. Second, the analyst acquires information about the information in current earnings studying e.g. sales, expenses or accounting techniques used by the company. Third, the analyst estimates the subset of information reflected in price that is reflected in current earnings. Fourth, the analyst estimates the earnings implication of that subset of information, which is expressed as an earnings forecast.

Having this information, the individual investor can assess the information in actual earnings after it is released. Thus, by comparing earnings expectations with actual earnings the individual will be able to draw conclusions regarding the revision of price. In this

model, an analyst does not produce new information in the way the managers of the firm do with their own earnings forecasts, but produce information about the information used by other investors.

The heterogeneity of investor information and beliefs has been studied in many papers since Hayek (1945). Beaver (1968), for example, studied trading volume at earnings announcements, Grossman and Stiglitz (1976) introduced a noise-trading model, the information quality between investors was modeled by Klein and Bawa (1977), the behavioral differences between investors by De Bondt and Thaler (1985, 1987), and the sophisticated and unsophisticated investors were modeled by Shleifer and Summers (1990).

2.3.2 Market efficiency with costly information

From the perspective of the present study, it is very important why, in the presence of market efficiency, there still might be room for an analyzing industry. As we know from the foregoing, if markets are efficient, nobody can earn abnormal returns and thus nobody would not be interested in the analysis of individual companies. According to some models (Grossman and Stiglitz 1976, 1980 and Cornell and Roll 1981), the sensible asset market equilibrium must leave room for security analysis. Instead of assuming costfree information, they make an assumption that information acquisition is costly.

Cornell and Roll (1981) presented a gaming problem with an examination of pairwise competition when analyzing the behavior of investors when information is both useful and costly (see also Copeland and Weston 1988). There are two simple strategies, analyst strategy and random selector's strategy. The first strategy is to pay a fee, c_2, for acquiring information, whereas the second strategy is to pay a minimum fee, c_1, for the right to trade, including commissions. There is also a normal return, r, and a competitive advantage d, which indicates how much information increases the return when analyzing trader trades with the random selector. For example, if normal return is 5 % and d = 2, then the gross income for the informed trader is 10%. However, if the analyzing trader trades with

another analyzing trader, the competitive advantage disappears because they possess the same information. Table 2.1 lists all the net payoffs for every possible combination.

Table 4. Trading, with or without analyzing.

		Trader 2 analyzes	
		Yes	No
Trader 1 analyzes	Yes	$r - c_2$	$dr - c_2$
	No	$r/d - c_1$	$r - c_1$

There exists a stable equilibrium if two conditions are met. First, all trading has to be anonymous, so that the uninformed trader is willing to trade with the informed trader. Second, the expected payoff to the analysis strategy has to equal the expected payoff to the random selection strategy. Let p stand for the probability of utilizing an analyst's strategy, then the probability for random strategy is 1 – p. Because the payoff for the both strategies has to be the same, it must be that:

(29) $p(r - c_2) + (1 - p)(dr - c_2) = p(r/d - c_1) + (1 - p)(r - c_1)$

The left side of the equation stands for the expected payoff to the analysis strategy, and the right hand side the expected payoff for the random selector strategy. The probability of using analysis equal to p, is thus equal to:

(30) $$p = \frac{r(1-d) + c_2 - c_1}{2r - rd - r/d}$$

Analysts and random selectors will both exist if p is greater than zero but less than one. This is called a mixed strategy. For such a strategy to exist, the necessary conditions are:

(31) $r(d - 1) > c_2 - c_1$

and

(32) $r(1 - 1/d) < c_2 - c_1$.

These conditions are derived in the following. The denominator of Equation (30) has to be negative, because the normal return has to be greater than zero and the competitive advantage, d, has to be greater than one:

(33) $2r - rd - r/d < 0$

(34) $2d - d_2 - 1 < 0$

(35) $(d - 1)_2 > 0$

In Equation (30) the numerator also has to be less than zero if the probability p is greater than zero. Thus:

(36) $r(1 - d) + c_2 - c_1 < 0$

(37) $r(d - 1) > c_2 - c_1$

This is the condition in Equation (31). In Equation (30) the numerator has to be greater than the denominator for probability p to be less than zero. This is because both numerator and denominator are less than zero. Thus:

(38) $r(1 - d) + c_2 - c_1 > 2r - rd - r/d$

(39) $c_2 - c_1 > r(1 - 1/d)$,

which is the second necessary condition presented in Equation (32).

If a mixed stable strategy exists, there are no economic incentives for new entrants to disturb the equilibrium due to zero profits. This condition is equal to setting both sides in Equation (2.1) at zero. From these results, for a stable mixed strategy the necessary situation is:

(40) $p = (rd - c_2)/(rd - r)$

and

(41) $d = c_2/c_1$

This model shows that, although the analysis strategy gives higher gross rate of return than random selection strategy, after the costs of obtaining information are subtracted, the net return is same for both strategies. Thus, it is consistent to have both efficient markets and a security analyzing industry concurrently.

There is some empirical evidence for this situation. For example, Ippolito (1989) found that mutual funds with higher turnover, fees, and expenses earn sufficiently high return to offset the higher charges for those funds. I.e. the markets are efficient yet there is costly information. According to him, this is consistent with the belief that mutual funds are efficient traders and information gatherers.

The Cornell and Roll (1981) analysis can also be used in examining the effect of transaction costs on information gathering. If we take partial derivatives from Equation (40) with respect to c_2 and d, we have:

(42) $$\frac{\partial p}{\partial c_2} = -\frac{1}{rd - r} < 0, \text{ since } rd - r < 0$$

and

$$(43)\quad \frac{\partial p}{\partial d} = -\frac{r - c_2}{r(d-1)^2} > 0$$

since r – c2 < 0 and the denominator is positive.

Thus, a decrease in transaction costs, as well as an increase in competitive advantage, increases the incentive to use analysis strategy. An important implication of this result is that informational market efficiency can be improved by decreasing the transaction costs.

3. DATA ENVIRONMENT

In this chapter, the Finnish stock market environment is briefly introduced, explaining the recent main developments. The mechanism Helsinki Stock Exchange (HEX) is presented. The chapter also includes also a presentation of earnings forecast data from Finland and UK for purposes of comparison. Some preliminary findings are presented based on these earnings forecasts.

3.1 The Finnish stock market

The Helsinki Stock Exchange (HEX) is the only stock exchange operating in Finland. Stocks are traded on an automated trading and information system, HETI (Helsinki Stock Exchange Automated Trading and Information System), which is similar to the CATS system in, for example, Toronto, Paris, Brussels and Barcelona. It is an open market-by-order type of limit order book in which each order is displayed individually to all brokers on the exchange. Price and time prioritize the way the orders are put into the book.

Trading is divided into four segments according to type. First, during an opening session, starting at 9:00, prices are fixed for the day. Second, after 9:40, the initial matching procedure is performed by batch trading and the sell and buy orders entered during the opening phase are automatically matched as transactions. Third, there is a continuous (free) trading session between 10:00 and 18:00. Continuous trading can be carried out as round lots, odd lots and negotiated deals. In round-lot and odd-lot trading, offers are matched automatically. Orders in round lots are matched in real time according to price and time priority. In negotiated deals, the seller and buyer are free to jointly negotiate the terms of the transaction as long as the trading price ranges between the highest and lowest price quoted during continuous trading. After this session the official closing prices are confirmed. Evening trading (continuous trading stage II) continues until 20:00, during which the same rules apply as in continuous trading during stage I. Fourth, there is a after market trading II at 8:30-9:00 a.m. on the following trading day, when sell and purchase

offers are not matched automatically only negotiated deals are possible. The trading price during after market trading may fluctuate between the trading range established during continuous trading for round-lot trades.

The minimum tick size in HEX is 0.01 Euro. Prior to 1999, the Rules and Regulations of the HEX specified that the minimum price variation was 1, 10, 100 and 1000 old Finnish *penniä* with stocks trading below 10, 100, 1000 and above 1000 FIM, respectively. Thus, the tick size was expressed in relative rather than absolute terms. This decimalization is used for example in Tokyo, as documented by Angel (1997).

Trading on the Helsinki Stock Exchange has been changing rapidly during the research period. This is due to major structural changes in the Finnish economy, affecting the financial markets in many ways. The influence of a worldwide, and particularly European, integration of Finnish markets has also been evident.

In Finland, the banks have traditionally had an important role on the money markets, while stock and bond markets have been quite insignificant. However, in the 1990's these markets became more and more important. This can be seen in many positive changes in the structure of the market, such as a rapid increase in trading frequency and an increase in trading volume, or share issues.

At the end of 2001, there were 155 companies listed on the HEX (the number of listed share series was 175) with a market value of 217 billion Euro. This is a big increase from 58 companies and market capitalization of 23 billion Euro in 1993. However, today one company, Nokia, accounts alone for about 60 percent of the market value of the stock market. The equity turnover at the end of 2001 was 203 billion Euro, or 11.4 billion shares, with a velocity of circulation of 98.13 percent. The return and turnover are presented in Figure 1.

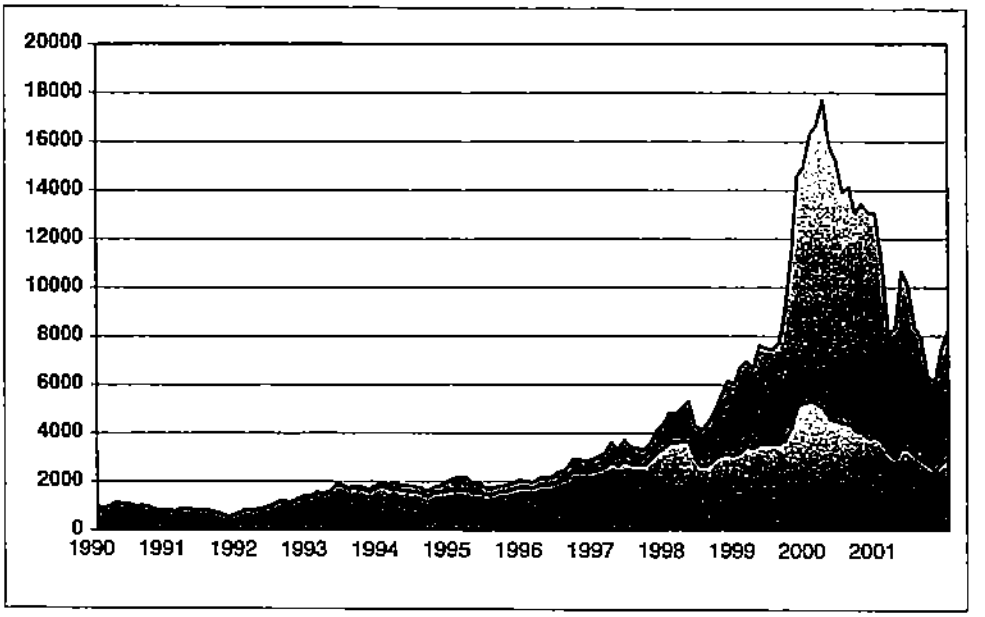

Figure 1. HEX General Index (dark) and HEX Portfolio Index (light) in 1990 to 2001.

Another feature of the 1990's was the increase in foreign ownership of Finnish companies, after the restrictions were lifted in 1993. At the end of 1993, foreign ownership was 20.2 percent, whereas it was 37.0 percent in 2001. However, in some stocks, the increase has been dramatic, for example in Nokia it has increased from 33.7 to 90.7 percent on the same period. Also, there are nowadays 24 remote trading members in advance of 18 local trading members in HEX, whereas in 1993 there were only 19 local members.

3.2 Analysts' earnings forecasts in Finland vs. UK

The analysts' earnings forecast were obtained from the Institutional Brokers' Estimate System (I/B/E/S) database, which provides analysts' individual earnings forecasts for all the sample firms. The data used in this chapter consists of 499,526 analysts' earnings forecasts released during the years 1988-1999. Table 5 provides descriptive statistics of the analysts' earnings forecasts.

Table 5. Descriptive statistics on earnings and earnings forecasts in the years 1988 to 1999. Total number of observations in Finland 1.010 firm-year earnings and 31,449 analysts' forecasts (Panel A) and in UK 14,184 firm-year earnings and 499,526 analysts' forecasts (Panel B).

	Mean	Med	STD	Skew	Kurt	25%	75%	t-val	Sign
Panel A: Finland									
Nobs	49.62	31.00	54.09	1.714	3.049	10.00	70.00		
Time	184.2	175.0	106.1	0.076	-1.312	86.00	288.0		
Earnings	2.788	1.390	8.422	-6.411	226.3	0.400	4.500	58.71***	11836***
Forecast	6.602	5.700	8.335	1.150	132.4	1.750	10.01	140.5***	13320***
FE	3.814	2.245	8.419	12.99	533.1	0.000	6.883	80.32***	8096***
FE2	0.347	0.701	8.635	-35.14	5234	0.000	0.861	7.128***	8100***
FE3	0.592	0.700	7.226	41.09	2893	0.000	0.861	14.52***	8096***
Panel B: UK									
Nobs	45.66	32.00	43.78	1.343	1.767	11.00	68.00		
Time	181.8	181.0	103.1	0.021	-1.187	96.00	274.0		
Earnings	20.20	16.80	50.63	-19.30	5436	8.200	29.48	282.1***	219245***
Forecast	25.03	19.00	37.50	50.80	10303	10.35	31.90	471.7***	240436***
FE	4.828	0.377	52.34	41.27	7234	-1.000	4.000	65.19***	36972***
FeS	0.298	0.021	9.077	133.7	29372	-0.059	0.211	23.18***	36767***
FeSO	0.873	0.022	87.20	349.8	142868	-0.059	0.212	7.076***	36972***

Nobs = number of observations, Time = number of days from first day of the year, Forecast = analyst's earnings forecast, Earnings = actual earnings, FE1 = earnings forecast less actual earnings, FE2 = FE1 divided by absolute value of earnings, FE3 = the same as FE2 when the absolute value of earnings is greater than 0.1, otherwise FE3 = FE1 divided by 0.1.
*** Statistically significant at risk level 0.001

In Finland there are about 50 forecasts per year for each company on average, although the median is only 31, i.e. the distribution is skewed to the right. This means that a few big companies (such as Nokia, UPM-Kymmene, Stora-Enso) draw a lot of attention, whereas smaller firms have only few analysts following (and/or have fewer forecasts per analyst). However, in time the forecasts are quite normally distributed over the year, which can be seen from the variable Time. Earnings are positive on average, with high kurtosis, i.e. the earnings are concentrated heavily between 4 and 4.5 Euro.

Here, the forecast error metrics are calculated as follows. Forecast error is unadjusted:

(44) FE1 = (forecast earnings – actual earnings)

The FE2 is equal to:

(45) FE2 = FE1 / | actual earnings |

There are problems in this definition if the actual earnings are zero or close to it: the quotient would be infinite. Thus, a third metric, FE3 is also calculated. It is equal to FE2 if the absolute value of actual earnings is greater than 0.1, otherwise a deflator of 0.1 has been used.

Actual earnings have been used as a deflator for forecast error, even though Brown (1996) criticized their use and suggested stock price instead. He based the notion on Christie's (1987) article showing that the appropriate deflator to use when regressing rates of return at the time of earnings announcements on "earnings surprises" is stock price and that the use of any other deflator generally leads to biased, inconsistent estimators of regression coefficients. However, when the study concerns only forecast errors, not stock market reactions, this may cause other problems. For example, it would always seem that the forecast errors are smaller for big firms (high market value) than for small firms. In recent years, the vast majority of studies in this field have used actual earnings as the deflator.

The forecasts are on average much higher than actual earnings, although the standard deviation is at the same level. This would suggest a positive bias. The undeflated forecast error FE is positive on average, with positively skewed distribution and high kurtosis. The forecast error is also statistically very significantly higher than zero. The difference between Finland and UK is that the median forecast errors are closer to zero in the UK, but the means are about the same or a little higher.

4. THE INFORMATION CONTENT OF DIFFERENT FINANCIAL DISCLOSERS

Several empirical studies suggest that financial disclosures of the firm have information content to investors in assessing share prices. This is true as well for Preliminary Announcements, as for Interim (or Quarterly) reports. However, the role of the Annual Accounts and Annual Report has not been addressed as much. Those few papers that have studied these events, have not found much evidence of market reactions. However, these studies are from Anglo-Saxon markets (USA and UK), where disclosed (reported) accounting earnings are relatively close to adjusted earnings. This is not necessarily so in every other country, where one factor of disclosed earnings may be the derivation of company taxes. In such a country, adjusted net income can be calculated using the information in the complete Annual Accounts. When the preliminary information is released, the Annual Accounts are usually not available.

To study this, i.e. incremental information in Annual Accounts in a tax-influenced market, Finnish data is used. It is found that the Annual Accounts and Report are important in regard of new information, even though Preliminary Announcement has been given before. For positive information, the reaction is positive, whereas for the Preliminary Announcement it is not. This is probably due to inadequate information in Preliminary Announcements.

4.1 Hypothesis development and research methodology

In this chapter, the return reaction to earnings is reviewed in the light of earlier research. Also, the differences in earnings between different markets are reviewed. Finally, the research hypotheses are explained.

4.1.1 Return reaction to earnings

Several empirical studies suggest that financial disclosures of the firm have information content to investors in assessing share prices (see e.g. Francis, Schipper and Vincent 2002, or Ertimur and Livnat 2002, and the literature cited there). This is true both for Preliminary Announcements and for Interim (or Quarterly) Reports (see e.g. Brookfield and Morris, 1992).

However, the importance of the Annual Accounts and Annual Report for the investors in regard of share price reactions has not been addressed as much. Almost all previous studies, e.g. Chambers and Penman (1984), Foster, Jenkins and Vickrey (1986), Cready and Mynatt (1991), and Rippington and Taffler (1995), agree that there is only very little, if at all, information in the Annual Accounts and Annual Report for share price valuation purposes. However, these studies have been done in Anglo-Saxon markets, where the net income information is released already in the preliminary announcements. This is not so for all other countries, like Finland, where the original motivation for calculation of earnings is in taxation purposes.

What this means in practice is that investors and investment analysts must always recalculate the profit figures by a series of adjustments before comparing them to earlier profits of the same firm, to other firms in the same branch, or to firms in the Anglo-Saxon world (or any non Anglo-Saxon country, where profit figures must also be adjusted). For example, Beeny (1985) found that German profits are greatly increased by investment analysts before comparing them to UK firms.

In such countries, only the taxable profit of the firm, calculated by the firm itself, can be seen from the Preliminary Announcement of the Accounts. Only after the complete Annual Accounts are released, it is possible for investors to calculate the 'true' net income of the firm, which can then be used for comparisons. Also, an important feature of the Preliminary report issued by a firm is that it is unaudited. This raises further the issue about the Preliminary reports reliability for investment decision making. Also, the market may take longer to incorporate such information into prices, as suggested by Opong (1995).

The Annual General Meeting is an important event in other respects. It is perhaps the only opportunity for small shareholders to meet the CEOs of the firm face to face (Rippington and Taffler 1995). In these meetings the managers, and usually the president himself, give their views about the future of the firm. Also, final decisions on dividends are made at this meeting. Previous studies of this event are from big stock markets, such as NYSE or the London Stock Exchange, where the institutional investors play an important role. Rippington and Taffler (1995), for example, conclude that the annual general meeting may '... appear to convey relatively little information.' Somewhat in contrast to this, Firth (1981) found little aggregate market reaction, though using much older data. However, there are small stock markets, such as the HEX in Finland, where mutual funds are new and play a minor role, and investors are used to investing their money in the stock market directly, not through funds. One implication of this would be that in Finland the Annual General Meeting is a more important event than on big markets. This should be reflected in market reactions.

Many empirical papers have found that profits and losses have different associations with share returns because losses are not expected to be permanent, see e.g. Sin and Watts (2000). Collins, Pincus and Xie (1999) found that including book value of equity in the valuation specification eliminates some of the differences. This is due to book value serving as a value-relevant proxy for expected future normal earnings for loss firms in general. This finding concurs with Barth, Beaver and Landsman (1998), who found that the incremental explanatory power of equity book value increases and net income decreases as financial health decreases. Hayn (1995) and Berger, Ofek and Swary (1996) also found that investors price the option to abandon a firm at its exit value, also supporting the importance of book values for loss firms.

4.1.2 Disclosed Earnings in non Anglo-Saxon countries

It is evident that accounting standards affect the accuracy of analysts' forecasts and thus the security prices on the stock markets, see e.g. Acker et al. (2002). However, disclosed

earnings in different countries vary for many reasons. According to Blake and Amat (1993), the most important areas of difference in international accounting practices are: accounting conventions, presentation, consolidated accounts, goodwill, foreign currency conversion, inflation, tangible fixed assets, research and development, stock and work in progress, leases, deferred taxation, pension schemes, and post balance sheet events. The severity of this problem can be seen immediately: the European Community's Fourth directive provides that 'Annual accounts shall give a true and fair view of assets, liabilities, financial position and profit or loss.' However, the concept of a true and fair view has a different meaning in various countries (Fédération des Experts Comptables Européens 1991).

There are several factors that determine the national accounting practice in a particular country, such as taxation, the economic environment, users and objectives, sources of finance, etc. In general, taxation is a major example of differences in financial reporting (Nobes and Parker 1991, pp. 24). From the present perspective, too, taxation is the most important one. In some countries it is required by the law that the accounts must be prepared in keeping with the tax law. The leading country for this approach is Germany, and countries like France, Belgium, Italy, Spain, Finland and many others follow. Nobes (1983) called these Macro-Uniform measurement practices. On the other hand, the alternative approach, where commercial rules come first, is found in countries like UK, USA and the Netherlands (called Micro based by Nobes). In these countries the taxation authorities have to adjust the commercial accounts for their own purposes, after exerting only minor direct influence on them (Nobes and Parker 1991). There is one major exception: in the United States, the use of LIFO inventory valuation is allowed largely for tax reasons.

According to Nobes and Parker (1991), the shareholder orientation of financial statements also spreads further than accounting principles by affecting the format of financial statements. The general use of vertical format in many Micro-based practices rather than a horizontal format in many Macro-Uniform practices, suggests a more shareholder orientation in the former countries. This is because the vertical format allows the presentation of working capital and net worth, and it contrasts net worth with shareholders'

funds. Furthermore, even inside the Micro based group, there are differences between countries. E.g., the UK balance sheet has more shareholder orientation than the Netherlands balance sheet, because it shows the shareholders' funds together, rather than showing the year's net profit as a separate item at the bottom of the balance sheet. The Macro uniform style profit and loss account, such as in Germany, is '... also probably less useful for decision making than the normal Anglo-Saxon concentration on gross profit, net profit and earnings'. Also, disclosed calculations of earnings per share are customary only in the Anglo-Saxon world.

Generous tax regulations give a lot of room for so-called income smoothing (on income smoothing, see e.g. Michelson, Jordan-Wagner and Wootton 2000), in which both charges against profit, provisions, as well as appropriations of profit, reserves, can be used in calculating the (taxable) profit of the firm. A good example is the use of accelerated depreciation in the financial accounts. Tax accounting rules have a major effect on financial accounting practice in Finland, where taxation is strictly tied to bookkeeping (Näsi 1990).

4.1.3 Hypothesis

The purpose of this chapter is to study the stock market reaction to four different events: Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting. The emphasis is on finding out when the net income information is reflected in the prices. The first question is the incremental information in Annual Accounts in relation to Preliminary Announcement. In this respect, the Finnish data is interesting, because there the annual report is made, in the first place, for taxation purposes, giving the 'taxable income' of the firm instead of the net income. For this reason, the official figures must be recalculated to convey information for investors, by removing certain value-irrelevant items from earnings.

However, the corrections can usually be done only after the complete Annual Accounts with all relevant information, are released. I.e., the net income for the year can be

calculated using the information in the Annual Accounts, but not in the Preliminary Announcement. Another thing is that most of the information in net income is already reflected in the share prices before *any* announcements are made. According to Ball and Brown (1968), this could account for as much as 90 percent of the total reaction during a year. This is in sharp contrast to big Anglo-Saxon stock markets, where the incremental information in the Annual Accounts has been shown to be very limited.

The second question is the role of the Annual General Meeting, on a market where small investors invest their money directly in individual firms, not through mutual funds or investment companies. Because big investors, such as mutual fund operators, can put more effort into following and analyzing firms, the information given in the Annual General Meeting may be more important in 'small investor' markets than in the US or UK. To study this, the Finnish data is valuable, because there the investment funds are new, very small and play only a minor role in the stock market.

The third question is the relationship of good and bad news. It sounds intuitively appealing that firms with positive information tend to give more information (i.e. release a Preliminary Announcement more often) than do firms with negative information to be released.

4.2 Data and methodology

In this section, the data and methodology are explained. The data consists of forty different firms and their Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting dates. The methodology follows previous studies in the field.

4.2.1 Data

All the firms traded on the Helsinki Stock Exchange (HEX) between the years 1989 and 1993 were selected for this study, if data about their earnings between accounting years

1990 and 1992 and corresponding financial information release dates, as well as long enough trading periods, are available. However, financial services, such as banks and insurance companies, that implement different accounting procedures, were excluded. This time frame was chosen because the Finnish legislation was gradually transformed during the 1990's to follow international accounting standards, for example companies are now obliged to use depreciation according to plan (see Chapter 2.2).

This left 40 different companies for the analysis (the total number of firms traded on the HeSE in 1990 was 80). Of the firms studied, 22 had at least in some year, filed preliminary information (as mentioned earlier, this is not mandatory in Finland). So the final sample consists of 110 observations of firms with annual accounting information, of which 33 observations are with preliminary information. Of the total sample, 12.7 percent are firms with positive information and preliminary information filed and 17.3 percent are firms with negative information and preliminary information filed. 20.9 percent are firms with positive information and no preliminary information filed, and 49.1 percent are firms with negative information and no preliminary information filed. For those firms that have changed their behavior (either started to file preliminary information, or ceased to do so) the corresponding figures are 21.1, 31.6, 15.8 and 31.6 percent.

The financial data used in this study was collected from the database maintained by ETLA (Aalto 1993). Each company's net income is calculated at the end of each annual accounting period (usually year end). Earnings are measured as annual net income exclusive of extraordinary gains and losses. This has been done by using the recommendations established by the Finnish Committee for Corporate Analysis (COC) on how to adjust earnings when using them in financial analysis. The main purpose of these recommendations, which are widely used by the Finnish media, financial analysts and researchers (see Martikainen 1993), is to remove certain value-irrelevant items from the earnings to make the firms more comparable to each other, as well as to previous years.

Compared to IAS, Finnish accounting rules differ in many ways. For example the inclusion of overheads in the inventory values is not allowed; a geometrically degressive declining balance method of depreciation for fixed long-term assets is used; financial leases are not

allowed to be capitalized on the lessee's balance sheet; when valuing owned affiliates, the cost method must be applied; unfunded pension obligations are not treated as balance sheet debt; several kinds of untaxed reserves are allowed; only the 'completed contract method' of accounting is normally allowed; the reporting of foreseeable losses is not permitted during the project (see Kasanen et al. 1992).

The result of all this is that losses for example, are considerably more frequent for COC adjusted earnings than for unadjusted disclosed earnings, as noted by Martikainen, Perttunen and Kallunki (1995). They also conclude that disclosed earnings result in a stronger return-earnings relation than the COC adjusted earnings, because '... the analysis where the depreciation rate of firms is made constant may not produce useful information in the prediction and analysis of stock returns.' For this reason, constant depreciation rate is not used, but 'depreciation according to plan', in which the idea is to allocate the cost of long-lived assets to the accounting periods following the depreciation plan. This is done in order to follow the Anglo-Saxon method more closely. There the depreciation for tax purposes is separated completely from the financial depreciation charges, thus giving full room for judgment in the latter.

The stock market returns are calculated from the data provided by the Helsinki Stock Exchange (HEX). Because of thin trading on the HEX, for stocks with no trading on a particular day, returns are also approximated with uniform returns, where returns are assigned equally over the days in the multiperiod return interval (see Kallunki 1995). The results of these did not differ much from the results presented, so only results from lumped return series are presented, where return is calculated only when trading takes place. Around the event days, trading is usually slightly heavier than at other times. However, thin trading may affect the estimation of the risk measure from the estimation period (see Luoma, Martikainen, Perttunen and Pynnönen 1994, for a discussion of the effects of thin trading on the Finnish stock market).

Event dates are received from the Helsinki Stock Exchange. Event date (day zero) is the date when the information is given to the HeSE (thus making it public). Four different events are studied: Preliminary Announcement (PA), Annual Accounts (AA), Annual

Report (AR) and Annual General Meeting (GM). The timing of these releases is presented in Figure 2. The estimation period is always 250 days before the 21 day event period (day zero plus ten trading days before and after that).

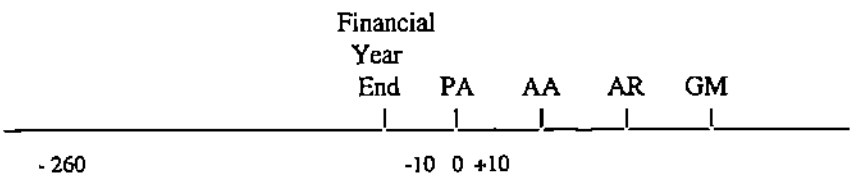

Figure 2. Timing of different releases during the company financial year. Preliminary Announcement (PA), which is the event in this example, Annual Account (AA), Annual report (AR) and Annual General Meeting (GM).

Firm size may be one explanation for different returns in event studies where the risk-adjusted returns are calculated from the CAPM (see e.g. Fama and French 1993 and Lewellen 1999). According to the firm size anomaly, small firms earn higher returns than they should in relation to their beta-adjusted returns. However, large companies are likely to show a higher level of earnings and may also show a higher frequency of positive earnings changes. If the frequency of positive earnings changes is higher in either of the groups (negative earnings changes vs. positive earnings changes), the results could be biased. Thus, it is necessary to test whether this is the case. The correlation between the sales of the firm and unexpected earnings is 0.045 (with risk level of 0.658) and direction of earnings change (negative earnings change has a value of zero and positive earnings change has a value of 1) is 0.099 (risk level 0.325). The corresponding figures for the assets of the firm are –0.010 (0.919) and 0.052 (0.609). The same was also studied by regressing unexpected earnings on sales of the firm. The R-square is 0.002, t-value of regression coefficient 0.44, and the figures from regressing the direction of earnings on sales of the firm 0.010 and 0.99. Neither t-value is significant. This evidence means that different sized firms are equally distributed in both groups, and thus, firm size does not explain the results of this study.

4.2.2 Methodology

The impacts of four different information announcements on the stock market are investigated. If there is new information in the announcement, there should be a visible reaction on the market. The sample is divided into two portfolios according to the sign of the unexpected earnings:

(46) $UE_{it} = E_{it} - E_{i,t-1}$

where E_{it} is earnings (net income) for the firm i at year t. The same method was used in the Finnish stock market earlier by Booth, Kallunki and Martikainen (1995), Kallunki (1995) and Martikainen (1995) among others. More sophisticated models, like the accounting index model, have not turned out to be much better than the simple random walk on the Finnish stock market (e.g. Martikainen, Rothovius and Yli-Olli 1991). On the other hand, analysts' forecasts may improve the model. Analysts' expectations are likewise not used at this stage for two reasons. First, this is the model used by uninformed investors, and second, analysts' expectations are studied in greater detail in the following chapters.

It can be expected that the two portfolios will differ from each other, not only in the sign of the reaction, but also in the magnitude of the reaction. This has been noted in many empirical papers, in Finland e.g. by Kallunki (1995), who states that "...the negative information concerning the firms' earnings is clearly more unanticipated by the stock market than the positive information." One intuitively appealing explanation for this might be that the firms usually tend to give as positive information as possible, thus only negative information in financial disclosures includes real "surprises". However, Kallunki did not distinguish between Preliminary Information from Annual Accounts, but used the first release given to the public.

Earnings information in different announcements is an important question, particularly in a country like Finland, because disclosed earnings are affected by taxation. For this reason, the disclosed figures must be recalculated or adjusted to convey the 'right' information, and naturally, the greatest variations are in net income information. This recalculation is

usually possible only after the complete report, the Annual Account with all relevant information, is released. In other words, the 'right' net income for the year can be calculated using the information in the Annual Accounts, but not in the Preliminary Announcements. The latter gives only the taxable income, which differs dramatically from the net income.

The returns are calculated from the daily price indices obtained from the Helsinki Stock Exchange. After correction for stock splits, dividends etc., logarithmic transformation is used in order to improve the normality of the data. From this data, the abnormal return AR is calculated as:

(47) $AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt}$

where R_{it} is the i'th stock's return at day t, α_i and β_i are the estimated parameters of regressing each stock's return on the market return, R_{mt}. Daily data is used. The coefficients are estimated using a 250 trading day estimation period preceding the event period, which ends ten trading days before the event day.

Three different test statistics for the statistical significance of the abnormal returns are implied. First, the standard t-statistic is used, since it is most commonly used in studies of this kind. The second is based on the standardized abnormal returns calculated for each event day by dividing each stock's abnormal return by the standard deviation of its abnormal returns estimated from the estimation period of each stock. By dividing the sum of standardized abnormal returns of stocks in the portfolio of the event day by the square root of the number of stocks in the portfolio, the test statistic is achieved. Finally, the third test statistic is calculated by dividing the estimated cross-sectional standard deviation by the number of stocks in the portfolio, by which the average abnormal return of the portfolio is divided. A Presentation and discussion of these tests can be found in Patell (1976), Brown and Warner (1985), and Boehmer, Musumeci and Poulsen (1991).

4.3 Empirical results

First, the sample is divided into two portfolios using earnings, or, more specifically, net income information. Positive earnings surprises are in one portfolio and negative earnings surprises in the other. This is done in order to obtain more detailed information about the behavior of the market in cases where Annual Accounts can be expected to have relevant, incremental information over the Preliminary Announcement with regard to earnings. Most previous studies have used only one portfolio, taking the absolute value of the negative returns.

When analyzing the results it must be realized that all information releases also contain a lot of other information than only net income. For example, dividends are finally decided at the Annual General Meeting and usually paid the next day. However, dividend information should be reflected in the stock prices well before the event, because the management has to make a proposal to the General Meeting at least two weeks in advance.

The case when unexpected earnings are negative (i.e. earnings are smaller than expected) is studied first. The results are presented in Table 6. There seems to be only a fairly significant reaction to the Preliminary Announcement, as well as to the Annual Report. However, the reaction to information in Annual Accounts is quite strong. In this instance, the reaction is significantly negative on days zero, one, four and five. Even though this is the first information release for some firms, it seems as if the market is also waiting for Annual Accounts for those firms before reacting to net income information. Also, the information given at the Annual General Meeting seems to be of great importance on the Finnish stock market. The return on the following day after the General Meeting is extremely negative. This also seems to continue on other days, except for the second day, when there is a recoil in the market. This recoil may be due to Finnish investors being contrarians (see Grinblatt and Keloharju 2000). In other words, if the price has decreased significantly, uninformed investors start buying, which will increase the price etc.

Table 6. Negative surprise in accounting information release, all firms included. Abnormal returns in the eleven-day period surrounding the Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting.

	Preliminary Announc.		Annual Accounts		Annual Report		Annual General Meeting	
Event day	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat
-5	0.233	0.386 0.523 0.574	0.171	0.450 0.534 0.606	0.292	0.678 0.811 0.878	-0.003	-0.008 -0.058 -0.099
-4	-0.797	-1.318 -0.913 -0.800	0.391	1.029 1.112 0.822	-0.451	-1.047 -0.993 -1.389	0.191	0.435 0.549 0.556
-3	1.107	1.833* 1.869* 2.215**	0.738	1.943* 1.720* 1.205	-0.514	-1.193 -0.338 -0.325	0.693	1.577 1.763* 2.170**
-2	0.435	0.720 0.543 0.574	-0.347	-0.914 -0.999 -0.965	0.045	0.104 -0.116 -0.123	-0.707	-1.608 -1.624 -1.141
-1	0.513	0.848 1.042 1.763*	-0.092	-0.242 -0.058 -0.051	0.773	1.792* 1.928* 1.540	-0.525	-1.194 -1.759* -1.488
0	0.801	1.326 1.427 0.770	-0.854	-2.248** -3.248*** -1.954*	0.671	1.557 1.555 1.240	-0.324	-0.738 -0.808 -0.995
1	-1.002	-1.658 -1.725* -1.257	-0.882	-2.321** -2.602*** -1.797*	0.423	0.981 0.408 0.300	-2.280	-5.186*** -6.311*** -4.548***
2	0.026	0.044 0.118 0.055	0.330	0.870 1.061 0.818	0.425	0.986 1.390 1.237	1.178	2.678*** 2.486*** 1.702*
3	0.282	0.468 0.250 0.137	-0.114	-0.300 0.144 0.111	-0.556	-1.290 -1.539 -1.981*	-0.431	-0.981 -1.353 -1.057
4	-0.182	-0.300 0.026 0.020	-0.761	-2.002** -1.739* -1.428	-0.410	-0.950 -1.470 -1.289	-0.825	-1.876* -2.531*** -2.114**
5	1.697	2.809*** 3.010*** 2.397**	-0.791	-2.081** -2.333** -1.856*	-0.270	-0.626 -0.061 -0.068	-0.200	-0.455 -0.066 -0.069

Firms are assigned to two portfolios according to unexpected earnings (net income), calculated as difference in annual earnings. Portfolios were formed every year during the research period 1990-1993. Event day zero is the day when the information is released (given to HeSE). Event day one is one trading day after day zero, and so on. Abn. return is the abnormal return of the portfolio on given day, calculated first by regressing each stock's return on the market return from the estimation period of 250 trading days, then using the obtained parameters to calculate the expected return predicted by the market model, and finally, subtracting the predicted return from the realized return of the particular day. T-test is the student t-statistic. Z-stat is based on the standardized abnormal returns calculated for each event day by dividing each stock's abnormal return with the standard deviation of its abnormal returns estimated from the estimation period of each stock. By dividing the sum of standardized abnormal returns of stocks in the portfolio of the event day by the square root of the number of stocks in the portfolio, the test statistic is achieved. Bmp-stat is calculated by dividing the estimated cross-sectional standard deviation by the number of stocks in the portfolio by which the average abnormal return of the portfolio is divided. Statistically significant at 0.10*, 0.05** and 0.01*** level.

These trends are clearly visible in Figure 3, where the cumulative average abnormal returns are calculated through the event window of eleven days. The market reaction to information in the Preliminary Announcement is about 3 percent positive, although the information in (corrected) net income is negative. The market reaction is opposite to that to information in the Annual Accounts, which is about 2 percent negative. This suggests that the earnings information given in the Preliminary Announcement is too positive compared to corrected net income, which is can be calculated from the information included in the Annual Accounts.

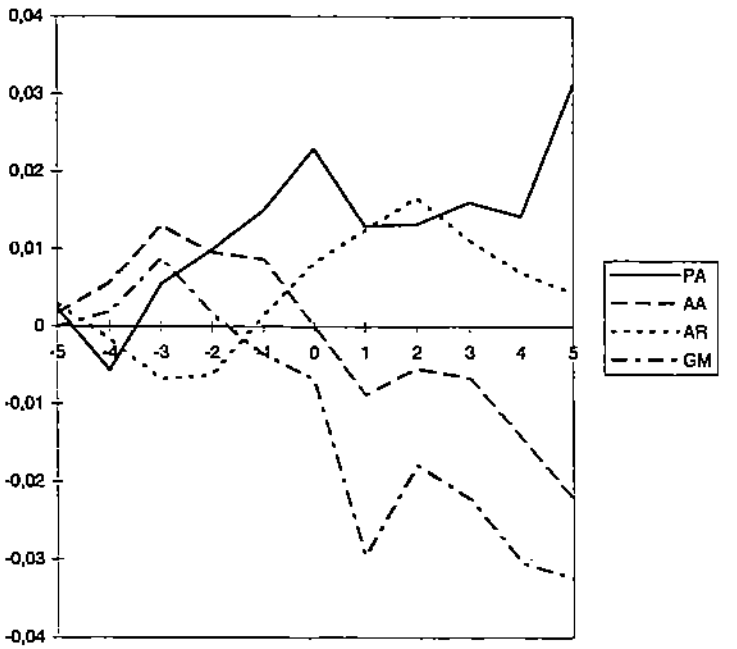

Figure 3. Negative surprise in accounting information. Analysis of average abnormal returns on Preliminary Announcement (PA), Annual Account (AA), Annual Report (AR) and Annual General Meeting (GM) days.

Table 7. Positive surprise in accounting information release, all firms included. Abnormal returns in the eleven-day period surrounding the Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting days.

	Preliminary Announc.		Annual Accounts		Annual Report		Annual General Meeting	
Event day	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat
-5	-0.427	-0.552	0.078	0.124	-0.693	-1.102	0.231	0.397
		-0.591		0.056		-1.014		0.123
		-0.945		0.056		-1.262		0.157
-4	0.691	0.893	-0.275	-0.435	0.678	1.078	-1.067	-1.832*
		0.956		0.640		1.658		-0.331
		1.381		0.413		1.771*		-0.132
-3	0.005	0.007	-0.192	-0.303	-0.286	-0.454	-0.235	-0.404
		0.041		-0.117		-0.938		-0.320
		0.035		-0.129		-1.402		-0.349
-2	0.167	0.216	0.375	0.592	0.459	0.730	-0.856	-1.470
		0.332		0.533		0.910		-2.247**
		0.692		0.467		1.024		-1.866*
-1	-0.231	-0.299	0.452	0.714	-0.083	-0.132	1.656	2.843***
		-0.306		0.744		-0.052		3.586***
		-0.475		0.746		-0.126		3.191***
0	0.470	0.607	0.710	1.121	-0.373	-0.593	-0.035	-0.060
		0.386		0.715		-0.079		-0.418
		0.239		0.629		-0.094		-0.372
1	-0.954	-1.233	-1.023	-1.616	-0.084	-0.134	-0.475	-0.815
		-1.369		-1.653		-0.162		-1.049
		-2.150**		-0.949		-0.170		-1.090
2	-0.103	-0.134	1.334	2.108**	0.571	0.907	0.029	0.051
		-0.562		1.686*		0.935		-0.158
		-0.390		1.273		1.484		-0.119
3	0.494	0.638	-1.483	-2.342**	-0.102	-0.162	-0.275	-0.473
		1.508		-3.052***		-0.086		-0.021
		0.910		-3.103***		-0.092		-0.018
4	-0.407	-0.526	-0.701	-1.108	0.799	1.269	-0.047	-0.080
		-0.955		-0.851		2.298**		-0.375
		-1.348		-0.784		1.302		-0.266
5	-0.878	-1.134	0.863	1.364	0.045	0.072	0.073	0.126
		-1.795*		1.874*		-0.288		0.780
		-1.689*		2.435**		-0.356		0.526

Firms are assigned to two portfolios according to unexpected earnings (net income), calculated as difference in annual earnings. Portfolios were formed every year during the research period 1990-1993. Event day zero is the day when the information is released (given to HeSE). Event day one is one trading day after day zero, and so on. Abn. return is the abnormal return of the portfolio on given day, calculated first by regressing each stock's return on the market return from the estimation period of 250 trading days, then using the obtained parameters to calculate the expected return predicted by the market model, and finally, subtracting the predicted return from the realized return of the particular day. T-test is the student t-statistic. Z-stat is based on the standardized abnormal returns calculated for each event day by dividing each stock's abnormal return with the standard deviation of its abnormal returns estimated from the estimation period of each stock. By dividing the sum of standardized abnormal returns of stocks in the portfolio of the event day by the square root of the number of stocks in the portfolio, the test statistic is achieved. Bmp-stat is calculated by dividing the estimated cross-sectional standard deviation by the number of stocks in the portfolio by which the average abnormal return of the portfolio is divided. Statistically significant at 0.10*, 0.05** and 0.01*** level.

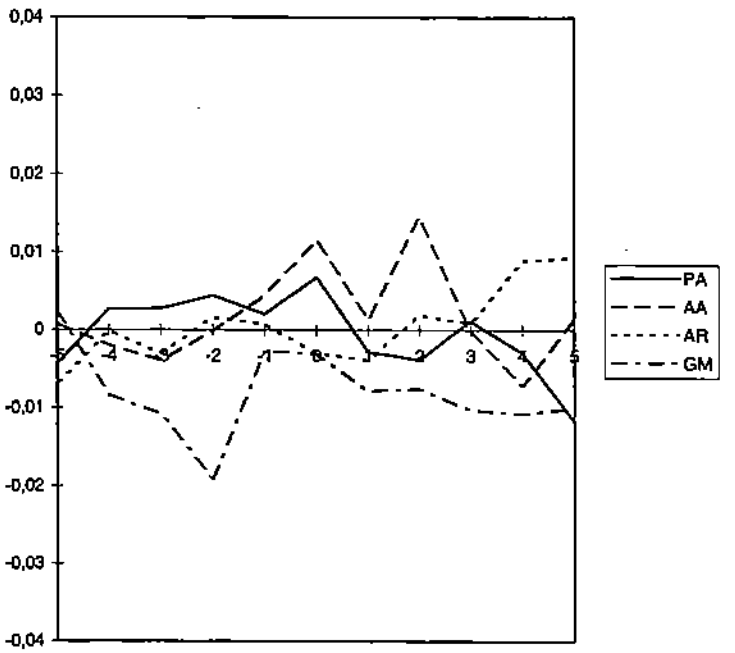

Figure 4. Positive surprise in accounting information. Analysis of average abnormal returns in preliminary Announcement (PA), Annual Account (AA), Annual Report (AR) and Annual General Meeting (GM) days.

The corrected net income is closer to the 'real' earnings of the firm than the disclosed earnings from the Preliminary Announcement. Another explanation might be that the best firms in this sample have filed a Preliminary Announcement, and the returns of the firms with no Preliminary Announcement are stressed on the Annual Account release date. At the Annual General Meeting event, the trend is also clearly downward biased. This gives support for the hypothesis that some investors are getting information, which is new to them. However, this hypothesis calls for further analysis, which is presented after the results for positive earnings information.

These results are fairly similar when earnings information is positive, as presented in Table 7. However, the results are not as significant statistically. As can be seen from Figure 4, no clear trends are visible. Thus, it seems like only negative information in financial disclosures includes big surprises. This is in line with the findings in Chapter 6, where it is noted that negative earnings changes are much more difficult to forecast than positive earnings changes, and that on average there is a positive bias in earnings forecasts.

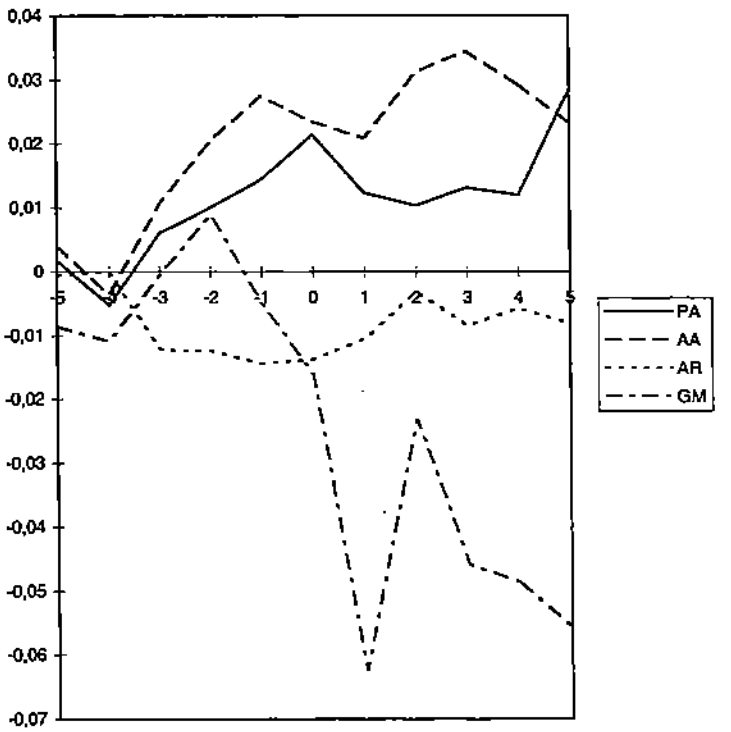

Figure 5. Negative surprise in accounting information. Only firms that have filed preliminary announcement are included. Analysis of average abnormal returns in Preliminary Announcement (PA), Annual Account (AA), Annual Report (AR) and Annual General Meeting (GM) days.

Table 8. Negative surprise in accounting information release. Only firms that have filed a preliminary announcement are included. Abnormal returns in the eleven-day period surrounding the Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting days.

	Preliminary Announc.		Annual Accounts		Annual Report		Annual General Meeting	
Event day	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat
-5	0.175	0.283 0.355 0.456	0.405	0.670 0.660 1.240	-0.062	-0.091 -0.370 -0.738	-0.855	-0.916 -0.689 -1.086
-4	-0.700	-1.135 -1.013 -1.082	-0.761	-1.261 -1.418 -2.145**	0.056	0.080 0.161 0.183	-0.239	-0.256 0.145 0.144
-3	1.124	1.822* 1.743* 2.599***	1.416	2.345** 2.178** 1.330	-1.215	-1.755* -1.492 -1.192	1.043	1.117 0.930 0.946
-2	0.400	0.647 0.412 0.475	0.986	1.633 1.214 1.328	-0.023	-0.033 -0.582 -0.448	0.940	1.007 1.025 1.940*
-1	0.444	0.719 0.749 1.621	0.695	1.151 1.532 1.713*	-0.199	-0.288 -0.097 -0.101	-1.393	-1.492 -2.007** -1.312
0	0.701	1.135 1.207 0.737	-0.397	-0.658 -1.148 -0.995	0.071	0.102 0.306 0.250	-1.121	-1.201 -1.543 -1.226
1	-0.910	-1.474 -1.257 -0.925	-0.254	-0.421 -0.157 -0.192	0.321	0.464 0.034 0.027	-4.616	-4.947*** -4.479*** -2.398**
2	-0.198	-0.320 -0.037 -0.020	1.025	1.698* 1.689* 1.616	0.734	1.062 1.162 0.882	3.927	4.209*** 3.672*** 1.406
3	0.277	0.448 0.425 0.255	0.331	0.548 0.489 0.753	-0.531	-0.767 -0.767 -0.893	-2.265	-2.427*** -2.419*** -1.203
4	-0.113	-0.182 -0.090 -0.081	-0.512	-0.848 -0.934 -1.222	0.272	0.392 0.266 0.258	-0.289	-0.310 -0.905 -0.787
5	1.641	2.659*** 2.587*** 2.331**	-0.597	-0.988 -0.851 -0.951	-0.240	-0.346 0.109 0.110	-0.689	-0.738 -0.505 -0.537

Firms are assigned to two portfolios according to unexpected earnings (net income), calculated as difference in annual earnings. Portfolios were formed every year during the research period 1990-1993. Event day zero is the day when the information is released (given to HeSE). Event day one is one trading day after day zero, and so on. Abn. return is the abnormal return of the portfolio on given day, calculated first by regressing each stock's return on the market return from the estimation period of 250 trading days, then using the obtained parameters to calculate the expected return predicted by the market model, and finally, subtracting the predicted return from the realized return of the particular day. T-test is the student t-statistic. Z-stat is based on the standardized abnormal returns calculated for each event day by dividing each stock's abnormal return with the standard deviation of its abnormal returns estimated from the estimation period of each stock. By dividing the sum of standardized abnormal returns of stocks in the portfolio of the event day by the square root of the number of stocks in the portfolio, the test statistic is achieved. Bmp-stat is calculated by dividing the estimated cross-sectional standard deviation by the number of stocks in the portfolio by which the average abnormal return of the portfolio is divided. Statistically significant at 0.10*, 0.05** and 0.01*** level.

In Finland, firms were not obliged to release preliminary information about their accounts during the research period. Despite that, about half of the sample firms did so. Because of this, the sample is divided further according to whether the firm filed preliminary information or not. It might be expected that a firm filing preliminary information has better (unexpected) earnings to present than firms on average. Unfortunately, this reduces the already small sample size still further. This is due to the small number of listed firms on the Helsinki Stock Exchange.

Thus only the firms that have filed preliminary information are studied next. First, the firms with negative information are under investigation. The results are given in Table 8 and Figure 5. Even though the information is negative, both Preliminary Announcement and Annual Accounts information releases experience positive market reactions. It may be that the model used to predict earnings (random walk) is too simple, and the market has better information (analysts forecasts etc.) about the forthcoming earnings. However, the reaction to information released at the Annual General Meeting is clearly negative, on day one, i.e. a day after the meeting, as low as -4.6 percent! This would suggest that the market reactions to Preliminary Announcement and Annual Accounts are wrong, and the 'real' information is released at the Annual General Meeting. On the other hand, this may also confirm the hypothesis that the firms that do (voluntarily) give preliminary information have better information to release than firms on average, or that they try to give as positive earnings information as possible, using earnings management etc. Another explanation might be that investors are not using the information in Annual Accounts, and realize the real earnings only after the Annual General Meeting. It is also possible that investors react to dividends that are decided at the General Meeting.

Next, the results for the firms with positive accounting information are given in Table 9 and Figure 6. Now, although the significance levels are not high, clear trends can be seen in the figure. In many Finnish studies the daily returns are lumped over two or more days, because small daily changes are usually not statistically significant in the small data (see e.g. Martikainen, 1995), which would also have improved the statistical significance here. Investors presume that information in a Preliminary Announcement usually tends to be positive, so the market reaction is not clear. I.e., positive information is anticipated.

Table 9. Abnormal returns in the eleven-day period surrounding the Preliminary Announcement, Annual Accounts, Annual Report and Annual General Meeting days. Positive surprise in accounting information release. Only firms that have filed preliminary announcement are included.

	Preliminary Announc.		Annual Accounts		Annual Report		Annual General Meeting	
Event day	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat	Abn. return	t-test z-stat bmp-stat
-5	-0.427	-0.552	-0.023	-0.025	-0.299	-0.407	-0.316	-0.204
		-0.591		0.027		-0.203		-0.215
		-0.945		0.055		-0.275		-0.815
-4	0.692	0.893	0.640	0.734	1.357	1.846*	0.796	0.514
		0.956		1.440		1.629		0.608
		1.381		0.677		1.762*		0.310
-3	0.006	0.007	-0.372	-0.427	-0.818	-1.113	-0.217	-0.140
		0.041		-0.385		-1.222		-0.084
		0.035		-0.567		-1.720*		-0.665
-2	0.167	0.216	0.945	1.084	1.269	1.725*	-1.848	-1.194
		0.332		0.518		1.866*		-1.068
		0.692		0.403		1.657		-1.212
-1	-0.232	-0.299	0.181	0.207	-0.270	-0.367	1.694	1.095
		-0.306		0.288		-0.435		1.137
		-0.475		0.272		-0.811		2.328**
0	0.470	0.607	1.092	1.252	0.664	0.903	-0.294	-0.189
		0.386		1.426		0.723		0.056
		0.239		1.414		1.037		0.086
1	-0.954	-1.233	-1.100	-1.263	0.477	0.649	-1.243	-0.803
		-1.369		-1.823*		0.893		-0.948
		-2.150**		-1.251		1.147		-2.801***
2	-0.104	-0.134	1.398	1.604	0.250	0.339	-0.518	-0.334
		-0.562		1.147		0.191		-0.194
		-0.390		0.724		0.411		-0.187
3	0.494	0.638	-1.332	-1.529	-0.239	-0.325	0.716	0.462
		1.508		-1.286		-0.355		0.698
		0.910		-1.556		-0.684		0.941
4	-0.408	-0.526	0.487	0.558	1.803	2.452***	-1.055	-0.682
		-0.955		0.365		3.421***		-0.739
		-1.348		0.295		1.546		-2.031**
5	-0.878	-1.134	0.466	0.534	-0.483	-0.657	0.931	0.602
		-1.795*		0.901		-0.925		0.676
		-1.689*		1.001		-1.617		1.297

Firms are assigned to two portfolios according to unexpected earnings (net income), calculated as difference in annual earnings. Portfolios were formed every year during the research period 1990-1993. Event day zero is the day when the information is released (given to HeSE). Event day one is one trading day after day zero, and so on. Abn. return is the abnormal return of the portfolio on given day, calculated first by regressing each stock's return on the market return from the estimation period of 250 trading days, then using the obtained parameters to calculate the expected return predicted by the market model, and finally, subtracting the predicted return from the realized return of the particular day. T-test is the student t-statistic. Z-stat is based on the standardized abnormal returns calculated for each event day by dividing each stock's abnormal return with the standard deviation of its abnormal returns estimated from the estimation period of each stock. By dividing the sum of standardized abnormal returns of stocks in the portfolio of the event day by the square root of the number of stocks in the portfolio, the test statistic is achieved. Bmp-stat is calculated by dividing the estimated cross-sectional standard deviation by the number of stocks in the portfolio by which the average abnormal return of the portfolio is divided. Statistically significant at 0.10*, 0.05** and 0.01*** level.

However, when the Annual Accounts and Annual Reports are released, investors can themselves calculate the true earnings, and only now do they realize how good the earnings really are, and thus the reaction is also very positive.

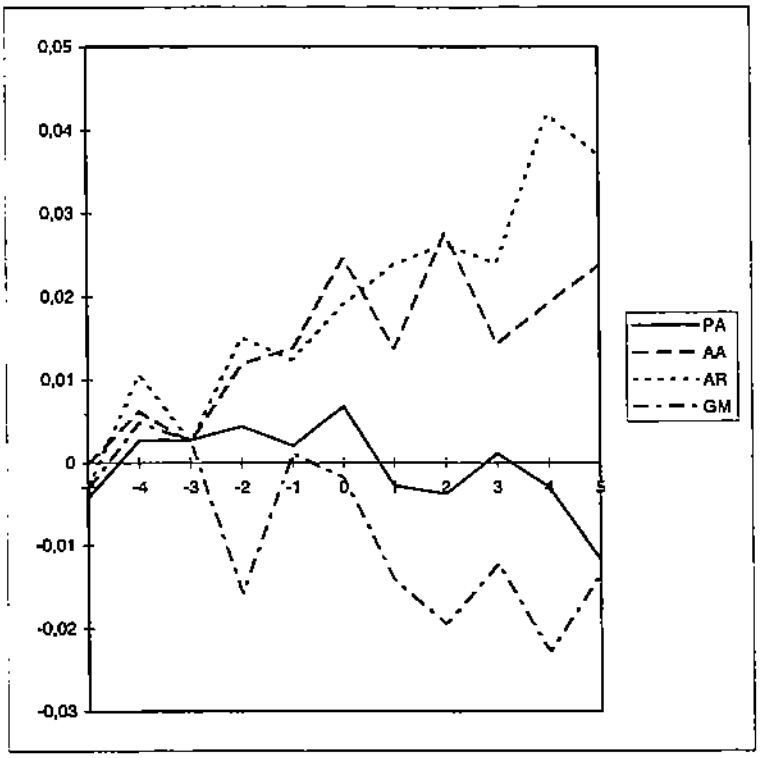

Figure 6. Positive surprise in accounting information. Only firms that have filed preliminary announcement are included. Analysis of average abnormal returns as io Preliminary Announcement (PA), Annual Account (AA), Annual Report (AR) and Annual General meeting (GM) days.

4.4 Concluding remarks

Several empirical studies suggest that financial disclosures of the firm have information content for investors in assessing share prices. This is true both for Preliminary

Announcements, and for Interim (or Quarterly) reports. However, the role of the Annual Accounts and Annual Report for the investors has not been addressed as much. A few papers on Anglo-Saxon markets (USA, UK) have not been able to find much evidence of market reactions to these events. However, in these countries the main purpose of the disclosed (reported) earnings is to give information to the stakeholders. Thus, the disclosed earnings are close enough to the 'true' net income of the firm, unlike in many other countries, where one reason for disclosed earnings is to determine the taxable income. Such countries are Germany, France, Italy, Spain, Sweden or Finland. In such countries, net income can usually be calculated only if the complete Annual Accounts are available, which is usually not the case when the Preliminary Announcement is released. To study this, Finnish data is used. It is found that the Annual Account release date is important in assessing share values in regard of the net income information. This fact should be taken into account in future studies of earnings reactions in non Anglo-Saxon markets.

The Annual General Meeting is another interesting event. It is more important for small investors than for the big ones as regards information, because it may be the only opportunity for small shareholders to get information from the CEOs of the firm directly. Also in this regard Finnish data is important, because there the investment funds are new, very small and play only a minor role in the market, so that the small investors are used to investing directly to individual firms. According to the results, this is also reflected in the market around the Annual General Meeting date.

For further research, it would be important to investigate the volume of trading in different events. Especially around the Annual General Meeting date it might shed light to the hypothesis of small investors reacting to new information. This could be done, for example by studying the relationship of big trades versus small trades in different events.

5. ACCURACY IN MARKETS WITH DIFFERENT FORECASTING ENVIRONMENTS

Several empirical studies suggest that first, there are differences between the analysts' abilities to forecast earnings, and second, that the forecast errors depend on such variables as variability in past earnings, size of firm, or timeliness of forecasts. However, whether there are differences in the abilities of the analysts to forecast earnings in different markets has not been studied, likewise whether these differences (if there are any) are due to differences in the forecasting environment in those markets. Thus, the differences between the analysts' performance on different markets are studied, and second, the role of the abilities of the analysts and forecasting environments are compared.

It is found that the forecast accuracy of the analysts in UK is much better than the accuracy of the analysts in Finland. However, it is also found that this difference can be explained by the more demanding forecasting environment in Finland. After the differences in forecasting environments have been accounted for, there remain no differences in the analysts' accuracy performance between these two markets.

5.1 Hypothesis development and research methodology

In this section, motivation and also previous research are presented. The purpose of this chapter is explained next, likewise the hypothesis. A review of previous literature on analysts' forecasting accuracy can be found in Sections 1.3.1.2 and 1.3.5.

5.1.1 The purpose and hypothesis

As seen above, several empirical studies suggest firstly that there are differences between analysts' abilities to forecast earnings (e.g. Sinha et al. 1993), and secondly, that the

forecast errors depend on such variables as variability in past earnings (Baldwin 1984), size of firm (Patz 1989), or timeliness of forecasts (Brown 1991).

However, whether there are differences between different markets in the variables explaining forecast accuracy has not been studied. For example, Reeb and Baek (1998) found that corporate geographic diversification increases firms' exposure to economic factors, such as currency and political risk, regulatory intervention and turbulence, which increases earnings volatility. Neither are there any studies on the abilities of the analysts in different markets to forecast earnings, although Capstaff, Paudyal and Rees (2001) found that there are differences between the accuracy of earnings forecasts for different European countries.

Thus, the purpose of the chapter is twofold. First, to find out if there are differences between the analysts' performance in different markets, and more specifically, in a market with newly developed analyzing industry (Finland), vs. one with a well-established tradition (UK) in this field. Second, if there are differences in forecasting accuracy between these two markets, to analyze whether there are differences in the abilities of the analysts, or whether they are caused by differences in the forecasting environment (firms and/or markets themselves, such as variability of earnings, timeliness of the forecasts or firm size).

This is done first by studying the differences in the forecast errors between UK and Finnish firms. Second, if differences emerge, a regression is run with correction variables to explain the differences in the forecasting environment in these two countries. Next, the result of this regression is used to calculate the adjusted errors, i.e. errors cleared from the affect of correction variables, which are again compared between these two countries. If there are differences before the correction, but not after it, this would suggest that the differences in the forecasting errors are due to different forecasting environment, not to differences in the abilities of the analysts.

The correction variables and their hypothesized signs are as follows. The coefficient of variability in past earnings should be positive, meaning that the more the earnings change, the harder it is for the analysts to predict future earnings. The coefficient of the timeliness should also be positive, which means that the longer the time elapsing since the forecast was given, the greater the forecast error. The sign of the coefficient of the analysts' following should be negative, meaning that the more analysts there are following a firm, the more accurate the forecasts are.

5.1.2 Methodology

This study ascertain if there are differences between the analysts' performance on a market with a well-established analyzing industry versus another with a newly developed analyzing industry, and if so, the study investigates whether the difference in accuracy performance is caused mainly by differences in the firms and markets themselves, or between the abilities of the analysts. To study this, the analysts' earnings forecasts on a big market, UK, are first compared to forecasts made on a small market, Finland. The error metric chosen is the absolute proportionate forecast error, used in a wide range of studies, such as Brown et al. (1987b) or more recently, Hussain (1997). It is defined as:

$$(48)\quad FE_{it} = | (FEPS_{it} - EPS_{it}) / EPS_{it} |$$

where

FE_{it} = Absolute Proportionate Forecast Error for firm i in year t

$FEPS_{it}$ = Forecasted Earnings Per Share

EPS_{it} = Actual Earnings Per Share.

The other possible deflator, also commonly used in studies on forecast errors, is the forecasted earnings instead of the actual earnings used here. Though Patz (1989) criticizes the use of actual earnings on the grounds of a practical problem of such measures being materially distorted when actual earnings are near zero, he gives no indication why forecasted earnings should not be as close to zero as actual earnings. On the other hand,

Lorek (1979) argues that the use of the forecasted earnings as a base implies measurement of a firm's ability to achieve a predicted result, rather than a predictor's ability to forecast an outcome. This argument seems more important from the perspective of the present study, thus the actual earnings are used as a deflator.

Another possible choice for a deflator would be the market value of the stock (share price), which was strongly recommended by Brown (1996). However, Basi et al. (1976), gives an opposite argument based on the fact that the study is about forecast errors themselves rather than possible uses of the forecasts, such as in forming expectations about future stock prices. Furthermore, as pointed out by Hussain (1997), the use of market value as a deflator would also mean that if two companies had identical actual earnings and forecasted earnings, forecast errors would be lower for the company with larger market value, implying greater accuracy. This cannot be in the interest of a study concerned solely with forecast accuracy.

Whether there are differences between the FE variable on the UK and Finnish markets is studied by using the F-test, as well as the Kruskal-Wallis test for the equality of the means between these countries. These test statistics were chosen because the problem with this kind of data is in the normality of the variables, and these test statistics have been found to be robust and only slightly affected by the lack of normality, as indicated e.g. by Rivera (1991).

If there are deviations from the equality of the means, the next step is to run a regression using the absolute forecasting error as the dependent variable, and three independent variables, namely the absolute value of error in the random walk model (ERW), the number of analysts following (NAF), and the timelines of the forecasts (TML). The variables are defined next.

According to Baldwin (1984), variability in past earnings is an important determinant of forecast accuracy. However, this may not be a good proxy for the uncertainty of future earnings, as noted by Barefield and Comiskey (1975). A measure of the new information

arriving over the forecast period would be better in this respect than a measure of past earnings variability. Such an (ex post) measure is the error in the random walk model, i.e. the change in earnings from year t-1 to t, which is used in this study. It is defined as:

(49) $ERW_{it} = | (EPS_{it} - EPS_{it-1}) / EPS_{it} |$

where

ERW_{it} = Absolute Error in the Random Walk model

EPS_{it} = Actual Earnings Per Share for the firm i in year t.

There is a lot of evidence that the share prices of larger companies convey more information about future earnings than the share prices of smaller companies (Collins et al. 1987), and also that a similar size effect is evident in analysts' earnings forecasts (Patz 1989). The number of analysts following has been found to be positively related to firm size in various empirical studies (Brennan and Hughes 1991), and it has also been shown to affect forecast accuracy directly. In fact, according to Carvell and Strebel (1987), size is a proxy for analyst following rather than the other way round. For this reason, analyst following is used in this study.

The timelines of the forecast (see e.g. Brown 1991, and the literature cited there) refer to number of days elapsing since the most recent forecast was given before year-end. The exact variable used is the average of the three most recent forecasts, which gives a more stable approximation of the timeliness (or recency) than the most recent forecast alone.

For the analysts' earnings forecasts (FEPS), there are numerous different alternatives to the consensus forecasts, which is the average of the forecasts made that year. The one used in here is the average of the three most recent forecasts (relative to year end), which according to Brown (1991) is good in accuracy. Further to this, the three-month period before the year-end average, the three-month period after the year-beginning average, and the most recent forecast before year-end were studied, but the results did not change the conclusions about the differences between the analysts in these two countries.

The regression equation takes the following form:

(50) $FE_{it} = \alpha + \beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it}$

where

FE_{it} = Absolute Forecasting Error

ERW_{it} = Absolute Error in the Random Walk

NAF_{it} = Number of Analysts' Following

TML_{it} = Timelines of the forecast(s) for the firm i in year t

β_n = the parameter estimates, n = 1 to 3.

The model is run using data from the respective countries differently in the research period 1989 to 1995. If the parameter estimates for the ERW, NAF and TML are the same for both countries, the value of the intercept should give the difference in the forecasting errors (in percentage points) between these countries after the control variables have been accounted for.

The results are then verified using a slightly different method. First, the same regression (Equation 50) is run using data only from the estimation period 1989-1990. The results of this regression are then used in the calculation of adjusted errors in years 1991-1995 in the following manner:

(51) $RFE_{it} = FE_{it} - (\beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it})$

where

RFE_{it} = the Adjusted Forecasting Error

FE_{it} = Absolute Forecasting Error

ERW_{it} = Absolute Error in the Random Walk

NAF_{it} = Number of Analysts Following

TML_{it} = Timelines of the forecast(s) for firm i in year t

β_n = the parameter estimates from model 3, n = 1 to 3.

These adjusted earnings forecast errors are again compared between the two countries in order to ascertain whether or the differences are reduced from the non-adjusted errors (Model 48).

5.1.3 Data

Initially, all the UK and Finnish firms in the I/B/E/S International Detail History (November 1996) data files were selected for the study. The quality for inclusion in the analysis, companies had to meet the following conditions: (1) have a December 31 fiscal year-end period, (2) have comparable earnings per share numbers for the preceding year, and (3) have at least 3 analysts' earnings forecasting observations in that fiscal year.

The rationale for the December 31 (fiscal year-end) criterion is that it is not clear what the first real earnings information release date is, especially in the Finnish data, and thus the problem with timeliness of the forecasts is better taken care of. There is a discussion about the information release dates in the Finnish data in Chapter 4. Also, the Report Date in the I/B/E/S data files is not consistent: in the Finnish data, it is sometimes the date of the Preliminary Report (of Annual Earnings), sometimes the date of the Annual Accounts release date, sometimes even the date of the Annual General Meeting, and sometimes even some day after all of these (the actual dates provided by the Helsinki Stock Exchange). For comparability, the UK data is also formed the same way, although it is much more common in UK to have some other accounting period than the calendar year.

The second condition is required, because the forecasting model (random walk model) needs one previous observation. The third condition is needed to calculate the timeliness of the forecasts (the average of the three most recent forecasts). In the study, only the forecasts made during the fiscal year are included. The normality statistics are given in Table 10.

A common procedure in many empirical studies, for example Hussain (1997), or O'Hanlon and Whiddett (1991), is to include only those firms for which both forecasted and reported

earnings numbers are positive. This is done to eliminate (potentially) unusual observations and the need to interpret the percentages of negative numbers. In this study, such elimination would mean that the already small data from the Finnish stock market would be dramatically reduced even further. However, the results of such firms are given for the sake of comparison.

Table 10. Test statistics for the absolute forecasting errors (FE), absolute errors in random walk model (ERW), timeliness of forecasts (TML), number of analysts following (NAF).

	FE	ERW	TML	NAF
Skewness	2.365	1.421	1.499	0.714
Kurtosis	4.854	0.648	2.027	-0.418
Kolmogorov D	0.273***	0.277***	0.149***	0.138***

*** Statistically significant at 0.01 level

Before the analysis, some adjustments to the data were made. Deletion of observations resulted from one reason only. If the actual EPS is very small, i.e. near zero, the EPS forecast error (defined as the error deflated by the actual EPS), as well as the forecast error from the random walk model, tends to be unusually high, even if the difference between forecasted and actual value is relatively small. If the stock price of the firm had been used as a deflator instead of the actual EPS, this would not be a problem. However, there are other considerations in favor of actual EPS, which were discussed above.

For this reason, the forecast error metrics were truncated at the value of 2 (which corresponds to 200 % of error in the forecast). One possible way to reduce the problem described above is to use Theil's (1966) inequality coefficient, U^2, as in e.g. Booth et al. (1997). However, there still remains the problem of having two consecutive earnings

changes near each other, which means that the U^2 inequality coefficient becomes unusually high. However, Theils's U^2 values are presented in Appendix 1.

The same method as in this study has been applied in various earlier studies, see for example Rivera (1991) or Brown et al. (1987). No other deletions of observations were made, even though in many previous empirical studies firms with actual earnings per share less than, say 0.20 currency unit have also been excluded. This was also attempted in this study, but it had no significant affect on the results.

Thus, a total of 2106 UK and 293 Finnish firm-year observations were left to be used in the empirical analysis. The correlation between the variables used in the study, and one variable measuring variation in analysts' earnings forecasts, CV is defined as follows:

(52) $CV_{it} = \sigma_{FE} / MFE_{it}$

where

σ_{FE} = the standard deviation of the analysts' earnings forecasts

MFE_{it} = the mean of the coefficient of the forecasts.

The results are presented in Table 11. The CV variable is not used as a correction variable in the regressions, because it is directly one part of the estimation accuracy. As can be seen from the table, the CV does not seem to be correlated with either timeliness nor analysts following. However, it is weakly correlated with random walk error. All the other variables are correlated as hypothesized, i.e. forecasting error positively with timeliness and random walk error, and negatively with number of analysts following. In addition, all the coefficients in these two countries are at approximately the same level with less than 0.1 percent risk level of being zero. Number of analysts following a firm and timeliness are strongly (negatively) correlated, leaving the incremental information over one and other less significant.

Table 11. Correlation coefficients between absolute forecasting errors (FE), absolute errors in the random walk model (ERW), timeliness of forecasts (TML), number of analysts following (NAF) and variation in analysts' earnings forecasts (CV) in UK and Finland 1989 to1995.

	ERW (prob)	TML (prob)	NAF (prob)	CV (prob)
Panel A: UK				
FE	0.689	0.110	-0.149	0.057
	(0.0001)	(0.0001)	(0.0001)	(0.009)
ERW		0.043	-0.085	0.056
		(0.047)	(0.0001)	(0.009)
TML			-0.646	-0.021
			(0.0001)	(0.338)
NAF				-0.010
				(0.656)
Panel B: Finland				
FE	0.529	0.216	-0.204	0.193
	(0.0001)	(0.0002)	(0.0004)	(0.0009)
ERW		0.063	-0.118	0.123
		(0.281)	(0.044)	(0.036)
TML			-0.618	-0.032
			(0.0001)	(0.585)
NAF				0.025
				(0.675)

The mean and standard deviations of the variables in the UK and Finland in years 1989 to 1995 are presented in Table 12. In this table it can be seen that the mean of the forecast error in Finland is higher than in UK (56.4 vs 25.8 percent), but so is the error in the random walk model (90.8 vs 48.2). The same goes for timelines, but for number of analysts following, it is higher in UK.

All the data, including actual earnings per share, are from the same source, namely I/B/E/S data files. This fact would be even more important if association along with accuracy were studied. Studies using the same sources of forecasts and actuals, e.g. Brown and Kim (1991), have found predictive ability and association to be two sides of the same coin. On the other hand, studies using different sources of forecasts and actuals, e.g. Hughes and Ricks (1987), have found the opposite, i.e. that more accurate earnings surprises do not

generate earnings surprises which are more highly correlated with contemporary abnormal returns.

Table 12. Mean and standard deviation of variables in UK and Finland 1989 to 1995.

	UK			Finland			F-stat
	Mean	Median	Std	Mean	Median	Std	
FE	0.258	0.071	0.460	0.564	0.324	0.589	105.780 ***
ERW	0.482	0.214	0.601	0.908	0.765	0.688	123.952 ***
TML	58.802	41.667	54.502	79.388	58.667	62.061	35.414 ***
NAF	9.270	8.000	6.317	6.249	4.000	6.301	58.856 ***
AF	14.537	13.600	109.107	4.928	3.277	18.064	2.263
EPS	14.624	12.900	17.706	3.481	2.970	13.406	106.646 ***
NFY	31.929	23.000	27.717	18.351	9.000	20.905	65.149 ***
CV	0.409	0.093	5.766	1.413	0.337	6.413	8.707 ***
REC	0.340	0.176	0.403	0.645	0.530	0.463	141.504 ***

The variables are the following: Absolute value of forecasting error (FE), absolute errors in the random walk model (ERW), timeliness of forecasts (TML), number of analysts following (NAF), analysts' forecast (AF), earnings per share (EPS), in which the values of less than -100 or more than 100 have been deleted in this table, number of forecasts per year (NFY), variation in analysts' earnings forecasts (CV), and amount of correction (REC). The last column gives the F-test statistic of difference between the mean values for the UK and Finland. According to the Kruskal-Wallis test (not shown), all differences (including AF) are statistically significant at 0.01 level. *** statistically significant at 0.01 level.

5.2 Empirical results

First, whether there are differences between analysts of the UK and Finland is studied. The UK is a big stock market with a well-established analyzing industry, and Finland a small one with newly developed analyzing industry. This comparison is done by studying the absolute proportionate forecast error, FE between the two countries. Table 3 presents the results. The mean for the UK firms' forecast errors is 25.8 percent, whereas for the Finnish firms it is as much as 56.4 percent. The difference between these two is as much as 30.6

percentage points. According to both F and Chi-square tests the difference between these two is statistically highly significant. Also, the standard deviation for Finland is little higher, 0.52 vs. 0.46 in the UK.

Table 13. Analysts' forecast errors (FE) in UK and Finland in 1989 to 1995.

Year	UK (std dev)	Finland (std dev)	F value (prob)	X^2 (prob)	Nobs UK Nobs Finland
All years	0.258 (0.460)	0.564 (0.588)	105.780*** (0.0001)	174.33*** (0.0001)	2106 293
1995	0.178 (0.374)	0.413 (0.523)	22.391*** (0.0001)	37.811*** (0.0001)	314 71
1994	0.177 (0.345)	0.483 (0.575)	37.659*** (0.0001)	44.260*** (0.0001)	321 50
1993	0.293 (0.480)	0.545 (0.592)	11.819*** (0.0006)	20.156*** (0.0001)	328 42
1992	0.351 (0.518)	0.620 (0.512)	10.960*** (0.0010)	24.582*** (0.0001)	300 36
1991	0.395 (0.583)	0.586 (0.540)	3.983** (0.047)	13.820*** (0.0002)	282 38
1990	0.353 (0.556)	0.998 (0.735)	47.853*** (0.0001)	43.938*** (0.0001)	278 43
1989	0.222 (0.454)	0.623 (0.598)	35.106*** (0.0001)	53.076*** (0.0001)	283 13

The model used: $FE_{it} = | (EPS_{it} - FEPS_{it}) / EPS_{it} |$, where EPS_{it} = Actual Earnings Per Share, and $FEPS_{it}$ = Forecasted Earnings Per Share for firm i in year t. The F-test, as well as the Kruskal-Wallis test, is used for testing the equality of the means between the forecast errors in these countries. Nobs refers to the number of observations.

** Statistically significant at 0.05 level

*** Statistically significant at 0.01 level

The same conclusion can be drawn from the yearly data analysis. Only in 1991 is the difference between the two countries slightly less significant according to the F-test, the risk-level being 4.67 percent with F-value 3.983. Also, 1991 seems to be different from other years in Finland, with a mean forecast error of almost one. This is due to the fact that in that year the Finnish economy fell into serious economic difficulties, which led to the

devaluation of the Finnish currency. The result of this was extreme changes in firms' earnings in that year, which made forecasting more difficult than usual. This can be seen in the standard deviation of Finnish forecasts, which is also much higher in that year.

The great differences between the forecast accuracy of Finnish and British firms may originate from two sources. First, it may be that the analysts who analyze Finnish firms are not as competent as the analysts of British firms. Second, the explanation may be that the economic environment in Finland is more problematic than in the UK. If the latter is the case, these differences should diminish after the control variables have been accounted for.

This affect of other variables is studied next, by running a regression on the Forecasting Error (FE) with three explanatory variables found to explain the analysts' forecasting accuracy in previous studies (see e.g. Brown 1993). These variables are the change in the EPS from the previous year (ERW), number of analysts following (NAF) and timelines of the forecast (TML). The results are given in Table 14.

The possibility of multicollinearity exists because of a correlation coefficient of –0.64 between TML and NAF. This level of correlation does not usually cause problems. However, the possibility has been tested using Variance Inflation factors. No exact limits are available, but Myers (1990) states, "... it is generally believed that if any VIF exceeds 10, there is reason for at least some concern; then one should consider variable deletion ...". However, according to Judge, Hill, Griffits, Lütkepohl and Lee (1988), a value of 5.0 or more is used by some as an indication of severe multicollinearity.

All the parameter estimates have the same signs in these countries, and all of them are as expected. The coefficient of the ERW is positive, meaning that the higher the change in EPS from previous year, the harder it is for the analysts' to predict the (future) EPS. The coefficient of the TML is also positive, which means that the longer the more time elapsing since the forecast was given, the higher the forecast error. As expected, the sign of the NAF coefficient is negative, meaning that the more analysts there are following a firm, the more accurate the forecasts are.

Table 14. Results of the regression model to explain forecast errors in UK and Finland 1989 to 1995.

Year	Country	Intercept (t-value)	ERW (t-value)	TML (t-value)	NAF (t-value)	R-square	Nobs
All years	UK	0.032 (1.250)	0.522*** (22.804)	0.00032* (1.600)	-0.00483*** (-3.214)	0.484	2106
	Finland	0.077 (0.951)	0.439*** (8.688)	0.00146** (2.338)	-0.00452 (-0.927)	0.315	293
1995	UK	0.038 (0.596)	0.429*** (5.401)	0.00023 (0.323)	-0.00442 (-1.580)	0.435	314
	Finland	-0.07565 (-0.444)	0.397*** (4.119)	0.00333* (1.724)	-0.00218 (-0.320)	0.406	71
1994	UK	0.015 (0.313)	0.401*** (5.599)	0.00053 (1.455)	-0.00413* (-1.741)	0.400	321
	Finland	0.262 (1.494)	0.296*** (2.800)	0.00035 (0.167)	-0.01637 (-1.540)	0.265	50
1993	UK	0.155** (2.129)	0.440*** (8.033)	-0.00024 (-0.416)	-0.01158*** (-2.725)	0.395	328
	Finland	0.273 (1.123)	0.369*** (3.008)	-0.00009 (-0.037)	-0.00818 (-0.498)	0.188	42
1992	UK	0.039 (0.503)	0.485*** (9.419)	0.00043 (0.621)	-0.00246 (-0.505)	0.433	300
	Finland	0.763** (2.227)	0.238* (1.920)	-0.00278 (-1.403)	-0.03909 (-1.428)	0.185	36
1991	UK	-0.094 (-1.209)	0.570*** (11.431)	0.00111* (1.751)	0.00326 (0.646)	0.503	282
	Finland	-0.610 (-1.589)	0.417*** (3.892)	0.00458** (2.181)	0.07919** (2.206)	0.349	38
1990	UK	0.033 (0.518)	0.611*** (11.881)	0.00051 (1.361)	-0.00763 (-1.523)	0.589	278
	Finland	-0.220 (-0.641)	0.596*** (4.758)	0.00283* (1.900)	0.03756 (1.099)	0.393	43
1989	UK	-0.007 (-0.133)	0.702*** (12.288)	0.00012 (0.290)	-0.00284 (-0.786)	0.609	283
	Finland	-1.049 (-1.720)	0.465* (2.052)	-0.00017 (-0.045)	0.24463** (2.887)	0.627	13

The model used: $FE_{it} = \alpha + \beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it}$, where FE_{it} = Absolute Forecasting Error, ERW_{it} = Absolute Error in random walk, NAF_{it} = Number of Analysts Following, TML_{it} = Timelines of forecast(s) for the firm i in year t, and β_n = parameter estimates, n = 1 to 3. Nobs refers to number of observations. The t-values in parantheses are calculated using the heteroscedasticity-consistent covariance matrix in regressions where heteroskedasticity is a problem according to White's (1980) X^2 test. According to Variance Inflation, multicollinearity is not a problem, since the highest figures for the UK are 2.095 for TML and 2.092 for NAF in 1989, all the rest being less than 2.0, and for Finland 3.589 and 3.560 in 1991, 3.491and 3.601 in 1992, correspondingly, all the rest being less than 2.0. * statistically significant at 0.10 level, ** statistically significant at 0.05 level, *** statistically significant at 0.01 level.

For some reason, in Finland the coefficient of the NAF is not significant. This may be caused by first, the correlation between the timeliness and the analysts' following, and second, the fact that there is a time delay between the creation of a forecast and its first appearance in the IBES data. However, in years 1989 and 1991 the coefficient was positive, which explains the fact that in average the NAF is not significant. The reason for positive coefficients is probably the depression in the economy, which hit the big exporting companies the most. These are also the firms that were most closely followed by analysts.

However, it seems that these variables explain the variation in forecast errors approximately the same way (same sign and same magnitude) in both countries, which makes it possible to compare the intercepts in these models in order to draw conclusions about the forecast errors. In Finland, the intercept is 7.7 percent, whereas in the UK it is 3.2 percent. If they were statistically significant, it would mean a difference of 4.5 percent points in forecasting errors, whereas before the correction it was 30.2 percentage points (Table 3). However, in a statistical sense, after the correction both of these intercepts are zero: in Finland, the risk level of the intercept not being zero is 39.2 percent, and in UK it is 18.4 percent. Thus, the difference has diminished from 30.2 percentage points to zero.

Table 15. The OLS results from the two-year estimation period.

	Intercept	β_1	β_2	β_3	R^2
Period 1989-1990	-0.031 (-0.708)	0.659*** (17.898)	0.001*** (2.604)	-0.003 (-0.889)	0.600
Variance Inflation	0	1.022	1.780	1.799	

The model $FE_{it} = \alpha + \beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it}$ is run 1989-1990. FE_{it} = Absolute Forecasting Error, ERW_{it} = Absolute Error in the Random Walk, NAF_{it} = Number of Analysts Following, TML_{it} = Timelines of the forecast(s) for the firm i in year t, and β_n = parameter estimates, n = 1 to 3. Variance Inflation stands for a test for multicollinearity. The t-values in parantheses are calculated using the heteroscedasticity-consistent covariance matrix because of White's (1980) X^2 test value of 81.51, which is statistically significant. According to Variance Inflation, multicollinearity is not a problem. * statistically significant at 0.10 level, ** statistically significant at 0.05 level, *** statistically significant at 0.01 level.

This analysis suggests that there are no differences between the accuracy of the analysts forecasting Finnish firms' earnings and of those forecasting UK firms' earnings, if the means of these forecasts are considered. (Or at least this difference is very small compared to differences before the control variables have been accounted for).

The yearly analysis of the results reveals that the intercept is not zero in one year in both countries; in 1993 in UK and in 1992 in Finland. Also, it can be seen that there is considerable variation between years in both countries.

Table 16. Analysts' Adjusted Forecast Errors (RFE) in the UK and Finland 1991 to 1995.

Year	UK (std dev)	Finland (std dev)	F value (prob)	X^2 (prob)	Nobs UK Nobs Finland
All	-0.096	-0.124	1.205	0.462	1545
years	(0.351)	(0.488)	(0.272)	(0.497)	237
1995	-0.084	-0.112	0.492	0.020	314
	(0.261)	(0.451)	(0.484)	(0.886)	71
1994	-0.117	-0.184	1.891	1.525	321
	(0.289)	(0.471)	(0.170)	(0.217)	50
1993	-0.111	-0.120	0.019	0.003	328
	(0.393)	(0.613)	(0.891)	(0.955)	42
1992	-0.081	-0.074	0.011	0.010	300
	(0.391)	(0.456)	(0.918)	(0.922)	36
1991	-0.083	-0.122	0.294	0.181	282
	(0.406)	(0.471)	(0.588)	(0.670)	38

The following model is first run during the estimation period 1989 to 1990: $FE_{it} = \alpha + \beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it}$, where FE_{it} = Absolute Forecasting Error, ERW_{it} = Absolute Error in random walk, NAF_{it} = Number of Analysts Following, TML_{it} = Timelines of forecast(s) for the firm i in year t, and β_n = parameter estimates, n = 1 to 3. Thus, the adjusted forecasting errors in 1991 to 1995 are $RFE_{it} = FE_{it} - (\beta_1 ERW_{it} + \beta_2 NAF_{it} + \beta_3 TML_{it})$, where β:s are the parameter estimates from the previous model. Nobs refers to number of observations.

Next, the adjusted errors were calculated using the parameter estimates from model 3 for the period 1991 to 1995 using a two-year estimation period of 1989 to 1990. The

estimated parameters are given in Table 15. As can be seen, the incremental contribution of TML and NAF is very small, TML being statistically zero. For theoretical reasons, they are not excluded from the model.

Finally, the results for adjusted errors are given in Table 16. For the UK, the adjusted error in analysts' earnings forecasts is -9.6 percent and for Finland -12.4 percent. The negative sign in these metrics does not necessarily mean negative bias in analysts' forecasts, but merely the relationship between the correction variables in estimation period vs. research period. The difference between these two, 2.8 percentage points is not statistically significant according to either F-test (1.205) or Chi-square (0.462), whereas the difference before the correction, 30.2 (Table 12) was clearly significant. This suggests strongly that after the correction variables have been accounted for, there are no differences between the abilities of the analysts in forecasting firms earnings for Finnish vs. British firms, but the more difficult forecasting environment in Finland results in better earnings forecasts for British firms.

5.3 Concluding remarks

In this chapter, possible differences between the analysts of a big stock market with a well-established analyzing industry, the UK, and a small one with a newly developed analyzing industry, that of Finland were studied. This was done by comparing the absolute proportionate forecast error, FE, between the two countries. The mean for the British firms' forecast errors is 25.8 percent, whereas for the Finnish firms' it is as much as 56.4 percent. The difference between these two is statistically significant. The source of the difference may be in the ability of the analysts, or in the forecasting environment. This was studied next, by running a regression on the Forecasting Error with three explanatory variables, change in the EPS from the previous year, number of analysts following and timelines of the forecast.

The parameter estimates have the same signs in both countries, and all of them are as expected. The analysis suggests that there are no differences between the accuracy of the

analysts forecasting Finnish firms' earnings and of those forecasting UK firms' earnings, if the mean of these forecasts is considered, or at least this difference is minimal compared to differences before the control variables have been accounted for.

The adjusted errors were calculated from the estimation period of years 1989 to 1990 in years 1991 to 1995. The difference in the adjusted error in analysts' earnings forecasts was 2.8 percentage points, which is not statistically significant according to either test statistic used. This strongly suggests that after the correction variables have been accounted for, there are no differences between the abilities of the analysts in Finland vs. UK, but the more difficult forecasting environment in Finland results in better earnings forecasts for UK firms.

In short, this study finds that the forecast accuracy of the analysts in UK is, or seems to be, much better than the accuracy of the analysts in Finland, but this difference can be explained by the more demanding forecasting environment in the smaller market. After these differences have been accounted for, there remain very few, if any, differences in the analysts' accuracy performance. In the future, the numerous ways to improve analysts' earnings forecasts found in previous studies might be worth taking in consideration, to study if there are differences between markets in these variables.

6. FORECAST ACCURACY AND POSITIVE VS. NEGATIVE EARNINGS CHANGES

Despite intensive research on the accuracy of analysts' earnings forecasts, there still remains considerable disagreement regarding many aspects of these forecasts. For example, whether analysts' forecasts are more or less accurate than forecasts by time-series models, whether the errors increase or decrease over time, whether there is an optimistic or pessimistic bias, if any, and whether there is over- or under-reaction to previous earnings changes.

The purpose of this chapter is to investigate these issues and suggest an explanation for the contradictions. The explanation is based on the empirical finding that the forecasts are more accurate for firms with increasing earnings compared to firms with decreasing earnings. All of these questions are investigated during each month of the year for which the forecast is made. The firms are divided into two sub-portfolios according to the sign of their earnings change from the previous year.

6.1 Hypothesis development and research methodology

The key factor in share appraisal methods is the predicted price-earnings ratio (Arnold, Moizer and Noreen 1984), which involves forecasts of future earnings. Thus the accuracy of earnings forecasts is a crucial point for investment practitioners in portfolio decisions. The increasing number of analysts employed by the investment industry also speaks for the demand for accurate earnings forecasts. This situation has provided a fertile ground for academic research assessing the accuracy and other properties of analysts' forecasts. Furthermore, there are various studies that use the assumption of analysts' forecasts as a reliable indicator of market expectations, in research on share price reaction to unexpected earnings information. This research is briefly reviewed next, a more complete review is presented in Chapter 1.3.

6.1.1 Background

The accuracy of analyst' earnings forecasts has been under intensive investigation in the empirical literature during several decades, see e.g. Duru and Reeb (2002) and the literature cited there. The forecast error has been compared to alternative forecasts (time-series models) as well as to actual outcomes. The earlier research has found analysts not to be more accurate than time series models (e.g. Cragg and Malkiel 1968), but most recent studies have found analysts to be more accurate. For example, Brown and Rozeff (1978) responded to others by presenting "overwhelming" evidence of the superiority of analysts' forecasts, arguing that the earlier research was based on inappropriate parametric tests and contained experimental data. This superiority is true even for the more sophisticated time-series models, as shown by Lee and Chen (1990).

However, Dreman and Barry (1995) argue that analysts' earnings forecasts are less accurate than forecasts by time-series models. They even postulate that the analysts' forecasts are too large to be reliably used by investors, and further that the errors increase over time. Similar results can be found in UK, where Capstaff et al. (1995) cast considerable doubt on the rationality of forecasts. On the other hand, Brown (1996a) postulates that analysts are more accurate and that the forecast errors have decreased over time, and are in fact absent in recent years. Brown also argues that using an appropriate benchmark, namely the stock price, the analysts' forecast errors are reasonable (within 3 percent).

Analysts' superiority over time-series forecasts is not the only open question in the literature. A related dilemma can also be found in the research on forecast bias. It refers to the empirical finding that analysts continuously estimate earnings too high (positive bias) or too low (negative bias) compared to actual earnings. There is more evidence in favor of analysts' earnings forecasts being overly optimistic, as first shown by Fried and Givoly (1982), and later by many others, e.g. De Bondt and Thaler (1990), Dreman and Berry (1995), Capstaff, Paydyal and Rees (2001) or Duru and Reeb (2002).

However, Brown (1996a and 1997) argued that analysts' earnings forecasts are significantly pessimistically biased. He gives three primary reasons for the pessimism bias. First, institutional pressures by firm managers in order to boost analysts' expectations have reversed. Second, hard-to-quantify productivity growth has increased companies' profitability. Third, analysts have underestimated the impact of globalization on boosting firms' corporate profits.

Another open question is whether analysts systematically under- or over-react to the (imminent) earnings information. The latter is the case in e.g. De Bondt and Thaler (1990), according to whom analysts over-react to extreme earnings. This is in line with their earlier evidence of stock market overreaction to new information (De Bondt and Thaler 1985). The same kind of conclusions can also be found in Patz (1989), Capstaff et al. (1995), Hussain (1996) or Capstaff et al. (2001). Other studies have reported contrary evidence. For example, Klein (1990), and also O'Hanlon and Whiddett (1991), Mendenhall (1991), Abarbanell and Bernard (1992) and Ali, Klein and Rosenfeld (1992) show that analysts under-react to earnings announcements.

6.1.2 Hypothesis

Despite intensive research on analysts' earnings forecasts during the recent decades, there still remains considerable disagreement about their rationality. Even the question about whether the analysts' forecasts are 'reasonably good' for use in investment decisions has not yet reached consensus, let alone the details of the matter.

As seen in the previous section, several empirical studies suggest that analysts' earnings forecasts are less accurate than forecasts by time-series models, whereas (most of the other) studies present evidence to the contrary. Furthermore, some papers show that the errors are increasing over time, whereas others show that the errors are decreasing and have actually disappeared in recent years. Second, many papers show that there is an optimistic bias, whereas several others show that the bias is pessimistic. Some papers even postulate that there is no (at least statistically significant) bias. Third, there are likewise a

few papers suggesting that analysts over-react to previous earnings changes, whereas others present evidence that the analysts under-react.

The main purpose of this chapter is to explain these contradictions. It is based on the empirical finding that the forecasts are more accurate for firms with increasing earnings compared to those with decreasing earnings. Thus, it is hypothesized that there are differences between such firms in, first, analysts' accuracy in relation to a time series model, second, forecasts' bias, and third, over- or under-reaction to earnings changes. If this is indeed the case, it is further hypothesized that the changing amount of negative earnings change (NEC) vs. positive earnings change (PEC) firms in different years can explain changes in the above questions. In other words, the reason for the conflicting evidence in earlier research is that it is much easier to forecasts PEC firms' earnings than NEC firms' earnings, thus the amount of NEC vs. PEC firms in different years can explain the inconsistent results.

This is done first bu studying the forecast errors per se through Theil's inequality coefficient, and also the mean, median and standard deviations of the forecast errors. A regression model is then employed to investigate the bias and over/under-reaction hypothesis. All the questions will be investigated separately during each month of the year for which the forecast is made in order to control for the timelines of the forecast.

The main contribution is in explaining the reason for completely different results in the empirical literature about analysts' forecast accuracy (and whether it is increasing or decreasing over time), as well as bias and over- or under-reactions. Minor contributions are the following. First, the occurrence of differences in accuracies of analysts' forecasts compared to time series models between negative and positive earnings change firms is studied. Second, possible differences in biases between these groups are identified, and third, differences in over/under-reaction are scrutinized. Fourth, changes in these differences within the fiscal year are investigated.

6.2 Methodology and data

In this section, Theil's inequality coefficient U^2 is presented, likewise the regression models used in the data analysis. This chapter uses UK data, which is also presented.

6.2.1 Methodology

First, the analysts' earnings forecast accuracy in relation to the random walk model is investigated. The models are compared by calculating the Theil's inequality coefficient, U^2, as in Chrichfield, Dyckman and Lakonishok (1978). The coefficient is:

$$(53)\quad U_t^2 = \frac{\sum_{i=1}^{n} \left(\frac{FEPS_{it} - EPS_{i,t-1}}{|EPS_{i,t-1}|} - \frac{EPS_{it} - EPS_{i,t-1}}{|EPS_{i,t-1}|} \right)^2}{\sum_{i=1}^{n} \left(\frac{EPS_{i,t-1} - EPS_{i,t-2}}{|EPS_{i,t-2}|} - \frac{EPS_{it} - EPS_{i,t-1}}{|EPS_{i,t-1}|} \right)^2}$$

where

$FEPS_{it}$ = Forecasted earnings per share for firm i in year t

EPS_{it} = Actual earnings per share for firm i in year t.

If all forecasts are perfect, the coefficient equals zero. If it is one, the analysts are exactly as good as naive forecasts, and if it is greater than one, the analysts would have been better off using the naive forecast, i.e. random walk with drift. The model assumes the earnings to grow at the same speed this year as they did in the two years preceding it.

All the firms are investigated together first. This is in accordance with earlier studies in this field. After this, the firms are divided into two portfolios according to the sign in change in actual earnings from last year to current year, i.e. $EPS_t - EPS_{t-1}$, so that there are firms with positive earnings change, PEC, in one portfolio, and negative earnings change,

NEC, in the other. All the analyses are done for each subgroup separately, in order to find out if there are differences in the forecastability of earnings between these sub-groups.

The analysts' forecast accuracy is also investigated by calculating the mean, median and standard deviations of the forecast errors. This is done by deflating the forecast errors by current earnings. The absolute proportionate Forecast Error |FE|, used in various studies, was also calculated for the mean and median. However, the results will not be presented because the conclusions did not differ from those presented. The proportionate forecast error is:

(54) $FE_{it} = (FEPS_{it} - EPS_{it}) / |EPS_{it}|$

where

FE_{it} = Forecast Error for firm i in year t

$FEPS_{it}$ = Forecasted Earnings Per Share for firm i in year t

EPS_{it} = Actual Earnings Per Share for firm i in year t.

The use and problems of using actual EPS as the deflator are discussed in Section 3.2. The data also includes firms with accounting losses, while in some empirical papers, loss firms have been excluded from the data. This has been done because the relevance of negative earnings is questionable, since investors view negative earnings only as transitory and expect earnings reversal, and because of the existence of an abandonment option (see e.g. Garcia-Ayuso, Monterry and Pineda 1997 or Sin and Watts 2000). Thus, a possible connection between the above findings and the loss firm explanation is investigated by excluding such observations.

Next, the bias and over/under-reaction hypotheses are studied using the same method as in De Bondt and Thaler (1990). Thus, the following regression is implied (subscript i omitted):

(55) $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \varepsilon_t$

A rational forecast would require that the $\alpha = 0$ and $\beta = 1$. If the intercept is not zero, it suggests a bias in the forecast. If it is less than zero, it means that the forecasts are on average overly optimistic, and, conversely, greater than zero suggests a pessimistic bias. The β coefficient concerns the overreaction hypothesis. If it is exactly one, it means that there is neither over- nor under-reaction to actual earnings in analysts' forecasts. If β is less than one, the forecasted changes in EPS are overly extreme. A β greater than one suggests that analysts are too conservative in their forecasts, i.e. there is under-reaction.

The effect of the timeliness of the forecast is controlled for by adding shift (a to k) and slope (l to v) dummy variables for each month but the last:

$$(56)\quad EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + aD11 + bD10 + \ldots + kD1 + lD11(FEPS_t - EPS_{t-1}) + nD10(FEPS_t - EPS_{t-1}) + \ldots + vD1(FEPS_t - EPS_{t-1}) + \varepsilon_t,$$

where D11 is one if the observation is from month 11, and otherwise zero, D10 is one if it is month 10, and zero otherwise, etc.

The division of observations into two portfolios is done in the same manner as before, i.e. according to change in actual earnings from previous year, using dummy variables. The following formula is therefore used:

$$(57)\quad EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + \varepsilon_t,$$

where DUM = 0, if $(EPS_t - EPS_{t-1}) > 0$, and -1 otherwise. The coefficient α gives the bias of PEC firms; a value greater than zero suggests a pessimistic bias. The coefficient γ is the difference between PEC and NEC firms' intercepts, and if $(\alpha - \gamma)$ is less than zero, it suggests an optimistic bias for NEC firms. Similarly, coefficient β gives the overreaction for PEC firms, so that a coefficient less than one suggest overreaction. Again, δ gives the difference between PEC and NEC firms' coefficients, and if $(\beta - \delta)$ is less than one, there is under-reaction.

Again, the timelines is controlled for by adding dummy variables to the above model:

$$(58)\quad EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + aD11 + bD10 + \ldots + kD1 + lD11(FEPS_t - EPS_{t-1}) + nD10(FEPS_t - EPS_{t-1}) + \ldots + vD1(FEPS_t - EPS_{t-1}) + \varepsilon_t,$$

where D11 is one if the observation is from month 11, and otherwise zero, etc. Because we are interested in intercepts and coefficients of PEC and NEC firms in each month, the results are also given separately for every month, i.e. Model 57 is run for each month separately. The results of these regressions are given in Appendix 2.

If the evidence shows that there is over/under-reaction, the possibility of them being over/under-reaction to *prior* year's earnings changes is investigated next. This is done by regressing realized earnings changes against forecasted earnings changes:

$$(59)\quad EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$$

In this model, if FEPS were an efficient forecast, β would be zero. An estimate greater than zero suggests under-reaction to the prior year's earnings change, while less than zero is indicative of overreaction.

Different months are again studied by adding dummy variables to the above model:

$$(60)\quad EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + aD11 + bD10 + \ldots + kD1 + lD11(EPS_{t-1} - EPS_{t-2}) + nD10(EPS_{t-1} - EPS_{t-2}) + \ldots + vD1(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t,$$

where D11 is one if the observation is from month 11, and otherwise zero, etc.

The division of observations into two portfolios is done in the same manner as earlier, i.e. according to change in actual earnings from previous year, using dummy variables:

(61) $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$,

where DUM = 0, if $(EPS_t - EPS_{t-1}) > 0$, and otherwise -1. The coefficient β refers to PEC firms, and difference between β and γ refers to NEC firms.

The different months are studied by adding dummy variables to the above model:

(62) $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) +$
$aD11 + bD10 + \ldots + kD1 + lD11(EPS_{t-1} - EPS_{t-2}) + nD10(EPS_{t-1} - EPS_{t-2}) +$
$\ldots + vD1(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$,

where D11 is one, if the observation is from month 11, and otherwise zero, etc. These results are also given separately for each month in Appendix 4, Table 28, using Model (61). Further, Model (61) and Model (62) are estimated using the change in previous year's earnings as dummy variable, thus DUM = 0, if $(EPS_{t-1} - EPS_{t-2}) > 0$, and otherwise -1.

Finally, the effect of number of NEC vs. PEC firms on bias is studied by adding an SNEC variable to Model 55. The SNEC gives the proportion of NEC firms of all the firms. Thus, the model is:

(63) $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma SNEC + \varepsilon_t$,

where SNEC is the number of NEC firms divided by all firms.

6.2.2 Data

Initially, all the UK firms between 1988 and 1999 in the I/B/E/S International Detail History data file dated 5/2001 were selected for the study. To qualify for inclusion in the analysis, companies had to have comparable earnings per share numbers for at least two preceding years, because the forecasting model used in Theil's inequality coefficient U^2

demands two previous observations. Only the forecasts released during the fiscal year for the same fiscal year are included in the study. A common procedure in many empirical studies, for example Hussain (1997) or O'Hanlon and Whiddett (1991), is to include only those firms for which both forecasted and reported earnings numbers are positive. This was done to eliminate (potential) unusual observations and the need to interpret the percentages of negative numbers. The effect of this is also studied here.

Before the analysis, some adjustments to the data were made, however. Deletion of observations was done for two reasons. First, there were two firms with extreme observations in some years. Caird decreased earnings per share from 30.30 in 1992 to minus 3765.15 in 1993, and increased it next year to minus 128.78. No 1995 data for EPS were available. These years were deleted completely. Richemont UTS has two forecasts of over 6000 for EPS in 1998, given May 13th (6620.00) and July 30th (6734.00), whereas the actual EPS was 137.57. Other forecasts for that company were in line with the actual earnings during the year. The two observations were deleted. The Cook's distances for the above observations were between 6.770 and 626.512. All the remaining Cook's distances are less than 0.170. As a further check for outliers, every firm-year observation with a Cook's value over 0.02 in any month of that year was deleted. The results remained practically the same, i.e. the conclusions remained the same, and are thus not reported.

Second, if the actual EPS is very small, i.e. near zero, the EPS forecast error (defined as the error deflated by the actual EPS), as well as the forecast error from the random walk model, tends to be unusually high, even if the difference between forecasted and actual value is relatively small. If the stock price of the firm had been used as a deflator instead of the actual EPS, this would not be a problem. However, there are other things in favor of actual EPS, which were discussed earlier.

To calculate the means of the U^2's a mechanical outlier deletion rule was applied. First, all the firm-year observations with earnings per share less than ± 0.1 in current or two previous years were deleted. There were 434 such observations out of the total of 70.864 observations. The removal of such observations is in accordance to most empirical studies

in this field, see e.g. Capstaff et al. (1995). Elimination is important; for example Abarbanell and Lehavy (2000a) found that forecast data providers' procedures to exclude items from reported earnings are only applied to about a half of the sample, having effects that are primarily concentrated on the extreme negative information tail of the distribution of forecast errors. After the deletion, a total of 70.430 firm-month observations from 1691 different firms were left. Second, if the numerator of Model (53) was more than 100 times the denominator, it was assigned a value of 100 multiplied by the denominator. Third, in calculating the averages, all the numerators were added up and their sum calculated, which was then divided by the sum of all denominators. Without this the averages were at worst tens of thousands. The results calculated using these three outlier deletion methods are presented in Appendix 2, Table 25a, and without mechanical outlier deletion in Table 25b. These problems can also be avoided by calculating the median of the U^2, which is used in this chapter.

For the same reason as above, in calculating the mean and median of the Forecast Errors presented in Tables 17 and 18, if the deflator in Model (54) is less than one, it is assigned a value of one. Similarly, when using regression models, observations with absolute value of dependent or independent variables greater than 100 were deleted, i.e. if earnings change from the previous year or difference between forecasted and realized earnings was greater than one hundred pounds or less than minus one hundred pounds. This is in line with previous research, which has usually eliminated those variables that are for example more than 100 % of the denominator, see e.g. Easterwood and Nutt (1999) or Capstaff et al. (2001). However, greater changes may be genuine and not data errors, although they are more probably caused by transient factors. Thus, the results without these mechanical observation deletions are given in Appendix 5.

All the data, including actual earnings per share, are from the same vendor, namely I/B/E/S International Inc. This is important since different vendors define forecasted and actual earnings numbers differently, and thus mixing data introduces error (Philbrick and Ricks 1991), potentially making analysts' earnings forecast errors appear larger than they actually are (Brown 1997).

6.3 Empirical results

First, in Table 17, the accuracy of the analysts' forecasts, i.e. forecast error, is studied using the Theil's U^2, as well as the mean, median and standard deviation of forecast error. The first panel presents results obtained by using all firms in the analysis. According to the median U^2, analysts' accuracy is better than those of the naive model (random walk with drift) already at the beginning of the accounting year for which the forecast is made. The accuracy improves during the year, from 0.578 in the first month of the accounting year to 0.063 in the last month of the same year. At the same time, the mean of the forecast error is reduced from 0.613 to 0.127, as well as the median from 0.047 to -0.010. According to the t-value, the mean is greater than zero for each month. The standard deviation during the year diminishes to less than one fourth, from 4.963 to 1.190. This suggests that the consensus among analysts also increases during the year.

The same analysis was also done yearly, but due to considerations of space the results are not given here. However, there are differences between the years. For example, the only time period when the median of U^2 was greater than one was during the first two months of 1991. Also, years 1990 and 1992 appear to be years of relatively poor earnings forecasts.

Next, the data is divided into two sub-samples according to the (ex post) sign in the change in earnings from previous year, i.e. negative (NEC) and positive (PEC) earnings change firms. According to the U^2, if the earnings decrease, the analysts' forecasts are less accurate than the forecast of the naive model in the first two months of the year. Only after that can the analysts beat the random walk model. This is in sharp contrast to the forecasts for PEC firms. Even at the beginning of the year, the U^2 for them is as low as 0.262. For both groups, the U^2 decreases throughout the year, but more slowly for PEC firms, so that in the last month, the accuracy of the groups is almost identical. According to the mean of the U^2 (Appendix 2, Table 25) the differences are even greater: the analysts are not able to beat the random walk model for NEC firms until the last four months of the year.

Table 17. Median of Theil's U^2, also median, mean, standard deviation and t-value (of mean = 0) of the Forecast Errors in 1988-1999 monthly.

Month	Nobs	Theil U^2	Median FE	Mean FE	Std FE	t-val
All firms						
12	4969	0.06282	-0.01002	0.12679	1.19040	7.514***
11	5650	0.08029	0.00000	0.19902	1.46392	10.228***
10	6618	0.09532	0.00000	0.22131	1.51213	11.919***
9	6626	0.11545	0.00209	0.22862	1.46452	12.720***
8	5661	0.17867	0.01413	0.31755	1.95128	12.257***
7	5606	0.24617	0.01978	0.35680	2.22976	11.987***
6	5587	0.29262	0.02631	0.42983	2.73173	11.767***
5	6421	0.32656	0.03278	0.44613	2.77424	12.898***
4	7171	0.38176	0.03448	0.46536	3.02959	13.022***
3	6139	0.40361	0.02952	0.51579	3.59514	11.250***
2	5084	0.50407	0.04113	0.55106	3.93471	9.990***
1	5337	0.57804	0.04682	0.61265	4.96342	9.024***
NEC						
12	1863	0.06170	0.05000	0.36278	1.84230	8.503***
11	2088	0.11038	0.10427	0.52158	2.26579	10.528***
10	2408	0.15871	0.14293	0.61189	2.39215	12.562***
9	2340	0.22275	0.17391	0.65309	2.33269	13.551***
8	2071	0.33560	0.24270	0.81772	2.63896	14.118***
7	2067	0.46608	0.29091	0.94658	3.51196	12.259***
6	2056	0.61072	0.33945	1.12580	4.30042	11.879***
5	2311	0.77129	0.40361	1.21562	4.43329	13.195***
4	2557	0.87212	0.44697	1.25926	4.88133	13.055***
3	2097	0.93448	0.44017	1.40811	5.73763	11.243***
2	1828	1.11829	0.47417	1.43599	6.35515	9.660***
1	1922	1.25796	0.53161	1.60203	8.02371	8.757***
PEC						
12	3106	0.06357	-0.02465	-0.01459	0.42422	-1.918
11	3562	0.06664	-0.02381	0.00994	0.54239	1.095
10	4210	0.06537	-0.02151	-0.00188	0.43254	-0.283
9	4286	0.07726	-0.02247	-0.00282	0.44305	-0.418
8	3590	0.10846	-0.02235	0.02888	1.32640	1.305
7	3539	0.14275	-0.02612	0.01239	0.59422	1.241
6	3531	0.14602	-0.02350	0.02434	0.76936	1.880
5	4110	0.15346	-0.02465	0.01326	0.67249	1.264
4	4614	0.17443	-0.02505	0.02585	0.72785	2.415*
3	4042	0.18663	-0.02806	0.05332	1.39314	2.435*
2	3256	0.23603	-0.03130	0.05500	0.91837	3.419***
1	3415	0.26160	-0.03189	0.05638	1.20073	2.746**

Forecast error $FE_t = FEPS_t - EPS_t / |EPS_t|$. NEC refers to the Negative Earnings Change firms and PEC to the Positive Earnings Change firms, Nobs is the number of observations. * statistically significant at 0.05 level, ** statistically significant at 0.01 level, *** statistically significant at 0.001 level.

The median of the forecast error for all firms in aggregate is quite low already in the beginning of the year and decreases further during the year, so that it is negative in the last month. The median of the NEC firms' forecast error is many times higher than that of all firms. However, it diminishes much more during the year, from 0.532 at the beginning of the year to 0.050 at the end. The median is completely different for the PEC firms, for which it is, first of all, negative, and even more importantly, almost exactly the same during the whole year! Positive mean and median imply that the forecast is too large compared to actual earnings, and negative values suggest too small forecasts.

The same phenomenon is evident when the mean of the forecast error is analyzed. For all firms, it is reduced substantially during the year. For NEC firms, it diminishes from 1.602 to 0.363, and for PEC firms, it only falls from 0.056 to -0.015. However, statistically the mean is zero for PEC firms from month five to twelve, whereas for NEC firms it is greater than zero every month. The standard deviation is also much higher for the NEC firms, although it is reduced in the course of the year in a similar manner for both groups. The mean is also presented separately for PEC and NEC firms in Figure 7, yearly and monthly (the data is given in Table 26 in Appendix 3). It is clearly visible from this figure that forecasts for PEC firms are much better than forecasts for NEC firms.

The results above include all firms, also those with losses (negative earnings). However, the relevance of negative earnings is questionable, since investors view negative earnings as only transitory and expect earnings reversal, and because of the existence of an abandonment option (Hayn 1995). For such firms, book value appears to be the most significant determinant of the market value of the firm according to Garcia-Ayuso et al. (1997). Thus, we also investigated here whether the findings shown above are connected to this phenomenon. In Table 18, all the firms with losses in the event year have been deleted. We also found what happens if the firms with losses either in the event year or the two preceding years were deleted; the results remained almost identical to those presented here. All the U^2's, medians, means and standard deviations are slightly lower, but they decrease in a similar manner as in the case of all firms. The most notable difference is that now the

mean of the analysts' forecasts for PEC firms is already statistically zero at the beginning of the year.

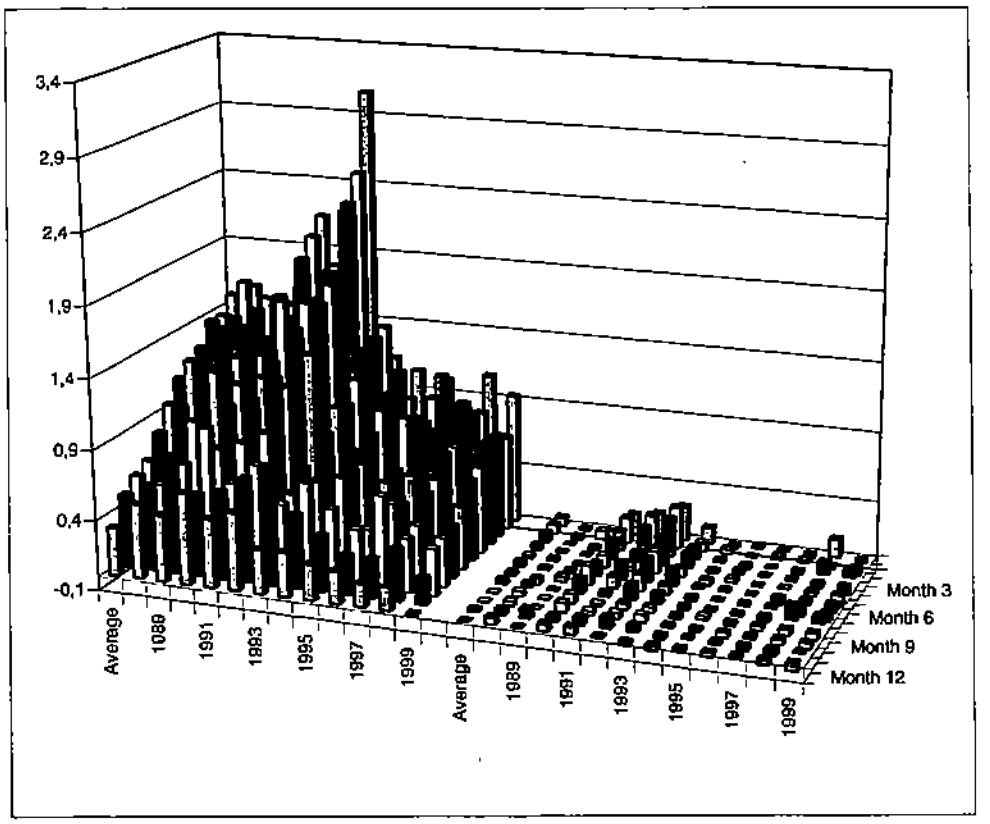

Figure 7. Mean of forecast error 1988-1999 yearly and monthly. NEC firms on the left, and PEC firms on the right.

Next, the bias and overreaction hypotheses are studied. This is done by utilizing, first, Regression Model (55). The results are given in Table 19 (and in Table 27, Appendix 4, which also gives the bias and over-reaction for different groups each month). First, forecasts are overly optimistic, as shown by a negative intercept –1.608, which is statistically significantly different from zero. Second, forecasted changes in EPS are too extreme, i.e. there is over-reaction. This can be seen from the beta coefficient 0.821, which is statistically less than one.

In Model (56), monthly shift and slope dummies have been added. For example, coefficient a added to α gives the intercept in month 11, which is –0.998 etc. Intercept α gives directly the value of intercept in the last month of the accounting year. The coefficient increases with the month, although not monotonically: the highest value is in month 4. All the coefficients are significantly different from zero. Similarly, the slope dummies are used for different months. Coefficient β gives the value in month 12, coefficient 1 added to that (=0.938) gives the value in month two etc. In the last four months the coefficients (with coefficient β) are statistically one, i.e. there is no over/under-reaction. Months 8 and 7 are statistically not different from zero, but together with coefficient β different from one with a risk level of 0.05. Prior to this, i.e. during months 1 to 6, there is over-reaction, which increases towards the beginning of the accounting year.

Next, the firms are divided into two portfolios according to change in earnings. This is done by using Model (57). The situation is now different; for PEC firms, the intercept 1.760 is positive, meaning that there is a pessimistic bias. The coefficient β is less than one, suggesting that there is an over-reaction. For NEC firms, the intercept $(\alpha - \gamma)$ is negative –7.070, which means that there is an optimistic bias, and a coefficient $(\beta - \delta)$ equal to 0.512 means that there is an over-reaction, as in PEC firms, although for NEC firms it is much stronger than for PEC firms.

Finally, in Table 19, monthly differences are considered for NEC and PEC firms separately by utilizing Model (58). For PEC firms, there is pessimistic bias in every month, and the differences between months are relatively small (2.226 in month one to 1.604 in month twelve). For NEC firms, there is an optimistic bias which is much higher than the pessimistic bias for PEC firms. Also, the variation during the year is greater (from -7.606 in month 1 to -2.519 in month 12).

Table 18. Median of Theil's U^2, also median, mean, standard deviation and t-value (of mean = 0) of the Forecast Errors 1988-1999 monthly. Only firms with positive earnings in the event year included.

Month	Nobs	Theil U^2	Median FE	Mean FE	Std FE	t-val
All firms						
12	4645	0.05860	-0.01337	0.06349	0.98896	4.379**
11	5210	0.07291	-0.00670	0.10728	1.12395	6.894***
10	6136	0.08610	-0.00363	0.13404	1.33669	7.862***
9	6174	0.10281	-0.00113	0.14779	1.37578	8.448***
8	5259	0.16052	0.00493	0.21118	1.88531	8.130***
7	5179	0.22162	0.00846	0.21306	1.51300	10.137***
6	5157	0.26297	0.01456	0.25967	1.87930	9.926***
5	5958	0.29345	0.01993	0.28155	1.88148	11.558***
4	6627	0.33628	0.02070	0.29934	1.94884	12.516***
3	5716	0.35944	0.01597	0.34469	2.40562	10.840***
2	4714	0.45057	0.02538	0.34997	2.29021	10.497***
1	4934	0.51336	0.02901	0.38974	2.52752	10.838***
NEC						
12	1607	0.04517	0.03268	0.22168	1.59754	5.566***
11	1741	0.08063	0.06704	0.33794	1.80363	7.820***
10	2030	0.12382	0.10300	0.44159	2.23358	8.909***
9	1990	0.16910	0.13053	0.48936	2.32630	9.386***
8	1749	0.27744	0.18484	0.60486	2.64733	9.560***
7	1734	0.38512	0.22539	0.65669	2.47791	11.035***
6	1730	0.51775	0.26364	0.78519	3.04905	10.714***
5	1947	0.68630	0.31672	0.88035	3.10009	12.533***
4	2120	0.77024	0.33912	0.92984	3.24180	13.212***
3	1772	0.83194	0.35915	1.05394	3.75780	11.806***
2	1543	0.97506	0.37070	1.03584	3.77772	10.770***
1	1602	1.17779	0.37933	1.14054	4.01413	11.372***
PEC						
12	3038	0.06530	-0.02533	-0.02010	0.35584	-3.117**
11	3469	0.07056	-0.02500	-0.00832	0.47610	-1.030
10	4106	0.06758	-0.02237	-0.01768	0.37175	-3.050**
9	4184	0.08079	-0.02344	-0.01433	0.37668	-2.464*
8	3510	0.11267	-0.02327	0.01519	1.31175	0.686
7	3445	0.14602	-0.02727	-0.00998	0.45345	-1.292
6	3427	0.15440	-0.02516	-0.00555	0.64383	-0.504
5	4011	0.15805	-0.02637	-0.00876	0.58333	-0.951
4	4507	0.17940	-0.02659	0.00320	0.61072	0.352
3	3944	0.19095	-0.03000	0.02667	1.31378	1.276
2	3171	0.24924	-0.03297	0.01676	0.72340	1.305
1	3332	0.26925	-0.03425	0.02951	1.15136	1.481

Forecast error $FE_t = FEPS_t - EPS_t / | EPS_t |$. NEC refers to Negative Earnings Change firms and PEC to Positive Earnings Change firms, Nobs is the number of observations. * Statistically significant at 0.05 level, ** statistically significant at 0.01 level, *** statistically significant at 0.001 level.

Table 19. Bias and under/over-reaction to earnings changes in 1988-1999. Number of observations 70393.

	Model 55 Parameter	STD	Model 56 Parameter	STD	Model 57 Parameter	STD	Model 58 Parameter	STD
Est of α	-1.608***	0.041	-0.503***	0.097	1.760***	0.061	2.402***	0.125
Est of β	0.821***	0.012	0.961	0.034	0.732***	0.014	0.858***	0.038
Est of γ					8.830***	0.095	8.611***	0.095
Est of δ					0.220***	0.025	0.232***	0.026
Est of a			-0.494***	0.149			-0.396***	0.151
Est of b			-0.601***	0.144			-0.454***	0.145
Est of c			-0.734***	0.141			-0.570***	0.145
Est of d			-1.156***	0.179			-0.811***	0.174
Est of e			-1.379***	0.161			-0.915***	0.161
Est of f			-1.326***	0.196			-0.822***	0.190
Est of g			-1.254***	0.194			-0.775***	0.184
Est of h			-1.444***	0.164			-0.921***	0.166
Est of i			-1.137***	0.203			-0.815***	0.196
Est of j			-0.869***	0.209			-0.435**	0.202
Est of k			-1.093***	0.194			-0.624***	0.192
Est of l			-0.023	0.049			-0.027	0.048
Est of m			-0.033	0.051			-0.034	0.048
Est of n			0.010	0.044			-0.010	0.043
Est of o			-0.061	0.058			-0.066	0.054
Est of p			-0.033	0.049			-0.042	0.047
Est of q			-0.150**	0.059			-0.131*	0.057
Est of r			-0.234***	0.062			-0.197***	0.056
Est of s			-0.171***	0.051			-0.144**	0.050
Est of t			-0.323***	0.060			-0.255***	0.057
Est of u			-0.410***	0.060			-0.316***	0.057
Est of v			-0.427***	0.057			-0.331***	0.054
R^2	0.367		0.381		0.511		0.518	
F Value	40670***		1882***		24476**		30297***	

Column headings as follows: Model (55): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \varepsilon_t$, Model (56): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + aD11 + bD10 + \ldots + kD1 + lD11(FEPS_t - EPS_{t-1}) + nD10(FEPS_t - EPS_{t-1}) + \ldots + vD1(FEPS_t - EPS_{t-1}) + \varepsilon_t$, Model (57): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + \varepsilon_t$, Model (58): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + aD11 + bD10 + \ldots + kD1 + lD11(FEPS_t - EPS_{t-1}) + nD10(FEPS_t - EPS_{t-1}) + \ldots + vD1(FEPS_t - EPS_{t-1}) + \varepsilon_t$. The significance level according to t-statistic: * Statistically significant at 0.05 level, ** statistically significant at 0.01 level, *** statistically significant at 0.001 level. The asterisks by the coefficients l to u stand for testing against zero.

The situation is quite similar regarding over/under-reaction. For PEC firms, there is relatively stable, but diminishing over-reaction during the year (0.633 in month 1, 0.774 in

month 12). For NEC firms, there is much greater over-reaction at the beginning of the year, but it decreases to zero during the year, i.e. from -0.056 in month one to 0.981 in month twelve, which is not statistically different from one.

The evidence in Table 19 therefore shows the following. First, the forecasts seem to be clearly optimistic. However, this is true in aggregate level; forecasts are optimistic only for PEC firms, for NEC firms they are pessimistic. Because there are more PEC firms, the average of all firms also shows an optimistic bias. Second, there is an over-reaction to earnings changes in analysts' earnings forecasts. This over-reaction is much higher for NEC firms early in the year, but it decreases so that at year-end the situation is the opposite. In fact, at the end of the year, for NEC firms there is neither over- nor under-reaction.

Next, the question of whether the above described over- and under-reactions are over- or under-reactions to prior years earnings changes is investigated. This is done using Models (59) to (62). The results are presented in Table 20 (and in Table 28, Appendix 4).

In Model (59) the forecasting error is regressed on the prior year's change in earnings. The β coefficient is statistically greater than zero, suggesting that the analysts under-react to the prior year's earnings change, e.g. the greater the change in the previous year's earnings, the smaller are the forecasted earnings compared to realized earnings. In Model (60), the monthly dummies have been added. The under-reaction is evident only in the first half of the year, decreasing finally statistically to zero. These results are intuitively understandable, since prior year's earnings change has the greatest effect at the beginning of the year.

Next, positive and negative earnings change firms are classified in Model (61). The results indicate an under-reaction in both firm types, but the under-reaction is approximately twice as big for NEC firms as for PEC firms. Finally, the monthly changes for different firm types are again studied according to Model (62). There is an under-reaction, mostly at the beginning of the year, and it is stronger for NEC firms than for PEC firms.

Table 20. Over/under-reaction to prior changes in earnings 1988-1999. Portfolio formation according to change in earnings (EPS_t - EPS_{t-1}). Number of observations 70219.

	Model 59 Parameter	STD	Model 60 Parameter	STD	Model 61 Parameter	STD	Model 62 Parameter	STD
α	-2.011***	0.033	-0.637***	0.097	0.595***	0.024	2.535***	0.102
β	0.060***	0.006	0.039***	0.007	0.043***	0.005	-0.007***	0.005
γ					7.046***	0.074	8.250***	0.088
δ					-0.045***	0.017	-0.078***	0.016
a			-0.534***	0.147			-0.368*	0.149
b			-0.642***	0.141			-0.475**	0.145
c			-0.696***	0.147			-0.539***	0.151
d			-1.187***	0.173			-0.929***	0.173
e			-1.256***	0.170			-0.926***	0.162
f			-1.380***	0.198			-1.054***	0.198
g			-1.359***	0.188			-1.118***	0.185
h			-1.406***	0.188			-1.180***	0.187
i			-1.107***	0.177			-1.045***	0.165
j			-1.214***	0.241			-1.068***	0.237
k			-1.086***	0.196			-0.942***	0.183
l			0.005	0.035			-0.193***	0.034
m			0.021	0.032			-0.173***	0.032
n			0.012	0.048			-0.197***	0.036
o			-0.041	0.063			-0.222***	0.046
p			-0.073	0.061			-0.253***	0.040
q			-0.110	0.082			-0.268***	0.053
r			-0.160*	0.075			-0.299***	0.047
s			-0.158***	0.048			-0.294***	0.048
t			-0.306***	0.041			-0.418***	0.038
u			-0.296***	0.056			-0.385***	0.056
v			-0.402***	0.044			-0.485***	0.041
R^2	0.007		0.037				0.227	
F Value	463.81***		117.30***				823.48***	

Column headings as follows: Model (59): EPS_t - $FEPS_t = \alpha + \beta(FEPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, Model (60): EPS_t - $FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + aD11 + bD10 + \ldots + kD1 + lD11(EPS_{t-1} - EPS_{t-2}) + nD10(EPS_{t-1} - EPS_{t-2}) + \ldots + vD1(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, Model (61): EPS_t - $FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, Model (62): EPS_t - $FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + aD11 + bD10 + \ldots + kD1 + lD11(EPS_{t-1} - EPS_{t-2}) + nD10(EPS_{t-1} - EPS_{t-2}) + \ldots + vD1(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$. Dummy variable DUM = 0, if ($EPS_t - EPS_{t-1}$) > 0 and otherwise zero. Significance level according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level. The asterisks by the coefficients l to u stand for testing against zero.

Table 21. Over/under-reaction to prior changes in earnings 1988-1999. Portfolio formation according to change in earnings (EPS_{t-1} - EPS_{t-2}). Number of observations 70219.

	Model 61		Model 62	
	Parameter	STD	Parameter	STD
α	-0.881***	0.056	0.359***	0.107
β	-0.093***	0.012	-0.081***	0.012
γ	1.189***	0.095	1.298***	0.095
δ	-0.218***	0.015	-0.163***	0.017
a			-0.537***	0.145
b			-0.662***	0.139
c			-0.734***	0.146
d			-1.241***	0.169
e			-1.331***	0.168
f			-1.443***	0.194
g			-1.450***	0.185
h			-1.529***	0.184
i			-1.247***	0.175
j			-1.290***	0.235
k			-1.213***	0.195
l			0.017	0.035
m			0.037	0.031
n			0.031	0.034
o			-0.016	0.046
p			-0.041	0.045
q			-0.084	0.053
r			-0.126**	0.047
s			-0.120*	0.047
t			-0.265***	0.041
u			-0.262***	0.055
v			-0.363***	0.044
R^2	0.026		0.049	
F Value	614.28***		145.25***	

Column headings as follows: Model (61): EPS_t - $FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \epsilon_t$, Model (62): EPS_t - $FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + aD11 + bD10 + \ldots + kD1 + lD11(EPS_{t-1} - EPS_{t-2}) + nD10(EPS_{t-1} - EPS_{t-2}) + \ldots + vD1(EPS_{t-1} - EPS_{t-2}) + \epsilon_t$. Dummy variable DUM = 0, if ($EPS_t - EPS_{t-1}$) > 0 and otherwise zero. Significance level according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level. The asterisks by the coefficients l to u stand for testing against zero.

Finally, in Table 21 (and Table 29 in Appendix 4), the portfolios are formed according to change in prior earnings, i.e. $EPS_{t-1} - EPS_{t-2}$, whereas they were earlier divided according to the change in actual earnings, $EPS_t - EPS_{t-1}$. Now there is an over-reaction instead of under-reaction also for PEC firms. Moreover, changes across different months are greater, shown by the decrease in dummy coefficients during the year. The slope dummy is significant only during the first four months. This suggests that previous year's earnings changes do not affect over-reaction later in the year.

Table 22. Number of all observations (N All), number of negative earnings change firms (N NEC) and their percentage share, median of Theil's inequality coefficient (U^2), mean of forecast error (FE) and mean of actual earnings (AE).

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
N All	1467	4462	5785	6065	6220	6535	6261	6306	6747	6970	7194	6971
N NEC	278	1288	2904	3990	3141	2109	1240	1766	2130	1890	2569	2334
%	19.0	28.9	50.2	65.8	50.5	32.4	19.8	28.0	31.6	27.1	35.7	33.5
U2	0.010	0.119	0.394	0.428	0.322	0.190	0.154	0.228	0.177	0.186	0.233	0.230
FE	0.204	0.324	0.638	0.868	0.750	0.517	0.181	0.216	0.187	0.163	0.236	0.155
AE	25.318	24.541	17.009	7.174	7.272	12.534	16.706	20.440	20.012	20.125	19.543	20.834

The conclusion of the above is that the results are completely different for the two different firm classes. Thus the number of NEC vs. PEC firms should affect the results in a certain research period as to whether there is positive or negative bias in aggregate level. Table 22 gives the yearly number of observations, NEC firms' proportion of observations, Theil's U^2, average Forecast Error and average Actual Earnings. The proportion of NEC firms has varied from 19.0 % to 65.8 %. The differences are so great that they clearly affect the results when different periods are compared, which can already be seen from the high correlation of 0.889 between the proportion of NEC firms and yearly mean of the FE. Also, whenever the proportion of NEC firms increases, the mean FE increases, and vice versa. The correlation coefficient between the two differences is 0.933. The respective

correlations between the proportion of NEC firms and U^2 are 0.946 for levels and 0,504 for differences.

This relationship is studied by adding an SNEC variable to the Model (55), which is given in Model (63). SNEC is the number of NEC firms divided by all observations. Table 23 gives the results. The variable SNEC is clearly significant every month (only months one and twelve are given in the table), although the coefficient is smaller at the end of the year.

Table 23. Effect of NEC firms' proportion of all observations on the regression model during the first and last months of the accounting year.

Month	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	F Value	R^2
Last Month	4637	-0.524*** (0.090)	0.986 (0.023)		11380***	0.711
	4637	1.814*** (0.279)	0.970 (0.023)	-0.063*** (0.008)	5841***	0.716
First Month	4963	-1.604*** (0.171)	0.528*** (0.046)		791***	0.137
	4963	5.298*** (0.454)	0.530*** (0.046)	-0.188*** (0.013)	565***	0.185

Column headings as follows: Month corresponds to month of the accounting year. Number of observations (Nobs), Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes: $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma SNEC + \varepsilon_t$, F value and R-square. The significance level according to t-statistic: * statistically significant at 0.05 level, ** statistically significant at 0.01 level, *** statistically significant at 0.001 level.

This has a clear affect on the results of various empirical studies. For example, if the years in this study are divided into sub-periods, the results may appear completely different. If the first month of the year is studied 1989 – 1993 there was an optimistic bias (the intercept of the Model 55 is –3.68 with Standard Deviation of 0.276), whereas in 1994 – 1997 there was a pessimistic bias (0.608 and 0.279). Again, in 1998 – 1999 there was an optimistic bias (-1.245 and 0.348). What is most important is that in the first period, there

were approximately twice as many NEC firms as PEC firms compared to second period, whereas in the last period, the number of NEC firms again increased. Thus, it is difficult to say whether forecasts have become better or worse in recent years, unless the share of NEC firms is accounted for. However, the beta coefficient is less than one for every year, as well as in each sub-period. Thus, the result that the forecasted changes in EPS are overly extreme, seems to be quite robust.

This explains for the most part the fact that in recent years forecast accuracy has been increasing, as suggested in Brown (1996a). Brown used US data in his study, but the relationship of NEC and PEC firms developed in a similar manner there. Furthermore, if there were no NEC firms or their amount relative to PEC firms were sufficiently low, the bias would be negative each year, which explains in part the empirical finding in some papers that in the recent years there has been a pessimistic bias.

Thus, the number of firms with increasing earnings in relation to firms with decreasing earnings should always be considered before drawing any conclusions about whether forecast accuracy is increasing or decreasing over the years.

6.4 Concluding remarks

First, the accuracy of analysts' forecasts was studied. It was found that analysts are more accurate than the random walk model when all the firms are analyzed together, except at the beginning of 1991. When firms with negative earnings changes (NEC) and positive earnings changes (PEC) are analyzed separately, it was seen that analysts are unable to beat the random walk model for NEC firms in the first two months of the accounting year for which the forecast is made. For PEC firms, the analysts are clearly already superior in the first month. The accuracy improves during the year in aggregate level. This is mostly due to the improvement in the forecasts for NEC firms.

Next, it was found that in aggregate level there is an optimism bias in analysts' earnings forecasts. Also, it was found that there is over-reaction, i.e. forecasts are too extreme.

During the year, both bias and over-reaction decrease, so that there is no over-reaction at the end of the year. The optimistic bias is evident only for NEC firms. For the PEC firms there is rather a pessimism bias, even though of a lesser magnitude compared to NEC firms. Both biases exist for the whole year. However, the over-reaction for PEC firms exists for the whole year, but the (much higher) over-reaction for NEC firms decreases to zero at the end of the year.

Finally, it was found that the forecasts (on aggregate level) deteriorated from 1988 to 1991, after which they improved until 1994. After that they improved in 1995, deteriorated in 1996 and 1997, again improved in the next year and deteriorated again in 1999. On the other hand, the number of NEC firms increased from 1988 to 1991, decreased in the three following years, etc., exactly opposite to the proportion of NEC firms. After this is taken into account, the accuracy of analysts earnings forecasts cannot be said to be increasing or decreasing over years. This seems to be the most important factor explaining the increase in forecast accuracy in recent years.

These results show that problems with earnings forecasting are concentrated on the NEC firms, and the empirical results of whether analysts are better than time series-models and whether there is negative or positive bias and over- or under-reaction, are dependent on the number of NEC vs. PEC firms in the research period. This is one important explanation for disparate results in various empirical papers in this field.

7. CONCLUSIONS AND IMPLICATIONS

The thesis investigated first the reflection of information content of earnings in the stock prices in a country where taxation plays an important role in determining the disclosed earnings. Second, it compared the analysts' earnings forecast accuracy in such a country with those on an Anglo-Saxon market. Third, it explained the dilemma in the financial literature as to whether analysts' accuracy has been improving or not over the years, whether there is positive or negative bias, and whether there is over- or under-reaction, if any, to previous earnings changes.

This study is relevant to investors, analysts, corporations and legislators as well as researchers. Investors will benefit from understanding the consequences of different information content on different types of markets, which is becoming more and more important with the need for international diversification. Also, they will benefit from understanding the role and motives of analysts on the market, and how analysts forecast earnings and with success. Analysts may benefit from realizing better what the reasons behind unsuccessful forecasts are, and how they can be improved. Corporations will benefit from understanding the informational needs of (disparate) markets and how the stock price of their company is affected by the information they release. Corporations will also benefit from knowing the role and motives of analysts on the market. Legislators will also benefit from understanding the informational needs of markets and the role of analysts in it, in order to improve the allocational efficiency of the market by new and improved legislation.

There were three main research hypotheses in the thesis. First, that the role of Annual Accounts and Annual Report are important in Finnish stock market (unlike in Anglo-Saxon markets), second, that the difference in analysts' forecast accuracy between markets can be explained by forecasting environments in those markets, and third, that the question in the financial literature whether analysts' accuracy has been improving or not over the years, whether there is positive or negative bias, and whether there is over- or under-

reaction, if any, to previous earnings changes could be explained by the relation of positive and negative earnings change firms in the sample.

Each of the main research hypotheses was supported by the empirical evidence. In Finland, the Annual Account release date is important in assessing share values regarding net income information. This fact should be taken into account in future studies on earnings reactions in markets where taxation plays an important role in determining disclosed earnings. Also, the Annual General Meeting is important regarding earnings information. For further research, it would be important to investigate the volume of trade around different events. Especially around the Annual General Meeting date it might shed light on the hypothesis of small investors reacting to new information. This could be done, for example, by studying the relationship of big trades versus small trades around different events.

Next, it was found that there are differences between the analysts' performance in a big stock market with a well-established analyzing industry, and a small one with a newly developed analyzing industry. However, even though the forecast accuracy of the analysts in UK is, or seems to be, much better than the accuracy of the analysts in Finland, this difference can be explained by the more demanding forecasting environment on the smaller market.

Finally, it was found that analysts are usually more accurate than the random walk model. However, analysts are unable to beat the random walk model for negative earnings change firms at the beginning of the accounting year (for which the forecast is made). The accuracy improves during the year. For other firms, as well as negative earnings change firms later in the year, analysts are superior. After the changing relation of negative and positive earnings change firms is taken into account, the accuracy of analysts cannot be said to be increasing or decreasing over the years. This seems to be the most important factor explaining the increase in forecast accuracy in recent years. Regarding the complete sample, there is an optimism bias in analysts' earnings forecasts. However, this bias is evident only for negative earnings change firms. For the positive earnings change firms,

there is a pessimism bias. Also, there is over-reaction in forecasts, but for the negative earnings change firms it is much greater. These results show that problems with earnings forecasting are concentrated on negative earnings change firms, and the empirical results of whether analysts are better than time-series models and whether there is negative or positive bias and over- or under-reaction, are dependent on the number of negative vs. positive earnings change firms in the research period. This is one important explanation for disparate results in various empirical papers in this field, and should be accounted for in empirical research.

REFERENCES

Abarbanell, J. & V. Bernard (1992). Tests of analysts' overreaction/underreaction to earnings information as an explanation for anomalous stock price behavior. *Journal of Finance* 47:3, 1181–1207.

Abarbanell, J. & R. Lehavy (2000a). Differences in commercial database reported earnings: implications for inferences in research on analysts forecast rationality, earnings management and earnings response coefficients. Unpublished manuscript, July, University of North Carolina.

Abarbanell, J. & R. Lehavy (2000b). Biased forecasts or biased earnings? The role of earnings management in explaining apparent optimism and inefficiency in analysts' earnings forecasts. Unpublished manuscript, July, University of North Carolina.

Abdel-khalik, A. Rashad & B. B. Ajinkya (1982). Returns to informational advantages: The case of analysts' forecast revisions. *Accounting Review* 57:4, 661–680.

Aalto, A. (1993). Talouselämä-lehden suuryritystietokanta Etlassa. The research institute of the Finnish economy, *ETLA*, No. 441.

Acker, D., J. Horton & I. Tonks (2002). Accounting standards and analysts' forecasts: the impact of FRS3 on analysts' ability to forecast EPS. *Journal of Accounting and Public Policy* 21:3, 193–217.

Albrecth, W., L. Lookabill & J. McKeown (1977). The time series properties of annual earnings. *Journal of Accounting Research* 15, 226–244.

Alexander, J. & J. Ang (1992). Do security markets respond to earnings paths? A case for low-balling. Unpublished manuscript.

Ali, A., A. Klein & J. Rosenfeld (1992). Analysts' use of information about permanent and transitory earnings components in forecasting annual EPS. *The Accounting Review* 67, 183–198.

Arbel, A. (1985). Gereric Stocks: An old product in a new package. *Journal of Portfolio Management* 11:4, 4–13.

Arbel, A. & P. Strebel (1982). The neglected and small firm effects. *Financial Review* 17:4, 201–218.

Arnold, J., P. Moizer & E. Noreen (1984). Investment appraisal methods of financial analysts: A comparative study of US and UK practices. *The International Journal of Accounting*, Spring, 1–18.

Arnott, R. (1985). The use and misuse of consensus earnings. *Journal of Portfolio Management* 11:3, 18–27.

Ashbaugh, H. & M. Pincus (2001). Domestic accounting standards, international accounting standards, and predictability of earnings. *Journal of Accounting Research* 39:3, 417–434.

Baber, W., J.-D. Kim & K. Kumar (1999). On the use of intra-industry information to improve earnings forecasts. *Journal of Business Finance & Accounting* 26:9, 1177–1198.

Baldwin, B. (1984). Segment earnings disclosure and the ability of security analysts to forecast earnings per share. *Accounting Review*, July, 376–389.

Ball, R. (1992). The earnings-price anomaly. *Journal of Accounting and Economics* 15, 319–345.

Ball, R. (1994). The development, accomplishments and limitations of the theory of stock market efficiency. *Managerial Finance* 20:2/3, 3–48.

Ball, R. & P. Brown (1967). Some preliminary findings on the association between the earnings of a firm, its industry and the economy. Empirical Research in Accounting: Selected Studies. *Supplement to Journal of Accounting Research* 5, 55–77.

Ball, R. & P. Brown (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6, 159–178.

Ball, R. & S. P. Kothari (1994). *Financial Statement Analysis*. McGraw–Hill series in advanced topics in finance and accounting.

Ball, R., S. P. Kothari & R. Watts (1990). Economic determinants of the relation between earnings changes and stock returns. Working paper, University of Rochester, December.

Ball, R. & R. Watts (1972). Some time series properties of accounting income. *Journal of Finance* 27, 663–681.

Barefield, R. & E. Comiskey (1975). The association of forecast error with other risk measures. *Journal of Business Finance and Accounting* 2, 315–325.

Barron, O. E. & P. S. Stuerke (1998). Dispersion in analysts' earnings forecasts as a measure of uncertainty. *Journal of Accounting, Auditing and Finance* 13:3, Summer, 245–270.

Barth, M., W. Beaver & W. Landsman (1998). Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting & Economics* 25:1, 1–34.

Barth, M., R. Kasznik & M. McNichols (2001). Analyst coverage and intangible assets. *Journal of Accounting Research* 39:1, June.

Bartley, J. & A. Cameron (1991). Long-run earnings forecasts by managers and financial analysts. *Journal of Business Finance & Accounting* 1, 21–41.

Bartov, E. (1992). Patterns in unexpected earnings as an explanation for post-announcement drift. *The Accounting Review* 67:3, 610–622.

Bartov, E., D. Givoly & C. Hayn (2002). The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33, 173–204.

Basi, B., K. Carey & R. Twark (1976). A comparison of the accuracy of corporate and security analyst forecasts of earnings. *Accounting Review*, April, 244–254.

Bathke, A. & K. Lorek (1984). The relationship between time-series models and the security market's expectation of quarterly earnings. *The Accounting Review*, 163–76.

Bauman, Scott W., S. Datta & M. E. Iskandar-Datta (1995). Investment analyst recommendations: A test of the "Announcement effect" and "The valuable information effect". *Journal of Business Finance and Accounting* 22:5, July, 659–670.

Beard, C. G & R. S. Sias (1997). Is there a neglected-firm effect? *Financial Analysts Journal*, September/October, 19–23.

Beaver, W. & R. Dukes (1972). Interperiod tax allocation, earnings expectations, and the behavior of stock prices. *Accounting Review* 47, 320–332.

Beaver, W. H. (1968). The information content of annual earnings announcements. *Journal of Accounting Research* 6, 67–92.

Beaver, W. H. (1981). Market efficiency. *Accounting Review* 56, 23–37.

Beaver, W., R. Lambert & D. Morse (1980), The information content of security prices. *Journal of Accounting and Economics* 2, 3–28.

Beaver, W., R. Lambert & D. Morse (1987). What determines price-earnings ratios? *Financial Analysts Journal* 34, 65–76.

Beaver, W. & J. Manegold (1975). The Association Between Market-Determined and Accounting-Determined Measures of Systematic Risk: Some Further Evidence. *Journal of Financial and Quantitative Analysis* 10:2, 231–84.

Beeny, (1985). Occasional Papers on Earnings per Share, Deutsche Vereinigung für finanzanalyse und Anlageberatung.

Berger, P., E. Ofek & I. Swary (1996). Investor valuation of the abandonment option. *Journal of Financial Economics* 42:2, 257–288.

Bernard, V. & J. Thomas (1989). Post-earnings-announcement drift: Delayed price response or risk premium. *Journal of Accounting Research* 27, 1–48.

Bhushan, R. (1991). Does the post-earnings-announcement drift reflect market inefficiency? Working paper, Massachusetts institute of technology, October.

Blake, J. and O. Amat (1993). *European Accounting*. Pitman Publishing.

Boehmer, E., J. Musumeci & A. Poulsen (1991) Event-study methodology under conditions of event-induced variance. *Journal of Financial Economics* 30, 253–272.

Booth, G., P. Brockman, J-P. Kallunki & T. Martikainen (1997). Accounting income smoothing and reductions in analysts' earnings forecast errors over the fiscal year: Finnish evidence. Manuscript, University of Vaasa, Finland.

Booth, G., J-P. Kallunki & T. Martikainen (1995). Post-announcement drift and income smoothing: Finnish evidence. *Proceedings of the University of Vaasa,* Discussion Papers 180.

Booth, G., J-P. Kallunki & T. Martikainen, (1997). Delayed price response to the announcements of earnings and its components in Finland. *The European Accounting Review* 6:3, 377–392.

Box, G. & G. Jenkins (1976). *Time Series Analysis: Forecasting and Control.* Oakland, CA: Holden-Day.

Branson, B. C., D. M. Guffey & D. P. Pagach (1998). Information conveyed in announcements of analyst coverage. *Contemporary Accounting Research* 15:2, 119–143.

Brealey, R. (1971). Some implications of the comovement of American company earnings. *Applied Economics* 3:3.

Brennan, M. & P. Hughes (1991). Stock prices and the supply of information. *Journal of Finance* 46, 1665–1691.

Brookfield, D. & R. Morris (1992). The market impact of UK company news announcements. *Journal of Business Finance & Accounting* 19:4, 585–602.

Brooks, L. & D. Buckmaster (1976). Further evidence of the time series properties of accounting income. *Journal of Finance* 31, 1359–1373.

Brown, L. (1991). Forecast selection when all forecasts are not equally recent. *International Journal of Forecasting* 7, 349–356.

Brown, L. (1993). Earnings forecasting research: Its implications for capital market research. *International Journal of Forecasting* 3, 295–320.

Brown, L. (1996a). Analyst forecasting errors and their implications for security analysis: an alternative perspective. *Financial Analysts Journal*, January-February, 40–47.

Brown, L. (1996b). *Earnings Expectations in Financial Theory and Investment Practice.* Ibes Reasearch Bibliography, 5th edition, Ibes International Inc.

Brown, L. (1997). Analyst forecasting errors: Additional evidence. *Financial Analysts Journal*, Nov-Dec, 81–88.

Brown, L. (2001a). Discussion: The accuracy and bias of equity values inferred from analysts' earnings forecasts. *Journal of Accounting, Auditing and Finance* 16:4, 363–367.

Brown, L. (2001b). How important is past analyst forecast accuracy. *Financial Analysts Journal*, November/December, 44–49.

Brown, L. & M. Rozeff (1978). The superiority of analyst forecasts as measures of expectations: Evidence from earnings. *Journal of Finance* 33, 1–16.

Brown, L. & M. Rozeff (1979). Univariate time series models of quarterly accounting earnings per share: A proposed model. *Journal of Accounting Research* 19, 178–189.

Brown, L., G. Foster, E. Noreen (1985). Security analyst multi-year earnings forecasts and the capital market. Working paper presented at the American Accounting Association, Sarasota, FL.

Brown, L., P. Griffin, R. Hagerman & M. Zmijewski (1987a). Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings. *Journal of Accounting and Economics* 9:1, 61–87.

Brown, L., P. Griffin, R. Hagerman & M. Zmijewski (1987b). An evaluation of alternative proxies for the market's assessment of unexpected earnings. *Journal of Accounting and Economics* 9:2, 159–193.

Brown, L. & K. Kim (1991). Timely aggregate analyst forecasts as better proxies for market earnings expectations. *Journal of Accounting Research* 29, 382–385.

Brown, L., G. Richardson & S. Schwager (1987c). An information interpretation of financial analyst superiority in forecasting earnings. *Journal of Accounting Research* 25, 49–67.

Brown, L. & M. Rozeff (1980). Analysts can forecast accurately! *Journal of Portfolio Management* 6, 31–34.

Brown, L. & M. Zmijewski (1987). The effect of labor strikes on security analysts' forecast superiority and on the association between risk-adjusted stock returns and unexpected earnings. *Contemporary Accounting Research* 4, 61–75.

Brown, S. & J. Warner (1985). Using daily stock returns: the case of event studies. *Journal of Financial Economics* 14, 3–31.

Butler, K. & L. Lang (1991). The forecast accuracy of individual analysts: evidence of systematic optimism and pessimism. *Journal of Accounting Research* 29, 150–156.

Canibano, L., M. García-Ayuso & M. P. Sanchez (2000). Shortcomings in the measurement of innovation: Implications for accounting standard setting. *Journal of Management and Governance* 4:4. 319–342.

Capstaff, J., K. Paudyal & W. Rees (1995). The accuracy and rationality of earnings forecasts by UK analysts. *Journal of Business Finance & Accounting* 1, 67–85.

Capstaff, J., K. Paudyal & W. Rees (2001). A comparative analysis of earnings forecasts in Europe. *Journal of Business Finance & Accounting* 28:5, 531–562.

Carvel, S. & P. J. Strebel (1984). A new beta incorporating analysts' forecasts. *Journal of Portfolio Management* 11:1, 81–85.

Carvel, S. & P. J. Strebel (1987). Is there a neglected firm effect? *Journal of Business Finance & Accounting* 14:2, Summer, 279–290.

Chambers, A. & Penman, S. (1984), Timeliness of reporting and the stock price reaction to earnings announcements. *Journal of Accounting Research* 22, 21–47.

Chaney, P., C. Hogan & D. Jeter (1999). The effect of reporting restructuring charges on analysts' forecast revisions and errors. *Journal of Accounting and Economics* 27:3, 261–284.

Chase, C. W. (2000). Composite forecasting: Combining forecasts for improved accuracy. *The Journal of Business Forecasting Methods & Systems* 19:2, 2–6.

Chrichfield, T., T. Dyckman & J. Lakonishok (1978). An evaluation of security analysts' forecasts. *The Accounting Review* July, 651–668.

Christie, A. (1987). On cross-sectional analysis in accounting research. *Journal of Accounting and Economics* 9, 231–258.

Clement, M. (1999). Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter? *Journal of Accounting and Economics* 27:3, 285–303.

Chung, R. & L. Kryzanowski (1997). Analyst following and market behaviour around TSE300 Index Revisions. *Organization and Quality of Equity Markets*, Paris.

Chung, R. & L. Kryzanowski (2001). Tests of investor cognizance using earnings forecasts of North American analysts. *International Review of Economics & Finance* 10:2, 187–204.

Collins, D., E. Maydew & I. Weiss (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24, 39–67.

Collins, D. & S. P. Kothari, (1989). An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics* 11, 143–181.

Collins, D., S. P. Kothari & J. Rayburn (1987), Firm size and the information content of prices with respect to earnings. *Journal of Accounting and Economics* 9, 111–138.

Collins, D., M. Pincus & H. Xie (1999). Equity valuation and negative earnings: The role of book value of equity. *The Accounting Review* 74:1, 29–61.

Comiskey, E., R. Walkling & M. Weeks (1987). Dispersion of expectations and trading volume. *Journal of Business Finance and Accounting* 14, 229–239.

Cooper, R., T. Day & C. Lewis (2001). Following the leader: a study of individual analysts' earnings forecasts. *Journal of Financial Economics* 61, 383–416.

Copeland, T. & J. Weston (1988). *Financial Theory and Corporate Policy*. Third Edition. Addison Wesley.

Cornell, B. & R. Roll (1981). Strategies for pairwise competitions in markets and organizations. *Bell Journal of Economics*, Spring, 210–213.

Cragg, J. & B. Malkiel (1968). The consensus and accuracy of some predictions of the growth of corporate earnings. *Journal of Finance* 1, 67–84.

Cready, W. & P. Mynatt (1991). The information content of annual reports: A price and trading response analysis. *Accounting Review* 66, 291–312.

Daley, L., D. Senkow & R.Vigeland (1988). Analysts' forecasts, earnings variability, and option pricing: Empirical evidence. *Accounting Review* 63:4, 563–585.

Das, S., C. Levine & K. Sivaramakrishnan (1998). Earnings predictability and bias in analysts' earnings forecasts. *Accounting Review* 73, 277–294.

Das, S., C. Levine, K. Sivaramakrishnan & S. Saudagaran (1998). Accuracy, bias, and dispersion in analysts' earnings forecasts: The case of cross-listed foreign firms. *Journal of International Financial Management and Accounting* 9, 16–33.

De Bondt, W. F. M. & R. H. Thaler (1985). Does the stock market overreact? *Journal of Finance* 40, 793–805.

De Bondt, W. F. M. & R. H. Thaler, (1987). Further evidence on investor overreaction and stock market seasonality. *Journal of Finance* 42, 557–581.

De Bond, W. & R. Thaler (1985). Does the stock market overreact? *Journal of Finance*, July, 793–805.

De Bondt, W. & R. Thaler (1990). Do security analysts overreact? *American Economic Review* 80:2, 52–57.

Dechow, P., R. Sloan & A. Sweeney (1996). Causes and Consequences of Earnings Manipulation: An Analysis of Firms Subject to Enforcement Actions by the SEC. *Contemporary Accounting Research* 13:1, 1–36

Dowen, R. J. & S. W. Bauman (1991). Revisions in corporate earnings forecasts and common stock returns. *Financial Analysts Journal* 47:2, March/April, 86–90.

Dreman, D. & M. Berry (1995). Analyst forecasting errors and their implications for security analysis. *Financial Analysts Journal* 3, 30–41.

Dugar, A. & S. Nathan (1992). The effect of investment banking relationships on financial analysts' earnings forecasts and investment recommendations. Working paper (Michigan State University).

Duru, A. & D. Reeb (2002). International diversification and analysts' forecast accuracy and bias. *The Accounting Review* 77:2, 415–433.

Easterwood, J. & S. Nutt (1999). Inefficiency in analysts' earnings forecasts: Systematic misreaction or systematic optimism? *Journal of Finance* 56:5, 1777–1797.

Elgers, P., M. Lo & R. Pfeiffer (2001). Delayed security price adjustments to financial analysts' forecasts of annual earnings. *The Accounting Review* 76:4, 613–632.

Elton, E. & J. Gruber (1986). Descrete expectational data and portfolio performance. *Journal of Finance* 3, 699–712.

Elton, E. J., M. Gruber & M. Gultekin (1981). Expectations and share prices. *Management Science* 27:9, 975–987.

Elton, Edwin J., M. Gruber & M. Gultekin (1984). Professional expectations: Accuracy and diagnosis of errors. *Journal of Financial and Quantitative Analysis* 19:4, 351–363.

Ertimur, Y. & J. Livnat (2002). Confirming or conflicting sales and earnings signals. *Journal of Portfolio Management* 28:4, 45–57.

Erwin, G. & S. Perry (2000). The effect of foreign diversification on analysts' prediction errors. *International Review of Financial Analysis* 9:2, 121–145.

Fama, E. (1965). Random walks in stock market prices. *Financial Analysts Journal*, September-October, 3–7.

Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance* 25:5, 383–417.

Fama, E. (1991). Efficient Capital Markets: II. *Journal of Finance* 46:5, 1575–1617.

Fama, E., K. R. French (1993). Common risk factors in the returns on stock and bonds. *Journal of Financial Economics* 33:1, 3–56.

Fama, E. & J. Macbeth (1973). Risk, Return and Equilibrium: Empirical Test. *Journal of Political Economy*, May-June, 607–636.

Fédération des Experts Comptables Européens (1991).

Finnish Committee for Corporate Analysis (2000). *A Guide to the Analysis of Financial Statements of Finnish Companies*. Helsinki, Gaudeamus.

Firth, M. (1981), The relative information content of the release of financial results data by firms. *Journal of Accounting Research* 19, 521–529.

Forbes, William & Len Skerrat (1992). Analysts' forecast revisions and stock price movements. *Journal of Business Finance and Accounting* 19:4, 555–569.

Foster, G. (1977). Quarterly accounting data: Time series properties and predictive ability results. *The Accounting Review* 52, 1–31.

Foster, G. (1979). Briloff and the Capital Market. *Journal of Accounting Research* 17, Spring, 262–274.

Foster, G. (1986). *Financial Statement Analysis*. Englewood Cliffs: Prentice-Hall Inc.

Foster, T., D. Jenkins & D. Vickrey (1986). The incremental informaiton content of the annual report. *Accounting and Business Research* 17, 91–98.

Foster, G., C. Olsen & T. Shevlin (1984). Earnings releases, anomalies and the behavior of security returns. *Accounting Review*, October, 574–603.

Francis, J. & D. Philbrick (1992). The association between Value Line earnings forecasts and Value Line recommendations. Working paper (University of Chicago).

Francis, J. & D. Philbrick (1993). Analysts' decisions as products of a multi-task environment. *Journal of Accounting Research* 31:2, 216–230.

Francis, J., K. Schipper & L. Vincent (2002). Earnings announcements and competing information. *Journal of Accounting and Economics* 33:3, 313–342.

Freeman, R. (1987). The association between accounting earnings and security returns for large and small firms. *Journal of Accounting and Economics* 9, 195–228.

Freeman, R., J. Ohlson & S. Penman (1982). Book rate of return and predition of earnings changes: an empirical investigation. *Journal of Accounting Research* 20, 639–653.

Fried, D. & D. Givoly (1982). Financial analysts' forecasts of earnings: a better surrogate for market expectations. *Journla of Accounting and Econimics* 4, 85–107.

Friend, I. & M. Blume (1970). Measurement of Portfolio Performance under Uncertainty. *American Economic Review*, September, 651–575.

García-Ayuso, M., J. Monterrey & C. Pineda (1997). Empirical evidence on the convex relationship between prices and earnings. The role of Abnormal earnings in equity valuation. Unpublished working paper, University of Sevilla.

Givoly, D. & J. Lakonishok (1979). The information content of financial analysts' forecasts of earnings: Some evidence on semi-strong efficiency. *Journal of Accounting and Economics* 1, 165–185.

Gordon, M. & E. Shapiro (1956). Capital equipment analysis: the required rate of profit. *Management Science* 3, 102–110.

Graham, B. & D. Dodd (1934). *Security Analysis*. New York.

Griffin, P. (1977). The time-series behavior of quarterly earnings: Preliminary evidence. *Journal of Accounting Research* 17, 71–83.

Grinblatt, M. and M. Keloharju (2000). The investment behavior and performance of various investor types: a study of Finland's unique data set. *Journal of Financial Economics* 55, 43–67.

Grossman, S. & J. Stiglitz (1976). On the efficiency of competitive stock market where traders have diverse information. *Journal of Finance* 31, 573–585.

Grossman, S. & J. Stiglitz (1980). On the Impossibility of Informationally Efficient Markets. *American Economic Review* 70:3.

Harmon, W. (1984). Earnings versus funds flows. An empirical investigation of market reaction. *Journal of Accounting, Auditing and Finance* 6:2, 24–34.

Harris, R. (1999). The accuracy, bias and efficiency of analysts' long run earnings growth forecasts. *Journal of Business Finance and Accounting* 26:5/6, 725–755.

Hassel, J., R. Jennings & D. Lasser (1988). Management earnings forecasts: their usefulness as a source of frim-specific inforamtion to security analysis. *Journal of Financial Research* 11:4, 303–320.

Hawawini, G. & P. Michel (1984). European Equity Markets. *Risk, Return and Efficiency*. New York: Garland Publishing Inc.

Hawkins, E. H., S. C. Chamberlin & W. E. Daniel (1984). Earnings Expectations and Security prices. *Financial Analysts Journal* 40:5, 24–38.

Hayek, F. (1945). The use of knowledge in society. *American Economic Review*, September.

Hayn, C. (1995). The information content of losses. *Journal of Accounting and Economics* 20:2, 125–153.

Hicks, J. (1946). *Value and Capital*. New York, Oxford University Press.

Hodgkinson, L. (2001). Analysts' forecasts and the broker relationship. *Journal of Business Finance and Accounting* 28:7/8, 943–961.

Hong, H., T. Lim & J. C. Stein (2000). Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. *The Journal of Finance* 55:1, February.

Hong, H., J. Kubik & A. Solomon (2000). Security analyts' career concerns and herding of earnings forecasts. *The Rand Journal of Economics* 31:1, 121–144.

Hopwood, W., J. McKeown & P. Newbold (1982). The additional information content of quarterly earnings reports: intertemporal disaggregation. *Journal of Accounting Research* 20, 343–349.

Hughes, J. & W. Ricks (1987). Associations between forecast errors and excess returns near to earnings announcements. *Accounting Review* 62, 158–175.

Hussain, S. (1996). Over-reaction by security market analysts: The impact of broker status and firm size. *Journal of Business Finance & Accounting* 9, 1223–1244.

Hussain, S. (1997). The impact of segment definition on the accuracy of analysts' earnings forecasts. *Accounting and Business Research* 2, 145–156.

Ippolito, R. (1989). Efficiency with costly information: A study of mutual fund performance. *The Quarterly Journal of Economics*; February, 1–24.

Ismail, B. & M. Kim (1989). On the association of cash flow variables with market risk: further evidence. *Accounting Review* 64:1, 125–36.

Joy, O., R. Litzenberber & R. McEnally (1977). The adjustment of stock prices to announcements of unanticipated changes in quarterly earnings. *Journal of Accounting Research*, Autumn, 207–225.

Judge, G., R. C. Carter, W. Griffiths, H. Lütkepohl & T-C. Lee (1988). *Introduction to the theory and practice of econometrics*, 2nd ed. John Wiley & Sons, New York.

Kallunki, J-P. (1995). Accounting information and stock market efficiency. Unpublished manuscript, University of Vaasa.

Kasanen, E., J. Kinnunen & J. Niskanen (1992). The prediction of international accounting standards profits from financial statements of Finnish firms. *Advances in International Accounting* 5, 47–73.

Kasznik, R., M. F. McNichols (2002). Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research*, 40:3.

Keane, S. (1985). Ten commandments for efficient investing. *Ohio CPA Journal* 44:1, 31–34.

Kendall, C. & P. Zarowin (1990). Time-series models of annual earnings, earnings persistence and earnings response coefficients. Working paper, New York University.

Kim, K. & D. Schroeder (1990). Analysts' use of managerial bonus incentives in forecasting earnings. *Journal of Accounting and Economics* 13, 3–23.

Klein, A, (1990). A direct test of the cognitive bias theory of share price reversals. *Journal of Accounting and Economics* 13, 155–166.

Klein, R. & V. Bawa (1977). The effect of limited information and estimation risk on optimal portfolio diversification. *Journal of Financial Economics* 5, 89–111.

Kross, W., B. Ro & D. Schroeder (1990). Earnings expectations: the analysts' information advantage. *Accounting Review* 65, 461–476.

Lang, M. & R. Lundholm (1996). Corporate disclosure policy and analyst behavior. *Accounting Review* 71, 467–492.

Latham, M. (1986). Information efficiency and information subsets. *Journal of Finance* 41, 39–52.

Lee, C. & Chen (1990). Structural changes and the forecasting of quarterly accounting earnings in the utility industry. *Journal of Accounting and Economics* 13, 93–122.

Lee, B. & B. Choi (2000). Discretionary accruals, the dispersion of earnings forecasts, and the accuracy of earnings forecasts over the forecasting horizon. *American Business Review* 18:2, 34–42.

Lev, B. (1989). On the usefulness of earnings and earnings research: Lessons and directions from two decades of accounting research. *Journal of Accounting Research* (Suplement) 27, 153–192.

Lev, B. & R. Thiagarajan (1993). Fundamental information analysis. *Journal of Accounting Research* 31:2, 190–215.

Lev, B. & P. Zarowin (1999). The boundaries of financial reporting and how to extend them. *Journal of Accounting Research* 37:2, 353–86.

Levy, H. & M. Sarnat (1990). *Capital Investments and Financial Decisions*. Prentice Hall, 4th ed.

Lewellen, J. (1999). The time-series relations among expected return, risk and book-to-market. *Journal of Financial Economics* 54:1, 5–43.

L'Her, J. & J. Suret (1995). Heterogenous expectations, short sales regulation and the risk return relationship. *Financial Review* 30:4, November, 637–662.

Libby, R. & R. Blashfield (1978). Performance of a composite as a function of the number of judges. *Organizational Behavior and Human Performance* 21, 121–129.

Lim, T. (2001). Rationality and analysts' forecast bias. *Journal of Finance* 56:1, 369–385.

Lin, H-W. & M. McNichols (1998). Underwriting relationships, analysts' earnings forecasts and investment recommendations. *Journal of Accounting and Economics* 25:1, 101–127.

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *Review of Economics and Statistics* 47:1.

Little, I. (1962). Higgledy piggledy growth. *Bulleting of the Oxford Institute of Economics and Statistics* 24, 389–392.

Liu, J. & J. Thomas (2000). Stock returns and accounting earnings. *Journal of Accounting Research* 38:1, Spring.

Lorek, K. (1979). Predicting annual net earnings with quarterly earnings time-series models. *Journal of Accounting Research* 17, 190–204.

Lui, Yu-Hon (1995). Market reaction to analysts' multi-year forecast revisions: A non-parametric analysis. *British Accounting Review* 7:1, 257–268.

Luoma, M., T. Martikainen, J. Perttunen & S. Pynnönen (1994). Different beta estimation techniques in infrequently traded and inefficient stock markets. *Omega, International Journal of Management Science* 22:5, 471–476.

Lys, T. & S. Sohn (1990). The association between revisions of financial analysts' earnings forecasts and security-price changes. *Journal of Accounting and Economics* 13:4, December, 341–363.

Machuga, S. & R. Pfeiffer (2000). A comparison of financial-statement-analysis-based and price-based earnings forecasts. *Journal of Business and Economic Studies* 6:1, 21–41.

Malkiel, B. G. (1982). Risk and return: A new look. The changing roles of debt and equity in financing U.S. capital formation. *National Bureau of Economic Research*, University of Chicago Press.

Mande, V. & R. Ortman (2002). The effect of Japanese business segment reporting on analysts' forecasts: Implications for US investors and the SEC. *J. of Accounting and Public Policy* 21:1, 31–70.

Mandelbrot, B. (1966). Forecasts of future prices, unbiased markets, and martingale models. *Journal of business* 39, 242–55.

Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, March.

Markowitz, H. (1959). *Portfolio Selection*. New York: Wiley.

Martikainen, M. (1995). The information content of losses around earnings announcements in the Finnish stock market. Unpublished working paper, Universtity of Vaasa.

Martikainen, T. (1993). Stock returns and classification pattern of firm-specific financial variables. *Journal of Business Finance and Accounting*, 537–557.

Martikainen, T., J. Perttunen & J-P. Kallunki (1995). Accounting losses and investors' decision making: Finnish evidence, Proceedings of the twenty-fourth annual meeting of the Western Decision Sciences Institute.

Martikainen, T., T. Rothovius & P. Yli-Olli (1991). On the informational characteristics of earnings and cash dividends in the Finnish stock market. *Acta Wasaensia*, No. 27.

Matsumo, D. (2002). Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77:3, 483–514.

McEwen, R., J. Hunton (1999). Is analyst forecast accuracy associated with accounting information use? *Accounting Horizons* 13:1, 1–16.

McNichols, M. (1989). Evidence of informational asymmetries from management earnings forecasts and stock returns. *The Accounting Review* 64:1.

Mendenhall, R. (1991). Evidence of possible underweighting of earnings-related information. *Journal of Accounting Research* 29, 170–180.

Michaely, R. & K. Womack (1999). Conflict of interest and the credibility of underwriter analyst recommendations. *The Review of Financial Studies* (Special Issue) 12:4, 653–686.

Michelson, S., J. Jordan-Wagner & C. Wootton (2000). The relationship between the smoothing of reported income and risk-adjusted returns. *Journal of Economics and Finance* 24:2, 141–159.

Miller, M. & F. Modigliani (1961). Dividend policy, growth and the valuation of shares. *Journal of Business* 34, October, 411–433.

Molodovsky, N. (1965). Common stock valuation. *Financial Analysts Journal* 20:1, 104–123.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica*, October.

Myers, R. (1990). Classical and modern regression with applications. 2nd ed, Boston, MA, Duxbury Press.

Niskanen, J., E. Kasanen & J. Kinnunen (1994). The association of stock returns with international accounting standards earnings: Evidence from the Finnish capital market. *International Journal of Accounting* 29, 283–296.

Niskanen, J., J. Kinnunen, E. Kasanen (2000). The value relevance of IAS reconciliation components: Empirical evidence from Finland. *Journal of Accounting and Public Policy* 19:2, 119–137.

Näsi, S. (1990). In: *The European Accounting Guide*, 733–765.

Newbold, P., J. Zumwalt & S. Kannan (1987). Combining forecasts to improve earnings per share prediction: an examination of electric utilities. *International Journal of Forecasting* 3, 229–238.

Nobes, C. (1983). A judgmental international classification of financial reporting practices. *Journal of Business Finance and Accounting* 10:1, 1–19.

Nobes, C. & R. Parker (1991). *Comparative International Accounting*. Third edition. UK, Prentice Hall International.

O'Brien, P. (1988). Analysts' forecasts as earnings expectations. *Journal of Accounting and Economics* 10, 53–83.

O'Brien, P. (1990). Forecast accuracy of individual analysts in nine industries. *Journal of Accounting Research* 28, 286–304.

O'Brien, P. & R. Bhushan (1990). Analyst following and institutional ownership. *Journal of Accounting Research* 28, 55–76.

O'Brien, P., R. Bhushan & M. F. McNichols (1990). Analyst following and institutional ownership; Discussion. *Journal of Accounting Research* 28, 55–82.

O'Hanlon, J. & R. Whiddett (1991). Do UK security analysts overreact? *Accounting and Business Research*, Autumn, 63–74.

Opong, K. (1995). The information content of interim financial reports: UK evidence. *Journal of Finance and Accounting* 22:2, 269–279.

Ou, J. & S. Penman (1989a), Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics* 11, 295–329.

Ou, J. & S. Penman (1989b), Accounting measurement, price-earnings ratio, and the information content of security prices. *Journal of Accounting Research* 27, 111–152.

Palepu, K., P. Healy & V. Bernard (2000). *Business Analysis & Valuation: Using Financial Statements.* Second Edition, South-Western Thomson Learning.

Parkash, M., S. Dhaliwal & W. Salatka (1995). How certain firm-specific characteristics affect the accuracy and dispersion of analysts' forecasts: A latent variables approach. *Journal of Business Research* 34:3, 161–169.

Patell, J. (1976). Corporate forecasts of earnings per share and stock price behavior: empirical test. *Journal of Accounting Research,* 246–276.

Patz, D. (1989).UK analysts' earnings forecasts'. *Accounting and Business Research,* Summer, 267–275.

Pennman, S. (1980). An empirical investigation of the voluntary disclosure of corporate earnings forecasts. *Journal of Accounting Research,* Spring, 132–60.

Peterson, D. & P. Peterson (1982). The effect of changing expectations upon stock returns. *Journal of Financial and Quantitative Analysis* 17:5, 799–813.

Philbrick, D. & W. Ricks (1991). Using Value Line and IBES analyst forecasts in accounting research. *Journal of Accounting Research* 29, 397–417.

Rajan, R & H. Servaes (1997). Analyst following of initial public offerings. *Journal of Finance* 52:2, 507–529.

Ramakrishnan, R. & J. Thomas (1991). Valuation of permanent, transitory and price-irrelevant components of reported earnings. Working paper, Columbia University.

Reeb, D., C. Kwok & Y. Baek (1998). Systematic risk in the multinational corporation. *Journal of International Business Studies* 29:2, 263–279.

Richards, M. R. & J. D. Martin (1979). Revisions in earnings forecasts: How much response? *Journal of Portfolio Management* 5:4, 47–52.

Richardson, S., S. H. Teoh & P. Wysocki (2001). The walkdown to beatable analyst forecasts: The roles of equity issuance and insider trading incentives. Unpublished working paper, August, University of Michigan.

Rippington, F. & R. Taffler (1995). The information content of firm financial disclosures. *Journal of Business Finance & Accounting* 22:3, 345–362.

Rivera, J. (1991). Prediction performance of earnings forecasts: the case of U.S. multinationals, *Journal of International Business Studies* 2, 265–287.

Roberts, H. V. (1959). Stock market "patterns" and financial analysis: Methodological suggestions. *Journal of Finance* 14, 1–10.

Rock, S., S. Sedo & M. Willenborg (2001). Analyst following and count-data econometrics. *Journal of Accounting and Economics* 30, 351–373.

Roll, R. (1977). A Critique of the Asset Pricing Theory's Tests. *Journal of Financial Economics*, March, 129–176.

Rubinstein, M. (1975). Securities market efficiency in an Arrow-Debreu economy. *American Economic Review* 65, 812–824.

Ruland, W. (1979). The time series of earnings for forecast reporting and nonreporting firms. *Journal of Business Finance and Accounting*, Summer, 187–201.

Saario, M. (1959). *Meno-tulo –kirjanpito*. Keuruu.

Sharpe, W. (1964). Capital Asset Prices: A Theory of Market Equilibrium under conditions of risk. *Journal of Finance* 19:3, 425–442.

Shleifer A. & L. H. Summers (1990). Crowds and prices: Towards a theory of inefficient markets. *Journal of Economic Perspectives*.

Shroff, P. (1999). The variability of earnings and non-earnings information and earnings prediction. *Journal of Business Finance & Accounting* 26:7/8, 863–882.

Sin, S. & E. Watts (2000). The information content of losses: shareholder liquidation option and earnings reversals. *Australian Journal of Management* 25:3, 327–338.

Sinha, P., L. Brown & S. Das (1993). Forecast accuracy of individual analysts in nine industries: a second look, Working paper, State University of New York.

Strebel, P. (1983). Analysts' forecasts in the Capital Asset Pricing Model. *Economics Letters*, 223–229.

Stice, E. (1991). The market reaction to 10-K and 10-Q filings and to subsequent The Wall Street Journal earnings announcements. *Accounting Review* 66:1, 42–55.

Stickel, S. (1990). Predicting individual analyst earnings forecasts. *Journal of Accounting Research* 28, 409–417.

Stickel, S. (1992). Reputation and performance among security analysts. *Journal of Finance* 47, 1811–1836.

Stickel, S. (1993). Accuracy improevement from a consensus of updated forecasts. *International Journal of Forecasting* 9, 345–353.

Sougiannis, T. & T. Yaekura (2001). The accuracy and bias of equity values inferred from analysts' earnings forecasts. *Journal of Accounting, Auditing & Finance* 16:4, 331–362.

Sudarsanam, P. & L. Fortune (1989). Relative usefulness of accrual-based and cash-flow-based earnings in security evaluation: an empirical test. The Annual Meeting of the European Accounting Association, Stuttgart.

Teoh, S., I. Welch & T. Wong (1998). Earnings management and the Long-Run Maket Performance of Initial Public Offerings. *Journal of Finance* 53, 6 December.

Terregrossa, S. (1999). Combining analysts' forecasts with causal model forecasts of earnings growth. *Applied Financial Economics* 9:2, 143–153.

Theil, H. (1966). *Applied Economic Forecasting*. New York: North-Holland.

Troberg, P. (1992). Recent developments in financial reporting in Finland. *Advance in International Accounting* 5, 25–45.

Trueman, B. (1990). On the incentives for security analysts to revise their earnings forecasts, *Contemporary Accounting Research*, 203–222.

Tse, S. (1986). Intra-year trends in the degree of association between accounting numbers and security prices. *The Accounting Review*, July, 475–496.

Watts, R. (1975). The time-series behaviour of quarterly earnings. Working paper. University of Newcastle.

Watts, R. & J. Zimmerman (1986). *Positive Accounting Theory*. NJ: Englewood Cliffs, Prentice-Hall.

Watts, R. & R. Leftwich (1977). The time series of annual accounting earnings. *Journal of Accounting Research* 15, 253–271.

Waymire, G. (1985). Earnings volatility and voluntary management forecast disclosure. *Journal of Accounting Research*, Spring, 268–95.

Welch, I. (2000). Herding among security analysts. *Journal of Financial Economics* 58:3, 369–396.

West, R. (1975). Two Kinds of Market Efficiency. *Financial Analysts Journal* 31:6, 30–34.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48, 817–838.

Wiggins, J. (1991). Do misperceptions about the earnings process contribute to post-announcement drift? Working paper, Cornell University.

Williams, J. (1938). *The Theory of Investment Value.* Cambridge, Mass: Harvard University Press.

Wright, C. & J. Groff (1986). Uses of indexes and data bases for information release analysis. *The Accounting Review* 61, 91–100.

Appendix 1, Table 24. Theil's U^2 for UK and Finland 1990 to 1995.

Year	UK (std dev)	Finland (std dev)	F value (prob)	X^2 (prob)	Nobs UK Nobs Finland
1995	0.426	0.371	0.279	0.445	304
	(0.703)	(0.625)	(0.598)	(0.504)	50
1994	0.386	0.407	0.039	0.087	311
	(0.666)	(0.666)	(0.843)	(0.767)	47
1993	0.468	0.259	0.312*	1.723	302
	(0.694)	(0.535)	(0.079)	(0.189)	37
1992	0.459	0.383	0.401	1.123	269
	(0.683)	(0.617)	(0.527)	(0.288)	35
1991	0.435	0.612	2.294	0.511	257
	(0.645)	(0.797)	(0.131)	(0.475)	37
1990	0.388	0.939	7.365	5.399	246
	(0.616)	(0.929)	(0.007)***	(0.020)**	10

The Theil's U^2 coefficient is calculated as follows:

$$U_t^2 = \frac{(F_t - A_{t-1}) / |A_{t-1}| \cdot (A_t - A_{t-1}) / |A_{t-1}|}{(A_{t-1} - A_{t-2}) / |A_{t-2}| \cdot (A_t - A_{t-1}) / |A_{t-1}|},$$

where F_t is forecasted earnings and A_t is actual earnings in year t. If the U^2 were greater than 2, it was cut of at that point (i.e. 2), so that the extreme values (caused by small denominator) would not affect the results. Nobs refer to number of observations. * statistically significant at 0.10 level, ** statistically significant at 0.05 level, *** statistically significant at 0.01 level.

Appendix 2, Table 25a. Mean of Theil's U^2, median, mean, standard deviation and t-value (of mean = 0) of Forecast Errors 1990-1999 monthly. All the firm-year observations with earnings per share less than $ 0.1 in current or two previous years are deleted.

Month	Nobs	U^2	Median	Mean	Std	t-val
All firms						
12	4944	0.10492	-0.01016	0.15604	1.60092	6.8535***
11	5611	0.16501	0.00000	0.23131	1.86548	9.2878***
10	6568	0.32122	0.00000	0.26680	2.11024	10.2462***
9	6584	0.37515	0.00188	0.29186	2.25180	10.5168***
8	5628	0.57383	0.01376	0.40163	2.78647	10.8131***
7	5573	0.35081	0.01941	0.42484	2.91393	10.8840***
6	5547	0.48018	0.02593	0.51058	3.34558	11.3663***
5	6379	0.40440	0.03202	0.52296	3.40080	12.2818***
4	7126	0.67425	0.03357	0.57845	3.87517	12.6009***
3	6098	0.68264	0.02857	0.61300	4.50609	10.6233***
2	5056	0.65234	0.04027	0.64196	4.67267	9.7690***
1	5300	0.68375	0.04479	0.74222	5.90864	9.1450***
NEC						
12	1851	0.23685	0.05000	0.42728	2.44408	7.5215***
11	2068	0.42278	0.10292	0.61075	2.86919	9.6801***
10	2386	0.82671	0.14266	0.72137	3.29909	10.6807***
9	2323	0.90861	0.17348	0.80081	3.56871	10.8153***
8	2058	1.04094	0.24210	0.98986	3.64421	12.3224***
7	2052	0.98054	0.29041	1.09384	4.38038	11.3118***
6	2037	1.01812	0.33798	1.31392	5.20129	11.4013***
5	2292	1.07754	0.40143	1.39555	5.29775	12.6113***
4	2536	1.24444	0.44570	1.52372	6.13049	12.5165***
3	2080	1.18261	0.43919	1.64015	6.93652	10.7838***
2	1814	1.38575	0.47232	1.66986	7.41433	9.5924***
1	1904	1.31067	0.52760	1.90604	9.42362	8.8257***
PEC						
12	3093	0.03358	-0.02465	-0.00628	0.67288	-0.5191
11	3543	0.02181	-0.02365	0.00983	0.75804	0.7717
10	4182	0.01130	-0.02151	0.00744	0.77497	0.6211
9	4261	0.03789	-0.02256	0.01439	0.82188	1.1426
8	3570	0.22928	-0.02240	0.06253	2.06712	1.8074
7	3521	0.08037	-0.02623	0.03495	1.35933	1.5256
6	3510	0.07493	-0.02367	0.04436	1.18383	2.2201
5	4087	0.07320	-0.02469	0.03361	1.28443	1.6727
4	4590	0.16077	-0.02523	0.05619	1.33715	2.8471**
3	4018	0.37283	-0.02822	0.08128	2.25555	2.2843*
2	3242	0.18414	-0.03156	0.06682	1.54298	2.4659*
1	3396	0.30310	-0.03249	0.08972	1.87837	2.7834**

Forecast error $FE_t = (FEPS_t - EPS_t) / |EPS_t|$. NEC refers to Negative Earnings Change firms, PEC to Positive Earnings Change firms. * statistically significant at 0.05 level, ** statistically significant at 0.01 level. *** statistically significant at 0.001 level

Table 25b. Mean of Theil's U^2, median, mean, standard deviation and t-value (of mean = 0) of the Forecast Errors 1990-1999 monthly. All observations, including observations with earnings per share less than $ 0.1 in current or two previous years are deleted.

Month	Nobs	U^2	Median	Mean	Std	t-val
All firms						
12	4974	0.27765	-0.01016	0.16650	1.7444	6.7324***
11	5656	0.36654	0.00000	0.29853	2.9189	7.6931***
10	6625	0.09643	0.00000	0.35615	7.6200	3.8054***
9	6633	0.08675	0.00214	0.31236	3.2064	7.9370***
8	5668	0.10052	0.01408	0.47190	5.0217	7.0774***
7	5608	0.14996	0.01969	0.45997	3.3098	10.4072***
6	5590	0.22715	0.02618	0.56741	4.4188	9.5972***
5	6428	0.16484	0.03272	0.69843	8.8967	6.2941***
4	7180	0.19002	0.03448	0.74987	8.1393	7.8071***
3	6146	0.16432	0.02942	0.84635	8.5849	7.7263***
2	5086	0.15480	0.04099	0.75271	5.9402	9.0350***
1	5341	0.57179	0.04672	1.66405	58.5830	2.0765*
NEC						
12	1865	0.29574	0.05000	0.46204	2.6642	7.4854***
11	2091	0.42527	0.10438	0.72876	3.8688	8.6115***
10	2411	0.14974	0.14316	1.08866	10.8566	4.9217***
9	2342	0.11487	0.17401	0.91320	4.2894	10.3008***
8	2075	0.12545	0.24620	1.20116	7.6639	7.1394***
7	2068	0.21024	0.29310	1.13680	4.5933	11.2520***
6	2057	0.76908	0.34145	1.49824	6.5300	10.4035***
5	2314	0.21578	0.40437	1.83856	14.6085	6.0515***
4	2561	0.28671	0.44898	1.74613	7.7784	11.3559***
3	2099	0.14910	0.44169	2.23411	14.0112	7.3000***
2	1828	0.16835	0.47619	1.85158	9.0318	8.7579***
1	1923	2.45507	0.53684	4.41483	97.5773	1.9841*
PEC						
12	3109	0.03986	-0.02467	-0.01042	0.7302	-0.7964
11	3565	0.07741	-0.02381	0.04652	2.1389	1.2993
10	4214	0.04997	-0.02154	-0.06201	4.8439	-0.8316
9	4291	0.06182	-0.02256	-0.01497	2.3575	-0.4164
8	3593	0.04414	-0.02235	0.05122	2.3256	1.3208
7	3540	0.01664	-0.02614	0.06489	2.1481	1.7976
6	3533	0.10724	-0.02354	0.02526	2.2962	0.6537
5	4114	0.06195	-0.02469	0.05801	1.6219	2.2947*
4	4619	0.10266	-0.02505	0.19829	8.2819	1.6278
3	4047	0.21428	-0.02810	0.12742	2.9494	2.7481**
2	3258	0.14138	-0.03130	0.13735	2.8856	2.7173**
1	3418	0.24823	-0.03189	0.11779	2.0421	3.3737***

Forecast error $FE_t = FEPS_t - EPS_t / |EPS_t|$. NEC refers to Negative Earnings Change firms. and PEC Positive Earnings Change firms. * statistically significant at 0.05 level, ** statistically significant at 0.01 level, *** statistically significant at 0.001 level.

Appendix 3, Table 26. Mean of the Forecast Error yearly and monthly, NEC in Panel A and PEC in Panel B.

Month	Year 1988	Year 1989	Year 1990	Year 1991	Year 1992	Year 1993	Year 1994	Year 1995	Year 1996	Year 1997	Year 1998	Year 1999
A												
12	0.530	0.471	0.653	0.484	0.551	0.317	0.319	0.253	0.230	0.164	0.165	-0.007
11	0.603	0.827	0.582	0.623	0.737	0.843	0.516	0.394	0.279	0.278	0.371	0.189
10	0.558	0.726	0.998	0.629	0.776	0.518	0.691	0.527	0.401	0.663	0.379	0.330
9	0.708	0.976	0.797	0.860	0.946	0.532	0.643	0.691	0.342	0.548	0.417	0.346
8	1.006	0.874	1.045	1.116	1.280	0.664	0.926	0.826	0.437	0.486	0.584	0.366
7	1.295	1.230	1.156	1.225	1.173	1.423	1.064	0.682	0.566	0.638	0.627	0.450
6	1.244	1.167	1.520	1.280	1.536	1.734	1.031	0.832	0.592	0.938	0.752	0.583
5	1.134	1.238	1.276	1.679	1.682	1.828	1.163	0.957	0.923	0.533	0.750	0.622
4	1.385	1.215	1.344	1.506	1.665	1.872	1.327	1.027	0.872	0.800	1.015	0.754
3	1.419	1.492	1.614	1.902	1.816	2.333	1.367	1.139	0.784	1.115	0.871	0.744
2	1.642	1.541	1.509	2.025	1.827	2.510	1.406	0.890	0.910	0.737	0.840	0.675
1	1.571	1.370	1.587	2.139	2.185	3.059	1.133	1.051	1.030	0.791	1.065	0.933
B												
12	0.050	0.005	0.047	0.054	0.012	-0.026	-0.038	-0.023	-0.030	-0.019	-0.036	-0.052
11	0.035	0.067	0.036	0.054	0.073	0.042	-0.024	0.008	-0.017	-0.033	-0.040	0.000
10	0.031	0.004	0.069	0.032	0.044	0.053	-0.015	-0.016	-0.035	-0.021	-0.038	-0.037
9	0.037	0.005	0.065	0.018	0.040	0.038	-0.020	0.024	-0.021	-0.026	-0.040	-0.046
8	0.026	0.001	0.108	0.030	0.111	0.068	-0.026	-0.009	-0.019	-0.038	0.103	0.048
7	-0.040	0.035	0.137	0.080	0.123	0.062	-0.022	-0.001	-0.016	-0.010	-0.044	-0.053
6	0.014	0.015	0.092	0.118	0.169	0.116	0.011	0.012	-0.004	-0.045	-0.028	-0.051
5	0.018	-0.005	0.085	0.031	0.160	0.060	-0.040	0.027	-0.004	0.004	-0.025	-0.073
4	0.008	0.006	0.132	0.066	0.195	0.101	-0.017	0.022	0.008	-0.011	-0.031	-0.055
3	0.001	-0.019	0.141	0.189	0.272	0.085	0.017	-0.030	0.000	-0.020	0.088	0.060
2	-0.023	0.063	0.178	0.214	0.296	0.063	0.030	-0.002	0.025	0.018	-0.025	-0.047
1	-0.015	0.000	0.150	0.176	0.246	0.110	-0.022	0.019	0.013	-0.028	0.131	-0.020

Appendix 4, Table 27. Bias and under/over-reaction to earnings changes 1988-1999 monthly. Panel A according to Model (55) and Panel B according to Model (57).

Lag	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	Estimate of δ (Std Error)	R^2
Panel A						
12	4942	-0.503*** (0.089)	0.962 (0.023)			0.690
11	5613	-0.998*** (0.113)	0.939 (0.034)			0.592
10	6573	-1.104*** (0.106)	0.928 (0.037)			0.568
9	6591	-1.238*** (0.100)	0.971 (0.028)			0.554
8	5626	-1.659*** (0.150)	0.901* (0.046)			0.413
7	5558	-1.882*** (0.129)	0.929* (0.034)			0.412
6	5544	-1.829*** (0.171)	0.812*** (0.048)			0.327
5	6372	-1.757*** (0.167)	0.727*** (0.051)			0.251
4	7123	-1.947*** (0.130)	0.791*** (0.038)			0.268
3	6106	-1.640*** (0.176)	0.639*** (0.049)			0.173
2	5044	-1.372*** (0.184)	0.552*** (0.049)			0.158
1	5301	-1.596*** (0.168)	0.535*** (0.045)			0.135
Panel B						
12	4942	1.604*** (0.264)	0.774*** (0.057)	4.123*** (0.356)	-0.207 (0.071)	0.725
11	5613	1.631*** (0.224)	0.739*** (0.049)	5.606*** (0.364)	-0.176* (0.072)	0.644
10	6573	1.442*** (0.214)	0.782*** (0.048)	6.223*** (0.383)	-0.016*** (0.086)	0.628
9	6591	1.271*** (0.110)	0.822*** (0.028)	6.309*** (0.270)	0.014*** (0.070)	0.619
8	5626	1.650*** (0.264)	0.758*** (0.059)	8.377*** (0.387)	0.119*** (0.098)	0.527
7	5558	1.556*** (0.119)	0.784*** (0.033)	8.479*** (0.274)	0.123*** (0.083)	0.544
6	5544	1.926*** (0.257)	0.704*** (0.060)	9.368*** (0.362)	0.201*** (0.099)	0.482
5	6372	1.808** (0.236)	0.720*** (0.057)	9.450*** (0.334)	0.498*** (0.097)	0.463
4	7123	1.644*** (0.141)	0.757*** (0.041)	9.225*** (0.268)	0.447*** (0.094)	0.476
3	6106	2.135*** (0.229)	0.649*** (0.058)	10.274*** (0.131)	0.463*** (0.096)	0.426
2	5044	2.314*** (0.238)	0.642*** (0.056)	9.775*** (0.389)	0.620*** (0.105)	0.441
1	5301	2.226*** (0.141)	0.633*** (0.040)	9.832*** (0.377)	0.689*** (0.113)	0.430

Column headings as follows: Month corresponds to calendar month, Number of observations (Nobs), Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes according to the Model (55): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \varepsilon_t$, and Model (57): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + \varepsilon_t$, and R-square. DUM = -1, if $(EPS_t - EPS_{t-1}) < 0$, and zero otherwise. The significance level according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level. The coefficients β and $(\beta - \delta)$ are tested against one.

Appendix 4, Table 28. Over/under-reaction to prior changes in earnings 1988-1999. Panel A Model (59) and Panel B Model (61). Portfolio formation according to change in earnings (EPS_t - EPS_{t-1}).

Lag	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	Estimate of δ (Std Error)	R^2
Panel A						
12	4939	-0.630***	0.007			0.000
		(0.096)	(0.022)			
11	5598	-1.164***	0.032*			0.003
		(0.098)	(0.019)			
10	6559	-1.247***	0.007			0.000
		(0.089)	(0.016)			
9	6576	-1.312***	0.033*			0.003
		(0.089)	(0.017)			
8	5615	-1.901***	0.036*			0.002
		(0.115)	(0.022)			
7	5550	-2.054***	0.042*			0.003
		(0.114)	(0.022)			
6	5529	-2.291***	0.060***			0.006
		(0.122)	(0.023)			
5	6345	-2.438***	0.064***			0.007
		(0.114)	(0.020)			
4	7099	-2.495***	0.068***			0.007
		(0.106)	(0.020)			
3	6090	-2.686***	0.096***			0.013
		(0.125)	(0.024)			
2	5034	-2.815***	0.132***			0.024
		(0.143)	(0.028)			
1	5285	-3.037***	0.155***			0.029
		(0.142)	(0.029)			
Panel B						
12	4939	0.576***	0.006	3.141***	-0.001	0.050
		(0.079)	(0.014)	(0.221)	(0.065)	
11	5598	0.419***	0.041***	4.169***	0.029	0.078
		(0.074)	(0.011)	(0.229)	(0.052)	
10	6559	0.485***	0.007	4.637***	0.003	0.095
		(0.059)	(0.012)	(0.214)	(0.045)	
9	6576	0.514***	0.029*	5.045***	-0.006	0.114
		(0.062)	(0.014)	(0.214)	(0.044)	
8	5615	0.552***	0.033*	6.586***	-0.002	0.150
		(0.083)	(0.018)	(0.263)	(0.057)	
7	5550	0.604***	0.034*	7.085***	-0.012	0.166
		(0.087)	(0.020)	(0.254)	(0.054)	
6	5529	0.574***	0.059***	7.620***	0.007	0.170
		(0.095)	(0.022)	(0.269)	(0.060)	
5	6345	0.598***	0.026	8.256***	-0.116**	0.204
		(0.083)	(0.019)	(0.250)	(0.050)	
4	7099	0.637***	0.042**	8.580***	-0.078	0.223
		(0.079)	(0.019)	(0.230)	(0.050)	
3	6090	0.691***	0.059***	9.644***	-0.105*	0.236
		(0.089)	(0.021)	(0.281)	(0.062)	
2	5034	0.769***	0.086***	9.755***	-0.128*	0.239
		(0.105)	(0.021)	(0.313)	(0.072)	
1	5285	0.749***	0.105***	10.243***	-0.129	0.255
		(0.104)	(0.022)	(0.312)	(0.081)	

Column headings as follows: Month corresponds to calendar months, Number of observations (Nobs), Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes according to Model (59): $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, and Model (61): $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, and R-square. DUM = -1, if $(EPS_t - EPS_{t-1}) < 0$, and zero otherwise. The significance levels according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level.

Appendix 4, Table 29. Over/under-reaction to prior changes in earnings 1988-1999 according to Model (61). The portfolio formation according to prior change in earnings (EPS_{t-1} - EPS_{t-2}).

Lag	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	Estimate of δ (Std Error)	R^2
12	4939	0.091	-0.094*	0.616*	-0.155***	0.015
		(0.214)	(0.052)	(0.322)	(0.058)	
11	5598	-0.165	-0.111**	0.779**	-0.220***	0.028
		(0.192)	(0.043)	(0.286)	(0.048)	
10	6559	-0.231	-0.138***	0.897***	-0.215***	0.024
		(0.152)	(0.035)	(0.253)	(0.040)	
9	6576	-0.634***	-0.064*	0.587**	-0.148***	0.014
		(0.164)	(0.036)	(0.229)	(0.042)	
8	5615	-0.776***	-0.116**	1.171***	-0.221***	0.022
		(0.211)	(0.047)	(0.328)	(0.054)	
7	5550	-0.959***	-0.111***	1.004***	-0.228***	0.024
		(0.195)	(0.042)	(0.329)	(0.053)	
6	5529	-1.168***	-0.091*	1.230***	-0.210***	0.023
		(0.221)	(0.048)	(0.359)	(0.059)	
5	6345	-1.410***	-0.067	1.216***	-0.182***	0.020
		(0.176)	(0.037)	(0.314)	(0.049)	
4	7099	-1.306***	-0.097***	1.274***	-0.234***	0.027
		(0.162)	(0.036)	(0.302)	(0.048)	
3	6090	-1.261***	-0.101***	1.613***	-0.269***	0.034
		(0.191)	(0.042)	(0.349)	(0.057)	
2	5034	-1.204***	-0.067	1.929***	-0.267***	0.048
		(0.232)	(0.049)	(0.403)	(0.065)	
1	5285	-1.457***	-0.054	1.848***	-0.283***	0.051
		(0.241)	(0.052)	(0.416)	(0.069)	

Column headings as follows: Month corresponds to calendar months, Number of observations (Nobs), Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes according to Model (61): $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, and R-square. DUM = -1, if $(EPS_{t-1} - EPS_{t-2}) < 0$, and zero otherwise. The significance levels according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level.

Appendix 5, Table 30. Bias and under/over-reaction to earnings changes 1988-1999 monthly. No mechanical outlier deletion.

Lag	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	Estimate of δ (Std Error)	R^2
Panel A						
12	4978	-1.990***	1.406***			0.439
		(0.421)	(0.023)			
11	5661	-2.933***	1.201***			0.469
		(0.407)	(0.017)			
10	6633	-2.737***	0.944***			0.328
		(0.442)	(0.016)			
9	6640	-2.154***	0.886***			0.501
		(0.279)	(0.011)			
8	5673	-2.910***	0.746***			0.204
		(0.450)	(0.019)			
7	5612	-3.207***	0.743***			0.195
		(0.499)	(0.020)			
6	5593	-2.995***	0.553***			0.075
		(0.510)	(0.026)			
5	6433	-3.155***	0.429***			0.037
		(0.607)	(0.027)			
4	7187	-3.845***	0.786***			0.164
		(0.470)	(0.021)			
3	6150	-0.633***	0.053***			0.014
		(0.502)	(0.006)			
2	5090	-2.033***	0.102***			0.010
		(0.761)	(0.014)			
1	5346	-2.895***	0.415***			0.075
		(0.482)	(0.020)			
Panel B						
12	4978	1.261**	0.867***	0.600	-1.120***	0.502
		(0.527)	(0.030)	(0.852)	(0.044)	
11	5661	1.169***	0.854***	6.916***	-0.512	0.493
		(0.214)	(0.042)	(2.701)	(0.397)	
10	6633	1.032***	0.878***	9.021***	-0.160	0.339
		(0.310)	(0.063)	(3.186)	(0.726)	
9	6640	1.304***	0.819***	8.155***	-0.276	0.528
		(0.164)	(0.037)	(1.826)	(0.581)	
8	5673	1.328***	0.834***	13.071***	0.603	0.252
		(0.141)	(0.052)	(2.067)	(0.861)	
7	5612	1.290***	0.854***	13.583***	0.700	0.249
		(0.173)	(0.036)	(1.446)	(0.779)	
6	5593	1.703***	0.751***	14.303***	1.046*	0.159
		(0.238)	(0.052)	(1.318)	(0.550)	
5	6433	1.539**	0.801***	14.698***	1.830***	0.185
		(0.634)	(0.138)	(1.670)	(0.662)	
4	7187	1.488***	0.795***	14.303***	0.301	0.194
		(0.172)	(0.042)	(1.513)	(0.562)	
3	6150	1.835***	0.745***	11.997***	1.618***	0.309
		(0.141)	(0.032)	(1.187)	(0.599)	
2	5090	1.733***	0.779***	11.115***	2.586***	0.322
		(0.317)	(0.068)	(1.561)	(0.549)	
1	5346	2.389***	0.588***	11.840***	1.577***	0.241
		(0.551)	(0.019)	(0.907)	(0.055)	

Column headings: Month corresponds to calendar month, Number of observations (Nobs). Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes according to Model (55): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \varepsilon_t$, and Model (57): $EPS_t - EPS_{t-1} = \alpha + \beta(FEPS_t - EPS_{t-1}) + \gamma DUM + \delta DUM(FEPS_t - EPS_{t-1}) + \varepsilon_t$, and R-square. DUM = -1, if $(EPS_t - EPS_{t-1}) < 0$, and zero otherwise. Significance level according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level. The coefficients β and (β – δ) are tested against one.

Appendix 5, Table 31. Over/under-reaction to prior changes in earnings 1988-1999 monthly. No mechanical outlier deletion.

Lag	Nobs	Estimate of α (Std Error)	Estimate of β (Std Error)	Estimate of γ (Std Error)	Estimate of δ (Std Error)	R^2
Panel A						
12	4978	-1.717***	-0.146***			0.017
		(0.431)	(0.016)			
11	5661	-2.780***	0.141***			0.022
		(0.407)	(0.012)			
10	6633	-2.858***	0.006			0.000
		(0.441)	(0.007)			
9	6640	-2.395***	0.081***			0.015
		(0.278)	(0.008)			
8	5673	-3.519***	0.248***			0.057
		(0.440)	(0.013)			
7	5612	-3.934***	0.162***			0.026
		(0.496)	(0.013)			
6	5593	-4.166***	0.139***			0.235
		(0.452)	(0.003)			
5	6433	-5.045***	0.1447***			0.136
		(0.575)	(0.005)			
4	7187	-4.648***	0.001			0.000
		(0.467)	(0.008)			
3	6150	-5.221***	0.146***			0.042
		(1.147)	(0.009)			
2	5090	-6.167***	0.154***			0.092
		(0.965)	(0.007)			
1	5346	-5.344***	0.176***			0.023
		(0.572)	(0.174)			
Panel B						
12	4978	0.623	0.012	5.872***	0.266***	0.038
		(0.543)	(0.026)	(0.875)	(0.032)	
11	5661	0.406***	0.031*	8.346***	-0.281	0.060
		(0.102)	(0.019)	(1.084)	(0.333)	
10	6633	0.310	0.025***	8.302***	-0.040*	0.022
		(0.551)	(0.007)	(0.900)	(0.023)	
9	6640	0.439***	0.136***	7.541***	0.202	0.058
		(0.084)	(0.029)	(0.747)	(0.164)	
8	5673	0.500**	0.099***	10.952***	-0.416	0.120
		(0.110)	(0.015)	(1.160)	(0.367)	
7	5612	0.510***	0.073**	11.763***	-0.510	0.087
		(0.117)	(0.033)	(1.265)	(0.595)	
6	5593	0.490***	0.156***	12.267***	0.017	0.259
		(0.117)	(0.017)	(1.207)	(0.031)	
5	6433	0.555	0.113***	15.144***	-0.033	0.158
		(0.716)	(0.020)	(1.175)	(0.020)	
4	7187	0.365***	0.035	13.503***	0.303	0.046
		(0.137)	(0.028)	(1.182)	(0.334)	
3	6150	0.648***	0.196***	13.562***	0.049	0.300
		(0.126)	(0.049)	(1.136)	(0.054)	
2	5090	0.691***	0.178***	16.798***	0.024	0.177
		(0.140)	(0.047)	(1.958)	(0.052)	
1	5346	0.465***	0.303***	15.608***	0.573	0.105
		(0.143)	(0.028)	(1.396)	(0.674)	

Column headings: Month corresponds to calendar months, Number of observations (Nobs), Estimate of regression coefficients of realized earnings changes against analysts' forecasted changes according to Model (59): $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, and Model (61): $EPS_t - FEPS_t = \alpha + \beta(EPS_{t-1} - EPS_{t-2}) + \gamma DUM + \delta DUM(EPS_{t-1} - EPS_{t-2}) + \varepsilon_t$, and R-square. DUM = -1, if $(EPS_t - EPS_{t-1}) < 0$, and zero otherwise. The significance levels according to t-statistic: * Statistically significant at 0.05 level, ** Statistically significant at 0.01 level, *** Statistically significant at 0.001 level.