PhD Dissertation in Accounting and Finance

Accounting for and valuation of pensions in Norway

-Earnings management and whether analysts detect it

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Contents

1. Introduction, positioning, research questions. Overview of methods and the research performed

1.1 Background and positioning of the paper

I have worked as an auditor in Norway for 15 years assuring that financial statements "have been prepared in accordance with law and regulations" and "in accordance with accounting standards, principles and practices" as the auditor's report states.But the accounting rules are flexible even within "generally accepted practices". Some of the accounting rules are very complex, and even though the information is disclosed in the notes, it may be difficult to interpret; what is really going on? As an insider I would often know what had been done and even issued assurances that the information was presented sufficiently "according to the accounting standards and GAAP", but had the external parties seen and interpreted the information correctly?

So I started to wonder; how frequently and how much management uses the flexibility in the accounting rules to manage earnings or report numbers, to perform earnings management , and did the market see and interpret complex accounting rules and information "correctly" when valuing the stocks when management had used the flexibility or managed the accounting rules *but* the information was disclosed? I was in doubt. Hence this became my general research question.

This research question would, however, have been of slight interest if the academics had also not started to wonder: Abarbanell and Bushee (1998) state that there is "a growing evidence … that prices fail to immediately reflect publicly available information". More important, Katherine Schipper, in a speech at the AAA annual conference (2005) summed up the findings regarding disclosed information in financial reports: There is no generally accepted theory of required disclosures, the information in the notes as such has proven to be value-relevant and to reduce uncertainty, but investors put a smaller valuation weight on it or ignore altogether disclosures vs. recognised items – but we know too little. Hence, she concludes, it is very important to understand more of how much the market reads and understands of complex disclosures.

"*Pension accounting is a magnificent example of all that is right and wrong with accounting*" (Henriksen and van Breda 1992, p. 757):

On the positive side, they continue, there is the careful handling of present values of pension obligations and periodic cost measured as increase in present values. There is the presentation of market values of pension assets. There is the recognition of assets and liabilities, even if they are partly managed by others, since the risk and reward still lie at the firm. These principles and values should fit straight into most valuation models for valuing stocks; and hence one should expect it would be easy for the market to read, interpret and use the information.

On the negative side, however, there are all the political compromises that have taken what was a relatively straightforward economic exercise and turned it into a complex and, at times, obscure set of accounting requirements. There is the deferral of changes in estimates and pension plans, there is the presentation of financial earnings items netted with other pension cost elements, and there is the offsetting of assets and liabilities with different external counterparties and risks. This requires a significant amount of additional information in the notes, which in my experience few seem to understand.

In addition the different pension systems are complex, with "black-box" calculations of the pension liabilities done by actuaries. The fact that the legal or vested obligations differ significantly from the obligation calculated for accounting purposes makes the area even more complex.

Hence, I applied my general research question to *pension accounting* where I felt that the transparency issue is particularly relevant. I have been auditing, lecturing and working particularly with pensions for the last 10 years, and most people I meet in business state that this is a complex area, but material for many firms. Most of the information that is required to understand what's going on and to perform proper valuation is included in the notes. Still the complexity and the degree of freedom for using managements' discretion open up opportunities for earnings management in this area.

Hence my first research question is:

- *Is earnings management performed by Norwegian listed firms in the area of pension accounting?*

However, finance theory says that all public information is contained in the stock prices, even if it is complex and even if it is earnings managed as long as sufficient information to reveal it is enclosed: Fama (1970) originally defined market efficiency, and stated that under the *semi-efficient* market hypothesis (SEMH)/ the semi-strong form, the current prices reflect all the information contained in past prices, and also all information contained in public information. Hence no investment strategy using this information would be useful in finding under/overvalued stocks. Empirical testing of the theory in general has found that, although it might take some time to fully absorb and interpret the new information, the effect of new information is reflected in the price after a short while (Fama 1998). At least it is believed that information easily available with low cost of obtaining the information is fully reflected in the stock price and satisfies the SEMH (Kothari 2001).

Hence, it should in particular be expected that information such as pension information in *public annual financial reports* is reflected in the stock price. This is due to the fact that the annual financial report:

- is controlled by the company and auditors before it is released, and with sanctions for incorrect or incomplete information.
- has formal language/definitions and standardised form in order to make it easier for the trained reader to read and interpret information homogenously.
- is easily publicly available and is widely distributed, to all shareholders and those who are interested.
- is shown to be a primary source of information by stock valuators such as analysts etc.

So how should the study and thesis around these issues be structured?

I start with the discussion of the *accounting principles for pensions*:
After the accounting scandals, particularly in the U.S. during the last couple of years, there has been a focus also on the accounting rules, how should they be designed to be useful, understandable and non-manipulative: the U.S. GAAP accounting standard setters, Financial Accounting Standards Board (FASB) and the IAS/IFRS accounting standard setters. The International Accounting Standards Board (IASB) has as a goal that financial reporting should be relevant; "should provide information that is useful to present and potential investors" (FASB's Statements of Financial Accounting Concepts ("FASB Concepts") No. 1) (Similar wording in IASB's Framework for the preparation and presentation of Financial

Statements ("FASB Framework")). The "Proposal of Principles-based approach to U.S. standard setting" (No. 1125-001, 2002) refers to the concerns many have expressed about the quality and transparency of (U.S.) financial accounting and reporting: "A principal concern is that accounting standards, while based on the conceptual framework, have become increasingly detailed and complex" and "the increasingly rule-driven specific accounting standards" (page 2). Conformity with the basic principles in frameworks and concepts in the specific accounting rules should be expected to increase usefulness, understandability and transparency. Hence it is useful to discuss where and how the accounting standards for pension accounting differ from the framework, concepts and basic accounting rules and to discuss some of the fundamentals in the framework, concepts and basic accounting rules. In particular it is useful to discuss the specific accounting rules in Norway, since this will be input to further analysis.

Since the basic principles of estimating pension obligations are based on sound valuation techniques from asset pricing theories (e.g. stated by FASB as basis for conclusions on pension accounting), my experience is that many stock valuators use the reported pension-obligation figures in their valuation models without adjustments. Hence it is important to discuss *how pension obligations should be valuated* using the financial report as a starting point, and discuss which adjustments have to be done. This input is also needed in order to have a model for comparing the pension values between firms.

The context for my analysis will be in Norway. However, there is no database or prior complete analysis of the pension accounting practices for firms listed in Norway. Hence I have to *construct a database, and use it to analyse accounting variations for pensions*. If there are high accounting variances, this might be tested vs. earnings management and market participants afterwards.

The discussion of pension accounting shows that important and value-significant assumptions are discretionary for management. I want to see whether the accounting variations are random, or whether the accounting variations are *indications of earnings management*. Hence I have to find from the literature the areas where EM is expected in pension accounting, and perform a test. The methods for performing proper tests of EM are highly debated, and therefore I have to discuss the different methods, the relevance for pensions, and decide on the most proper method. I conclude that a cross-sectional empirical test on specific

discretionary "firm-independent" pension assumptions is the most relevant. I also conclude that, due to the specific accounting rules for pensions, EM should particularly be expected when the pension obligation effects have to be fully recognised and effect the book value of the equity: This is done when new accounting standards are implemented as in 1994 (NRS 6) and 2004 (IAS 19) in Norway. EM is tested by testing whether the equity ratio is associated with the assumptions determining the value of pension obligations. Since the governmental pension systems heavily influence the firms' pension obligation, unlike the U.S, I have to construct a combined pension assumption factor ("PAF") that can be used to test for EM in Norway.

If there is earnings management in Norway regarding pensions, the next key question is whether the market has discovered this. Hence my second research question is:

- *Do the security prices reflect "properly" the information disclosed about the pensions in financial reports, tested by verifying whether influential market participants, here the sell-side analysts, "see through" earnings management and/or different accounting practices or assumptions regarding pensions in Norway, when they valuate stocks?*

I have chosen a method for this that has to be discussed more in detail below: I have chosen to do a field study reviewing how sell-side analysts in Norway treat abnormal pension-accounting assumptions when they value the firms.

The results of my study should be of academic interest because:

- A thorough discussion of pension accounting anomalies vs. the framework, concepts and basic accounting principles of USGAAP, IAS/IFRS and NGAAP will give insight for academics, standard setters and practitioners as to why the current accounting rules may confuse or mislead the market.
- A full theoretical analysis of whether or not the accounting rules for pensions correspond with "correct" asset valuation methods according to finance theory (as it is more or less stated to be) is a valuable input for both academics testing pension obligation values and practitioners performing intrinsic firm valuations.
- A full documentation of accounting-practice variations among listed firms in Norway regarding pensions in Norway has not been done before.
- A test/documentation of earnings management of listed Norwegian firms has not been done before.

- I have not found a broad field study done before with direct test of if and how a large group of analysts actually treat pension information when valuing firms (do they detect and adjust for accounting differences – if they exist?). Despite the importance of analysts, we know little about the way they process information generally and in particular that which has been taken from firms' published accounts (Brenton and Taffler 1998).
- The results of the study may be used as input to standard setters, and to researchers on earnings management, analysts and valuation methods.

Moreover, if there are accounting practice differences and indications of earnings management,

if the pension accounting rules do not correspond to asset-pricing theories

and

if the stock-market analysts (perhaps the most informed and competent "actors" in the market) do not see and reflect this when they valuate listed firms in Norway – who else does? Does the market price really include or reflect all public information?

1.2 Discussion of methods for empirical testing of market efficiency of different accounting practices.

Discussions of tests of market efficiency should start with a definition of market efficiency and the empirical evidence so far:

Fama (1970) defines efficient market as one whose "security prices fully reflect all available information". So, what does the theory tell us about market efficiency? Contrary to most other finance theories, the market efficiency hypothesis is not rigorously theoretically defined; its origin lies mainly in the empirical domain. The background or rational for the theory is, as Fama states (1970, quoting his 1965 article):

- "In an efficient market, on average, competition will cause the full effects of new information on intrinsic values to be reflected "instantaneously" in actual prices." (He writes "instantaneously" in quotes because how quickly the price should adjust in order to satisfy the definition is a matter of discussion/ definition).

Fama (1970) classified 3 levels of efficiency based on what information was reflected in prices:

- +Under *strong form*, the current price reflects all information, public as well as private, and no investors will be able to find undervalued stocks consistently.
- Under *semi-strong form*, the current price reflects all the information contained in past prices, and also all public information – hence no investment strategy using this information would be useful in finding undervalued stocks.
- Under *weak form*, the current price reflects all the information contained in all past prices (only), suggesting for instance that using technical analyses on past price alone would not be useful in finding undervalued stocks.

Empirical research has by and large proven that valuable, private (non-public) information exists, and that corporate insiders have private information that, if used, could lead to abnormal returns (Fama 1970, 1991, and Kothari agrees on this in his 2001 article). Moreover, with complete and perfect markets there is no role for accounting, much less for accounting choice or disclosed notes. Hence I will not study this.

My main field of interest is the use of financial reports (public information) in valuation. Fama's (1991 and 1998) view is that the semi-efficient market hypothesis is valid in security markets. "This evidence tilts me toward the conclusion that prices adjust efficiently to firm specific information" (1991), and reviewing the research of others on how stock prices respond to (public) information he concludes, "the evidence does not suggest that market efficiency should be abandoned" (restated in his 1998-article).

The semi-efficient market hypothesis is closely related to the formula for (security) prices at equilibrium, and may formally be expressed (as Jensen in 1978 as editor of a special issue on market efficiency defined market efficiency):

"A market is efficient with respect to information set Φ_t, if it is impossible to make economic profit (risk adjusted returns net of all costs) by trading on the basis of information set Φ_t ".

Or as Fama (1970) express this in mathematical terms:

where $Z_{j,\,t+1}$ is the return of the j security at t+1 in excess of the equilibrium expected return projected at t. Φ_t is the general symbol for (here) all publicly available information available at time t.

LeRoy (1976) later criticised this definition because they were "true as tautologies" "…since they are as true of the most naive Dow theory model as of a pure random walk. Because the

equations imply no restrictions on the data, they cannot possibly generate testable implications". Hence he redefines the definition in mathematical terms to be:

or, for rates of return

This says that all the information (Φ_t) needed to predict the (conditional) expected value of return ($p_{j,\,t+1}$) is reflected in p_{jt}. The difference is that the price ($p_{j,t}$) of the security does not have to be stationary (then $\delta_g/\delta_t=0$ as in Fama's formula).

The key here is that since all (relevant) information is included in the price calculation, there other public information cannot exist that, if used systematically and predictably, gives abnormal returns.

I write systematically and predictably, because the (S)EMH does not state that prices are correct all the time. It only requires that errors in the stock market price are unbiased; prices can be higher or lower than the equilibrium price (often named intrinsic or fundamental value) defined above. Theory and empirical work have shown that there are cycles in the market, caused by changes in investor utility functions, risk aversion/risk premium levels at recession and upturns, changes in inflation level and real interest rate (expectations), and perhaps "bubbles" caused by behavioural patterns, but the deviations should be random.

The dominant ways of testing the SEMH using specific information in financial reports is to do empirical testing between characteristics of different independent variables vs. the stock prices, to try to verify the hypothesis (Kothari 2001). Or the SEMH could be tested by testing price-reactions when new information is revealed to the market: How quickly and how much do the prices change? Since new information typically is caused by (new) events, the research-stream is called "Event-studies" (by Fama in 1991 and afterwards).

Tests of the SEMH are typically based on regressions such as (Groenewold and Kang 1993):

where R_t is the asset return, R^e_t is the equilibrium return, E_{t-1} is the expectation conditional on information up to period t-l, X_s is a vector of variables that affect share prices, and where e_t is

a random error term, serially uncorrelated and uncorrelated with the expectation errors. The null hypothesis is the $H_0 : \beta_s = 0$, s=1, 2,…….n.

To test the SEMH, one uses price data from stock markets and measures whether prices adjust *"properly"* and/or *quickly* to new information or events. This creates testing problems: The problem with "proper" adjustments is that these require a "proper" pricing or valuation model. As Roll (1977) and Fama (1970) stated, a SEMH-test is a joint test of the model and the market, and it is impossible to find out where the error is.

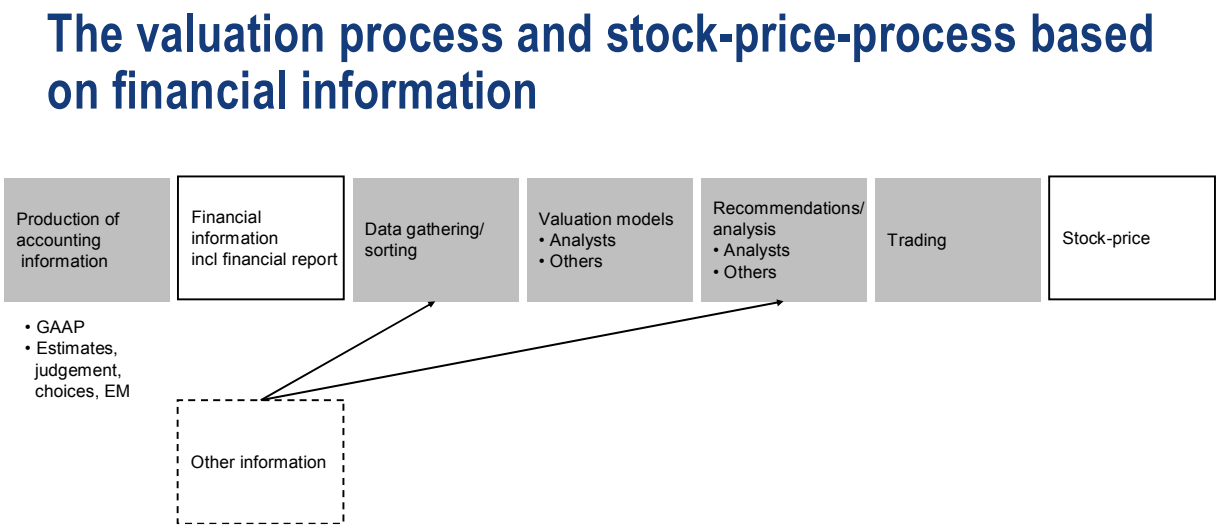
The other problem relates to how quickly prices should adjust? Research work has found some abnormal drifts, increased volatility, some days (or longer) before the stock prices stabilize etc. (Kothari 2001). The problem, however, is that although the specific event or new information can be specified to occur on a specific date, all the detailed, related information and its value consequences might not be publicly available immediately, but flow gradually to the market. So perhaps the drift is not a violation to the SEMH.

There have been, particularly after the accounting scandals and the stock market bubble and burst in the late 1990s, many attacks on the (semi)-efficient market hypothesis. Fama, in particular, through his articles in 1970, 1991 and 1998 has thoroughly reviewed, discussed and defended the SEMH against the many attacks. He agrees that some of the anomalies are "above suspicion" (1998, p. 304), the post-earnings announcement drift first reported by Ball and Brown (1968) and the short–term momentum effect documented by Jegadeesh and Titman (1993). Kothari (2001) also focused on these two attacks in particular. But, they both sum it all up by stating that no better model or theory than the market efficient hypothesis has arrived so far. Cochrane (2001) reaches the same conclusions: "Asset markets are to a good approximation, information efficient" and "reasonably efficient".

The main reasons for these conclusions are not that the (S)EMH is perfect, or that the anomalies are not true, but that the attacks on the (S)EMH in general have 2 major weaknesses that disturb the findings:

- The "bad model" problem (Fama 1998) described above; is the market inefficient or are the (valuation) models wrong?
- They are "fraught with methodological problems" (Kothari 2001) (skewed distributions of financial variables, survival biases in data, auto correlation etc.).

Only the fact that a stock price reflects numerous known and unknown different information sets makes it extremely difficult to statistically prove (not reject) the effect of one type of information (here, pension) and control/rule out all other types of information, and at least large samples are needed to conclude statistically. Moreover, the normal tests (public information vs. stock market price reactions and a "black box" in the middle) use quite general hypotheses since they have to rely on easily available data, and a high amount of data in order to reach sufficient statistical power. The valuation process is however a long chain of steps involving some of the following:



Hence, I wanted to find another way of studying how the market or it's participants include complex, but disclosed accounting information when they price stocks: To inspect directly how some of the key participants, who influence the stock prices in the market place, include the specific information in their value-function.

By doing this I will not include the whole valuation chain, from all sorts of public information, through the collection, interpretation and the use of this information in valuation models, and the influence on the final stock price in the equilibrium between many bidders and offerings. My method follows an important part of the chain (specific pension accounting data in financial reports (hence only a specific part of all the public information) – inspecting accounting variations and earnings management – and testing it directly by observations of how key participants (but again; only a fraction) use the information in specific valuation models. Hence I may go much deeper into the issue, follow several parts of the valuation

chain, and have a much more precise analysis with fewer methodological problems. But, of course, since I do not include the last step, the relation to stock prices, I cannot conclude whether the SEMH holds or not, even for the specific pension issue.

But, if the specific treatment of pension information in stock valuation models can be observed and tested, it will give specific insight into: are the disclosures reflected as much as the recognised values, and are accounting practice differences for estimates where the firms should have more or less the same expectations levelled out? These have value in many areas.

Which participants to chose? One could include samples for all types of participants. Methodologically, this probably will result in measurement problems/cross-sectional test problems, misinterpretation of answers from heterogenic groups with different educations is a risk, numerous different valuation methods/functions more or less explicitly shown must be interpreted, etc.

The best choice is to test the valuation method/function on a group that is known to be highly influential on price-setting in the market, that are skilled and trained in analyzing and performing valuation from complex accounting data, and normally have an explicit, possible to verify, valuation method/-function where one could see and test how a single information-piece/item such as pension is used.

The *analysts* and especially the sell-side analysts are, according to the empirical finding, such a group.

- They are important for the market and influence stock market prices (e.g. Womate 1996 and 2001, see 4.6.1).
- They rely heavily on accounting data and financial reports for valuation (e.g. Beaver 2002, see 4.6.1. and 4.6.2), and can read, and interpret complex financial information – in general – although regarding pension information we have few, and conflicting studies (see 4.6.4 and 4.6.6). According to Arnold et al. 1984b, the sell-side analyst spends more time and performs deeper analyses of the specific firms than the buy-side (portfolio) analysts, hence should be able to detect EM in complex areas better than others.
- They mostly use explicit, quite standardised valuation models (e.g. Demirakos et. al. 2004, Arnold et. al. 1984a) where it is possible to test how different information is used. (Although the gathering and analysis of data and information is a complex process (DeFond and Hung 2003)).

If this group includes all relevant pension information in their valuation, one should expect according to their influence that the market price also includes all information. Although not the aim of my study, if this presumably very competent, dedicated group does *not* include the

pension information in valuation, one should perhaps be more sceptical whether the SEMH holds or not.

I will argue that the best method to see how analysts treat reported pension-information in their stock valuations is to identify firms with abnormal/unusual pension assumptions and to perform a field study testing how the analysts have valued these firms. This is done in the last part of my study and thesis. The combination of survey and field study is similar to Arnold et al.'s study in 1984a of buy-side analysts, but my study goes further since it also includes direct inspection/verification of the spreadsheet, hence reducing risk of biased interview errors.

1.3 Scope and context of the study

As I will discuss in the method chapter, I have chosen to study pensions by performing a test of earnings management and a field study of the sell-side analysts' valuation of listed firms in Norway with significant pension liabilities *and* unusual pension assumptions. Hence I have limited the scope of the study:

- Only firms with *defined benefit pension* plans are investigated, since defined contribution pension plans are non-complex and do not involve significant assets/liabilities.
- Only the pension *assumptions* are studied in the earnings management study and the field study of the analysts.
  The reason for this is that several of the pension assumptions; the discount rate, the G-factor (increase in governmental paid part of the pensions) and the expected salary increase are more or less company independent – and should have little variation between firms. Hence they are well suited for external studies of earnings management and valuation by analysts.
- Only *listed* firms in *Norway* are investigated for EM (111 in 1994 and 165 in 2004), since all these firms use the same accounting rules (NRS 6), and almost all changed to IAS 19 in 2005. In this market I also have unique access to data/people.
- Only the firms with *significant* pension assets/liabilities vs. equity ratio (viewed as the most significant earnings management indicator) were tested for earnings management, in 1994, 41 firms, in 2003-2004, 44 firms.
- Only the firms with significant pension assets/liabilities *and* "unusual" assumptions were tested vs. the analyst, *21 firms*. Sell-side analysts reviewing these firms were 53, out of which 49 were interviewed.
- Only the *sell-side analysts* are included in the survey and field study. The total population of sell-side analysts is known, but the total number of analysts (including

investors) of a company is not known. The bias of only looking at sell-side analysts is discussed in a later chapter.

- The time period of the analyses is 1994 and 2004 for the earnings management study (when the new pension accounting rules were introduced, with high "reward" for EM), and spring 2005 for the field study of analysts.

1.4 Further structure of the paper:

- Chapter 2 reviews the pension systems in Norway, and the accounting rules for pensions under NGAAP, IAS/IFRS and USGAAP, and in particular discusses the abnormalities of pension accounting.
- Chapter 3 reviews the theoretical valuation of pension obligations vs. the valuation of pensions required by the accounting rules, calculates some of the specific assumptions to be used in Norway, and develops a combined pension assumption factor ("PAF") that may be used to analyse the pension assumptions of the specific firms.
- Chapter 4 reviews the literature and academic research specifically related to the importance of financial reports and how well they are read and understood, the analysts' role and work regarding stock-analysis, the frequency and methods of earnings management and finally the findings in the Norwegian context since most of the mentioned studies are U.S. based.
- Chapter 5 is an overview and descriptive statistics of the significance of pensions, pension accounting practices including the disclosed information regarding pensions of the listed firms in Norway for the periods 1994, 2003, 2004 and the IFRS implementation.
- Chapter 6 utilizes this information to test whether earnings management is performed on pension assumptions for listed firms in Norway. The chapter discusses how EM for pensions may be performed, and the design of the study.
- Chapter 7 discusses the method and specific design of testing pension accounting on analysts when they value stocks. Firms with significant pension obligations that have used abnormal pension assumptions are chosen to test whether the analysts adjust the reported or disclosed numbers when valuing the firms. The chapter also discusses possible theories that could explain the findings: Why the analysts in general had *not* recalculated the reported pension numbers.
- Chapter 8 summarizes the paper; the findings of the work, its scientific importance and usage, and suggests further areas for research.
- Appendix 2-4 shows a survey questionnaire to Norwegian analysts regarding valuation techniques, EM and pension accounting. The survey served as useful background information for the field study of analysts.

2. Overview of the pension systems and accounting rules for pensions

In this chapter I will briefly review in Part A the different types of pension systems in Norway, including governmental pensions, early retirement pensions, contribution plans and funded and unfunded defined benefit plans. A review of the systems in function in 1994 and 2003-2005 is needed since my analysis covers these time-periods.

In Part B I will first briefly give a historical overview of the development of the accounting standards for pensions under U.S. GAAP, IAS and NGAAP, and a brief overview of the current standards, and then discuss where pension accounting differs from the IASB Framework, FASB Concepts, basic accounting principles under NGAAP and similar accounting standards.

A. A brief overview of the pension system in Norway

Relevant when discussing pension obligations for firms are the following types of pension systems in Norway:

- The government funded pensions (Folketrygden)
- Funded defined benefit plans according to Lov om foretakspensjon
- Defined contribution plans according to Lov om inskuddspensjon
- Defined early retirement benefits (AvtaleFestet Pensjon (AFP))
- Non-funded defined benefit plans

2.1 Government pension/Folketrygden

All citizens in Norway are part of the Folketrygden (FT).

FT is a defined benefit plan paid by the government on a yearly basis (non-funded).

The pension benefits are based on the salary level over a certain time period and the number of total working years. In combination this defines a number of pension points. The actual pension paid is then the combination of pension points and a base pension called Grunnpensjon (G). FT defines a minimum pension level, and a maximum pension level.

Maximum pension today (2005) varies somewhat according to date of birth, but is around NOK 225-260.000 per year.

The important factors when accounting for the firms' pension obligation are that the future pensions paid by FT are an uncertain amount, since they vary with the G (which is decided by the government each year), and that the pension benefits have been and probably will be changed over the upcoming years. This affects the pension obligation for the firms, since the pension obligations for the company typically are based on the residual between the total promised level of pension to the employees, and the level paid by FT. However, the law states that the firms now should *only compensate/have the risk for the changes in the level of G*, not for changes in the other factors/pension levels in FT.

2.2 Defined benefit plans according to Lov om Foretakspensjon

The pension act for firms ("Lov om Foretakspensjon") was implemented January 1, 2001, with transition rules to January 1, 2003 and January 2011. The law is voluntary for the firms, but has some tax benefits.

The law requires a defined benefit plan for the employees, and must be funded either through an agreement with a life insurance company or a separate pension fund.

The required funding ("Pensjonspremie reserve") of the pension obligation is based on the employees' *current* salary level. (The pension liability according to the accounting rules is based on expected salary level at retirement). The discounts rates and other actuarial assumptions *(different from the accounting rules)* are defined by the pension law through detailed rules from the Financial Supervisory Authority of Norway ("Kredittilsynet"). In addition the firms may pay, with tax deduction benefits, extra amounts to a restricted fund ("Pensjonspremie-fond") that can only be used for future pension premiums.

The yearly promised gross pension for the employee is typically at a level between 60-70% of the salary for the employee the last years before his retirement. In order to achieve full pension benefits, the employee has to be employed a number of years, normally 30 years (30-40 years are allowed). The pension benefits is reduced proportionately with fewer employment years (e.g. 15 years of employment with the firm, and normally 30 years of

employment required to obtain full pension benefits give the person right to obtain 50% (15/30) of full pension benefits).

Hence the pension obligation and the required pension fund is not the same as the corresponding *accounting* pension liability or pension asset (see 2.7).

A rule in the new law is that the pensioners have their annual pensions adjusted between 0 and the increase in the annual G according to the annual returns on the funds set aside to the pensioners. Earnings above this level will be set aside in a specific pensioner fund that can be used to subsidize the increase in pension when earnings are low. If the funds are not sufficient, the firms have to pay the under-funded amount. Hence for accounting purposes, this extra payment risk also has to be taken into account (but is normally immaterial amounts).

Also new with this law is what is called the linear principle (§4-2) for measuring and paying the pension benefits: The pension premium reserve must always be equal to the current vested benefits[*] (based on today's nominal salary) (§ 5-8). Hence, with a salary increase, the pension benefit will increase correspondingly, and the company has to pay a one-time premium to compensate for the total increase in the vested pension benefit (including the catch-up of too low premiums from prior years based on the new salary level). Hence the pension premium paid each year varies a lot corresponding to changes in estimates, salary levels, number of employees, changes in FT, etc.

Pension assets are managed by life insurance firms or separate pension funds. They have rules for maximum investment in different types of securities: A life insurance company as a maximum may have 35% of their funds in shares. In 2004 the portion of shares is much lower, around 10% (Source: Aon Grieg Investor).

The returns from the pension funds (after the life insurance firms' cost), are allocated back to the pension assets, and hence pay some of the future pensions. The life insurance firms, however, have to guarantee 3% (sometimes 4%) minimum annual earnings to the funds. If the actual earnings are not high/ sufficient (including taking from accumulated reserves from the life insurance firms), life insurance firms have to use their own equity to subsidize earnings.

[*] Benefits for which the employee's right to receive a present or future benefit is no longer contingent on remaining in the service of the employer (FAS 87 Definitions). In other words; the value of the employee's pension plan if he leaves today.

Since my study also relates to periods before 2001 (implementation year for "Lov om Foretakspensjon"), I will briefly comment on the legal situation prior to this: Prior to the new law, the regulations for private firms' pension agreements were not collected into one law, but were regulated and fragmented into different laws. The most important were the rules in the laws for insurance firms and the rules in the tax law ("tjenestepensjonsforsikring etter skatteloven" ("TPES")). The firms had to follow the TPES rules in order to get a tax deduction for the premiums paid, since in practise these were the rules for defined benefit plans prior to 2003. The pension contracts were between the firm and its employees, and could not be altered without formal negotiations (as part of salary negotiations) between the firm and the employees or their unions. The new law does not introduce many new principles, but summarizes many of the prior rules in one, new law. However, there are some important differences in the legal situation prior to 2003 vs. the new law (NoU 1994: 6):

- The firms were allowed to guarantee the total pension-level (hence also taking responsibility for changes in FT).
- The employees had to work a time period (1 year, today immediate membership) and to work half time or more (today only 20%) in order to join the pension plan.
- The pensions were for life only (today 10 years or more or life)
- Changes in salary levels or pension plans could be funded over time (today changes must be immediately funded/paid, the linear-principle (NoU 1994:6): If there is no increase in salary levels over the working period, the annual premium paid for pension saving is the same (included interest) for the whole period. An increase in salary level, however, has a corresponding increase in promised pension level, and immediately affects the current and future premium level. But the new pension level also implies that historically too low premiums have been paid. According to the new law, this accumulated "catch-up" must be funded/paid to the employees' pension-premium fund immediately. Prior to this, however, the firms were allowed to allocate the catch-up over the remaining working years for the employees. With continuing salary increases as the norm, this resulted in a sharp increase in pension premiums as the employee got closer to retirement. If the employee switched to another firm, normally pension assets allocated to the employee were significantly lower than the employee's PBO, and the new firm had to pay pension premiums for benefits attributed prior to the new firm's employment of the employee. As a whole, the old system normally resulted in smooth,

but steadily increasing pension premiums over the working period, whereas the new system results in more equal pension premiums on average over the working period, but a much higher variance, since a salary increase requires immediate payment of all the missing premiums from prior years in addition to the new, higher pension premium level. The new law normally means that pension funds/assets for the firms are higher than before. In fact the new "linear principle" does *not* introduce a new principle for calculation the vested benefits as of a date, it only requires that the pension funds allocated to an employee always should equal his vested benefits.

2.3 Defined contribution plan through the Lov om innskuddspensjon

"Lov om innskuddspensjon" was implemented January 1. 2001. Prior to this law there were no law or tax-benefits for defined contribution plans in Norway. The new law gives tax benefits by allowing deduction for tax when an amount is set aside for saving to pay future pensions. The company has no other obligation than paying a certain annual amount to the employees. The employee has to save the contributions in restricted funds/accounts until his retirement date. For accounting purposes the annual payment is treated as an expense. The volume of "innskuddspensjon" is low at present (less than 1% of assets in 2003 vs. 99% defined benefit plans measured in % of total pension assets) (source Aon Grieg), and the accounting treatment is very simple (premiums paid equal the recognised cost). Hence I will not discuss this further when discussing accounting evaluation of pension obligations.

The volume of defined contribution plans in Norway is much lower than in the US (In 1998 52% of pension assets in the US were defined contribution plans vs. 48% defined benefit plans according to Aon Grieg)). It is expected that some firms will change their pension plans from defined benefits plan to defined contribution plan, since this gives higher certainty for the firms of their future pension costs. Moreover it is expected that many small firms that have no pension plans at all for their employees at the moment will enter into defined contribution plans.

2.4 Early retirement plans (AFP)

There are several AFP-arrangements in Norway negotiated at General Agreements between different labour unions and the corresponding company associations. The arrangements are voluntary for the firms, but there are strict rules when entered. Each employee has an option to use the pre-retirement.

The employee can chose to start the pre-retirement from age 62 until 67 years.

The company pays part of the pension in this period, normally 25% (LO/NHO arrangement), or 60% (bank/finance industry) or 40% (NAVO arrangement), where the last 2 arrangements pay 100% of the expense when the employee is 62-64 years old. The government pays the remaining part of the pension for these years. In addition, the company pays an annual premium per employee to be part of this arrangement.

The firms typically continue to pay the annual pension premium (for pensions after 67 years) when the former employee is under the AFP plan. In addition, some firms pay an extra pension (above the normal AFP-level) to their employees in the AFP period in order to motivate them to retire early. As one can see, it is quite complex to estimate the total payment of AFP for a company, because it relates to the number of employees utilizing the AFP, which year they will the utilize AFP, and how much is subsidized by the government.

Accounting-wise, AFP-membership premium is recognised as a cost when it is paid. In addition, a part of the expected AFP pension obligation is recognised as a cost every year similarly to the general pension obligation accounting. Moreover, the total pension obligation has to be amortized over a fewer number of years since the employees will not work until 67 years, but perhaps only to 62 years.

2.5 Non-funded pension benefits

In addition to the above mentioned pension systems, the firms often have individual pension contracts with their employees, normally for the executives. These pension benefits have pensions above the levels defined by FT and above the levels for tax-deductible pensions; hence there are no tax incentives. Moreover these pension benefits normally include individual options of early retirement with salary levels other than the AFP. Typically these pension obligations will only be a liability if the employees are employees at the date of retirement.

Hence for accounting purposes, it is sometimes complicated to define whether you have an obligation or not, and if should be recognised as a liability, what are the expected payment amounts if pension has to be paid.

B. Accounting for pensions

2.6 Pension accounting rules – historical development

2.6.1 International accounting standards (FAS and IAS) - history

One of the first accounting standards on pensions was probably the Accounting Research Bulletin No. 36 (ARB 36) under US GAAP from 1948. This standard mainly focused on the accounting for non-funded pensions, paid directly to the retired employee from the company. The standard suggests that such pension obligations should be accrued.

In 1956 ARB 47 was issued, which introduces the idea that non-funded pension obligations should be calculated on a present value principle of the obligations, and viewed as a liability in the financial accounts. However, funded pension obligations should only be expensed according to the payment of the premiums (on cash basis paid to the insurance company or similar).

In 1966 the Accounting Policy Bulletin No. 8 (APB 8) introduced for the first time that also funded pension obligations should be viewed as part of the firms' liabilities, and the net accumulated premiums paid, including accumulated profit, should be viewed as part of the firms' (restricted) assets. However, there were many different options as to how the annual cost should be calculated, and this was linked to the legal requirements and options for financing and funding the different pension obligations.

The "Employers' Accounting for Pensions", Statement of Financial Accounting Standards No. 87 ("FAS 87"), issued by FASB in 1985, implemented in 1986, removed these options, and defined accounting rules that were independent of the actual payment and the funding of the pension obligations. The current accounting standard views pension obligations as an estimated present value of the expected obligation when the employee is retiring. Similarly, the pension assets should be valued at (estimated) current market value. The recognised pension cost (the service cost) for the period is based on the increase in present value of the benefits attributed by the pension plan's benefit formula to employee service rendered in the period.

The International Accounting Committee (IASC, now transformed to International Accounting Board ("IASB")) issued IAS 19 in 1983. The standard was similar to the American standards at that time, but had several options. The current standard, revised in 2000, has few accounting alternatives, is similar to FAS 87, but there are differences on a detail level. After 2000, there have been some amendments developed, and the accounting rules for share-based compensation were taken out and moved to a separate standard (IFRS 2).

2.6.2 Norway pension accounting – history

In short, the pension accounting history may be summarized:

- Pre 1984: GRS No 13, no liability recognised, premiums paid = pension cost
- 1984: GRS No. 13 unfunded pension liability recognised or disclosed on the face of the balance sheet
- 1994: NRS 6; all defined benefit plans recognised as assets/liabilities
- 2005: IAS 19 (similar to NRS 6) implemented for all listed firms (effective 1.1.2004)

The accounting standards vs. the Accounting Act

Financial reporting in Norway is regulated by legislation, the Accounting Act ("Regnskapsloven" "RL") from 1999. The law implements the EC Accounting Directives, encompassing the content of the directives rather than the specific wording (Johnsen and Eilifsen 2004). An important part of the Accounting Act is the basic accounting principles (RL § 4-1 through 4-5). Together with the § 4-6 requirement that the financial report shall be prepared in accordance with good accounting practice (could be interpreted as to be in compliance with the basic accounting principles, other provisions in the Accounting Act, as well as general acceptance in practice), the measurement rules in § 5-1 through 5-20, and it defines the framework for all accounting rules and practice in Norway. The accounting act overrides if there are deviations with accounting rules outside the law or practices (NoU 1995). This differs from the hierarchy in the IASB Framework and FASB Concepts, where the specific rules override the frameworks. Recently a requirement for true and fair view ("rettvisende bilde") has been included in the law (§ 3-2a) that overrides even, in extreme

cases, the basic accounting principles and rules set out in Chapter 4 (and 5, 6 and 7) of the Accounting Act.

The Norwegian Accounting Standards Board ("Norsk RegnskapsStiftelse") (NRS) was established in 1989 for the purpose of publishing financial accounting standards. NRS has issued different accounting standards called "Norske RegnskapsStandarder" (NRS). The law does not define the meaning of "god regnskapsskikk" (NGAAP), but the NOU ("Norsk Offentlig Utredning"; Official Norwegian Reports made by working groups working on instructions from the Government) (1995) states that it should be generally assumed that the NRS is to be viewed as "god regnskapsskikk". The NRS statement regarding issuing of the standards says (1996:8) that:

- A final accounting standard is assumed to be followed ("En endelig regnskapsstandard forutsettes fulgt").
- A preliminary accounting standard is recommended to be followed ("En foreløpig standard anbefales fulgt").

The wording assumed and recommended is used because the standards have no legal standing by themselves. However, the Norwegian courts have typically used the issued standards as the basis for their conclusions when judging how the accounting rules should be used in the Norwegian financial accounts (**NOU** 1995).

Since the middle of the 1980s, the Accounting Committee at the Oslo Stock Exchange has had an important role in ensuring that good accounting practice is followed and developed by reviewing the annual reports of listed firms and by publishing Accounting Bulletins (Johnsen and Eilifsen 2003). They stated that both the preliminary and the final accounting rules "are expected" to be used.

As of 2005 the listed firms in Norway, among others, have to follow the accounting rules from IASB that are adopted by the EC, and are stated in the Accounting Act. The Financial Supervisory Authority of Norway ("Kredittilsynet") has been given the overseer role to be the national enforcement body for Norway, and also has established an expert committee to discuss and to interpret the practical implementation and use of the IAS/IFRS rules in Norway. Hence, the role of NRS is reduced, and standards issued from NRS have little relevance for listed firms in Norway.

Before the Accounting Act was implemented in 1999, the accounting rules were included in a chapter in the Joint-Stock Firms Act of 1976. It did not, however, include the basic

accounting principles, or set out fewer measurement rules, but included the reference to good accounting practice. The NOU (1995) of the Accounting Act (1998) states that many of the basic accounting principles and measurement rules in the new law were the underlying or implicit principles prior to the new law. The NRS had a special relevance for interpreting good accounting practice (Johnsen and Eilifsen 2003).

Neither the Accounting Act (1998) nor the Joint-Stock Firms Act (1976) had specific measurement or recognition rules for pensions, only some rules for presentation (see below). Accounting for pensions is however discussed in NOU 1995 p. 54 and p. 181-182. NRS issued the preliminary standard for pensions in 1994, which after some minor revisions, became a NRS in November 2000. Through the reference in both acts to good accounting practice, and the statement from Oslo Stock Exchange, the conclusion is that the listed firms in Norway up until 2005 were required to use the preliminary and issued NRS statements, and from 2005 the EU-accepted IAS/IFRS accounting standards.

Accounting for pensions before and after 1994 and up until 2005

NRS issued their preliminary statement for pension costs in April 1994. The final NRS for pensions was issued in November 2000, "Pensjonskostnader" (NRS No. 6). In the following I will refer to it as NRS 6. Because of the statement about the status of the preliminary NRS from the Oslo Stock Exchange, listed firms implemented the new accounting rules for pensions in their accounts for 1994.

NRS 6 has accounting rules for several types of pensions. Specifically it requires that the liabilities and the corresponding pension assets from the defined benefit pension plans be included as part of the company's assets for liabilities (net).

Prior to the implementation of the NRS 6 in 1994, the accounting rules for pensions were defined by the GRS No. 13. GRS is short for "god regnskapsskikk anbefalinger" (good accounting practice recommendations) issued by the Norwegian Institute of State Authorized Public Accountants ("Norske Statsautoriserte Revisorers forening ("NSRF"). These recommendations had a somewhat looser link to the accounting law at that time, as discussed, and purported to be no more than guidelines to good practice (Johnsen and Eilifsen 2003). However, most firms followed the recommendations, and the Oslo Stock Exchange urged the firms to follow the rules.

GRS 13 in the first version did not require the pension obligations to be recognised as a liability in the financial accounts, but allowed the company to expense the annual pension premium paid (the cash accounting principle). This principle was also accepted in the Joint-Stock Company Act in 1976 (where the accounting rules were included) (Ot. prop. Nr. 19, 1974-75 page 168).

In Norway and internationally there was debate about the accounting principles for pensions. The Accounting Advisory Council ("Regnskapsrådet"), appointed by the Ministry of Trade (now the Ministry of Finance) issued a pronouncement on good accounting practice ("uttalelser"), and issued a statement in 1989 that the pension premium fund (the additional, voluntary pension fund for firms) could be viewed as an asset and recognised. The debate continued, and the Joint-Stock Company Act was changed regarding pension accounting in 1984, according to the suggestions regarding pension accounting in the law preparation (Ot. prop. nr. 71, 1982-83): The firms were required recognise the pension obligation as a liability, or present the estimated pension obligation as additional information in the balance sheet (but unrecognised) related to the accounts ("innenfor linjen"). The GRS 13 was changed accordingly. However, this was interpreted in the GRS 13 to only include the present value of the *non-funded* defined benefit pension obligation ("driftspensjoner"). The estimation of the obligations was done similarly to the calculations in today's pension accounting standards; discounted estimated cash flows of future pension payments, but based on more standardized calculations shown in tables disclosed in GRS 13. The funded pension plans however, which were in the majority, were still accounted for using the cash accounting principle. In addition there was little information in the notes in order to estimate the total amount of the pension obligations and the corresponding assets. Hence the implementation of the new accounting rules, NRS 6 in 1994, represented a major change in accounting method, which in turn had significant impact on many firms' total liabilities and assets, and had an effect on equity (see descriptive statistics later).

The implementation of NRS 6 was viewed as a fundamental change in accounting principle, and according to the NRS, it was acceptable to recognise the effect of the pension liabilities at the time of implementation directly to equity, not through the income statement. A deferral of the implementation effect, expensing the effect over several years, was also allowed.

Accounting for pensions after 2004

Norway, as part of the EØS, which has an agreement with the EU, is required to follow the accounting rules decided by the EU from 2005. The EU has decided to implement the IAS/IFRS rules issued by IASB, with a few exceptions, from 2005 for all listed firms. Hence, the listed firms in Norway and some other firms are required to implement the IAS/IFRS rules in their accounts with the opening balance effective January 1. 2004. Hence, the IFRS accounting rules for pensions, IAS19, was implemented on that date. Similar to 1994, it is accepted to recognise the effect of the adjusted pension liability directly to equity. Specifically this relates to the unrecognised effect of the accumulated differences between assumptions used when calculating the pension obligation and the actual. Again, this will have a significant effect on the recognised equity for listed firms in Norway (see 5.3).

2.7 The current accounting rules for pensions

2.7.1 Overview of general principles of pension accounting for defined benefit plans

In the Basis for Conclusion of FAS 87 the Board, as early as in 1986, very precicely described the fundamental accounting issues and treatment of pensions: Pensions are exchange for services provided by the employee in addition to current wages and other benefits, and hence part of an employee's compensation. Since payment is deferred, the pension is a type of deferred compensation. This is not an unusual accounting issue; and it follows that the employer's obligation (and cost) is incurred when the services are *rendered* (the accrual principle) (FAS 87 § 79). Hence the complexity of pension accounting primarily should be the *measurement* of the liability, due to complicated pension plans, long time horizons, uncertainty etc. But in principle, as the Board also states, the most relevant and reliable information to be used is the fair value of the pension assets, and the present value of the pension obligations earned by the employees as of a certain date using current, explicit (and best estimate – my comment) assumptions (FAS 87 § 98).

But, as I will discuss, there are important deviations in the accounting rules to these basic principles.

Accounting for defined benefit pension plans can be viewed both as a way of treating assets/ liabilities, and a way of treating the cost for pensions. The IASB Framework and FASB Concepts No. 5 have specific and quite similar definitions of asset and liabilities ("assets are benefits expected to flow to the company" and liabilities are "expected outflows from the company"(IAS Framework)). Neither the Norwegian Accounting Act nor the NRS has a definition of an asset or a liability. The basic accounting principles stated in the Accounting Act focus in general on principles regarding the income-statement: the transaction principle, the earned income principle, the matching principle defines when cost should be recognised and so on. The standards issued by NRS often focus on the income statement where the focus could be assets/liabilities: pension *cost* ("Pensjons*kostnader"),* Income taxes ("*Resultat*skatt") and so on. It is, however, generally assumed that legal and/or expected liabilities and constructive obligations for the firms should be viewed as a liability in the balance sheet, and assets owned by the company or expected to flow to the company should be viewed as assets.

Pension benefits are included in working contracts between the employees and the company. The company is obliged to pay the employee at retirement an annual pension of a certain amount based on the employees' future salary, length of employment, level of pensions from government, etc. The company is not free from its obligation even if it has insured or made a contract with an outside life insurance company to pay the pensions and the company has made pension deposits by paying pension premiums; if the funds are insufficient, the company has to supply extra payments to the life-insurance company. Hence, the pension contract is clearly a liability, and according to the IAS Framework and basic accounting principles (Norway) the liability should be calculated with an estimated value. In this case the gross pension liability should be the present (discounted) value of the estimated future payment.

Similarly the accumulated premiums paid (including returns) to the insurance company or a private pension fund should be viewed as part of the company's assets, since the company has the risk and rewards of the income of the funds. The assets may in some cases (with restrictions) be managed according to rules set by the company, to a certain extent be repaid to the company, etc. However, the assets are restricted funds, and in case of a bankruptcy the employees will have the payment directly from the insurance company, unaffected by the company's bankruptcy, but the employees will suffer if the funds are insufficient to pay the total pension obligations. Hence the pension assets are part of the company's assets for accounting purposes, but they are restricted assets. The IAS Framework and FASB Concepts

only list a number of different measurement bases. The specific standards override the Framework and Concepts, and financial assets are normally valued at fair value (market value) or amortised cost (initial recognition (historical cost) with amortisation effects thereafter (e.g. IAS 39 Financial instruments)). Similarly, according to the general accounting principles for assets (RL § 5-2 and 5-3) in Norway, financial assets should be valued at the lower of the value at transaction (historical cost) or market value, or in some cases at market value (RL § 5-8).

The pension liability is not based on vested obligations for accounting purposes, but the *expected* pensions. It could be argued that the present value estimate of pension liabilities including *future* (not "present obligation" or "present events") salary increases does *not* meet the definition of a liability: e.g. "…some respondents argued that … pension benefits dependent on future increases in compensation cannot be a present obligation" (FASB 87 § 138). The IASB Framework § 51 states that: "In assessing whether an item meets the definition of asset, liability or equity, attention needs to be given to its underlying substance and economic reality and not merely its legal form". Hence "reasonable estimates" (§86) including "assessments of the degree of uncertainty" (§85) of future events (the salary increase) affecting the existing liability, where the pension contract includes these future increases, should be included. Similar wording is found in the NRS regarding provisions with uncertainties and contingencies ("Usikre forpliktelser og betingede eiendeler") § 3.1: A liability should be recognised if the entity as a result of prior actions has created a valid expectation towards the involved parties that it will take economic responsibility although there are no legal responsibilities. ("at foretaket gjennom handling har skapt velbegrunnede forventninger hos berørte parter om at det vil påta seg et økonomisk ansvar uten å ha rettslig plikt til dette"). FASB 87 § 138 concludes that this is not a definition issue, but a measurement issue where best estimate should be used. In total, the liability should be calculated based on the company's expected net pension settlement (based on the employees expected salary at time of retirement, the expected level of governmental pension over the expected years of pension payment, but it will include the scenario that the employee will not work until retirement or accept early retirement). Kvifte (2004) follows a similar line of argument (5.3.1).

The accounting principles for the recognition of pensions are based on the matching principles (e.g. IAS Framework § 95 and a basic accounting principle in the Norwegian Accounting Act

(RL § 4-1.3)). The idea is that as the employee is working, he gradually and systematically earns his right to his future pensions as a part of his total salary compensation, and hence the pension cost should be matched to the value and income he generates. NRS 6 normally recognises the periodic pension cost according to the linear method; an amount equal to 1/n of the employees' total pension benefits is recognised each year, where n is the number of years required to earn the full right. The Projected Unit Credit Method in FASB 87 (§ 40) and the benefit formula under IAS 19 (§ 64-65) is similar to this principle, but based on the actual benefit formula used to calculate the pension benefits attributed for each period (see 2.7.3 for a discussion whether there are differences between NRS 6 and IAS 19). Conceptually however, it could be discussed whether the annual recognised amount should be more closely linked to the employees salary level (which can be viewed as the company's perceived value of the employee), i.e. that the annual recognised pension cost should not be 1/n of the total pension obligation, but should be linked to the salary levels in the same period vs. total expected salary.

2.7.2 A brief overview of the NRS 6 for pension cost

Defined contribution plans: The actual contribution for the period is recognised as the cost for the period. No liability, except for unpaid contributions for past periods is recognised.

Defined benefit plans, whether they are financed directly by the company or funded through external entities, are measured as of a date as the present value of all the benefits attributed by the pension plan's benefit formula to the employee service rendered prior to that date (the Projected Benefit Obligation; the "PBO") and the pension assets are measured at market value. In principle the pension cost for the period should equal the net increase in the net of the PBO and the pension assets. Due to accounting rules accepting smoothing (see below), the recognised net pension liability and pension cost may differ from these measures.

The PBO-calculation is based on many assumptions, most notably:

- The discount factor for the obligation
- Expected salary increase for the employee, including nominal increase of the general salary level and the individual salary level
- Expected increase in the pension after retirement
- Expected increase/decrease in the FT based on the changes in the G-factor (grunnbeløpet)

- Actuarial factors such as expected rate of death, disability factor and so on
- Voluntary retirement

The accounting literature use the term *the Accumulated Benefit Obligation*; the ABO. This is the PBO, but based on the *current and past compensation level* (FAS 87, Definitions No. 18), wheras the PBO is calculated based on expected compensation level at retirement/termination (if the pension benefit formula is based on those future compensation levels). Hence the difference shows the effect of expected salary increases on the pension liability.

The Total Benefit Obligation; the TBO is mostly used in Norway, and is the the present value of all the benefits attributed by the pension plan's benefit formula assuming that the employee will stay until retirement and receive his full pension rights. Hence this includes both the PBO (benefits as of a certain date) and additional pension benefits from future employee services.

The effect of changes in assumptions or in pension plans and differences between prior actual and estimated assumptions (called *actuarial gains and losses*) should be expensed or taken as income systematically over the average period to retirement (recommended) or within a shorter time (i.e. immediate recognition is also accepted).

As an alternative, the accumulated effect of differences between estimates and actual within 10% of pension obligations/assets can be excluded from amortisation. The difference outside the 10% "corridor" has to be expensed/ taken as income over time.

Value of the pension assets should be valued at fair value/ market value ("virkelig verdi") Fair value is the (proportional part of the) market value of the pension asset in the life insurance company/the fund. The value if assets are moved ("flytteverdien") to another insurance company (only a portion of unrealized gains are included) may be used as an approximation.

Periodic pension costs consist of:

- The service cost for the period
- Interest cost on the pension liability
- Expected (not actual) return on pension assets
- Recognised portion of actuarial gains and losses

The service cost for the year is equal to the present value of the benefits attributed by pension plan's ben formula to the employee service rendered in the *current period/year*. The service cost is calculated as (the linear principle) of the present value of the estimated benefits received at retirement by the employ including the actuarial assumptions of disability and death risk until retirement, and where n is the numbe employment years required to receive full benefits.

Net pension cost should be shown as part of salary cost (operating profit).

A net pension asset (pension assets are larger than pension obligations) in one pension plan can not be viewed as an asset for accounting purposes or netted against other net pension obligations for another plan, unless it is probable that the pension asset can be used for future (other) pension premiums.

In the notes the following disclosures are required:

- Type of pension arrangements and number of persons included
- Accounting methods including method for evaluations of pension assets and actuarial principles
- Important economic and actuarial assumptions
- A split of the net pension cost
- Actual return on pension assets and split of pension assets
- A specific description of and a table with the reconciliation of the actual vs. recognised pension obligations and assets, and a split between the difference in estimates, yields and effect of changes in pension plans.

The next page shows a copy of a disclosed note in a financial report for a listed Norwegian firm that is typical for a firm reporting according to NRS 6 (the example is from Rieber & son ASA 2004).

Rieber & Søn has pension schemes which provide the employees with future pension benefits. The benefits are in accordance with the conditions governing the pension schemes at any given time. The pension benefits which, according to the «Norwegian Accounting Standard for the Accounting Treatment of Pension Costs», are regarded as benefit plans, are actuarially calculated based on the employee's salary at the date of retirement and the number of years of accrued pension rights. The Accounting Standard forms the basis of the calculation of pension costs and pension obligations on benefit based schemes as they appear in the accounts and in this note. The Group's legal obligations are unaffected by the Accounting Standard. Overfunding has been assessed, and the accounting treatment assumes that all overfunding can be utilized.

The Rieber & Søn Group has the following pension schemes which are managed by Norwegian life insurance companies:

- A Group pension scheme which covers salaries up to 12G (G = social security contribution ceiling) for employees engaged in the company's Norwegian businesses. The scheme covers 1 180 employees at the end of 2004.
- A pension scheme with a retirement age of 67 for employees in Norway with a pensionable base in excess of the maximum limit under Norwegian tax law. This scheme covers the difference between 12G and the current salary. This scheme covers 25 employees at the end of 2004.
- For members of the Group's management team, the retirement age is 64. Both the company and the employee can raise the question of early retirement pension from the age of 60. This scheme covers 3 employees at the end of 2004.

In addition, provisions have been made for the company's own contribution and gift pension related to CPAs (contractual pension agreements) in Norwegian businesses, together with individual operational pensions.

Benefit based schemes in other countries:

- A Group pension scheme for business in the Netherlands. The scheme includes 54 employees.
- A statutory pension scheme for the business in Poland corresponding to one months salary for personel employed at achieved retirement age.

Figures in NOK 1 000	2004	2003	2002
Defined in contribution-based plans:			
Cost of contribution-based pension schemes	5 464	4 139	1 773
Defined benefit plans:			
Present value of benefits earned during the year incl.national insurance contributions	26 817	27 419	32 554
Interest cost on benefit obligations	39 308	37 952	34 814
Return on pension plan assets	-35 798	-33 628	-33 522
Effect of changes in pension schemes *)	-13 273	-	-
Net amortisations and deferrals	3 043	7 709	12 137
Net pension cost of benefit-based schemes	**20 097**	39 453	45 983
Aggregate pension cost in Group accounts	**25 561**	43 592	47 756

*) The pension schemes were changed in Rieber & Søn ASA in 2004, and the most significant change was the discharge of spouse pension. This implied a positive one-time effect of NOK 13.3m for the pension cost in 2004.

Figures in NOK 1 000	2004	2003	2002
Financial status pension plans:			
Accumulated benefit obligations incl. national insurance contributions	-642 841	-678 717	-628 971
Projected effect of future salary increases	-56 702	-88 055	-67 980
Projected benefit obligations	-699 543	-766 772	-696 951
Plan assets at market value	507 879	539 319	539 444
Plan assets larger/less than projected benefit obligations	-191 663	-227 452	-157 507
Unrecognised net actuarial gain and loss	76 584	102 139	59 438
Unrecognised part of pension plan alteration	19 777	38 573	42 037
Net pension plan assets/pension liabilities	**-95 302**	-86 740	-56 032
Balance sheet value of overfunded schemes	16 602	23 353	9 018
Balance sheet value of underfunded schemes	-111 903	-110 093	-65 050
Net financial status of pension schemes	**-95 302**	-86 740	-56 032

The 2003 figures include the acquisition of Nopal from the time of acquisition. Nopal is not included in the corresponding figures for 2002.

Economic assumptions:			
Discount rate	5.5%	5.5%	5.5%
Return on pension assets	6.5%	6.5%	6.5%
Salary increase	3.0%	3.0%	3.0%
Pension increase	2.5%	2.5%	2.5%
Inflation/increase in social security contribution ceiling (G)	2.5%	2.5%	2.5%
Turnover	2.0%	2.0%	2.0%

Estimated rate of participation in CPA: 10% at the age of 62 and further 75 % at the age of 64. The actuarial calculations in year 2004 were based on death rate table K63 and disability rate table IR73.

2.7.3 Major differences between IAS 19 and NRS 6, with special focus on the discount factor

Implementation of IAS 19 led to some differences in the calculated net pension obligations vs. NRS 6 calculations (see empirical descriptive statistics later). It is therefore relevant to see whether the standards have such differences, or the differences are caused by differences in interpretation by the firms and the auditors accepting this interpretation of the standard.

The major differences between the two standards regarding defined benefit plans (IAS 19 covers more areas than NRS 6) are:

- IAS 19 has stricter rules for when pension assets can be recognised as assets (limited to the net total of unrecognised actuarial losses and past service costs, plus the present value of available refunds and reductions in future contributions to the plan (§ 58)). IAS 19 also has stricter rules related to when net pension assets from one plan may be netted against pension liabilities in another plan ("has legally enforceable rights and intend to exercise" (IAS 19) vs. probable ("kan sannsynliggjøre") (NRS 6)).
- IAS 19 accepts actuarial gains and losses to be recognised outside profit and loss/recognised directly against equity, presented in a statement of changes in equity. Nr 6 does not accept this.

Several interpretation guides for IAS 19 (e.g. Ernst & Young Pensjoner, and the NRS guide for IAS 19) claim that there is a difference between NRS 6 and IAS 19 in how the PBO and the annual service cost shall be calculated: NRS 6 may be interpreted as the annual service cost should be an *equal portion* of the full pension benefits independent of the actual pension plan formula vs. IAS 19 states that the pension-plan's actual benefit formula (not necessarily linear) should be used. Since defined benefit plans in Norway are always linear, there will be no differences in practice between NRS 6 and IAS 19 for Norwegian plans, but there might be differences according to this interpretation. The assumed difference is related to the sentence in NRS 6 which states that it is assumed that the benefit is recognised by the linear method over time ("Det legges til grunn at opptjeningen skjer lineært over tid"). According to some of the members of the working group who drafted the NRS 6, the sentence is ment as a guidance, and not to be interpreted to override the recognition by using the pension plan's actual benefit formula. There was no intention to have differences between NRS 6 and IAS 19 on this subject. The sentence may cause confusion, and should be clarified.

One of the most important assumptions determining the size of the pension obligations is the discount factor. Are there differences between the 2 accounting standards' discount factor to be used?

NRS 6 states that the discount rate in principle is the implicit interest rate if the entity could sell its pension obligations in an efficient market. Hence, it states, the discount rate is firm-independent as well as independent of whether it is funded or not. As a practical rule the discount rate is the long-term risk-free rate or the interest rate on high quality corporate bonds. ("Diskonteringsrenten fastsettes som en praktisk regel til *den langsiktige risikofrie renten* eller renten på obligasjoner med særlig høy kredittverdighet" (§ 2.7)) (My emphasis.

The standard focuses on the consistency of the different assumptions; each assumption must be consistent and express the same expectations (as other assumptions, my comment) regarding expected future economic development ("De enkelte forutsetningene må være konsistente i den forstand at de gir uttrykk for den samme antagelse av fremtidig økonomisk utvikling" (§2.7)). Mentioned are expectations about development in prices, interest rates, and economic growth.

In 1994, the Norwegian Institute of State Authorized Public Accountants (NSRF) issued an implementation guide for how pension costs should be treated for accounting purposes. This guide does not give any further interpretation of how the discount rate should be defined. But, interest rate chosen as the basis for the discount rate should have a duration equal to the pension plan ("samme langsiktighet som pensjonsordningen har" (p. 32)). Another guideline book specifies that the discount rate should be based on average payment period ("gjennomsnittlig løpetid") for the pension liability (Ernst & Young "Pensjoner" p. 99).

IAS 19 § 78 states that the discount rate should be "determined by reference to market yields at the *balance sheet date* on high quality corporate bonds. In countries where there is no deep market in such bonds, the market yields (at the balance sheet date) on government bonds should be used". Furthermore in § 80: "in practice, an enterprise often achieves this (… the discount rate, my comment) by applying a *single weighted average discount rate* that reflects the estimated timing and amount of benefit payments." Furthermore in § 81: "there may be no deep market in bonds with a sufficiently long maturity to match"… "An enterprise uses current market rates of the appropriate term discount shorter term payments, and estimates the discount rate for longer maturities by extrapolating current market rates along the yield curve." § 77 states that "financial assumption should be based on market expectations, at the

balance sheet date, for the period of which the obligations are to be settled". Furthermore in § 75: "actuarial assumptions are mutually compatible if they reflect economic relationships between factors such as inflation, rates of salary increase, return on plan assets and discount rates".

As one can see there are slight differences in the wording between the two standards: IAS 19 places emphasis on the discount rate *at the balance sheet date*, whereas NRS 6 does not explicitly use this wording. The other difference is that IAS 19 states that the single "*weighted average* discount rate" may be used, whereas NRS 6 uses the wording of "the long-term discount rate". In my opinion this has lead to, probably unintended, different accounting practices for discount rates, and as a result different pension obligations. I will discuss this in turns:

- NRS 6 lacks the specific wording-emphasis on *balance sheet date*, and might in the wording be interpreted to be looking more long-term, with an acceptance of not adjusting the assumptions from period to period as long as they are internally consistent and have the same expectations of future economic development. More importantly, the Accounting Committee at the Oslo Stock Exchange stated that the assumptions are used to calculate uncertain obligations with long time horizons, and hence should not be adjusted too frequently (Regnskapsirkulære 1998).
  As I will show in 3.2.8, even small nominal changes in pension assumptions normally would imply material changes in the PBO for the firm. The Oslo Stock Exchange probably did not intend to say that the firms should not update the assumptions if the effect was material, but this is how it was interpreted by the firms and the auditors from my experience. In my opinion this misunderstanding might have caused the firms in Norway not to adjust their assumptions according to the changes in the risk-free interest rates (which should affect the G-factor, the expected salary-increase and the discount-rate simultaneously), because management and others might have assumed that the PBO would be immaterially affected.
  The basic accounting principles in the Accounting Act (1998), however, state that the accounts should *always* be based on best estimate at the balance sheet date. Hence the assumptions used to calculate the PBO must always be based on best and must current updated estimate when preparing the accounts. Hence in my opinion, the market rates at the balance sheet date should be applied as well for the discount rates under the Norwegian accounting rules as under IAS 19. However, as the empirical descriptive statistics will show, many firms did not adjust their discount rates (or other assumptions) in the years when the interest rate fell (and this should imply parallel shift in the discount rate).
  Ernst & Young (Pensjon 2003) has the same opinion: that there should be no difference between the discount rate according to NRS 6 vs. IAS 19, and that the discount rate at the balance sheet date should be used for Norwegian firms under NRS 6.
- As shown above, the other difference related to discount rates is that IAS 19 states that the single *weighted average* discount rate may be used, whereas NRS 6, including

> guides, may be interpreted as a discount rate with duration to the average time of pension settlement. But if there is a steep yield curve for interests, there is a significant difference between the long-term interest rate equal the *weighted sum* of the interest rates in the yield curve (e.g. over 34 years) (IAS) vs. the interest rate with duration (e.g. the 20-year interest rate) equal to the average time to pension settlement (NRS 6 interpretation). As of March 2005, the interpretations resulted in interest rates of 3,97 % and 4,4 % respectively (see 3.2.5 for calculation). In my point of view the different wording and practical implementation is unintended, but might partly explain the use of high discount factors in Norway (see descriptive statistics). The problem, however, is that this misunderstanding seems to continue in Norwegian interpretations. The Norwegian guidance to IAS 19, (NRS(V) issued by NRS, October 2004, revised January 2005) states: the interest rate should be based on the average time of the pension settlement ("i forhold til løpetiden for forpliktelsen. Løpetiden for en pensjonsforpliktelse tilsvarer gjennomsnitts*tiden* til pensjonsforpliktelsen er utbetalt" (§ 10)).

The third issue regarding the discount factor relates to the practical implementation of calculating the discount factor in the Norwegian market under IAS 19; should the risk free (state government bond) or a high quality corporate bond be used as a basis? NRS has issued guidance to IAS 19 as of October 2004, revised January 2005. Here NRS discusses the use of state government bonds or high quality corporate bonds. The reason for that is that there are no "AA" (high quality corporate bonds), only "A" rated bonds in Norway (Telenor, Norsk Hydro, Statoil). Moreover there is low liquidity in these markets, whereas IAS 19 requires that there should be a deep market (active market) in order to use these discount rates. NRS concludes that an *estimation* of a corporate bond rate should be allowed when interpreting IAS 19, although there is no "deep market" of such bonds. The Financial Supervisory Board of Norway asked the IFRIC (International Financial Reporting Interpretations Committee, a committee under IASB) to comment on the issue. The issue was a "Potential agenda item" and discussed in the IFRIC Update April 2005 p. 7, where they state that "a synthetically constructed equivalent to a high quality corporate bond by reference to the bond in another country may not be used to determine the discount rate". The Financial Supervisory Board of Norway concludes from this that in Norway the governmental bond rate (without adjustments) should be used as the discount rate (May 25. 2005). All major auditing firms in Norway now support this conclusion. Using the governmental bond-rate without adjustments will lead to a lower discount rate and hence a higher pension-obligation than including a risk-premium or using a high quality corporate bond rate. In my opinion these arguments and conclusions are not in line with IAS 19. The IAS uses the term (§78) "the rate used ……

should be determined by *reference* (my abbreviation) to market yields … on high quality corporate bonds. In countries where there is no deep market in such bonds, the market yields … on government bonds shall be used." Hence, the discount rate, in my opinion, is not *the same* as the corporate or governmental bond interest rates; *it should only be used as a starting point before adjustments for a proper risk adjustment;* look at the wording, "be determined by *reference* to…" But the reference must be a reference that could be measured reliably, has high liquidity. Hence, if the Norwegian markets for quality corporate bonds are not deep enough, the governmental bonds should be used (agreeing with The Financial Supervisory Board of Norway) as a starting point, but then adjusted for risk.

2.7.4 Major differences between FAS 87 and IAS 19

Since FAS 87 and IAS 19 are quite similar, and I have commented on differences between NRS 6 vs. IAS 19, I will only comment on differences between SAF 87 and IAS 19.

Pensions are included in the Convergence project between FASB and IASB (formalised in the Norwalk agreement in 2002). Hence there have been and are developments in both standards (IAS 19 and FAS 87) to reduce or eliminate differences. As of September 2005 there were still, however, many and some significant differences.

Ernst & Young has an internal guide of differences, and over 100 detailed differences between the 2 standards are listed. In the following I will only discuss the major differences regarding defined benefit plans:

- IAS 19 recognises immediately past service cost (increase/decrease in the PBO caused by plan amendments) related to benefits that have been *vested*, but FAS 87 in general accepts it to be amortized over the expected time period the employee will stay active and receive benefits from the plan. See the discussion in 2.8.1 of these two principles.
- IAS 19 has no minimum liability requirement vs. FAS 87 that at a minimum requires the accumulated unfunded benefit obligation to be recognised.
- IAS 19 has limitations on recognition of pension assets (not in excess of accumulated unrecognised losses from errors/ benefits from plan changes) vs. FAS 87 has no limitations.
- IAS 19 permits the recognition of actuarial gains or losses directly in the statement of equity; FAS 87 does not permit this.

2.8 Areas where pension accounting differs significantly from the Framework/Concepts and accounting for similar assets/liabilities in IAS/IFRS, FAS and NGAAP

There are at least 5 fundamental aspects that are unique to pension accounting and are similar in the 3 standards:

1. Deferred recognition
2. Net cost presentation of all pension costs and income
3. Offsetting pension assets vs. pension liabilities
4. To accept recognition of unknown (not reliable) returns of pension assets as income, and measure the income as the expected return.
5. Not to include all costs in calculating the pension obligation

The 5 aspects will be discussed in relation to the general framework and/or other similar costs/liabilities in the standards.

2.8.1 Re. 1) Deferred recognition

The *deferred recognition* ("delayed recognition" in the original FAS 87 pronouncement) feature means that changes in the pension obligation (including those resulting from plan amendments) and changes in the value of assets set aside to meet those obligations are not recognised as they occur, but are recognised systematically and gradually over subsequent periods. All changes are ultimately recognised except to the extent they may be offset by subsequent changes, but any plan changes that have been identified and quantified await subsequent accounting recognition as net cost components and as liabilities or assets (FAS 87, summary).

The accumulated deferred recognition (often called the accumulated unrecognised or unamortized amounts) is disclosed in the footnotes as a reconciling item between the balance sheet amounts and estimated pension assets and liabilities using current estimates.

All 3 standards (FASB 87, IAS 19 and NRS 6) explicitly state that the deferral principle is not in line with their overall framework/concepts of accounting principles:

- FASB has chosen deferred recognition of gains and losses as "the best pragmatic solution ….without conceptual basis" (§ 178 in FAS 87). The solution came as a response to the massive critique and lobbying against the original proposed rules in 1987: "A number of respondents expressed concern about the volatility".
- IAS 19 BC § 2 also states: "In particular….. it would be preferable to recognise all gains and losses immediately". IAS 19 refers to "other international accounting standards" as a reason for accepting the deferral method.
- NRS 6 states, "the effect should be recognised in the period when the assumptions are changed" (my translation) (§ 2.6) (re-actuarial assumptions, but similar for plan changes and asset gains). NRS 6 explains the deviation from the basic accounting principles by stating that this treatment is in accordance with international practices and other accounting standards.

Both NRS 6 and IAS 19 refers to "other international accounting standards" when they accept deferred recognition, but the only one to refer to is US GAAP's FAS 87, which was the first statement about pension accounting based on the asset/liability recognition.

But FAS 87, in Basis for Conclusions (§ 84) states "the deferred recognition conflicts in some respect with accounting principles applied elsewhere". In fact: FASB Concepts No. 6 "Elements of Financial Statement", issued in 1985 defines assets and liabilities. Assets are defined as "probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events". Similarly, liabilities are defined as "probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transaction or events".

IASB has the basic accounting principles stated in "Framework for the preparation and presentation of Financial Statements" ("IASB Framework") (approved in 1989). IASB Framework defines assets and liabilities, and income/expenses are recognised as an increase/decrease in net assets (§ 92 and 94). Assets are defined as (IASB Framework § 49a): "An asset is a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity", and liabilities as a "present obligation of the entity rising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits" (§ 49b). As one can see, the definitions are very close to that of FASB Concepts, and in general IASB Framework has taken many of the ideas or wordings from FASB Concepts (Ernst and Young International GAAP 2004). Hence the portion of the recognised pension assets in the balance sheet (because the pension assets are increased in each period by the *expected* and not the

actual income on pension assets) above the PBO (which is the best estimate of "probable future economic benefits", which is "expected to flow") does not meet the definitions above of assets. Similarly the recognised part of the pension liability exceeding the best estimate of the PBO is not a liability (not "probable future sacrifices" or "expected to outflow") according to the liability definitions above. Hence the deferral principle under IAS 19 is a violation vs. the IASB Framework and FASB Concepts. Kvifte (2004) agrees (5.3.1.2). NGAAP has not defined assets and liabilities, so the discussion is not relevant here.

Changes in estimates are something that occurs after the initial recognition, and it could be argued that the deferred recognition is related to limitations in the Framework or Concepts for changes in assets or liabilities *after* initial recognition. FASB Concepts No. 5 § 90 however states regarding recognition and measurement after the initial recognition: "Information based on current prices should be recognised if it is sufficiently relevant and reliable" and FASB Concepts state that recognised liabilities with uncertainties (always) should be based on the most current information. Accordingly, recognition of changes in estimates as in FAS 87 should not be deferred.

The IAS Framework requires using "best estimate" at the time of issuing the financial report. This indicates immediate and full recognition of the effect of changes in estimates. IASB, however, has currently reissued the specific statement regarding estimates, IAS 8. A change in estimate is *defined* as "an adjustment of the carrying amount of an asset or a liability"(§ 5). I read carrying amount as the recognised amount in the balance sheet. The definition is confusing; a change in estimate is a measurement discussion (and following the general principles in the Framework of reliability (§ 31), reasonable estimates (§ 86), and neutrality (§36)) should be done by estimating the expected, unbiased value based on the most recent information (relevance (§26-28)). Whether the carrying (the recognised) amount should be adjusted for this change in estimate is a recognition issue. In the definition these two issues are combined in an unusual way. In my point of view this is done more precisely in § 37; "To the extent that a change in an accounting estimate gives rise to changes in assets and liabilities…it shall be recognised by adjusting the carrying amount." IAS 8 §36-38 requires that changes in estimates have to be accounted for prospectively defined as recognizing the effect of the change in the accounting estimate in the period of the change, but also in *future periods if the change affects both*. Hence, the deferral of pension estimate changes follows this principle of allocating the effect also in future periods. But a change in estimates affecting

the PBO does not relate to employee service rendered for future periods. Hence, the deferral of new pension estimates is accepted neither under the Framework nor the parallel to IAS 8.

Under NGAAP the basic accounting principles (RL § 4-1 to 4-6) in the Accounting Act are the basis for all accounting rules. RL includes some specific accounting principles and some exceptions to the basic principles in § 5-6 through 5-16. All NRS' should be in line with the Accounting Act. RL § 4-2 states that when there is uncertainty, best estimate shall be used on the basis of the information available at the time of the issuance of the financial report. This basic principle is applied in the accounting standard for changes in estimates and events, NRS 5: § 3-3: The effect of changes in accounting estimates shall be recognised in the period of the change ("Virkningen av estimatendringer inngår i … resultatet i den perioden estimatet endres"). The law and NRS 5 were implemented after NRS 6. However, the NOU (1995) of the Accounting Act (1998) states that many of the basic accounting principles and measures in the new law were the underlying or implicit principles prior to the new law. The recognition of uncertain and remote obligations (similar to pension obligations) was first discussed by the Accounting Advisory Council ("Regnskapsrådet"), appointed by the Ministry of Trade (now the Ministry of Finance), and they issued a statement on good accounting practice ("uttalelse") in October 1989 regarding expenses related to material obligations to remove fixed assets after their use ("fjerningskostnader"). They concluded that such obligations should be recognised using best estimates, and estimates should be updated and changes recognised in the period of the change. Similarly, the preliminary NRS 5 regarding construction contracts concluded that recognition should be based on expected, future profits, and that changes in estimates should be recognised in the period of the change. This is the reason why NRS 6 (in 1993) states that differences between actual and estimates, changes in estimates and new pension plans are changes in accounting estimates and/or events in the current period and hence *should* be included in the current period's earnings (e.g. § 2.6).

However, there is a distinction between changed estimates vs. *changes in pension-plans* (named plan amendments in FAS 87*)*, and hence the accounting rules are different for changes estimates and plan amendments. It could be argued, that when a firm and their employees accept an improved pension plan, that, yes, this immediately increases the vested and estimated pension liability, *but this might also* be viewed as a trade-off for lower future salary increase. It is difficult to argue that the firm just hands over increased pension benefits as a free gift. In efficient markets this is a result of negotiations seeking the overall best

cost/benefit solution for the current and future total salary compensation. Hence, there are better arguments for accepting deferral of plan changes than estimation changes and deviation between actual and assumptions according to IAS 8 § 36, because the plan change might affect future periods. This is also FASB's view: "The Board believes that a future economic benefit exists, that the cost of acquiring that benefit can be determined, and that amortisation of that cost over future periods is consistent with accounting practice in other areas" (FAS 87 § 159). But the argument does not hold in my opinion: The principles in the Framework, the Concepts and the basic principles of *conservatism*/*prudence*, *do not* accept deferring expenses that could be matched with revenues (here cost/savings) if those revenues cannot be measured reliably (e.g. IASB Framework § 97-98: "An expense is recognised immediately … when … future economic benefits do not qualify for recognition as an asset" or "in those cases when a liability is incurred without the recognition of an asset"). It is very difficult to claim that the future salary-savings or increased employee effort from the improved pension plan can be measured reliably.

IAS 19 does not accept to defer vested benefits, but requires that the *unvested* part of the increase in PBO from plan amendments should be deferred, and recognised on a straight line basis over the average period until the benefits becomes vested (§ 97). NRS 6 has the same rule. The reason why the vested/unvested part is an issue, is the fact that in many pension plans the employee will not receive any pension benefits if he leaves before x number of years of employment (e.g. 5 years in some US plans, 3 years before the new law in Norway, now 1 year in Norway). However, the employee earns his pension benefits from the day he enters the plan, and will receive these benefits if he stays longer than the minimum requirements. Hence, for a new employee the pension benefits earned the first period are conditional, and for the firm it may be viewed as a conditional or (using the former IAS definition of contingent) a contingent obligation. But a conditional obligation does not explain the IAS 19 accounting rule of deferring unvested pension obligations; the critical event in establishing the pension liability occurs when the employees' services are rendered (FAS 87 § 79). The legal date of vesting serves merely to confirm an event which in substance occurred some years before (Henriksen and van Breda 1992 p.748). Current unvested benefits that are expected to vest are probable future sacrifices, and hence liabilities (FAS 87 § 149). The only accounting issue is how to estimate the value of the unvested part; how many of the employees will stay until their pension benefits are vested. But this is similar to the measurement problem related

to estimating the PBO in general; how many of the employees will stay until retirement (the turnover issue). According to general accounting theory and to the accounting rules in IAS 19, FAS 87 and NRS 6 this should be based on best turnover estimates. There is no reason why the same principle should not be applied for the unvested portion. Hence the IASB argument for deferring unvested benefits because "any method of attributing non-vested benefits to individual periods is essentially arbitrary" (IAS 19 BC § 53) does not hold. A better argument is the one stated in § 97 that plan amendments are changes in return for employee service over the period until the benefits concerned are vested; "we improve the plan, but then you have to stay here some more years before you receive the benefits". However, in my opinion, in line with my arguments against the deferral of plan amendments under FAS 87, the matching principle of service rendered and the related pension cost by using best estimates for deferred compensation, this argument does not hold either.

Hence, the pension accounting accepting deferred recognition in the income statement and balance sheets is in violation of the IASB Framework, the FASB Concepts and basic principles in The Accounting Act in Norway and, in my opinion, differs from the principles in similar accounting standards.

The UK standard setters recognised this, and the FRS 17 Retirement Benefit (accepted November 2000, however implementation has been deferred waiting for IAS/IFRS-updates) requires assets and liabilities to be recognised at fair value in the balance sheet. Pension cost in the income statement is split between operating cost and financial items. Differences between actual and estimated assumptions are, however, only shown outside the income statement in a "statement of total recognised gain and losses" corresponding to the US "comprehensive income". FRS 17, which states that it attempts to be more principle based than IAS 19, however accepts to deferral the non-vested part of plan amendments. Based on my discussion above this is difficult to understand.

So, why is the deferral accepted in FAS 87, IAS 19 and NRS 6?

- FASB Concepts state that it is accepted that the specific rules might violate certain statements in the FASB Concepts (SAS 69, and reconfirmed in the exposure draft No. 1300-001, April 2005: The Hierarchy of GAAP § 3). And the Board accepts this for pension accounting: "The Board believes that it would be conceptually appropriate and preferable to recognize… either with no delay in recognition of gains or losses, or perhaps with gains and losses reported currently in comprehensive income but not in earnings" (FAS 87 § 107). But the Board concludes that "it is not practical at this time to require accelerated recognition of those changes in financial statements as they

occur" (§ 102), and immediate recognition "would represent an unacceptable radical change (for whom… my comment) from current practice" (§ 159) acknowledging that this "excludes the most current and most relevant information" (§ 104). It is important to recognize that the accounting rules for pensions in FAS 87 are a result of massive lobbying and negative response – not pure, theoretically founded, sound principles (e.g. FAS 87 § 95, 99-102 and Henriksen and van Breda 1992). Remember that this was written in 1985. Twenty years later the time should be right to recognise changes in estimates and plans/obligation fully when they occur.

Pensions are part of the Convergence project between IASB and FASB, with the objective to eliminate differences but also improve the standards from the two standard setters (Norwalk agreement 2002). So far, removing the deferral method has not been proposed by FASB (FASB homepage; www.FASB.org, Research projects, current status, Pensions, updated October 2005), only increased note disclosures requirements (FASB Exposure Draft 1025-200).

- Also IASB accepts and is aware of the conflicts between the Framework and the principles in the individual standards. If so, the individual standards override the Framework (this overriding principle/hierarchy principle is strangely enough not presented in IASB Framework, but in IAS No. 1; "Presentation of Financial Statements" § 15 and in IAS No. 8: "Accounting policies..." § 7-10). Hence, it is accepted that e.g. the accounting rules for pensions do not fit with the principles in the Framework.

  The board fully recognises this (e.g. in proposed amendment to IAS 19, April 2004 BC5 to BC17), "The Board does not accept (the) arguments for deferred recognition. Immediate recognition provides more transparent information than deferred recognition". The Board believes that deferred recognition is inconsistent with the IASB Framework". However, the Board still decides "to allow such an option further" (e.g. the allowance of both deferred and immediate recognition). However, deferrals must be included in a "comprehensive income" type statement ("the statement of recognised income and expenses). But, as an option, the amendment now allows actuarial gains and losses to be recognised to equity (not in the income statement). The Board acknowledges that further development may be necessary as it progresses with its project on comprehensive income. (Proposed amendment to IAS 19).

- Under NGAAP, deviations from the basic accounting principles may only be accepted by reference to the Accounting Act. And the acceptance is in RL § 4-2: Deferred recognition of estimate changes may be accepted according to good accounting practice ("med mindre resultatføringen kan utsettes i samsvar med god regnskapsskikk"). Deferred recognition of changed estimates is rarely found in other NRSs; perhaps the only other similar example is the acceptance to defer the effect of revised estimated life of an asset over the remaining life ("knekkpunkts-løsningen"). An example similar to pension assets is the accounting rule not to recognise changes in value for fixed interest loans. The only reason given for the acceptance of the deferral is that this is accepted by other countries' standards and practices (NRS 6), and the only reason why this does not violate the law is RL § 4-2.

It is difficult to understand the continued acceptance of deferral recognition for pension, especially compared to the evolution in other accounting standards, from deferral of

unrealized profit *to* market/fair value recognition of financial instruments, the use of fair values for biological assets including unrealized income, etc. It is, for example, very difficult to see the arguments for differences in accounting principles between the investment portfolio of a financial instrument and a pension asset portfolio.

Use of the "corridor" is not a deferred income/cost principle, but a use of the materiality clause (IAS Framework § 29 and FASB Concepts No. 1): It smoothes the effect of small changes in estimates with high uncertainty, and where these small changes in assumption estimates have large value/earnings effects. Materiality is not explicitly stated in the Accounting Act, but is understood to be an underlying principle, and is discussed in NoU, Regnskapsloven, 1995. The use of materiality can be found in rules such as RL § 3-8 regarding non-consolidation of immaterial subsidiaries, the criteria for writing down fixed assets (F NRS "Nedskrivning av anleggsmidler"), the acceptance for the use of average cost or inventories (§ 5-3), etc. However, the trend over the last years in developing accounting rules and in practice has to be more accurate with estimates and have lower materiality levels about when to recognize changes in estimates. The main problem with the corridor however, is how it works: The accounting rule is *not* to recognise *all* deviations outside the corridor (which would be the logical thing to do under the materiality criteria), but to recognise only a *portion* of the amount *outside* the corridor, by amortising the amount over the remaining period to settlement. The result is that many firms have material unrecognised amounts when the deferral is combined with the corridor principle (see descriptive statistics later for listed firms in Norway).

2.8.2 Re. 2) The net cost feature

The net cost feature means that the recognised consequences of events and transactions affecting a pension plan are reported as a single net amount as part of salary cost in the income-statements. That approach aggregates at least three items that might be reported separately: the compensation cost of benefits promised, interest cost resulting from deferred payment of those benefits, and the results of investing the pension assets, where the 2 latter clearly are financial, not operational items.

The explanation for this varies in the different standards:

- FAS 87: "That approach (the net cost – my comment) aggregates at least three items that might be reported separately. The interest cost and return on plan-asset

components represent financial items rather than employee compensation cost." (§86) It does not explain why all items are showed as net cost, just states "Within features of practice that are retained…." and give practical reasons for not changing too much from prior statements.

- IAS/IFRS in general does not give detailed requirements for presentation and states (IAS 19, §119): "This standard does not specify whether an entity should present ….as components of a single item". My experience from practice with IAS/IFRS reporting though, is that most firms present pension cost as a net figure as part of operating cost.
- NRS 6 states that net pension cost should be shown as a one line item under "salary cost" (§3-3), and refers to the detailed disclosure requirements of the cost components in the notes.

2.8.3 Re. 3) The offsetting feature

The offsetting feature means that the pension assets and the pension liabilities are shown net in the balance sheet.

FAS 87 states in the basis for conclusions, that the solution is not in line with the general principles for offsetting liabilities and assets: "…are shown net… even though the liability has not been settled the assets may still be largely controlled by the employer, and substantial risks and rewards associated with both of those amounts are clearly borne by the employer" (§87).

IAS 19 Basis for conclusion does not give the reason for netting the assets and liabilities (re § 54 in the standard). The basic rules for offsetting are not dealt with in the Framework, but IAS 1 Presentation of Financial Statements § 32-35 states that offsetting depends solely on whether it is "required or permitted by a Standard", hence not conflicting with IAS 19. IAS 1 stresses the importance of reporting assets and liabilities separately, but only lists some examples of offsetting (but no general principles), where revenue/gain and related cost/loss of same transaction or group of similar transaction may be offset. This is not relevant for offsetting pension liabilities and assets.

Probably the most general offsetting rules under IAS/IFRS are in IAS 32, Financial Instruments: Disclosure and Presentation. Offsetting is only permitted when an entity has a legally enforceable right to offset and intends to settle on a net basis (§ 42). This is different than pension contracts: The firms have the pension contracts with the employees, and another contract with the insurance company/pension fund to invest pension assets and to handle insurance and payments for retired related to the pension contract and fulfilment of the

obligations are done on gross basis. In a bankruptcy, the pension assets are protected from general debtors, and may only be used to pay the pension obligations. But the fact that some assets may be reserved to fulfil certain liabilities (e.g. a secured loan) in a bankruptcy, is not unusual, and does not allow netting. Hence, netting of pension assets and liabilities are not in line with other similar standards under IAS/IFRS.

In a bankruptcy, at least in Norway – but as far as I know also in UK and US, only the premium reserve (not the premium fund; hence not all the pension assets) can be used to pay the pension liabilities, but *not* the recognised amount or the PBO, but the vested benefits (usually lower) based on the current salary.

NRS 6 does not comment why the offsetting is allowed, although it is not in line with the general offsetting rules under NGAAP described in the NoU (1995) to the Accounting Act. Referring to the EC Directive, and statement from Commission, offsetting can and must be done if there are "legal rights to set off claims and debt by virtue of the law or of contractual arrangements" (§ 7.2.5). NoU explicitly discusses the presentation of pensions in the balance sheets and the income statement, but just concludes to recommend the offsetting (and the net cost) presentation of pensions without reasoning (§ 7.6.5)

2.8.4 Re. 4) To recognise the expected return for an unknown return on pension assets.

For pension assets the accounting standards state that the *expected* (but assumed unknown) return on the pension assets should be recognised as income:

- FAS 87: "The expected return on plan assets shall be determined based on the expected long-term rate of return on plan assets." (§ 30)
- IAS 19: "An entity shall recognise the …expected return on any plan assets" (§61)
- NRS 6: The *expected* return on pension assets is included in the pension cost ("Periodens forventede avkastning på pensjonsmidler..." is included in "periodens pensjonskostnad") (§2.5).

The expected return should depend on how the portfolio of the pension assets is invested. Hence, NRS 6 states that normally the long-term return on pension assets could be set higher than the risk-free rate ("Normalt vil den forventede langsiktige avkastningen på pensjonsmidler kunne settes høyere enn den risikofrie renten") (NRS 6, 2.6) (Similarly IAS 19 and FAS 87 §).

The returns to be estimated at the time of issuing the financial report relates to the completed period/the period of the past. Hence the return is *earned* but it is unknown. According to the basic accounting principles in the Accounting Act in Norway, the earned income principle, the return should be taken as income ("Inntekter skal resultatføres når den er opptjent") (§4.-1.2) and should be valued at best estimate at the time when preparing the financial report ("Ved usikkerhet skal det brukes beste estimat, på bakgrunn av den informasjonen som er tilgjengelig når årsregnskapet avlegges") (§4-2).

Under the FASB Concepts asset returns should be recognised if they can be measured reliably:

- "The asset … must have a relevant attribute that can be quantified in monetary units with sufficient reliability". Five different measurement attributes are listed: historical cost (not relevant for asset returns), current cost (replacement cost), current market value net realizable (settlement) value" (FASB Concepts No. 5 § 65).
- "To apply the definitions of assets and liabilities … this community requires assessments of probabilities, but degrees of probability are not part of the definition" (FASB Concepts No. 6 § 47).
- "Assets are probable (def. in footnote 18: "used with its usual general meaning, which can reasonably be expected or believed") future economic benefits obtained or entitled by a particular entity as a result of past transactions or events" and "the transaction or other events giving rise to the entity's right to control the benefit has already occurred" (FASB Concepts No. 6 § 25 and 26).
- "Revenues represent actual or expected cash inflows that have occurred or will eventually occur as a result of the entity's ongoing operations" (FASB Concepts No. 6 §78).

Similarly under the IAS Framework:

- "Income is recognised … when an increase in future economic benefits related to an increase in an asset …has arisen that can be measured reliably" (Framework § 92) and "should be recognised if it is probable that any future economic benefit associated with the item will flow to or from the entity" (Framework § 83).
- "In many cases, cost or value must be estimated; the use of reasonable estimates is an essential part of the preparation of financial statements, and does not undermine their reliability" (Framework 86).

FASB Concepts and IAS Framework focus more on the reliability in the measurement than NGAAP. If one assumes that the actual returns from pension assets are unknown at the time of preparing the financial statement, the actual return cannot be measured reliably: Risky assets are more or less unpredictable (see Cochrane 2001, Chapter 20), and pension assets normally consist of mostly risky assets. Hence, it does not satisfy the reliability criteria in the Framework or Concepts – and according to this, in my opinion, one could not recognize the

unknown return on a pension asset. It is only the ranking order of the specific statements (here IAS 19/ FAS 87) vs. the Framework/Concepts that permits the recognition.

Nowadays good estimates on the actual return on pension assets are more or less known for the year when the financial statement is prepared in January or February the year after. It is even a requirement in the standards to disclose the (estimated) actual pension asset return, and several (but not the majority – see descriptive statistics) of listed firms in Norway disclose the information. Hence, the (estimated) actual return should be recognised according to the Framework, Concepts or the basic accounting principles in Norway.

At the time when the FAS 87 was issued (1985), however, (by which IAS 19 and NRS 6 are heavily influenced), the insurance firms did not have their final or even estimated returns for the firms' pension assets ready at the time of preparation of the financial reports – this was not calculated before spring/summer the year after. The situation was similar in Norway (I audited US firms in 1989/1990 and Norwegian firms in the 1990s). This, I think, is the reason why the standards proposed that the expected return be used, because the returns were earned, but unknown.

Hence, the formal accounting problem was how to estimate the unknown but realized return on a risky asset/portfolio. Finance theory gives us support for such valuations (e.g. see Cochrane 2001,Ch. 1-4). The asset pricing theory, according to Cochrane (2001), shows that the expected return of a portfolio of assets is the portfolio – weighted average of the expected returns of the individual assets in the portfolio. With risk averse investors (preference is for higher means of return, and lower variance with homogenous beliefs and a frictionless, complete market) the prices in the market are consistent: The expected return for a riskier (higher variance) is higher than for a less risky asset. Hence, perhaps one could argue that one should recognise a higher income for a risky asset than for a non-risky asset. But the theory also implies that there are no arbitrage possibilities: If one should sell the two unknown returns, the return for risky assets vs. the return from the risk free asset, the price would be the same: The price of any asset (under the property of the consistent price system/existence of a state price measure) can be shown to be equal to its expected nominal (krone/dollar) return under the risk–neutral probability measure q (Eq), discounted at the risk-free rate (E.g. Cochrane 2001 Ch. 3.2):

Where

p = the current price of the asset

r_f = risk-free total return given by the sum of all nominal returns in all the states

R = vector of nominal return at end of the period

Hence the expected return is

That is, a rational investor will pay the risk-free rate for unknown returns from assets with different returns, when choosing between risk-neutral probabilities. Hence, one could not take as income more than the fair value, what could be settled at the market, and this is the risk-free rate.

Hence, according to the finance theory described, the best estimate for the value of an earned, unknown return is the *risk free rate.* Using the basic principles in the NGAAP or the IASB Framework or FASB Concepts would lead to the same result, e.g. IAS Framework suggests settlement value as a measure. This would be the risk-free rate; a realized, but unknown return would be expected to be sold at the risk-free rate as settlement value. Current cost will give more or less the same result, as this is "the amount to be paid if the same asset was acquired currently" (IAS Framework §100(b)), and a buyer should pay the same as the settlement price if there are no transaction costs and efficient markets. It is not easy to see why the pension standards have concluded differently (the expected value, and not the risk-adjusted expected value).

For pension assets in Norway there is an additional problem:
Most firms in Norway have their financial assets in/managed by life insurance firms, with no/little influence over the asset allocation or investment strategies. The insurance firms have to guarantee a return on assets of 3% p.a. (sometimes higher)(before administrative costs). In return, the life insurance firms have tight restrictions on their asset allocations (by law) in order to reduce risk. With higher returns, the insurance firms may retain some of the surplus. In sum, it is difficult to judge whether the value of the pension asset is equal to market value of similar assets without such restrictions: The return clearly has lower variance; lowest return 3% and reduced maximum return since high risk profiles are not accepted. Hence*, if*

the returns are unknown in Norway, the risk-free rate should be used, but not lower than the guaranteed rate. This is in accordance with "best estimate" and "reasonable estimates".

These days, however, with quite precise estimates on the actual returns on pension assets shortly after the end of the period, there is no good reason why the accounting standards should not require the (estimated) *actual* returns to be recognised as income and adjusted to pension assets.

2.8.5 Not to include all costs in the pension obligation calculation

In none of the standards for pensions (IAS 19, FAS 87 or NRS 6) are administrative costs mentioned or included in the costs (service cost or similar) when the pension obligation is calculated. But the insurance company or fund will charge administrative costs in the future to run and pay out the pension benefits. (The return on pension assets is calculated net of administrative cost, so this is not an issue). This issue is similar to the case where the insurance firms cannot charge the firms or individuals for future administrative costs, but the insurance firms have to perform the work. In Norway now, the insurance firms, according to accounting rules for insurance firms defined by The Financial Supervisory Board of Norway, have to – and have – accrued /recognised the estimated administrative expense.

Similarly, and in line with the liability definition in the Framework and Concepts, and "best estimate" in the Accounting Act, all future expenses for the firm related to administration and payment of the pension benefits included in the PBO should be estimated and accrued for and recognised as a pension cost. The issue has been raised informally recently in IASB and related working groups working with suggestions for improved pension accountings standards.

2.9 Summary

Henriksen and van Breda (1992) in their text book "Accounting theory" sum up the discussion of accounting for pensions: "Pension accounting is a magnificent example of all

that is right and wrong with accounting" (p. 757). On the side of right, they continue, there is the careful handling of present values and the continued evolution of the standard as understanding of pension systems and related accounting develops. On the negative side, there are all the political compromises that have taken what was a relatively straightforward economic exercise and turned it into a complex and, at times, obscure set of accounting requirements.

As shown, especially FASB, but also IASB and NRS are fully aware of many of the negative sides. They have tried to modify them in two ways:

- By explicitly stating at the implementation of IAS 19, FAS 87 and NRS 6 that the development of the standards should be a continuing process towards "good accounting practice". However, as I have shown, if one compares the development of the pension accounting standards vs. the development of many other accounting standards (e.g. financial instruments with increased focus on immediate recognition of fair values), it is my opinion that the gap has widened rather than closed in last 10 years or so.

- By requiring a high level of disclosures in the notes that shows both the full reconciliations of differences between recognised amounts and best estimate amounts, and by disclosing the key assumptions. The complexity of pension accounting, combined with the unusual accounting treatment are used as the explanation for the high level of required disclosures in all standards. Perhaps NRS states this most explicitly as the standard states; due to the netting and the offsetting feature and the deferred recognition, additional information is required to be disclosed. (NRS 6, § 2.7). FASB issued exposure draft 1025-200 in September 2003 with the objective of helping investors better understand defined benefit plans. "The Board concluded that disclosures about pensions could be improved to provide information that would better serve the users' needs". (Why not just remove the abnormal accounting rules.(my comment)).

  This way of reasoning seems to stem from a point of view that the users and the market may utilize equally, or almost equally, publicly available information, regardless of whether the information is recognised or not, and whether the information is displayed "visibly" on the face of the balance sheet or "hidden" in the

notes. Bernard and Schipper (1994) confirm that this tends to be the view of the regulators, and that this point of view is followed by the academics (Dechow and Schinner 2000 and Fields et. al. (2001)). However, as my literature review will show, this has been proven wrong in many empirical studies (see 4.1.2). More importantly, this view is not in line with the statement in the Concepts or the Frameworks, which distinguish between the importance of recognised and disclosed items.

"Since recognition means depiction of an item in both words and numbers, with the amount included in the totals of the financial statements, disclosure by other means is not recognition". (FASB Concepts No. 5 § 9). IASB Framework § 21 states that notes are additional information that is relevant to the needs of the user, about risk and uncertainties, and supplementary information, clearly indicating the lower rank (but importance) of notes vs. recognition. IASB, in the former version of IAS 1 (up till 2005), in fact made a point regarding firms "repairing" improper use of accounting rules by adding disclosures, but this could also be used as a critique of the "repair" of the pension accounting standard: "Sometimes a wrong or inappropriate treatment is adopted for items in the balance sheets, income statements or profit and loss accounts, or other statements. Disclosure of the treatment adopted is necessary in any case, but disclosure cannot rectify a wrong or inappropriate treatment" (Withdrawn IAS 1 § 10). The NoU (1995) to the Accounting Act has an almost identical statement ("Det er imidlertid ikke meningen at man skal kunne rette opp feil eller mangler i regnskapsføringen ved å gi noteopplysninger om forholdet").

Aside from these fairly general observations though, there is little guidance in the authoritative literature as to the relationship between note disclosure and disclosure and/or recognition in the statements themselves.

Schipper held a speech at the AAA conference 2005 that got considerable attention. Here she addressed the importance of disclosed information vs. recognised information. She states that "disclosures and recognition are *not* alternatives". She discusses the treatment of unrecognised pension items under FAS 87 and 132, and questions whether the disclosure effectively compensates for not recognizing the amount, when this is preferred. She refers to the theory of investors who are not subject to constraints on ability to process information, but concludes that, "based on results of experiments, users appear to underweight (or ignore altogether)

disclosures". As a board member of FASB, these viewpoints could be worthwhile to consider when discussing recognizing actual returns, fair values and best estimates of pension assets and liabilities and not allowing offsetting or net cost presentation in the standards.

3. Valuation of pension obligations vs. the valuation method in the accounting standard for pensions

In this chapter I will discuss how the pension data in financial reports should be used when performing a firm valuation. First a theoretical valuation is discussed. Then, the adjustments needed to be done to reported pension data are discussed bringing up some of the accounting discussion from the prior chapter. Since I will test later the valuations performed by analysts, in the last part of the Chapter I calculate and discuss the specific pension assumption values to be used. Finally I construct a combined pension assumption factor (the "PAF") that I can use later to compare assumptions used between firms, test for earnings management and select firms with abnormal PAFs that can be tested on analysts.

3.1 Theoretical valuation of pension liabilities (and assets)

Pension assets should be valued at market value. There is some debate (and accounting differences between the different accounting standards) about what defines the market value of pension assets; the settlement value if assets are moved to another insurance company ("flytteverdien"), or the firm's portion of the insurance company's recognised value of pension assets (does not include all unrealized gains) or the firm's portion of the full market value of the pension assets in the insurance company. However, normally the differences are marginal, and I will not discuss these further. I will focus on the more complex issue: How to value the pension obligation under defined benefit plans.

Pension obligations are fulfilled by paying out pensions to the employees in their retirement period. The employee's total pensions are based on how long he is expected to live (or a pre-defined pension payments period (e.g. 10 or 15 years)), with annual payments based on his salary level when he retires multiplied by the promised pension level (e.g. 60%). The annual pensions are increased by the agreed yearly pension adjustment (fixed or return-dependent). Most of the pensions are adjusted only by the actual return of the (remaining) pension funds for the employee.

The employee may also have an early retirement option (AFP (Avtalefestet Pensjon) or the like, see 2.4). This is an extra obligation, since the firm pays a part of the early retirement pension.

Hence, the pension liability for a firm for one employee could be expressed as the sum of:

1. The employee works till ordinary retirement (typically at 67 years)

   - The ordinary pension retirement liability is the present value of the expected pension paid by the company for as many years as expected life or a specific number of years according to the pension agreement.
     Whereas
     - The annual pension is the promised pension level multiplied by salary level at retirement reduced if the employee has not worked long enough to get his full pension benefits.
     - Salary level at retirement is today's salary plus future increases in salary.
     - The pension paid by the company is the gross pension minus the pension paid by the government (Folketrygden; FT). The future amount paid by Folketrygden is based on today's FT-level and the expected annual growth in the G-factor. (As explained firms do not have responsibility in their pension obligations for changes in the FT other than the G-development).
     - The total amount is typically settled (paid cash) with the life insurance company (not the employee) at retirement based on the life insurance companies estimates of the persons expected life, expected return on the allocated pension assets etc. Hence normally the firm has little or no pension risk for a person after retirement.

2. Plus the present value of the cost of a possible early retirement; the possibility that the employee accepts early retirement in any year between 62 and 67 years of age times the cost of such an early retirement.

   - The company's own cash cost is dependent on the specific AFP-arrangement or other early retirement arrangements. Since an employee may decide which year he wants to use the option, a present value must be calculated for each year with an individual (increased, conditional) probability each year that the employee will exercise the option.

3. Minus the present value of the (saved) cost related to the probability that the employee leaves (called the turnover factor), dies or becomes disabled in any year before event 1 and 2. In this case he will only receive his pension benefits (normally paid cash to a life insurance company) according to his salary level and number of years in the pension plan

when leaving the firm. Since an employee could leave any year, a probability of leaving, conditional of working until that, is calculated for each single future year until retirement. The sum of the turnover effect can be measured as a reduction factor of the gross values of 1 and 2.

This is the present value of expected cash outflow to one employee for his pension benefits.

An employee is not entitled to full pension benefits until (normally) after 30 years of employment**.** The present value of the full pension benefits is called the Total Benefit Obligation (TBO)[*]. The firm's calculated pension obligation at any point of time is the employees' benefits attributed by the pension plan's benefit formula to employee service rendered prior to that date. This is calculated as a fraction (A/T) of the TBO , where A normally (depending on the pension plan's formula) is today's accumulated number of working years with the firm, and T is the required number of years to receive full pension benefits (normally 30 years).

The benefits attributed by the pension plan's formula to the employee service rendered as of a certain date (A/T of TBO) is called the Projected Benefit Obligation; the PBO.

Each year the employee normally increases his pension rights by 1/T of his TBO. This annual benefit is called the "Service Cost" in accounting, and is equal to the present value of the expected (extra) pension payment by working one year. Together with the annual interest on the PBO (the discount-rate times the PBO) this is in total the pension cost in accounting (set aside return from pension assets and partial recognition of prior estimation errors and effect of new estimates).

The principles described above are also the principles used for calculation of pension liabilities in NRS 6, IAS 19 and FAS 87.

This could be illustrated by a simple example:

An employee earns NOK 300 000, and has a gross pension level plan of 66%; NOK 200 000 per year based on today's salary level. FT pays 75% of this, NOK 150 000.

[*] TBO is not a definition used in USGAAP or IAS, but is defined and used by the Den Norske Aktuarforening in their implementation guide for NRS6. Hence TBO is used frequently by Norwegian firms.

The employee has worked 10 years of the 30 required to receive his full pension benefits. He has 20 years to retirement.

Gross pensions are dependent on how long the retiree is expected to live after retirement, and are based on average expectations from actuarial statistics. When this is known, the present value of the pension-settlement is a normal, discounted value calculation: the sum of the pensions for all living years of the pension (=cash flow), starting with the pension first year of retirement, growing each year by an expected factor for as many years as life expectation, discounted by a discount factor. In the calculations, insurance for widows, children etc. are also included. The actuarial assumptions, growth rates and discount factors are predetermined by the pension plan, actuarial statistics and Kredittilsynet, but all these assumptions regarding settlement of pensions are at the insurance companies' risk (not the firm). Hence a factor is calculated that is multiplied with first year's pension – and the total amount is settled.(Technically this is done by transferring an amount from the pension assets equal to the calculated settlement amount to a retiree fund at the insurancecompany's risk. Hence the firm's pension assets and pension liability are reduced by this settlement). Hence, I assume that all pensions are finally settled at retirement date with a predetermined factor.

With *no growth* in salary levels, *no growth* in G level, and *no increase* in pensions after retirement, the nominal value of the expected pension benefits if the employee receives his full pension rights, assuming no turnover, is:

((NOK 300 000*66% - 0,75% (NOK 300 000*66)) * 10 =

(NOK 200 000 - 150 0000) * 10 = NOK 500 000

Where 10 is an example of the present value factor of an annuity of 15 years (expected life after retirement or – as the actuaries say– the annuity adjusted for mortality).

The present value of this amount, assuming 20 years to settlement/retirement, using a discount rate of 5%, 20 years, assuming no turnover:

NOK 500 000 /$(1+5\%)^{20}$ = approximately NOK 188 000

This amount; the present value of the expected pension benefits if the employee receives his full pension rignts is the total benefit obligation (TBO), and includes factors as the current pension plan, current salary level, payments from the government, discount rates, but also (but not shown in the example) expected increase in salary, expected change in governmental payment, turnover/mortality until settlement etc.

However, the employee is only entitled to 10 years out of 30 years of his full pension benefits, since he only has worked or been a member of the pension plan in 10 of the 30 years required to receive the full benefits. Hence PBO is

(NOK 188 000) * 10/30 = approximately NOK 63 000

This will be the present obligation (PBO) calculated at year-end and disclosed in the notes.
The employees increased pension rights for the year will be 1 year out of 30 years full pension benefits (this is the Service Cost (= " SC") recognised for the year) in this case:

SC=NOK 188 000/ 30 = approximately NOK 6 265

In addition there is an annual interest (5%) on the PBO, so the sum of the service costs and the interest will grow after 20 more years to NOK 500 000 with the assumptions in this case. This amount is also recognised as part of the pension cost (interest on pension obligation):

NOK 63 000* 5% = NOK 3 150

Hence the PBO the year after should equal NOK 63 000 + NOK 6 265 + NOK 3150= NOK 72415. The test of this calculation is 11/30 of NOK 500 000/$(1+5\%)^{19}$ = NOK 72 465. The minor difference is the interest cost on the average service cost for the year

In the simplified case above no growth in parameters were expected. If we expect a salary increase ("s") per year and a growth in G factor pr year ("g"), and a discount rate ("r ") the nominal value at retirement of the pension benefits attributed as of to day, assuming no turnover, but settled "n" years from now (20 years in the example) would be:

(10 years/30 years)*NOK 300 000* 66%*$((1+s)^n$ – 75%$(1+g)^n)$*10

And the present value (the PBO assuming no turnover) would be the amount above divided by:

$(1+r)^n$

Simplified, the PBO (which includes the turnover factor) is calculated as the PBO(assuming no turnover) times a factor (less than 1) taking into consideration the possibility that the employee leaves before retirement.

A similar calculation is done to calculate the value of the early retirement.

As shown, a key figure in estimating the firm's pension liability is the expected pension to be paid the first year of retirement.

The present value of the pension paid by the firm the first year of retirement for one employee who is entitled to receive full pension benefits, and is expected to stay as an employee and live until retirement, as an approximation can be expressed as:

$$xS \frac{(1+s)^n - y(1+g)^n}{(1+r)^n}$$

Where:

x = the % of salary at the retirement date that the firm has promised as the pension level

S = today's salary level

s = expected annual increase in salary level

n = number of years to pension settlement/retirement

y = the part of the Gross Pensions to be paid by the government ("Folketrygden) based on today's salaries and rules. (By law the firms do not have a legal responsibility for changes in the Folketrygd in a defined benefit plan (Lov om Foretakspensjon § 5-5), so the y for each employee is a constant for a specific gross pension level, even if Folketrygden's pension plan is changed in the future).

g = average annual expected increase in G factor until retirement

r = discount rate

This could be illustrated as shown in Exhibit 3.1

Exhibit 3.1

The PBO for one employee is the present value of the sum of all expected years of pension payments (expected life or a defined number of years according to the plan) assuming full pension rights adjusted for by the probability that the employee do not work until retirement (the TBO) times the portion attributed by the pension plan's formula as of a date

$$PBO = M\ L\ (A/T)\ xS\ \frac{((1+s)^n - y(1+g)^n)}{(1+r)^n}$$

Where

M = a multiple reflecting expected number of years with pension payment, the expected payment increase and discounting to retirement date/settlement date (this is the multiple that the insurance firm use when they settle the pension liability at retirement)

L = a multiple between 0-1 reducing the pension liabilty by the probability that the employee leaves before his retirement. According to the actuaries I contacted (see below) this factor is in their experience between 0.7 and 0.9.

A/T = the number of years worked (A) divided by the required number of years (T) needed to receive the full pension benefits with a linear pension formula.

The pension obligation (PBO) for a firm is the sum of the pension obligations for all the employees. In addition the present value of early retiment cost is calculated to estimate the total pension liability for a firm; the AFP, where

AFP = the present value of the expected cost of the APF (early retirement pension) times the probability that the employee will use the AFP. According to the actuaries, the AFP cost for the firm is normally less than 10% of the total PBO. The assumptions determining the AFP are similar to the assumptions determining the PBO: the expected increase in salary level, the portion paid by the government as a function of G and the specific AFP agreement, the discount factor, in addition to the probability that the employee uses his option to use the AFP and when he uses his option.

In a present value calculation of pension obligations, all scenarios (states) with their related probabilities for different pension plans should be calculated to get to the expected cash flow. The accounting standards use only the current pension plan as a basis for the pension liability calculation. In complete valuation models, all possible pension plans should be considered with their value/cash flows and related probabilities to calculate expected cash flows. I will use only the current pension plan as a proxy for expected cash flow, unless there are specific

expectations to change the current plans. The reason for this is that in efficient labour markets, changes in pension plans would normally be a trade off against salary levels and hence leave no net value effect.

Most sell-side analysts in Norway (see Appendix 4), start the valuation with estimating and discounting profit and/or cash flow from *operations* to calculate the enterprise value of a firm and then subtract net financial assets or debt to get the estimated market value of equity. Hence it is convenient to apply the split of pension liability according to the Feltham-Ohlson model ("F-O model")(1995, 1996) described in Christensen and Feltham (2005).

Following Christensen and Feltham*:

$V_t = FA_t + OA_t$

(operating cash flow model)

(residual income model)

Where:

V_t = market value at time t (current value) of the firm

r_t = risk adjusted discount rate for period t.†

* assuming: no arbitrage, clean surplus relations (CSR) (i.e. that all changes in owner equity are the result of accounting earnings and net contribution to owners), the financial asset relation (FAR) (where all transfers to equity holders are made through the financial assets, and financial assets are only influenced by financial income and net cash flow from operations and measured at fair value), and the operating asset relation (OAR) (operating assets are only influenced by operating earnings and net cash flows to/from financial assets.

† The F-O model use the riskless spot interest rate (risk free rate) and risk adjusted expected cash flows. As the survey in the appendix shows, most analysts and most of the quoted litterature in chapter 4 using the model in empirical work use risk adjusted discount rate and expected cash flows. As Christensen and Feltham (2005) point out, it is "an open question whether the latter is a reasonable approximation of the former …but their (function) clearly have different forms").

FA_t = marked-to-market value of net financial assets (financial assets and financial debt) at time t

OA_t = market value of operating assets at time t

$OA_{BV,t}$ = book value of operating assets at time t

roi_t = risk adjusted residual operating income ($oi_t - d_tOA_{BV,t-1}$), where oi_t is the operating income in period t from operating assets, and $d_{t-1}OA_{BV,t-1}$ is riskless spot interest rate (risk free rate) times the operating assets in period t-1 (opening book value).

$CFOA_t$ = expected cash flow from operating assets at time t

What the F-O model shows is that since financial assets (FA) are valued at market value, there is no sense in valuing these assets from returns or cash flows using asset-pricing models; the market has already done this. Hence, the focus in valuation should be on estimating the value of operating assets. What Feltham and Ohlson's work shows is that the value of operating assets is the same whether one calculates the value based from all future estimated *residual earnings (*earnings above required return from book value of operational assets*)* from operations or calculate the value based on estimating all *cash flows* from operations, even if earnings and cash flows are different in each year, as long as the assumptions in the model are met. As Christensen and Feltham state, the cash flow model may be viewed just as a special (very conservative accounting) case of residual income, where all operating assets are expensed fully the year they are purchased.

Introducing the value of pensions in the F-O model, including the expected service cost (SC_t =Service Cost in the future year t) in income from operations, and marked-to-market value of pension assets as financial assets (=FA_{PA}), and PBO as financial debt calculated as the present value of the expected pension cash flow of employees "earned" pension as of to day produces the following:

$FA_t = FA_{p^-,t} + FA_{PA,t} - FA_{PBO,t}$ (where FA_{p^-} is all Financial Assets excluding pension . assets, $FA_{PA,t}$ are all pension assets and $FA_{PBO,t}$ is the PBO).

$CFOA_t = CFOA_{p^-,t} + SC_t$ (where $CFOA_{p^-,t}$ is Cash Flow from all Operating Assets except for pension)

Hence:

Hence applying the accounting method for measuring pension liabilities and pension cost with the F-O model for valuation, the present value of all future pension payments may be divided into:

- A financial asset; the net of the pension assets at market value (shown in the notes) and the PBO. The PBO represents the employees "earned" rights as of today and which could be settled in the market place at market value if there was an efficient market for pension liabilities. The pension liabilities (PBO**)** in the notes are the present value of cash flows of the employees "*earned"* pension rights as of today – if calculated properly. This can be viewed as an interest bearing liability/a financial asset.
- A part of the (future) operating income: The yearly service cost recognised as part of the net pension cost in earnings is the present value of the cash flow from the increased pension rights derived from having the employees working one extra year. Hence the expected future service costs may be used in the estimated future operating cash flow in the F-O model.

The F-O model does not specify, however, what is included in financial assets and financial debt, and what is included in income from operations. This is not crucial; the model only requires that there exists or is possible to estimate marked-to-market values of some financial assets, and that the income/cost included in income from operations must *not* come from financial assets/financial debt (a mutually exclusive, completely exhaustive principle).
Applying the F-O model on pensions one could split the different components between financial assets and operating income in at least 3 different ways (where the PBO/SC split was desribed above):

1. Annual pension *premium* paid is part of cash flow from operations, the net of pension assets and the pension obligation equal to the employees' vested benefits is included in net financial assets.

2. Annual pensions *paid* to the employees are part of cash flow from operations, (gross) pension assets (only) are included in financial assets.

3. Annual service cost is part of operating income or in operating cash flow, pension assets and the calculated PBO liability are included in financial assets.

Re. 1:

In a funded plan, the firm pays an annual pension premium to an insurance company/ fund, based on the pension obligation equal to the employees' vested benefits. The annual premium is based on changes in salary levels, number of employees, pension plans, asset returns etc. Hence, the pension premiums vary a lot from year-to-year: The premium paid is based on other sets of calculation rules than the accounting rules, for instance, every salary increase requires immediate premium payment for all previous years the employee has been a member of the pension plan, since the required funding of vested pension benefits is based on the actual salary level each year. Hence it is almost impossible to use historical premiums paid as a basis for estimating the future pension premium payments. In sum, this method would be very difficult to use in practice, because future pension premiums are difficult to estimate.

Re. 2:

Estimating all future pensions payments (for the PBO as of today and pension benefits for service rendered in the future) in the valuation model is an attempt to perform a direct DCF calculation. Many (US) analysts use cash flow from operation in the *cash flow statement* as a starting point when valuing firms (see Chapter 8 and Appendix 4). The aim is to estimate future cash flows from operations. Ideally, this cash flow from operations should include the current year's cash payments for pensions. However, from my analysis of listed firms in Norway (which corresponds to the findings from Ernst & Young (2003) and my auditor colleagues), "cash flow from operations" in the financial report does *not* include the cash payments for pensions this year, but more often the pension premium paid (just a "transfer" between internal accounts). Hence, one should be very careful when using cash flow from operations as a starting point for estimating future cash flows if pension/payments are

material. And then the problem for analysts is that the number required, the actual amount of pensions paid, is not disclosed/not accessible.

Re. 3:

As discussed the PBO as of a date is the present value of expected future pension payments/ cash flows related to all benefits attributed by the pension plan's benefit formula to employee service rendered prior to that date. Hence the service cost (SC) (in earnings from operations) equals the expected present value cash flow effect of the current years (increased) pension benefits. Moreover, since the service cost each year/in year t (SC_t) is the present value of the expected cash flow from pension payments caused by the additional benefits attributed to the employees from the pension plan in that year; *the service cost measured for one particular year is the same amount in both the (residual) earnings model and the operating cash flow model.*

The annual service cost is disclosed in the financial report (requirement under NRS 6, IAS 19 and FAS 87). Future service cost should also be easier to estimate for analysts then the future premiums (No. 1 above) or all future pension payments (No. 2 above). Future service costs could be estimated using the current, disclosed service cost as a basis, and expected increases (decreases) in future number of employees, salary levels, pension plan levels etc. would imply a proportionally equal adjustment in future service costs. With pension assets at market value, and the PBO calculated as the present value of the estimated future pension cash flows, defined as financial assets, this in sum is applicable in a F-O valuation model.

It should be noted that there is some criticism to the Feltham-Ohlson valuation models. The linearity properties (e.g. that the different value components could be added to reach the total value of a firm, or vice versa, as here where the total value is decomposed between pension items and other items) are questioned. In fact, empirical work has found non-linear relations (Burgstahler and Dichev 1997, Collins, Pincus and Xie 1999, Barth et al. 1999, Stecher 2004). This might have implications when only one component, here the pension cost or pension liability, is tested and compared to the full valuation of a firm.

3.2 Why the recognised pensionliabilties and pension cost in the financial reports should be adjusted when valuing firms.

As shown in 3.1, applying asset pricing theories, the market value of a net pension liability as of a date of defined benefit plans is the net of the PBO (calculated correctly) minus the current market value of the pension assets. There are however some important deviations between the accounting rules for pensions and valuation according to the finance theories described.

The 4 most important deviations are explicitly discussed in FAS 87 and IAS 19 (which NRS 6 refers to), and in Chapter 2, and will only be briefly discussed here:

1. *Deferred recognition* of changes in liabilities and assets due to deviations between estimates and actual, and changes in pension plans.
2. *The net cost presentation:* The presentation of all consequences of events and transactions (annual service cost, financial items etc.) affecting pension plans as one single amount, typically shown as operating expenses.
3. *The offsetting feature* by presenting the gross pension assets and pension liabilities as net asset/liability in the balance sheet – although they represent separate risks.
4. *Not including administrative costs etc. in the calculation of the PBO/pension obligation.*

However, the calculations of the gross pension liability (PBO) and pension assets shown in the notes in the financial reports are assumed by FASB and IASB (see the basis for conclusions in the respective pension standards) to be calculations in accordance with the dominating finance theories and "correct" valuations of the assets, liabilities and associated costs (e.g. see the discussion in IAS 19 Basis for conclusions §26 – where they discuss discount rates, finance theories and derive conclusions about the method they believe was the closest to the dominating finance theories).

Hence, by using the values of the pension assets and PBO pension liabilities shown in the notes as financial assets, one should believe that one would end up with a correct value according to finance theories. However, there are at least 2 deviations in interpretation of the NRS 6 vs. the finance theories discussed that implies that even the disclosed numbers should be recalculated:

5. The use of *expected returns* on pension assets, not the actual.

6. The use of one discount rate for pension liabilities based on the risk free rate with a duration equal to the *average time period remaining* to pension settlements, not on the *weighted average* of all the discount rates over the whole time period.

If management applies biased estimates of the parameters of the model, adjustments have to be done for this as well; this is discussed in Chapter 6.

The 6 potential "adjustment items" of the reported accounting numbers for pensions are discussed in the following.

3.2.1 Deferred recognition

The accumulated deferred recognition (often called the accumulated non-recorded or unamortized amounts) is disclosed in the notes of the financial report as a reconciling item between the balance sheet amounts and the "true" values.

According to finance theory textbooks using enterprise valuation techniques, where net financial assets are added to the value of operating assets, the *current* market values of financial assets *always* should be used (e.g. Penman 2003). Christensen and Feltham (2005) state the same, and assume market values (the FAM (financial assets marked-to-market) relation) in many of the valuation models.

Respondents to the FAS 87 proposal and to the IAS 19 proposal focused on the long-term "mean reversal" effect (e.g. see IAS 19 BC § 32) on returns on pension assets – and that this supports the deferral of returns when they deviate from the expected returns: a low return from pension assets one year would typically be offset by a high return on pension assets the next year, and hence the accumulated net effect would be small in the long run. Analysts I interviewed (see chapter 8) also gave this line of argument as an explanation for not adjusting the value of pension assets to the current market value.

But the dominating finance theories do not support mean reversal of returns on assets in efficient markets: if the return one period is very high (or low) there is no expectation that in the next period there would be a higher probability that the return will be lower (higher) than "normal". The expected *future* returns are, regardless of the past returns, more or less unpredictable (e.g. Penman 2003, Cochrane 2001). This is the same conclusion as Samuelsen (1967) formalised; diversification works across different assets but not across different times.

Prior view was that risky asset returns are largely unpredictable or that prices follow random walks (Malkiel 1990, Cochrane 2001). Everything is explained in today's price. Current theory has been modified somewhat: to compensate for risk (as a rational investor will do in order to join the risky business), risky asset values (cum dividend/cash payments) should trend upwards. The property of asset prices that is actually predicted by theory is that *risk adjusted* prices follow a martingale (Campbell, Lo, MacKinlay 1997, Ch. 2): $E(P_{t+1} \mid P_t, P_{t-1}, \ldots..) = P_t \ \forall \ t$. (Expected price (risk adjusted) (P) tomorrow, given all past prices is today's price, always) (implies that non-overlapping price changes are uncorrelated at all leads and lags).

There is though some debate about this, based on empirical evidence. For example, Cochrane (2001) claims returns on stocks and bonds are predictable to a certain degree. This is especially based on Fama and French (1988 and 1996) and Poterba and Summers (1988), finding a substantial mean reversion (negative autocorrelations) on stock prices at longer horizons and Fama and French (1996) the same for shorter horizons. Moreover, Fama and French (1989) find that low prices – relative to price/book or to dividends, predict higher subsequent returns (higher future prices). But this does not necessarily mean that there is a predictability or mean reversal – the models used (CAPM or multifactor models) might be incomplete. A multifactor model explains these variations better. As Roll (1977) showed, the CAPM cannot be empirically tested; it is also a test of the model. Also the empirical results may be caused by changes in required returns during different cycles. In fact, Fama and French (1996) show that a portfolio of *last year's* winners vs. last year's losers gains momentum; the good performers continue to perform well (opposite of mean reversion; positive auto correlation), hence predictability. Similarly Jagadeesh and Titman (2001, which also refer to the same result from 1993), Rouwenhorst (1998), Moskowitz and Grinblatt (1999) and Grundy and Martin (2001) show that the winners continue to win (momentum strategies turns out to be profitable). However, the strategies tested do not take into consideration "real world" transaction costs (which remove all or almost all gains (Carhart 1997)) or capture the actual differences in risk of the different portfolios tested (e.g. a firm with high price/book has a lot of the value in future riskier earnings). Similar high growth companies, high P/E companies and small firms might have higher bankruptcy risks etc.

Other academics (e.g. Ang and Bekaert 2001) have questioned, or tested and reversed the findings related to predictable returns by adjusting for econometrical issues, small sample sizes, effect of Great Depression (1928-1935) and so on.

In summary, there is no theoretical or conclusive empirical evidence that (risk adjusted) prices are predictable, or that there are mean revision effects.

Hence, all gains and losses from pension assets should be viewed as (permanently) realized. The actual market value of the assets should always be used as best estimate and the changes in value should be fully recognised. Hence, the value of the pension assets and the PBO in the notes should be the best starting point (not the values in the balance sheets), when valuing a firm using the financial asset technique.

3.2.2 The net cost feature

Classifying the pension cost net as an operating cost aggregates at least three items that might be reported separately: the current service cost, interest costs resulting from deferred payment of the pension obligation, and the results of investing the pension assets. The latter two are clearly financial and not operational items according to the definition used here.

Estimated returns on pension assets are a major part of operating income:

- In the US approximately 46% of earnings before extraordinary items for S&P 500 companies in mid 1990s are from the returns on pension assets (Amin and Benartzi, 1998)
- In Norway in 2004 total returns from financial pension assets was 3,8% of the operating profit and 7,6% of net profit after tax for all listed companies (see descriptive statistics in 5,3) .

Since both return on pension asset and interest cost on pension liabilities are financial items, and since pension assets and liabilities are about the same for most companies, and the estimated return and discount rates are about the same, the *net* financial items the last years in Norway are not material. However, for some companies in Norway it can be large: in 2003 almost 20% of the firms had net financial pension items exceeding 20% of operating profit (see Appendix 1).

Depending on the valuation technique used, adjustments to the net pension cost must be made:

- If the enterprise value method is used (full value of the enterprise excluding debt), or the value from operating assets (F-O model), then adding the financial assets to

calculate value of equity – the financial items in the net pension cost must be taken out (or else the financial items are included twice)(Penman 2003).

- If pension assets and liabilities are not viewed as financial assets – then the interest items should be included (Penman 2003).

3.2.3 The offsetting feature

The offsetting feature means that pension assets and pension liabilities are shown net in the balance sheet. For valuation purposes the pension assets and pension liabilities should not be netted: The assets and liabilities represents different risks, and risks that are not a hedged: returns and risk for the pension assets are associated with stock market, interest risks etc. Pension liability risk is associated with salary levels, governmental pension system, age and turnover of employees etc. Clearly there are related risks (interest rates, cycles in the economy), but in line with the separation theories for asset valuation, assets are separated from debt and equity (financing of the assets). Hence, when valuing firms, pension assets and liabilities should be treated separately.

3.2.4 Not including all costs in the pension obligation calculation

Similarly, in line with the discussion in 2.8.5, all future expenses related to the administration and payments in the future of the pensions should be estimated and included in the calculation of the pension obligation.

3.2.5 The use of expected return (not risk adjusted) on pension assets

The accounting standards (FAS 87, IAS 19, NRS 6) all state that the *expected* return should be used as the yearly income included in net pension cost. The expected return should vary according to the mix of invested assets. Taken to the extreme, this implies that if all pension assets were invested in (high risk) "junk bonds" with an expected return of 20%, a 20% return on pension assets should be recognised as part of net pension cost for the year and the pension assets in the balance sheet would grow by 20%.

Analysing the firm, the *actual* return for the past years should be used, i.e. implies that the market value of the pension assets should be used at any time if pension assets are viewed as financial assets.

When valuing the firm and estimating *future* cash flows in a net cash flow-to-equity (hence including financial income/cost) model, the *expected* return is correct to use because the risk factor is included in the discount rate for the specific type of pension assets. The present value of this calculation exercise for pension assets return should of course be equal to the market values of those pension assets in efficient markets.

3.2.6 Discount rates based on long-term market rates.

The discount rates used to discount the expected pension payments to a present value have material effect on the pension liabilities due to the long time period. The discount rate using the CAPM or similar model depends on the level of the risk free rate implied and the risk premium. Here, I will focus on the duration period when choosing the discount rate(s).

Valuation methods such as the CAPM model are one-periodic models (e.g. Cochrane 2001). Hence the theoretical, correct discount rates should be based on one discount rate for each of the expected pension payments with discount rates having duration according to the length of the time remaining until the individual pension payment dates. In practice, when discounting pensions one would typically use a *weighted average discount rate* based on all risk free rates plus a risk premium (Penman 2003).

Hence, the described use of discount factors under FAS 87 is in accordance with the theory: "Interest rates vary depending on the duration of investments: Thus, the weighted average discount rate (interest rate) inherent in the prices of annuities (or a dedicated bond portfolio) will vary depending on the length of time remaining until individual benefit payment dates", and "A properly *weighted average* can be used for aggregate computation such as the interest cost" (§199).

As discussed, this is similar wording as the IAS 19. However, also as discussed, the translation or interpretation in the Norwegian accounting standards and guidelines has a slightly different wording which may be important: The discount rate for the *average time* to pension settlement may be used.

If there is a concave/convex yield curve for interests, there is a significant difference between the long-term interest rate for the average time to pension settlement (say 20 years, which is

the estimated average across firms) and the *weighted sum* of the interest rates in the yield curve:

For example, using the yield curve of March 22, 2005 (when I did my field study) for Norwegian government bonds (1-10 years; source Finansavisen) as a basis, and estimating a 11-40 year yield curve by applying the interest rates of the US Treasuries for 10, 20 and 30 years and the USD/NOK swap rates correspondingly (source Nordea), and assuming a smooth yield curve between the years with market data and from 30-40 years:

1 year:	1.9%
2 year:	2.4%
3 year:	2.6%
4 year:	2.9%
5 year:	3.3%
6 year:	3.5%
7 year:	3.7%
8 year:	3.9%
9 year:	4.0%
10 year:	4.1%
11- 15 year:	4.1% increasing to 4.3%
16- 20 year:	4.3% increasing to 4.42%
21-29 year:	average 4.45%
30 year	4.5%
31- 40 year:	4.5% increasing to 4.7%

The yield curve from 1-10 years is based on the yield curve on Norwegian Government bonds as of March 22, 2005 (source Finansavisen). The estimated yield curve from 10-40 years is calculated by using the slope of the yield curve on US Treasuries from 10, 20 and 30 years (nominal years, not duration) which in March was 4.11% 10 years, 4.42% 20 years (source Nordea Markets), and 4.50% for 30 years (a difference of 0.39% from 10 to 30 years).

The weighted average with each year from 1-40 weighted equally using this yield curve is 4.05%. The 20-year rate is 4.45%. A small difference, but as input in the discount factor calculating the PBO it could have a material impact (approximately 7% difference in PBO value if the weighted average time period is 20 years).

Hence, with a steep upward sloping yield curve, the pension liability will be too low using the interest rate for the average time period. In my opinion, the wording in NRS 6 is misleading, and may result in using a too high discount rate with an upward sloping yield curve.

3.2.7 Estimating average discountrates, G-increase and salary increase for Norwegian firms as of March 2005

When analysing the different firms' different assumptions, and when selecting some abnormal cases, it may be useful to have some perspectives on which assumptions an average firm would use if official, unbiased perspectives on interest rates, salary and G-factors were used. These assumptions may also be used to calculate an "unbiased" combined assumption factor for an average firm.

Discount rate

An average listed firm, according to the actuaries I spoke to and the sample data I received or looked at, has approximately 20 years until pension settlement on average. The discount rate may be expressed as the risk free rate plus a risk premium.

The risk free rate in March 2005 with a weighted average of 20 years is estimated above at 4.05%.

Risk premium

According to asset pricing theories, the *risk premium* in the discount factor should reflect the risk in the pension liability; portfolio theory suggests that the interest rate inherent in a liability is related to the diversifiable risk associated with that liability. Most of the firm's specific risks (life/death, disability etc.) can be diversified or insured. Hence these risk factors should not be included in the risk premium.

The risk premium may be calculated from the variance in return from the specific assets/group of assets vs. the return from a risk free asset (e.g. Cochrane 2001). The asset in discussion is the PBO. The PBO is heavily influenced by the relationship between the expected salary growth, the expected growth in the G-factor (which is closely linked to the average salary-increase; see below) and the expected risk free rate (which is an important part of the expected salary- and G-increase). Hence, the most important factor that cannot be diversified is the risk of *real* salary increase. Real salary increase historically has correlated with general economic cycles. However the real salary growth variations historically have been very low:

	1997	98	99	00	01	02	03	04	05	06	07
Real salary increase	2.0%	4.2 %	3.0 %	1.4 %	2.1 %	4.0 %	1.4 %	3.3 %	2.5 %	2.8 %	1.5 %
Real BNP growth	5.2%	2.7 %	2.1 %	2.8 %	2.8 %	1.1 %	0.4 %	1.5 %	2.0 %		
KPI*	2.6%	2.2 %	2.3 %	3.1 %	3.0 %	1.3 %	2.5 %	0.4 %	1.6 %	2.2 %	1.7 %
Risk free rate**	4.0%	5.4 %	5.7 %	6.8 %	6.9 %	6.8 %	3.8 %	2.0 %			

**KPI is the general inflation of goods and services defined by SSB measured in % increase vs. last year*
*** One year average Statskasse Veksler effective interest rate in % as a proxy for governmental bonds, used by Norges Bank*
Sources: Statistisk sentralbyrå statistikkbank (SSB) including their prognosis until 2007, Norges Bank as of March 2005

Hence, by looking at the historical figures above, the risk premium related to the discount factor of the PBO should be very low.

If one combines this with the law regulation of defined benefit plans in Norway (Lov om Foretakspensjon), where a change in pension plan cannot reduce *vested* pension benefits (in a PBO calculation this means that the salary increase cannot be negative), the different expected outcomes for increase in real salary would be a narrow range. This reduce the variance of the real salary, and the risk premium should be very low; perhaps as low as 0,1%.

This is also in line with the recommendation in the accounting standards:

- FAS 87: "Discount rate should be independent of the companies' financial situation and firm specific risks". The practical implications are also suggested: "may also look to rates of return on high quality fixed income investments" (§198 and §45).
- Similar in IAS 19: "the rate used shall be determined by references to market yields on high quality corporate bonds" (§78).
- NRS 6: "renten vil være uavhengig av foretakets økonomiske situasjon. Diskonteringsrenten fastsettes som en praktisk regel til den langsiktige risikofrie renten eller renten på obligasjoner med særlig høy kredittverdighet".

This is in sharp contrast to implementation guidelines for pension accounting in Norway; e.g. Ernst & Young recommend a risk premium of 0.5% to 1.0% ("Pensjon" p. 78) based on the average credit spread on high quality corporate bonds. As I will show in the descriptive statistics about discount rates used by Norwegian listed firms, it is normally 2-3 % above the risk free weighted rate.

It could be argued that the PBO in the accounts should be reduced (increased) when valuing the firm for the possibility of negotiating lower (higher) levels of pension benefits with the employees in the future. However, as discussed, a change in the pension plan would typically not (be allowed to) affect the *vested* benefits (most of the current pension liabilities). Moreover, in efficient markets a change in pension levels will be offset more or less by a similar change in salary levels – having a small total effect on the firm's future cash flows.

To sum up: For an average listed firm in Norway with defined benefit pension plans, the discount rate to be used to calculate the PBO should be very close (probably less than 0.1% above) to the weighted average of the risk free yield curve interest rates on governmental bonds. In March 2005, with a weighted average of 20 years, this implies a risk free rate of 4.05%, a risk premium of approximately 0.1%, and a discount rate of approximately 4.2% for an average firm.

G-factor

As explained, the expected G-factor is crucial for the net pension cost for the firm, as it is vital for calculating the value of the pensions paid from FT, and hence the net pension cost for the firm. Which G-factor should companies with pension plans according to Lov om Foretakspensjon use?

Regulation of the G-factor is set annually by the Parliament, and hence is clearly firm independent, and all firms with the same information set should have the same expectation on future annual G increase.

Development in G vs. inflation (KPI) and average salary increase in recent years (source SSB and Rikstrygdeverket, March 2005 and unchanged as of September 2005) (% change from prior year):

	97	98	99	00	01	02	03	04	05E	06E	07	08	09
G	3.9	5.7	4.5	4.2	4.6	5.2	5.1	3.9	3.3				
KPI	2.6	2.2	2.3	3.1	3.0	1.3	2.5	0.4	1.6	2.2	1.7	1.7	2.2
Salary	4.8	6.6	5.3	4.5	5.1	5.3	3.9	3.8	3.7	3.5	3.7	3.9	3.7

(G = increase based on average G for the year, KPI is the general inflation of goods and services defined by SSB, Salary increase is calculated by SSB as average increase pr normal working year).

Average increase pr year 1997-2005:

- G = 4.12%, KPI = 1.93% Salary = 4.37%

As shown, the annual regulation of G is marginally below, but closely related to the annual average increase in salary in Norway; and although discretionarily set by the Parliament each year, the close relation has also been the intention from the government. In the 1980s and most of the 1990s, the annual G regulation was between the inflation (KPI) –rate and the average annual increase in salary, on average 1,5 % below the average annual salary increase in 1970-2003. The main reason for the close relation in 1997-2005 is the "Eldremilliarden" and "Pensjonsforliket" in 2003 as one-time catch up to get the G increase over time more in line with the average salary increase, and the intention to also keep the two parameters closer in the future (source: Pensjonskommisjonens instilling 2005 (NOU 2004 1)). Pensjonskommisjonen was formed by the Stoltenberg government in 2001 – including members from many parties – in order to agree on a common platform for future state guaranteed pension systems. Pensjonskommisjonen has suggested that the regulation of G, and hence the upwards adjustment of the basis for pensions, should be formally linked with the increase in salaries. (The annual adjustments of the pensions from the government in the retirement period, however, should be based on a combination of inflation and salary increase, but this will not affect the companies' pension cost.) The Ministry of Finance put forward these suggestions in St.meld. No. 12 2004, Dec. 10 2004, but with some

important modifications that in fact meant that the G would not be 100% adjusted by the average salary increase. As the actuaries firm NIP showed in a speech where representatives from the Ministry of Finance, Kredittilsynet and several politicians were present, this effect would imply that the firms have to pay a higher portion of the defined benefit plans, and this has resulted in a new debate of the G regulation. No formal decisions have been made by the Parliament, and the final outcome is uncertain.

Hence, it is difficult to set unbiased expectations for the future G increase, but it should be expected that the annual G increase should be somewhat below or equal to the annual, average expected salary increase in Norway. I have, for the analysis in this paper, used an estimated, although uncertain,, expected annual increase in G 0.5% below the expected salary increase. This factor is only used as a benchmark to see possible effects of the PBO if all firms, especially those tested on analysts, used the combined assumptions I have estimated in this chapter. Hence, it is not crucial for the further analysis or conclusions.
SSB expects long-term inflation to be around 2.2% after 2-3 years, then increasing to 2.5% long-term, and this also corresponds to Norges Bank's perspective (source: Norges Banks inflation report March 16. 2005). SSB further expects the annual average salary increase to be 1.75% above the inflation in the next few years and in the longer perspective. This results in an average, weighted, expected annual future salary increase of 4.1%.

Hence, according to SSB, Norges Bank, corresponding to the market expectations for the risk free rate and based on suggestions from Pensjonskommisjonen and historical G development, the annual increase in G should be expected to be somewhat below or (up to) equal to the average annual increase in salary. Assuming the G increases 0.5% less than the average annual salary increase, this should imply a long-term weighted(20 years) average G increase of approximately 3.6% (4.1%-0.5%) for an average listed Norwegian firm with Norwegian defined benefit plans.

Expected salary increase
The salary increase shown above is the average for Norway as a whole. The salary increase to be used in the PBO calculation is the specific increase expected for the specific firm in the specific industry in the private sector:

- SSB reports average increase in salary pr industry. From 1999-2004 there was little difference between average salary increases for private industry compared to Norway as a whole (including the public sector) 4.35% v. 4.37% respectively. (Source SSB Statistikkbanken). In the salary forecast from SSB, SSB does not expect differences between the private and public sector (source: SSB konjunkturbarometer, March 2005).

- There are historical differences per industries. Commercial services ("forretningsmessig tjenesteyting"), commercial trade ("varehandel") and the oil industry have had somewhat lower salary increases than other industries during the last 3 years, but this is explained by different cycles: these industries had higher than average increases in previous years (SSB). SSB does not expect significant differences in future salary increases between industries, with the exception of possibly lower increases in the industries exposed to foreign, low cost (i.e. low salary) competition.

- There are of course differences in salary *levels* between firms – even some differences for the same categories of labour. This could probably be explained by differences in firm specific factors; geographic supply and competition for labour a.s.o. However, one should not expect that long-term changes in salary levels should differ significantly. This corresponds to the historical salary development the last 10-15 years in Norway (source: SSB salary statistics per industry and variations within industries). In competitive labour markets one should expect each firm to be paying the value of each employee, and *expected* increases in salary should be equal. However labour markets are not fully competitive and hence there might be some specific firms/industries expecting higher than average increase in salary due to the power of labor unions, low supply of certain labour categories etc. Similarly, industries expecting increased international competition from low labour cost firms might expect (or can only afford) lower than average future salary increases. Firm specific differences should be expected to be unsystematic, but certain industries may as a group have (unbiased) different salary expectations than others. Hence in cross-sectional tests I would control for industry.

- Hence, as a proxy one could expect the long-term salary increase to be more or less firm independent, positively correlated with industry-specific salary increase, and highly positively correlated with the average expected salary increase in Norway.

Hence, based on this, as a proxy, one could use expected long-term salary increase when calculating the pension liability for an average Norwegian listed firm. In March 2005 this implies a long-term (20 years) expected weighted salary increase of 4.1% for an average listed Norwegian firm with Norwegian defined pension plans.

The expected salary increase to be used to calculate the pension liability is the expected salary increases for each employee including his individual salary increases due to his career development/seniority. According to Pensjonskommisjonen the average employee in Norway historically has had a sharp increase in salary the first half of his working life, and than a stable (i.e. close to the average) salary development the second half of his employment period. Although they do not have good data, they use an individual annual average salary increase of 0.5% above the annual average salary increase over an individual's total average employment period. (Based on SSB statistics; see NOU 2004-1). This is also used when Pensjonskommisjonen calculates effect on future pensions. For an average firm with average age of employees (even mix of young and older employees) the average expected salary increase of course would be equal to the overall average salary increase expectations. But for a firm filled with younger employees, a salary increase above the overall average should be expected/used, and for firms filled with elderly employees, a lower than average increase should be used.

3.2.8 Summary of valuation method in practice of pension liabilities.

To sum up, the typical adjustments an analyst has to do while doing a practical valuation of a firm when using a discounted cash flow enterprise valuation model, using operating *income* as the starting point:

- Use the market value of pension assets and the present value calculation of the pension liability (PBO), based on the most current unbiased estimates for actuarial assumption and market rates, and a discount factor based on a yield curve weighted risk free rate with only a marginal risk premium.

- Viewing pension assets and the PBO as financial assets, the annual service cost ("correctly" calculated using the current best estimates) is the only pension cost that should be included in earnings or cash flow from operations. The annual recognition of a portion of the accumulated actuarial gains and losses must be removed, as well as the financial items from pension assets and pension liabilities.

- If pension assets or the PBO are not viewed as part of the financial assets, the return from pension assets and interest cost on pension liabilities should be included in operating income/cash flow. However, the net present value of the items should be equal to the market value of the pension assets and the PBO (correctly calculated). Viewing pension assets and pension liabilities as financial assets, and including returns and interest from the assets in the basis for future cash flows, is of course double counting and a valuation error.

- The assumptions to be used for funded defined benefit plans in Norway as of March 2005 for an average listed firm with Norwegian defined pension plans, using the assumptions from SSB, Norges Bank and Pensjonskommisjonen are as follows:

  - Discount factor; average weighted interest rate on Norwegian government bonds equal to the average weighted period to pension settlement with a marginal risk premium; approximately 0.1%. This implies a weighted average discount factor as of March 2005 of approximately *4.2%* for an average Norwegian firm.

  - Expected annual increase in salary level is expected by SSB to be 1.75% above the expected inflation, which is expected to increase from today's 1% level to a 2.5% level after 5 years. This implies an expected weighted (20 years) annual, average salary increase, of app *4.1%* for the whole period. However this factor varies with the average age of the employee in the firm. The firms with average age of the employees lower than the average age of all employees in Norway should have a higher expected salary increase, whereas firms with higher average age should have lower expected increase.

  - Expected annual increase in G is uncertain, but should be expected to be somewhat below up to equal to the expected average increase in salary level.

Using a level of 0.5% for the further analysis, this implies a weighted expected annual increase of G of *3.6%*.

3.2.9 The construction of a combined pension assumption factor in order to compare the firms' different combinations of assumptions

In my study I am interested in comparing the different combinations of assumptions discretionarily selected by different firms' management as input to the actuaries' PBO calculations. However, since I want to study earnings management *and* want to compare firms based on official data, I have to find the assumptions that are normally discretionarily set by management *and* are more or less firm independent (so two similar firms should use the same assumptions).

Only a few of the pension assumptions are truly discretionary for management *and* more or less firm independent; the discount factor, the G factor and the expected salary increase:

- *Discount factor* for pension liabilities is non-firm specific for firms with the same pension payment profile. Average payment profile could vary between firms, but typically vary between 15-20 years, where the interest difference (hence the discount rate) only varies by approximately 0.2% (using US data from 2002 to 2004). Hence in a cross-sectional analysis, all firms should use approximately the same discount rate.
- *Governmental pension increase (G factor.)* This is set by the parliament, and is clearly firm independent. Hence unbiased G rate expectation should be expected to be equal in a cross-sectional analysis.
- *Long-term increase in salary levels*. Firms individually negotiate and set their salary levels. However, the long-term increase should be expected to be more dependent on the average salary increase in Norway, in the home country or industry specific salary levels, since firms compete for labour. Hence, at least within industries the long-term salary increase should be expected to be more or less equal in a cross-sectional analysis.

There are many other assumptions when calculating the pension obligations such as expected lifetime, disability ratio, marriage factor etc. These factors, according to my discussions with actuaries and management of many firms, are, however, normally not set by the management, but by (independent) actuaries that rely on official statistics in most of the cases. These factors, according to the actuaries, tend to be quite similar for all actuarial firms, and are based on national statistics. Moreover, these data are not included in the information given in

the financial reports. Hence, these factors are not included in the "combined pension assumption factor" I have constructed, and should not vary much across firms.

Only the turnover, in addition to r, s and g, is normally discretionally set by management. However the turnover is firm specific, and is difficult to use in cross-sectional analysis, and therefore is not included here. The turnover (t) affects the total pension liability by $(1-t)^n$, and hence could be viewed as a constant (reduction factor) of the PBO.

Many of the US-based studies of pensions focus only on the nominal *differences* between the discount factor minus salary increase, and use this as a basis for further analysis. This can be done since there are only 2 critical discretionary assumptions involved in US pension plans; the discount factor and the salary increase factor; there are no governmental plans affecting the firms' pension payments in the US. In the US the present value of the pension paid the first year of retirement for one employee who is entitled to his full pension benefits, and is expected to stay/live until retirement, as an approximation can be expressed as:

According to Brown (2004) this, as a first order approximation, can be written as $xS/(1+(r\ s))^n$, since r and s are expected to be small. Hence, the US researchers may focus only on the difference between r and s when analysing assumptions. Since pension liabilities are present value calculations, measuring and comparing only the differences will lead to wrong conclusions for Norwegian pension plans, where there are 3 factors simultaneously involved: The discount rate, the salary increase and the G increase. Moreover, I have to test combinations of assumptions, not only one assumption at a time. This is in line with arguments from other studies looking at combined pension assumptions only (e.g. McGill and Gribbs 1989, Winklevors 1993, Asthana 1999). Hence I have to define a formula including the discount rate, the salary increase and the G factor; a factor I will call "the combined Pension Assumption Factor"; the PAF.

Only focusing on the discretionary "firm independent" assumptions: the expected salary increase, the expected G increase and the discount factor in the formula for the PBO shown in 3.1, the combined pension assumption factor may be defined as:

Combined Pension Assumption Factor $=PAF^{*}= \frac{(1+s)^n - y(1+g)^n}{(1+r)^n}$

As one can see from the formula, different n's (e.g. 15 years vs. 20 years) and different y's (the portion of the pensions paid by the government) will affect the factor. These factors are firm specific and not disclosed. A simulation of the effect on PAF by varying the n's and y's is done in 6.8.1., and the possible effect on empirical results is discussed there. From the discussion in 3.2.7 one also should keep in mind that there is a very high positive correlation between the r, the y and the g; and large differences should not be expected.

[*] In order to make a "normalised" PAF close to 1, all the PAF numbers in the paper are multiplied by 4.

Exhibit 3.2 PAF values with different discount rates (r), salary (s) and G (g) increase

Salary increase (s)(%)	Discount rate (r)					
And g=2.0%	4.2%	4.5%	5.0%	5.5%	6.0%	6.5%
2.0%	0.67	0.62	0.56	0.51	0.46	0.42
2.5%	0.94	0.87	0.79	0.72	0.65	0.60
3.0%	1.24	1.15	1.04	0.95	0.86	0.79
3.5%	1.57	1.45	1.32	1.20	1.09	0.99
4.0%	1.93	1.79	1.62	1.48	1.34	1.22
4.5%	2.32	2.15	1.96	1.78	1.62	1.47
And g= 3.0%						
3.0%	0.81	0.75	0.68	0.62	0.56	0.51
3.5%	1.14	1.05	0.96	0.87	0.79	0.72
4.0%	1.50	1.39	1.26	1.15	1.04	0.95
4.5%	1.89	1.75	1.59	1.45	1.32	1.20
And g= 4.1%						
4.1%	0.99	0.94	0.86	0.78	0.71	0.65
4.5%	1.26	1.17	1.06	0.97	0.88	0.80
5.2%	1.88	1.74	1.58	1.44	1.31	1.19

*PAF (Combined pension assumption factor) calculated using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) used to calculate the PBO. Assumed weighted average time to pension settlement of 20 years (n=20) and assumed that governmental pensions pays 75% of gross defined pensions (y=0.75). PAF= $4\ \frac{((1+s)^n-y(1+g)^n)}{(1+r)^n}$

Hence in order to perform PAF calculations, I have to make standardized assumptions and afterwards do some sensitivity analysis (as control factors) when comparing the different firms.

Based on input from 3 leading actuarial firms in Norway calculating NRS 6/the pension liabilities for listed firms (Vital, Storebrand, NIP), I have constructed the formula based on their average pension levels, time to pension payment, and average salary level reported by these actuaries. **The PAF shows the present value of expected future pension settlements by starting with 1 unit (krone) of the PBO today (based on today's salary and today's governmental pension), calculating the nominal value of earned** pension liabilities at settlement date by increasing the current liability with expected G and salary increase, and discounting this value to present values with a discount rate.

According to the 3 actuaries/actuary companies, the average numbers for listed companies with defined benefit plans are (they represent approximately 50% of the listed firms with defined benefit plans in Norway):

- 65% effective Gross Pension level (varying between 58-72%)
- Average salary levels: NOK 355 000 pr year (most companies varying +/-10%)
- This result in a y of approximately 75% (Folketrygden pays 75% of the pensions)
- n = app 20 years varying between 15-25 years

By using the firm specific assumptions for salary increase, G factor and discount rates on this formula, a combined assumption factor (typically varying between 0,4 and 1,5) for each firm is calculated, indicating combined pension liability increasing or decreasing effect.

Some examples:

a)With expected salary increase per year of 3%, g = 3%, r = 7%, the PAF is 0, 47

b)With s=3%, g=2%, r=7%, PAF is 0.71

c)With s=3%, g=3%, r=6%, PAF is 0.56

d)With s=3%, g=2%, r=5%, PAF is 1.04

Using the assumptions calculated above by using input from SSB, Norges Bank and Pensjonskommisjonen (s=4.1%, g=3.6%, r=4.2%), the combined pension assumption factor is 1.25. More combinations of assumptions are shown in Exhibit 3.2.

Hence, we can see that the present values of pension liabilities are very sensitive to the relative differences in assumptions. But focusing only on nominal differences between the discount rate, the salary increase and the G factor (at least in Norway the way Folketrygden works), leads to wrong analysis: As one can see, the difference between the discount rate and the salary increase in nominal terms is the same between example a) and b) above, but the present value of the PAF differs significantly (0.47 vs. 0.71 respectively). In the US, where the G factor does not influence the firms' pensions, as explained, only focusing on the nominal differences vs. using the full formula described above is a good proxy (e.g. r=7%, s=3% vs. r= 6%, s=2% (4% differences in both cases)) and gives a PAF of 1.87 and 1.85 respectively when the effect of G is eliminated (y = 0)).

I will use the combined pension assumption factor/formula to analyse pension assumption differences for Norwegian firms. This will be used to test for both earnings management and to find abnormal firms regarding pension assumptions that may be tested on analysts.

4. Theoretical background (litterature review) and development of specific research questions

In this chapter I review the findings of the research areas I am focusing on.
Since my overall research question is related to market efficiency, I will first briefly review the findings in this area in part A..

Then, in part B, I will review the specific literature regarding accounting information, analysts and earnings management. This could have been done in each chapter discussing and testing theories, but since the issues are so closely related, reviewing this in one chapter will give a better overview.
Finally, since none of the studies reviewed are done in a Norwegian context or on Norwegian firms, but my empirical work will be performed in this context, I will review some studies related to Norway and the specific Norwegian context, and try to conclude whether the other empirical works are relevant or not.

A. General overview of market efficiency research

Market efficiency in different forms, and especially the relationship between financial statements/financial information and capital markets, has been and is of course an important field of study. Kothari (2001) reports over 1000 published papers in leading academic accounting and finance journals in the last 30 years.

The seminal paper in the research area is Fama's paper from 1970 where he surveys the extant empirical evidence at that time in support of market efficiency (the paper discusses weak and strong forms efficiency as well as the semi-strong form). Among the papers discussed in this paper there were two which defined the research design for most of the subsequent tests of semi-strong form efficiency (with, of course, some minor modifications): Fama et al. (1969) and Ball and Brown (1968) used the residuals from the market model around particular events to study the firm specific price reactions to those events (stock splits in the case of the former, earnings announcements in the case of the latter).

Ball and Brown's work (1968), which has been particularly influential and widely quoted, began a major industry in stock market reaction (or information content) studies. The principal objective of these studies was to determine the way in which the stock market, through share prices, reacts to different types of accounting information. The major focus of attention was accounting earnings, although the incremental information content of other accounting signals has also been examined. These other signals include interim reports, balance sheet values and information disclosed in the notes to the accounts. Initial price-earnings studies, based on monthly returns data, were supplemented by studies using intra-day returns, as the quality of data available improved. Trading volume, in addition to prices, was also studied. The evidence was broadly supportive of semi-strong form efficiency in that prices reacted speedily and unbiased to new information. A significant number of subsequent studies have found similar evidence to support semi-strong form efficiency (Kothari 2001). The original events-study methodology has been extended in terms of the return generating processes used and the statistics used for establishing significance (see, for example, Brown and Warner, 1985; Campbell, Lo and MacKinlay, 1997).

However, a number of studies (for example in the accounting area where the "post-announcement drift" is a well-documented phenomenon) have found evidence that is not consistent with the Efficient Markets Hypothesis. The early studies were summarized and analysed in Ball (1978), and he pointed out that inherent research design problems (such as misspecification of the pricing process and thin trading) could have led to the anomalous results. Watts (1978) incorporated the suggestions for changes in research design in Ball's paper, but still found evidence inconsistent with the efficient markets hypothesis when quarterly earnings announcement were studied. Foster, Olsen and Shevlin (1984) found some evidence of size effects in the anomalous price responses.

When Basu (1977) reported that profitable investment strategies could be devised by going long in low price/earnings (P/E) stocks and short in high P/E stocks it seemed that another example of semi-strong form in efficiency had been discovered (as P/E ratios are publicly available information). However, Reiganum (1981) demonstrated that this anomaly was a manifestation of what has now become known as the "size effect"; that is, smaller market capitalization firms, have higher risk adjusted returns than larger market capitalization firms.

DeBondt and Thaler (1985) provided empirical evidence to support the notion that in the long-term stock prices overreact to economic news, in the sense that poorly performing stocks in one period experienced higher returns in a subsequent period (with reverse happening for strongly performing stocks) (mean reversal). Some supports for this hypothesis was provided in a number of other studies (for example, Chopra, Lakonishok and Ritter, 1992). However, Ball, Kothari and Shanken (1995) demonstrate that the overreaction detected is reduced when the research design is modified, and that (any) overreaction is concentrated in stocks, which have very low stock prices. Fama and French (1996) provide an explanation for this long-term overreaction in terms of a three-factor (or APT) pricing model.

Short-term momentum, though, reported by Jagadeesh and Titman (1993) – whereas strong performing stocks continue to have high returns and vice versa – has not been explained by the three-factor model.

Rationales for this have been given by many, but Fama (1998) discussed behavioural finance and other explanations, and basically concludes that the empirical work shows both under and overreactions (hence not necessary a violation to the EMH), and that the new models does *not* produce rejectable predictions that capture the menu of anomalies better than the market efficiency models. Studies of the speed of adjustment of prices towards their intrinsic values (or at least "stable" prices or "normal" price variability) showed rather quick adjustment in earlier studies, (Abarbanell and Bernard 1992, Damodaran 1993), but later studies find shorter or medium term drifts; e.g. Burgstahler et al (2002). Soffer and Lys (1999) however dispute these types of results, using a two-stage process to retest the prior findings: they are "unable to reject the null hypothesis that investors' earnings expectations do not reflect the implications of prior earnings for future earnings". Similar rationales have been given for the shorter – or medium drifts.

Market-based accounting research (value relevance – research) arose from a group of studies that examined the predictive ability of accounting information. The purpose of these predictive ability studies was to examine the usefulness of financial reports in predicting the variables of interest to decision-makers. However, because of the difficulty of determining future earning and cash flows, these studies generally examined the relationship between accounting information and current share prices (taken to represent the market evaluation of future cash flows).

The stock market reaction studies had a significant impact on standard-setting practice. The efficient markets hypothesis leads to the proposition that all available information is impounded in the share price. Thus, whether a particular piece of information is presented in the body of the financial statements or in the footnotes should not matter, as in both cases the information content will be impounded in the share price.

As discussed above, there have been and still are, many attacks on the (semi) efficient market hypothesis. Fama, in particular, through his articles in 1970, 1991 and 1998 thoroughly has reviewed, discussed and defended the SEMH against the many attacks. He agrees that some of the anomalies are "above suspicion" (1998, p. 304); the post-earnings announcement drift first reported by Ball and Brown (1968) and the short-term momentum effect documented by Jegadeesh and Titman (1993). Kothari (2001) also focus on these two attacks in particular. But, they both sum it all up by stating that no better model or theory than the efficiency market hypothesis has arrived so far. Cochrane (2001) reach the same conclusions: "Asset markets are to a good approximation, information efficient" and "reasonably efficient".

The main reason for these conclusions is not that the (S)EMH is perfect, or that the anomalies are not true, but that the attacks on the (S)EMH in general have 2 major weaknesses, that disturb the findings:

- The "bad model" problem (Fama 1998); is the market inefficient or are the (valuation) models wrong?
- They are "fraught with methodological problems" (Kothari 2001) (skewed distributions of financial variables, survival biases in data, auto correlation etc. etc.).

Hence, it is still reasonable to assume that the semi-efficient market hypothesis is more or less valid, at least for easily available public information in the financial reports (Kothari 2001) – like disclosed pension information.

B. Specific literature review regarding accounting information, analysts and earnings management.

In testing the semi-efficient market hypothesis, the study is narrowed down to a specific topic, namely; how do analysts – when they value stocks – detect and adjust for different accounting practices, assumptions or earnings management regarding pensions, where the main public data is disclosed in the financial report for listed firms in Norway? Hence my literature review will focus specifically around these topics:

1. How important are published financial reports for valuation purposes (value relevance)?
2. Does the market read and interpret the financial reports "correctly"?
3. Earnings management; frequency and how it is performed.
4. Does the market "see through" earnings management?
5. Specifically: does the market interpret the value of pensions correctly?
6. The importance of analyst' influence on stock market prices, how they value stocks and how they rely, read and use financial reports.
7. How is the Norwegian stock market compared the US market regarding efficiency and earnings management? I.e. is the (non-Norwegian) research relevant in the Norwegian context?

In the following I will discuss the academic research in each area.

4.1 How important are published financial reports for investors for valuation purposes? (Value relevance of financial reports)

If information or lack of information in financial reports should lead to mis-priced stocks, financial reports must have high relevance for the investors when valuing firms and little alternative information is available or used.

Value relevance was a major area of empirical research in the 90th's. Holthauser and Watts (2001) identified 54 value relevance studies, only 3 of them were published before 1990.

Value-relevance research examines the association between a security price based dependent variable and a set of accounting variables.

Traditionally published accounts are found to be a key source of information, and this finding is uniform across markets and through time (e.g. Lee and Tweedie 1981, Hines 1982, Chang et al 1983, Arnold et al. 1984a, Day 1986, Pike et al 1993).

Such importance is apparently due not only to what is termed their confirmatory use vis-à-vis the preliminary statement or other information, but also their potential to convey new information (Rippington and Taffler 1994). The annual report and accounts provide the only information about the firm that is independently audited, and it constitutes the physical repository of a wide range of general information collected in one place.

Similarly, Holthauser and Larker (1992), Lev and Thiagajaran (1993) showed the usefulness of data in financial reports to construct ratios predicting future earnings. Penman and Ou (1989) show that different information in the financial reports are valuable for estimating future earnings, by using an array of financial ratios to accurately predict future earnings changes.

There are also numerous empirical studies concluding that information in financial reports do affect the stock prices. (Examples are the seminal work of Ball and Brown (1968) studying correlation between earnings announcements and stock price changes (data from 1957-1965), and Alford et al. (1993) cross sectional tests of earnings in 16 different countries compared to a sample of US firms, Beaver et al. (1997)).

However; the correlations between earnings and stock price movements are not 100%. Other information is also important: Stock price changes are leading (reported) earnings not vice versa; this has been demonstrated e.g. by Collins et al. 1987, Kothari 1992, Kothari and Sloan 1992, Kothari and Zimmerman 1995. For example Demski and Feltham (1994) analyse a model, and show that private information and prior public announcements are reflected in prices before other public earnings announcements.

One key question, however, is how relevant the financial statements are, and whether they their relevance over time have decreased.

In a frequently (sited and well timed article (just at the height of the stock market bubble autumn 1999), Francis and Schipper (1999) released their article “Have financial statements lost their relevance?”, (for investors for valuation purposes). They concluded that the answer

was yes: Market adjusted returns had decreased in relevance to changes in earnings (profit before extraordinary items) and to a combination of (book value) equity, earnings and change in earnings, and for an assortment of financial ratios.

My study is based on the assumption that the financial report is important and relevant for stock market prices and as input in valuation for influential market participants. therefore Francis and Schippers conclusion might violate my assumptions. However I have many comments to their study that might weaken their conclusions:

1. The sample period is from 1952-1994: In the period of bull stock market from 1990 to 1999 with many firms having little or no earnings, but high stock prices, (contrary to the periods earlier with more capital-intensive and higher asset values firms and historical earnings closer to future expected earnings) the value relevance questions were of the financial reports with backward looking numbers, and the balance sheets not capturing the real values of the firm: intangibles, value of brands, market shares, R&D, value of the organisation, core competences, customer relations (also Collins, Maydew and Weis, (1997) and Lev and Zarowin (1999). These types og internally generated assets were not allowed to capitalize in the balance sheet according to GAAP. Hence, due to the change in mix of firms from the pre 1990 to past 1990, a reduction in relevance should be expected. However, this max is not necessarily permanent.

2. The study in my opinion *gives* strong evidence that the financial statements *are* relevant for stock prices:

   - On average 59% of the market-adjusted return is explained/earned by having perfect foresight of the sign and magnitude of earnings (profit before extraordinary items). Although decreasing somewhat over time, the average is above 50% for the single number "change in net profit before extraordinary items" in the P/L statement for the whole period. With a lot of other information in the financial report, and including the effect of semi-annual reports the value relevance for the financial reports as a whole is higher. In my opinion the r.r. is high.
   - R^2 shows that the earnings variable explains an average of 22% of the variation in market-adjusted returns, however declining to 15% after 1980. Knowing that the price/value of a firm can be expressed as the discounted value of all expected *future* dividends (Feltham and Ohlson 1996), that's quite impressive for one single historical number. Stock price levels and changes are also based on general market trends and expectations; events occurred but often not reflected in accounting numbers.
   - Similarly, change in cash flow explains 52% of the abnormal return (defined as cash flow from operations in the cash flow statement).

- The book value of equity alone explains 41% of the variation in stock prices (R^2) and increasing to an average above 55% from 1980.
- Book value of equity, plus the level and change in earnings earns about 61% of total perfect foresight returns.
- A combination of different financial variables (picked and tested by Lev and Thiagarajan (1993)) from the financial report yields an average of 52% of the perfect portfolio, declining somewhat to just below 50% from 1980, and the explained variation (R^2) of this model is an average 62%.

Moreover, professional evaluators like the analyst (DeFond and Hung, 2003), do not start their valuation of firms based only on a single or few historical numbers in the financial report, but do numerous firm and industry specific adjustments to reported earnings, book values and cash flows based on other information in the financial reports. Some of the information about the fair value and earnings for certain items are only disclosed in the notes; e.g. pensions, and some financial instruments.

Hence the combined relevance for the best or the professionals' use of the financial reports must be higher than the findings from Francis or Schipper only testing for a few reported numbers. Hence – even if the reported decrease of relevance for some of the number are true – the relevance of the financial report up till 1994 was in my opinion high according to this study.

3. There could be many sound explanations why their findings do *not* prove decreasing relevance of a reported accounting numbers (they have done several control tests, but *not* for the ones mentioned below):

    1. Francis and Schipper measure *changes* in earnings, cash flow and so on vs. stock price changes. A company with totally stable earnings (historical/future) would probably have high correlation with the stock price, but will not be heavily weighted in this model, since changes in earnings etc. is zero, but would normally still have (some) *changes* in stock prices.
    2. Francis and Schipper focused on a few (although important) numbers from the financial report. However, the volume of information has increased significantly for the financial report in total over the sample period, perhaps reducing the relative relevance of the few tested numbers, but perhaps not the total relevance of the financial reports: Lev (1989) finds that only 2-5% of the variance in stock price (excess returns) could be explained by the net earnings number. However, this does not imply low relevance of the financial reports. taken as a whole, combined information in the financial report could explain most of the stock price changes.
    3. The decrease of earnings relevance is measured as change in net profit before extraordinary items vs. stock price changes over a 15 months period (from the

beginning of the accounting year ending 3 months after fiscal end-year (after the release of the financial report)).

- This earnings number (profit before extraordinary items) is heavily loaded with one-off items or non-recurring items (items that cannot be expected to be earned (at the same level) in the future, but that is not classified as extraordinary items due to the strict definition of extraordinary items) e.g. write downs, minor errors, changes in accounting methods, gain/losses on sale of assets, gains on financial assets. Both the stock market and professional evaluators like the analyst tend to correct for these items. Penman (2002) has shown that reported net earnings have very low correlation with price. Adjusted (operating) earnings have much higher correlation.
- The criteria for extraordinary items has changed in the sample period, with almost all unusual, non-recurring, now included in the defined earnings number, whereas in the beginning of the sample period many of those items were not part of the tested earnings. Hence because this definition-change, R^2 and correlation will be reduced without underlying real changes.
- The increased variability in the defined earnings number over the sample period shown by Francis and Schipper, by itself could explain some of decrease of relevance (R^2) (They mention this themselves, but do not investigate it further).
- Under US accounting rules, investments in intangibles (R&D, brands, markets) are immediately expensed, and the relative spending for such items increased the last decade of Francis and Schippers sample period (Ballester, Garcia-Ayuso, Livnat 2003), perhaps reducing the value of this single earnings number. But since the information is disclosed elsewhere, the relevance of the financial report is not necessarily reduced..
- Stock price changes are measured over 15 months (the accounting year and 3 months into the next year). This includes the release of annual report from last year in the beginning of the year/measurement period and the measurement period ends 3 months into the next year-end into the next year information affecting next year's annual report. With increasing variance of earnings this will lead to lower R^2 and correlations, without necessarily proving reduced earnings relevance.

4. Book value shows an increased relevance over the sample period; but this might also be explained by changes in accounting rules – recognizing information which earlier was not part of equity/book value, but shown in the footnotes.
   - There are more value relevant items included in the balance sheet at the end of the sample period than in the beginning; new accounting rules required the capitalization and fair value measurement of items like e.g. financial leases, pensions, financial derivatives (partly), business combinations (purchase accounting with fair value measurement of assets and goodwill vs. prior methods of pooling/ historical values accounting.
   - Lower inflation levels tend to bring historical fair values closer to today's market values.

In sum I do not claim that financial statements have maintained their level of relevance, only that Francis and Schipper do not necessary disprove that. Others also have found a decline in the relevance of earnings information, and an increase in the relevance of balance sheet and book value information (Collins, Maydew and Weiss (1997), Ely and Waymire (1999), Lev and Zarowin (1999) and Chang (who finds decrease in book value relevance also) (1999), although some or most of my critique above can also be raised for these studies.

However, Brown et al. (1999) has demonstrated that time series and correlation tests using R^2 as a proof should be used with care when testing value relevance. The auto-correlation effect shown in this study may imply that the relevance has decreased *more* than the value-relevance researchers conclude.

So far, there are very few relevance studies including data from the period 1999-2003 (after the stock bubble burst, and the accounting scandals).

In recent years especially Feltham and Ohlson (F-O) have contributed significantly in developing "theory of accounting" (i.e. a formal representation of value in terms of accounting numbers). Important articles are Ohlson (1995, 1996) and Feltham and Ohlson (1995, 1996). They formalize the relationship between the value of equity and the expected future dividends, the sum of future cash flows minimum net debt, or as the sum of book equity value and expected value of residual income (under different sets of assumptions). Thus F-O provides a rich platform to test value relevance.

The F-O approach has stimulated considerable empirical research. Frankel and Lee (1998) and Dechow et al. (1999) use the approach in testing market efficiency, which is a very ambitious application of the model. Studies employing a combined book value and earnings approach that either literally relies on the FO model or is motivated by it are Barth, Beaver, and Landsman (1996, 1998), Barth and Clich (1998), Burgstahler and Dichev (1997), Aboody et al. (1999), Barth, Beaver, Hand and Landsman (1999), Collins, Maydew and Weiss (1997), and Collins, Pincus, and Xie (1999). Other empirical applications include direct tests of the F-O model (e.g., Myers 1999). Major findings of this literature are listed in the following, and may sum up the discussion of financial statement relevance.

1. The sum of the information content in the financial statements is significant pricing factors.

2. Both book value and earnings are significant pricing factors.

3. The relative importance of book value is inversely related to the financial health of the firm.

4. The coefficient on earnings is lower for the firms with low return on equity.

5. The coefficient on positive earnings is positive and significant, while the coefficient on losses is significantly different from zero.

6. Accrual vs. cash flow components of earnings are priced significantly differently from one another. In general the accrual components are associated with a lower coefficient.

4.2 Does the market read and interpret the financial reports "correctly"?

4.2.1 In general? Yes

When transforming reported earnings, the market must interpret how much of this is relevant for future earnings and hence the stock price. Several earnings response coefficient studies have examined this, and found that the market is good at reading and translating reported earnings correctly (e.g. Beaver et al 1979, Kothari and Zimmermann 1995, Kothari and Collins 1989).

Several studies examine how the market "reads" different earnings/asset components in the financial report. Sloan (1996) test accruals, (which are often difficult to estimate and often is set at management's discretion) and finds that in general stock pricing do reflect the information in accruals and "see through" (too) high accruals, which tend to give lower earnings and stock prices in the future. Fair values of (simple – my comment) financial instruments are priced (Barth et al. 1996). Dechow, Sloan and Sweeny (1996), however, test samples of firms with high accruals, which are more likely to experience future earnings problems, and find that the market over-value the accruals.

Capitalized software, brands and goodwill are priced (Aboody and Lev 1998, Barth, Clement et. al. 1998, Barth and Clinch 1998, Chambers et al 1999). Studies also find that investors perceive R&D and advertising expenditure as assets of the firm (Hirschey and Weygadt 1985, Landsman and Shapiro 1995, Barth et. al. 1996).

4.2.2 Does the market read the notes as thorough as the balance sheet and income statement? Probably not

This question is of course very relevant for pensions since most of the value information is included in the notes.
Disclosure information is often not as prominently displayed and may contain complex data that can be difficult to interpret. Hence the pricing of data in the notes is nontrivial.

Bernard and Schipper (1994) discuss different perspectives on the equivalence of disclosure and recognition and the role of accounting research in evaluating that equivalence. They suggest that the views of regulators and practitioners diverge on the distinction between recognition and disclosure. For example, they observe that a number of corporate managers submitted comments to the FASB indicating that the recognition of stock-based compensation as an expense would adversely affect their stock price and their ability to raise capital, but that disclosure of this information in footnotes would be acceptable. In contrast, regulators believe that the financial markets *value* substance over form so that information, whether recognised or disclosed, will be assigned its appropriate weight in determining *values.*

Academics tend to share the regulator's view (Dechow and Skinner 2000 and Fields et. al. (2001)'s summarize of the research in the area), and consequently, many research designs do not distinguish between recognised items and other disclosed items. Consistent with the practitioner view, however, Bernard and Schipper (1994) point out that recognition and disclosure could result in different stock price effects if (1) investors inappropriately undervalue disclosed amount, or (2) recognition implies greater *relevance* or reliability.

Bernard and Schipper (1994) suggest that one reason for the dearth of studies testing the equivalence of recognition and disclosures is that such studies require a high level of precision in the face of several research design problems. They note that cross-sectional comparisons are difficult because accounting standards usually do not allow a choice between disclosure and recognition for the same economic situation. Even if there is such a choice, the firms self-selected disclosure or recognition and controlling for the effect of such self-selection is problematic. Within-firm comparisons can also be problematic if estimates become more reliable and consequently move a firm from disclosure to recognition.

Gold (2000) analyses 2 different ways the market looks at financial reports:

- The transparent model, where the market reads everything in the financial report, and with equal weighting, and the
- The opaque model, where the market gives more (value) weight to the numbers in the income, balance sheet and cash flow statements than the numbers in the notes.

The opaque model is conceptual, but with little empirical evidence so far to support or refute it.

However, Bernard and Schipper (1994) cite numerous studies that address how investors evaluate notes in the financial report. Many prior studies indicate that disclosures in the notes related to unrealized gains/losses for banks, unrecognised changes in oil and gas reserves, and unrecognised R&D are at least partially valued by the stock market. However, few studies examine whether disclosures are completely priced or equivalently priced to recognised amounts. Aboody and Lev (1998) found that firms that expensed software immediately were priced lower than firms that capitalized software (following FAS 86), and documented a significant positive association between the expensed software and their stocks subsequent return (indicating under pricing of software). However, they indicate that this might be caused by lack of transparency; for firms that expensed software development there were little information about the projects, so the investor would have difficulties performing a valuation. Bernard and Schipper (1994) conclude that prior academic research is consistent with market participants pricing disclosures to some extent, but the research is inconclusive regarding the equivalence of disclosed and recognised amounts.

Amir (1993) found that disclosures in the notes about post-retirement benefits were underweighted by investors until the policy discussions leading up to FAS 106, which made the long-term costs of these benefits more salient. In Aboody (1996) investors valued recognized write-down information more strongly than disclosed write-down information in the oil and gas industry. Davis-Friday et al. (1999) examined whether the market values financial statement data differently if it is disclosed instead of recognised in the body of the financial statement. They identify a sample of 229 FAS No. 106 adopters who disclose an estimate of their anticipated liability for retirement benefits *other* than pensions (PRB) in their financial report prior to the year of recognition. They then test whether the disclosed estimate of the PRB liability is valued differently by the market than is the subsequently recognised PRB liability. They provide modest and model-sensitive evidence that the recognised PRB liability receives *more* weight than the disclosed liability in market value association tests. Similarly, Ahmed et al. (2005), found that for the same firm, disclosed values of certain

derivatives had lower valuation weights than derivatives with (required) recognised values; prior to FAS 133 implementation not all derivatives should be recognised. Davis-Friday et. al. (2004) found that investors perceived disclosed retiree benefits other than pensions with greater error than recognised benefits. Hirshleifer and Teoh (2003) find that some investors use only recognised items and ignore other disclosed items.

In sum, the market seems to read the notes, but not as thorough as and perhaps put less weight on relevance than the balance sheet/income/cash flow statements. This *could* imply that the information regarding pensions in the notes are under analysed and not fully valued.

Disclosure is closely related to corporate transparency (defined by Bushman et. al. (2004)) as availability of firm-specific information to those outside publicly traded firms). My study relates to the use of pension information disclosed in the notes of the financial report, and hence this is public information. However, disclosure intensity (amount and content of disclosures), accounting policies (specific use and description), timeliness of disclosures and credibility of disclosures are also components of corporate transparency (Bushman et. al. 2004) and thus relate to the discussion above and to pensions. This is further discussed below in 4.3 - 4.5 regarding earnings management and disclosed information; how the market reads pension information disclosed in the notes and in 4.7 when Norway is compared to other countries in studies of market efficiency, transparency and earnings management tendencies.

4.3 Earnings management; frequency and how it's performed

4.3.1 Factors determining the frequency and magnitude of earnings management

I am looking at evidence of earnings management regarding pensions. I will have a limited number of observations – but detailed data. Hence, I need to find factors and events implying high frequency and high levels of EM according to - and test my data vs. these factors in order to obtain sufficient statistical power.

Reviewing academic theory and empirical work I have found the level of earnings management in general to be associated with the following factors:

Generic factors (as I call it)

1. Level of general earnings pressure

2. Firm specific rewards

3. Opportunity for EM

4. Managements will or perceived barriers to perform earnings management.

Event specific factors (as I call it)

1. Financial distress

2. Capital market events

3. Loan renewals

4. Changes of management/auditors

5. Changes in rules and regulations

6. Incentives contracts for managements

This will be discussed in the following:

1. Level of general earnings pressure on management, by society or by the owners:

According to agent-principal theory, the principal puts pressure or gives incentives for management to maximize earnings (Christensen and Feltham 2005). However, management has to balance short-term and long-term motives, to balance maximum profit vs. cost/effort and risk, and to balance between the asymmetric reward function of under vs. over performing:

- Principal-agent theory predicts that there are high general incentive pressure/avoided towards meeting the earnings-targets (the hurdle), but with declining pressure/incentives for over performance (Christensen and Feltham 2005).
- Contrary; earnings far below target and especially negative earnings increase the risk for negative career development (job loss, reduced total (life) compensation (Degeorge et. al 1999)) and increase the pressure for costly actions (for the agent); turnarounds, cost cutting etc.

Hence, even without specific incentive contracts (but with long-term career concerns, expectation of higher future compensation, social pressure/prestige etc) for management in a principal-agent setting, one should:

- In general smoothing EM is done because the stock market does not like uncertainty/perceived risk, and value lower earnings-variability firms higher than

similar higher earnings-variability firms. Steady earnings growth–stocks are valuated higher than other firms (Barth, Elliot and Finn 1999 and DeAngelo 1999). Maximizing stock valuation will tend to make management to report (smooth) numbers in order to show a stable growth vs. a variation in earnings. High (unexpected) earnings variance could be interpreted negatively ("Don't you have control? Get control!") and hence provide an incentive to perform EM to smooth numbers.

- Expect EM ("true earnings" to be higher than reported earnings) when the true earnings is above the target level) and increasing EM the higher the true earnings is relative to the target. The deferred earnings are to be taken as income in future situations of below target earnings (Smoothing of income).
- Expect EM (true earnings is lower than reported) when earnings are far below targets or very negative. (Big Bath).
- Expect EM (to reach or exceed target) when true earnings is just below the target
- Higher general earnings pressure (e.g. by the social pressure related to business success, by the owners), should lead to higher tendency of EM.

These factors explaining earnings management tendencies are well explored in empirical testing:

- Something in general to reduce variance in earnings/growth and to avoid small losses/ report profit;
  - Burgstahler and Dichev (1997) estimate that 8-12% of the firms with earnings just below 0 perform upward earnings management, and approximately 30-44% of firms with actual small decline in earnings stretch earnings to show a small (continued) growth – and this tendency increase over time.
  - Myers and Skinner (1999) find abnormal tendencies for growth firms to report smooth growth in earnings.
  - Peek (2004) finds smoothing done by altering provisions.
  - Abnormal frequency of small, continuous increases in reported earnings (Burgstahler and Dichev 1997, Burgstahler 1997 and Degeorge et al. 1999).
- Small upward rounding of numbers to above round number levels (e.g. Kinnunen and Koskela 2003).
- Upward rounding to just beat analysts/ market expectations (low frequency of earning just below analyst expectation) are found in many studies; e.g. by Brown (1998), Burgstahler and Eames (1998), Richardson et al. (1999), Degeorge et al. (1999). Kaznik (1999) find use of accruals to meet/beat analyst expectations.

Empirical evidence shows that the earnings management tendencies described above increase with increased earnings pressure caused by:

- Increased social earnings pressure on management:
  - National culture for measuring success and punishing financial failures (LaPorta et. al. 1998).
  - Importance of equity market in society (Leuz et al 2003).

- Firm-specific factors:
  - Higher ownership concentration (Leuz et al 2003, and Dhaliwal et al. 1982) (where the theory is that large influential owners may influence management to perform EM (at the effect on other shareholders).
  - Larger size of the firm, which implies more public interest (by the media etc.), investor interest and analyst following (LaPorta et al 1998). Brown (2004) however, does not find evidence that larger firms use more conservative assumption due to the political cost hypothesis. Christie (1990) also only finds weak or no evidence of this. Size correlate with higher analyst following (Hope 2003), which should lead to higher transparency/less possibilities for undiscovered EM. This could explain the conflicting results, for EM and firm size.

2. Firm specific rewards for performing earnings management (lower taxes, duties, grants etc.).

Lead to EM in order to minimize cost or maximize grants (Maydew 1997, Choi et al. 2001).

3. Opportunities:

The discussion above relates to general factors increasing the pressure to perform EM. However, in addition to motives or pressure to EM, there also must be opportunities: How easy is it to perform "successful" earnings management – to perform EM without being discovered: Empirical studies will show that opportunity is positively related to:

- Size and complexity of the firm (many different units/ industries)(Kothari 2001)
- Complexity of discretional estimates and accounting rules: long-term projects, % of completion, complex financial instruments (e.g. Plumlee 2003, Chen et al. 2002)

and negatively related to quality of:

- The control mechanisms (internal and external) detecting earnings management:
  - Number of people involved in preparing the accounts
  - Quality, independence and accounting focus of the board, audit committee and other control groups e.g. Messier et al. 2004).
  - Quality of auditor's degree of independence and amount spent on auditors (LaPorta et. al. 1998).
  - Quality and level of regulations in society/the country (e.g. as defined by LaPorta et. al. 1998): laws, regulation, and the required level (quality and quantity) of accounting information to be reported.
  - Level of formal and actual sanctions by the government and by the enforcement regulators and the stock exchange. LaPorta et al 1998).

4. Managements perceive barriers performing earnings management:

Given the pressure, the rewards and the opportunity to perform earnings management – it is still up to management whether it actually performs earnings management. Theory and empirical evidence in psychology shows that the tendency for crime/fraud etc is highly dependent on individual personal factors, personal morality, personal wealth, ambition etc., but where the probability for crime/fraud is very difficult to predict ex-ante. Hence, even with all the other factors indicating EM, there might still be little EM.

Event specific factors (as I call it) Relevant events are:

1. Financial distress:

When earnings, equity or other financial numbers/ratios are below or close to covenants set by creditors (e.g. Scholes et al. 1990, Collins et. al. 1995, Healy and Palepu 1990, Hall 1994). They all found high earnings management tendencies (abnormally high frequencies of ratios just above covenant ratios). Several studies showed abnormal accrual fluctuations in time-series studies when the firms experienced financial distress, especially with low solvency but also negative results in general.

*2. Capital markets events***:**

IPO's (e.g. Teoh et. al. 1998), stock increase, expected mergers acquisitions (payment with stocks) and takeovers (Erickson and Wang 1999, Thauvron 2000), MBO's (e.g. Perry and Williams 1994, Wu 1997). Bergstresser, Deasi and Ravin (2004) find that managers that expect or prepare to be acquired/merged increase the expected return on pension assets in the year of an acquisition merger. (som blir kjøpt opp /dress the bride)

3. Loan renewals (e.g. Sweeney 1999) in order to obtain beneficial terms/low interest

4. Changes of management/auditors.

New managers perform "big bath" (DeAngelo 1988) because the resigning auditor want to reduce risk of law suit or critique from the new auditors findings (Defond and Subramyan 1998).

5. Changes in rules and regulations affecting financial reporting:

New rules with different accounting choices that affect profits (new tax rules, regulations

etc.) (Fields et al. 2001) or choice of implementation date/accounting options (Chao et. al. 2004).

6. Incentive contracts for management.

Incentive contracts tend to increase the EM tendencies as explained under the "general earnings pressure on management*:* Most compensation, salary, bonus or option contracts tend to have a concave shape or minimum-maximum compensation levels (e.g. Holthausen et al. 1995). Hence there should be a tendency to perform EM to move reported earnings between periods to maximize total bonuses, reduce high earnings and save hidden reserves for years of just below bonus target earnings. Tendency increases when there are management incentive contracts with bonuses linked to reported earnings or stock price development (e.g. Healy 1985, Holthauser et. al. 1995).

4.3.2 How earnings management related reported pension data is done

The academic interest in earnings management related to reported pension data has come in two waves: The first wave was a result of the implementation of FAS 87 in 1986. The second wave followed the turbulence in the equity markets after year 2000, which had huge effects on return on pension assets, and hence firms (real) equity and (operating) profits. The significant reduction in (real and nominal) interest rates (hence discount factors) in the same period, which should affect the value of the PBO, added to the interest.

Earnings management related to accounting method options for pensions. Empirical studies in general find high frequency of EM when accounting choices or implementation options exist:

Stone and Ingram (1988), Sami and Lipka (1989), Senteney and Strawser (1990), Scott (1991), Ali and Kumar (1993, 1994), Brozovski, Murray and Selto (1993), Harper and Strawser (1993), Langer and Lev (1993), and Espahbodi (1996) analyzed the relation between the year of adoption of FAS 87 and firm characteristics. The case where the firms can choose the time of a new accounting standard is a situation with high flexibility. All studies show strong or weak evidence that the choice of starting year is dependent on the implementation effect on equity and earnings.

In Ghicas (1990), the accounting and principles of pension cost, before the FAS 87 era when there were analyzed by multivariate logic models (regression analysis with chi-square tests). The tendency observed was that the firms who implemented the new accounting standard chose higher discount rates than the firms not choosing to implementing the standard. This reduced reported pension obligations.

Klumpes and Whittington (2003) examine various factors that potentially explain cross-sectional variance in UK firms' decision (according to the UK accounting rules then is optional) to switch the new accounting rules for pensions. They find a significant relationship between the switching decision and the funding of the pension plan, as well as pension earnings in the pre-switch valuation year.

Earnings management in general regarding choice of discount factor or actuarial assumptions used when calculating the pension liability. Empirically tendency for managing actuarial assumptions is high when profits and especially equity/balance sheet ratios are poor:

Bodie et al. (1987) document an inverse relationship between profitability and discount rates, hence suggesting earnings management by choice of discount factors.

Godwin, Goldberg and Duhac (1996) also reported that the rate of return, and the equity to debt ratio and the existence of corporate tax payments were significantly inversely related to the discount rate for pensions.

Kwon (1994) chose the nominal discount rates as the dependent variable, and analyzed the motives for discount rate choice by OLS regression. The debt to equity ratio, the interest coverage ratio, the manager's stock holding ratio and the funding ratio were statistically significant variables. However, this research did not control for the changes in market interest rates and the other interest-dependent variables in pension accounting. Moreover, in Kwon (1994) it is unclear whether interest coverage ratio is a proxy for profitability or for financial condition. As a result, his conclusion about the specific motives might be questioned.

Blankly & Swanson (1995) however conclude that there is little evidence of marginal discount rate manipulation in the *earnings* number; few firms change their discount rates regardless of profit.

Obinate (2000) tested why some firms in Japan chose to reduce the discount rates, when calculating pension liabilities, more slowly than the market interest decline in the 1990s. He found proof of earnings management (by regression analysis); but contrary to many other

empirical studies, the significant factor affecting the firm's choice was not equity-ratio, but profitability.

As discussed in chapter XX, the value of pension liabilities relates to the difference between the discount rate and expected salary increase. Hence only analyzing one variable – the discount rate – without controlling for the other, as the above studies do, should be done with caution.

Amir and Gordon (1996) (although investigation post retirement benefits other that pension (FAS No. 106)), however, analyzed the choice of two related assumption factors: the expected salary increase and the discount rate. They applied OLS regression, transforming the combination of two factors into the standardized present value of obligations, and chose this present value as the dependent variable. In their result, only the debt to equity ratio was significant

Some empirical studies focus on relations between manager incentive contracts, and how they are structured, and underlying pension discount rate choices: Ghicas (1990), Kwon (1994) and Godwin, Goldberg and Duchac (1996). All conclude that there is significant correlation. Feldstein and Morck (1983), Godwin et al. (1996), Petersen (1996), Asthana (1999) also examined how reporting incentives affect managerial choice of pension assumptions. They find in general, that firms with under-funded pension plans use less conservative assumptions.

In the US (unlike in Norway) management's choice of assumptions also affects the actual cash contribution to pension funds/assets. Hence choice of assumption will influence the cash out flow for the firm: Asthana (1999) examines the combined set of actuarial of estimates to calculate pension liabilities. He finds as firms become over funded, they make conservative actuarial choices to increase the reported pension liability. The larger the profitability, cash flow from operations, and tax liability and the smaller the debt of a firm, the higher is the likelihood that the firm's managers will make conservative actuarial choices to maximize cash contributions. Conversely, the smaller the profitability, cash flow from operations, and tax liability, and the larger the debt of a firm, the higher is the likelihood that the firm's managers will make aggressive actuarial choices to minimize cash contributions. Brown (2004) finds that firms with under funded plans (liabilities higher than assets) use more optimistic assumptions than those with neutral or over funded pensions. Blankley and Swanson (1995) however, find no evidence of systematic manipulation of assumptions in order to influence cash funding of pensions, but are actually looking at estimates only defining accounting – not

payments. Asthana (1999) demonstrates that firms make actuarial choices in order to achieve tax benefits in the US (not possible in Norway).

Expected return on pension assets. Amir and Benartiz (1998) examine firms expected rate of return assumptions on pension assets vs. actual returns and finds little correlation, and indicate that many firms adjust their expected return to meet earnings target.

Bergstresser, Desai, Rauh (2004) find that managers are more aggressive (choose higher) estimated rates of return on pension assets when their assumptions have a greater impact on reported earnings. Managers also seem to increase assumed rates of return on pension assets (and thus reported operating profit) as they prepare to acquire or merge with other firms and as they exercise stock options, further confirming earnings management and their belief that the market or the evaluators do not discover such manipulation.

To sum up, earnings management in the different pension areas is well documented – and is used especially to increase (book) equity/ratios and to some extent to increase earnings. This empirical evidence is used to develop strong hypothesis in chapter 6, and will be further discussed there.

4.4 Does the market "see through" earning management in the financial reports? Generally yes, but at times the market can be fooled

The key question is to what extent the market discovers and adjusts small or large earnings management. Penman and Zhang (2002) looked at accounting conservatism (on investment capitalization) and conclude that the market did *not* penetrate the quality of earnings of firms with conservative accounting during the sample period (1976-1995).

Also other studies show that the market does not always value manipulated accruals correctly; (high) abnormal accruals in statements related to IPO's tend to be too high and reversed subsequently. The market does not discover this fully; negative abnormal returns follows (Theoh et. al 1998).

On the contrary, Aboody and Lev (1998) detect earnings management regarding capitalising or not capitalising software, but find no evidence of mispricing (163 firms during 1987-1995 were studied, but the conclusion was drawn before the stock bubble burst…).

The market *is* more sceptical to, and prices suspects the discretionary components of accruals differently, hence earnings management in these numbers: E.g. Beaver et al. 1989 and Wahlen 1994 draw this conclusion for banks' loan loss reserves (reserves vs. equity ratio vs. stock price). Beaver and McNichols in 1998 and 2001 concluded similarly regarding the loss reserves in the property and casualty insurance sector.

Although several of the earnings management studies conclude that the market identifies this, it should be noted that the types of earnings management tested are after those that are "easy" to detect by superficial external cross-sectional tests. The methods for the identification are of potentially low power. Dechow et al. (1995) provide evidence of this. Most of the earning management accruals studies I have read (see above and in the EM chapter) are studies on *total* accruals in the balance sheet (e.g. Sloan 1996) or different components in the balance sheet (e.g. Chan et al. 2001, Thomas and Zhang 2002) they study the level of accruals in relation to later stock price development. In none of these were there further investigations on whether disclosure information in the notes of the financial report revealed information to the market that could give guidance or explanation of the accruals, or what type earnings management was performed. If it is relatively easy to detect earnings management empirically just from the main balance sheet number, should one not believe that also the capital market and analysts have seen it? The accounting scandals in recent years may have shown that earnings management can be much more sophisticated than can be easily discovered by researchers. Further, McNichols (2000) offers evidence that so-called managed accruals found in many studies are correlated with growth. Growth often leads to growth in accruals, even if the accruals are not manipulated. Kaplan (1985) offers evidence that accruals are correlated with macro economical up cycles and indicates that some of the "mis-priced" stocks may in fact be "glamour stocks". Hence, some of the studies indicating earnings management might in fact not show true earnings management, but just variations in (unbiased) accruals caused by economic cycles.

I will discuss EM more in chapter 6. Now I will return to how the market reads the financial reports, in 4.5 regarding pension information.

4.5 Does the market interpret the value of pensions correctly? Earlier studies say yes, more recent studies say not always

What are the results from research whether the market reads, interprets and prices the value of disclosed and non-disclosed pension data correctly?

"True" pension values gains/losses and expenses are only shown in the notes. Since many of the assumptions for calculating the reported pension cost and values are set discretionary by the management, pensions is also well suited for earnings management and earnings management seems to be performed frequently (see 4.3). Hence, it is critical that the market interpret the data correctly.

When reviewing the (US) literature on pensions, one should distinguish between 3 periods:

4.5.1 Studies with datasamples before 2001

Does the market adjust for the deferred recognition of pension assets/ liabilities only shown in the notes? Generally yes.

Often cited papers include Feldstein and Segliman (1981), Feldstein and Morck (1983), Bodie er al. (1987), Bulow et al. (1987) and Bodie and Papke (1992) and Gopalakrishnan and Suqrue (1990, 1992, 1993, 1995). These papers provide considerable empirical evidence that the equity market's valuation of firms takes into account the real difference between the value of pension plan assets and its liabilities, i.e., the pension surplus or deficit. Carroll and Nierhaus (1998) confirm those findings in a parallel test of debt market recognition of the value of the pension surplus or deficit, by empirically examining the positive relation between over/under funding of defined-benefit pension plans and debt ratings. But they find that the market is more sophisticated than that: While an under-funded pension liability should be fully reflected as a corporate liability, over-funded pension assets are not entirely a corporate asset, due to the difficulty of converting an over-funded pension plan's assets into unencumbered corporate assets. Hence, they find that in both equity and debt markets, there seem to be an asymmetric relationship between changes in pensions assets and liabilities and the market value of the firm and debt ratings: while each dollar increase in pension liabilities lowers the market value of the firm by about a dollar, an equal increase in pension assets raises the firm's

market value by less than a dollar. Similarly, a pension deficit reduces debt ratings by more than a pension surplus increase of the same size debt ratings.

Barth (1991) also concludes that the market incorporates the full pension liability calculated in the disclosures (PBO), but the results are noisy.

There are some contradicting studies: Landsman and Ohlson (1990) suggest that the market under-priced pension liabilities that are not recognised, similar with Harper et al. (1987) that are not recognized, but disclosed in the notes.

Davis-Friday and Folami (1999) provide evidence that pension obligations only disclosed in the notes is *not* fully included in the stock price.

Does the market adjust for differences in combined pension assumptions? Probably yes

Barth, Beaver and Landsman (1992) test how the market weights the different pension's components relative to other earnings components. They show mixed results in general, showing that the market puts different discount rates on the different components. They find that the investor may have trouble weighting the pension costs when assessing firm value. Brown (2002) finds that where managers have chosen optimistic (pension liabilities reducing) assumptions relative to the industry peers, market place "sees through" this and place a lower value on his firm.

Does the market adjust for variation in discounts rates? Probably yes

Among the studies analyzing the influence that pension obligations have on stock prices, there are a few studies that directed its attention especially to the variations in pension discount rates: Reiter (1991), Gopalakrishnan and Sugrue (1990 and 1992) and Kwon (1994). In those studies, the "constructive pension obligations" as they call the variable (which they computed by using the average actuarial assumptions (instead of the actual assumptions used) to adjust the PBO), was chosen as an independent variable. Those studies investigated whether investors would adjust the reported pension liability information on accounting in such a manner for firm valuation. The results give noisy and weak conclusions, but conclude that the market adjusts for some (or at least the extreme) deviations.

Obinate (2000) also finds weak evidence that the firms who choose lower discount rates for pension liabilities than others, are priced higher in the market.

Does the market see the true rise in pensions? Mixed results

Gold (2000) finds that the investors fail to adjust for pension assets risk and differences between actual true return and the reported (estimated) pension return.

Jin, Merton and Bodie (2004) find that the equity risk (equity beta) does reflect the risk of the firm's pension plans despite the fact that the true variance of pension assets and liabilities are not shown in the P/L statement (data from 1993-1998).

4.5.2 Studies with data after 2001

Franzoni and Marvin (2004) find that the market has significantly overpriced firms with severely under funded pension plans. Conclusion is based on data up to 2002 from Compustat (US firm), hence including the sharp drop of pension asset value after 1999.

In the frequent sited paper ("Did pension plan accounting contribute to a stock market bubble?") regarding market efficiency in general, Coronado and Sharpe (2003) also find that investors/the market over-value firms with defined pension programs in general and under funded firms in particular, especially since 2001. This is caused by investors' tendency to incorrectly judge the permanence of pension earnings and thus treat pension earnings (including returns for pension assets) as core or operational earnings. The market seems to pay more attention to pension earnings in the income statement than the reported net pension liabilities. The test they performed was to remove financial pension terms from operational reported earnings, and that stock values for firms with or without high financial pension income. They found that pension accounting caused some (2-3%) overvaluation of firms with high net pension financial income. However, they found that the pension accounting only had limited (2-3% stock price over valuation) effect of the "bobble-effect" in the stock market in the late 1990s.

To sum up; most of the earlier studies conclude that the market reads, interpret and price the true values and returns/costs of pension obligations and investments. However, more recent studies do indicate that the market does not price pensions correctly when the market variance and pension value variance are high.

However, in my opinion there are potential weaknesses in to the studies mentioned above, which could weaken their conclusions:

- All studies focus on correlations (cross-sectional) between different pension values or variables (giving a constant value) and stock prices. This assumes a linear relationship between one earnings-/asset – or liability component and the value of the firm and the stock price: E.g. a firm with net pension cost of 50% of operating income compared to a firm with net pension cost of 5% operating income, the former firm pension income would be weighted 10 times as important related to affect on stock prices as the latter. This linearity is not shown in any theoretical model tested, hence giving noise to the results. Feltham and Ohlson (1996) indirectly assume linearity and that different value components could be added to reach the total value of a firm in their valuation models, but are unsupported by empirical data I have seen (e.g. Myers 1999, Bartheld 1999) (see 3.1 re 3)
- Looking at the test model, using a t-test, it can be difficult to find statistical evidence that market does *not* price pensions correctly, at times when the interest rates (discount rates) and other underlying actuarial assumption has low variance like in the 90's. The combination of optimistic pension asset return assumption and the (high) actual returns in the bullish stock market up to 2000, adds to this argument. Perhaps that's why most studies before the 2001 crash and turbulence showed that the market is "pension efficient", but studies afterwards showed another story.
- Many studies have looked at *one* pension variable only (typically the discount rate). However, one variable cannot be separated from the joint process of selecting other actuarial estimates also closely related to the interest rate (see 3.2.8). Hence, several of the studies had regression estimates that are inconsistent and biased. Thomas (1998) Ghigas (1990) and Thomas and Tung (1992) use means of discount rate and the other actuarial rates. But the absolute differences between assumptions for each firm are more important than the mean of assumption in such calculations (as discussed in chapter 3). Moreover, salary increase as a variable was not shown before 1986 (pre-FAS 87 period) in the disclosures for listed US firms– making correct testing of these important assumptions very difficult.

Hence, in my opinion, there are so many design problems and statistical measurement problems in prior studies that we do not have a clear picture of the way the market interprets the true value of pension assets and liabilities.

4.6 Analysts as important interprets of accounting information to the stock market?

My study will focus on how analysts value pension information in financial reports. Underlying assumptions are that analysts rely heavily on financial report information when valuating firms, and that the analysts are important for the stock market price. What does the literature research show?

4.6.1 Analysts important for the market? Yes.

Beaver (2002) sums up research on market efficiency and concludes that analysts are among the major information intermediaries and who use and interpret accruals (also Schipper 1991). According to Beaver, security prices reflect the results of their analysis. Because the average prudent investor may lack the time, skill and resources needed to analyse and interpret financial statements, analysts can be a major factor linking accounting data and security prices.

Analyst activity itself is also the key to efficient price setting: Analyst following is highly correlated with the level of information available to the market about the firm (O'Brien and Bhushan 1990, Bhushan 1989, Lang and Lundholm 1996).

High firms with high analyst following exhibit substantially lower levels of price reactions to "unexpected" events (Freeman 1987, Foster et. al 1984).

Analyst may also have an important role in reducing information asymmetry between firm management and actual and potential investors within an agent theory concept (Arnold et al. 1984b).

So, are the analysts good at forecasting stock prices? Yes, but of course not perfect, and not unbiased:

Analysts' forecast outperform the best statistical models (Brown et al. 1987; Penman 2003 among others), which is not surprising since the analysts can use a much richer information set than the past earnings series. Fairfield and Whisenant (2001) find that a group of fundamental analysts (from the Centre of Financial Research and Analysis, who issue "independent" stock analyses reports) are able to forecast deteriorating firm performance and stock prices (373 firms).

Barber et al. (2001) find that using analysts' recommendations yield abnormal gross return (greater than 4 %). Moreover, the returns are not adjusted for transaction costs).

However, a model that incorporates both statistically based forecasts and analysts' forecast outperforms analysts' forecast alone, which implies that the analysts' forecasts do not reflect all of the information in the past earnings series (Brown et al. 1987). Also Dechow et al.

(1999), Frankel and Lee (1998) find that analysts' forecasts do not fully reflect all the available information.

(As human nature) the analysts also rely too heavily on history repeating itself, i.e. that analysts' forecast errors are correlated with prior stock return (Cohen and Lys 2003, Klein 1990, Lys and Sohn 1990, Elgers and Murray 1992, Arbarbanell and Bernard 1992 and Chan et al. 1996 (Sited in Cohen, Lys 2003). The forecast errors are serially correlated.

Much prior research has concluded that analysts' forecasts are optimistic (O'Brien 1988, Stichel 1995, Amir and Lev 1996, among others) although there appears to be secular reduction in the optimistic bias (Brown 2001). The degree of bias is related to underwriter affiliation. Analysts employed by investment firms that are associated with the underwriting of the firm's securities issue more optimistic forecasts (Lin and McNicols 1998). Analysts' (initially optimistic) forecasts tend to be revised downward during the year (Kasznik and McNicols 2001). Analysts with better forecasting ability appear to have a higher probability of survival (Mikhail, Walther, and Willis 1999; Clement 1999).

Does the market listen to the analysts? Yes

These findings would be of mild interest in their own right even if capital markets fully adjusted for this behaviour. However, they take on added significance, to the extent that capital markets do not appear to unravel these biases and processing inefficiencies.

Brau and Lehavy (2003) analysed how the market reacted short term to analyst target price *revisions* over the period 1997 to 1999. They found a significant market reaction (total of 223' target prices).

Womak (2001 and 1996) also finds that the market reacts both in price and volume to analysts' recommendation changes (stock prices increase 3% for buy recommendations and drop 4.7% for sell recommendations in the 3–days after the event).

Analysts' stock recommendations reflect a view that (Womack 1996, p. 164) "I have analyzed the publicly available information, and the current stock price is not right". Hence stock recommendations reflect opinions on the relative degree of under or overvaluation (current price deviation vs. intrinsic value). At least this assists in reducing arbitrage

possibilities in the market, since investors act on recommendations, but also shows that people do listen.

Capital markets appear to (at least partially) reflect naively analysts' forecast in price. (Dechow and Sloan 1997; Frankel and Lee 1998): A strong sell and buy recommendation issued do affect stock priced immediately, even if the recommendation does not reveal any new information. I will discuss the role of the analysts more thorough in Chapter 7, especially in 7.4.

4.6.2 How important are financial information/reports for analysts?

Despite the importance of analysts, we know little about the way they process information generally, and in particular, information from firms' published accounts (Breton and Taffler 1998).

Fundamental analysis is the method most widely used by analysts in both the US and UK (e.g. Arnold and Moizer 1984a, Block 1999). The manner in which this is typically conducted requires an estimation of "core" earnings for the current and prior year, and an application to this of a subjectively determined future earnings profile to obtain an appropriate "intrinsic" market price. This is then compared to the market price. DeFond and Hung (2003) find that most analysts use *earnings* forecast rather than cash flow forecasts (period 1993-1999, 8886 firm analysis in the US).

DeFond and Hung (2003) find that the situations where analysts do use cash flow forecasts (and not earnings) are situations where the firm experiences poor financial health, has high capital intensity, has high accruals (suspicion of earnings management), uses "unusual" accounting principles, has high volatility in earnings and/or grow quickly.

An analyst's view on a company at any one point in time is the result of a long and complex process of gathering and evaluating information from many sources. Analysts will typically be heavily reliant on soft sources of information such as derived from company contacts and visits, and use more timely interim and preliminary statement numbers in reaching a judgement about the firm.

Financial reports are a key source of information for analysts, and this finding is uniform across markets and through time (Breton and Taffler 1998).

Previts et al (1994) for instance, review 479 analysts' reports with the Word Cruncher

computer program to document information input by analysts, and find extensive use of various accounting data from financial reports.

How important is difficult to judge, because correlation tests are easy, but *relative weight* is difficult due to the complex valuation process as described.

Breton and Taffler (1998) have made an overview from 5 other US-based studies of the ranking by analysts of information and compared this with their own study results. Company visits/management meetings and financial reports rank as No. 1 or as No. 2 in these studies.

Several studies (Roger and Grant 1997, Breton and Taffler 2001) have examined the *report* of analysts, looking for relative weighting of wording in order to decide relevance of different information. These studies conclude that accounting numbers (profits, balance sheet) are not *the* most important factor when analysts analyse firms for valuation. Non-financial/ "soft" and qualitative information is more important. However, the method used is an indirect way of studying analysts, with the risk of misjudgement. The studies are based on wording-weighting in analyst reports, giving equal weight to "key" word relating to the sell/hold or buy recommendations. I would expect in general that financial information (e.g. a earnings number) is more condensed and includes more information that other types of information, and should weight more.

It should however be noted, that even if analysts use financial reports as an important input to earnings forecast – and this is their primary tool in valuation – there is not a clean link to stock recommendations: Evidence linking analysts earnings forecast, stock price valuation and recommendation are limited:

For example, Schipper (1991) argues that earnings forecasts are "not a final product, but rather an input into generating a final product." Bandyopadhyay et al. (1995) examine price forecasts for 128 Canadian firms and investigate the explanatory power of earnings forecasts revisions for stock price forecast revisions. They find that near-term forecasted earnings revisions explain approximately 30 percent of the analysts' variation in stock price forecast revisions, but long-term earnings forecast revisions explain approximately 60 percent of the analysts' variation in stock price forecast revisions. In a related paper, Francis and Soffer (1997) examine the relative price informativeness of earnings forecast revisions and changes in stock recommendations. They find that both signals are informative after controlling for the other.

Bradshaw (2004) finds *little* evidence that the analysts recommendations are explained by their own earnings forecast that Bradshaw have tested in 4 different present value models.

4.6.3 Do the analyst read and use the disclosures? Yes.

Byard and Shaw (2004) used linear regression to test whether increased/high quality of financial disclosures in annual and quarterly reports increased precision of analysts' earning forecast. The conclusion was positive, hence indicating that analysts *do* use the details in the financial reporting.

Lang and Lundholm (1996) also show that firm with higher quality disclosures have smaller analyst forecast errors (when forecast error is based on the mean error).

Hope (2003) also finds that increased level (quantity) of disclosures in financial reports is positively related to analysts forecast accuracy (using samples from 22 countries).

There might of course also be other explanation than disclosure – analyst relationship. Large firms have more and higher quality disclosures (e.g. Lang and Lundholm 1996) – but also probably have more qualified people to assist the market in good estimates, have less variance in earnings (because of size and diversifications (verified e.g. by Fama and French (1995), and there are more analyst following large firms. Several of these control variables are not tested for in the papers mentioned.

4.6.4 Do analyst read, interpret and use correctly complex financial information and information disclosed, not recognised?

Pension rules, valuation of pensions and interpreting the information in the financial statements are viewed to be one of the most complex areas for analysts (see Appendix 4).

Two streams of research suggest that complexity of the information may affect how efficiently market participants use that information. Theoretical and empirical judgment/decision-making research concludes that increased complexity of task adversely affects judgment quality (e.g. Payne 1976, Einhorn et al. 1977, Iselin 1998, Paquette and Kida 1988, Payne et al. 1988). This literature suggests that task complexity impairs judgment through decision-makers' strategy selection, where strategy is the method or set of procedures an individual uses to incorporate, information into decision making (e.g. expected utility maximization, satisfying, elimination by aspects). For example, Payne (1976) finds that,

at a high level of task complexity, individuals use strategies that are analytically simpler to complete the task. Subsequent studies report similar findings (e.g. Payne 1982, Smith et. al. 1982, Early 1985, Bettman et. al. 1990). These studies suggest that higher task complexity leads decision makers to adopt analytically simpler strategies that may result in incomplete use of available information.

A second stream of research suggests that information complexity likely impairs analysts' abilities to assimilate the information. For example, Hirst and Hopkins (1998) document that analysts fail to access comprehensive income information under certain reporting formats (a perhaps less convenient statement of changes in equity vs. the same information/numbers included in the income statement) and suggest that "clear reporting" of information increases analysts' use of it (McEwen and Hunton (1999) and Chen et al. (2002) have similar findings).

However, Hirst et al. (2002) hypothesize and find that analysts experienced with relevant comprehensive income information are unaffected by differences in reporting format. In another experimental study, McEwen and Hunton (1999) document that analyst who forecast more accurately tend to emphasize different information than other analysts who forecast less accurately.

Clement (1999) shows that increasing task complexity can result in increasing analyst forecast errors. Analysts may thus be less likely to incorporate pension charges into their forecasts due to the complexity of the information and the associated learning effort costs.

Plunlee (2003) investigated the relation between information complexity (in tax law changes) and the financial analysts' use of that information. He examined the analysts' explicit forecasts for this, and finds that the analysts *do* impound the less complex rules, but *not* the more complex changes. Also the magnitude of errors in their forecasts increased with the complexity of this information.

Similarly, Chen and Scoderbek (2002) find that analysts failed to incorporate the deferred tax effect of an increase in the corporate tax rate from 34 percent to 35 percent stemming from the Omnibus Budget Reconciliation Act of 1993 into their forecasts of earnings for the third quarter of 1993. In a follow-up study, Chen et al. (2002) report that some analysts inappropriately revised their earnings forecast for the fourth quarter of 1993 and the first quarter of 1994 to reflect a continuing effect of this one-time change in tax rates. Chen et al. (2002) suggest that analysts' incorrect responses to the increase in tax rates may arise

because of "the complexity of this deferred tax adjustment". They do not measure the relative complexity of the adjustments or other transitory items to test this conjecture, however.

In summary, judgment/decision-making research consistently finds that higher task complexity leads decision makers to select analytically simpler strategies to complete a task, and analyst-related research finds that analysts fail to use all available information – especially when only disclosed in the notes – in forming their forecasts. If less complex information is less costly to use than more complex information (like pensions) (i.e. it takes less time, effort, or training) and there are constraints on an analyst's time effort, or ability, then all else equal, the net benefit of incorporating information into a forecast should be a decreasing function of the information's complexity.

4.6.5 Do the analysts detect earnings management? Not always, but after some time

This is an important question for my study since pensions are well suited for earnings management, and I will want to test this in my study.

According to Breton and Taffler (1998) at that time there were little academic research that had tested earnings management explicitly and explored whether market participant like the analysts were able to see through accounting manipulation. A have found very few direct tests/field studies of if/how analysts adjust for earnings management. Panko (2005) reviews prior field studies of spreadsheets, and found 13 in total, but *none* related to analysts' spreadsheets.

Prior studies examining how analysts respond to accounting disclosures by management in the light of reporting incentives/earnings management have found mixed results. In some cases, the findings suggest that analysts are "fooled" and do not seem to consider the accounting choices that mangers have made (for example Neill et al. 1995). In other cases, the analysts seem to impound the accounting numbers into values depending on the choice of the accounting procedures used to compute those numbers (for example Harris and Ohlson 1987).

Even after 1999, the academic results are mixed, but most studies seem to conclude that the analyst see some of the earnings management – but not all – and at least it takes some time to discover it. Sloan, Richardson and Soliman (2001) find that the market detects (too) high

accruals (predicts lower future earnings and stock prices) caused by earnings management or biased estimates. But - the analysts do not (Bradshaw, Richardson and Sloan (2001): their forecast errors increase with higher accruals. Failfield and Whisenant (2001) compare sell recommendations from fundamental analysts with post event negative abnormal returns, and find, contrary to Bradshaw, Richardson and Sloan's study, that the analysts *are* able to identify firms that mask operational problems in aggressive accounting.

Breton and Taffler (1998) conducted a laboratory-test testing whether analysts detect and correct what they label "window dressing" (minor levels of earnings management, but not in violation of (US) GAAP, and accepted by auditors). The test design was good in the sense that it included two group of analysts; one group who were told and only given tasks to detect earnings management, and one test group who were not aware of that earnings management was specifically addressed, but got the questions as part of a more general valuation test. However, low external validity and the risk of biased/too positive results is always a problem with laboratory experiments where the participants are "over focused" on the issues. Still the result was depressing: At a 99% confidence level, the amount of adjustments done by the analysts was significantly below what was needed on order to conclude that analysts *do* find and correct minor earnings management attempts.

4.6.6 Do analysts read, interpret and value pensions correctly? We don't know

There are not many studies on this specific subject.

A survey (but not an academic study) done by Mercher Consulting in US in 2003 interviewed 9 directors of buy-side analysts, and found that they *do* re-engineer the pension data in the financial statements when valuing firms. According to them, analysts did not pay so much attention to pension date before 2000 – because there was little focus on the subject, but this survey shows that almost all analysts inspect the pension number in the disclosures carefully. Focus areas are especially the discount rate and expected rate of return.
The survey shows that

- 7 of 9 explicit incorporate pension-related financial information in their valuation
- 5 of 9 adjust for pension surplus or deficit (I interpret this as adjusting for the unrecognised amounts)

- 3 of 9 make their own estimates/adjust ("penalize") for those firms whose discount rates or expected return the analysts consider to be out of line.

Picconi (2004) has done an academic test of whether the analyst incorporate information given in the notes of next years/changes in pension estimate factors when they make earnings forecasts. He does this by comparing deviation between actual results and analysts consensus forecast, and statistically tests how much this is caused by (disclosed/informed) changes in pension assumption. He finds that analyst do *not* fully incorporate this new information in their estimates. My experience from the field study where I analysed the actual adjustments done by analysts regarding pensions, was that the directors believed more adjustments were done than the actual adjustments performed by each analyst in the specific case. This might explain the deviations in the 2 studies.

4.7 How is the Norwegian market in terms of efficiency and earnings management tendencies? I.e. may the (non-Norwegian) findings from research be applied in the Norwegian context?

None of the studies above relates to the Norwegian market, and most of the empirical studies cited are performed in a U.S. context. My studies will be performed in a Norwegian context or on Norwegian listed firms. The key question is whether the research above may be related to the Norwegian context. Hence I will discuss expected efficiency of the Norwegian stock market, empirical research related to the Norwegian market-efficiency and earnings-management tendencies, and try to conclude based on this.

If the Norwegian market is less efficient than the US market, there could be a higher tendency that complex or earnings managed pension data are not fully or "correctly" reflected in the stock prices in Norway.

There are, in my opinion, at least 6 reasons why the Norwegian market is expected to be less efficient than the US market:

1. *The market is less liquid and with fewer traders than the US market.*

   According to Eckbo and Smith (1998) and general market efficiency theory, efficiency increases and arbitrage possibilities decrease with higher number of transactions, and more traders looking for and doing trading. Total volume for the market is not important, more important is volume and number of traders per listed firm. Norway has significantly

lower volume and number of traders per listed firm (Gjerde, Knivsflå and Settem 2001) than the US market.

2. *There are fewer analysts per firm in Norway.*

   One of the more important groups reducing information asymmetry, and hence increasing market efficiency, are the analysts. According to Lang and Lundholm (1996) there were on average (in their large sample) 17.6 analysts making forecast per listed firm in the US, vs. 7.5 on average in Norway from my sample (21 firms out of 160) (see 7.2).

   Lang and Lundholm (1996) show that more analysts cause the firms to increase disclosures. O'Brien and Bhushan 1990 and Bhusan 1989 have the same findings. Analysts followed firms, exhibit more accurate analyst forecasts (Lang and Lundholm 1996), and substantially lower levels of "unexpected" events (Freeman 1987, Foster et al. 1984).

3. *Less requirements for disclosures in Norway*

   Less publicly available information should according to the SEMH result in less efficient markets: Reduced disclosures make it more difficult for the market to understand and interpret what is going on in the firms and how the financial information should be read. Leuz and Verrecchia (2000) show that increased level of disclosure reduces information asymmetry; (measured as the price-spread difference for German firms who switched to IAS/IFRS or US GAAP with increased disclosure requirements from the German reporting regime).

   Norway has less quantitative disclosure requirements in the notes than the US: The checklist prepared by Ernst & Young for ensuring completeness of disclosures for listed firms in Norway is 32 pages (2004) (before the IAS/IFRS implementation). The similar checklist for IAS/IFRS is 86 pages (2004), and for US GAAP 132 pages (2004).

   SEC in the US also requires additional information about the firms to be filed; F-10/F-16/F-17, with management comments, and more detailed explanation of risks and disclosures (In the required Management Discussion and Analysis part (the MDA)). There are no similar MDA information disclosure requirements in Norway, but we have some information requirements that should be disclosed in the Directors report.

4. *There is less formal control of the financial statements in Norway than in the US*

   The only ongoing control as of 2004 is the accounting department of Oslo Stock

Exchange, with 3 employees only, spending only part of their time on financial statement review. The US has SEC (and from 2003: Public Firm Accounting Oversight Board) as a large enforcement institution, with several hundred people who perform full time formal control of the financial reports and the filings. Even relatively this is more resources pr. firm than in Norway. More control should lead to management preparing more accurate and complete financial reports/disclosures. As an example (see 5.3) very few of the Norwegian firms have provided all the information required by the Norwegian accounting standard for pensions in the disclosures in recent years, but there has been no formal reaction on this from Oslo Børs or others in Norway. An enforcement institution has, however, been established by Kredittilsynet when IAS/IFRS was implemented in 2005.

5. *Fewer audit committees by the listed firms in Norway than in the US*
   As of 2004 only 10 of the 120 listed firms in Norway reported that they had audit committees (counted by me by looking at information in the 2004 from financial reports), whereas all listed US firms are required to have audit committees (from 2004). It is expected that the requirement for audit committees will increase quality of the financial statements, since board members and other external members with a accounting expertise is expected to spend more time on the reporting (Sabane-Oxley Act 2002).

6. *No formal requirement in Norway that the CEO and CFO have to verify that the issued statements are accurate and complete like the Sabane-Oxley requirements.*
   One should expect the management to be more careful with earnings management, and perform more internal controls ensuring that other internals do not perform EM with such signing – and especially with the sanctions/penalties attached. Unlike the US, there are no such requirements in Norway.

In total one should expect that the stock market in Norway is somewhat less efficient than the US market, and with higher risk that errors, different judgement or some events or earnings management not being discovered by the market or analysts following the firms.

Empirical evidence of market efficiency/earnings management climate in Norway:

In emprical research where Norway is compared to other countries, including US, the Norwegian stock market ranks high with respect to efficiency and transparency and with law expectancy of earnings management. As expected, Norway ranks somewhat behind the US

stock market, but perhaps somewhat closer than my analysis indicates:

(The exhibits discussed below are constructed by carving out the specific results related to Norway and US re market efficiencies and earning management. Possible errors and wrong interpretations is my responsibility.)

Leuz et. al. (2003) (exhibit 4.1) confirms this view: Norway is at about the same level as US, and ranks among the countries with lowest earnings management indicators. They used multiple regressions to examine the relation between earnings management and investor protection, measured by variables from La Porta et.al (1998). Norway is here ranked (high number indicates good control environment/lower earnings management opportunities).

Exhibit 4.1 Descripitive statistics of control environment measures in Norway and the U.S. (Source Leuz et.al. 2003) (A high number (except for ownership concentration) indicate a good control environment)

Control environment measures*	Norway	US	Scale
Outsider investor rights:	4.0	5.0	scale 0-5
Legal enforcement (efficiency of juridical system, assessment of rule of law, corruption index)	10.0	9.5	on a scale 0-10
Importance of equity market (stock market size vs. GNP, no of listed firms and IPO's vs. population)	20.3	23.3	mean ranked scale 0-30
Ownership concentration (% owned by 3 largest share-holders in 10 largest (non-fin) privately owned firms)	0.31	0.12	on a scale 0-10 (NB: 0 is the best control environment, see ')
Disclosure index (from 1990-reports)	74	71	on a scale 0-90

*The Outside Investor Rights variable is the anti-director rights index created by La Porta et al., (1998): It is an aggregate measure of minority shareholder rights and ranges from zero to five.

Legal Enforcement is measured as the mean score across three legal variables used in La Porta et al. (q1998): (1) the efficiency of the judicial system, (2) an assessment of rule of law, and (3) the corruption index. All three variables range from zero to ten.

The importance of Equity Market is measured by the mean rank across three variables used in La Porta et al. (1997): (1) the ratio of the aggregate stock market capitalization held by minorities to gross national product, (2) the number of listed domestic firms relative to the population, and (3) the number of IPOs relative to the population. Each variable is ranked such that higher scores indicate a greater importance of the stock market.

Ownership Concentration is measured as the median percentage of common shares owned by the three largest shareholders in the ten largest privately owned non-financial firms (La Porta et al., 1998). The theory is that few, large owners may influence earnings management and external reporting. Presumably they have direct access to information (in board meetings etc) and do not have to rely on the external information.

The Disclosure Index measures the inclusion or omission of 90 items in the 1990 annual reports (La Porta et al., 1998).

Of the 31 countries, Norway ranks in the best cluster of investor protection variables. In this test, Norway's cluster also comes out with significantly lower levels of the earnings management indicators (accrual levels, change in accruals vs. cash flow, small loans vs. small profit ratio): Norway gets an average rank score of 5.8 (US lowest with 2.0, Sweden 6.8, Denmark 16.0, Austria and Greece highest with 28.3). Norwegian firms score higher on disclosure index than US firms. With reference to my claim that disclosure quantity requirements are lower in Norway than the US (see 3.6 No. 3) the results seem conflicting. However, Leuz et.al. (2003) base their conclusion on La Porta et.al. (1998) who had chosen 90 specific disclosure items and ranked the countries with respect to inclusion or omission of these items. Whether these 90 items are the most relevant items, and represent a complete choice for defining high/low score on the disclosure index is an open question. Having audited both US and Norwegian listed firms for several years, I question this specific result. It also should be mentioned that the years analysed were the years when Norway had its highest number of IPO's ever (source: Oslo Børs internet page) – and hence might not be representative.

In "Who is miss World in cosmetic Earnings" by Kinnunen and Koskela (2003), they studied cosmetic upward rounding based on 87 000 observations from 22 000 firms from 18 countries (Western Europe vs. Japan, Canada, Hong Kong, Australia etc.)
Norway ranked as No. 18 (Lowest tendency to perform cosmetic earnings!)
They also look at institutional factors/overall environment suited for earnings management of the sample countries:
Norway is ranked based on a combination of findings from other researchers (exhibit 4.2)

Exhibit 4.2 Descriptive statistics of certain earnings management indicators in Norway and the U.S. (Source: Kinnunen and Koskela 2003) (High or low scores varies vs. indicating high earnings management from indicator to indicator, but a low rank (in parenthesis ranked from 1 to 18) (e.g. No. 1 is a low rank) always indicate low expected earnings management tendencies)

	Norway	US	Scale and variance of 18 countries
Shareholder protection rights	3 (rank 6)	5 (rank 1)	On a scale 0-5
Latitude in GAAP (missing disclosures and accounting rules) vs. selected IAS	4 (rank 4)	3(rank 2)	On a scale 1-18
Spending on auditing	0.14 (rank 9)	0.24 (rank 8)	Variance 0,004-0,60
Relative firm size	0.045 (rank 8)	0.001(rank 18)	Variance 0,001-0,11
Power distance	31 (rank 16)	40 (rank 8)	Variance 18-74 on a scale from 1-100
Masculinity	8 (rank 2)	62 (rank 13)	Variance 5-95 on a scale 1-100
Value relevance of earnings	5.3 (rank 17)	8 (rank 2)	Variance 4,7-48,6

Shareholder protection = number of antidirector rights: scale: 0-5 (Laporta et al. 1997; Hung 2001);

Latitude in GAAP = index of missing national accounting rules and disclosure requirements with respect to selected IAS (GAAP 2000);

Spending on auditing = total fees of the country's ten largest accounting firms as percentage of gross domestic product for 1990 (Ali and Hwang 2000; Francis et al. 2001);

Relative firm size = median net sales of sample firms in 1997 as percentage of gross domestic product in 1997 (worldscope database: The Statistical Office in Finland);

Power distance = dimension of national culture measuring the degree to which institutional and organisational authority is accepted by individuals in the society (Hofstede 1984; Gray 1988; Jaggi and Low 2000);

Masculinity = dimensions of national culture measuring preference for achievement, assertiveness, heroism and financial success (Hofstede 1984; Gray 1988; Jaggi and Low 2000);

Value relevance of earnings = cumulated market-adjusted return of hedge portfolios based on perfect knowledge of net income, as a percentage of market-adjusted return of hedge portfolio based on highest and lowest market-adjusted returns (Hung 2001)

Kinnunen and Koskela do not weight these rankings, but as one can see, Norway overall is ranked high (low earnings management opportunities, similar to Leuz et. al.'s findings). Norway ranks high on power distance (the degree which institutional and organisational authority is ignored by individuals). As far I know, Norwegians are known to be independent, not just accepting instructions from their supervisors without questioning why, so the ranking sounds reasonable. But, in my opinion, the measure (as is supposedly indicates) does not necessarily indicate that managers in Norway tend to break the rules more frequently than managers in other countries. Norway also ranks high on value relevance of earnings. It should be noted that Hung's (2001) results, which the ranking is based on, includes data and earnings numbers from Norway before 1992; when tax adjustments heavily influenced the net earnings-number and probably made it less value relevant. In sum, Norway's relative ranking might be even better than indicated by Kinnunen and Koskela (2003), but it is impossible to conclude since there might be similar explanations for the ranking from other countries.

Hope (2003) also constructs descriptive statistic for many countries regarding earnings management indictors (Exhibit 4.3). The analysis is based on firm samples from each country (e.g. 23 in Norway, 493 in the US) (non-financial firms reporting to Center for International Financial analysis and Research (CIFAR)) (22 countries are included; most Western European countries, US, Canada, Australia, Hong Kong, Japan, New Zealand and South Africa).
Norway generally receives low rankings (low earnings management indicator), but somewhat higher rankings than the US. A weighted score (by Hope 2003) including 5 of the measures give Norway an overall ranking as No. 4, and USA as No. 1.

All of the studies are based on figures from the beginning of the 1990 and before the actions taken especially in the US to reduce earnings management.

*Exhibit 4.*3 Descriptive statistics of certain transparency and enforcement indicators in Norway and the U.S. (Source: Hope 2003).

Transparency indicators	Norway*	USA*	Scale and variance
Forecast accuracy	÷0.089 (rank 16)	÷0.011 (rank 2)	Variance -0.008-(-0.180)
Disclosure level	78 (6)	74 (11)	Scale 1-100, variance 58.1-83.1
No. of analyst following	16.1 (9)	20.6 (6)	Variance 3.9-30,2
Enforcement indicators			
Audit spending	0.21 (12)	0.31 (13)	Variance 0.07-0,70
Insider trading laws	2 (1)	2 (1)	Scale and variance 0-2
Juridical efficiency	10 (1)	10 (1)	Scale 0-10, variance 5.5-10
Rule of law and order tradition	10 (1)	10 (1)	Scale 0-10, variance 4.42-10
Shareholder protection	4 (6)	5 (1)	Scale and variance 0-5
Choice among accounting methods in 9 areas	7.5 (10)	2 (1)	Scale 0-10, variance 2-10, only 18 countries
Weighted enforcement	0.70 (4)	1.21 (1)	Variance (-3.65) -1,21

Rank out of 22 countries in parenthesis; low ranking indicates low expected levels of earnings management.
Forecast accuracy= the negative of the absolute difference between actual EPS and analysts' forecasts (average over fiscal months 4-12) scaled by stock price (data source IBES)
Disclosure= firm level total annual report disclosure scores (CIFAR 1993,1995)
Analyst following= the number of analysts following the sample firms averaged over fiscal months 4-12 (source IBES)
Audit spending= sum of audit fees of 10 largest firms/GDP (1990) (Mueller, Germon and Meek (1994)
Insider trading laws= sum of existence and enforcements of insider trading laws (Bhattacharya and Daouk 2002)
Juridical efficiency, Rule of law and order tradition= rating from 0-10 done by Business International Corporation (LaPorta et al 1998)
Shareholder protection= measured by antidirector rights (LaPorta et al. 1998)
Choice among accounting methods= country ranking of accounting methods allowed in 9 ares. A higher score means more choice (i.e. Hope has inverted the scale vs. Basu,Hwang and Jan 1998)
Weighted enforcement= degree of enforcement of accounting standards measured based on factor analysis of 1)country level audit spending 2) juridical efficiency 3) rule of law 4) insider trading laws (existence and enforcement) 5) shareholder protection (anti-director-rights) (LaPorta et al. 1998, Mueller, Gernon and Meek 1994, Bhattacharya and Daouk 2002 and CIFAR 1995)

Chan et. al. (1997) tested efficiency in several countries including Norway, based on the level of co integration between countries. The co integration literature, according to Chan et. al., says that if 2 markets are co integrated than possible arbitrage profits can be explored. Hence it is a test for the weak form market efficiency. If 2 stock markets are collectively efficient in the long run, then their stock prices cannot be co integrated. The data includes the period from 1961 to 1992. Empirical results (using 3 different models of unit root tests of stock prices) find that on a 1 % significance level the stock prices in Norway (as in USA) follow a random walk. Therefore, they conclude, Norway is individually weak-form efficient.

In sum, Norway's rankings in various studies indicate comparatively high market efficiency and low expected earnings management, but somewhat lower market efficiency and somewhat higher expected earnings management tendencies than USA.

There are however very few studies (at Ph.D. level or in reputable academic journals) with pure focus on the efficiency of the Norwegian stock market and earnings management tendencies:

In a PhD. thesis Aaker (2004) finds clear evidence of earnings management: 25% of all firms (all non-listed) perform earnings management outside GAAP. However, he does not test whether the market detects these earnings management attempts.

Eckbo and Smith (1995) found no abnormal performance (returns) by insiders in Norway – despite the fact that insiders account for more than 14% of the market.

Gjerde, Knivsflå and Sættem (2001) find no indications of market inefficiency when they study parts of the Norwegian market – although this is not their main focus in the study.

In total, the Norwegian market should be expected to be somewhat less efficient than the US market; but (reasonably high compared to most other countries, and with low expected earnings management tendencies. Hence, although most academic research is done with US empirical data, many of the findings should have some relevance also in the Norwegian market.

Hence, on should expect also in Norway:

- Financial reports are value relevant
- The market "reads" (incorporate in the stock prices) the information in the financial reports, but the information in the notes to a somewhat lesser degree.
- There is earnings management, but the market "sees through" most – but not all – of this and adjusts most EM in stock prices.
- The market interprets most of the information about pensions correctly
- The analysts are important for the market, and the market listens to the analysts.
- The financial report is important for analysts when they value stocks, and analysts read the financial reports thoroughly – but not everything equally well – and they do not always/immediately detect earnings management.
- Analysts study pension information, but we do not know whether they fully incorporate the information in their valuation. The SEMH however implies this in general.

5. Descriptive statistics on pension obligations in financial reports for firms listed in Norway.

The context for my analysis will be in Norway. But there is no database or prior complete analysis of the pension accounting practices for firms listed in Norway. Hence I have to *construct a database, and use it to analyse accounting variations for pensions*. If there are high accounting variances, this might be used to test for earnings management and for analysts about how they reflect the variances in their valuation models. Documenting the significance of pension liabilities, pension accounting variances and different use of "firm-independent" pension assumptions in Norway also should be of academic interest.

This chapter shows descriptive statistics of the listed firms in 1994, 2003 and 2004, with the focus on the pension data, and I have used the pension assumptions per firm to calculate each firm's PAF and present the distribution of the PAFs. 1994 and 2004 have been chosen since in these two years NRS 6 and IAS 19 were implemented respectively, resulting in immediate recognition of net pension liabilities with a book equity effect. Data from these years will be used to test for earnings management. 2003 was chosen since at the time of the field study of analysts (Chapter 7), it were the most recent publicized financial data regarding pensions, and 2003 was also used as a control test vs. the 2004 earnings management tests. The data by themselves also document the large variations in accounting estimates on presumably more or less firm-independent assumptions.

5.1 Overview of data

Information from all firms that were listed in the whole year 1994, 2003 or 2004, and that issued financial reports for the respective years while listed on the Oslo stock exchange/in Norway, are included in the manually built database. (I.e. IPO's during the year or delistings during the year and until issuance of financial reports are not included since financial reports do not have to fulfil the listing requirements for the whole period and these firms are not in the same context in the unlisted period vs. those listed in terms of control environment; fewer/no analyst following, less control procedures from auditors, stock market etc.).

General information that was collected is total sales, operating profit, net profit for the year and total assets, book equity and market values at December 31. Specific information that was collected about pensions is: whether the firms have defined benefit plans, the values of pension liabilities/assets in the balance sheet, and from the notes, the pension assumptions, the annual pension cost and its different components, the PBO (Projected Benefit Obligation; i.e. the gross pension liabilities) and other pension liabilities, market value of pension assets, unrecognised actuarial gains and losses, and whether information about actual returns on pension assets and composition of pension assets are disclosed. Choice of accounting principle regarding recognising or deferring actuarial gains and losses and use of the "corridor" is registered (i.e. information to be disclosed according to NRS 6). From these data, relative amounts of pension assets and pension liabilities vs. total assets and equity, the pension cost vs. income and the mean, median and variance of the different pension assumptions may be calculated.

5.2 1994 data

5.2.1 Overview

Total number of listed firms in 1994 that also issued annual reports for 1994 when listed is 111. (Total number of listed firms as of Dec. 31,1994 was 114 according to Kierulf Håndbok 1994, but the 3 remaining firms were delisted before the financial report for 1994 was issued).

Eight firms stated that they do not have pension liabilities or say nothing.103 of the firms stated that they have defined benefit plans (3 of them unfunded only):

- 98 implemented the new accounting standard
- 2 explicitly stated that they did *not* implement the GRS6 (Grand Hotel and Liva Bil). No official sanctions were imposed by the Oslo Stock exchange although it was viewed as mandatory to implement NRS 6 for listed firms (see Chapter 2.6.2) .
- 3 firms stated that the pension liabilities are immaterial, and gave no further information, presumably not implementing the new accounting standard. This was most likely acceptable under the general Norwegian GAAP rule (underlying materiality assumption, see NoU "Ny regnskapslov" Chapter 3.2 (1995: 30)).

Exhibit 5.1

Table A: Descriptive statistics on 111 firms listed in 1994*

	NOK mill. (unless stated)	%
No. of listed firms issuing financial reports while listed (No.)	111	
No. of listed firms with defined benefit plans (No.)	103	
Total sales for all firms	427 066	
Total operating profit	44 261	10.4% of sales
Total net profit	25 842	6.1% of sales
Total assets	839 101	
Total book equity	164 575	36% of assets
Pension data:		
Total net of pensions shown as assets in balance sheets	7 061	
Total net of pension shown as liabilities in balance sheets	6 295	
= Net of the net pension assets and net pension liabilities shown in the balance sheets	(766)	0.1% of assets
Total gross pension assets in the notes (≈fair value)	45 756	5.5% of assets
Total gross pension liabilities (PBO etc.) in the notes	44 779	5.3% of assets
=Net of total pension liabilities and assets shown in the notes	(977)	
Accumulated unrecognised amount as of Dec. 31. 1994**	4 500	3% of equity
Total recognised amount against equity as of 1.1.1994**	1 664	10% of equity
Total (net) recognised pension cost	1 904	4.3% of op.profi
Total (gross) recognised return on pension assets	2 738	6.2% of op.profi
Total (net) recognised financial cost (income) on pensions	(99)	0.2% of op.profi

*No. of listed firms in Norway listed in the whole of 1994, and listed while issuing financial report for 1994.Balance sheet items as of 31.12
** It was not mandatory to recognise net pension assets or liabilities vs. equity, and some firms ; notably Norsk Hydro and DNL did not do this as of NRS 6 implementation. In addition the number includes actuarial gains and losses in 1994. This explains why the unrecognised amount is not the same as the recognised amount against equity.

Table B: Descriptive statistics of pension assumption for 1994 data samples*

	Mean	Medium	Std.dev.	Mean lower decile	Mean upper decile
r= discount factor %**	6.60	7.0	0.69	5.2	7.4
s=salary increase %	3.10	3.0	0.51	2.2	4.1
g=G increase %	2.68	2.5	0.49	2.0	3.5
PAF=pensions ass. factor***	0.65	0.62	0.16	0.4	1.0

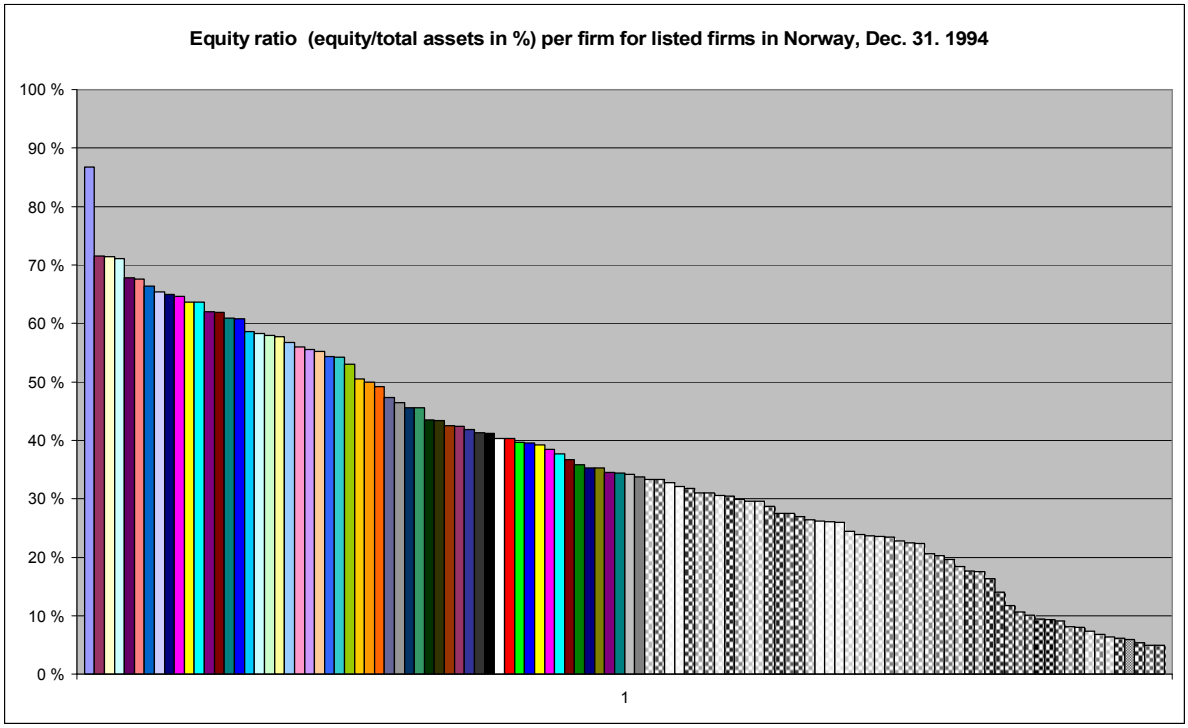
* 103 listed firms in Norway with defined benefit plans in 2003 ** Few firms disclosed the expected/recognised return, hence the data are omitted ***PAF= combined pension assumption factor= $PAF = \frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$

The general financial data (Exhibit 5.1) seem to indicate a "normal" year for 1994, average operating profit of 10.4%, average net profit after tax of 6,1% and an book equity ratio of 36%. Total net pensions recognised in the balance sheet are immaterial. However total gross pension liabilities (full value shown in the notes) are NOK 44.8 bill (5.3% of all assets), and gross pension assets are NOK 45.8 bill (5.5% of all assets). SAS (10.5/8.2), Norsk Hydro (7.9/11.9) and Statoil (3.5/4.8) (bill NOK of pension liabilities/assets respectively disclosed in the notes) make up the largest amounts. Ranked according to PBO as a % of total assets, firms in traditional labour intensive industries with strong labour unions make up the top group: the newspaper industry, Schibsted (49%), Adresseavisa (44%), Stavanger Aftenblad (29%).

The SAS consortium (where the Norwegian ownership in 1994 was listed through the holding firm DNL) is a special case (the 1994 figures include the total numbers for SAS, not only DNL's share): Gross PBO was NOK 10 547 mill. vs. book equity of NOK 2 985 mill, a ratio of 350%. At the same time SAS had low equity ratio, 9%. As the only firm, in addition to Norsk Hydro, it did not charge the implementation effect against equity, but deferred the effect (allowed). The deferral was NOK 1770 mill, almost 60% of the equity. One could only speculate about this motive for the choice of accounting treatment. The combined pension-assumption-factor is one of the lowest of the listed firms: 0.46. A 1% reduction in the discount factor used (7 %, one of the highest among the firms) would represent an increase in PBO equal to about 75% of the book equity. *

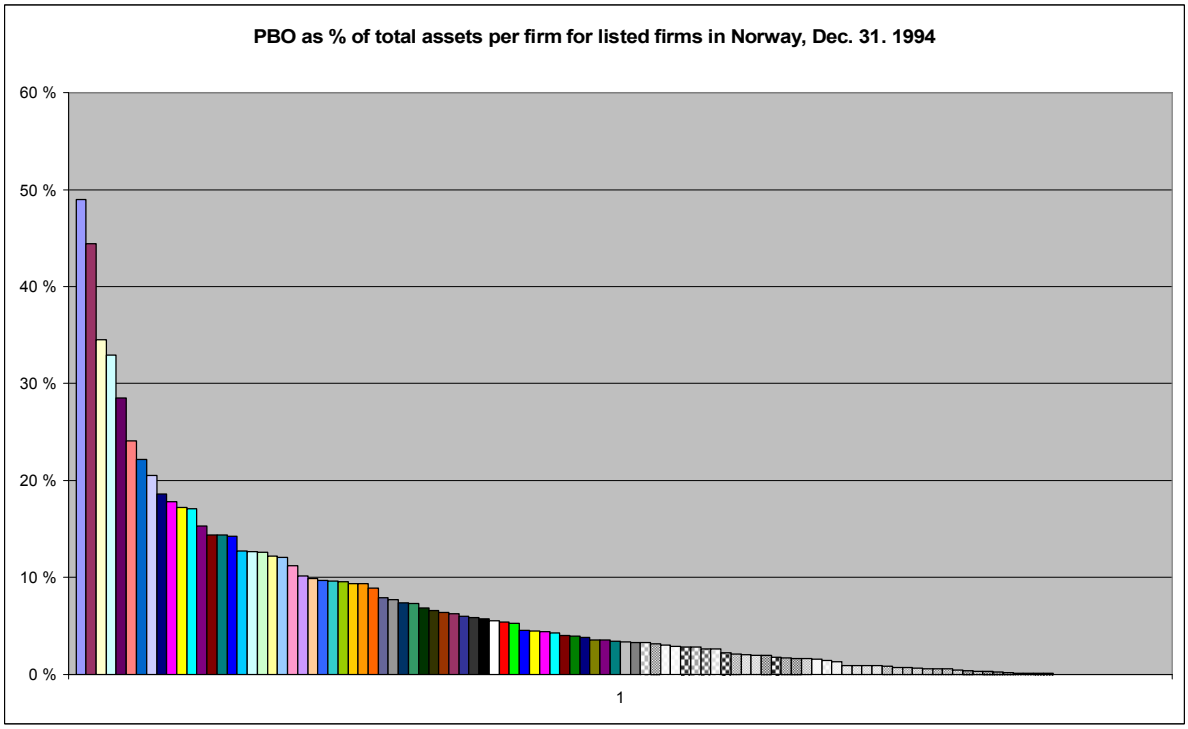
*Using the PAF formula, PAF would increase from 0.46 to 0.56 if the discount rate is reduced from 7% to 6%, the PBO of NOK 10.547 would increase by approximately 2293 mill. NOK vs. a book equity of NOK 2985 mill.

Exhibit 5.2



*Equity/total assets in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised figures as of December 31.1994. Ranked descending.

Exhibit 5.3

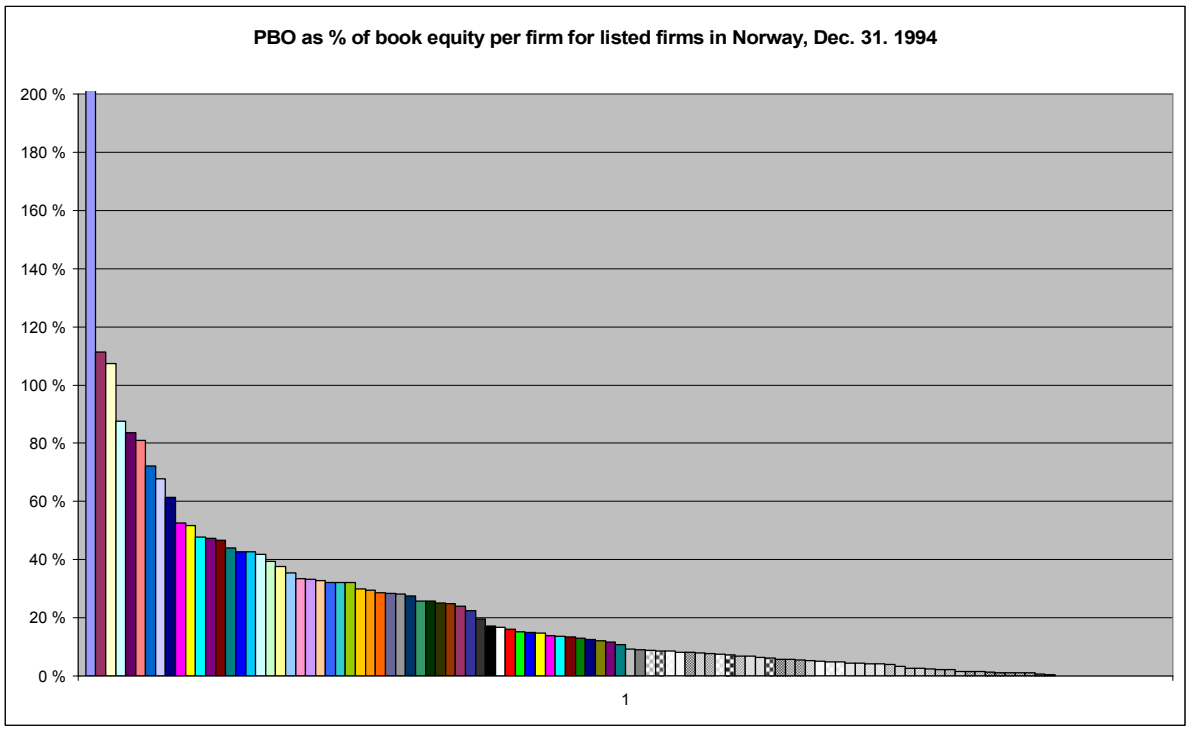


*PBO/total assets in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised assets and PBO as disclosed in the notes as of December 31.1994. Ranked descending.

5.2.2 Equity and PBO ratio

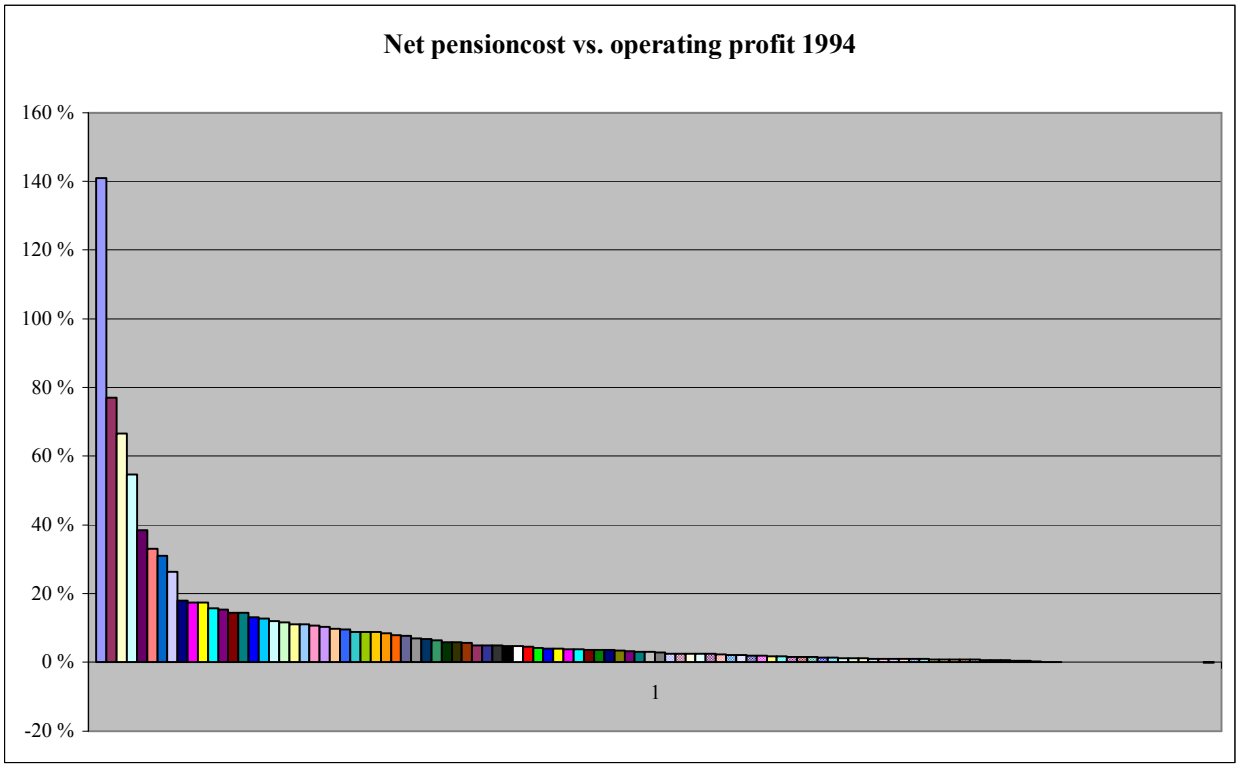
I am interested in the effect of pension accounting on reported numbers, and especially the equity recognised in the balance sheet ("book equity"). The average book equity ratio was 36% (Exhibit 5.2), but the data show high variations; 14 firms have lower than 10% (mostly banks/financial institutions), and one firm has approximately 85%. From my personal experience with 4 of the 5 largest banking groups in Norway, a book equity ratio of 20% or more is a common covenant required by Norwegian financial institutions. 13 non-financial firms (12%) had 20% equity or less as of December 31, 1994. The average pension liability as a % of total assets is not high, but again there is a high variability (Exhibit 5.3): On average the gross pension liability (PBO including unfunded liabilities, "PBO") is 5.3% of total assets, but as the exhibit shows more than 20% of the firms have a PBO higher than 10% of assets. PBO is on average 25% of book equity (Exhibit 5.4), but more than 15% of the sample has PBO higher than 40% of their book equity. In these cases, marginal changes in pension assumptions would have a significant effect on the equity ratio.

Exhibit 5.4



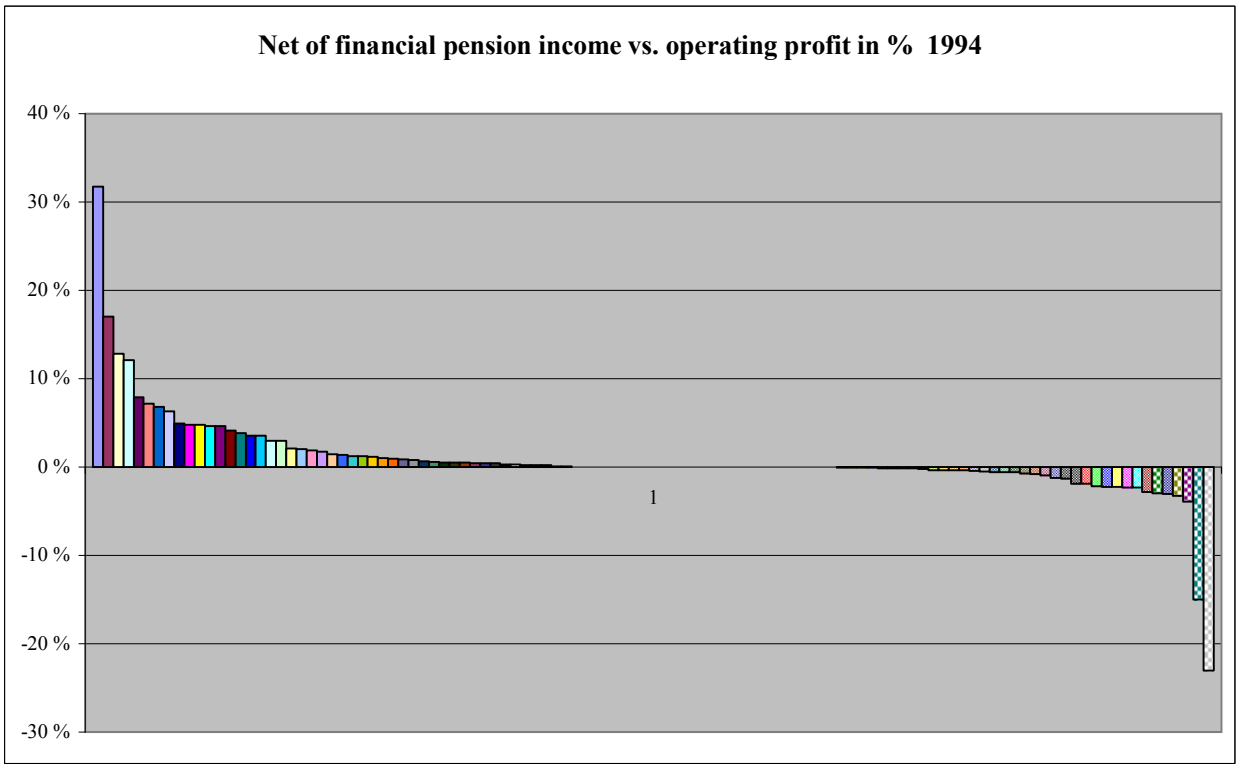
*PBO/equity in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised equity and PBO as disclosed in the notes as of December 31.1994. Ranked descending.

Exhibit 5.5



*Net pension cost/operating profit in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised figures for 1994. Ranked descending.

Exhibit 5.6



*Net financial pension income (return on pension assets minus interest cost on PBO) /operating profit in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised figures for 1994. Ranked descending.

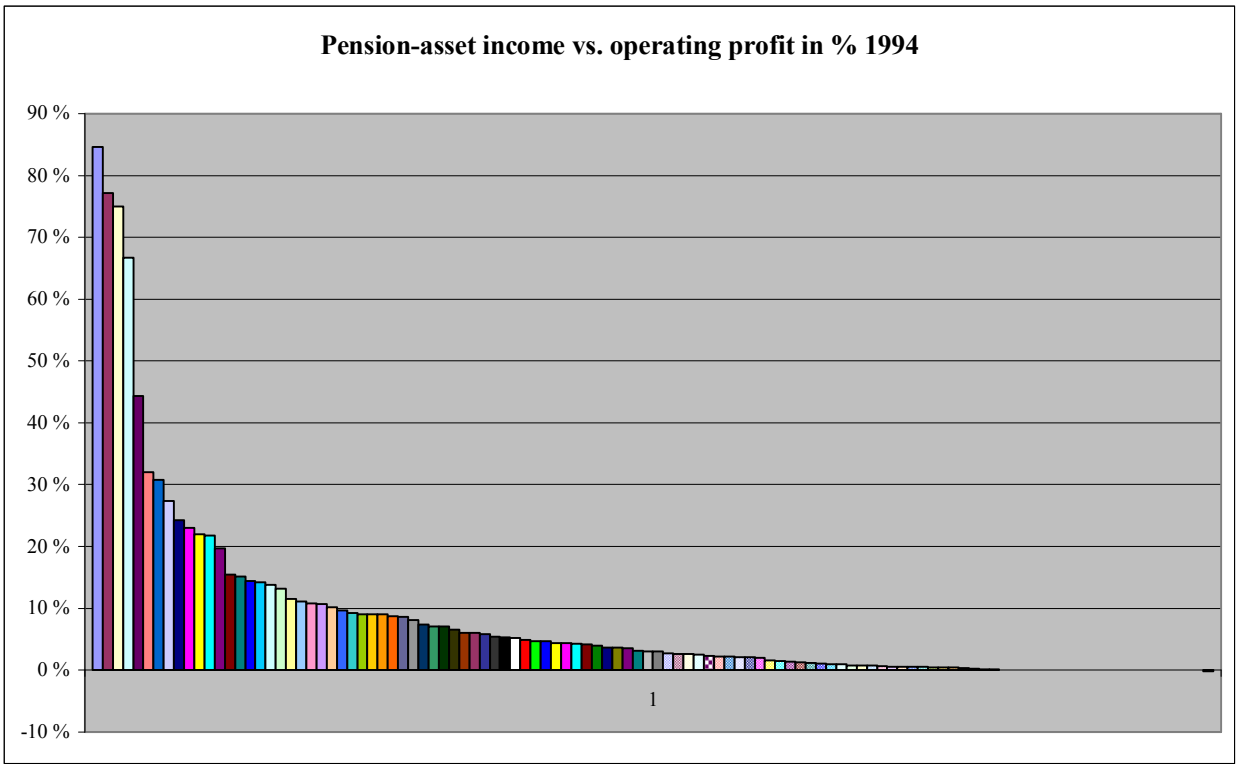
5.2.3 Pension cost and ratios

Net pension cost on average is low compared to operating profit (Exhibit 5.1): 4.3%. However, the variability is high, with 8 firms exceeding 20% (Exhibit 5.5).

The net effect of the "non-operating items", net financial income from pension assets and the imputed interest cost on pension liabilities, is close to 0% (Exhibit 5.1), but for more than 5% of the firms it exceeds 10% of their operating profit (Exhibit 5.6). Hence, using operating profit/EBIT(DA) as a starting point for estimating cash flows from operations to calculate the enterprise value of a firm, and *not* excluding net (gross) financial pension income in this calculation, and at the same time adding net (gross) pension assets as financial assets to reach the equity value, could lead to significantly miscalculated intrinsic values.

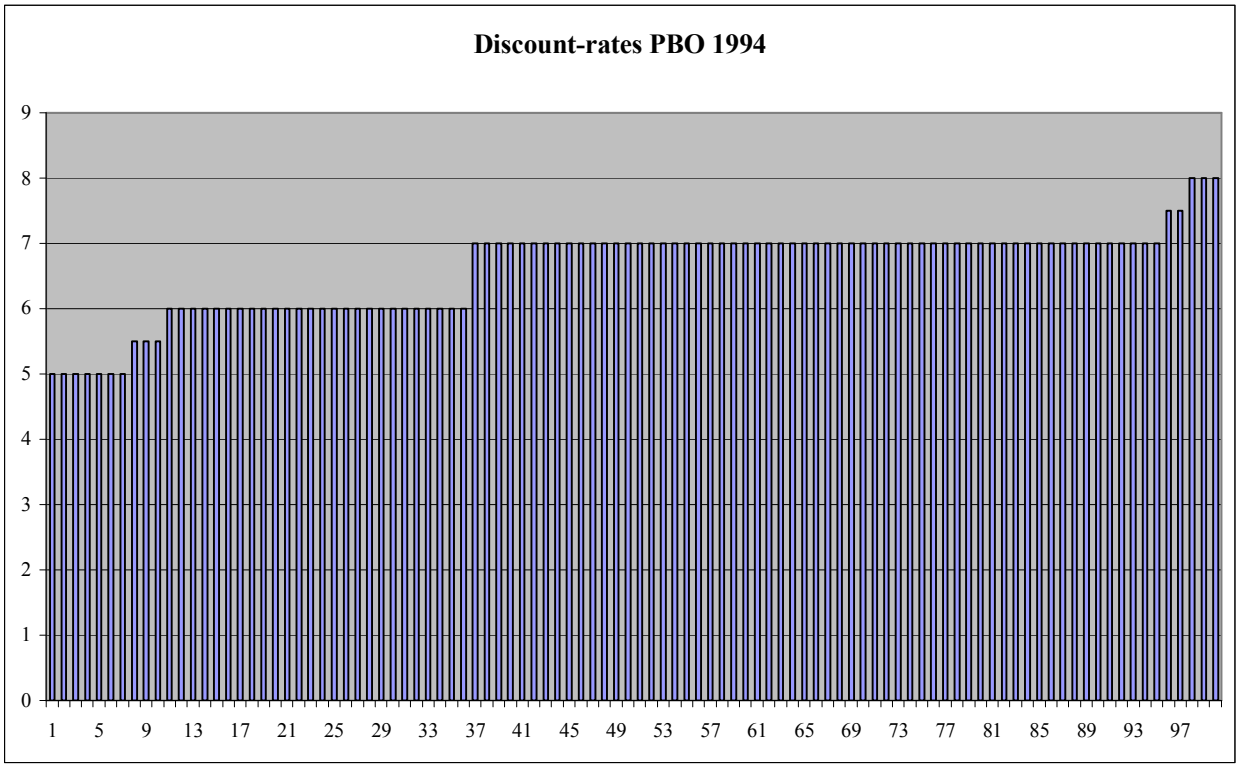
The recognised expected (but not actual) return on pension assets is on average 6.2% of operating profit (Exhibit 5.1), but for more than 20% of the firms it exceeds 10% of operating profit (Exhibit 5.7). In cases of large differences between expected and actual returns, the recognised profits could be significantly misleading vs. the actual profits.

Exhibit 5.7



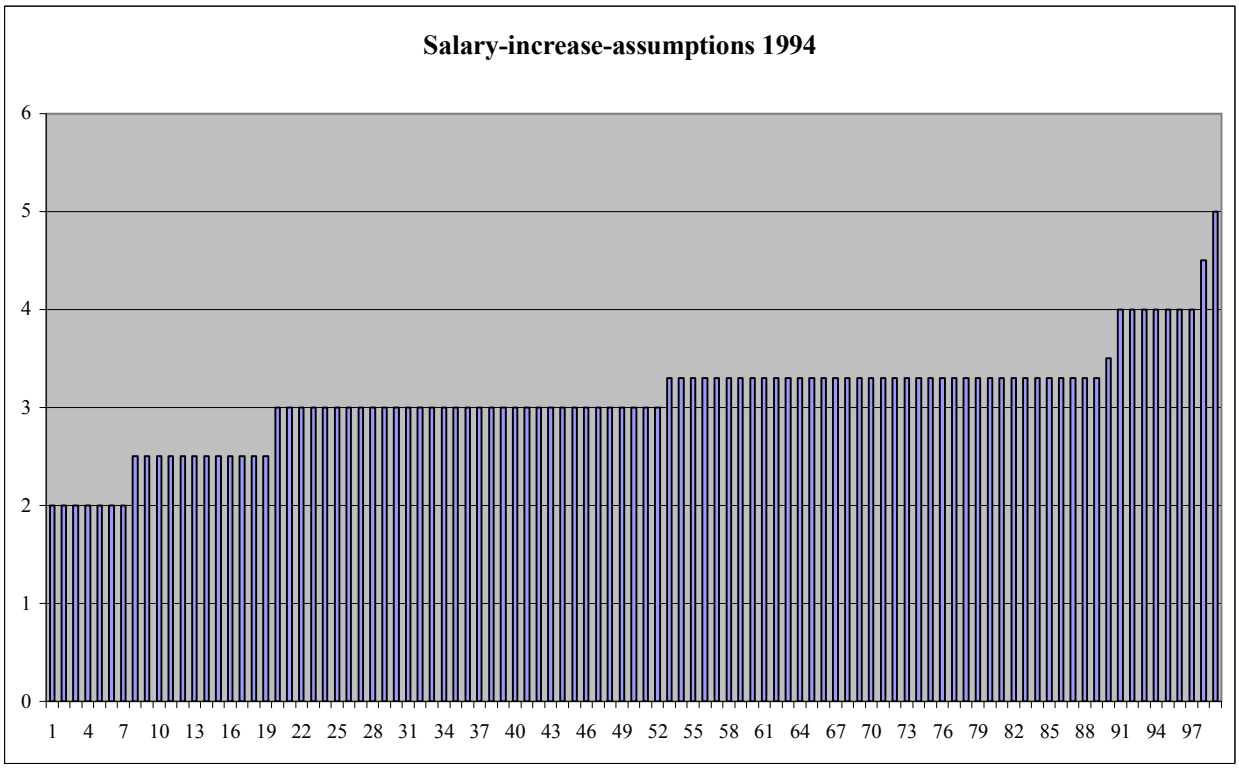
*Recognised return on pension assets/operating profit in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised figures for 1994. Ranked descending.

Exhibit 5.8



*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Ranked ascending. Includes all firms with defined benefit plans (103) who where listed in the whole of 1994 and issued financial reports while listed.

Exhibit 5.9



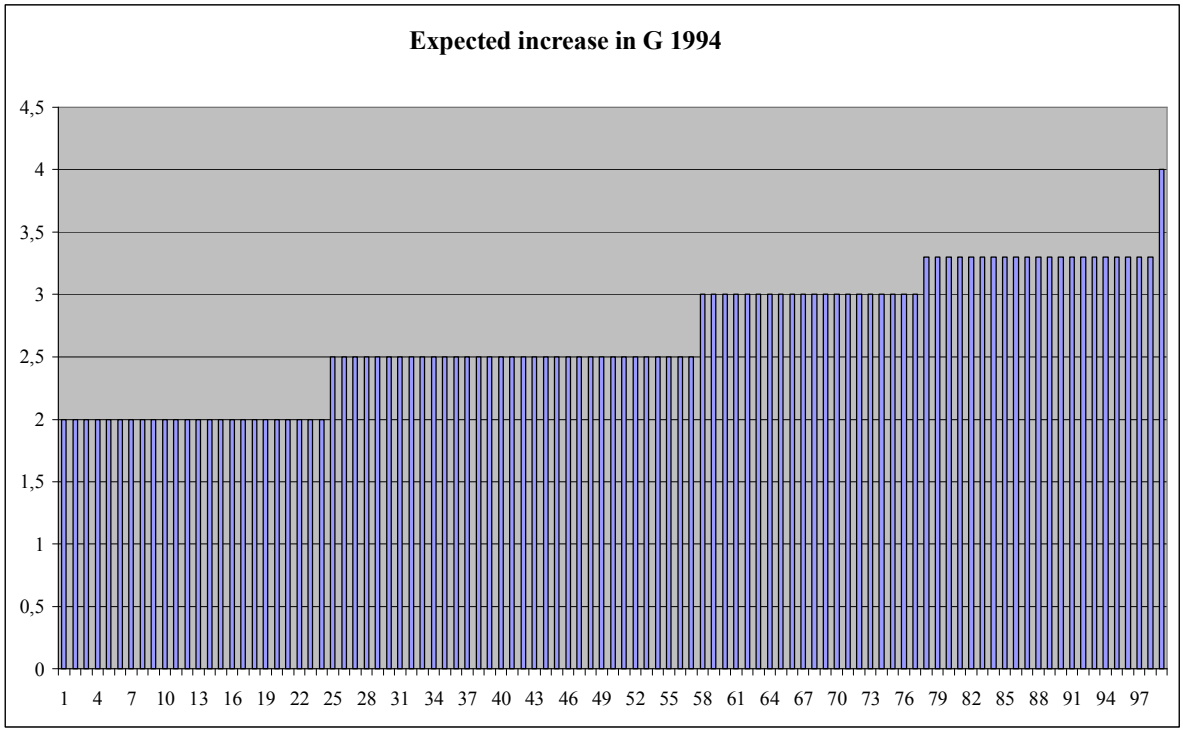
*Expected salary increase disclosed in the notes used when calculating the PBO in % per firm. Ranked ascending. Includes all firms with defined benefit plans (103) who where listed in the whole of 1994 and issued financial reports while listed.

5.2.4 Pensionassumptions

Pension assumptions show high variability (where the expectations should be quite similar):* Discount rates vary from 5-8% (Exhibit 5.8), with an average of 6.5% (Exhibit 5.1). All else equal, a change in the discount rate from 8% to 5% would increase the PBO by approximately 60% (20 years weighted average remaining period to pension settlement calculated by using the PAF formula), and would of course have a higher effect on net pension liabilities, and could effect the equity significantly. In the end of 2004 the weighted average risk free rate (20 years, using the same method as described in 3.2.5) was approximately 6.4%, which according to my discussions should imply an average weighted discount rate of 6,5%. Hence, the actual average discount rate used by the firms does not differ significantly from my calculations.

- Expected increase in salary varies from 2-5%, average of 3.2% (exhibit 5.9). This factor is more or less firm-independent in a long-term perspective, and should not be expected to have such a high variance.
- Expected increase in the G factor varies from 2% to 4% (only 1 firm), average of 2.7% (Exhibit 5.10). Since this factor is firm-independent and all firms have the same information, all firms should have the same expectations.

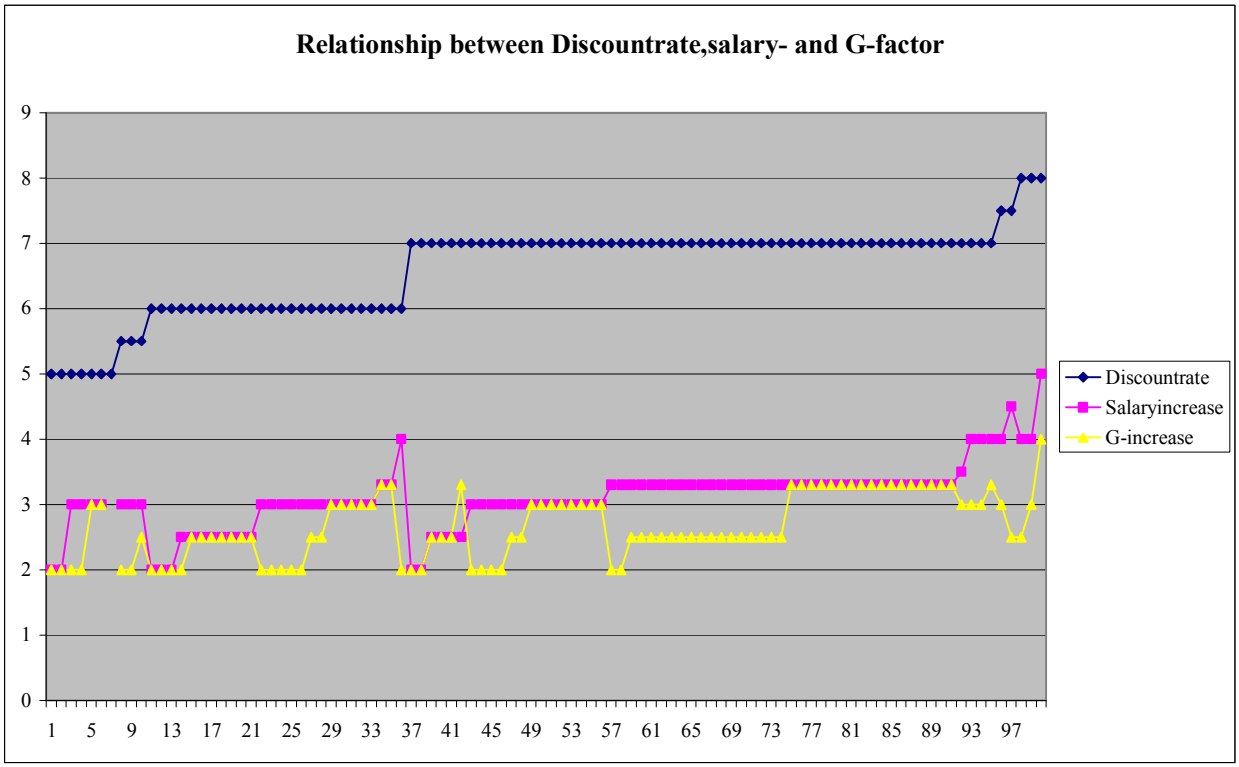
Exhibit 5.10



Expected increase in the G factor disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (103) who where listed in the whole of 1994 and issued financial reports while listed.

*return on pension assets assumptions is not shown since many firms (although required) did not disclose this assumption

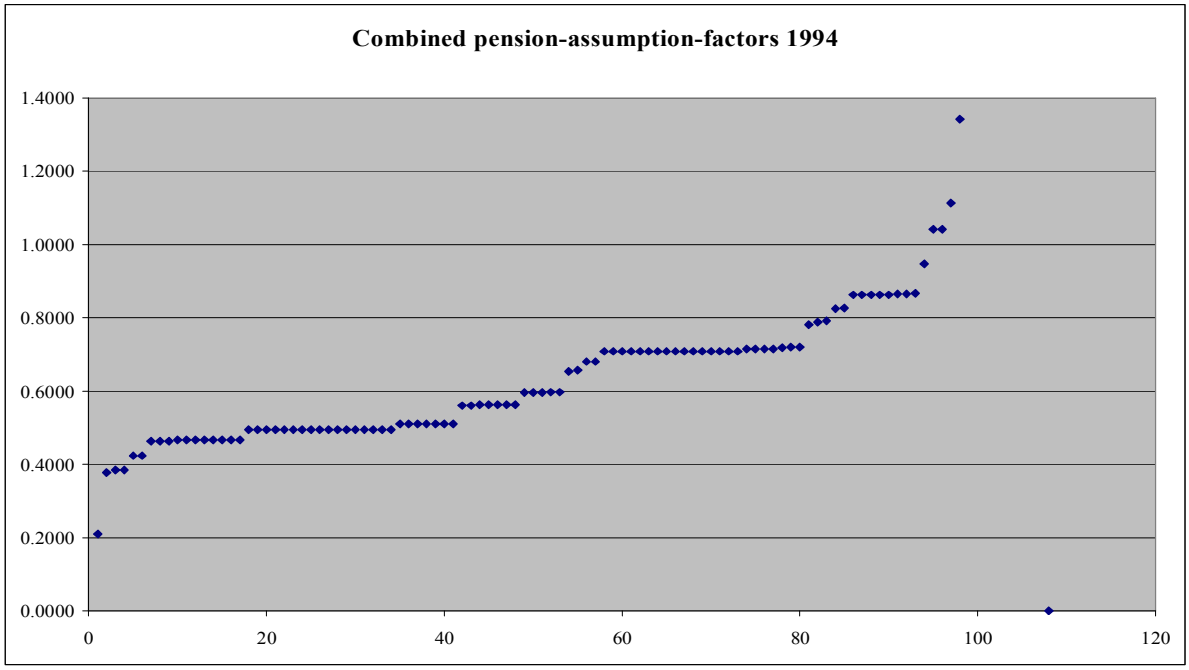
Exhibit 5.11



*Discount rates, salary increase and increase in G factor shown per firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (103) who where listed in the whole of 1994 and issued financial reports while listed. Rank ascending per firm according to the discount rate.

Exhibit 5.11 shows the relationship between the discount rate, the expected salary increase and the g factor per firm in 1994, where the firms are ranked ascending by the discount rate. There seems to be a positive correlation between the level of discount rates and the corresponding salary increase and G factor. This corresponds to the discussion that the expected interest rate is an important factor in all of the 3 assumptions, and different expectations could explain parallel shifts. But also recall that parallel shifts normally imply significant changes in the PAF and hence in the PBO. For all firms the discount rate is significantly higher than the G increase and the salary increase. As discussed in Chapter 3 these assumptions should be very close. The relatively high discount rate vs. the s and g makes the PBO lower. The salary increase and the G increase are quite close, with s normally somewhat higher than or equal to g.

Exhibit 5.12



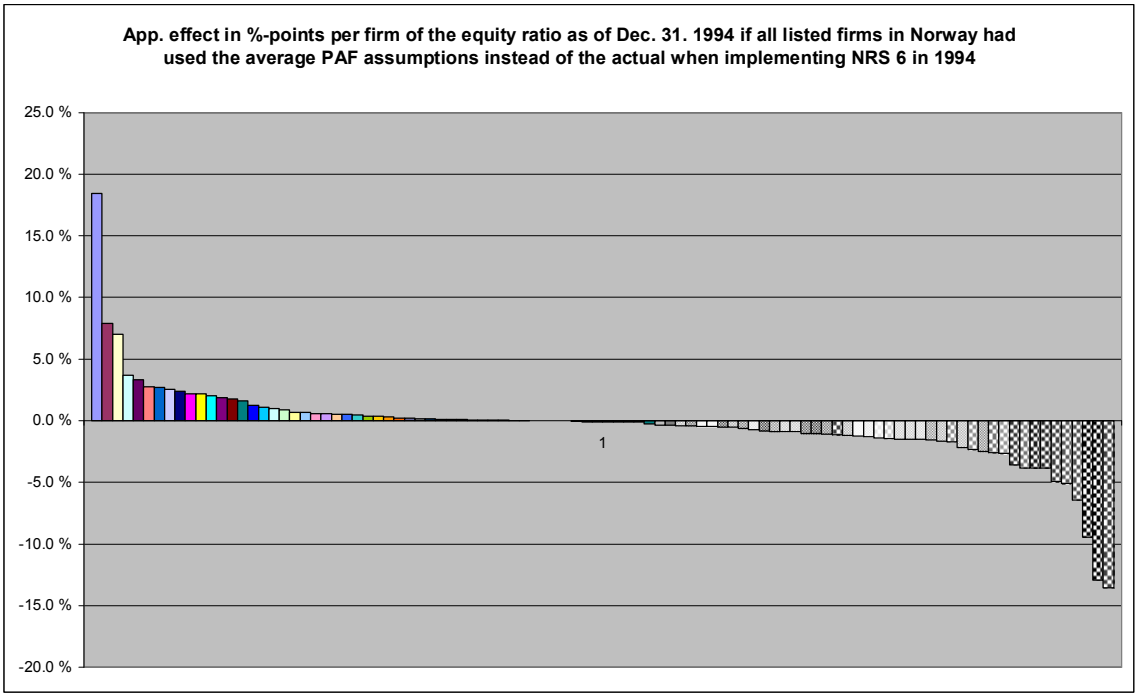
*Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. Shown in ranked order per firm who had defined benefit plans and who where listed in Norway the whole of 1994 and issued financial report while listed. 103 firms. Assumed weighted average time to pension settlement 20 years (n=20) and that government pensions pay 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n-y(1+g)^n)}{(1+r)^n}$

5.2.5 The PAF

This is confirmed by calculating the combined pension assumption factor (from the discount factor, salary increase and G increase, 20 years average time to retirement/leave/pension settlement, governmental pensions paying 75% of gross pensions on average with today's pension system):

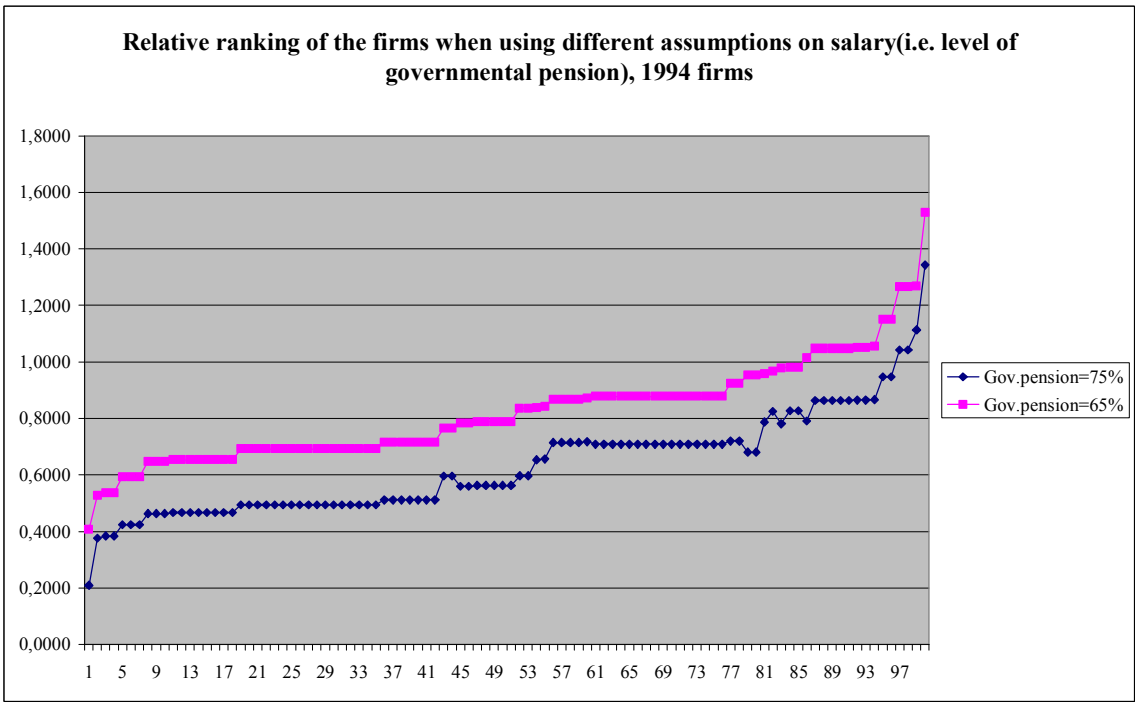
The combined pension-assumption-factor varies significantly (Exhibit 5.12), from 0,2 (Namsos Trafikkselskap) to 1.34 (Agresso) (average is 0,65). A firm using assumptions giving the highest PAF (1.34) instead of using assumptions giving the lowest PAF (0.2) would (rough calculations and all others equal) increase the PBO by more than 6 times (since PBO = L*A/T*GP*M*PAF, replacing a 0,2 PAF with 1.34 would increase PBO by 1.34/0.2)

Exhibit5.13



The PBO for each firm disclosed in the notes is divided by the actual calculated PAF factor (see exhibit 5.14) per firm and multiplied by the average PAF factor for all firms, 0,65. This gives an estimated change in PBO in NOK mill per firm by changing PAF all others equal, and this change is divided by each firms equity respectively and shown in % in descending order. PAF (combined pension-assumption-factor) is calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. The ranking includes all firms who had defined benefit plans, and who were listed in Norway the whole of 1994 and issued financial reports while listed. 103 firms. Assumed weighted average time to pension settlement 20 years (n=20), and that government pensions pay 75% of gross defined pensions (y=75%).

Exhibit 5.14

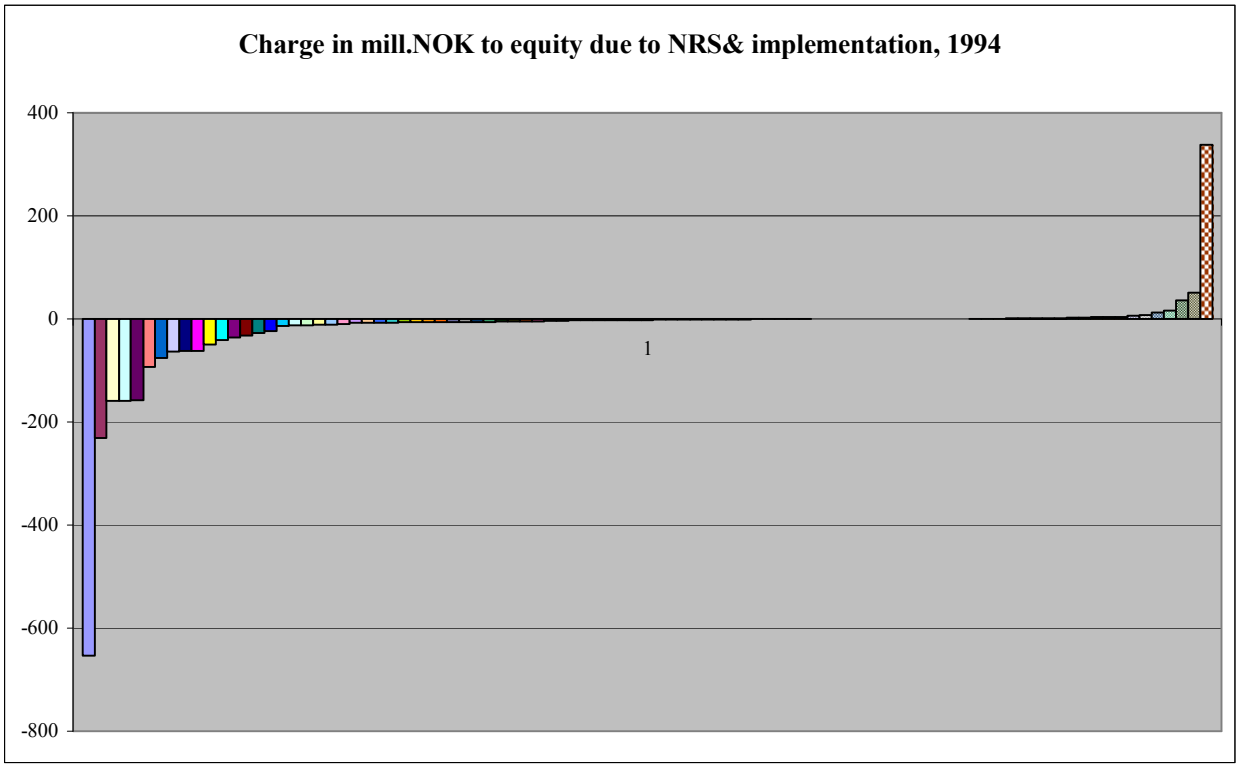


Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. Shown in ranked PAF order per firm for g=75% and related PAF with g=65% for all firms who had defined benefit plans and who were listed in Norway the whole of 1994 and issued financial reports while listed. 103 firms. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that governmental pensions pay 75% and 65% respectively firm-by-firm of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n-y(1+g)^n)}{(1+r)^n}$

Another way of looking at the effect of the combined pension assumptions is to look at the effect if all firms had the same set of assumptions, e.g. the same PAF. Using the average PAF for all firms in 1994 (0.65), and recalculating the PBO by replacing each firm's PAF with the average PAF, the estimated potential change in PBO in NOK mill. may be calculated. If the firms had used the average PAF and recognised this amount, the equity effect would have been significant: Exhibit 5.13 shows potential equity ratio effect; and approximately 10% of the firms with defined benefit plans would change their equity ratio by more than 5% points (e.g. from 20% equity ratio to 15% equity ratio).

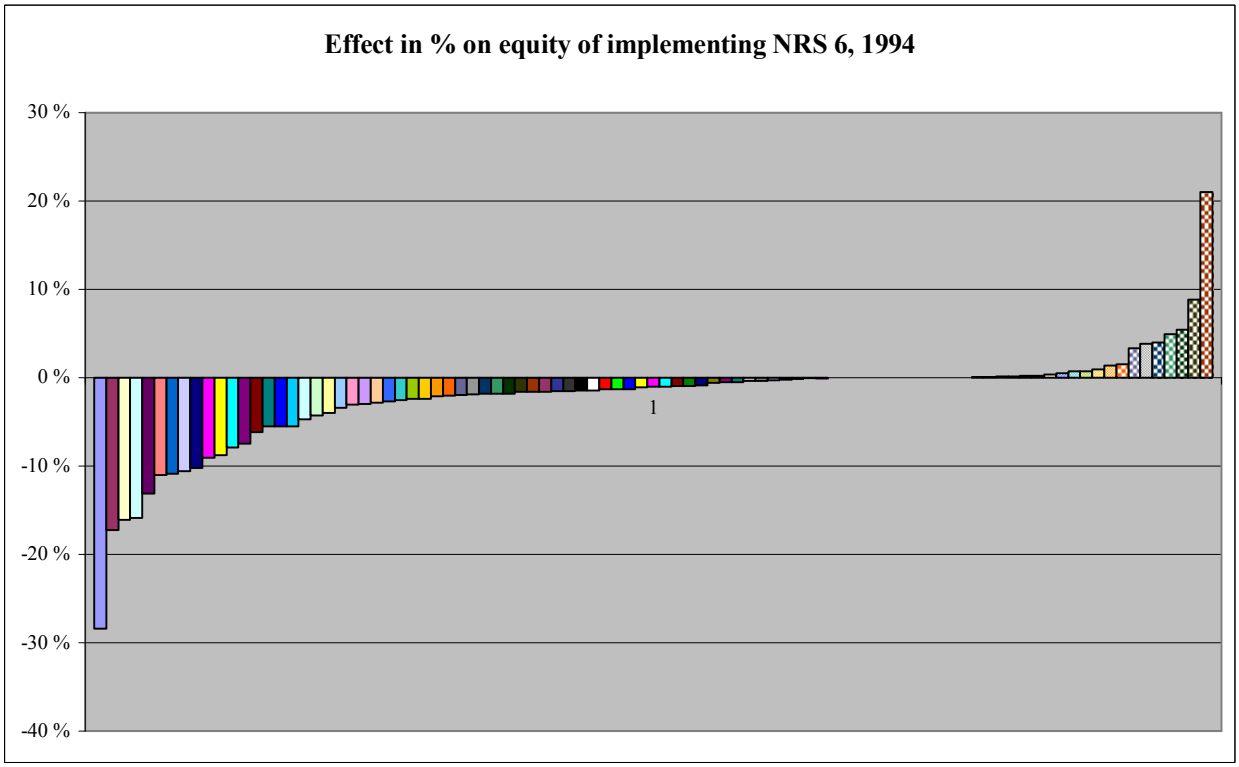
As discussed in Chapter 3, an average assumption is used for the y in the PAF (fraction of gross expected pension paid by the government), and the analyses of the PAF, relative rankings and relations between the PAF per firm is a function of y. However, although the PAF of course varies somewhat with the level of y, the rankings do not change and the relative differences does not vary much by changing the level of y from the assumed rate of 75% to 65% (Exhibit 5.14) or to 85% (not shown).

Exhibit 5.15



Implementation effect of NRS 6 per firm in mill. NOK as reported in the 1994 financial report of amount charged to equity as of 1.1. Ranked ascending.

Exhibit 5.16



Implementation effect of NRS 6 per firm in mill NOK as reported in the 1994 financial report in % of book equity. Ranked ascending.

5.2.6 Equity effect of implementation of NRS 6

When the pension accounting reform was implemented in 1994, the main rule was to charge the net asset/liability effect directly to the equity at 1.1.1994. The NOK mill amounts varied between minus NOK 645 mill to positive NOK 337 mill (Exhibit 5.15). The total net effect in 1994 was negative NOK 1664 mill, on average only 1% of equity (Exhibit 5.1). For some firms the % effect was much higher (Exhibit 5.16); for 10% of the firms the effect on the equity ratio was 10 percent points or more (e.g. from 20% ratio to 10% ratio; a change of 10%). Kreditkassen had the highest negative effect in nominal values (NOK 645 mill/13% of the equity book value before the recognition). DnB had the highest positive effect (NOK 337 mill/3 % of the pre-recognition equity). The reason why some firms had *positive* equity effects of the implementation is that they had pension assets higher than the pension liabilities (over funded): The tax rules gave incentives to pay extra pension premiums and hence many firms in 1994 had relatively high pension assets. With the new pension law, over funding is significantly reduced.

All firms charged the NRS 6 implementation effect directly against equity 1-1-1994, except for SAS/DNL (who deferred the effect) and Norsk Hydro (who chose full retrospective accounting using the FAS 87 numbers from its USGAAP accounts). However, if these 2 firms had also recognised accumulated actuarial gains and losses to equity, the total effect would have increased by 3360 mill NOK (more than 2 times the actual charge) (SAS: NOK 1850 mill, Norsk Hydro NOK 1510 mill).

Exhibit 5.17

Table A Descriptive statistics of the 165 firms listed in 2004*

	NOK mill. (unless stated)	%
No. of listed firms issuing financial reports while listed (No.)	165	
No. of listed firms with defined benefit plans (No.)	122	
Total sales for all firms	1 012 434	
Total operating profit	149 479	15.3% of sales
Total net profit	75 261	7.8% of sales
Total assets	2 312 982	
Total book equity	484 640	40.7% of assets
Pension data:		
Total net of pensions shown as assets in the balance sheets	17 235	
Total net of pensions shown as liabilities in the balance sheets	15 696	
= Net of the net pension assets and net pension liabilities shown in balance sheets	(1 539)	0.1% of assets
Total gross pension assets in the notes (≈fair value)	95 644	4.1% of assets
Total gross pension liabilities (PBO etc.) in the notes	118 644	6.2% of assets
=Total net pension liabilities shown in the notes	22 820	
Accumulated unrecognised amount as of Dec. 31. 2004**	26 454	5.5% of equity
Total recognised amount against equity as of 1.1.2004**	6 605	1.4% of equity
Total (net) recognised pension cost	8 831	5.9% of op.profit
Total (gross) recognised return on pension assets	5 727	3.8% of op.profit
Total (net) recognised financial cost(income) on pensions	512	0.3% of op.profit

*No. of listed firms in Norway listed in the whole of 2004, and listed while issuing financial report for 2004. Balance sheet items as of 31.12
**Not all listed firms had to recognise the net pension assets or liabilities vs. equity when IAS 19 was implemented; the prospective method was allowed, and firms listed on the US stock exchanges may defer the implementation until 2007. Amount also includes actuarial gains and losses for 2004. This explains why the amount is not the same as the recognised amount against equity.

Table B: Descriptive statistics of pension assumptions for 2004 data samples*

	Mean	Medium	Std.dev.	Mean lower decentile	Mean upper decentile
Return on assets %	6.50	6.5	0.48	5.3	7.2
r= discount factor %	5.52	5.5	0.37	5.0	6.1
s=salary increase %	2.97	3.0	0.36	2.2	3.5
g=G increase %	2.77	3.0	0.39	2.0	3.3
PAF=pensions ass. factor**	0.75	0.65	0.15	0.47	1.0

* 122 listed firms in Norway with defined benefit plans in 2004
**PAF= combined pension assumption factor= $PAF = \frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$ assuming n=20 and y= 0.75

5.3 2004 data

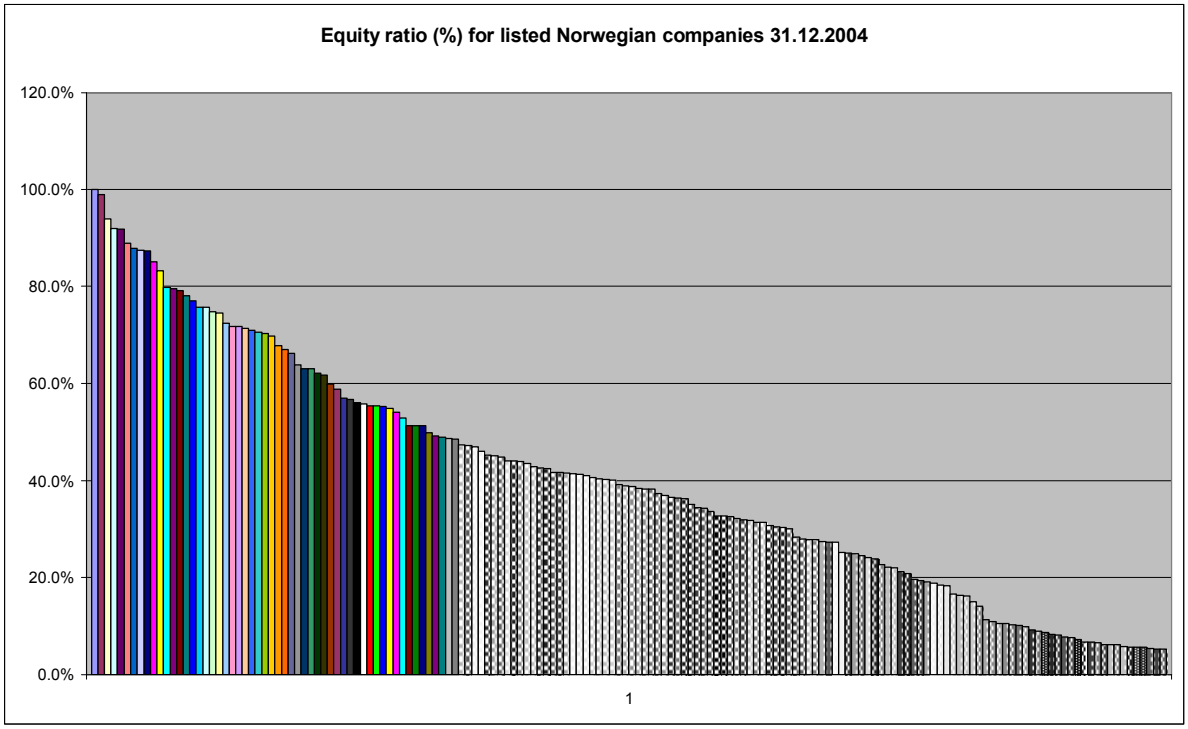
5.3.1 Overview

The total number of firms that were listed in the whole of 2004 and issued financial reports for 2004 while listed, was 165 (Exhibit 5.17). In total there were 180 listed firms according to Dagens Næringsliv as of March 2005, but 10 of them were newly listed, and the 5 remaining firms were not listed the whole of 2004 (Aker-Kværner and Norsk Hydro split up and there were 2 delistings).

- 122 of the firms stated that they had defined benefit plans. All but 3 firms deferred recognition of actuarial gains and losses. 5 of the firms had unfunded plans, the remaining had funded plans. 3 of them stated that their pension plans from now on are defined contribution plans (but they still have the obligations from defined benefit plans up till this date).
- 2 firms stated that they had AFP/early retirement pension plans *only*.
- The remaining 43 firms stated that they had no pension plans, immaterial pension plans or stated nothing. 12 of these firms stated that they had defined contribution plans (but no pension liabilities).

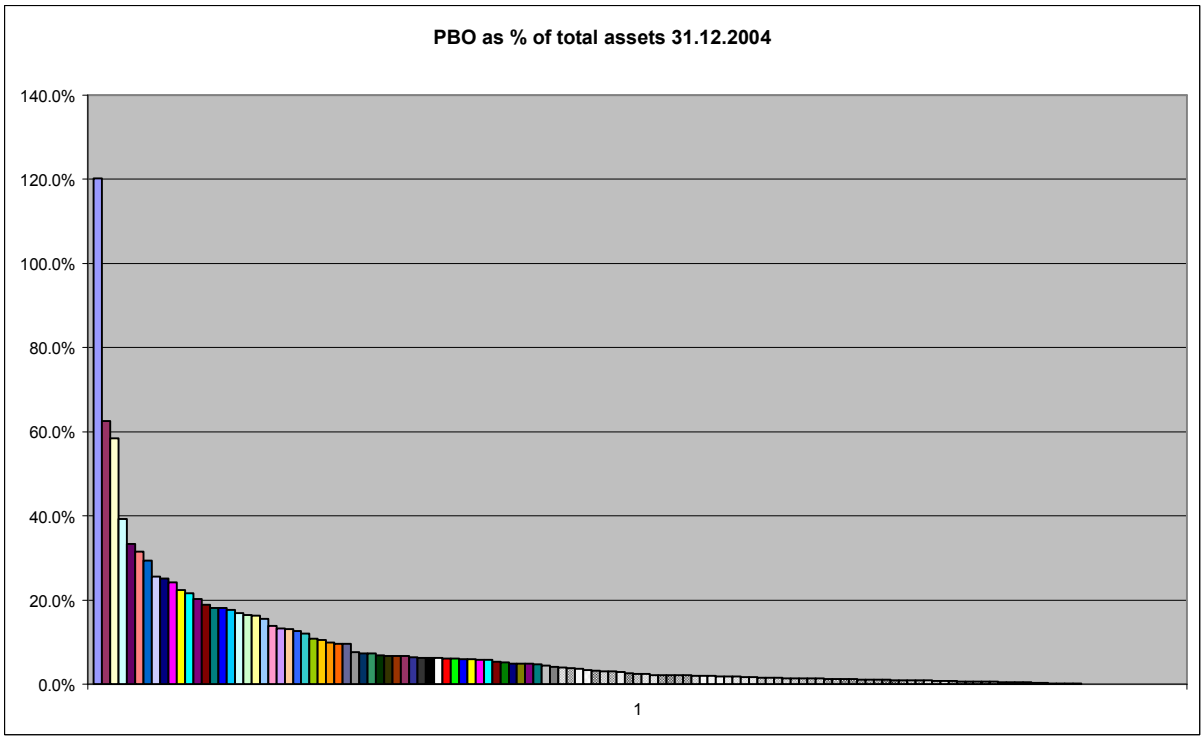
Data summary from 2004 indicate a more profitable year than 1994/2003, and in general the press characterised it as a good year (Source Dagens Næringsliv March 5. 2005): Operating profit margins were up to almost 15%, and net profit margin above 7%. Equity ratio was as high as 41%.

Exhibit 5.18



*Equity/total assets in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised figures as of December 31. Ranked descending.

Exhibit 5.19



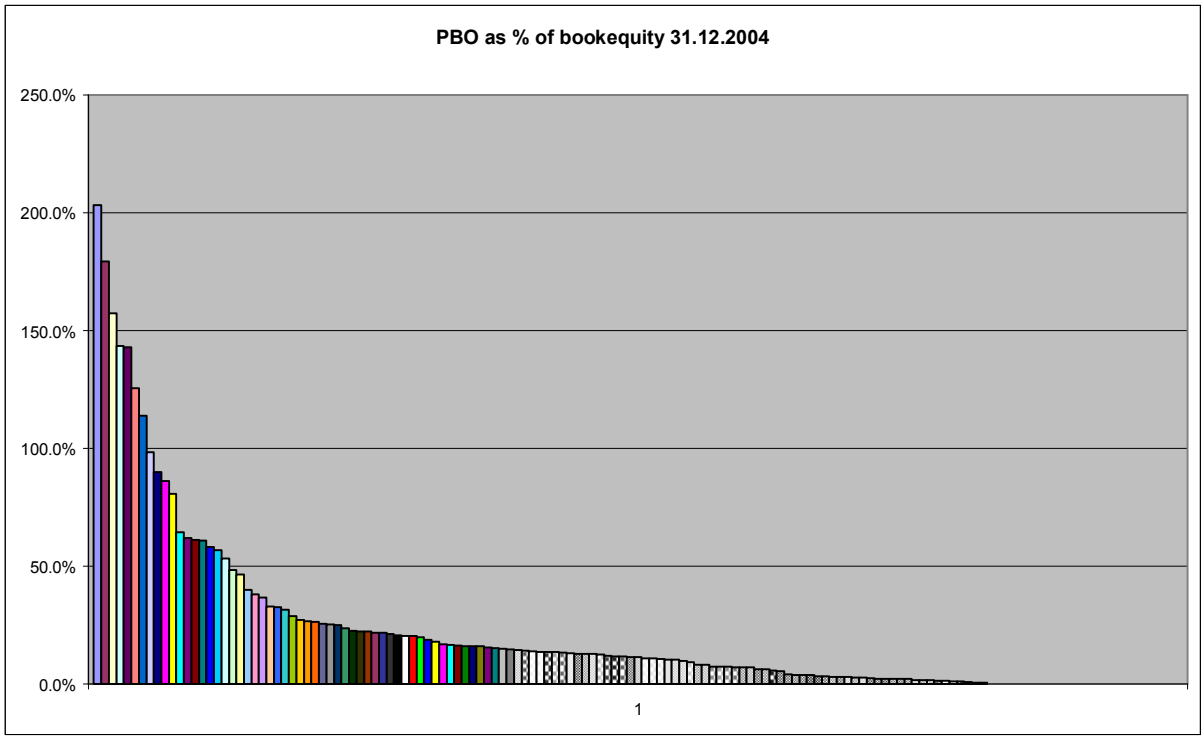
*PBO/total assets in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised figures for assets and disclosed PBO in the notes as of December 31. ranked descending.

5.3.2 Equity and PBO ratios

The detailed data (Exhibit 5.18) showing equity ratio per firm, show that there is high variability. 40 firms have 20% equity ratio or less, but 25 of these are financial institutions, leaving only 15 firms with low equity ratio (potential covenant problems).

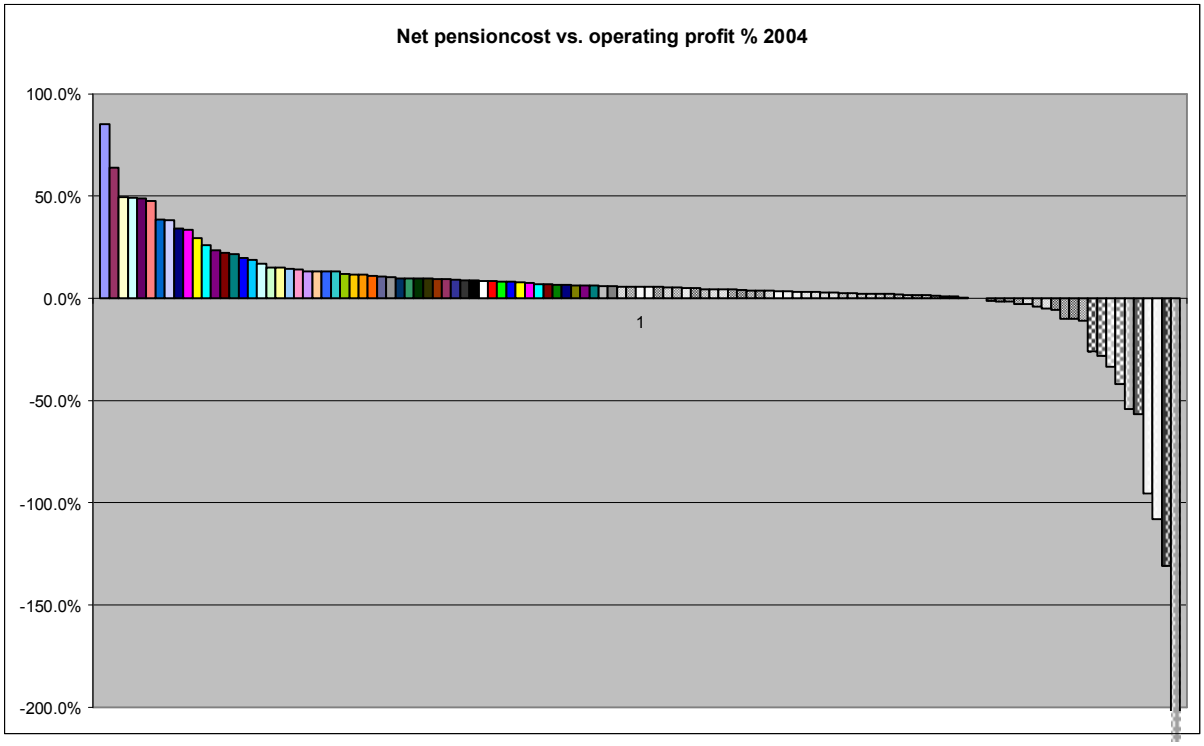
The average PBO disclosed in the notes as % of total assets is 6.2% (Exhibit 5.19), but with a high variability; 13 firms have a ratio higher than 20%, 30 firms higher than 10%. PBO as a % of equity is on average 20% (Exhibit 5.20) but with 18 firms higher than 50%. Norsk Vekst Forvaltning's PBO ratio is very high (120% of assets/179% of equity), but Norsk Vekst Forvaltning is a fund management firm with high employees' assets ratio in this legal entity. The firm manages assets in unconsolidated investment funds. Adresseavisa (63%/143%), Stavanger Aftenblad (58%/114%), SAS (39%/203%) Hands (25%/157%) and Aker-Kværner (14%/143%) (which retained all the pension contracts after the split up/demerger of Kværner and Aker) have the highest ratios (PBO as % of assets and equity respectively).

Exhibit 5.20



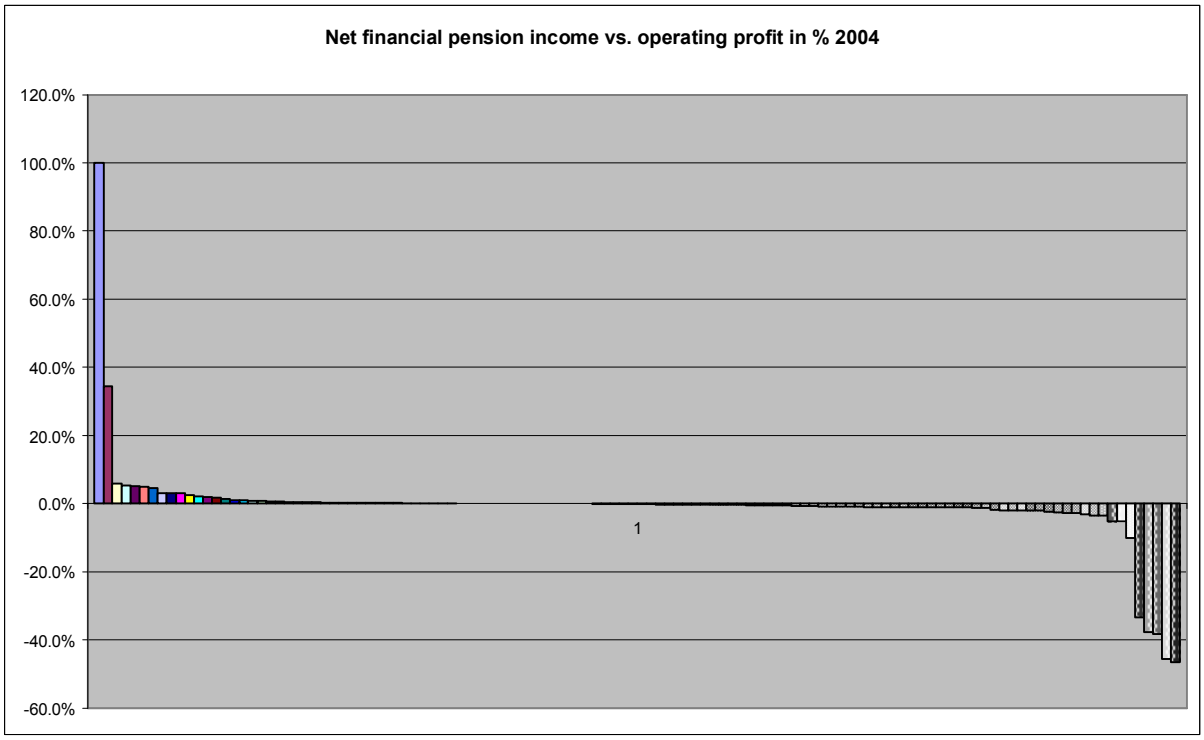
*PBO/equity in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised equity and PBO as disclosed in the notes as of December 31. Ranked descending.

Exhibit 5.21



*Net pension cost/operating profit in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised figures for 2004. Ranked descending.

Exhibit 5.22

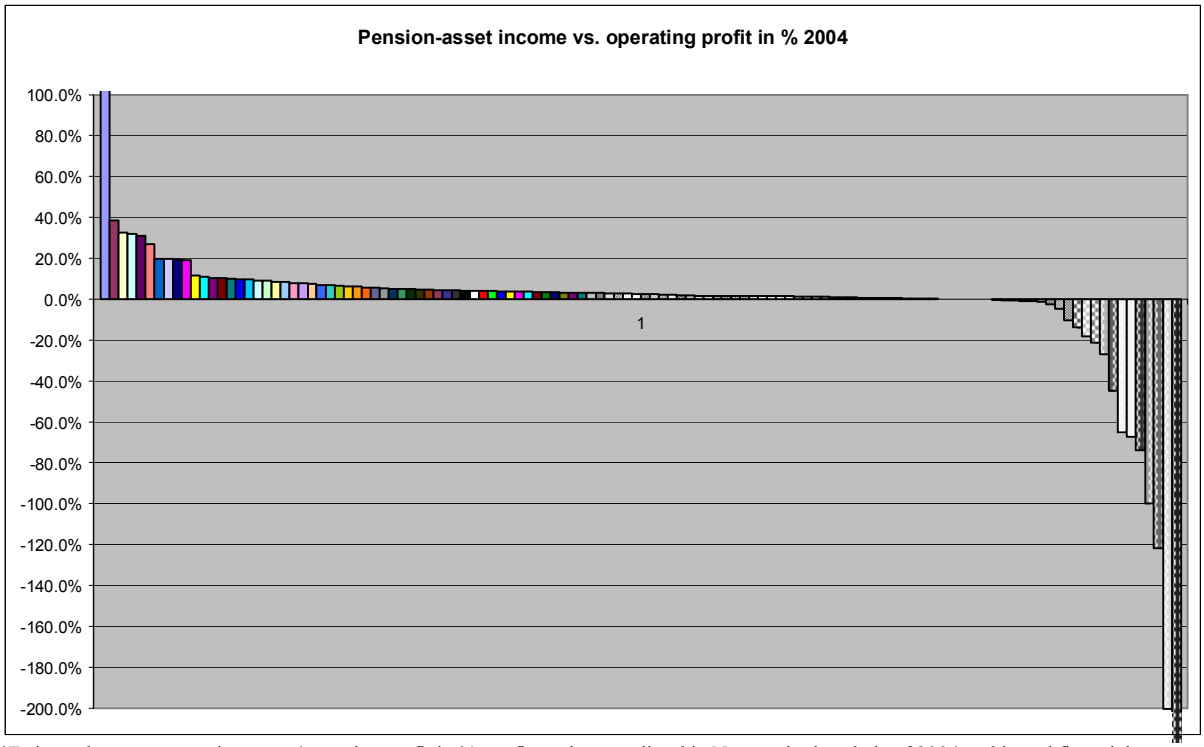


*Net financial pension income (estimated return on pension assets minus interest on PBO)/operating profit in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised figures for 2004. Ranked descending.

5.3.3 Pension cost and ratios

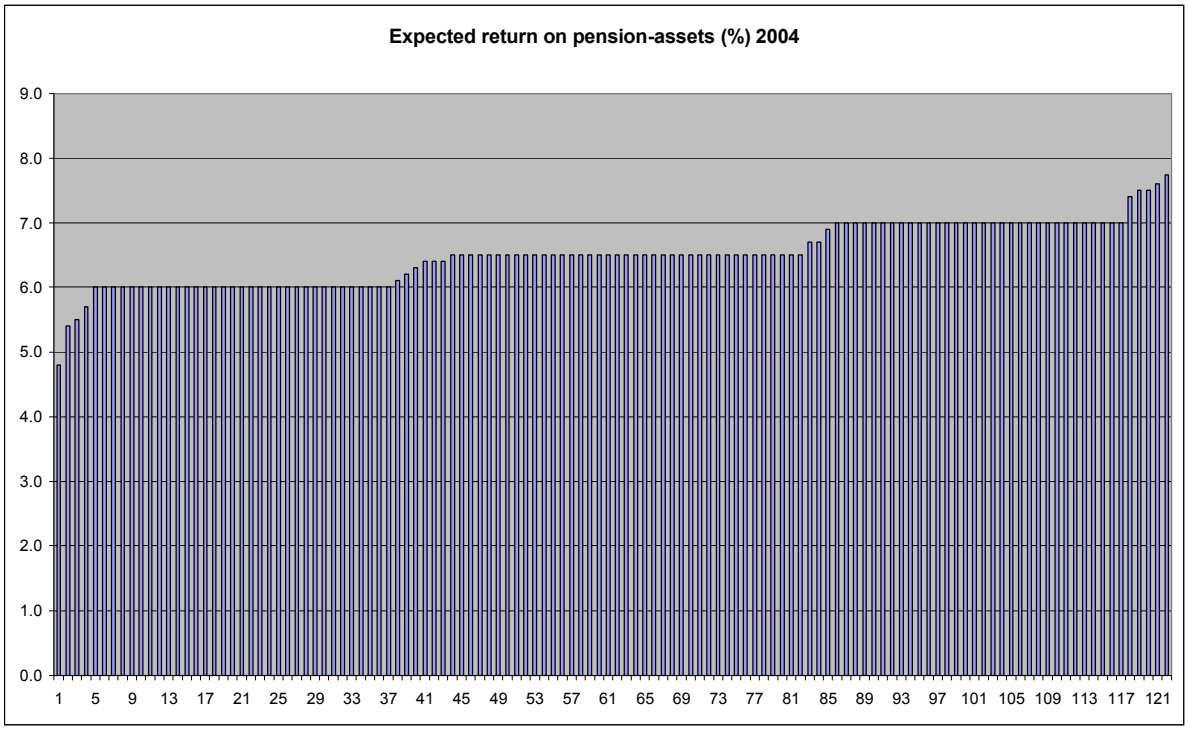
The total net recognised pension cost is only 0.6% of total operating profit (5.17), but for 10 firms (6%) the ratio is above 50% (Exhibit 5.21). 7 (4%) (Exhibit 5.22) of the firms have a net recognised financial pension income above 20% of operating profit. 16 (10%) (Exhibit 5.23) of the firms have recognised returns on financial pension asset above 20% of the recognised operating profit. In many cases this is due to nearly insignificant profits, but for some firms the pension cost even with "normal" results is material: Kongsberg: 85% net pension cost out of NOK 135 mill in operating profit, Schibsted: 50% of NOK 326 mill, Aker-Kværner: 38% of NOK 775 mill, and notably, SAS: with 95% out of the loss of NOK 813 mill in pension cost. More remarkable still is the fact that the net *financial* pension *income* for SAS was NOK 320 mill compared to a loss of 813 mill, based on an expected return on pension assets of 7.4% amounting to NOK 1629 mill in 2005. With such material pension items, close attention is advised when valuation is performed, with different adjustments needed according to valuation methods.

Exhibit 5.23



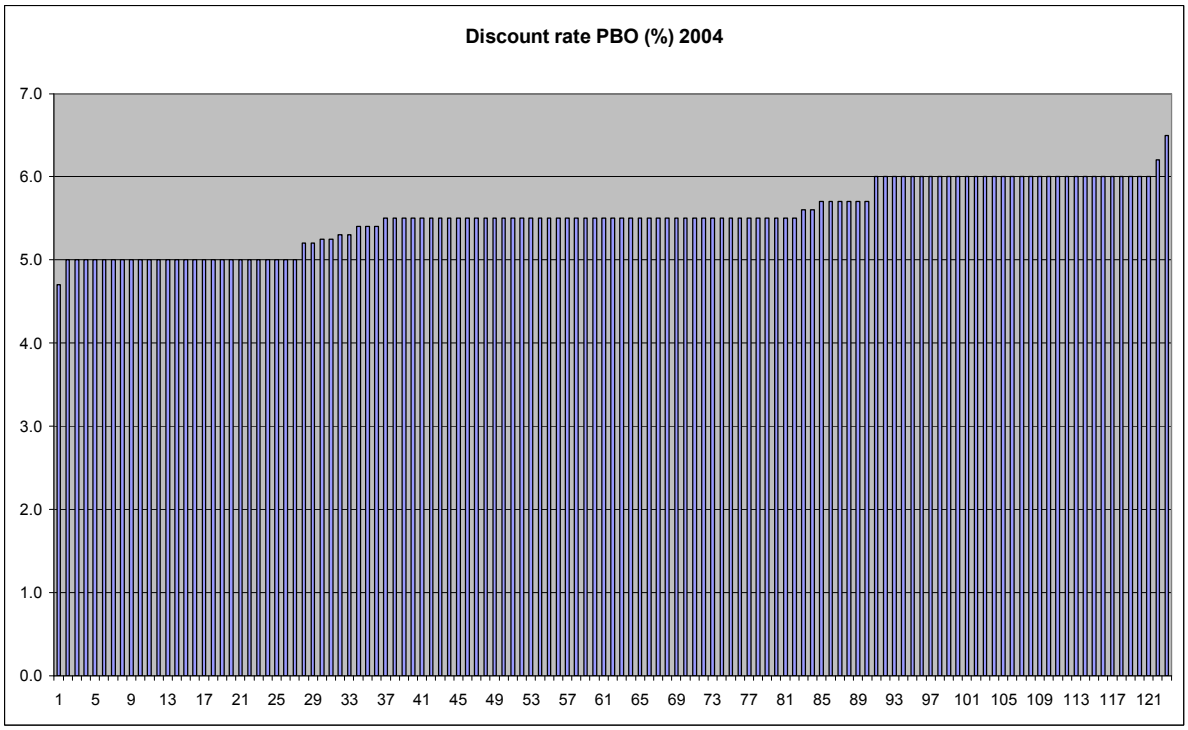
*Estimated return on pension assets/operating profit in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed, 165 firms, recognised figures for 2004. Ranked descending.

Exhibit 5.24



*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed. Ranked ascending.

Exhibit 5.25

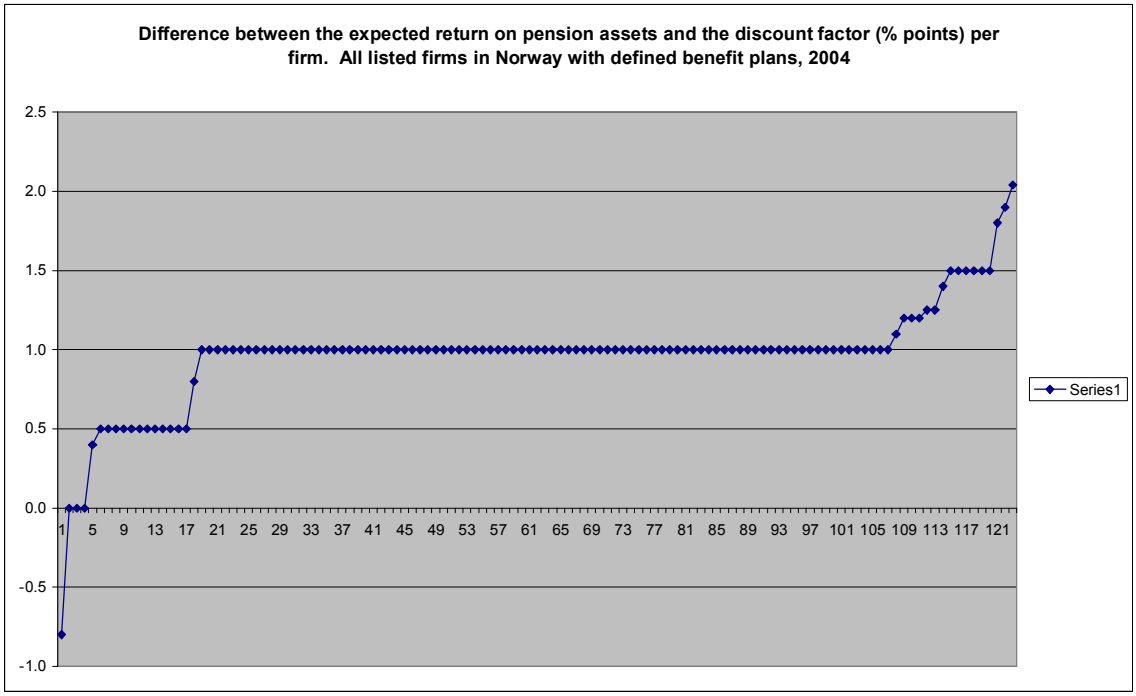


*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed. Ranked ascending.

5.3.4 Pension assumptions

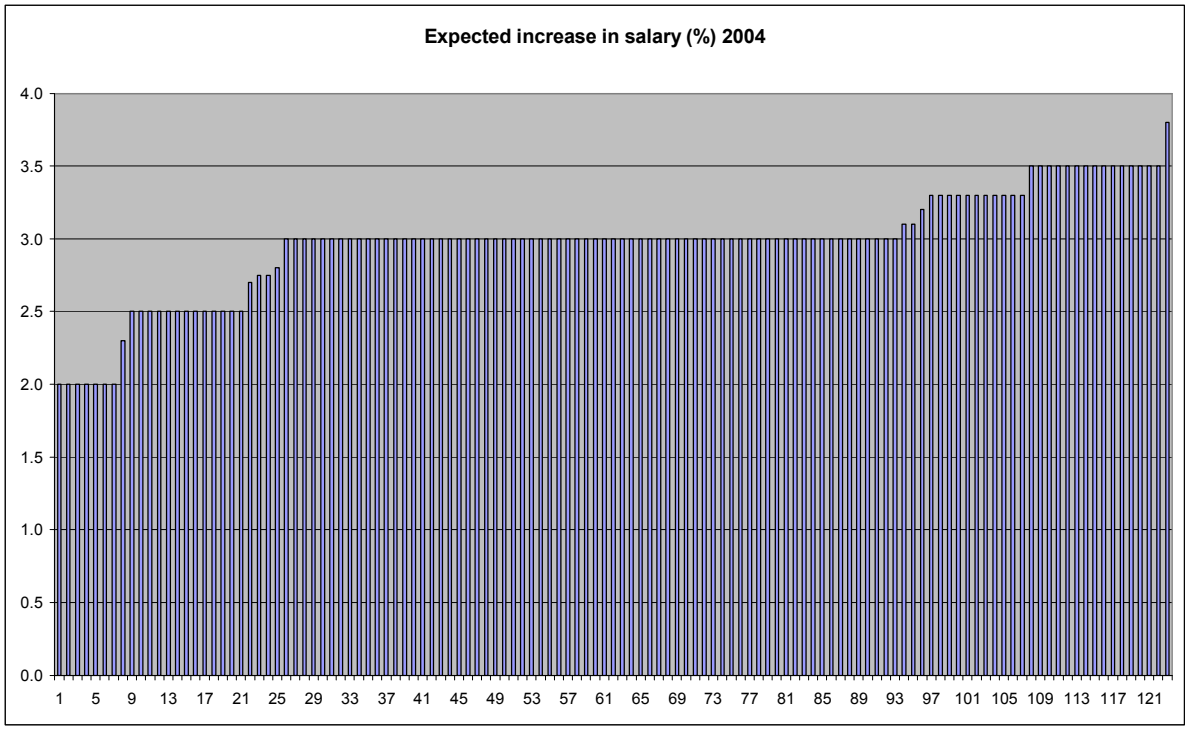
Expected pension asset return varies from 4.7% to 7.7% (Exhibit 5.24), with an average of 6.6% (Exhibit 5.17). The discount rate varies from 4.7% to 6.7% (5.25), with an average of 5.5%. As shown in Chapter 3, the weighted risk free rate for 20 years according to the weighted average time to pension retirement was 4.1%, around the time when the pension assumptions should be set (early spring 2005 when issuing the annual reports for 2004). Allowing for an appropriate risk premium the discount factor, in my opinion, should be significantly lower for all firms. Equally interesting is the relationship per firm between the actual return and the discount factor. Normally the expected return is one percent point above the discount factor (Exhibit 5.26). However, some firms have 1.5 to 2.0 % points in difference; although most all of these firms have their pension assets in the same insurance firms as the other firms – and hence should have the same expectations as the other firms given the same set of information. The firms with the highest differences are Stolt-Nielsen, Golar and Norsk Hydro, but these had their assets in private pension funds ("Pensjonskasser") and could, according to the accounting rules, set expected returns specifically according to the asset mix in the specific pension fund. Some firms have no or even a negative difference between the expected return and the discount rate.

Exhibit5.26



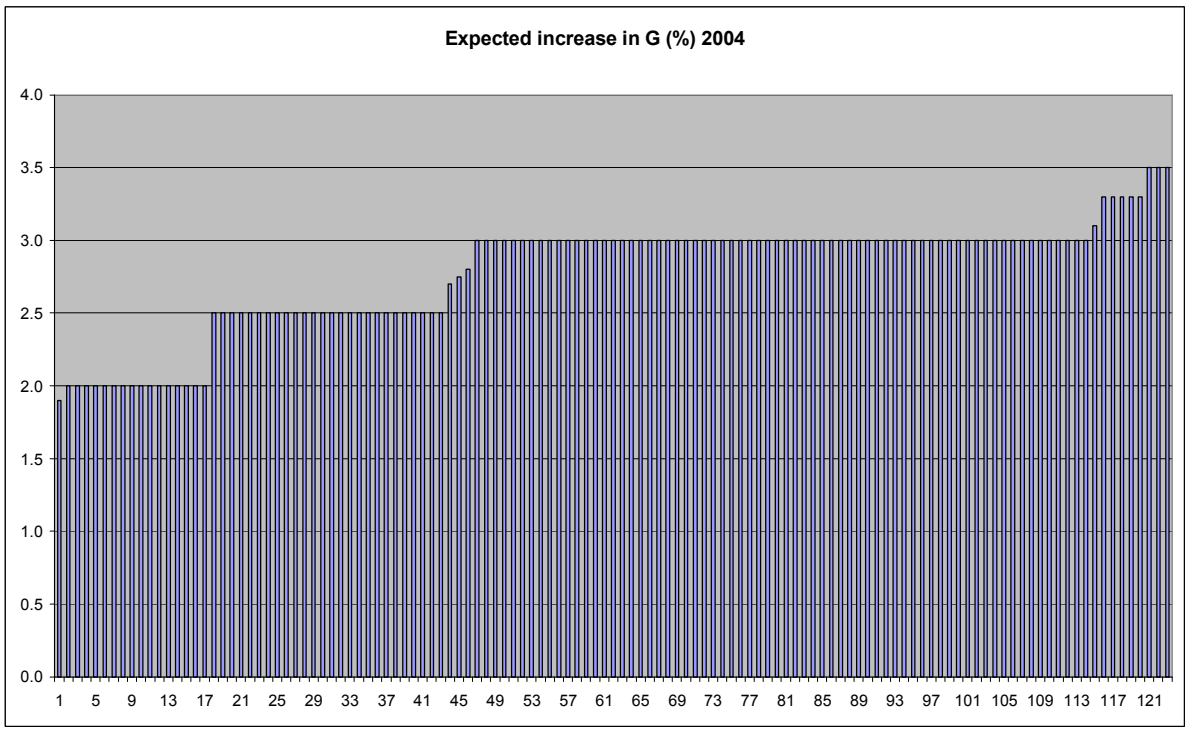
*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed.

Exhibit 5.27



*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed.

Exhibit 5.28

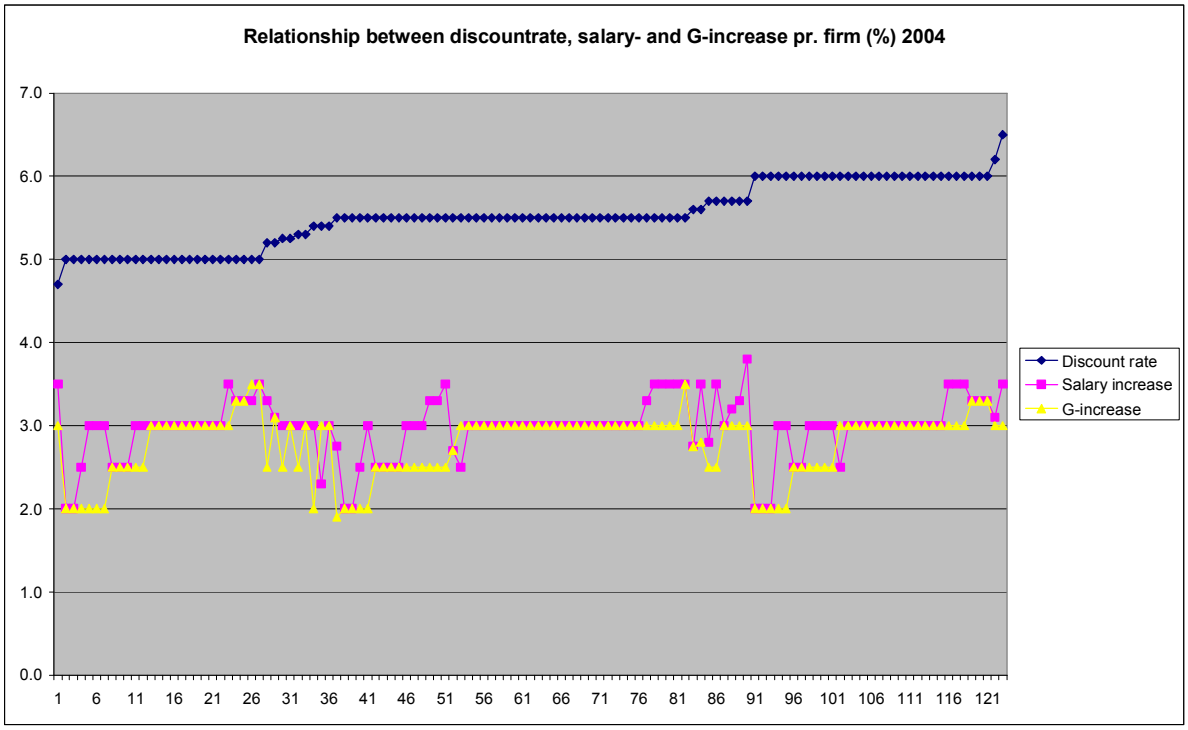


*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed.

The average expected salary increase in 2004 was 3.0%, and varied from 2% (many firms) to 3.8 % (only one firm; Stolt-Nielsen) (Exhibit 5.27). My calculations showed 4.6 (see 3.2.7).

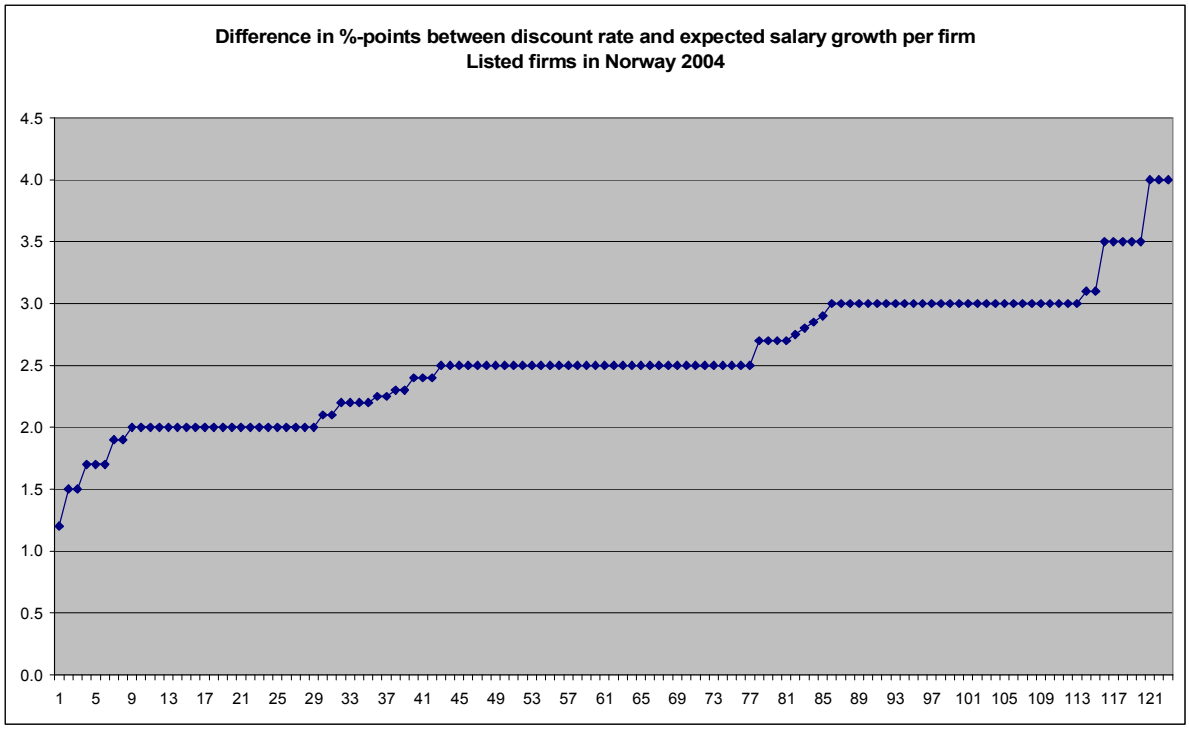
The average expected increase in the G factor was 2.8%; it varied from 1.9% (weighted averages of Eltek) to 3.5% (many firms) (Exhibit 5.28). My calculations showed 3.6% (see 3.2.7).

Exhibit 5.29A



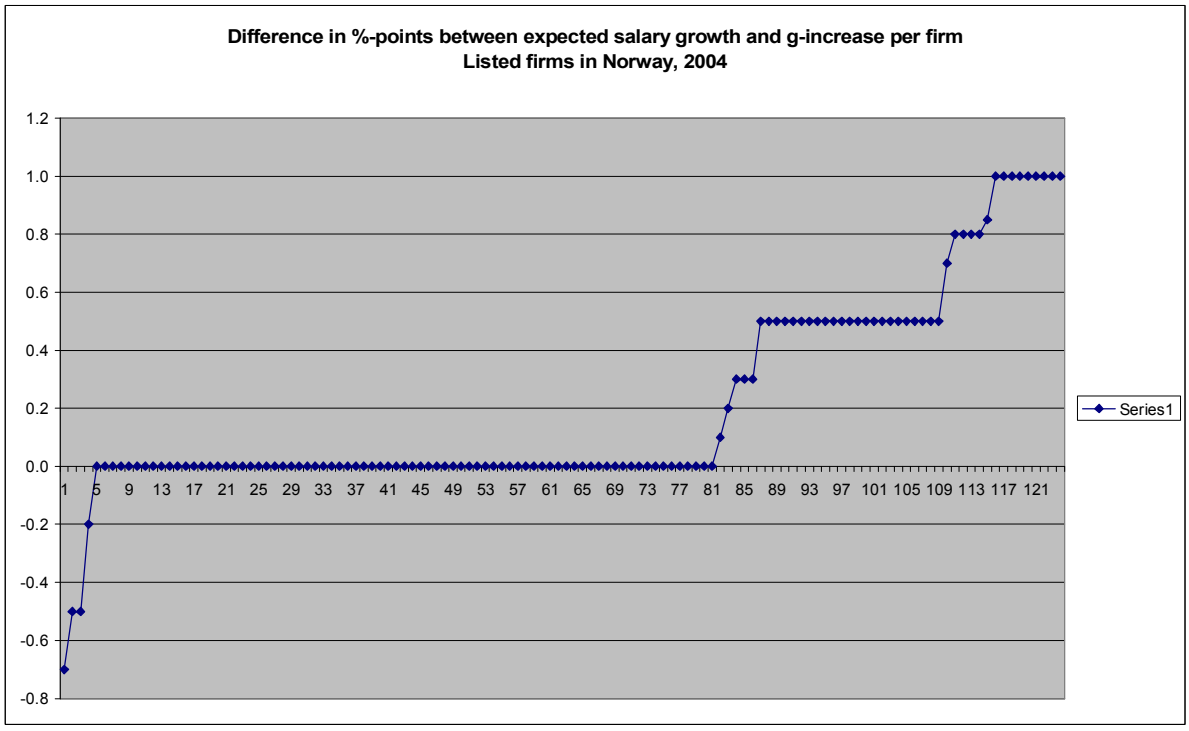
*Discount rates, salary increase and increase in G factor shown per firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed.

Exhibit5.29B



*Discount rates and salary increase shown per firm in %. Numbers disclosed in the notes of the 2004 financial report. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed. Ranked ascending.

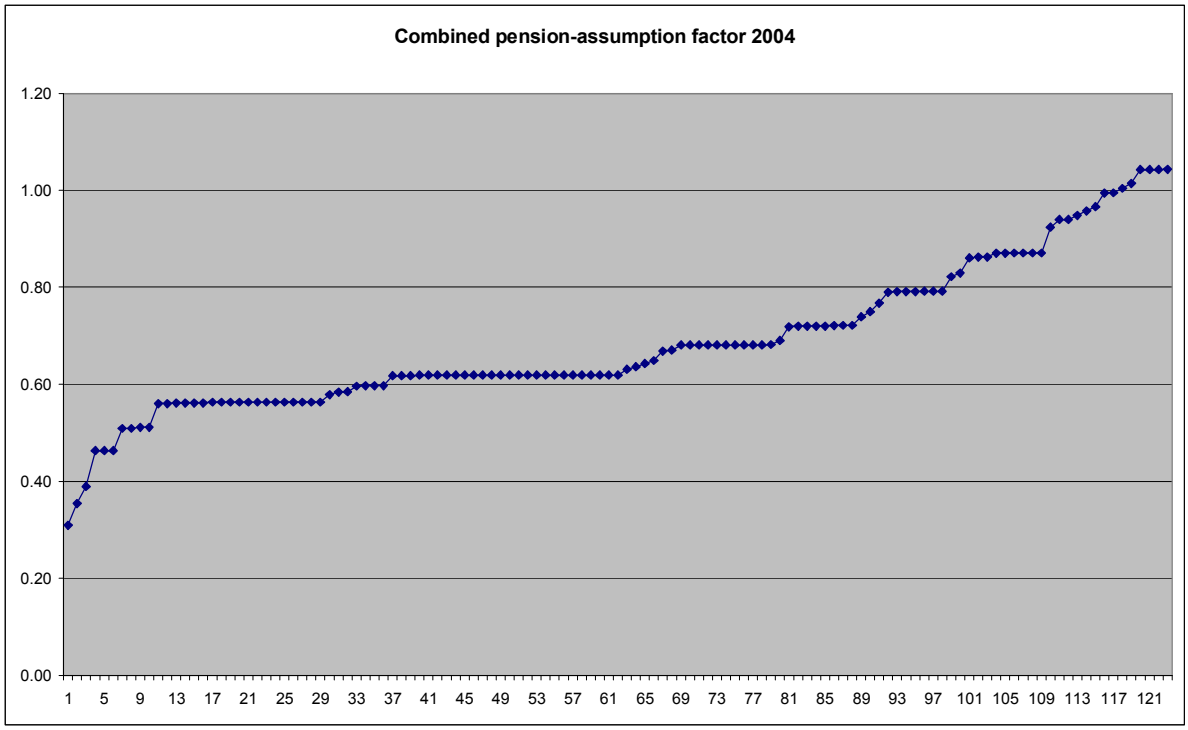
Exhibit5.29C



*Salary increase shown per firm in %. Numbers disclosed in the notes of the 2004 financial report. Includes all firms with defined benefit plans (122) who were listed in the whole of 2004 and issued financial reports while listed. Ranked ascending.

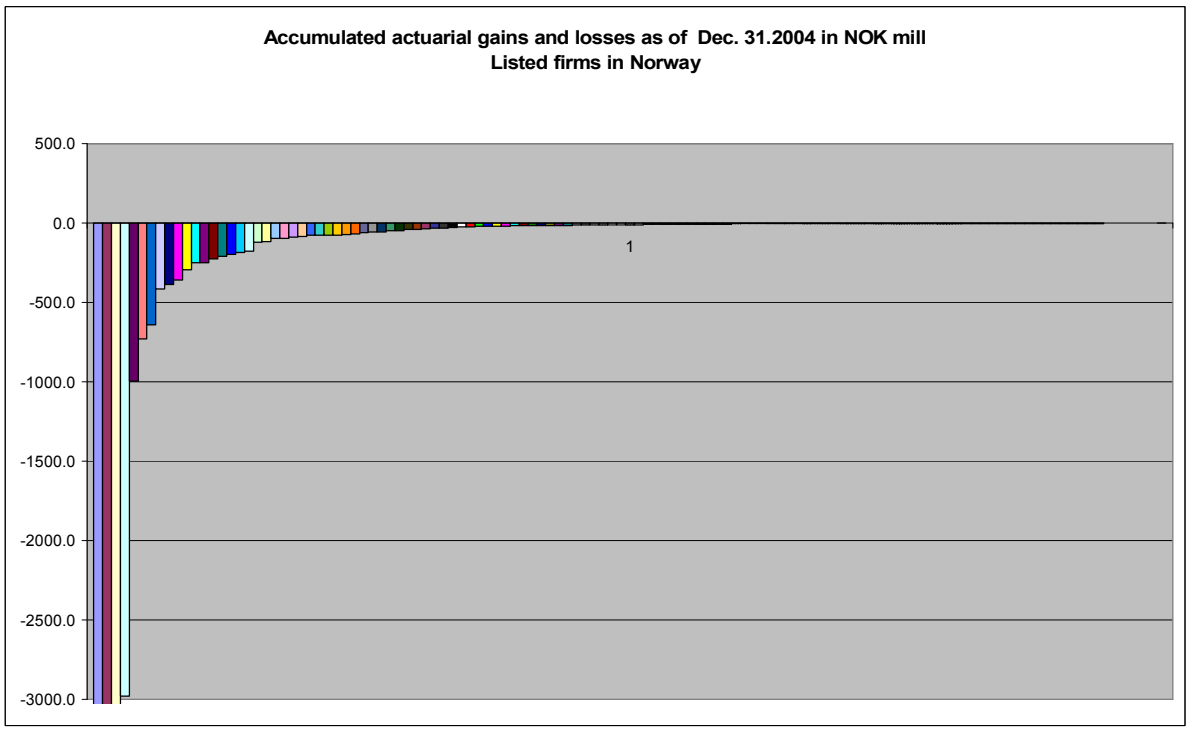
Equally interesting is the relationship between the expected salary and G increase *per firm*, and (as seen in Exhibit 5.29 A-C) the salary increase assumption is normally equal to or just above the G increase. However, there seems to be a low correlation between discount factor and salary or G factor. The difference per firm between discount rates and expected salary increase varies from 1.2 % points (DnB NOR) to 4 % points (DOF, Avantor, Green Reefer). According to the discussion in Chapter 3, there should be little difference expected for an average firm. The difference between the expected salary increase and the expected G increase per firm varies from a negative difference (Hands, Norwegian and Super Office) to a 1 % point positive difference (many firms). The explanations for this *could* be firm specific; e.g. the employees/crew in the airline firm, Norwegian, might have a higher average age than for an average company, and the competition between the firms in the industry might be so intense that one could expect a lower than average increase in salary in the firm than the expected average salary increase (which should be close to the expected G increase; see Chapter 3). However, reviewing outliers in general, it is difficult to think of good reasons as an outsider.

Exhibit 5.30



*Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. Shown in ranked order per firm who had defined benefit plans and who were listed in Norway the whole of 2004 and issued financial reports while listed. 122 firms. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that government pensions pay 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$

Exhibit 5.31

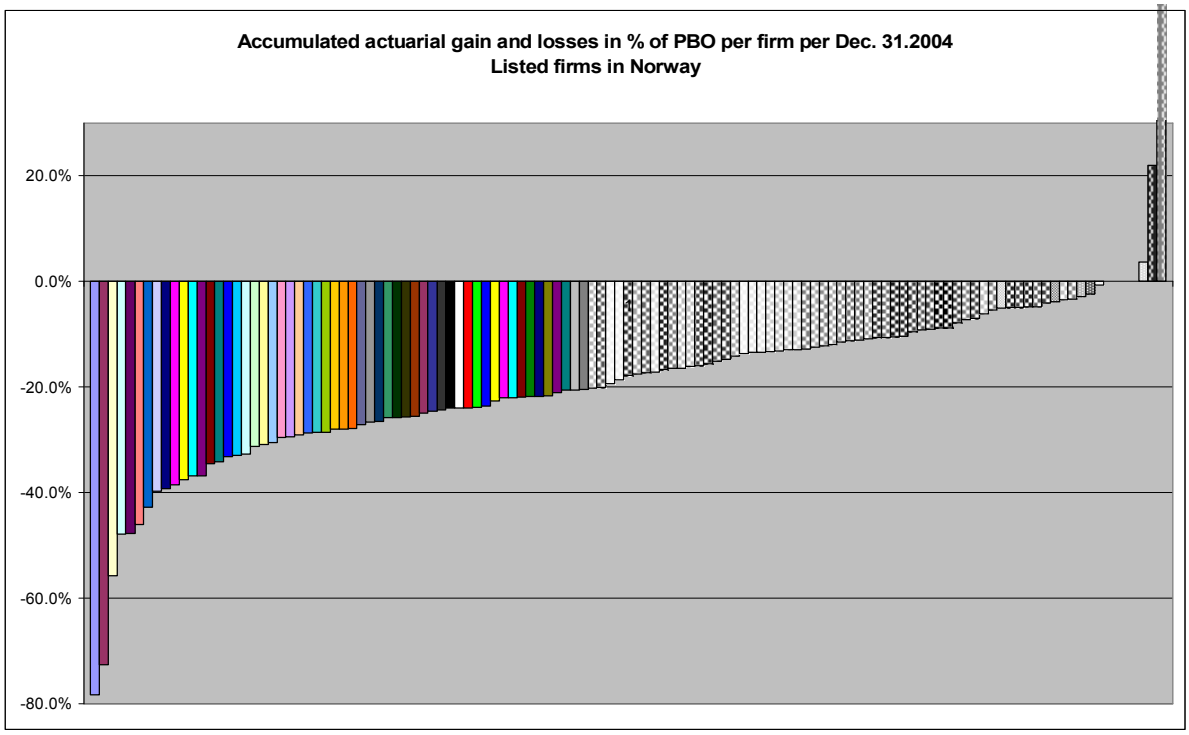


*Accumulated unrecognised actuarial gains and losses disclosed in the notes as reconciling items in mill NOK as of December 31, 2004 per firm. Includes all firms (165) that were listed in Norway in the whole of 2004 and issued financial reports while listed. Ranked ascending.

5.3.5 The PAF

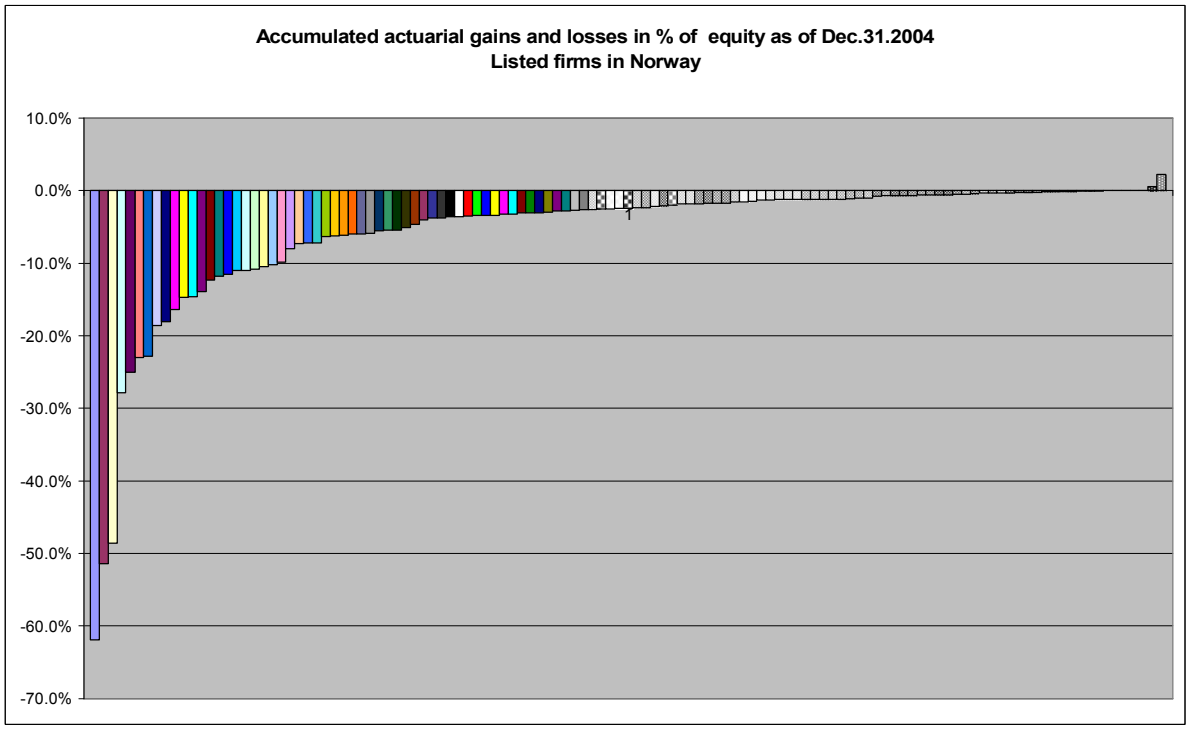
The average combined pension-assumption-factor (PAF) for 2004 was 0.75 (with y = 75%, n = 20; see 3.2.9) (Exhibit 5.17). The factor varied from 0.31 to 1.04 (Exhibit 5.30); all else equal, the PBO will more than triple if the firm with the lowest factor should instead apply the highest factor (1.04: 0,31). No firm was even close to the suggested combined pension-assumption-factor for an average firm, which I calculated as of March 2005 of 1.25 (see 3.2.8).

Exhibit 5.32



*Accumulated unrecognised actuarial gains and losses disclosed in the notes in % as of December 31, 2004 per firm. Includes all firms (122) that had defined pension plans, were listed in Norway in the whole of 2004 and issued financial reports while listed.

Exhibit 5.33



*Accumulated unrecognised actuarial gains and losses disclosed in the notes as reconciling items/equity in % as of December 31, 2004 per firm. Includes all firms (122) that had defined benefit plans, were listed in Norway in the whole of 2004 and issued financial reports while listed.

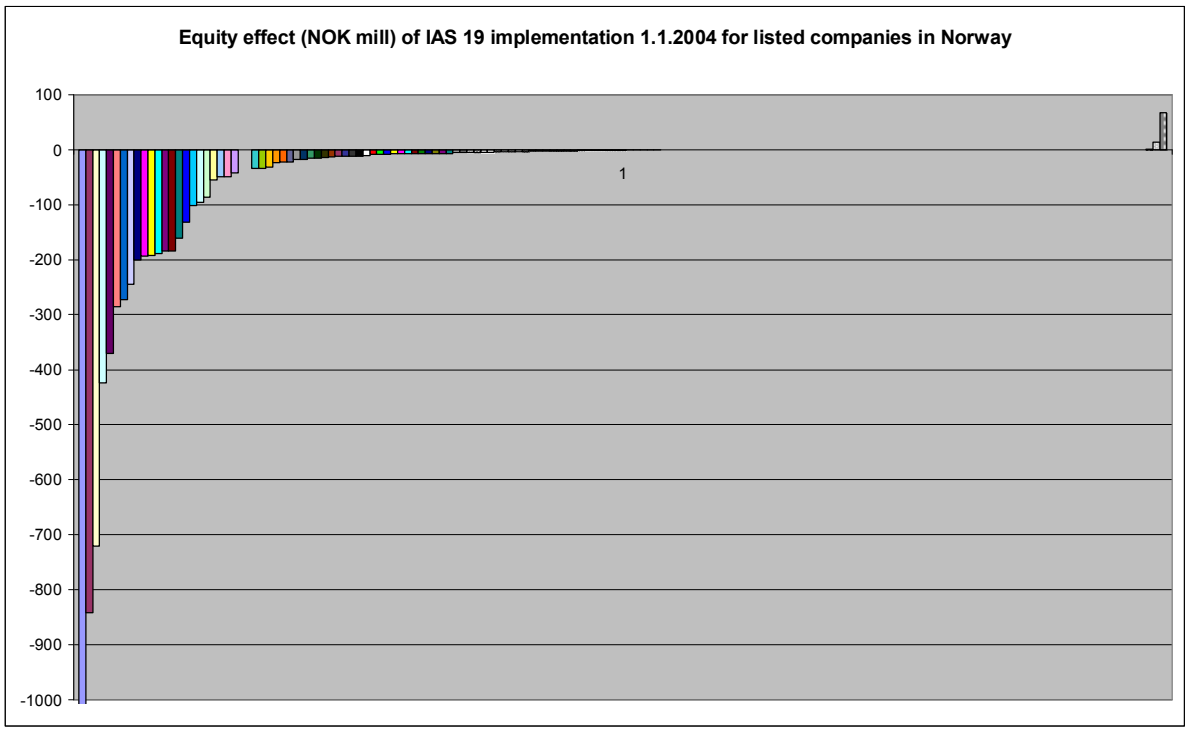
5.3.6 Accumulated actuarial gains and losses and equity effect of IAS 19 implementation

The firms implemented the new pension accounting rules in 1994. As explained, the actuarial gains and losses are typically not recognised immediately (only 4 firms out of 122 firms with defined benefit plans in 2004 had chosen this principle), but deferred, a portion being recognised in the pension cost each accounting period. In 2004, over the 10 year period the total accumulated actuarial losses on average were 1.1% of total assets, 5.4 % of equity and 22% of PBO as of December 31, 2004 (Exhibit 5.17).

Interestingly, only 3 firms accumulated assumptions that were too *pessimistic* over the (maximum) 10 year period (Exhibit 5.31, 5.32 and 5.33). The amounts are immaterial however: Tandberg Data 3.4 mill NOK (103% of PBO as a result of a demerger), Birdstep NOK 0.5 mill and DSND 0.4 NOK mill. 114 (93% of all the firms with defined benefit plans) accumulated assumptions that were too *optimistic*, the highest nominal amounts were from Norsk Hydro (NOK 7936 mill), SAS (NOK 4879 mill), DnB Nor (NOK 3398 mill) and Statoil (NOK 2980 mill).

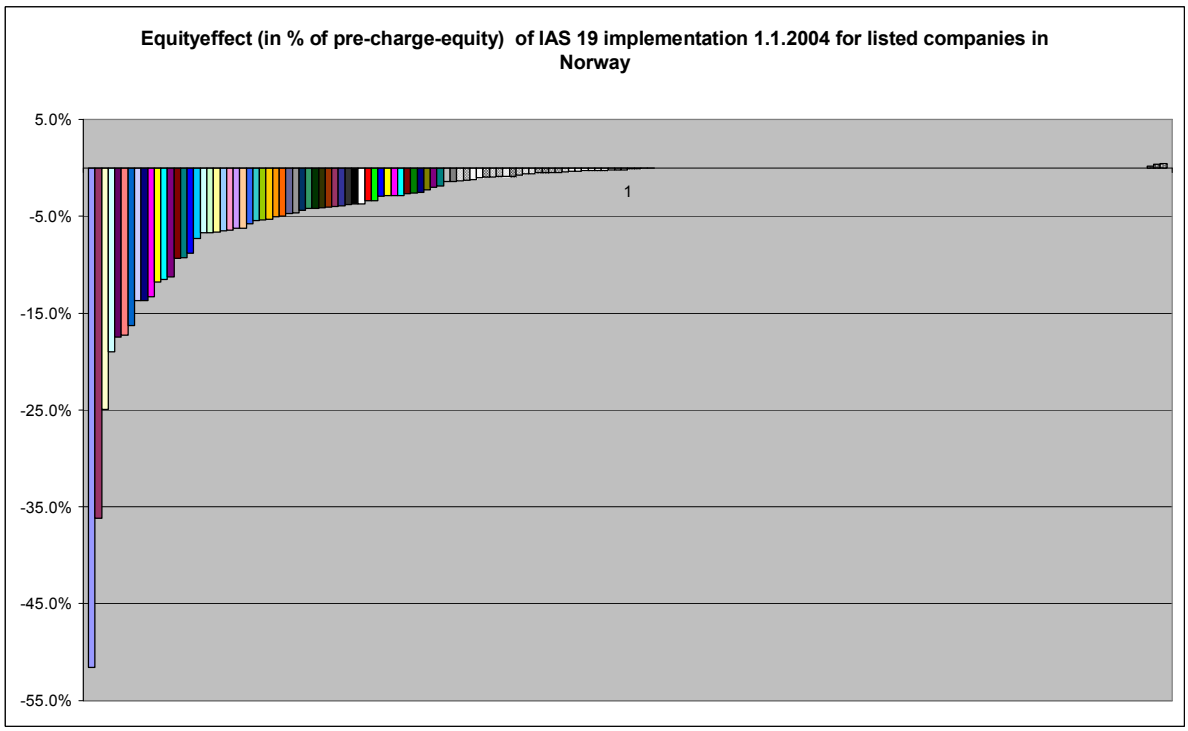
More remarkable is the off balance sheet liability in relation to PBO (Exhibit 5.32) or equity (Exhibit 5.33): More than 50% of the firms with defined benefit plans have their accumulated actuarial losses exceeding 20% of the PBO. Of the firms where both ratios are high (i.e. not including immaterial amounts), Norsk Vekst Forvaltning has 34%/62%, Hands 32%/51%, SAS 24/49%, Kitron 48%/28%, Stavanger Aftenblad 22%/25% (% accumulated unrecognised actuarial losses in relation to PBO and equity as of Dec.31, 2004 respectively).

Exhibit 5.34 A



*Amount in mill. NOK charged against equity 1.1.2004 due to the IAS 19 implementation according to the IFRS report per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed. 165 firms. Ranked ascending.

Exhibit 5.34 B



*Amount in mill. NOK charged against equity 1.1.2004 due to the IAS 19 implementation according to the IFRS report/equity 1.1. prior to the charge. Measured in % per firm who were listed in Norway in the whole of 2004 and issued financial reports while listed. 165 firms. Ranked ascending.

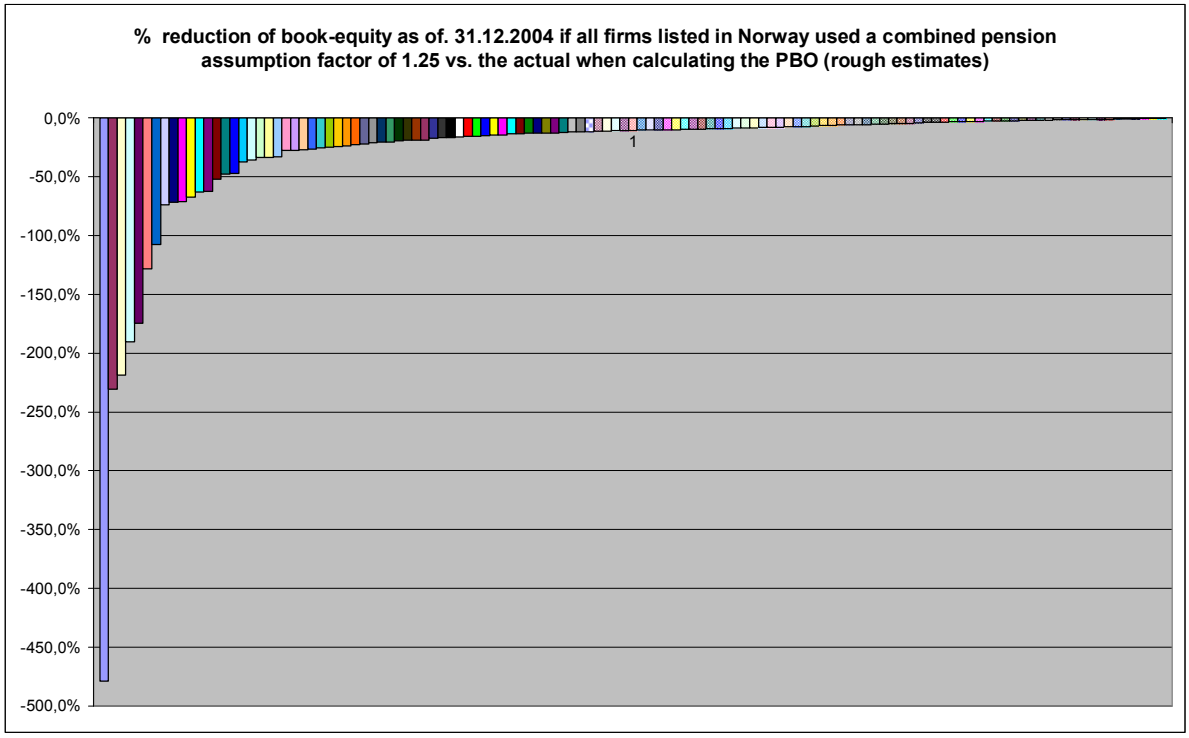
Listed firms in Norway (who had not already done so) had to implement IAS 19 1-1-2005 with implementation effect 1-1-2004. As discussed above, in practice the firms had to recognise the accumulated actuarial gains and losses to equity, but unrecognised effects of pension *plan changes* remain unrecognised. Firms listed on US stock exchanges and reported according to USGAAP may postpone the implementation until 2007. Accordingly, firms such as Norsk Hydro and Statoil, with large nominal implementation effects put off the implementation.

The total equity effect of IAS 19 implementation for listed firms in Norway were 6605 mill NOK (according to their IFRS reports in 2005 describing the effects of IAS/IFRS implementation)*. This is 1.4% of total equity for all listed firms in Norway as of 1-1-2004.
However, for some firms the effect is material. Telenor has the largest nominal IAS 19 effect; NOK 1825 mill (Exhibit 5.34 A), but this is only 4% of pre-charge equity. For 17 of the firms, the effect was more than 10% of their precharge equity (Exhibit 5.34 B).
Fosen (52%), Hands (36%) and Adresseavisa (25%) had the largest negative effect in % of precharge equity.

No firms reported changes in pension assumptions from the NRS 6 assumptions when implementing IAS 19.

* Not all firms reported the specific IAS 19 effect, but these amounts are immaterial as the whole IAS/IFRS-effect for these firms is immaterial.

Exhibit 5.35



Change in PBO is calculated as PBO*(PAF=1.25/actual PAF per firm). Shown in ranked order per firm who were listed in Norway the whole of 2004 and issued financial reports while listed as % change in PBO vs. equity December 31, 2004. 165 firms. PAF (combined pension assumption factor) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial reports used to calculate the PBO. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that government pensions pay 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$

An interesting exercise is to calculate the effect on the PBO for listed firms in Norway by using a PAF of 1.25, as I calculated the PAF in March 2005 assuming 20 years weighted average to pension settlement, 75% payment from FT. As the average PAF is 0.75, on average the PBO would almost double. This would have a dramatic effect on the equity (if the effect was recognised) as of December 31, 2004 (exhibit 5.35):

- 7 of the 165 firms would have a negative equity (more than 100% change in equity)
- In total 16 firms of the 165 firms would have their equity reduced by more than 50%
- 39 (vs. 22 firms as reported) would have a book equity ratio of less than 10%
- 61 (vs. 39 firms as reported) would have a book equity ratio of less than 20%

Exhibit 5.36 A

Descriptive statistics of the 121 firms listed both in 2003 and 2004* (Numbers are NOK mill. Unless stated)

	2003	2004
No. of listed firms issuing financial reports while listed (No.)	176	165
No. of listen firms in both 2003 and 2004 w/fin. reports (No.)	121	121
Total sales for all firms	902 463	950 613
Total operating profit	91 373	135 889
Total assets	2 152 482	2 185 070
Total book equity (% of assets)	407 117(19%)	437 177(20%)
Pension data:		
Total net of pensions shown as assets in the balance sheets	19 148	17 235
Total net of pensions shown as liabilities in the balance sheets	15 765	15 690
= Net of the net pension assets and liabilities shown in the balance sheets	(3 383)	(1 545)
Total gross pension assets in the notes (≈fair value)	109 825	95 621
Total gross pension liabilities in the notes (% of assets)	137 947(8.4%)	118
=Total net pension liabilities in the notes (% of assets)	109 825(5.1%)	95 621(4.3%)
Acc. unrecognised amount (% of assets)	32 823(1.5%)	26 294(1.2%)
Total net charge against equity as of 1.1	NA	NA
Total (net) recognised pension cost	8 551	8 756
Total (gross) recognised return on pension assets		
Total (net) recognised financial (income) on pensions		
Average assumptions:		
Return on assets	7.0%	6.5%
Discount factor	6.0%	5.5%
Salary increase	3.1%	3.0%
G increase	2.8%	2.8%
Combined pension assumption factor	0.70	0.70

•No. of listed firms in Norway listed in the whole of 2003 and 2004, and listed while issuing financial reports for 2004.Balance sheet items as of December 31.

5.4 Comparison of firms in 2003 vs. 2004

5.4.1 Overview

When testing for earnings management in Chapter 6, I will test the data from 2004 since unrecognised pension items were recognised and affected equity this year as this was the effect of implementing IAS 19. But if earnings management tendencies are verified, it is of great interest to analyse whether the pension assumptions and accounting practices were the same the year before, in 2003, where unrecognised pension items had *no* book equity effect. Tendencies of earnings management in 2004, no tendencies in 2003, but significant firm-by-firm changes between the two years in pension assumptions should strengthen an earnings management indication in 2004. Hence I have compared data for the firms listed both in 2003 and 2004.

In total there are 121 firms with defined benefit pension plans that issued financial reports in 2003 and 2004, and were listed the whole period (Exhibit 5.36). Of course there were some structural changes to some of the firms (acquisitions, demergers etc), most notably the split up of Aker-Kværner and Norsk Hydro. Still it is interesting to compare the pension data and other data for the same listed firms over the 2 years. The data will be analysed further in Chapter 6, which focuses on earnings management.

Comparing the same listed firms (in a demerger or merger the continuing entities group accounts are compared in the 2 years) for 2003 and 2004, total sales increased by 5,3%, the operating profit margin increased on average from 10% to 14%, and the equity ratio increased from 19% to 20%. Sum of total assets increased marginally from NOK 2152 482 to 2185 070 mill.

Sum of the net pension assets in the balance sheet decreased from NOK 3383 mill to NOK 1545 mill. Total pension assets in the notes decreased from NOK 109 825 mill to NOK 95 621 mill, and the total PBOs decreased from NOK 137 947 mill to NOK 118 435 mill, a marginal decrease as % of total assets. The demerger of Norsk Hydro into Norsk Hydro and Yara explains most of the net decrease.

Exhibit 5.36 B

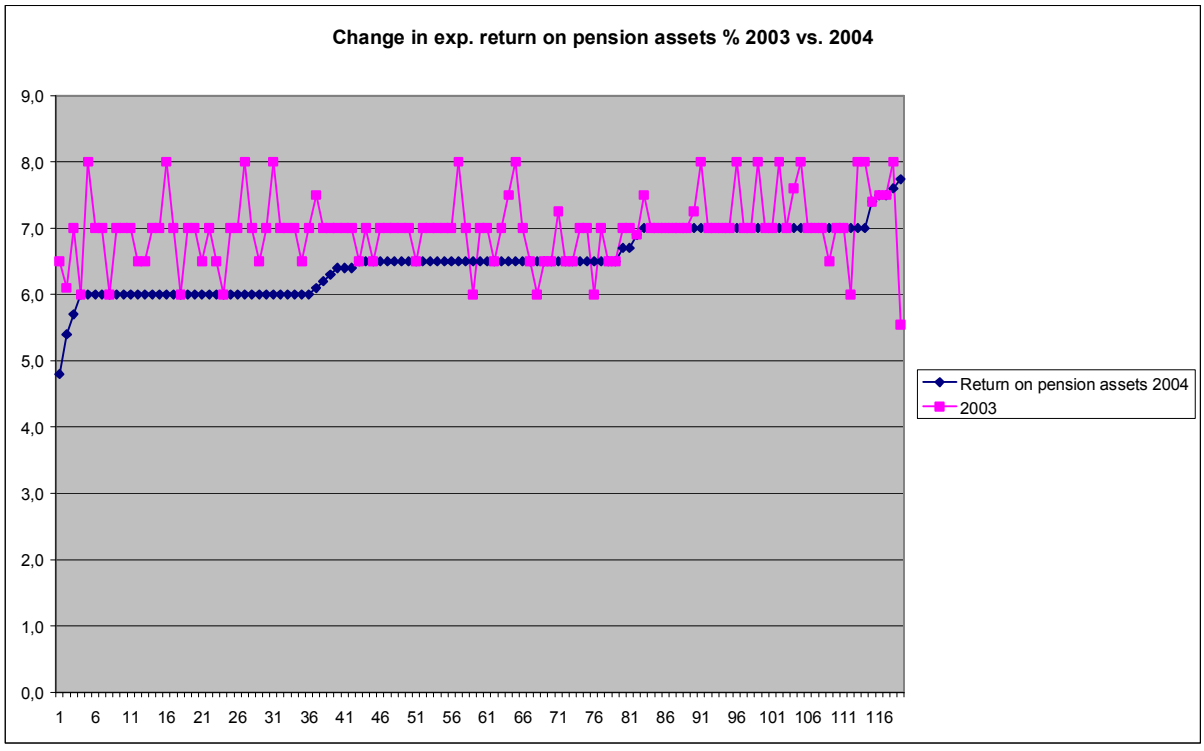
Descriptive statistics of pension assumptions for the same firms in 2003 and 2004*

	Mean	Medium	Std.dev.	Mean lower decentile	Mean upper decentile
2003					
Return on pension assets %	6.98	7.0	0.51	6.05	8.00
r= discount factor %	6.04	6.0	0.48	5.38	7.08
s=salary increase %	3.12	3.0	0.45	2.23	3.89
g=G increase %	2.84	3.0	0.48	1.94	3.60
PAF=pensions ass. factor**	0.67	0.66	0.16	0.46	0.99
2004					
Return on assets %	6.51	6.5	0.48	5.83	7.27
r= discount factor %	5.53	5.5	0.37	4.98	6.06
s=salary increase %	2.98	3.0	0.37	2.19	3.53
g=G increase %	2.78	.,0	0.39	1.99	3.26
PAF=pensions ass. factor**	0.68	0.63	.,15	0.47	1.00

* 121 listed firms in Norway both in 2003 and 2004 with defined benefit plans

**PAF= combined pension assumption factor= PAF= $\frac{4((1+s)^n-y(1+g)^n)}{(1+r)^n}$ assuming n=20 and y= 75%

Exhibit 5.37

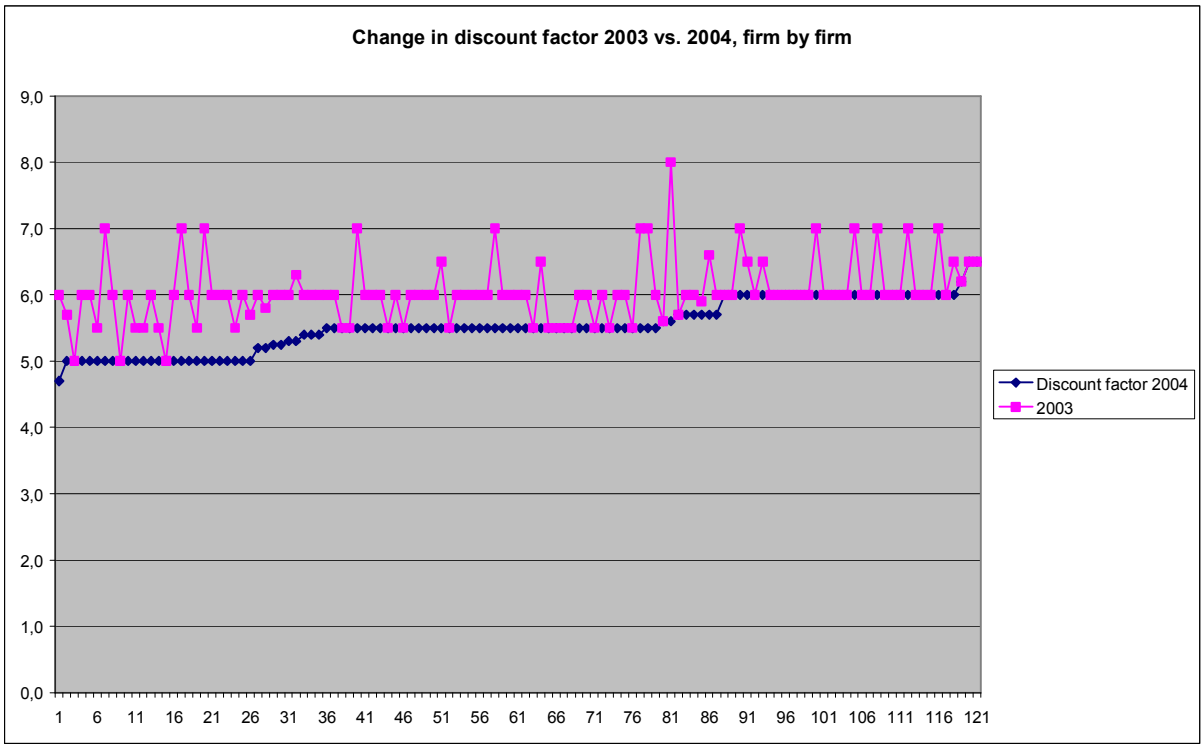


*Estimated recognised return on pension assets in 2003 and 2004 compared fir-by-firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (121) who were listed in the whole of 2003 and 2004 and issued financial reports while listed.

5.4.2 Pension assumptions

The expected return on pension assets on average decreased from 7.0% to 6.5% (Exhibit 5.36). The discount factor on average decreased from 6.0% to 5.5%. Most firms reduced the expected returns and the discount factors (Exhibit 5.37 and 5.38 showing the return and the discount factor, respectively, for the same firms comparing 2003 and 2004). A few firms also increased the expected return from 2003 to 2004 (Exhibit 5.37). The higher expected return could be explained by a different portfolio mix of pension assets (using the accounting rules of expected, non-risk adjusted expected returns), but knowing that most firms have their assets managed by (the same group of 5) independent insurance firms, the increase is difficult to explain when the risk free one-year rate dropped from 3.8% to 2.0% (see 3.2.6, source Norges Bank) from 2003 to 2004. No firm increased the discount rate used from 2003 to 2004, but several kept it unchanged (Exhibit 5.38). Long-term interest rates decreased from 2003 to 2004, e.g. the 10-year Government bond rate from 5.04% to 4.36% (source Norges Bank), and hence one should expect that all firms reduced their discount factors.

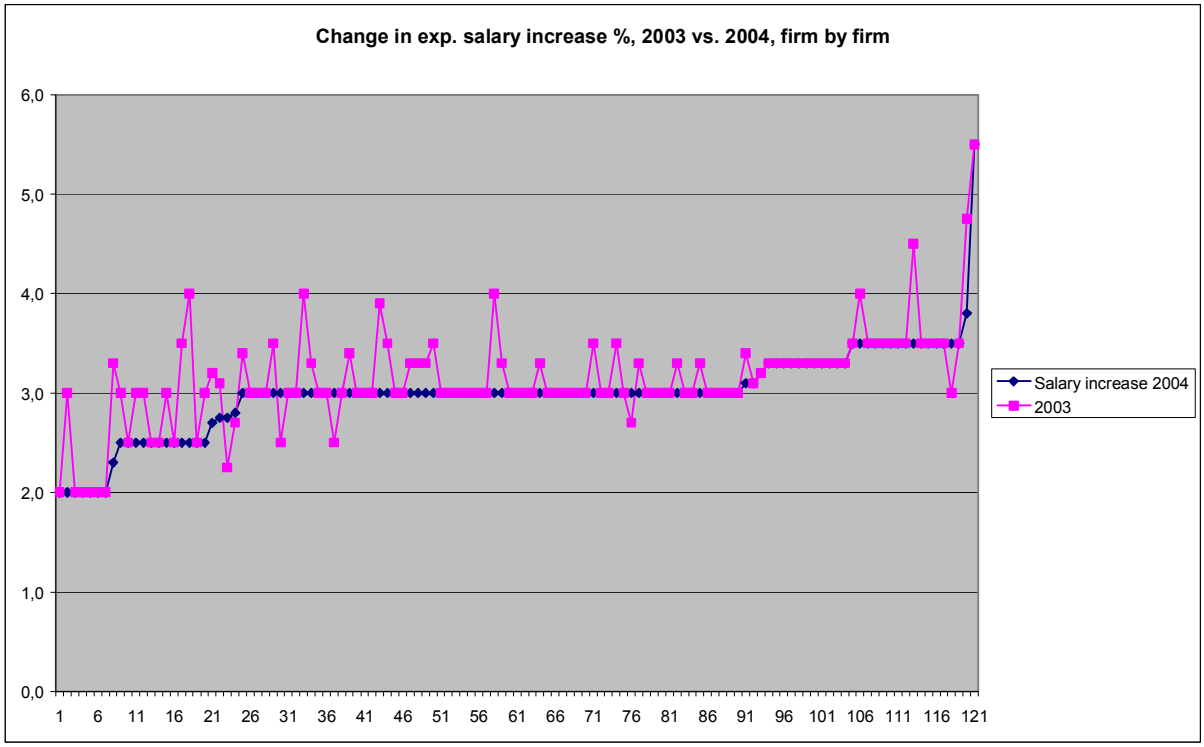
Exhibit 5.38



*Discount rates used when calculating the PBO in 2003 and 2004 compared firm-by-firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (121) who were listed in the whole of 2003 and 2004 and issued financial reports while listed.

Exhibit 5.39

Exhibit 5.40

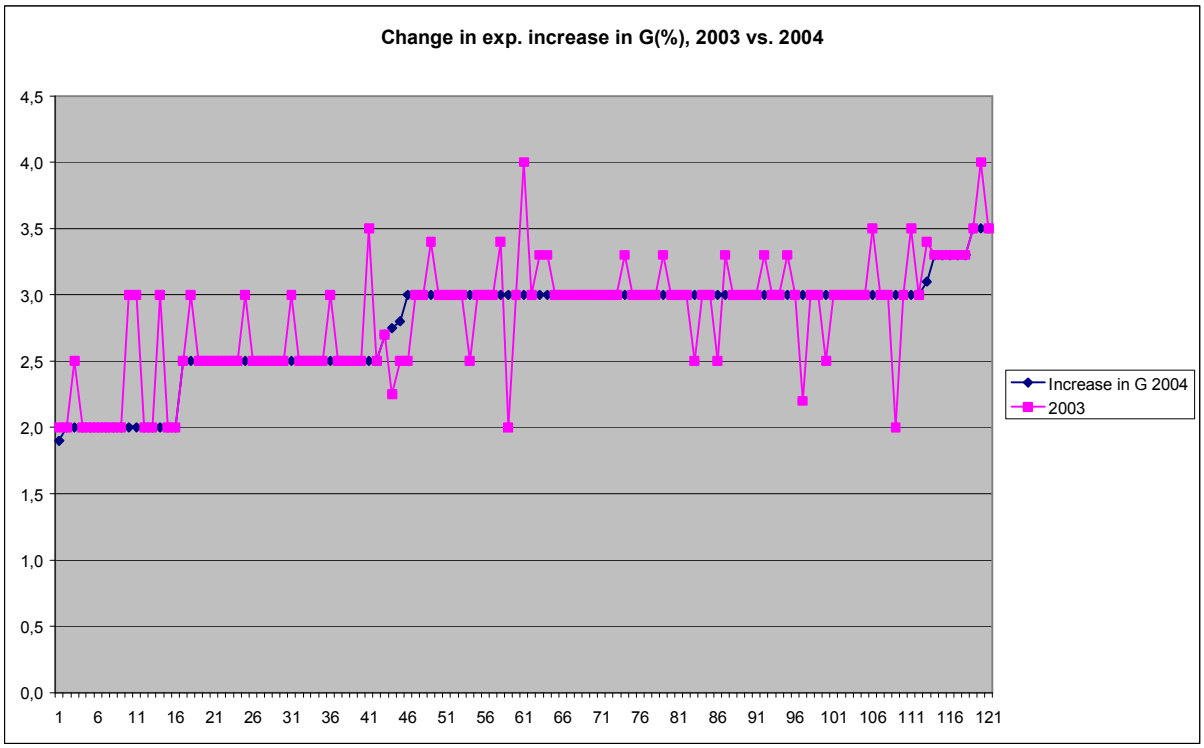


*Expected salary increase used when calculating the PBO in 2003 and 2004 compared firm-by-firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (121) who were listed in the whole of 2003 and 2004 and issued financial reports while listed.

By looking at the trend from 2002 to March 2005, in the difference between the discount rate and the 10-year state bond rate (Exhibit 5.39), the slow adjustment of the discount rate is even more striking (remember that the accounting rules regarding discount rate were not changed: rather the requirement of using best estimates was enforced through the IAS 19 implementation process) (No firm reported of changes in pension assumptions when implementing IAS 19).

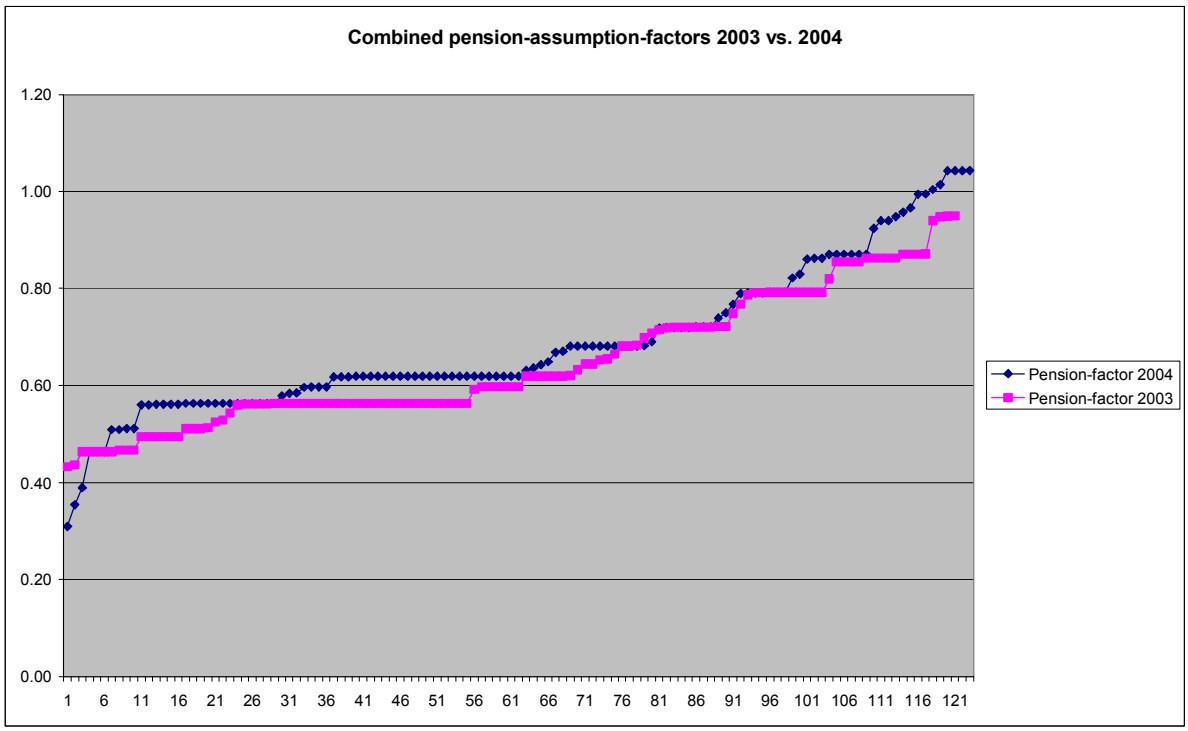
With a decreasing long-term risk free rate in the period, and the inflation expectation playing an important role in both the risk free rate, the expected salary increase and the expected G increase, one should, with all else equal, expect the firms to reduce their salary and G factor assumptions from 2003 to 2004. On average, the expected salary increase was reduced marginally from 3.1% to 3.0%, but there was some increase in standard deviation (Exhibit 5.36). The expected G increase on average remained unchanged with 2.8%, and there was a small increase in the standard deviation. Many firms however, changed their salary increase assumptions (Exhibit 5.40) or G factor assumptions (Exhibit 5.41) from 2003 to 2004. Casual inspecting does not reveal any systematic relationship between the direction of the change and the previous level.

Exhibit 5.41



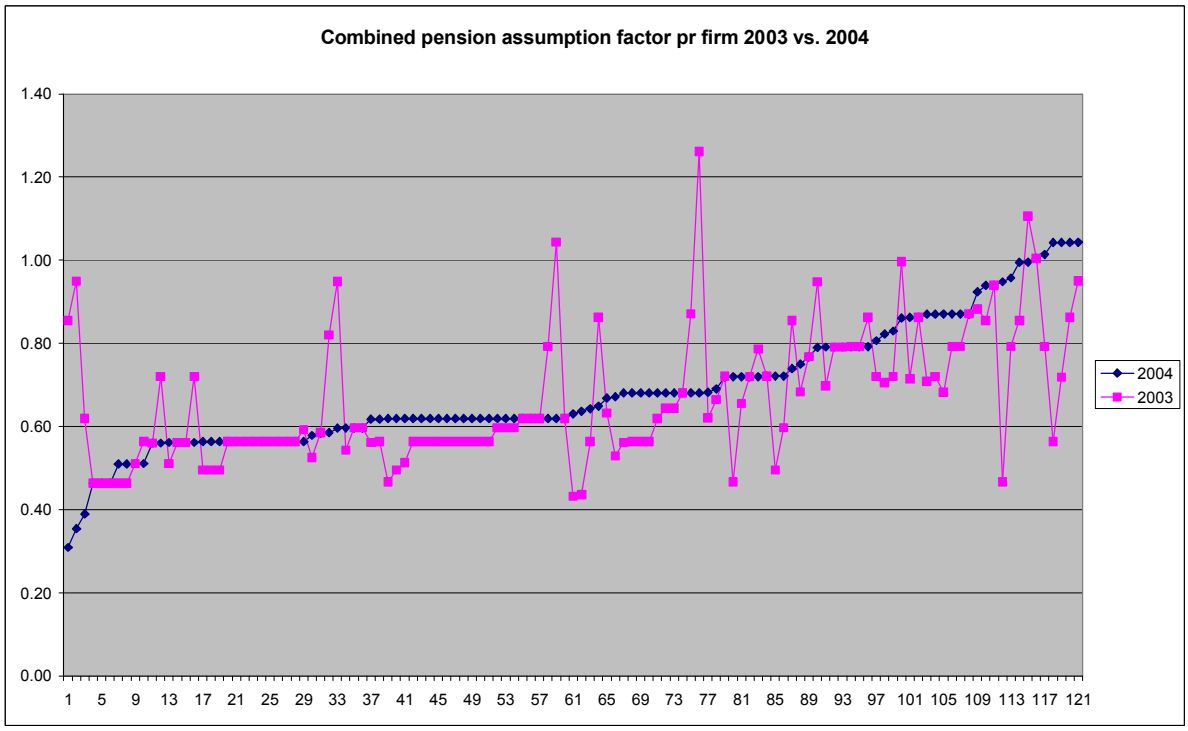
*Expected G increase used when calculating the PBO in 2003 and 2004 compared firm-by-firm in %. Numbers disclosed in the notes. Includes all firms with defined benefit plans (121) who were listed in the whole of 2003 and 2004 and issued financial reports while listed.

Exhibit 5.42



*Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. Shown in ranked order per firm independently for 2003 and 2004 or all firms who had defined benefit plans and who were listed in Norway the whole of 2003 and 2004 and issued financial reports while listed. 121 firms. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that government pensions pay 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n-y(1+g)^n)}{(1+r)^n}$

Exhibit5.43



*Calculated PAF (see exhibit above) based on the estimated pension assumption factors disclosed used to calculate the PBO in 2003 and 2004 comparing PAF in 2003 and 2004 for the same firm. Ranked in order of PAF 2004 factor. Includes all firms with defined benefit plans (121) who were listed in the whole of 2003 and 2004 and issued financial reports while listed.

5.4.3 The PAF's

The average PAF (combined pension-assumption-factor) decreased insignificantly (0.68 to 0.67) from 2003 to 2004 (exhibit 5.36). Ranking the firms independently ascending according to PAF the slope is quite similar for the 2 years (Exhibit 5.42). However, ranking the firms ascending according to PAF for 2004, and comparing the 2004 PAF with the 2003 PAF for the same firm, there are many firms with significant changes in PAF and hence pension assumptions. 19 firms decreased their PAF; 67 increased their PAF. Although most firms reduced the discount rate used (which increased the PAF), many firms also reduced the difference between the g and the s (which reduces the PAF) and this explains why so many firms decreased the PAF or kept it unchanged. Upon inspection, the changes do not appear to be systematic (Exhibit 5.43). In the next chapter I will investigate whether these changes are unsystematic changes, or if they are indications of earnings management.

6. Earnings management in pension accounting for listed firms in Norway.

6.1 Introduction

I want to investigate whether listed firms in Norway perform earnings management (EM) when accounting for pensions.

After the accounting-scandals the last few years, earnings management has gained specific academic interest: Even with specific accountings rules, with auditors and others controlling the reported financial information, and with the sanctions if EM was discovered, firms like Enron and others performed EM on a large scale, and even managed to fool the stock market for shorter or longer time periods. So how frequently and under which circumstances is EM performed? Which methods should be used to detect EM?

Accounting for pensions has also gained a lot of attention in recent years: The pension obligations and assets for many listed firms are large in relation to the firm's total assets and equity, with high value sensitivity to stock market or interest fluctuations. Moreover, the accounting rules for pensions allow firms to smooth or defer value changes in the balance sheet and income statements. The "true" numbers (best estimates) are only shown in the notes.

The main assumptions used to calculate the reported pension obligations are discretionarily set by the management of the firms, hence giving opportunities for earnings management. Pension plans and accounting rules for pensions are viewed as complex. Many of the assumptions and specific data regarding the firms' specific pension plans and employees are not disclosed. Hence it requires in-depth skills and insider information by analysts to fully understand the true value of recognised and disclosed pension values. Hence pensions are well suited EM.

There have been many empirical studies the last years on earnings management in general, that have found evidence of EM. There have also been many studies for pensions and pension accounting testing for EM – especially after the introduction of new pension rules in the US

with FAS 87 in 1986, and in the last couple of years after the high stock market and interest rate fluctuations. Earnings management to a certain degree has been identified.

So what is new with this study?

- First, there are very few (one?) academic studies on EM specifically for Norway. In his Ph.D. dissertation (2004) H. Aaker found that there was EM in more than 25% of the tested firms (but none of them listed) in Norway in the fish farming industry. I will test EM across all industries for listed firms in Norway.
- Results from EM studies are hotly debated because of the test methods used: These are mostly indirect tests typically looking at gross or many accruals combined, hence EM indications could have many other (sound) explanations (see discussion in 4.4 and 6.6 below). I will do a specific EM test on the specific assumptions re pensions where the different firms *should* be expected to have more or less similar (combination of) variables. Since calculating pension obligations is a present value calculation, I have constructed a combined assumption factor that captures the effect of altering the different assumptions better than the measures used in previous studies.

In this chapter I will first discuss the definition(s) of earnings management, then the motives for earnings management and how to perform earnings management. Together with the prior literature review of earnings management, this forms the basis for developing hypotheses for when and how EM in particular should be expected to be performed by means of pensions. An empirical test of the relationship between the PAF and the firm's equity ratio is performed, with the hypothesis that they are positively correlated due to EM. The results of the test are discussed in the last part of the chapter.

6.2 Definition(s) of earnings management

There have been several attempts by academics to define earnings management. Frequently cited definitions are:

- "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports either to mislead some shareholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen 1999)(HW).
- "The process of taking deliberate steps within the constraints of generally accepted accounting principles to bring about a desired level of reported earnings" (Davidson, Stickney and Weil 1987).
- "The use of management's discretion to make accounting choices or to design transactions so as to effect the possibilities of wealth transfer between the firm and

society (political cost), funds providers (cost of capital) or managers (compensation plans)" (Stolowy and Breton 2004).

- "A purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain" (Schipper 1989).
- "Operating and discretionary accounting methods to adjust earnings to a desired outcome; the incentives of management to modify earnings in their own best interest" (Giroux 2004).
- "Earnings management occurs when managers exercise their discretion over the accounting numbers with or without restrictions" (Watts and Zimmerman 1990).

Financial fraud is clearly related, and is defined by National Association of Certified Fraud Examiners (1993):

- "The intentional, deliberate misstatement or omission of material facts, or accounting data which is misleading, and, when considered with all the information made available, would cause the reader to change or alter his or hers judgement or decision".

The literature often distinguishes between EM, manipulation and fraud, assuming increased level and affect of alteration. But from the definitions above, the differences may be semantic: I will discuss this further below (see "How much").

I will briefly discuss some of the definition elements:

Which information is managed? Although the definitions do not state it directly, the authors restrict EM to external (not internal) reporting.
EM seems to be restricted to financial reporting (annual reports, interim, financial information in prospectus, proforma statements a.s.o.), (not all value relevant information from the firm) where the firm presents data about financial position, financial income and changes in financial position, (as also FASB Concepts No.1 § 7 defines financial reporting).
All information in the financial information that has relevance is included in my opinion: choice, use and changes of accounting principles, practicing of principles, estimates and judgement. Watts and Zimmerman (1990) only focus on the accounting *numbers,* but in my opinion this is too narrow; all information (numbers and words) are important.

Equally important is to include important, but *omitted* information in the definition of EM (e.g. Regnskapsloven § 7-1: "I tillegg ….. skal det gis opplysninger som er nødvendige for å bedømme ….. stilling og resultat og som ikke fremgår av årsregnskapet for øvrig". Similarly, IAS 1 § 103: "provide additional information, but is relevant to an understanding of any of them (balance sheet, income statement, and cash flow statement- my comment)".

- *What is managed; the process or the output.* In my view the focus on the *process* as Schipper (1989) and Davidsen, Stichney and Weil (1987) included in the definition of EM is less relevant; it is the information *output* that is important: This is the only way EM may have an affect (see later in 6.3 about motives).
  Moreover, EM does not seem to include "real" underlying alterations, e.g. which have cash flow implications (delaying sales/shipment etc.): By "structuring transactions" (Healy and Wahlen 1999) or "designing transactions" (Stlowy and Breton 2004) I do not understand the fundamental transactions, but rather how they are structured. Hence setting up legal structures, contracts etc. in order to comply with an accounting rule, but that "mask" the realities (e.g. to structure a SPE in such a way that consolidation may be avoided when accounting for it, or a leasing contract in order to avoid recognising it as a financial lease; but the reality is that the SPE or lease should be recognised) are included. However, Schipper (1989), Giroux (2004) or Davidsen et al. (1987) only focus on the use of accounting rules in their definition.
  Is EM restricted only to *earnings* (as the word indicates)? According to Davidsen et al. (1987) and Giroux (2004) it is; and the word "performance" in HW could indicate the same. However, the other definitions cited address more broadly all the information in financial reporting that could influence and mislead external decision makers. I view the broad definition as the most interesting and also the most relevant; if a firm performs intended alterations only to present a higher book equity than actual, e.g. to obtain lower funding or to mask a financial distress, this to me is EM as much as manipulating earnings. Empirical work also shows that level of book equity may influence stock prices (e.g. Schipper 1994). At least a great deal of the empirical EM-research, especially research dealing with pension accounting, looks at balance sheet effects (e.g. test of accruals (Sloan 1996, see literature review 4.3.2) and test of different assumptions defining the size of the pension liabilities, see literature review 4.5.1 and 4.5.2).
  I will include intended alterations of all financial information (not only earnings) in my definition of EM in the following.

Who manages? The EM must be done by the ones responsible for preparing or deciding the external financial statements etc, top management typically, but also the board, accounting committees and even the general assembly and others. Hence, in my opinion some of the definitions are too narrow; they only focus on EM performed by the managers.

In my opinion, however, earning management performed by lower management, not that which is known by those who prepare or are responsible for external information, should *not* be included.

- *How much* alteration is included in the earnings management definition: Only EM outside or also altered financial information w*ithin* the limits of laws and standards (cosmetic or other changes)?
  Davidson et al. 1987 restricted the definition to be *within* GAAP. Others restrict earning management to be only outside GAAP (e.g. chairman of SEC, Levitt in a speech in 1998 (cited from the press)). In my opinion, like HW, the important

discussion is not whether earnings management is inside or outside GAAP, but whether EM influences or could change or alter judgements or decisions based on the accounting numbers/information. This is in line with the overall guidelines set by the IASB Framework and FASB Concepts, the rules should be applied "faithfully", "free from bias" (IASB Framework § 31, 33) or "neutrality", "free from measurement bias" (FASB Concepts No. 2 § 98-, 85-,). The Framework and Concepts do not override the specific standards, but still I view the specifically mentioned requirements to be general underlying guidelines for all the accounting standards. Hence I would view, for instance, recognised unbiased estimates (a different estimate than the management believes in) that a decision maker using the information believes is material, to be a violation to GAAP.
In Norway, the Accounting Act requires that all estimates should be best estimates/expected values ("beste estimat" (RL §4-2)). Hence, all deviations from this under NGAAP could be said to be outside GAAP as long as these are viewed as material by the *users*.

Some of the specific accounting rules in my opinion do not give a "true and fair view"; e.g. the accounting rules for pensions as discussed in Chapter 2. However, the Framework, Concepts and Regnskapsloven assume that the users have a reasonable knowledge of accounting (e.g. IASB Framework § 25 and FASB Concepts NO. 2 § 32) and hence are expected to know the context (i.e. the specific accounting rules under the relevant GAAP) under which the accounts are produced. Hence, when specifically accepted accounting rules are followed faithfully this is not earnings management: In Norway it is generally assumed that the accounting rules defined by NRS give a "true and fair view" (Ot. Prop 2004 about the introduction of "true and fair view" in § 3-2a) and may be altered only in extremely unusual cases ("I særlige unntakstilfeller..fravikes" (RL § 3-a.2)). Under IAS compliance with IAS/IFRS if there are applicable rules (IAS nr.1 §15) this is not EM, and similarly under USGAAP as discussed in the Concepts No. 2.
Hence EM in my opinion is not a discussion of inside or outside GAAP, but rather unbiased, faithful, relevant and complete use of accounting rules, practices and estimates.
EM is not defined by whether it is "successful" (not revealed) or not, rather by whether EM is intended; this is in line with all the HW definitions.

- *Errors, misjudgements?* There are many areas within accounting that require estimates and discretional judgement. Only the purposeful or intended or known deviation from management's best estimates is EM according to the definition. The fact that other professionals (such as analysts or investors) have other estimates, or that ex-post events show other results, are not included. Management's poor (but best) judgement or insight (miscalculations, errors, misunderstanding) is not included in the definition, in my opinion.
  In the literature there is a discussion of differences between earnings manipulation and earnings management. However, the definitions of EM focus on intended or purposeful or deliberate steps or deliberately misleading someone. To me these definitions are synonymous with manipulation – so I do not see value of distinction between EM and earnings manipulation.
- *Whose benefit?* Giroux (2004) focuses in his definition on the management's interest. The definition should be broader in my opinion, as Healy and Wahlen (1999) Stlowy

and Breton (2004) and Schipper (1989): The management could perform EM not in their own interest, but for the "firm" (employees etc), or some outsider's perceived interest only. A definition focusing on management's incentive could be very difficult to use; sometimes motives/incentives for management are more vague or remote: reputation, long term career opportunities etc.

- *Who is harmed by the EM?* Stlowy and Breton (2004) define this widely, and in line with most academic theory and work. Hence shareholders, creditors, management benefiting from bonus contracts, and others trading or making contracts with the firm on the basis of altered financial numbers are included.

In my opinion, Healy and Whalen's definition is the one closest to my discussion above - but I would like to suggest a definition of earnings management as:

"Earnings management is when the ones responsible for preparing or accepting external financial information purposefully use their discretion in financial external reporting and in structuring transactions to alter or omit information in financial reports, either to mislead some external users about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting information".

6.3 Motives for earnings management

According to Healy and Wahlen (1999), who also cite Watts and Zimmerman (1986), motives are divided into: 1) compensation contracts, 2) debt covenants, 3) capital market pricing, 4) taxes, 5) litigation and 6) regulatory behaviour. To me these are examples, not an exhaustive definition based on concepts. E.g. EM could be based on long-term career incentives or job security or expectations of higher future salary (DeFund and Park 1997), even if there is no formal compensation contract.

Breton and Stolowy (2004) in my opinion, structure the motives better, as transfer of wealth between groups: 1) political motive (transfer between firm and society), 2) cost of capital motive (transfer among fund providers) or 3) compensation motive (from owner to managers).

- *Political motive*/minimization of political costs is related to lowering or deferring different tax payments or cost of regulation (environment, legal right to do or restrict business/competition a.s.o.).
- Minimization of the *cost of capital motive* is related to debt contracts (interest rates, avoiding increased interest rates or minimize restrictions related to covenants) and

cost of equity (stock prices, new shares (IPO/stock increase), valuation at mergers, sale, and purchase a.s.o.

- Maximization of the *manager's compensation motive* is related to bonus plans, stock options, but also more general long-term career concerns or concern related to business success reputation.

Watts and Zimmerman (1978) classify the first 2 motives as managers manipulating *for* the firm and the latter that managers manipulate *against* the firm. The principal–agent theories (and most of the empirical work I cite in this chapter) have EM against the firm as a general underlying assumption (Christensen and Feltham 2005). Hence, empirical work tends to make a hypothesis of causal relations between (short-term) incentives and EM.

I do not think the motives mentioned are mutually exclusive: For example, an IPO with management contracts related to the success of the IPO may lead to incentives to overstate earnings both from the cost of capital motive and the managers' compensation motive. In fact the principal-agent literature discusses how these motives may be combined (e.g. Christensen and Feltham 2005). There could also be situations of what I call efficient manipulation; the manipulation increases wealth of several parties and (almost) no *current* party is worse off. An example: EM is performed, and as a result stock prices increase and managers increase their bonus/compensation. The EM is never revealed, and the stock price continues to reflect smoothed income (low perceived variability implies ceteris parabus higher price) or above target earnings (ceteris parabus higher prices according to empirical work (Kothari 2001)). (Of course a potential investor (non-current) or investor of financial stock derivatives would potentially have his wealth reduced since he might have gained from the higher variability with no EM). Erickson, Hanlon and Maydew (2004) even showed that some firms overstate earnings with increased tax payment consequences, hence increasing the government's, the current shareholder's and current management's wealth (but of course reducing the firm's real intrinsic value). Hence, the motives can operate in either opposing or reinforcing ways, often making it difficult to isolate the primary motive (Healy and Wahlen 1999). Watts and Zimmerman (1990) also criticise historical studies for not taking "an integrated perspective (i.e. multiple goals)" on EM/accounting choice.

But in general one should be careful in concluding the cause or motive for EM: Watts and Zimmerman (1990) criticise many studies testing and concluding that a specific motive caused the EM, reporting unusual financial numbers and not actual events: It is very difficult to conclude whether the motive tested (e.g. to maximize the bonus plan) was the real

explanation, or that true improved performance was the explanation. Similarly, is a "big bath" the year after a CEO left caused by EM by the former CEO or true poor performance (and hence the CEO had to leave or left before it was revealed)?

6.4 How to perform effective earnings management for pensions

Methods for earnings management for pension can be grouped into the following 7 areas.

1. Choice of implementation date of new rules, when there are options. Examples of optional implementation dates are:

   - The adoption of the SFAF 87 in the US prior to 1986. Early implementation affects both reported earnings and equity.
   - Implementing IAS 19 for Norwegian firms that report under US GAAP may be postponed to 2007. For firms such as Norsk Hydro, Statoil and others this means that they may defer, and actually have chosen to defer, the recognition of the accumulated actuarial losses. However, for other listed Norwegian firms, implementation of NRS 6 and IAS 19 was mandatory in 1994 and 2004.

2. Choice of accounting principles. Examples are:

   - At the date of implementation of NRS 6 in 1994, the firms who had not implemented the standard or similar standards were allowed to recognise the implementation effect directly to equity or defer the recognition by amortising the amount and recognising it over some years in income. All listed firms, except SAS (formally DNL see 5.2.1), chose to charge the effect immediately (see 5.2). However, even if the effect is charged immediately, choosing different combinations of assumptions would create different pension obligations, and also future pension cost. Hence, effective EM may be performed by choosing between conservative or optimistic actuarial assumptions, charging much or little to equity at the implementation date, with correspondingly lower or higher earnings the following years as a result (see more detailed description in No. 5 below).
   - Under NRS 6 the firms had an option to recognise actuarial gains or losses immediately or defer the effect. Deferral vs. immediate recognition will often have a material effect on book equity and sometimes on earnings. Almost all listed firms in Norway chose the deferral option which normally reduces the earnings variance caused by pension cost (see 5.2).
   - When implementing IAS 19 in 2004 and NRS 6 in 1994, one could choose between recognising all accumulated effects (except those from plan changes) at the date of transition, or performing a retrospective calculation as if the IAS 19 were used from the day the pensions were introduced in the firm. Using the retrospective method would reflect the effect of not recognising actuarial gains or losses that would have

developed over time. Hence, the last alternative is a way of avoiding charging unrecognised amounts against equity. In practise, however, the retrospective alternative requires so much work or data is so hard to find, that it is not a viable option for many firms. According to the actuaries I interviewed, many firms investigated/tried the retrospective alternative without succeeding and had to choose the alternative of recognising all unrecognised pension items against equity in 2004 instead. Of all the listed firms, only SAS chose or was able to use the retrospective method (see 5.3).

- Recent amendments to IAS 19 introduced an additional general option to immediately recognise actuarial gains and losses in the balance sheet outside profit and loss with no earnings effects. Hence there are now 3 accounting options for recognition of actuarial gains and losses: immediate recognition in earnings, immediate recognition in the balance sheet or deferred recognition in earnings and in the balance sheet.

3. *Valuation of pension assets.* Since valuations of pension assets (shown in the notes) typically are done by independent insurance firms or actuaries, with copies to the auditor, opportunities for EM in this area are low in Norway. There are some debates and differences between accounting standards about what defines the market value of pension assets: the realisation value if assets are moved to another insurance firm ("flytteverdien"), or the share of book value of assets that the insurance firm has allocated to the pension policy (does not include all unrealized gains) or the share of the full market value of the pension assets in the insurance-firms. However, normally the differences are marginal, and the different accounting standards specify specifically the value to use. Hence there are seldom accounting choices for pension asset values.

   Expected return on assets, however, is discretionally set by management, and could materially influence operating earnings. However, since the return assumption is related to (often 1%- point above) the discount factor assumption, the annual return on assets and the interest cost on the pension obligations more or less offset each other in reported earnings. Significant EM for assets return assumptions requires unusually large differences between the discount factor and the expected return assumption, and since this is disclosed, detection risk is high, reducing the expected EM frequency.

   Pension assets in the balance sheet, however, may over time be materially affected by EM of expected returns; asset values are based on the actual values when the standard was implemented, but are increased by the accumulated *estimated* returns, not the actual. In the notes the pension assets shown are the sum of actual values at the beginning of the accounting period plus the estimated return in the period. Picconi (2004) showed that the market (analyst-forecasts) does not fully understand the distinction between actual and

estimated returns and changes in estimated returns; hence EM related to estimated returns is likely to be "successful".

4. *Omission of actual pension liabilities.* Lack of completeness by not including all pension plans (not including top management plans, special plans etc) in the pension liability calculations was a significant problem in Norway in the post NRS 6 implementation period, in my experience. However, in my experience this relates to errors, not EM. Today this has been reviewed many times by auditors and independent actuaries – and EM in this area should be difficult.

5. *Use of assumptions when calculating pension liabilities.* Some assumptions are solely at the management's discretion; discount rates, increase in G, salary increase, and timing and usage of early retirement and to a certain degree turnover of employees. All these assumptions have significant effects on the calculated pension liability shown in the notes. Other assumptions (mortality, disability etc.) are typically set by independent actuaries, and opportunities for EM are limited.

   It is important to notice that the balance sheet is little affected by such EM: A change in the assumptions e.g. that will lead to significantly lower pension liabilities calculated in the notes will *not (immediately) affect the pension obligation in the balance sheet since the effect is (normally) deferred.* Hence one should focus on the EM effect on earnings and on the disclosed pension assets and PBO in the *notes.*

   The effects of performing EM by changing the different assumptions can be described by the exhibit below (Exhibit 6.1): As one can see, a change in the value of some assumptions (a change in the salary growth, G-growth, turnover, use of early retirement) increase (decrease) operating profit *and* at the same time a decrease (increase) in the PBO-liability in the accounting period the change is done: E.g. if expected G-growth is increased from say 3 % per year to 4 % per year, this would result in higher earnings (since the pension cost will be lower in the period) and a lower PBO (since it is now expected that the government will pay a higher portion of the pensions at retirement) than if the G-growth expectation was kept unchanged. An increase of the expected turnover would have the same effect. A decrease of the expected salary growth or use of early retirement would have the same effect. In an EM-perspective, such "double-effects" are normally most desired.

   For the discount-rate, the effect is that an *increased* discount-rate *decreases* the PBO, but

might *increase or decrease earnings* (since interest cost of pensions is the discount-rate times PBO, and the PBO decrease with higher discount-rate and increase with lower discount rate). Hence, using discount-rates in EM is a trade-off between the earnings-effect and the PBO-effect.

After some years, EM by using wrong assumptions/estimates will affect earnings and book equity since a portion of actuarial gains and losses have to be recognised. However, combining the accounting options of the corridor and the deferral method, the gain or loss has to first exceed 10 % of the PBO, and than only a small portion of the gain or loss outside the 10 % corridor should be recognised. Hence the EM could be quite effective, with many years of estimation errors before the earnings will be affected.

Exhibit 6.1

Discressionary assumptions and (earnings mangement) effect

	Effect by increasing assumption value		**Firm specific factors**
	Operating profit	Liability/asset shown in disclosures	
Expected return on assets	↑	Marginal: Only last years expected returns	YES, on actual asset portfolio mix
Discountrate	↓/↑	↓	NO, (but duration period may vary somewhat)
Salary increase	↓	↑	NO, but…
G-devlopment	↑	↓	NO
Turnover	↑	↓	YES
Use of early retirement	↓	↑	YES

6. *Net pension assets.* Net pension assets (pension assets higher than pension liabilities) may only be recognised as assets in the balance sheet if it is "probable" that they can be used for future pensions (NRS 6). This is a vague restriction, and left at management's discretion to come up with more or less sound arguments. Using EM by "producing" arguments for recognising pension assets that otherwise should not have been recognised could significantly affect the equity ratio. SAS has recognised net pension assets of NOK 6700 mill (but accumulated actuarial losses not recognised of NOK 4879 mill). SAS' book equity as of December 31, 2004 was NOK 10 043 mill. Without the "probable" use of the net assets, SAS' book equity would have been 3 343 mill (10 043 – 6700).

7. *Amount/content of disclosures*. The NRS 6 and IAS 19 contain comprehensive disclosure requirements. However, important information such as weighted average time period to pension settlement is missing. Moreover, my database show that very few firms listed in Norway with defined benefit pension obligations reported all the required information in 1994, 2003 or 2004- with no sanctions or reactions from the Oslo Stock Exchange (see 5.2 and 5.3). Hence, there should be possibilities for EM in this area. However, my statistics from the listed firms in 1994, 2003 and 2004 show that the firms have increased the amount of disclosures over the years, and that there are less deviations from the disclosure requirements in the more recent years.

With all the methods for performing EM for pensions, EM in this area should be expected. In addition: Pension schemes and pension accounting are viewed as complex, relates to uncertain future events and assumptions are difficult for outsiders to judge. EM or misjudgement takes long time to be discovered since errors/EM in assumptions stays unrecognised. External control groups like the actuaries and auditors in Norway view the assumptions and accounting methods as being within management's discretion (within limits). ("Det presiseres at forutsetningene er definert av selskapet" quote from an actuarian's report. "Vurder om forutsetningene virker rimelige" quote from a working program in an audit firm). Oslo Stock Exchange has not responded to lack of disclosures.
The best opportunities (high significance) for EM seem to be by using discretional assumptions to calculate pension liabilities, especially when the new accounting standards are implemented. Unlike in the US, there are no public recommendations on the assumptions to be used. Only once has Oslo Stock Exchange issued general guidelines on which assumptions to use. On the other hand, since assumptions and other pension information are disclosed, hence transparent, this should indicate lower EM tendencies.

6.5 Developing hyphothesis based on empirical work in situations where EM in particular should be expected

As discussed, EM in pension accounting affects earnings and the balance sheet differently than EM in most other accounting areas: Changes in assumptions and estimates do not materially affect earnings or the balance sheet immediately; the effect may only show up in the notes. However, according to the SEMH, the market should reflect the information about the

"true" pension values in the notes when the stock is priced, hence EM might have a stock price impact.

I want to perform a test of EM in listed firms in Norway, as there are no previous tests specifically on this.

There are a limited numbers of listed firms in Norway (180 in 2004), only a fraction (30) of these with significant pension liabilities (gross liabilities above 10% of total assets) (see 5.3). Hence, to obtain sufficient power I have to focus on situations where high frequency and magnitude of earnings management should be expected for pensions.

Summarizing prior empirical work, the general level and frequency of EM should be expected to be low in Norway (LaPorta et al 1999, Leuz et al 2003, Kinnunen and Koskela 2003, see 4.7). But pension accounting is well suited for EM due to the complexity and significance of different discretionary choices and few reacting control groups. As shown, the existence of EM in pension accounting is well documented (see 4.3).

Specifics in management's incentive contracts are not public information in Norway, and details about debt covenants or loan renewals are not disclosed. Analysts' consensus estimates are only available for a few listed firms. Hence EM hypothesis re these events cannot be tested in Norway using public data.

IPO's, mergers, equity issue and other visible capital market events as well as changes of auditors or management are very few for the firms with significant pension obligations[*]. Even using observations from several years (which could give some model problems), it would be difficult to obtain statistical power. However, these factors should be used as control factors.

Hence, I construct my hypotheses combining 3 types of visible events empirically known to have potentially large effect on EM-frequency/magnitude:

- *The use of management-discretionary assumptions* for pension obligations, since they have significant effects and are frequently performed. This should have significant

[*] E.g. of all the listed firms in 2003 I found 22 different firms in total out of the 176 listed firms that had IPOs (8), and/or mergers or capital increase (14), and/or change of auditors (5) (source: Dagens Næringsliv, Ernst & Young). Out of these firms only a fraction would have material pension-liabilities).

impact in the period from 2002 to 2004, where the interest rates decreased dramatically, and the firms in Norway according to the accounting rules should reduce their discount factors.

- *New accounting rules and "fresh start accounting*": Normally EM with pension assumptions primarily affects the disclosures in the notes and not the book equity – since the effect of the changes in estimates are deferred. However, when the new pension accounting rules were implemented in 1994 (NRS 6) and in 2005 (IAS 19), most firms recognised the whole effect of the difference between the previous book value and the new calculated values directly to equity, (Events similar to FAS 87 introduction in 1986 see 4.3.2). Hence pension EM had a more direct effect on equity in these years than in other years, and was empirically proven to occur (e.g. Chicas 1990). Firms with high equity ratios could use this opportunity to take a "big equity bath" (but without the normal earnings effect), use conservative pension assumptions, resulting in a high liability at the implementation date, but with lower reported pension costs and improved reported earnings the following years. For firms with a low equity ratio this option is more costly. Expected return on pension assets assumptions does not significantly influence the net pension-obligations at implementation date, so this assumption is not expected to be managed in the same magnitude.

- *Financial distress*. Empirically, the EM tendency is especially high when there is financial distress or the firm is close to its covenants. Low solvency combines bankruptcy risk with covenant risk - since covenants typically are linked to minimum requirements of solvency. I have checked 50 out of 180 annual reports in 2004. It seems as if listed Norwegian firms report solvency ratios based on balance sheet numbers (not including effects of actuarial gains and losses on pensions shown in the notes: I analysed the reported equity ratios and the definition of the equity ratio in the 2004 annual reports of the first 50 firms in alphabetical order who had defined benefit plans and reported an equity ratio number. All of these firms used the balance sheet numbers only. Of the 5 largest banking groups in Norway, I know that for 4 of the banks the most frequently used covenant is minimum book equity ratios. Boye et al. (2004) also reports that book equity ratio is a frequently used ratio by banks and analysts to warn about financial distress. Duke and Hunt (1990) found that equity-based covenants (debt/equity ratio or book equity ratio) were the most frequently used (36%) covenant in the US after dividend covenants (55%) (working capital-ratio was used in 35% of the cases). DeFond (1994) found significant EM (accounting choice) the year prior to reported debt/equity covenant ratio violations (94 firms). Beaver, McNichols and Rhie (2005) used 3 ratios to predict bankruptcy in a dataset from 1962 to 2002, which provided significant explanatory power. Debt to assets ratio (1 minus equity-ratio) was one of the variables. However, other studies have found other ratios with higher predictive ability than the equity ratio, such as interest coverage (e.g. Boye 2000, Hall 1994). Eilifsen et al. 2006 on the other hand reject equity-ratio as having significant bankruptcy predicting ability. In my experience, however, top management, especially boards, are highly concerned about book solvency.

Hence the hypotheses are as follows:

- *H1 (Part 1): Firms with significant pension liabilities and low equity ratio would, when the accounting rules require the full pension liability to be recognised, have a tendency to use a combination of discretionary pension assumptions that gives lower pension liabilities than firms with higher equity ratio.*

Low solvency firms performing EM in this way will probably get somewhat higher pension cost/lower earnings the following years, since higher discount rate is important to achieve low pension liabilities, and this results in higher pension cost the following years (higher interest on pension liability) unless the assumption is changed again. However, as discussed, assumptions re salary increase; increase in G, turnover and use of early retirement that minimize pension liabilities will also give low pension costs the following years. Hence the net effect is unknown.

- *H1 (Part 2): Firms with significant pension liabilities and high equity ratio would, when the accounting rules require the full pension liability to be recognised, have a tendency to use a combination of discretionary pension assumptions that gives higher pension liabilities, but lower future pension cost than firms with lower equity ratio.*

For firms with high solvency the hypothesis is not exactly the opposite of that for low solvency firms. If high solvency firms use assumptions resulting in high pension liabilities at implementation (which they can "afford" to charge against equity), the pension cost will not automatically be lower/earnings that are improved the following years. It is only low *discount rate*s that will have this effect (see 6.3 No. 4 and Exhibit 6.1). However, as discussed, the assumptions cannot be analysed independently, since they all move (and normally are adjusted) together. However, the discount rate, incorporating the implied expected inflation in the other assumptions is the most important factor in the combined pension assumptions.

The hypotheses above are expressed in the alternative form: That there *is* a relationship between equity ratio and pension assumptions. When testing the hypothesis, the null hypothesis is tested; that there are *no* relations between equity ratios and firms' pension assumptions.

6.6 Choice of method and design for detecting earnings management regarding pensions

Following McGrath (1982) there are some generic design options in order to reveal that EM historically has taken place in financial reports: (Since I investigate whether EM has taken place in the real world, laboratory-studies are not relevant.)

- Ask the preparer of the financial reports whether they have performed EM through survey studies (interviews, questionnaires etc.). Realism or truthfulness in the answers will be a serious validity problem. Admitting to having performed EM could cause legal or political problems for those involved (management, the board, audit committees, auditors etc.). Even with anonymous answers, truthfulness and bias would be serious problems.
- Field studies accessing internal firm data to find evidence of EM would be even more problematic. Access would be problematic, and would probably not give a random sample (external validity problem). The method ("needle in the haystack" type of work) requires large samples and is costly.
- There are also a few studies where the researchers have studied the specific cases where EM was discovered (by SEC or others). In Norway there are few such cases. External validity will be a problem.
- Hence most EM studies are based on empirical studies analyzing external financial reporting data (not by choice, but because it is the only way). The researcher will not seek verifications from the firms, but by statistical methods look for abnormal patterns in accounting methods or numbers contradicting the 0-hypothesis that there is *no* EM.

Naturally, it has been difficult to develop good research methods using only external data in order to detect earnings management: Earnings management in financial reporting is by definition done to avoid detection (or else the purpose of EM disappears). Moreover, empirical studies have shown that the EM phenomenon is very complex with many different motives and many different methods. It is difficult to distinguish EM from true errors or honest misjudgement or to distinguish EM from accounting differences caused by true underlying factors or events. Hence, developing good empirical test methods for EM are difficult (see Aaker 2004 for a good discussion).

This results in a high risk of type 1 and 2 errors:

- Type 1 errors: Hypothesis of EM is accepted (by rejecting the 0 hypothesis that there is no EM), but the real explanation is subjectively different (but not biased) opinions of best estimates or methods of accounting. Furthermore economic factors and random errors may not have been controlled.

- Type 2 errors: Hypothesis of EM is rejected (the 0 hypothesis of no EM is accepted), because the design or test has not been able to detect the existing EM.

Hence, there is growing literature that is sceptical to the empirical work "detecting" earnings management based on one-factor analysis/correlations, (e.g. Healy 1999 and McNichols 2000). There could be numerous uncontrolled explanatory factors destroying the validity.

In empirical work, 3 main methods have been used for empirically detecting earnings management (McNichols 2000) – trying to cope with the measurement problems mentioned above:

1. Choice of accounting principles and implementation of new rules¨
2. Frequency distribution models
3. Abnormal accruals models
    a. aggregate accrual models
    b. specific accrual models

6.6.1 Re. 1: Choice of accounting principles

Typically the firm has the choice of 2 or more alternatives with different earnings/balance sheet effects. If the effects are significantly different, measurable and there are a sufficient number of firms with different choices, the method is good for detecting earnings management. The statistical method used is discrete analysis, where one use probit or logit analysis (depending on whether unexplained variables are normally distributed or not) to look for relationships which are associated with EM.

Relevance my pension study:

My database show that almost all listed firms (not already using IAS 19/FAS 87) implemented NRS 6 in 1994 and IAS 19 in 2004. As discussed, almost all firms chose the accounting option to defer recognition of actuarial gains and losses. Hence, there is not sufficient variation in the database to get sufficient statistical power. Therefore no test was developed.

6.6.2 Re. 2: Frequency distribution models

This method was introduced by Burgstahler and Dichev (1997), and used by, for instance, Degeorge et al. (1999), Myers and Skinner (1999), Kinnunen and Koskela (2003). They all looked for unusual features of the frequency distribution of earnings around 0 profit, analyst expected earnings, last year's earnings or "round numbers". The power of this approach comes from the specificity of the prediction regarding which group of firms will manage earnings: It seems impossible that the behaviour of earnings could be explained by factors other than EM, when there are such large differences in the number of observations in the narrow intervals around the hypothesized earnings targets.

Of course, the method does not (try to) explain why there is EM, nor the level of EM. Moreover, the method ignores the possibility that actual actions are performed (pushing (true) sales the last days etc.) ensuring that profits/threshold levels//budgets are (just) made.

Relevance for my pension study

The method is relevant for pensions in general: E.g. one might test whether changes of pension assumptions that effect earnings/equity are abnormally frequent around specific target levels. However, I have relatively few observations (3-400 firm-years), and the frequency distribution model where expected variance is low/medium normally requires much larger quantities of data to obtain power, (The studies referred to above have several thousand observations and more).

6.6.3 Re. 3a: Aggregate accrual models

Accruals in an accrual model/accounting model are defined as measures of non-cash value flows (Penman 2003 p.122): that is recognition in earnings or in the balance sheet prior to or after the cash flows. Pension expense (and the corresponding pension liability) is an example of an expense incurred that will not be paid until later (Penman 2003 p. 123), and hence an accrual and is *measured* as a financial item or as present value of future cash flows.

The aggregate accrual method is to detect EM by identifying abnormal vs. normal or "expected" accruals. Healy (1985) is believed to be one of the first using the method. Sloan (with different co-authors) has used it frequently in recent years. The model has several challenges:

- One must empirically identify what are the "normal"/unbiased accruals
- One must identify which of the abnormal accruals are earnings management, and not caused by firm-specific or other actual events.

According to McNichols (2000), the (modified) model proposed by Jones (1991) is the most commonly used in academic research to cope with these problems. Two methods are used:

- *Time series analysis* (in periods where EM is expected not to occur systematically). Typically minimum 10 years of observations before the EM-test period is needed.
- *Cross-sectional analysis:* Abnormal accruals are tested on "similar" firms in the same period.

As Fields et al. (2001) state, the advantage with the method is that it should be expected that when management performs EM they do it simultaneously in different areas. Hence testing accruals in total takes this into consideration. However, testing aggregated accruals requires large datasets, and the method might detect EM, but with low statistical power (Fields et. al. 2001). Guay et al. (1996) have retested some of the research and even claim (although debated) that the aggregate accrual methods do not outperform even the random decomposition model.

Relevance for my pension study

- I only focus on pensions (one specific accrual); hence the total aggregate accrual model is not relevant for my study.

6.6.4 Re. 3b: Specific accrual models

In this model only specific accruals (e.g. level of bad debt only) are tested or specific characteristics of an accrual (e.g. depreciation rate of similar ships). As McNichols (2000) points out there are specific advantages with this method: The researcher may develop very precise hypotheses relating to EM for the accrual by exploring specific knowledge of the field. Also one can estimate the relation between the single accrual factor and explanatory factors directly, and since one is only testing for one specific accrual and the researcher might have specific insight into the area, the alternative explanations to test might be easier to detect and explore.

There are disadvantages as well:

- The accrual factor must be significant enough to give high level of effect.
- The method requires more insight/knowledge about the problems and difficulties/cost of getting the specific data.

- Management that *does* perform EM has a battery of tools at their disposal; why use just the chosen accrual? Hence the number of firms for which a specific accrual is managed may be small in relation to a total sample of EM firms. This also may limit the external validity of the findings.

Hence, reviewing many of the research papers using this method, I find weaknesses in some of the studies:

- *Measurement*: The models are normally used to try to distinguish between discretional accruals (supposedly suited for EM) which are tested for abnormality, and non-discretionary accruals. Accounts receivable are typically viewed as discretionary, depreciations on fixed assets non-discretionary. But in my experience many "non-discretional" items are discretional or judgemental: life of an asset, cost expensed vs. capitalized on a fixed asset etc. Not all "discretionary" variables are discretionary either; there will typically be an interval of e.g. a bad debt reserve that control groups or external users agree is reasonable - but accruals outside that interval are unacceptable. Only estimates inside the interval are truly at management's discretion. Hence the choice of measures and how they are measured is often a design problem.
- *Statistical problems*: Time series testing typically requires independent variables from year-to-year. But firm performance/earnings conditional on past performance do not follow a random walk. Moreover, earnings, cash flows or growth from poor performing or highly performing firms are (probably) mean reverting (e.g. see Dechow 1994, Penman 2001). Neither the modified Jones-model nor other frequently used models capture the serial correlation property. Time series testing typically requires at least 10 years of observations. This gives risk of survival-bias or sample bias. Kothari (2001) finds that only 19% of the original sample survived in the Teoh et al. (1998) study.
  Subramayan (1998) finds the cross-sectional method to be better than the time series-test. However, this requires that the firms are truly "similar": Often industry codes (SIC code or similar) are used – expected to reflect same underlying economic climate, type of earnings, accounting methods etc. underlying same "normal" accruals. But there might be large variations also within an industry, and the SIC code in fact includes many different types of firms. With very detailed SIC codes sample size might be a problem.
- *Control variables/other possible explanations than EM*
  In general, but especially with time-series tests of 10 years or more, controlling for other factors than EM is a test problem: E.g. Teoh et al. (1998) studied IPOs finding EM (increasing earnings or other financial performance indicators) in the years leading up to the IPO. But IPOs are typically discretionary decisions, and are often undertaken following excellent performance.
  Moreover, levels of accruals can be related to ordinary industry/business cycles: In bad times bad debt accruals normally would be higher than in good times (but this is not EM), and high growth firms will typically have higher levels of accruals (investing in fixed assets, inventory, acquisitions, intangibles etc.), than other firms (McNichols 2000) and this could revert when growth declines. Firm-specific events or external events also affect the true/unbiased accrual levels: new accounting rules, new products, changes in business structure or risk etc.

I have found few of the mentioned studies testing for the types of control variables described above, hence reducing the internal validity of the studies.

Relevance for my pension study

This is a well suited model for making good hypotheses with high possibilities for good empirical results testing the discretionary assumptions for pensions:

- Changes in assumption showing high influence on liabilities/earnings (see Chapter 3).
- Most firms have defined benefit plans, and calculate the PBO by the same method.
- I do have specific knowledge, and can obtain the data.
- Many of the assumptions in pension accounting are assumptions that should be fairly equal for all firms at a certain point of time (non-firm specific)(see Chapter 3). Hence cross-sectional analysis across industries may be performed. With few listed firms surviving over longer time periods in Norway from 1994 to 2004, and several law and accounting changes, time series tests are difficult to perform with statistical power.

Hence, performing a cross-sectional test for non-firm-dependent pension assumptions in the years where the full PBO effect is charged against equity (1994 and 2004) should be a good design for testing the hypotheses. However, testing with total pension-related accrual levels in nominal figures or ratios (e.g. pension liability in NOK or % of assets) will not be suitable for empirical analysis due to:

- Cross-sectional analysis: Many factors determining pension liabilities are truly firm-specific, making it almost impossible to detect a "normal" level, even when compared to other firms in the same industry: Pension level (% of salary at retirement), type and level of early retirement, how many of the employees are included in a defined benefit plan etc.
- Time series: Typically at least 10 successive years of data are required. In this period the accounting rules has been changed twice (1994, 2004), the pension law has been changed significantly (2001 with optional implementation dates for different elements), and many firms have chosen to alter their pension plans when they discovered the high cost of pensions. More important, the actual underlying factors determining liability and return have changed dramatically: the interest rates, G development a.s.o. Hence there are few constant parameters and such a study would be difficult to design.

Hence, it might be useful not to focus on absolute or relative size of the pension accrual, but rather to find common underlying factors determining the size of the accrual.

6.7 Specific design

6.7.1 Data

I will use the database I have constructed from financial reports including data for all listed firms in Norway for the years 1994 (when NRS 6 was implemented) and 2004 (when IAS 19 and IFRS were implemented) (see descriptive statistics in Chapter 5). I will also use the data from 2003 (where NRS 6 was still used, and there was no change in accounting rules) as a controlling year vs. 2004. The database includes earnings, total assets, equity numbers and recognised pension assets/liabilities for the firms, and the pension data reported in the notes. The data do not exist electronically in Norway; hence the database had to be constructed manually.

Pension liabilities must be significant in order to be EM effective. From the 111-165 firms, 35-50 firms per year had significant gross pension liabilities - defined as gross pension liabilities disclosed equal to or above 5% of the total book assets, (Tests with other levels will be done to test for sample bias).

6.7.2 Empirical test

I will perform a statistical correlation test with equity ratio as the independent variable, and the combined pension assumption factor (the PAF as explained in 3.2.8) as the dependent variable. This will be done for the year 1994, 2003 and 2004. All tests are cross-sectional. To test the EM hypothesis a t-test (kji-test) will be performed to test for significant relations between the equity ratio and pension assumptions, controlling for several other factors.

6.7.3 Measures

Independent variable:

As the measure for equity ratio, book equity/total book assets are chosen. Many US studies use equity/debt or interest bearing debt, but as shown in 6.5, book equity/total book assets is the most common equity ratio disclosed and the most common equity ratio covenant used in Norway.

Fields et al. (2001) criticise using low equity ratio as a proxy for debt covents, because it is a poor proxy for covenants (all types of/most frequent/specific covenant ratio) or focuses on only one of perhaps many motives for EM. But I do not use equity ratio as a proxy for (all types of) covenants, just state that most Norwegian banks seem to almost always include *a* low equity-ratio covenant, and I do not speculate on the managements motive for EM: I just test equity ratio vs. combined pension assumptions and *if* (not why there could be several motives) there seems to be an EM tendency.

Dependent variable: Combination of pension assumptions

As discussed in 3.2 only some of the pension assumptions are truly discretionary for management. Moreover, in order to perform cross-sectional analysis, ideally only assumptions that are non-firm specific should be chosen:

- *Discount factor* for pension liabilities should be identical for firms with the same pension payment periods. The average number of years until pension settlement could vary between firms, normally between 15-25 years (see Chapter 3). The discount factor might vary significantly for discounting a weighted average time series of 15 years vs. a weighted average time series of 25 years. However as 3.2.5 shows, the discount rate to be used for a 15-year average time series is only approx. 0.3 percent points lower than a 25-year average time series in 2004, due to the shape of the interest yield curve. The situation was similar in 1994. Hence in a cross-sectional analysis, all firms should use approximately the same discount rate.
- *Governmental pension increase* (G-factor). This is set by the parliament, and is clearly firm-independent. Hence unbiased G-rate expectation should be equal in a cross-sectional analysis, although there might be differences of opinions.
- Long-term *increase in salary-levels*. Firms individually negotiate and set their salary levels. However, the long-term increase should be expected to be more dependent on general market conditions and the average salary increase in Norway or in the industry, since firms compete for labour. Hence, at least within industries the long-term salary increase should be more or less equal in a cross-sectional analysis (see 6.3.2).

Some firms, referring to the Oslo Stock Exchange's statement for choice of pension assumptions and NRS 6, state that they don't adjust the assumptions, as long as the combined set of assumptions gives pension liabilities not deviating too much from the updated assumptions. Hence, I have to test combinations of assumptions. This is in line with arguments from other studies looking only at combined pension assumptions (e.g. McGill and Gribbs 1989, Winklevoss 1993, Asthana 1999). However, all these studies measure *differences* between the assumptions (discount factor minus salary increase). Unlike in the

US, the governmental pensions (the increase in G) influence the firms' pension payments in Norway. Hence there are 3 parameters involved.

Therefore I have constructed a NPV formula combining the management discretionary "non-firm-dependent" assumptions (the discount rate, the G factor and the expected salary increase) in a variable called the *PAF* (the combined Pension Assumption Factor) defining the pension liability (see 3.2.8):

PAF is the combined effect of the expected salary increase (s), the expected increase in G (g), discounted with the discount rate (r) to a present value for the average number of years (n) to pension settlement for the firm, and based on the portion(y) that the government will pay of the gross pension.

$$PAF = \frac{(1+s)^n - y(1+g)^n}{(1+r)^n}$$

As one can see from the formula, using different n's (e.g. 15 years vs. 20 years) and different y's will affect the PAF. These variables are firm-specific. Ideally I would like to calculate the PAF using the specific n and y per firm, but the n and y are not disclosed. Hence in order to perform calculations I have to make standardized assumptions. This creates a measurement error, but there are no reasons to believe that n and y are correlated with the equity ratio. When performing the test, I will perform sensitivity analysis (as control factors) when comparing the different firms.

According to the 3 actuarial firms, which did most NRS 6 calculations for listed firms today (Vital, Storebrand and NIP), the typical n and y for listed firms with significant defined benefit plans are:

- n = approx. 20 years (varying between 15-25 years)
- y is approximately 0.75 (Folketrygden pays 75% of the gross pensions) based on a typical pension plan of 65% of salary level (varying between 57-72% in their examples) and a typical average salary level in the pension plan of NOK 355 000 per year (varying approximately +/- 10%).

By using the firm-specific assumptions for salary increase, G factor and discount rate, and a n = 20 and a y = 0.75 for all firms, the PAF for each firm is calculated. The descriptive statistics for the PAF for 1994 and 2004 are shown in Exhibits 5.1/5.12 and 5.17/5.30 respectively.

The PAF only includes 3 of many variables defining the PBO. However, as discussed most other variables are not truly discretionarily set by management/not easy to manipulate. However, the turnover rate, use of early retirement and some other variables might also be discretionarily set by management and hence could also be used for EM. In general, one would expect that if s, g and r are used for EM, the other discretionary assumptions are managed to affect the PBO in the same direction. Then the effect in my test is underestimated only by including the PAF in the test.
There is at least no reason to believe that the PAF and the other assumptions are negatively correlated.

The equity ratio is based on the actual reported and recognised pension liability (potentially post-managed EM), hence each firms' chosen pension assumptions. The PAF also, of course, includes pension assumptions. Hence the PAF is not a truly independent variable. However the alternative, if EM for pension assumptions was expected, is to adjust all recognised pension liabilities by "normalising" the PAF (use the average of all firms or a PAF based on average, unbiased assumptions). However, *if* there is EM, such an adjustment of the pension liability, and hence the equity, would *reduce* the reported solvency for the low-solvency firms (down to the "true" level, since the EM is done in order to improve the reported equity ratio) and increase the reported solvency for the high solvency. This would strengthen the statistical power and results in the test. The relationship between the firm's equity ratio (ER) and the PAF used to calculate the PBO will be tested in a regression model: $PAF = c+bER_i+e_i$ (see 6.8.1)

Control variables

There are several control variables that might influence the results, and could give other explanations than that EM has taken place[*]. This will be tested in a multiple regression model (see 6.8.1):

[*] As explained I am not looking for explanations/motives for *why* EM has taken place – only whether EM is taking place or not. Hence I do not have to control for events such as change of CEO, IPOs etc, or for firm size, analyst following etc. for the firms with abnormal assumption factors vs. high/low solvency.

PAFi=c+bERi+dCONTROLVARIABLE 1i,j+fCONTROLVARIABLE 2i,k+…+e_i

- *Firm differences in average number of years to pension settlement (expected sign?)* .
  Differences in number of years to pension settlement affect the n, and marginally the weighted calculations r, g, and s. This is a measurement error in PAF, but might be biased: e.g. firms in emerging industries/start-ups on average have younger people and perhaps lower equity ratio than mature industries and firms.
- *Large differences between firms in salary levels and large differences in firm-specific pension plan levels (% of salary paid in pensions) (expected sign +).*
  This could alter y, and should be tested. This is a measurement error in PAF but might be biased: Firms with low equity ratios might have lower salary levels/pension plans (can not afford high salary levels/pension plans) than similar firms with high equity ratios.
- *Firm-specific or industry reasons for different (long-term) salary increase(expected sign?):*
  Norwegian firms with low equity ratios due to poor profitability for all Norwegian firms in the same industry due to tough non-Norwegian low cost competition might expect unbiased lower salary increases than other firms.

If EM tendencies are revealed, the explanation might not be that the *management* has influenced or managed the pension assumptions, but other groups:

- *Audit firm (expected sign +)*
  Pensions calculations/assumptions are overlooked by audit firms, and each audit firm (in my experience) tends to have an internal view of assumptions and acceptable deviations from this, that might influence the firm's choices. The auditor, as an accounting expert, might also understand the implications and discretionary assumption span better than the management, and hence could "consult" the management with high or low equity ratio in choice of assumptions.
- *Actuarial (expected sign+)*
  As are auditors, actuaries are the experts on pension (accounting) and could guide or influence management's decisions.
- *Ownership (expected sign?)*
  If one owner owns or has significant influence in several of the listed firms, he might use his influence as a board member in different firms etc. to decide the same set of assumptions or to dictate the assumptions for a high or a low equity ratio firm (but the owner might influence a higher or lower the PAF depending on his motives).

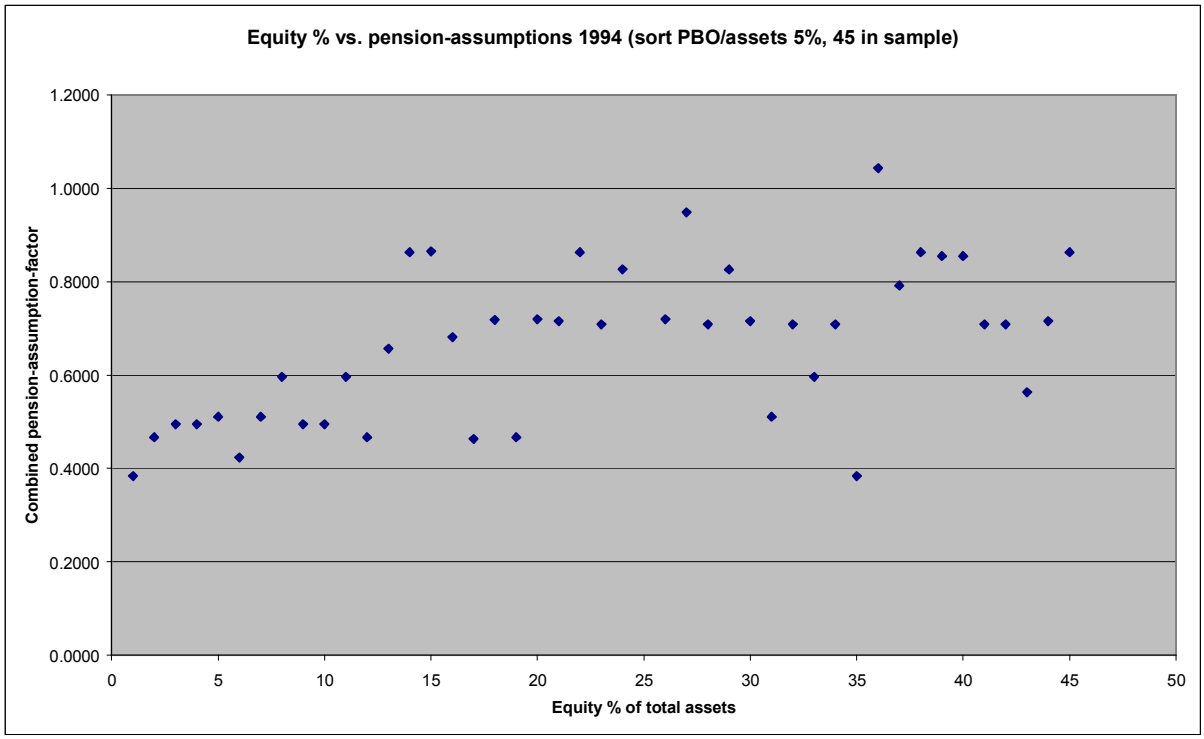
Exhibit 6.2

Estimation of linear relation between the equity ratio (ER) and PAF ($PAF = c+bER_i+e_i$ **)**

1994 (Sample PBO/assets larger or equal to 5%, sample 44 firms)

Variable	F Value	Adj R-sq	Parameter estimate	Standard error	t Value	Pr > |t|
Intercept			0.48183	0.06659	7.24	<.0001
EQUITYRATIO (in decimals)	10.47	0.1772	0.52053	0.16084	3.24	0.0233

Exhibit 6.3



Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G-increase) disclosed in the notes of the financial report used to calculate the PBO. Shown for all firms who had defined benefit plans and who were listed in Norway the whole of 1994 and issued financial reports while listed and had reported pension liabilities in the notes (PBO and other) above or equal to 5% of total book value of assets as reported at year-end. 44 firms in sample. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that government pensions pay 75% of gross defined pensions (y=0.75). PAF= $\frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$

Equity%= Book value of equity in % of total assets as reported at year-end.

6.8 Empirical results

6.8.1 1994

The 0 hypotheses are tested with data from the 44 firms with PBO/assets larger or equal to 5%*. A regression model is estimated with equity ratio (ER) as the independent variable and the combined pension assumption factor (PAF) as the dependent variable. The regression is:

$PAF_i = c+bER_i+e_i$

where c is a constant (the intercept), b is the slope-parameter for ER_i (the gradient of the straight line fitted to the data), and e_i is the error term (the difference between the score predicted by the line for the subject *i* and the score that subject *i* actually obtains). The results are shown in the Exhibit 6.2. The intercept c is 0.48, and the slope of b is positive 0.52, indicating a positive correlation between the equity-ratio and the combined pension assumption factor: A higher equity ratio correlates with an increase in the combined pension assumption factor resulting in higher PBOs (all else equal) – as my hypothesis stated.

More important; the results are significant at the 5% level (two-sided - with my hypothesis a one-sided test would be sufficient. This would reduce the significance level to 2.5%) with a t value of 3.24. This is quite an impressive significance level with only 44 data in the sample. The trend can also be observed by looking at the chart of the observations (Exhibit 6.3). The adjusted R-square is 18%, which indicates that the equity ratio explains a material part of the pension assumption factor.

Testing for other cut-off samples with higher levels of PBO/asset-ratio (10%) (not shown here) is also significant at the 5% level.

By visual observation of the exhibit (Exhibit 6.3), the homoscedasticity assumption in an OLS regression model (a constant variance for the error term for each x (here: equity ratio)) might not be fulfilled. There is a tendency for higher variance of the error term with higher equity ratios. This could have sound explanations as discussed in 6.5 when the hypothesis was split

* There are no financial institutions in the sample (who often have low equity-ratios), because these firms have PBOs lower than 5 %.

between low and high equity ratio firms: Management in firms with low equity ratio will have strong motives to choose assumptions reducing the PAF (and hence the pension liability). Management in firms with higher equity ratios would not have such strong motives and EM would be based on longer term effects, possibilities of improved earnings the following years, but with immediate negative equity ratio effect. Hence I have tested the data in a regression that tests the two parts of the hypothesis by introducing a dummy variable I:

$PAF_i = Ic+b_1ER_i+b_2I\ ER_i+e_i$

Where

I = 1 if ER is equal to or less than 0.25

I = 0 if ER is greater than 0.25

The regression combines testing for "low equity ratio" (defined as ER equal or less than 0.25, i.e. equity ratio equal or less than 25 %) and "high equity ratio" (defined as ER greater than 0.25, i.e. equity ratio above 25%). The cut-off is just above the normal equity ratio covenant of 20% and above the perceived low equity ratio level (see 6.5) In addition by visual observation one could find a shift in pattern of the data around this level.

The regression result was:

$$PAF = 0.68177 + 0.08252\ ER - 0.27004\ I^{**} + 1.41382\ I\ ER^{**}$$

That is, the intercept for high equity ratio firms is a PAF of 0.68 with an almost horizontal slope of b1 and more important, not significant, even at the 10% level. Hence the 0 hypothesis Part 2 is not rejected: There is no evidence that there is a relation between the equity ratio and the PAF for firms with high equity ratio. For low equity ratio firms the intercept is lower, (0.68177 – 0.27004 =) 0.41173 and with a much steeper slope (0.08252 + 1.41382 =) 1.49634, indicating a strong relationship between a decrease in the equity ratio and a decrease in the PAF. The result is significant at the 5% level (two-sided) (t value of 3.42 and significance of 0.0221). Hence if there are no other factors that could explain the results, the 0 – hypothesis Part 1, that there is no relation between the equity ratio and the PAF, is rejected for low equity ratio firms.

** Significant at the 5 % level, two-sided.

Exhibit 6.5 A

PAF-sensitivity to changes in n and y

y= 75%	Discount rate			
Salary increase = 3.5%, G=3.0%)	4.5%	5.0%	5.5%	6.0%
n=12	1.04	0.98	0.93	0.88
n=15	1.05	0.98	0.91	0.85
n=17	1.05	0.94	0.89	0.82
n=20	1.05	0.97	0.89	0.82
n=25	1.06	0.94	0.83	0.74
y= 65%				
n=12	1.38	1.30	1.23	1.16
n=15	1.37	1.28	1.19	1.11
n=17	1.36	1.26	1.16	1.07
n=20	1.35	1.23	1.12	1.02
n=25	1.33	1.18	1.05	0.93
y=85%				
n=12	0.71	0.67	0.63	0.59
n=15	0.73	0.68	0.63	0.59
n=17	0.74	0.68	0.63	0.58
n=20	0.75	0.69	0.62	0.57
n=25	0.78	0.69	0.61	0.54
S=4.1%, G= 3.6%, y=75%	4.2%			
n=12	1.12			
n=15	1.16			
n=17	1.21			
n=20	1.25			
n=25	1.30			

*PAF (Combined pension assumption factor) calculated using the assumptions (r=discount factor, s=expected salary increase, g=expected G-increase) used to calculate the PBO. $PAF = \frac{4((1+s)n - y(1+g)^n)}{(1+r)^n}$

Exhibit 6.4

Estimation of linear relation between the equity ratio (ER) and PAF ($PAF = c+bER_i+e_i$ **)**

1994 (Sample: PBO/equity larger or equal to 15%, sample 42)

Variable	F Value	Adj. R-Sq	Parameter estimate	Standard error	t Value	Pr > |t|
Intercept			0.41403	0.06135	6.75	<.0001
EQUITYRATIO in decimals	22.32	0.3421	0.76426	0.16175	4.75	<.0001

Exhibit 6.5 B

y sensitivity for different pension plan levels and ages

			FT pays in NOK:		FT pays in % of gross pension level		
Salary-level	Pension level (65%)	age 55 years	age 45 years	age 35 years	age 55 years	age 45 years	age 35 years
400000	260000	185000	179000	178000	71 %	69 %	68 %
350000	227000	170000	168000	167000	75 %	74 %	75 %
300000	195000	149000	147000	146000	77 %	76 %	76 %
250000	163000	127000	126000	125000	78 %	77 %	77 %
	Pension-level (60%)						
400000	240000	as above			77 %	75 %	75 %
350000	210000				80 %	80 %	79 %
300000	180000				83 %	82 %	80 %
250000	150000				91 %	84 %	82 %

Control testing for other factors

As discussed in 6.7.3., there may be other explanations for the relationship between equity ratio and PAF than earnings management. These will be discussed in turn:

- *Firm differences in average number of years to pension settlement (n) and ratio of gross pensions paid by Folketrygden (y):* Exhibit 6.5 A shows PAF sensitivity for different n and y. As the exhibit shows, the PAF is little sensitive for changes in n around the normal (according to the actuaries) variations in n: 15-25 years for different discount rates, e.g. PAF varies from 0.98 – 0.94 with n = 15 or 25, given a discount rate of 5.0%, and a y = 0.75. Hence, the measurement error for n should not be significant in the normal cases. The PAF is more sensitive to changes in y (Exhibit 6.5 A); the ratio of gross pensions paid by the government. This factor depends on the average salary level, age and the pension plan level (70% of salary vs. 60% etc) (Exhibit 6.5 B). Financial reports do not disclose (average) salary levels for members of the pension plans, and the salary level for members only can not be calculated only from public data. Pension plan levels are not disclosed.
  Different combinations of n and y cause large differences in PAF, e.g. from 1.16 (n=12, and y=0.65) vs. 0.54 (n=25 and y=0.85). This is a measurement error, and the essential question is whether the measures are biased. I have gained access from the actuaries to the specific pension plans/salary levels of 5 of the 44 firms from 1994. The 5 firms are nr. 5, 13 17, 28 and 39 ranked declining according to PAF (hence a good spread), and their y is approximately 76%, 73%, 75%, 72%, 77% (respectively), and average age varying from 43 years to 47 years, indicating low variability and correlation with PAF. The subsample is too small to conclude, but shows no sign of biasness. In addition, by inspecting the type of firms, age of the firm, industry of the firm etc. there seems to be no systematic pattern for low PAF firms vs. high PAF firms in relation to expected average age or salary levels of the firms.
- *Firm/industry specific reasons for variances in expected salary increase:*
  As shown in Exhibit 5.9, the expected salary increase has high variance among the firms. There could be sound industry specific explanations for this. Reviewing the industries of the firms, however, there seems to be no bias in the type of industry vs. the PAF-ranking. The firms with PAF lower than 0.5 and salary increase expectations lower than 2.5% combined (6 firms) represent the following (main) industries: mining, IT consulting, transportation, telecom, airline, and shipping. The firms with PAF above 0.8 and s equal to or above 4 % combined (6 firms) represent the following (main) industries: newspaper, publisher, conglomerate, shipbuilding, chemicals, forest/pulp and paper, and IT consulting. The equity ratio itself could be argued to influence the future salary increase; a firm with low solvency cannot "afford" to give high salary increases, and the employees accept this if the alternative is bankruptcy and loss of employment. For a firm with high bankruptcy risk, this in my opinion may be true in the short-term. However, none of firms with the 10 lowest PAFs had ongoing concern problems as reported by the auditor.
  Barth and Schøne (2005) find some relationship between firm profitability and salary increase in Norway. Testing for this relationship, I find very low correlation between net profit margin (net profit/turnover) and PAF (correlation 12%, not significant at the 10% level); hence this does not explain PAF. It is difficult outside the immediate bankruptcy risk situation to argue that a general salary equity ratio relation exists.

Exhibit 6.6 A

Pearson Correlation Coefficients between equity ratio, audit firm, actuarial and PAF, 1994, N=44

	PAF	EQ.Ratio	AA	CL	EY	KPMG	D&T	PW	OTHAUD	STOREB	AKTUAR	VITAL
PAF		0,51230**	0,18523	-0,15222	-0,20128	0,12062	0,09532	0.0,11853	0.11203	-0.14220	-0.06620	-.099253
EQ.Ratio	0.45034**		0.26331	-0.23500	-0.25633	0.18223	-0.15224	-0.19552	0.35221*	0.03620	-0.10201	0.08523
AA	0.12567	0.22765		-0.29336	-0.33250	-0.36999	-0.45222	-0.25610	-0.26315	-0.12304	0.18201	-0.0631
CL	-0.12149	-0.32185	-0.17150		-0.15633	-0.17522	-0.23522	-.0.01963	-0.23555	-0.09223	0.01222	0.45620**
EY	-0.29685	-0.32320*	-0.21550	-0.12566		-.20301	-0.26333	- 0.13633	-0.0.1999	-0.19666	0.39555**	-0.20135
KPMG	0.06838	0.13411	-0.21550	-0.12566	-0.15789		-0.18999	-0.12230	-0.19600	0.25633	0.01866	0.18524
D&T	0.01289	-0.08271	-0.21550	-0.12566	-0.15789	-0.15789		-0.18222	-0.28555	-0.0233	0.18222	0.16321
PW	0.05683	-0.16391	-0.11835	-0.06901	-0.08671	-0.08671	-0.08671		-0.0.3922*	0.26122	0.012121	0.25333*
OTHAUD	0.08010	0.23701	-0.21550	-0.12566	-0.15789	-0.15789	-0.15789	-0,26548		-0.12333	0.11111	0.13666
STOREB	-0.08770	-0.02601	0.00540	-0.03150	-0.11217	0.17815	-0.11217	0,21820	-0,00752		-0.30200*	-0.30222
AKTUAR	-0.05819	-0.03906	0.02557	-0.14907	0.32781*	-0.01561	-0.18732	0,05328	0,093721	-0,24441		-0.15555
VITAL	-0.03901	0.03785	-0.03529	0.39445*	-0.21550	-0.05747	0.10057	0,22052	0,25100	-0,18533	-0,16320	
OTRACT	0.17272	0.02427	0.00540	-0.20478	0.03299	-0.11217	0.17815	0,11220	0,05622	-0,16230	-0,11120	-,099800

Lower left: Pearson Correlation coefficients. Upper right: Spearman rank order correlation (PAF and Equity-ratio 1-44 scale, other 0 and 1 scale). ***,**,* represent significance at the 1%, 5% and 10% levels respectively, two-tailed. PAF is a combined pension assumption factor, equity ratio is book values of equity vs. total assets, AA (Arthur Andersen), CL (Coopers and Lybrand), EY (Ernst & Young),KPMG, D&T (Deloitte & Touche), PW (Price Waterhouse) and OTAUD (all other audit firms) are audit firms with dummy variables of 0 or 1 (=used by the firm, and only one audit firm is associated with a firm at a time), and Storeb(rand Aktuartjenester), Aktuar (Consult), Vital (Pecon) and Othact (=Other actuaries) are different actuaries-advisors with dummy variables of 0 or 1 (=used by the firm, and only one actuaries is associated with a firm at a time).

Exhibit 6.6 B

Regression result for the relation between equity ratio, audit firm, actuarial and PAF. 1994, N=44 firms*

Variable	Estimate	t Value	Pr > |t|
EQUITYRATIO	0.54489	2.45	0.0199
AA	0.02437	0.29	0.7751
CL	0.06679	0.50	0.6216
EY	-0.07002	-0.62	0.5422
KPMG	0.03331	0.34	0.7381
DELOITTE	0.02832	0.28	0.7828
PW	0.14909	0.94	0.3522
STOREB	-0.09325	-1.21	0.2358
AKTUAR	-0.06319	-0.69	0.4955
VITAL	-0.09776	-1.12	0.2703
F value	1.31		
Adj. R-sq	0.0663		

* For variable explanation; see * in exhibit 6.6 A

- *Audit firm and actuarial:*
  I am testing earnings management performed by management. However, the PAF/equity ratio relationship could be caused by influence from audit firms or actuaries, parties close to the production of financial reports with competence to understand the effects of altering pension assumptions. Whether there is a relationship between the PAF and a specific audit firm or actuarial is tested in a multiple regression:

  PAFi=c+bERi+dAUDITFIRMi,j+fACTUARIANi,k+ei

  where AUDITFIRM represents a dummy variable for audit firm j (0 = do not audit the specific firm or 1 = audit the specific firm) for each of the 6 audit firms (Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, Price Waterhouse and Other for other audit firms).
  Similarly ACTUARIAN represents a dummy variable for actuarial firm k (0 = have not calculated NRS 6 for the specific firm or 1 = have calculated NRS 6 for the specific firm) for each of the actuarial firms (Storebrand, Aktuarconsult, Vital or Other (including actuarial not known)).
  In the regression one audit firm (Other) and one actuarial (Other) is taken out, since the sum of dummy variables for AUDITFIRM and ACTUARIAN respectively always is 1 for a firm i.
  Descriptive statistics are shown in exhibit 6.6 A. The explained variance R^2 adjusted is only 7% (exhibit 6.6 B). This indicates that adding auditors and actuaries do not add explanatory power. Equity ratio still shows a significant relationship with PAF (2% level).

- *One significant owner deciding pension assumptions for several firms*
  Out of the 44 firms there are only 2 owners controlling more than 20% of several listed firm*. There seem to be no systematic pattern. Two subsidiaries of 2 different firm in the sample has a PAF equal to the mother company, indicating that they have been told which pension assumptions to use or have cooperated with the mother company. However, this should not influence the overall results.

Conclusion:

Hence my hypothesis Part 1 is rejected in favour of the alternative hypothesis: There is a significant positive relation between the equity ratio and the PAF for firms with low equity ratio, indicating earnings management in order to reduce the pension liability the year (1994) pension liabilities had to be recognised in the balance sheet.

* In the US literature, significant ownership is often defined as above 5% ownership from one owner. It is difficult to imagine that one 5% owner might influence the financial report or accounts of a firm. In Norway and in the accounting standards above 20% by an owner often is used as a guideline to define an influential owner. Hence I used this level.

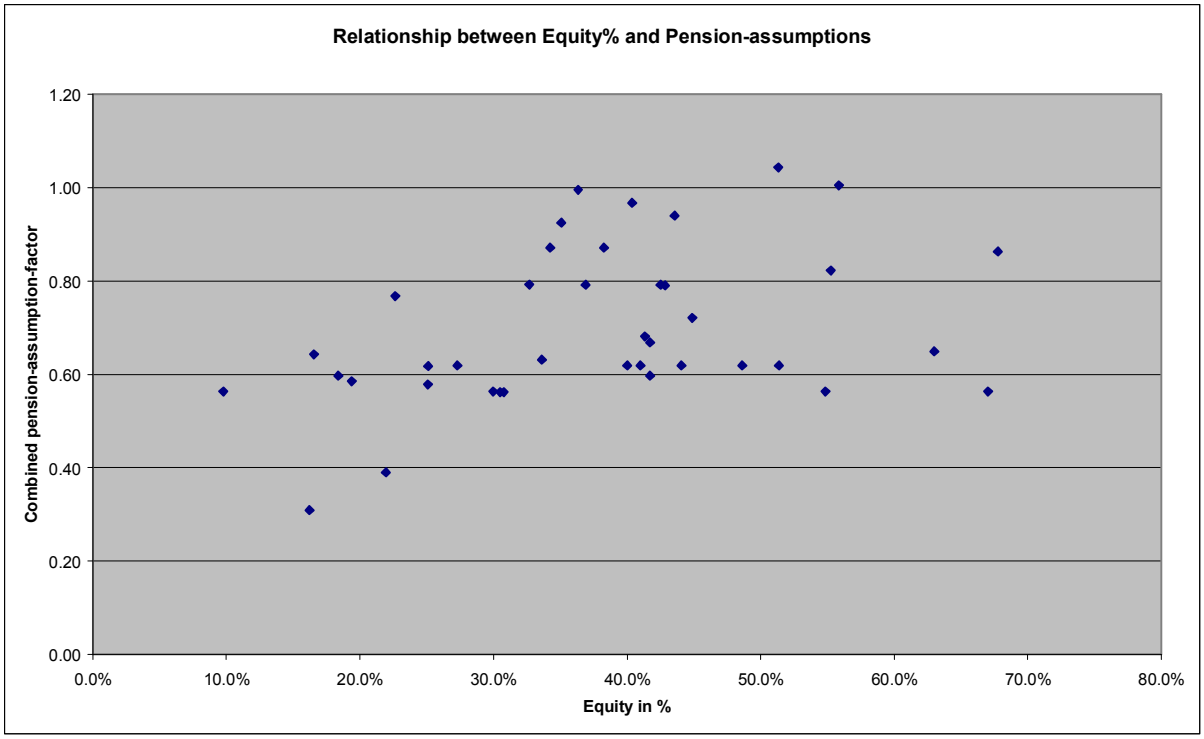
Exhibit 6.7

Equity ratio (indep. variable) vs. combined pension assumption factor (dep. variable)

2004 (Sample PBO/assets larger or equal to 5%, sample 49 firms)

Variable	F Value	Adj. R-Sq	Parameter estimate	Standard error	t Value	Pr > |t|
Intercept			0.57583	0.06001	9.60	<.0001
EQUITYRATIO	5.58	0.0855	0.34320	0.14524	2.36	0.02222

Exhibit 6.8



Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G-increase) disclosed in the notes of the financial report used to calculate the PBO. Shown for all firms who had defined benefit plans and who where listed in Norway the whole of 1994 and issued financial report while listed and had reported pension liabilities in the notes (PBO and other) above or equal to 5% of total book value of assets as reported at year end. 45 firms in sample Assumed weighted average time to pension settlement 20 years (n=20) and assumed that governmental pensions pays 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)^n - y(1+g)^n)}{(1+r)^n}$

Equity%= Book value of equity in % of total assets as reported at year end.

6.8.2 2004

The statistical analysis of the 49 firms with PBO/assets larger or equal to 5% is tested in the same regression model as the 1994 data.

The results are shown in Exhibit 6.7.

The intercept c is 0.57, and the slope of b is positive 0.34, indicating a positive correlation between the equity ratio and the combined pension assumption factor: A higher equity ratio correlates with an increase in the combined pension assumption factor resulting in higher PBOs (all else being equal) – as my alternative hypothesis stated. The adjusted R-square is 9%, which indicates that the equity ratio explains a significant part of the pension assumption factor.

More importantly, the results are significant at the 5% level (2.2%) two-sided (the 0-hypothesis is that of no EM) (with my hypothesis a one-sided test would be sufficient reducing the significance level to 2.5%) with a t-value of 2.36. This is a quite impressive significance level with only 49 observations in the sample. The trend can also be observed by looking at the chart of the observations (Exhibit 6.8). By visual observation of the chart, the homoscedasticity assumption (a constant variance for the error term for each x (here: equity-ratio) in a regression seem to be fulfilled over the whole scale. This is confirmed by performing a test equal to the test on the 1994 data, testing Part one and Part two of the hypothesis in a combined regression introducing a dummy variable; the slope is almost identical and both parts are significant (at the 10% level).

Testing the hypothesis with a sample of firms with PBOs larger than 15% of equity yields similar results (Exhibit 6.9) (T-value of 2.39. 44 firms in the sample. Slope coefficient 0.39).

Exhibit 6.9

Firms with PBO/equity larger or equal to 15%. 44 firms in the sample.

Variable	F Value	Adj. R-Sq	Parameter estimate	Standard error	t Value	Pr > |t|
Intercept			0.57475	0.06233	9.22	<.0001
EQUITYRATIO	5.70	0.0964	0.39139	0.16399	2.39	0.0215

Exhibit 6.10 A

Pearson Correlation Coefficients between equity ratio, audit firms, actuarial and PAF, 2004; N=49

Lower left: Pearson Correlation coefficients. Upper right: Spearman rank order correlation (PAF and Equity-ratio 1-49 scale, other 0 and 1 scale). ***,**,* represents significance at the 1%, 5% and 10% levels respectively, two-tailed. PWC= Price Waterhouse Coopers) is an audit firm, Gabler (Consulting) and NIP (=Norwegian Insurance Partners) are actuaries. See Exhibit 6.6A for further comments.

Exhibit 6.10 B

Regression result for the relation between equity ratio, audit firm, actuarial and PA; n=49

Variable	Estimate	t Value	Pr > |t|
EQUITYRATIO	0.38306	2.27	0.0288
EY	-0.02724	-0.40	0.6943
KPMG	0.00914	0.09	0.9277
PWC	-0.03870	-0.55	0.5884
GABLER	-0.01721	-0.23	0.8165
NIP	-0.01704	-0.09	0.9259
STOREB	-0.00583	-0.08	0.9393
VITAL	0.00349	0.05	0.9620
F value	0.83		
Adj R-Square	-0.0286		

Control testing for other factors

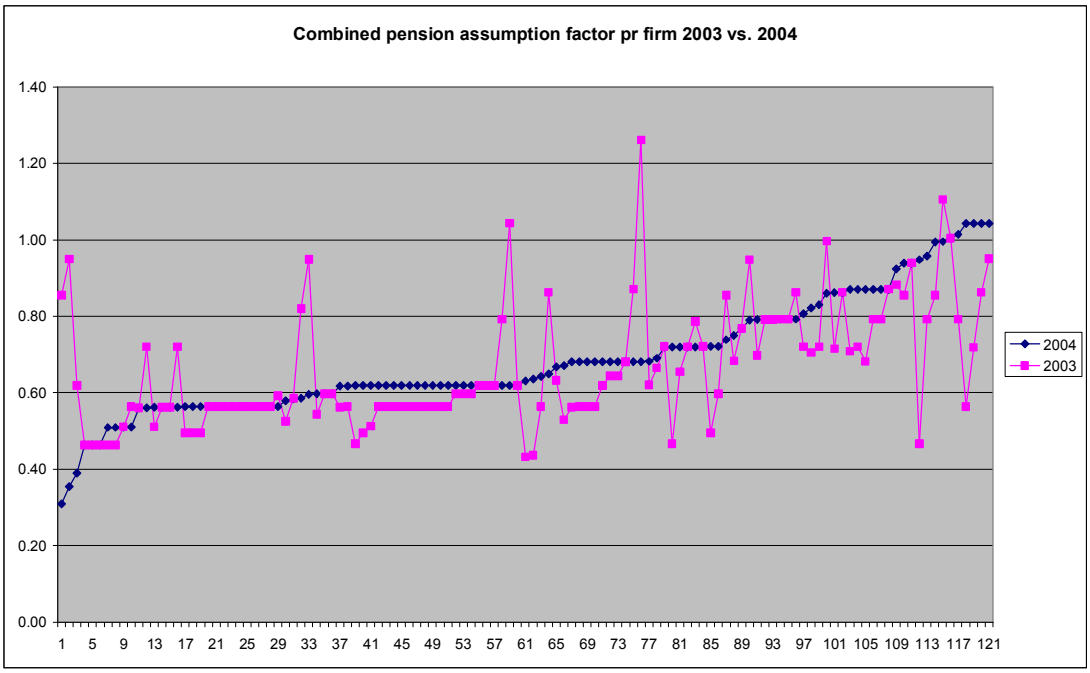
As discussed in 6.3.3. there may be other explanations for the relationship between equity ratio and PAF than earnings management. These will be discussed in turn replicating the tests done on 1994 data, and for further explanations and discussions see 1994 discussions:

- *Firm differences in average number of years to pension settlement (n) and ratio of gross pensions paid by Folketrygden (y):*
  I have also gained access to the specific pension plans/salary levels of 9 of the 49 firms from 2004. The 9 firms are nr. 2, 4, 8, 14, 15, 23, 28, 36 ranked descending (hence a good spread), and their y's are approximately 75%, 69%, 75%, 76%, 79%, 76%, 71%, 72%, 75% (respectively), indicating low variability and relationship with PAF. The sample is too small to conclude.
- *Firm-/industry specific reasons for different expected salary increase:*
  Reviewing the firms in the sample, there seem to be no pattern for firms in the same industries and the PAF: The firms with the 6 lowest PAFs and lowest s combined represent the following (main) industries: IT-consulting, airline, electronic manufacturing, automotive manufacturing, shipping, electrical power utility. The firms with the 6 highest PAFs and s combined represent the following (main) industries: newspaper, telecommunication, manufacture, energy-transportation, shipping, industrial manufacture, shipping.
  Barth and Schøne (2005) find some relationship between firm-profitability and salary increase in Norway. Testing for this relationship also on 2004 data, I find very low correlation between net profit margin (net profit/turnover) and PAF (correlation 16%, not significant at the 10% level); hence this does not explain PAF.
- *Audit firm and actuarial:*
  This is tested in a multiple regression:

  $$PAF_i = c + bER_i + dAUDITFIRM_{i,j} + fACTUARIAN_{i,k} + e_i$$

  explained in 6.8.1, where AUDITFIRM represents a dummy variable for audit firm j (0 = do not audit the specific firm or 1=audit the specific firm) for each of the 4 audit firms (Deloitte, Ernst & Young, KPMG, PWC).
  Similarly ACTUARIAN represents a dummy variable for actuary firm k (0= have not calculated NRS 6 for the specific firm or 1=have calculated NRS 6 for the specific firm) for each of the 5 actuarial firms (Gabler, NIP, Storebrand, Vital or Other (including actuary not known)).
  The explained variance R^2 adjusted is -3% (Exhibit 6.10 B). This indicates that adding auditors and actuaries does not add explanatory power. Equity ratio still shows a significant relationship with PAF (at the 3% level).
- *One significant owner deciding pension assumptions for several firms*
  Out of the 44 firms there are few such relationships. Only the government is a owner controlling more than 20% of several (4) listed firms in the sample, two of them with the same PAF. However, this should not influence the overall results.

Exhibit 6.11



*Calculated PAF based on the pension assumption used to calculate the PBO in 2003 and 2004 comparing PAF in 2003 and 2004 for the same firm. Ranked in order of PAF in 2004. Includes all firms with defined benefit plans (121) who where listed in the whole of 2003 and 2004 and issued financial reports while listed. PAF (combined pension assumption factor) is calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G-increase) disclosed in the notes of the financial report. Assumed weighted average time to pension settlement 20 years (n=20) and assumed that governmental pensions pays 75% of gross defined pensions (y=75%). PAF= $\frac{4((1+s)n - y(1+g)n)}{(1+r)n}$

Exhibit 6.12

Accumulated actuarial gains and losses as disclosed in the notes in the 2004 financial reports. Includes all firms with defined benefit plans (121) who where listed in the whole of 2003 and 2004 and issued financial reports while listed. Rank ascending as % of the disclosed PBO per firm.

I have also tested the earnings management hypothesis on the 2003 data, Exhibit 6.13 (52 firms with PBO higher than 5% of total assets). Interestingly, the results are *not significant* (not even at the 10% level); t-value is only 0.60. From the descriptive data, I have compared the changes in the combined pension assumption factors for the same firms from 2003 to 2004. There are many firms with significant changes in combined factors (Exhibit 6.11)[*].

The fact that there is a significant indication of EM in the year where the chosen assumptions directly affect the equity ratio (2004), but no significant indication of EM in 2003 where the changes in PAF may not affect book equity ratio, *combined* with significant changes in assumptions for many of the firms from 2003 to 2004, in my opinion strengthens the indications of EM. Moreover, the accumulated actuarial gains and losses for all listed firms in Norway with defined benefit plans show a systematic optimism; the discretionary assumptions have underestimated net pension liabilities compared to the actual development in 114 of the 121 firms with defined benefit plans (Exhibit 6.12). For 25% of the firms the negative deviation is significant; the accumulated effect is more than 20% of the PBO as of December 31, 2004. This in general could be an indication of earnings management when choosing the pension assumption factors, but could also be a consequence of lower than expected level of real interest rates.[†]

Exhibit 6.13

2003 observations: Firms with PBO/assets higher or equal to 5%. 52 firms in the sample.

Variable	F Value	Adj. R-Sq	Parameter estimate	Standard error	t Value	Pr > |t|
Intercept			0.67118	0.06175	10.87	<.0001
EQUITYRATIO	0.36	-0.0126	0.08391	0.14075	0.60	0.5537

[*] Testing for all firms who changed assumptions from 2003 to 2004, and testing for the changed affect on the PAFs and how they related to each firms' equity ratio did not show significant relations. The explanation may be the inclusion of many firms with insignificant PBOs, where a change only affects the equity ratio marginally, hence gives little incentive for EM.

[†] The actuaries I talked to said that, and this is in accordance with my own experience, many firms asked for several alternative calculations of the PBO with different assumptions. This also is a clear indication of earnings management. Referring to the previous exhibit 5.39, the fact that the difference between the average discount-rate used and the risk-free rate has increased from only 0.12%-points in 2002 to 1.4%-points in 2004 with no changes in accounting rules, could also be an EM indication.

Conclusion:

Hence my 0 hypothesis is rejected in favour of the alternative hypothesis: There is significant positive relation between the firm's equity ratio and its PAF, indicating earnings management in order to reduce the pension liability when it was recognised in the balance sheet in 2004.

Overall conclusion regarding earnings management indications for PAF vs. equity ratio:

For the 2 years where the full effect of the unrecognised net pension liabilities (in most cases) were charged directly to equity, 1994 and 2004, there are strong indications that firms with lower equity ratios chose a combination of pension assumptions resulting in lower pension liabilities (all else being equal) than firms with higher equity ratios. Hence there are strong indications of earnings management in the pension accounting area for listed firms in Norway, and the effect could significantly affect the reported book equity and operating profit.

7. Field-study of financial analysts´ valuation of pension obligations

In this chapter the field study of financial analysts' is reviewed. The overall goal of the study is to test how market participants use and evaluate public information in financial reports. Using the empirical data from Chapter 5, the firms with significant pension obligations and low PAFs are chosen and tested on financial analysts. In the field study, including interviews and inspection of the valuation spreadsheets, the treatment of the reported pension obligations in the analysts' valuation models of the selected firms are documented. The findings are discussed by looking at valuation methods used, methodological errors and finally and most importantly, whether the analysts had discovered and/or adjusted for abnormal pension assumptions when performing valuations. Finally, possible explanations for the findings are discussed.

7.1 Methodology, methods and specific design

This part presents the methodology and methods chosen. Then I discuss the specific research design, the empirical setting, data collection procedure and measurement of the variables.

7.1.1 Methodology

Methodology is the study of different sets of methods that can be used for scientific research. It may be viewed as different sets of measurement systems linking theory and data/observation (Ryan, Scapens and Theobald 2002).

First, the overall choice of methodology will be discussed before detailed methods and design will be addressed for each part of the sub-studies.

According to Ryan, Scapens and Theobald (2002), the dominant methodology of the financial discipline today is empiricist in nature, and accepts the distinction between theoretical and empirical domains of discovery. The theories can be viewed more as (different) models or abstractions of reality.

Testing of the theories/models according to this dominant methodology must be based on the scope of the models, and as rejections of hypothesis (deductive). Alternatively, from observation or falsifying of existing models, new models or theories can be developed (inductive). The researcher's role is to do this in an objective way. Testability is the key when constructing the methods. After Friedman (1953) introduced positivism based on many of the principles stated above, this has been the dominant methodology in economics.

In this study the positivistic approach will be used, but with some exceptions that will be discussed. A *combination* of the two methods (deductive and inductive), called *retroductive reasoning* (Laudan 1981) will be applied. Laudan places retroductive reasoning between the contexts of discovering, which he describes as inductive, and the deductive context of justification. Retroductive reasoning rests in the presumption that hypotheses are developed rather than intended. When a hypothesis is formulated, the subsequent tests are often simple to perform, and often require only few or simple observations of facts (Hanson 1958).

The retroductive inference has this logical form:

1. Some surprising phenomenon P is observed

2. P would be explicable as a matter of course if H were true

3. Hence there is reason to think that H is true (Hanson, 1958 p. 56)

7.1.2 Method used for the study

The overall goal of the study is to test how market participants use and evaluate public information in financial reports. The underlying hypothesis (semi-efficient market hypothesis, SEMH) is that influential market participants and investors have incorporated all public value information in the current stock price; no arbitrage could be made based on this information.

In order to test this hypothesis, specific choices in the overall design have to be made:

- Should the whole financial report or only different parts be studied – and in this case – which parts?
- What is the best test to find out whether the information in the financial report is reflected in participants' valuation or even the stock price?
- In which context should this be tested?

Choice of public information

Most tests of the SEMH are event studies (Kothari 2001 and as discussed in the literature review): A specific (unexpected) event that is value-relevant occurs. The firm reveals this (new) information to the market, and the stock price changes, assimilating the information. SEMH is tested by analysing how quickly and by how much the stock price reacts. Ideally the event should be unexpected by the market (so it is not reflected in the stock price), and the market should get the same and sufficient information at the same time – "all at once" – in order to value the effect. No other value-significant event occurs simultaneously. In the real world, however, most events have a likelihood of occurring, which implies that they are partly included in the stock price, and after the event more value-relevant information flows gradually to the market. The effects of price-relevant information are hard to measure.

The aim of my study is not to connect information and stock prices, but to test whether information in complex accounting data is reflected in important participants´ valuations of stocks. Although publicly available, (some of) the accounting rules and the way the data are presented are viewed as complex; accounting practices differ and it might be difficult to transform data into values.

Accounting rules and principles are normally only shown in the annual financial report, so this should be the source of information to study. Moreover, the information in the annual report is value-significant (e.g. Pike et al. (1993), Francis and Schipper (1999); see literature review).

However, studying the whole financial report is impossible: A specific accounting area that is known to be complex should be chosen and tested.. Several areas are viewed as particularly complex (see textbooks e.g.. Penman 2003).

- Financial instruments: complex standard, several accounting options, accounting standards different in different countries, (IAS/IFRS vs. USGAAP), and frequently changed, many different instruments with complex features.
- Leasing: same as above
- Pensions: same as above

Pensions are particularly suited for the following reasons:

- Pension accounting is viewed as complex (e.g. Coronado and Sharpe 2003). This is also confirmed by my survey among analysts (see A4.2.5).

- In contrast to most of the other accounting information, the pension data is normally only shown in the annual report: There are no requirements in the major accounting regimes (IAS/IFRS or USGAAP) or NGAAP about giving information about pensions more frequently. Moreover (see A4.2.5) information about pensions is seldom publicly available other than in the annual report. Hence the source and information given are identifiable and well-suited for empirical testing.
- Pension values are found to vary significantly; and for many firms are highly value-relevant (Coronado and Sharpe 2003 and Chapter 5). Hence pensions are well-suited for empirical value-relation studies.
- The accounting rules for pensions have many options, and many important parameters are discretionally set by management. The variability of the accounting practices should be high, with high opportunities of earnings management. Hence the market has to adjust for these differences differently when valuing stocks.
- As discussed above, the pension accounting values found in the notes to the financial reports are in principle easy to translate into intrinsic values, as they may be used more or less unadjusted (if calculated properly and unbiased) as financial assets in an enterprise valuation model.

Choice of method to test pension information vs. market participants

The dominant way of testing the SEMH using specific information in financial reports is to look for correlations between different independent variables and stock prices, trying to verify the hypothesis (Kothari 2001). These methods, as Kothari (2001, see literature review) states, are "fraught with methodological problems".

Just the fact that a stock price reflects numerous known and unknown information sets makes it extremely difficult to investigate the effects of one type of information (here, pension) and control for all other types of information. Large samples are needed to conclude statistically. The "bad model" problem (Fama 1998) is the other serious problem. In order to test the effect of new information on the stock price, a "correct" model is needed, and according to Kothari (2001) so far, no model has been found to be correct. These tests also assume efficiency which is not uncontroversial in these days (Cochrane 2001).

To test the SEMH one uses price data from stock markets and measures whether prices adjust *"properly"* and/or *quickly* to new information or events (see 1.2).

Tests of the SEMH are typically based on regressions such as (Groenewold and Kang 1993):

where R_t is the asset return, R^e_t is the equilibrium return, E_{t-1} is the expectation conditional on information up to period t-l, X_s is a vector of variables which affect share prices and e_t is a random error term, serially uncorrelated and uncorrelated with the expectation errors. The null hypothesis is the $H_0 : \beta_s = 0$, s=1, 2,…….n.

This creates testing problems: The problem with "proper" adjustments is that this requires a "proper" pricing or valuation model. As Roll (1977) and Fama (1970) stated, a SEMH test is a joint test of the model and the market, and it is impossible to find out where the error is.

The other problem relates to how quickly prices should adjust. Research work has found some abnormal drifts, increased volatility, some days (or longer) before the stock prices stabilize etc. (Kothari 2001). The problem, however, is that although the specific event or new information can be specified to occur on a specific date, all the detailed, related information and its value consequences might not be publicly available immediately, but flow gradually to the market. Hence, the market will adjust the expected outcomes and probabilities (and hence the price) as new information is gradually revealed. So perhaps the drift is not a violation to the SEMH.

There have been, particularly after the accounting scandals and the stock market bubble and burst in the late 1990s, many attacks on the (semi)efficient market hypothesis. Fama, in particular, through his articles in 1970, 1991 and 1998, has thoroughly reviewed, discussed and defended the SEMH against the many attacks. He agrees that some of the anomalies are "above suspicion" (1998, p. 304); the post-earnings announcement drift first reported by Ball and Brown (1968) and the short–term momentum effect documented by Jegadeesh and Titman (1993). Kothari (2001) also focus on these two attacks in particular. However, they both sum it all up by stating that no better model or theory than the efficient market hypothesis has arrived so far. Cochrane (2001) reaches the same conclusions: "Asset markets are to a good approximation, information efficient" and "reasonably efficient".

The main reason for these conclusions is not that the (S)EMH is perfect, or that the anomalies are not true, but that the attacks on the (S)EMH in general have 2 major weaknesses, that disturb the findings:

- The "bad model" problem (Fama 1998) described above; is the market inefficient or the (valuation) models wrong?

- They are "fraught with methodological problems" (Kothari 2001) (skewed distributions of financial variables, survival biases in data, auto correlation etc. etc.).

Only the fact that a stock price reflects numerous known and unknown different information sets makes it extremely difficult to statistically prove (not reject) the effect of one type of information (here, pension) and control/rule out all other types of information, and at least large samples are needed to conclude statistically. Moreover, the normal tests (public information vs. stock market price reactions and a "black box" in the middle) use quite general hypotheses since they have to rely on easily available data and a high amount of data in order to reach sufficient statistical power.

Hence, I wanted to find another way of studying how the market or its participants include complex, but disclosed accounting information when they price stocks: To inspect directly how some of the key participants influencing the stock prices in the market place include the specific information in their value function.

By doing this, I will not include the whole valuation chain, from all sorts of public information, through the collection, interpretation, and the use of this information in valuation models, and the influence on the final stock price in the equilibrium between many bidders and offerings. My method will follow an important part of the chain (specific pension accounting data in financial reports (hence only a specific part of all the public information) – inspecting accounting variations and earnings management – and testing it directly by observations of how key (but again, only a fraction) of the participants use the information in specific valuation models. Hence I may go much deeper into the issue, follow several parts of the valuation chain, and have a much more precise analysis with fewer methodological problems. But, of course, since I do not include the last step – the relation to stock prices, I cannot conclude about whether the SEMH holds – even on the specific pension issue.

But, if the specific treatment of pension information in stock valuation models can be observed and tested, will it give insight into how information in financial reports are treated: are the notes/disclosures reflected as much as the recognised values? Are estimates where the firms should have more or less the same expectations levelled out? This is important to understand.

If this can be observed and tested it will give specific insight into how the information is treated. Do the valuations reflect the underlying facts properly according to predominant valuation theories?

Which participants should be chosen for study? One could include samples for all types of participants. Methodologically this probably will result in measurement problems/cross-sectional test problems, misinterpretation of answers from heterogeneous groups with different education is a risk, numerous different valuation methods/functions more or less explicitly shown must be interpreted etc.

The best choice is to investigate a group that: is known to be highly influential on price-setting in the market, is skilled and trained in analyzing and performing valuation from complex accounting data, and normally has an explicit, verifiable valuation method where one could see and test how a single information item such as pension is handled.

Financial *analysts* and especially sell-side analysts are, according to the empirical finding, such a group:

- They are important for the market and influence stock market prices (Womack 1996 and 2001, 4.6.1).
- They rely heavily on accounting data and financial reports for valuation (Beaver 2002, 4.6.1 and 4.6.2), and should in general be able to interpret complex financial information. For pension information however, we have few, and conflicting studies (see 4.6.4 and 4.6.6). According to Arnold et al. 1984b, the sell-side analyst also spends more time and performs deeper analysis of the specific firms than the buy-side (portfolio) analysts. Hence, they should be able to detect EM in complex areas better than others.
- They mostly use explicit, quite standardised valuation models (Demirakos et. al. 2004, Arnold et. al. 1984a), where it is possible to observe how different information is handled. (Although the gathering and analysis of data is a complex process (DeFond and Hung 2003)).

If this group includes all relevant pension information in their valuation, one should expect according to their influence, that also the market price reflects all information. If this group does *not* include the pension information in valuation, one should perhaps question whether the SEMH holds.

The analysts are a heterogeneous group working in brokerage firms, in funds management, large firms etc., where some of them work full-time and some part-time with analysis of firms.

Some of them only recommend buying or selling shares, some also invest on behalf of others (Bruner et. al. 1998, Block 1999). The sell-side analysts in brokerage firms are a more specialized group; they are working full-time analysing firms, performing valuations and comparing the results to the current stock prices. They have a more specialized educational background and are trained and have specific experience in analysing financial information and to translate this to stock valuation (Breton and Taffler 1995). They are proven to be somewhat biased in their external recommendations (e.g. Lim 1998), but that should not significantly affect their will to find information to be used for trading and hence include all relevant information – also pensions – in their *internal* valuation.

I want to test the group, which is expected to have the highest competence and experience and that uses most of their time in analysing firms and financial information; they should at least be expected to also understand, interpret and value even complex accounting information in the notes. The sell-side analysts constitute such a group – and they are also proven to influence the market and hence market prices (Womack 1996 and 2001, 4.6.1).

Which test method should be used?

As the discussion of valuation of pensions showed in Chapter 3, and according to dominant text books about valuation (e.g. Penman 2003) or theories of use of accounting numbers for valuation (e.g. Feltham and Ohlson 1995, 1996), the pension values found in the notes should fit directly into many valuation models for calculating intrinsic values if the numbers are unbiased. However, as Chapters 5 and 6 have shown, the firms have chosen different assumptions when calculating the PBO even when the assumptions are more or less firm-independent. There are indications of earnings management for the firms with abnormal PAFs. Even if firms honestly believe in the chosen assumptions, an analyst should have his own expectations of assumptions such as discount rates, expected G increase and expected salary growth. If the analyst's expectations differ significantly from the firms', he should be expected to adjust the assumptions and hence the PBO if the adjustments are value-significant.

Hence, the best method is to identify firms with abnormal pension assumptions (PAFs) from the descriptive statistics in Chapter 5, and to test whether and how analysts have adjusted for the assumptions in their valuation models. Whether proper adjustments are made by the

analysts may be analysed by comparing the adjustments and the valuation method with the valuation methods discussed in Chapter 3.

Context for the research

The ideal context for the research would be to perform a test of how pension data are used in valuation for all sell-side analysts for all the firms with abnormal pension accounting/-practices/assumptions. A representative sample of analysts per abnormal firm may not be sufficient; even a small group, not included in the chosen sample, that have used all the relevant pension information when performing valuation, may be enough to influence the market and hence the stock price.

Hence, the ideal context is to find a small, but efficient market, with homogeneous accounting principles where the sample size, even including all analysts following a group of firms with abnormal pension data, is small enough to be manageable, but sufficiently large to have statistical data power.

Norway is such a context:

- One set of accounting rules for pensions for listed firms, but with expectations of high variance in accounting practices (Ernst & Young 2003 and chapter 7). Hence a sufficient sample of abnormal firms should be found.
- The Norwegian stock market is perceived to be quite efficient and with low earnings management tendencies (e.g. Leuz et al. 2003, Hope 2003; see 4.7).
- The number of analysts is manageable. According to Kapital approx. 133 analysts in total are following listed firms in Norway.

In small communities like the Norwegian ones, it is easier to obtain access to analysts' valuations and spreadsheets than perhaps in other countries. I will take advantage of this.

Accordingly the chosen method for testing the specific use of disclosed pension data by analysts in their valuation models is:
Select a sample of firms listed in Norway with abnormal pension accounting assumptions (PAFs) for which pension obligations are significant, and investigate how the analysts have treated this abnormal pension information when valuing the case firms.

In analysing the findings, supporting theories on the analysts behaviour, following the theories of March (1988) and others about the rational or limited rational man, cognitive capacity, background and education should be used to explain the results.

Although not following the typical inductive/deductive path, this methodology still is close to Keynes' definition of positive science as "a body of systematic knowledge concerning what is" (1891, cited in Ekelund and Hebert 2001).

The disadvantage of this method is that I will only discover what the *analysts* have done or not done. It is not a proof of whether the market has obtained and included the pension information in the stock price in other ways. Moreover, the work is only performed in the small Norwegian market place.

Hence, I cannot provide conclusive evidence on the relations between accounting information regarding pensions in financial reports and stock market prices in general, only raise some question marks: If the most skilled and informed groups in the market place do not reflect pension information in their price setting – who does? If no one analyses and uses pension information in the stock price calculation, how can the SEMH hold?

7.1.3 Hypothesis

My research question is:

- *How have sell-side analysts treated abnormal pension information in financial reports in their valuation of listed stocks in Norway; have they adjusted for accounting -assumption differences between firms?*

The null hypothesis, following the logic of the semi-efficient market hypothesis where the current stock price reflects all available public information, is that influential, dedicated and professional market participants like the analysts should have uncovered the pension accounting differences and abnormalities, and adjusted the reported data in their valuation models.

7.1.4 Specific design for testing analysts' use of pension data in financial statements when valuing stocks

The first section lays out criteria for choosing research designs, and then argues that the survey design by interviews and direct verification through observation (triangulation) design is the best design for the research question. The second section describes the sample

framework and procedures. The third section describes the empirical setting. The fourth section addresses measurement issues.

Research design

The answer to my research question above is descriptive. What designs are available for this purpose? And on what basis should a choice be made among these alternatives? It is most convenient to start with the latter. The relevant criteria for choosing a research design are those of validity and reliability. In the following the criteria will be presented and discussed in this context.

Criteria of validity

According to McGrath (1982), the research process can be viewed as a "*series of interlocking choices*, in which we try *simultaneously to maximize several conflicting desiderata*" (p. 69, *original emphasis*). The considerations to which he refers are various forms of validity. According to Shadish, Cook and Campbell (2002), there are mainly four forms of validity; statistical conclusion, internal, construct, and external validity. Statistical conclusion validity refers to whether covariation can be assumed to exist between two variables. Internal validity is concerned with the relationship between the variables. Construct validity is related to the "confounding" problem; can the measures of the constructs be construed otherwise? External validity is related to the generalizability of the results.

Ideally, a study should score high on *all* these forms of validity. Doing so is not possible, because of the true dilemmas with which researchers are presented (McGrath 1982). Typically, if a study scores high on one type of validity, it does so at the expense of another. For example, increasing construct validity by having multiple measures is likely to decrease the motivation to fill out the questionnaire and then introduce halo or bias (Mitchell 1985). Hence, an important part of the research process is to make grounded choices; one should focus on scoring high on the types of validity that are especially important given the purpose of the study (McGrath 1982). In this study the purpose is to get a *precise* answer to the question: How have analysts treated pension information in financial reports, and specifically how have they treated accounting and assumption differences for pensions in the valuation of the stock? And to receive answers which are as *realistic* as possible (there should be no serious doubts as to whether the answers are truthful/correct or not) and they must be as *general* as possible for analysts analyzing listed firms in Norway.

According to McGrath it is not possible to combine all these goals; but in the design chosen I have made an attempt:

Research designs – options and choice

The design options typically available for my type of study are (McGrath 1982):

- Sample surveys
- Judgement of analysts' (already performed) work
- Field study (direct observation)
- Laboratory experiments

All of these designs have been done before. Each method has its design limitations:

- *Sample attention surveys*; sending out questionnaires to analysts with questions (here) of how much they have used pension information in their valuations.
  Examples are Lee and Tweedie (1981), Hussey, Bence and Wilkie (1992), Pike, Meerjanssen and Chadwich (1993) and Breton and Taffler (1998) (see literature review).
  The advantage of a survey (with random sampling of the analysts in the population) is the possibility to generalize the findings to the whole population. Low response rates could, however, seriously affect generalization possibilities. In addition, precision and realism tend to be low. The respondent could misinterpret the questions; the answers could be biased (in order to "please" the researchers by answering "correct") and so on (Hines 1982).
- *Content analysis of analyst-reports (already performed work)*: Studying analysts´ reports and looking at their description of how they have treated information in the financial report, have been done by Govindarajan (1980), Breton and Taffler (2001) and others. The advantage is that the research or the researcher does not play a part in the behaviour of concern. The disadvantage is the risk of misinterpretation; what did the analysts really mean, and the risk of differences between the analyst's internal ("true") valuation and his "official" external recommendations (due to bias etc.)
- *Judgement of analysts´ forecasts* (by analysing analysts´ different price estimates for firms with different accounting practices). The additional problem (of that of content analysis) is to statistically isolate the effect of (here) the pension accounting.
- *Field study* (direct observation) (e.g. by Gniewosz 1990). This gives high realism, but few cases give low external validity.
- *Laboratory experiments* - bringing in analysts to review different financial reports with different accounting practises and seeing how they value the firms (e.g. done by Breton and Taffler 1995). The advantage with this is high precision of the test, but external validity can be a serious problem because of the risk that the participants

over-focus or under-focus compared to real-life situations (the external validity problem). Do the analysts discover/not discover the problems in real life?

As shown, all these methods have their advantages and disadvantages. Hence, the study I have designed combines some of the methods above.

The listed firms are identified (where pension liabilities/costs are significant) where the accounting practices (that is the assumptions used when estimating the pension values (PBO) and pension cost) deviate most from the normal (average or normative) assumptions for 2003. Hence, the analysts are expected to treat these firms and the information differently than the other firms when doing valuations.

These cases *could* be used in a laboratory setting or questionnaire survey, but with a high risk of over-sensitiveness to the problems (lack of realism) and risk of participants misunderstanding questions.

Hence, a field survey study is performed by interviewing the analysts actually doing the detailed analysis and valuation (not their leaders) in their working environment, asking how they have analysed the chosen firms, and how the pension information actually was used in their valuation models.

In order to be certain that their answers were correct, the information (for a random sample of the interviewed analysts) is verified by checking the actual spreadsheets of their valuation model in their computer (but I was not allowed to take copies).

To obtain external validity for all broker analysts in Norway, the analysts chosen were the ones that happened to analyse the firms that were selected *and* the samples include *all* analysts analyzing the chosen firms. This should be an unbiased sample if the sample of firms is unbiased. External validity should also be obtained since the sample includes so many analysts, (53 out of approximately 115 analysts analyzing listed firms in Norway) that the sample size should be sufficient to make conclusions for all the brokers analysts in Norway.

In sum the choice of design should give:

- *High precision* (since specific cases are tested on the analysts).
- *High realism* (since field interviews are performed about what the analysts have done – not influenced by the context – and verified by triangulation).

- *Some generalisation:* (since a large sample of sell-side/broker-analysts analysing listed firms in Norway is studied).

The disadvantages/ risks are two-fold:

- Since I perform the interviews, I am a part of the context. The risk is of my questions forming the answers and my potential bias influencing the interpretation of the answers (internal validity risk).
- The general external validity; generalization asking only the *broker* analyst analyzing listed firms in *Norway*; not all types of analysts, not all investors, and not including all information in the financial report (see 7.1).

However, I have shown that the choice of design is the best when verifying whether and how analysts have checked and used complex information in financial reports when valuing stocks. The combination of survey and field study is similar to Arnold et al.'s study (1984a) of buy-side analysts – but my study goes further since it also includes direct inspection/verification of spreadsheets – hence reducing risk of biased interview errors.

Breton and Taffler (2001) conclude that field studies with direct observation are the most desirable design, but that this is very time consuming *and* it is usually difficult to get direct access (confidentially etc.) to a "random" group of analysts. Hence there are very few such studies; Panko (2005) reviews prior field studies of spreadsheets, and found 13 in total, but *none* related to analysts` spreadsheets. One such study is Petersen and Plenborg (2005) receiving spreadsheet analysis from 5 Danish stockbrokers and corporate finance departments. In this case I have been lucky enough to obtain permission to talk to all analysts operating in Norway. This is the only study that I am aware of working so extensively with this type of design.

The problems of the internal validity I have to control for in my detailed design and the external validity I have had to sacrifice are discussed next:

External validity/generalizing from the field studies

My choice of method, a field study of a limited number of broker analysts´ understandings and use of pension information in financial reports in Norway in the spring of 2005 has (of course) low external validity in the following sense.

Statistical generalizing on:

- Population
  Field studies in general have low sample sizes and there is in general a low response

rate with high risk of bias. Therefore field studies are difficult to generalize (McGrath 1982, Breton and Taffler 2001). However, in my study as many as 49 (37%) analysts out of the total population of approximately 133 analysts are included in the sample, the analysts are chosen at "random", and only 4 of 53 (8%) were non-respondents. Hence, one could probably generalize the findings to the total population of broker analysts in Norway. I am fulfilling the general criteria for generalization (Jacobsen 2002), and have higher response rates than many other similar studies regarding analysts that generalize their results (e.g. see Breton and Taffler 2001).
There are however buy-side analysts not included in my study. In my small survey (see A7.2) I have some background data about these analysts (education, age etc.) and they do not differ much from broker-analysts. However, the buy-side analyst might be more concerned with the downsides (such as pension liabilities) than the (sometimes positively biased) sell-side analyst.

I have, outside the study, performed 5 interviews with buy-side analysts using my "abnormal" cases, finding no one adjusting the reported pension accounting numbers in their accounting based valuations. This sample is too small to allow generalizing all Norwegian buy-side analysts, but I would be very surprised if they behave differently than my sell-side analyst group in this respect.

My survey/ background data shows that the analysts are quite young, and with few years experience as an analyst. Average US analysts are on average older and have longer tenure. In addition, the formal educational and background is somewhat different (see A4.2). Hence I cannot necessarily generalize to analysts outside Norway.

- Context: Norway:
  In Norway there are fewer analysts following each listed firm, and up until now (before IFRS) the financial reports have contained less information than firms reporting according to US GAAP/IFRS. The Oslo Stock market (see literature review) is viewed as quite efficient – although not as efficient as the US market. Hence the findings cannot be generalized to larger markets, especially not the US market, but perhaps to other markets of similar size.
- Time: The study was performed spring 2005.
  This was just before the information from the firms of the IFRS accounting effects (pension liabilities were expected to be significantly affected) was released. Hence the analyst *should* be on his/her toes – and focusing on pensions. As discussed, analysts' focus may vary with fads and fashion. The analysts I spoke to in the field-study said that pensions were more "hot" some years ago. Many analysts pay attention to pensions in their valuations, but perhaps it is somewhat less in focus nowadays. Perhaps after the IFRS effects became known there might be more attention. Hence it is difficult to generalise to other periods.
- Subject:
  The main reason for focusing on pensions was to find a complex area with discretionary estimates, where the information is available primarily in financial reports. There exist other similar complex areas with discretionary estimates where information is difficult to obtain and not frequently released:

  Financial derivatives

Loss reserves for insurance claims and loans

Value/life of goodwill

Hence, there *could* be other information issues in financial reports where one could find the same results.

Theoretical generalizing:

As will be discussed in the last part of this chapter, one possible reason why analysts have not looked deeply into pensions can be the setting in which they are working:

Analysts are exposed to an enormous amount of information. In addition they have to actively search for information. According to the semi-efficient market theory they (at least in sum) should absorb *all* value-relevant information available. In real life and according to the theory of limited rationality (March 1988), cognitive capacity and time is limited, so the analysts must continuously decide which information is important. As will be discussed, the choices might not always be rational.

These settings might also apply for all types of information, not only pensions, and for other investors. Hence such a finding might be possible to generalize to all investors, hence explaining why some information seems to be overweighted and other information underweighted compared to the ideal stock market. It could also explain fad and fashion movements of stocks. However, these types of conclusions need further investigation.

Sample frame and procedures

Design and sample of cases (firms) to be tested on analysts

From the database I have constructed with pension data from all listed firms in Norway, I analysed the accounting differences and abnormalities for 2003. These differences are found in areas openly shown in the disclosures of the financial report:

- The deferred pension cost due to accumulated actuarial gains and losses not recognised in the profit/loss-statement or in the balance sheet
- Assumptions that differ significantly from the average assumptions used in calculating the net present value of the pension liabilities
- Estimated (not actual) returns on pension assets.

I chose to analyse all firms where the gross pension liability in the notes are significant, and assumptions with the lowest PAFs. The two other areas did not have sufficiently high variances and sufficiently large samples of abnormal cases.

I chose only the firms with the *lowest* PAFs, not including the firms with the highest PAFs. The main reason for this is that my analysis in Chapter 3 showed that an average firm should use a PAF of 1.4, but Chapter 5 and appendix 1(with 2003 data) showed that the firms with highest PAFs were in the range of 1-1.38. Hence for these high-PAF-firms, only small adjustments in reported PBO value should be done. Analysts not adjusting reported pension obligations in these firms would not necessarily perform a valuation error. An alternative would be to include a high and a low PAF firm for the same analyst to see if he had treated the firms differently. I have done this indirectly by asking if they had adjusted the PBOs/pension obligations for any other firms they analysed, and always got a negative answer. In addition, I included Statoil (a high PAF firm) in my interviews, since they have large pension obligations, but very different PAF than Norsk Hydro (low PAF) in the same industry.

"Significant" I defined as the gross pension liabilities shown in the notes (PBO) exceeding 10% of total assets. Adjustments in assumptions or the PAF would in these cases have significant effect on valuation. Since the pension accounting numbers (in the notes) are (discretionary) net present value calculations of future cash flows on existing liabilities, it is irrelevant which valuation method the analyst use (valuation starting with equity, profit or cash flow statements) (see 3.1). . The cut-off of 10 % is not a definition of high significance, just a cut-off where pension liabilities at least should be significant vs. changes in calculation.

"PBO-significance" could also be measured as the PBO/*market value* of equity. When interviewing analysts they typically compared possible value adjustments of pension liabilities with the market value of the equity. By doing this, 3 new firms were included; Schibsted, Adressavisa and Stavanger Aftenblad. They all have significant pension liabilities (28 %, 45 % and 48 %) of the market value respectively, but not the lowest combined pension factors (approx. 0.86).

I used the assumptions shown in the financial reports for 2003: Hence the pension assumption should have been known for quite a while. Moreover, since market estimates regarding pension assumptions had changed since the firms issued their annual reports, the analysts should have updated their calculation with their most recent estimates (March 2005). Moreover, since the firms were just about to issue their 2004 reports with their updated pension assumptions (which should be unbiased expectations), including the equity-effect of

the IAS 19 adoption, it should be expected that the analysts had special focus on the issue and had tried to recalculate the pension liabilities with new assumptions.

This resulted in a sample of 31 firms (the firms with PAFs lower than 0.70 and PBOs of more than 10% of total assets, and in addition the 3 firms with highest PBO-value-sensitivity). Hence the cut-offs gave a combination of a sufficient number of firms to obtain statistical power, but not more firms than realistically could be tested in a field test. Of these 31 firms, I found no analysts performing specific analysis/valuation(detailed analysis including forecast and specific valuation) for 9 of the firms: There were analysts following the stocks, but only doing more general analysis of stock price, overall firm-review, earnings review, technical analysis etc., but no detailed valuations. The turbulence: in most of the brokerage firms that followed some of these firms (Alfred Berg) could partly explain this. Hence I had no one to interview analysts to perform field study of, and the firms had to be excluded from the field-study. The excluded firms were Norsk Vekst Forvaltning, Håg, Borgestad, HSD, Byggma, Belships, Blom and Melhus Sparebank.
For Tandberg Storage there was a typo in the first database that was not discovered at the time of the field study, so the firm was (erroneously) excluded from the field study. However, this should not affect the analysis or conclusions.

This resulted in 21 cases tested (out of 176 listed firms) with significant "abnormalities" regarding pensions and with analyst' coverage.

The sample is of course not a random sample; it consists of the extreme cases. However, this is what I need: *If these* cases are not properly handled by the analysts, cases with *less* significant pensions accounting deviations should also be expected to be treated incorrectly.

The sample typically consists of firms with many employees, which have existed for some time (hence having employed people for some years). Younger firms are excluded because they do not have sufficient pension obligations in the first place. Hence traditional industrial firms are overrepresented. Asset intensive (shipping, real-estate, financial institutions) and new, fast growing firms are underrepresented. However, for external validity this should not have significant effects, since I am testing the extremes.

Sample of analysts
The analysts chosen are *all* the analysts analyzing the selected firms (in Norway and abroad).

To ensure completeness I performed the following:

- I used the list of analysts following each firm from the firms' homepages on the internet if they were updated in 2005. If there was no analyst list, or the list was not updated in 2005, I phoned the firm (CFO or director of information) and got their updated view of analysts following the firm.
- I added analyst names to the list above from Kapital's analyst ranking for 2004.
- I asked all managers of the analysts group in the brokerage firms with offices in Norway which analysts they had following my 21 firms. Sometimes the specific analyst following the firm deviated from the firms' or Kapital's lists. In that case, the brokerage firm's choice was used.
- Out of these, only the analysts who said that they did specific firm valuations were included ("Do you perform a specific valuation of the stock of firm X, where you calculate an inherent/fundamental value of the firm?"). As explained above, this resulted in the sample of firms being reduced from 31 to 21 firms.

Hence my sample of analysts should be almost complete. However, there is a risk that some few foreign analysts are missing because the firms were not updated as to who were following them.

There was one exception to the rule; the analysts following SAS. Only the analysts in the brokerage firms with location in Norway were included for SAS. AB is a Swedish firm with listing also on the Oslo Stock Exchange. Hence, SAS differs from the other firms in the sample, which are all Norwegian firms or have their primary listing on the Oslo Stock Exchange. Until recently, the SAS share was split between Norway, Sweden and Denmark by having one holding firm per country, each with listed shares in their home country. Hence, only the "Norwegian part" of the analysts was in the sample.

The total number of different analysts following and doing specific valuations was 53. 7 of these analysts were located outside Norway. More analysts (especially analysts located outside Norway) were following the stock (loosely), but they did not do a specific valuation. In addition there were some analysts switching brokerage firm/employer at the time of my investigation. In the switching period they were not allowed to perform analysis or bring valuation data from one firm to another. Even though they had performed valuation on the selected firms, they were excluded because they did not do so in the interview period.

One analyst refused to be interviewed (saying that he did not look at pensions). 3 analysts I did not get hold of or they did not have time for an interview. The remaining 49 analysts were interviewed (49 interviews), approximately 40% of the total analyst population specifically following Norwegian listed firms. Hence the group should be representative.

Hence, I ended up interviewing 49 analysts on 21 different cases (from 1 to 9 analysts following each of the chosen firms) – ending up with a total of 95 single tests/cases.

Empirical setting

Context of the data collection: the interviewee

The data was collected through interviews at the offices where the analysts worked. Most of the interview was done at the desk with the analyst in their natural setting. 18 of the interviews were done in a separate meeting room, not at their working place, but in the brokerage firms' office. This context is believed to give higher reliability to the answers, due to lower tendency to stress and distractions compared to less familiar settings (Silverman 1993, Shadish, Cook and Campbell 2002 (SCC2002)).

The interviewees were informed up front (by their manager) of the purpose of my visit. They knew the subject (valuation of pensions), but not which firms I had chosen. If there was any bias in the answers, one should expect an over focus (SCC2002), or pre-reviewing the firms' pension data or perhaps even altering/"correcting" the valuation before the interview.

One might also expect a tendency for the analyst to be "clever" and pretend that he had looked at and adjusted "properly" for the pension information (SCC 2002). Hence if the analyst said that he had not noticed the abnormal pension assumptions and/or said that he had performed no adjustments or not taken any abnormalities into consideration when valuing the firms, this tendency should be under-represented rather than over-represented.

Context of the data collection; the interviewer

There are several internal validity risks (since I did all the interviews):

- The bias of the interviewer (I did not believe that the analysts had seen and adjusted in all cases).
  This may have effected my questions and the way questions are formed may shape the answers (Schwartz 1999).
  I tried to cope with this by having (semi-)structured interviews, starting with open questions – and if I was uncertain of the true meaning of the answer – more closed questions and guiding questions (see interview structure later).
- The "learning curve" effect (as I do interviews I learn more about how to do it – and hence the context changes over time).
  I tried to cope with this by having test interviews outside the sample (analysts/corporate finance people in asset funds and audit firms) – and by having structured, pre-printed interview questions (see Appendix).

- Bias or misinterpretation of the answers:
  I tried to cope with potential misinterpretation by restating the answers, and by follow-up questions if in doubt or on critical issues (see Appendix).
- Since I did all the interviews, the use of different interviewers with different styles etc. should not be a source of error.

Most of the context problems were, however, solved by triangulation; I checked (randomly) the actual valuation spread sheets for 61 (out of 95) of the test cases – finding no discrepancies. Hence I expect the data collection and interpretation to be fairly accurate.

Collection of data

All data from the interviews were collected and written down on a standardised interview schedule (Appendix).

I took notes directly in the meetings. The notes were reviewed and cleaned up immediately after (the same day as) the interviews. I summarized all the data myself afterwards. All detailed raw data are available for peer review. However, direct replication is of course difficult.

Since I have worked as an auditor and consultant collecting interview data for 20 years, I should have sufficient training, and this should increase the precision.

Since the required data was quite limited and focused (a descriptive study with no need for many details) there was no need for detailed notes or tape-recordings.

Since the questions in the field study are related to how a group of analysts treat the same issues, pure cross-sectional data gathering should be sufficient. Repeating the study later would create internal validity problems, due to "training" of the respondents.

Measure and measurement and interpretation

The research is qualitative research. However, the questions require only short answers (ultimately yes or no to different cases). I pre-constructed a (semi-)structured interview questionnaire, where I also directly documented the answers (see Appendix).

In its simple form the questions are in the form of (Appendix 4):

- How have you analysed the pension information in the financial report and used it in the valuation?

- If there is little response to this ("I have not looked at the pension information", "I have just used the values in the income, balance sheet or cash flow statement" etc.), there were control – questions like:
  - Have you reviewed whether the pension assumptions or accounting principles are similar to other firms or in your opinion good assumptions?
  - Have you used the recognised values or the values shown in the notes?
  - Have you taken this information (showing them my findings) into consideration and calculated your own values (not used the recognised values) when valuing? How have you done the calculations?

Hence these were structured, but open questions, with a combination of closed control questions to be sure of the answers. As Schwartz (1999) showed, the question might shape the answers. Even answers to open questions (How have you treated pensions….?) are formed by the context. The respondent will probably answer me (an accountant/corporate finance student) differently from how they would have answered an actuarial, a psychologist etc. Also the introduction/lead-in of the interview might influence the respondent. The option/space on closed questions might be too narrow or biased. All this might influence the internal validity and reliability of the study.

Krosnich (1999) suggests open questions, with control questions and closed follow-up questions whenever possible to increase internal validity and reliability, and this is what I have done.

The structured interview is needed for comparison and summarizing of data to answer the research problem ("Have analysts (how many) detected…")

The ultimate measures are "yes" or "no", and qualifications to this. Hence it is possible to summarize data and compare data, even if the study is qualitative.

Hence measurement is not very difficult, and is followed up by control questions with response and triangulated by observation. In total this should give few interpretive problems. This ensures high reliability.

A weakness in the design is that I did everything alone as an interviewer. Hence, data collection errors and interpretation errors are more probable. As described I have tried to minimize this risk.

Specifics about the structure of the questions:

Since valuation can be done in different ways, and valuation can be more or less dependent on the use of financial report data, I had to include some questions first about valuation methods and then shape the specific questions about treatment of the pension information. More specifically:

- First I asked which valuation method they used when valuing the specific firm. This is an open question. If they were uncertain about the question, I guided them by asking if they used a DCF-model, multiples, peer-review, adjusted equity etc.
- Then I asked if they started the valuation by using some reported numbers in the financial report, and if they said yes, which numbers (EBIT, net profit, equity and so on).
- *If* they did valuation based on/starting with reported *operating* profits (enterprise value calculation), the treatment of pension cost and especially financial income expense from pension assets/liabilities (included "erroneously" in operating profit) and the definition and valuation of pensions as a financial debt or not is particularly relevant.
- *If* they did valuation based on/starting with *net* profit (hence calculating the equity value directly and not treating pension assets/liabilities as financial assets liabilities) the treatment of adjusting expected return on pension assets and which discount rate is used, etc. is important in addition to the other pension cost elements.
- *If* they did valuation based on/starting with net *equity*, the calculation of the net pension liability is particularly relevant.
- *If* they started with (operating) cash flow from the cash flow statement, the definition and adjustment of pension cash cost is particularly relevant (no one did this).

7.2 Implementation of the field study

7.2.1 Descriptive statistics of the selected firms

As described, firms with lowest PAFs (PAF lower than 0.70) with significant pensionliabilities (where PBO/book-equity were above 10 %) or PBO/market value above 27 % were included in the sample. In addition specific analyst following was required. This gave a total of 21 firms/cases to be tested on the analysts. Descriptive statistics are shown in Exhibit 7.1.

Exhibit 7.1 Descriptive statistics for firms selected as cases for field study of analysts*

(NOK mill unless stated)	**Total**	**Average**	**Std.dev**	**21 firms vs. all listed**	**All listed firms**
No. of firms	**21**			**listed firms in %**	**Average ratios**
Total sales	340 650	16 222	38 087	35%	
Op.profit (% of sales)	26 526	1 263 (7.8%)	5 216	26%	(10.8%)
Net profit (% of sales)	9 876	471(2.9%)	2 287	26%	(4.5%)
Total assets	388 958	18.521	74 076	17%	
Book equity (% of total assets)	137 344	6540(35.3%)	18 115	30%	(21.9%)
Pension data:					
Net pension assets in balance sheet	3 870	184	1 505	116%	
Gross pension assets in notes (% of assets)	66 209	2 490(13%)	6 625	59%	(4.8%)
Gross pension liabilities (PBO etc. in note (as % of assets)	83 548	3 978(21%)	8 297	59%	(4.8%)
Acc. unrecognised amount (% of equity)	17 306	1 820(28%)	2 461	52%	(7.1%)
Total rec. pension cost (% of op.profit)	4 828	230(18%)	463	56%	(8.7%)
Assumptions:					
Return on assets		6.9%	0.41		7.0%
Discount factor		6.0%	0.52		6.0%
Salary increase		3.0%	0.33		3.2%
G-increase		2.9%	0.52		2.7%
PAF (def. se exhibit 3.2)		0.62	0.07		0.7
Increased "PBO" if PAF was 1.25	72 094	3 433	7 628		
Increased PBO if PAF was 1.25 as % of book-equity (variation)		69%	(16-300%)		
Equity ratio if PAF was 1.25 and PBO effect was charged against equity (variation).		18%	(-46%-45%)		
Increased PBO as % of market cap.(variation)		28%	(4%-		

*The 21 firms in the sample in column 2-4, total numbers of the 21 firms in % of total numbers of all listed firms in Norway (listed the whole of 2003 and until financial report was issued) in column 5, and average ratios of all listed firms in Norway in column 6. All numbers taken from 2003 financial reports.

As one can see from Exhibit 7.1, these 21 firms (12%) out of the 176 listed firms in 2003 represent a higher % of total sales (35%), and of total assets (17%). But on average they have a lower operating margin (7.8%) and net profit margin (2.9%) than the average for all listed firms (10.8% and 4.5% respectively). The firms in the sample however, vary significantly in size and profit numbers.

Obviously, the 21 firms have higher than average pension numbers as % of their total assets, equity etc, the 21 firms represent 116% of total recognised (net) pension assets of all listed firms in Norway, and they have 59% of both gross pension assets and pension liabilities shown in the notes of all listed firms in Norway (column 5). They represent 52% of all unrecognised pension obligations (Statoil is not included in the sample of 21 firms, and represents a large part of the remaining portion).

The average pension assumptions for the 21 firms do not differ much from the overall average of all listed firms with defined benefit plans, but the average PAF of the 21 firms are 0.62 vs. 0.70 for all listed firms with PAF.

The pension assumption sensitivities for these firms are illustrated by showing the effect if PAF had been increased from the specific PAF calculated for each firm to a PAF of 1.25 (which I calculated as a norm for an average firm with a weighted average of 20 years to pension settlement, and 75% of gross pensions paid by the FT). Total PBO would increase with approx. NOK 72 094 mill (vs. recognised pension liabilities of NOK 83 548 mill). This represents 69% of book equity of the 21 firms as of 1-1-2004. The book equity ratio would have been on average 18% *if* this PBO had been recognised.

The increase in the PBO's using a PAF of 1.25, represents on average 28% of the total market capitalisation of the 21 firms (Exhibit 7.1 – last 4 lines). The variation is between 4 % and 100 %. In a valuation it is difficult to ignore figures of this magnitude.

I do not claim that the analysts have to adjust reported pension values according to my suggested PAF, but I claim that the analysts should have detected the differences in pension assumptions and made their own value adjustments or received firm-specific satisfactory answers on variances.

Alternative criteria for selecting "abnormal" accounting practices for pensions were considered, but none were found to have yielded enough firms:

- Firms with significant defined benefit pension plans not recognising pensions as liabilities (not following the NGAAP/NRS 6 requirements):
  None in 2003.
- Firms with immediate recognition of actuarial gains and losses:
  3 smaller firms.
- Firms with net financial income (from pension assets and pension liabilities) as a high % of operating profit.
  Depending on the valuation technique, abnormal asset return or discount factor assumptions could give wrong input to valuations unless adjustments are made. However, only 21 firms out of the 176 listed firms had net pension returns in excess of +/- 10% of operating profit in 2003. Firms with abnormal assumptions would be a fraction of this, hence resulting in a too small sample.
- Firms with recognised net pension assets:
  Very few (most notably SAS; which will be discussed separately).
- Firms with high accumulated actuarial gains and losses:
  In a valuation the accumulated actuarial gain or loss should be added to the recognised pension obligation, if pensions are viewed as financial assets. But, then the amortised part must be removed from the operating profit numbers.
  However, no adjustment of operating profit for pensions (where the amortisation is included), and no adjustment of recognised pension obligations necessarily result in a methodological valuation error: The unrecognised amounts may be correctly included in an enterprise value if the amortized amount in the pension cost is included in the cash flow/earnings numbers used to calculate the enterprise value combined with a "proper" discount factor or multiple. Below (Exhibit 7.2) is a list of the listed firms in Norway with largest reported accumulated deferred recognition in their 2003 reports (NOK mill.): If the analyst includes the amortized amount in their earnings/cash flow estimate in their earnings/DCF-models with the implicit multiples (combinations of discount rates and growth) shown in the right column, no valuation error is committed. The calculation yields the same result as including the unrecognised liability in pension obligation and removing the deferred cost from earnings/cash flow. Hence testing for the analysts' "correction" of accumulated deferred recognition is not a relevant valuation test.*

* Of course one could question whether analysts would have used 65 as a multiple on Norsk Hydro, or how they would have adjusted for Kitron or Tandberg TV (no amortisation), but these are few cases.

Exhibit 7.2 *Descriptive statistics of firms listed in Norway with highest unrecognised pension amounts disclosed.*

Firm	**Acc. actuarial gains and losses**	**% of market cap.**	**Annual amortisation recognised**	**% of operating profit**	**Implicit multiple on annual amortisation in order to equal accumulated unrecognised amount**
Norsk Hydro	9297	8%	143	0,5%	65
SAS	5964	55%	298	51%	20
Aker Kværner	5438	50%	282	51%	19
Elkem	699	5%	46	4%	15
Orkla	606	1,5%	28	1%	22
Kongsberg	374	12%	22	8%	17
Fred.Olsen E	293	5%	77	21%	4
W.Wilhelmsen	271	4%	21	4%	13
Nera	172	9%	6	11%	29
Rieber	102	2%	8	3%	13
Kitron	54	15%	0	-	-
Tandberg TV	54	1%	0	-	-

*Firms listed in Norway with highest nominal (NOK mill) accumulated unrecognised differences between estimated and actual pension-assumptions and plan changes, as disclosed as reconciling items in the notes from the 2003 financial report. Annual recognised amortisation and operating profit as shown in the financial report. Market cap= market value of outstanding shares as of February 15.2005 according to Dagens Næringsliv.

7.2.2 Description of analysts

I tried to perform field tests including *all* analysts performing firm-specific valuations on the selected 21 firms. This resulted in a total of 53 different analysts included in the field study, where several of the analysts followed more than one sample firm. Out of these 53 analysts, 1 did not want to be interviewed (said he never looked at pensions), and 3 analysts I never reached during the sample period (in March-April, but before the pension accounting numbers for 2004/1st quarter 2005 were known through the release of the financial report or other disclosures). The non-response rate is so low (7%) that this should not influence the results.*

Exhibit 7.3A Descriptive statistics: Analysts included in the field study:

Approx. total number of different analysts following specific listed firms in Norway**	133
Analysts doing specific valuations on the 21 analysed firms	53
Analysts not contacted/not willing to be included in the study	(4)
Analysts participating in the field study	49
Number of brokerage firms involved	12
Total number of analyst-firm cases	95
Average number of analysts per firm	4,5
Spread of analysts per firm	1-9

**There are no formalised data on the total number of analysts following listed firms in Norway. The number is based on Kapital´s ranking list of all analysts following specific listed firms in Norway (macro and strategy-analysts not included), and Oslo Børs Informasjon AS information of analysts not included in this list, working abroad, but following specific firms listed in Norway.

* It should however be noted, that since there was turbulence in the brokerage firm Alfred Berg; almost all the analysts following Norwegian firms left Alfred Berg during my field study and did not perform any valuation in that period.

Exhibit 7.3B: Descriptive statistics of the background etc. of the 49 interviewed analysts

Factor	Average	Range
Sex	100% men	
Age	33.5 years	25-45
No. of years as analyst	5	1-18
Education	76% Norw. MBA (Siv.øk)	
	12% MBA from abroad	
	10% engineers/economists	
	2% bachelor (DH)	
Additional education	25% Certif. Fin. Analysts	
	13% Master of Sc (AFA)	

Exhibit 7.3.B shows some personal statistics of the interviewed analysts, all men, on average 33.5 years old and with 5 years of tenure. Most of them hold a Norwegian MBA (Siv.øk), and more than 1/3 have further specialisation in finance/economics (AFA/HA). The interviewed analysts' personal backgrounds are very similar to the backgrounds from the analyst respondents participating in the survey (Appendix). Hence, there should be no particular bias in the analyst sample. The interviewed analysts are on average somewhat younger, have relatively fewer years of tenure than US analysts I have seen participating in US studies (e.g. Breton and Taffler 2001). However, they are well educated, most of them with accounting and finance background.

The combination of 21 firms and 49 analysts resulted in a total of 95 cases to be tested (1-9 analysts following each sample firm) (Exhibit 7.3 A).

All interviews were performed at the brokerage firm, at the analyst's desk or a meeting room nearby. Physical inspection of spreadsheets was done at the desk of the analyst.
There were 2 exceptions to this procedure; 1 analyst in Copenhagen and 1 analyst in Sweden were interviewed on the telephone. One of them (Stockholm) mailed me the spreadsheet in advance - the other faxed his spreadsheet to me in advance.

In 61 (of 95) interviews I (randomly) decided to check the responses by inspecting the spreadsheet/detailed valuation performed by the analyst. There were no conflicts vs. the answers in the interviews (Exhibit 7.4). Since the analysts knew up front that I might inspect the spreadsheets to verify the answers, I do not expect any conflicts in the spreadsheets that were not checked.

Exhibit 7.4

# of spreadsheets tested vs. statements in the interviews:

Total number of cases	**95**
Total # of spreadsheets tested	61 (64%)
Deviations between interviews and spreadsheet	0

The interviews were performed during the period March 29 - April 20, 2005. This was before the release of updated pension information in the 2004 annual report and before the effects of IFRS adoption was known.

7.3 Summary of findings and interpretation

7.3.1 Valuation methods

Use of financial reports as the starting point for valuation

In order to test the analysts' use of pension data disclosed in financial reports, it is a prerequisite that the analyst actually use the financial reports as the starting point. My interviews confirmed this.

Exhibit 7.5 Financial statements as information source for valuation:

Total number of cases	**95**
▪ Reported financial statements starting point* (using one or several specific number(s) in the financial report)	94
▪ Using number from several sources/not a specific number from the financial report	1
Total	95
Financial statement component as starting point for valuation:	
▪ Income statement primarily	49
▪ Balance sheet prim. (everyone used the value adjusted equity-method)	6
▪ Combination of numbers from income statement/balance sheet	33
▪ Combination of income statement and cash flow statement	4
▪ Cash flow statement primarily	3
Total	95
Starting point when doing Discounted Cash flow analysis:	
Income statement: total	73
▪ Operating profit (EBIT)= Enterprise value method	(60)
▪ Net profit = cash flow to equity method	(13)
Cash flow statement	3
▪ Cash from operations	(3)
Total using DCF techniques	76

* Starting point: Calculating a value of a firm the analyst uses his own estimated/calculated cash flow, earnings or asset value figures. But to derive to his own number he would pick out a or some *specific* reported numbers from the financial report (which I call the starting point) and do adjustments to this/these numbers (see Appendix 4; survey of analysts).

In 94 of 95 cases (see Exhibit 7.5) the analysts used numbers in the financial report as a starting point (definition: see * under Exhibit 7.5). This is above my survey results (91%) (see A4.2.3), but could be explained by the fact that I only include analysts performing specific and detailed value-analysis; whereas the survey includes all types of (i.e. simpler) analysis.

Out of these 94 cases, in 49 (53%) cases the analyst started with one or several numbers in the (historical) *income* statement, and made adjustments to these numbers before they were put into a valuation model. In 6 cases the analyst started with the balance sheet, in 3 with the cash flow statement, in 33 with a combination of income statement and balance sheet, and in 4 with a combination of income statement and cash flow. This is in line with my survey results (see A4.2.3).

Discounting estimated future earnings with some adjustments for investments and changes in working capital to serve as a proxy for cash flows or discounting a direct cash flow estimate ("DCF") is the dominant valuation technique; it is used in 76 of the 95 cases. In 60 of 76 DCF-cases the operating profit (EBIT or EBITD (A) is used as a starting point. In 13 cases net profit is used as a starting point and in 3 cases cash flow from operations is used as a starting point. This is also in line with my survey results.

It is important for my field study that Norwegian analysts rely heavily on accounting numbers in their valuation. This should increase the importance of reported pension accounting numbers and the need to analyze and adjust these numbers.

Valuation method used

Valuation methods used were surprisingly standardised (Exhibit 7.6); in 82 of the 95 cases the analysts had a spreadsheet where the historical earnings were shown. The analysts had made their forecasts of the income statement (and sometimes balance sheet) components (normally at least sales, cost of goods sold, operating profit, financial items other non-recurring items). This corresponds with the survey results (A4.2.3). If the firm had independent segments, the historical numbers and forecasts were made per segment and added to total numbers by some of the analysts.

Earnings forecasts were a normal part of the output an analyst is expected or required to produce. From my inspection of the spreadsheets, forecasts were made from 4 to 10 years ahead. Valuation of the firm was made with these estimates as a basis.

Exhibit 7.6

Valuation methods used by the analysts in the field study:

1. "Discounted cash flow" method ("DCF") as *primary* method	59
2. "DCF"-method (see above) combined with multiples/peer analysis	17
3. Ratios/multiples/peers as *primary* method	12
4. Value adjusted equity method	7
Total number of cases	95
Total number of cases where "DCF"-method is used	76
▪ "DCF" based on enterprise value minus debt	63
▪ "DCF" of net income/cash flow to equity	13
Number of cases where valuation was based on earnings forecasts	82

In 76 (59+17) of 95 cases a discounted cash flow/earnings model ("DCF"-model) was used. (In 17 of these cases the DCF was used in combination with other models, normally peer reviews). From the earnings forecasts and historical numbers, adjustments were done for non-recurring items, special accounting methods and (often) some adjustments to translate earnings to numbers closer to cash flow number: Estimated future investments substituted for depreciation, estimated increase in working capital were subtracted and so on.

Hence, the valuation method was normally not a pure DCF, but based on a proxy for cash flow equal to "normalized" earnings adjusted for some cash flow effects. The full value of the firm was normally measured by a multi-period model; the "cash flows" or earnings from the forecasted periods were discounted, and a continuing value was calculated by using the Gordon formula (or a multiple) after the last explicit period. This corresponds with the 88% "yes" response to this method in the survey (see Question No. 13 in Appendix 3).

Within the multi-period "DCF" model, the enterprise value model (EV model) dominant: 63 out of 76 used it with only 13 using the net cash flow/earnings to equity model. Out of the 63

cases using the enterprise value model, 60 used earnings from operations (EBIT or EBITD (A)) as the starting point. Based on multi-period forecasts they calculated the total value of the firm, and subtracted debt or financial assets to obtain the net equity value of the firm. In the 3 remaining cases, enterprise value was calculated based on the cash flow statement (cash flow from operations as a starting point).

Perhaps surprisingly, no one used residual income or EVA/CFROI methods. Demirakos et al (2004) found that 10% out of 104 analysts used some type of residual income method in their reports, and 11% stated this in my survey (see Appendix 4.2.2). Residual income is currently taught as a convenient tool for firm valuation in several business schools (e.g. NHH), so perhaps the responses to the 2 questionnaire surveys are "good student" response errors, whereas the field study shows the true story?

In 12 of the 95 cases a multiple/peer review model was used as the primary valuation model. In these cases the reported or adjusted earnings or forecasted (and adjusted) earnings combined with other financial numbers were used to calculate ratios. The ratios were compared with the same ratios and market values of similar firms. Of the 12 cases, 6 were related to SAS and NAS (more than 50% of the cases for these 2 firms). Analysts said that it was difficult to make long-term earnings or cash flow forecasts for these types of firms: SAS is a firm in a turn-around phase with negative earnings, and NAS is a start-up, high growth firm. Moreover, airline net earnings were claimed to be highly correlated with oil prices and economic cycles. Hence peer reviews were chosen. The 6 other cases using peer reviews were smaller, growth firms, where there was little historical data. The analysts typically said that they wanted to spend less time on analyzing these firms, and therefore used a method that was less time-consuming than a full forecast/"DCF"-model.

In 7 of the 95 cases the analysts used the value-adjusted equity method. Using book equity as a starting point, the equity was adjusted by replacing book values of assets with market (i.e. sales) values of assets. 6 of the 7 cases were shipping-firms. The market values of the specific or similar ships were collected by the analysts from ship brokerage firms or other analysts, and the market values were viewed as a proxy for both the sales value and the value in use of the ships. The market value for the other net asset (or book value as a proxy) was added to the ship-assets to get the intrinsic value of the equity. Hence, the value–adjusted equity method does not differ much from the "DCF"-model, but the analyst does not base the value on his/her own earnings estimates, but relies on the market's estimates for each asset. In the

value-adjusted equity method, pensions should be treated as financial assets/debt in the calculation.

Since 85 of 95 cases used historical, adjusted earnings as a starting point for valuations, pension accounting numbers are relevant, and in most cases must be analyzed and adjusted using procedures discussed in Chapter 3 (see 3.2.7). In the remaining cases (except 1) the analysts also use reported financial data as the starting point for valuation, and even here the pension numbers are relevant.

7.3.2 Logical errors in the valuation of pensions

When interviewing the analysts and reviewing the valuation spreadsheets, I documented the specific method of valuing pension assets and liabilities. Although not part of my hypotheses, I also documented methodological errors in the field study. Hence my study can be related to Petersen and Plenborg's (2005, unpublished) study of methodological errors in the valuation spreadsheets used by financial institutions in Denmark. They tested for different types of errors, and found surprisingly many cases of errors related to cost-of-capital, proforma financial statements and terminal values. In fact all spreadsheets contained errors. Panko (2005) summarize "What we know about spreadsheet errors" (not only valuation spreadsheets) and found that all field studies of spreadsheets have found remarkably many errors. He divides errors into 3 categories: mechanical, omission and logical. He reports errors of all categories in his studies. I have only studied the logical errors regarding pensions, but also found surprisingly many errors:

In my opinion, the following procedures are logical errors[*]:

1. Using the DCF enterprise-value method starting with income from operation to calculate normalised cash flows, treating pension assets/liabilities as financial assets/liabilities, but *not* eliminating net pension/income from operating income.

[*] Not adjusting the recognised pension-cost and at the same time not adjusting the recognised pension liability for unrecorded amounts (even if there are significant accumulated unrecognised amounts), is not necessarily a logical error, as discussed in exhibit 7.2; it depends on the valuation methods, the relative value of accumulated unrecognised errors/plan-changes and annual amortized amounts.

2. Using the full market value of pension assets and the PBO value found in the notes, but *not* eliminating the amortized portion of errors/plan changes included in the pension cost in a "DCF"-valuation model based on adjusted earnings.

3. Adjusting the assumptions (discount rate, salary income, G-growth) and recalculating the PBO, but not adjusting the (expected future) service cost accordingly in a "DCF" model based on adjusted earnings.

4. Not adjusting the amortised part of accumulated actuarial gains/losses to a "proper" amount as part of pension cost (if this number is used in the valuation) when pension liabilities are not treated as financial assets (or are used as financial assets, but only with recorded amounts).

Exhibit 7.7

Logical errors committed by analysts when performing firm valuation including pension data found in my field study:

	Total # of cases where relevant	**# of cases with errors**	**# of cases with significant errors**
1. Not eliminating financial pension income from op. earnings when the EV-method is used and pension assets are financial assets	10	9	2*
2. Not eliminating amortisation effect in earnings when the "DCF" method is used, and market value of pension-assets and PBO in the notes are used	18	11	6*
3. Not adjusting annual service cost, when pension assumptions (discount rates, salary/ G-increase) are adjusted , and the "DCF" model is used (Kværner).	1	1	1
4. Not including a "proper" amount of amortised part of acc. unrecognised items when *no* adjustments are done for unrecognised errors/ plan changes and the "DCF" method is used.**	6	4	4
TOTAL	35	25/19 diff.cases	13/11 diff. cases

*Significant; net fin. income from pensions or amortised amount>3% of operating income
**Only where no amortisation were recognised or a very high/very low multiple must be used on the amortised amount to calculate unrecognised actuarial gains and losses (ref. exhibit 7.2 discussion) (Hydro, Fred. Olsen, Kitron).

In total there were logical errors regarding pensions in 19 of the 95 cases (Exhibit 7.7), including 25 errors in total (5 cases had several errors). But in many cases the issues were not relevant (due to model used). The errors in question could be committed in 35 cases. In 19 of these (54 %) there were logical errors. In 11 (31 %) of the cases the errors could cause significant valuation errors (error is said to be significant if it exceeded 3 % of 2003 operating income). I asked all the analysts committing the error whether they were aware of these logical errors, but had not adjusted because they viewed the effect to be insignificant. *None* of the respondents said that they were aware of the potential error and had checked for significance. However, not all analysts considered errors significant when it was pointed out to them.

7.3.3 Adjustments of pension-accounting numbers when performing valuations

As shown in the exhibit below (Exhibit 7.8), very few analysts had made any adjustments at all to the reported pension data in the financial reports, but used them unadjusted in the firm valuations:

Exhibit 7.8 Analysts' adjustments of pension accounting numbers when performing valuation:

	Number of cases	**Number of firms**
Not relevant (does not use reported financial data as a starting point)	1	N/A
No adjustments made to reported data	76	17
Adjustments made	18	4*
Total	95	21
More specifically		
▪ Adjusting pension assets/liabilities in the bal. sheet with unrecognised amount	18	4**
▪ (Also) adjusting pension assumptions	2	1

* Aker Kværner, Hydro, SAS, Fred.Olsen

** For 2 of the 4 firms (Aker Kværner and Fred. Olsen Energy representing 6 cases), the pension liabilities (PBO) were adjusted (downwards) on the assumption that some of the reported pension liabilities could be avoided.

In 76 of 94 relevant cases no adjustments were done at all, including 17 of the 21 firms. Hence only in 18 of the cases, including only 4 firms, adjustments were made. The 4 firms for which adjustments were done are firms where the pension problems and accounting for pensions have been discussed on several occasions in the press:

- 6 of 8 analysts of Aker Kværner had performed adjustments to the recognised pension data (earnings/assets). Aker Kværner has been mentioned in over 100 Norwegian articles (source: internet search: "pensions+Aker Kværner") in the press and management journals (Kapital, Økonomisk Rapport and so on) during the last 2 years. The PBO, recognised pension liabilities and unrecognised amounts are significant relative to market capitalisation. However, the discussions have mostly been related to whether Aker Kværner could reduce some or most of the pension liabilities in the UK by not paying unfunded pensions or by selling the firm with pension liabilities (UK legal rules differ from Norwegian rules). Most analysts believed this was possible, but found it difficult to get sufficient and precise information from the management of Aker Kværner. Hence, the analysts of Aker Kværner who adjusted the pension data have made subjective adjustments to the pension liabilities in the balance sheet, ranging from adding the full unrecognised amount to only a small portion. Only 2 of the analysts had looked at and adjusted the pension assumptions used by performing (rough) recalculations. One had explicitly looked at the assumptions and accepted them.
- 3 of the 5 SAS analysts adjusted the net pension assets in the balance sheet, all with the unrecognised amount. The SAS pension problem (very high pension obligations and large unrecognised pension items) has received media exposure, especially after a Swedish analyst wrote an analyst report, "SAS' pension bomb," in 2003. The 3 analysts knew of this analysis.
- Hydro's pensions are not much discussed in the press, but especially after 1 analyst raised the pension issue with the management, it has been discussed among analysts - in particular the level of unrecognised actuarial gains and losses and the level of pension obligations. 6 of 9 Hydro analysts had adjusted the balance sheet pension liabilities with the unrecognised liability.
- Fred.Olsen Energy's pension obligations are probably the least known among the 4: I found no news reports of this special case, but among the analysts 3 of the 4 were aware of the case and had adjusted for it. Fred. Olsen Energy has (similar to Aker Kværner) a subsidiary in the UK with large pension obligations that are not fully funded and with large unrecognised amounts. According to the analysts, the management of Fred. Olsen Energy does not expect that they have to cover this obligation fully. Hence 3 of the 4 analysts have made adjustments to the recognised pension assets, but only with a fraction of the unrecognised amount.

The focus of my study of analysts is whether the analysts have analysed and adjusted for the abnormal pension *assumptions* for the 21 firms.

As one can see, only in 2 of the 94 relevant cases representing one firm (Aker Kværner) had analysts specifically (roughly) recalculated the PBO with a new set of assumptions or tested different assumption scenarios. In only one case were the new assumptions actually adopted.

I cannot claim that all the analysts *should* have adjusted the assumptions made by all the firms when calculating the PBO – but my analysis of the firms shows that many of the 21 firms' PBOs *probably* should be recalculated when they are to be used in valuations where earnings and/or book assets are used as the starting point.

Moreover, there should be no doubt that for my chosen 21 firms, the analysts *should* have taken a closer look at the pension data, and considered whether adjustments needed to be made. The result is, however, the opposite (Exhibit 7.9):

Exhibit 7.9 Analysts' review and analysis of the pension assumptions

	Number of cases	**vs. number of firms**	**Comments**
Not reviewed the pension assumptions specifically	31	15	
No explicit analysis of whether assumptions are acceptable	54		
Explicit review of assumption in the financial report	10	6	A-Kværner, Hydro, SAS, Schibsted, Elkem, Tandberg TV
Total	95	21	
Whereas (out of the 10 with explicit review) ▪ No explicit opinion on whether assumptions are acceptable	6	3	
▪ Assumptions are acceptable/do not have to adjust	2	2	A.Kværner, Schibsted
▪ Have adjusted/considered adjusting PBO	2	2	A-Kværner
▪ Analysis or discussions with the firms of assumptions not disclosed in the notes	0	0	

As my analysis shows, the result of the field study is that in 85 (31+54) of the 95 cases, representing 15 of the 21 firms, ***no*** *analyst reviewed or explicitly analysed the pension assumptions to review whether they were appropriate to use when valuing the firm.*

In contrast with the specific adjustment test, where I could confirm the answers by triangulation (reviewing the actual spreadsheets), and these responses (to the question: "have you reviewed the pension assumptions in the financial report") are based only on the verbal answers from the analysts. Hence, the answers could be biased or not truthful or the analyst might not remember his analysis correctly. One should, however, believe that if there is a bias, it would tilt towards wanting to be "clever", saying too often that one had looked closely at the assumptions (Schuman and Presser 1996). In that case even fewer analysts might actually have performed the assumption analysis, strengthening my conclusion.

The 10 cases (where the analysts had performed explicit review of the pension assumptions) represented 6 of the 21 firms: Aker Kværner, Hydro, SAS, Schibsted, Elkem and Tanberg TV. When questioned, in 6 of the cases representing 3 of the firms, the analysts had no explicit conclusion on whether the assumptions used should be adjusted or not when using them for valuation. (In one of these cases the analysts regarded changes in assumptions to have an immaterial effect on the valuation). In 2 of the cases representing 2 of the firms, the assumptions were viewed by the analyst to be acceptable for valuation purposes. In 2 of the cases, representing 1 firm (Aker Kværner), the analysts did adjust the assumptions made as discussed above.

My field study also showed that very few analysts had explicit discussions with the management of the analysed firm regarding the pension system, plans and accounting (Exhibit 7.10):

Exhibit 7.10 Analysts' discussions with the firm's management of pension accounting data

	Number of cases	**Number of firms**
Not discussed pensions/pension accounting with the management of the firm	83*	13
Discussed with management	12	8
Total	95	21
What discussed: ▪ Only in general about pensions plans/-system/IFRS-effects	3	3
▪ Also about possible changes in plans/likelihood of reduction of legal pension obligations	7	3**
▪ Also about the pension assumptions shown in the financial report	2	2***
▪ Also about pension assumptions not shown in the financial report	0	0

*Some (5) of the analysts knew (more or less) about some of the other analysts' discussion with the firm's management. Some had tried to ask the management in some firms regarding pensions, but got no answers.
** A-Kværner, Fred. Olsen, Kverneland
***Tandberg TV, Hydro

There had been explicit discussions with management in only 12 of the 95 cases (Exhibit 7.11), representing 8 of the 21 firms. In 3 of the cases this had been a more general discussion of pension plans, effects of the IFRS implementation and so on. In 2 of the cases (of the 10 cases where analysts had performed explicit analysis of the pension assumptions), the assumptions had been discussed with the management. In one of these cases the analyst concluded that the assumptions had to be changed in his valuation process. The remaining cases are primarily the discussions with management in Aker-Kværner and Fred.Olsen Energy of the likelihood of a reduction or elimination of the pension liabilities in the UK. In some cases (notably SAS), several analysts had asked about pensions, but not received satisfactory answers.

The results show that analysts rarely spend much time on or probe deeper into pension accounting data. This is the case in spite of the fact that many firms do not disclose the information regarding pensions required according to NRS 6 (see Chapter 5), or information

not required by NRS, but needed in order to perform a full analysis of whether the PBO is calculated using sound assumptions (see Chapter 5).

Exhibit 7.11 No. of cases where the analysts had discussed or made enquiries regarding pension accounting explicitly with management

Total number of cases	**95**
Discussed with management	12
Adjusted accounting numbers (also other adjustments than assumptions)	8*

* 4 of these cases are Aker Kværner

Based on these results one could conclude that the analysts following the listed firms in Norway, with the largest reported pension obligations and the most aggressive pensions assumptions, in most cases do ***not*** *analyse the pension data or question the assumptions. The cases where a thorough review is performed consist of a few abnormal cases well known from the media in the analyst community. In very few cases (2 of 95) were adjustments of the assumptions are made.*

I have only performed the test on the firms with the highest pension obligations and the lowest combined pension assumption factors. Relating to the external validity issue, one should, however also have reasons to believe that the conclusions are valid for the other listed firms in Norway with (relatively) smaller pension obligations and (relatively) less aggressive combination of assumptions.

When I got access to the analysts and their spreadsheets, I had to give absolute anonymity when I reported the results. Therefore I cannot disclose descriptive statistics of the analysts who adjusted/did not adjust, did logical errors a.s.o. since the number of analysts is so few. However, reviewing the results I find no bias in the groups (age, tenure, education, sex, Norwegian/foreign analysts) that might explain the results.

7.4 Possible explanations for the findings in the field study

In my research I have tested out some elements related to the semi-efficient market hypothesis (SEMH) developed by Fama (1970): Stock prices reflect all relevant, publicly available information.

The hypothesis is, by and large, backed up by empirical evidence over the years. Some contradictory findings exist, but as discussed, Fama (1998) rejects many of these findings. If the SEMH is true, standardized information about pension assumptions disclosed in the mandatory financial reports should be reflected in valuation models used by the experts on financial information and valuations, the analysts. I chose to study analysts because they are trained and fully occupied with analysing firms and performing valuation and stock price testing. Empirical research has shown that analysts predict future earnings and stock prices better than other groups (e.g. Brown et. al., 1987 (who also retested their earlier work)).

However, I find that only in the "extreme" cases, which are well-known to the public (SAS, Kværner, Fred. Olsen, partly Hydro), the analysts have adjusted pension assumptions and other accounting differences. In almost all other cases no analyst had adjusted for pension accounting differences with material value effect.

What could the possible explanation be? It is true that this research is done on a small stock market (Norway), where there are few analysts and low numbers of analysts following per firm (1-10). But the findings are so overwhelmingly negative that it is hard to believe that this is the only explanation.

If the SEMH does not hold, the underlying assumptions may not hold. The search for explanation for my results may start here. According to Ryan et al. (2002 p. 51) who sum up the (S)EMH theories, efficient pricing requires:

1. Market efficiency
    a. Sufficient demand and supply of traded items with little friction (transaction costs)
    b. Relevant information is available for everyone at a low cost

2. Rational investors

    a. Rational decisions, consistent behaviour over time and for different decisions

    b. Profit maximizing, but risk averse investors

The problems with these requirements relevant for my study (assuming market efficiency regarding demand/supply is fulfilled) are, in my opinion, primarily related to the information flow and decision process in today's markets (following the arguments of O'Hara 1998): There is an information overload in the market place, and collecting, sorting, and interpreting information is costly and complex for investors. Hence they use or rely on sell-side analysts to perform the most in-depth, complex, time-consuming and costly part of this task. Hence there is a group of informed, non-investing intermediaries who are supplying comprehensive information to (partly) uninformed investors. This leads to 3 problem areas regarding the theory requirements for efficient pricing:

- Re. 1b: Information is not available at low cost, and cost-benefit trade-offs must be made by analysts. Here pension information may suffer.
- Re. 2a: Rational, consistent decisions are difficult in the stock market due to information overload, uncertainty and complexity. Cognitive constraints, time pressure etc. force analysts (and others) to simplify decision processes, violating traditional decision theory. A complex area like pensions may be ignored.
- Re. 2b: The investor might be profit maximizing and risk averse, but the analyst, who is not investing, might have other, conflicting goals which result in biased analysis. Value-negative information like underestimating pension-obligations may be ignored, in particular if analysts tend to be overoptimistic.

This will be discussed in the following.

7.4.1 Re. 1b – Information is available at low cost

Information gathering, processing and analysis for stock valuation are often costly. This has been discussed and tested in research for decades (O'Hara 1998). Although much information is available at low cost (in financial reports, SEC filings, firm data issued, internet etc.), a lot of information is only collected through costly/time-consuming personal interviews by analysts with firm management, by attending conferences etc.

Pension data, however, is often easily and freely available in the financial reports. What's costly in my opinion is to transform the data into valuable information through acquiring knowledge and background information. Understanding the pension plans for each firm and the accounting rules are viewed as complex and time-consuming ("Jeg har brukt uendelig tid på møter med ledelsen og med analyser av pensjonsforpliktelsene i Aker-Kværner uten å bli noe særlig klokere; pensjonsforpliktelsen er kun tenk på et tall") (one of the interviewed analysts). In my survey most analysts say that the pension area is viewed as complex (88 % viewed the pension accounting rules as very complex or rather complex). They also think they know little about the rules (58 % do not know or know little of the NRS 6-rules, 72 % for the IAS 19*)*.

It will take considerable time for most analysts to first get the proper general education/training/skills about pensions, and then afterwards to understand the specific situation for each firm. And time is money for an analyst; the analysts in general are known to have very busy schedules, working long days and are well paid*. At least all analysts I interviewed had busy days with long working hours. Hence, they have to prioritize and to make cost-value judgements in relation to obtaining or analyzing different types of data. Many of my interviewees said that gathering information regarding pension was too time-consuming relative to the expected value of doing this – and hence skipped or just skimmed the area.

Hence, the first potential explanation of the findings of my study is that some data are costly to transform into information – like pension data. This is a violation to an important requirement of the SEMH.

7.4.2 Re. 2a: Rational, consistent decisions

The SEMH rests on the assumptions that investors consistently make rational decisions. The classical decision theory this is built on contains a set of consisting-enforcing axioms describing the choice events in an ideal environment (March 1988, 1994):

- The decision-maker has knowledge of all the (set of) alternatives.

* Routinely 1 mill. USD per year in the US, and some earn 15 mill USD per year according to Bruce (2002)

- The decision-maker has knowledge of the consequences, at least up to a probability distribution.
- The decision-maker has a consistent preference ordering.
- The decision-maker has decision rules.

In the most familiar form of the model, it assumes that all alternatives, the probability distribution of consequences conditional on each alternative, and the subjective value of each possible sequence are known. A choice is made by selecting the alternative with the highest expected value (March 1988). This emphasis on expected value is typically moderated by risk averseness in finance theory (e.g. Damodaran 2002). In valuation/price testing and forecasting, finance theory typically assumes that investors make Bayesian forecasts (alternative outcomes are weighted according to Bayes' rule) (Rust 1988).

In reality the market is buffeted by a continuous flow of information, more or less relevant, some information is correct, some is not: It's an information - or more precisely - data overload. This data is to be collected, analyzed and weighed by time and capacity constraints, and put into uncertain value models. Investment theory does not consider that human cognitive limitations, psychology or behaviour play a role in professional investor decision-making (Fama 1998).

But March (1988) and others reject the idealistic way of making decisions in the real world due to cognitive constraints and instead talk about the *limited rational decision maker/investor (*Hirshleifer and Teoh (2003) use a similar phrase - investors with *limited attention)* with:

- Limited cognitive capacity.
- Decisions as a consequence of history, patterns and context.
- Humans as interpreting decision makers, with inconsistent and different interpretations from person-to-person, and changing over time and space.

This results in violation of the rational investor requirement of the SEMH.

The theory of the limited, rational investor has been further developed in situations with attributes similar to that of investors or analysts: So-called naturalistic decision theory (Zsambok 1997, Hober and Wider 1997). A naturalistic decision situation is characterised by:

- The problem is ill-structured and complex.
- Information is incomplete, ambiguous and changing.

- Goals are ill-defined, shifting and competing.
- Stress is high due to time requirements and/or high stakes.

Decisions may involve multiple participants. In my point of view this decision situation is very similar that of an investor, or analyst.

Ill-structured complex tasks are characterized by the lack of an obvious, best procedure to use to solve the problem. It then becomes necessary to make a judgment as to the best way to proceed. In addition, these tasks do not allow the identification of a unique standard or process against which the quality of the decision choice can be compared.

Fundamental security analysis, which requires identifying an "intrinsic value" for a security, is a classic ill-structured complex task, so is portfolio selection. A brief survey of the investment literature will illustrate the wide range of opinions and justifications offered for selecting alternative formulas, data sets, and valuation paradigms. For example, should we set values based on cash flow discounting, or P/E ratios? Should we construct portfolios using a mean-variance optimizer, or some other asset allocation technique? Is risk a function of beta, or possible loss? As Charles Ellis (1993), the "Dean of Portfolio Management", succinctly summed up:

"Valuation is neither art nor science. It is instead a very special problem in engineering, of determining the most reliable and efficient way of reaching a specified goal, given a set of policy constraints, and working within a remarkably uncertain probabilistic, always changing world of partial information and misinformation, all filtered through the inexact prism of human interpretation (p. 51)."

The second principal naturalistic decision attribute is that *information is incomplete, ambiguous, and changing*. The frame of reference here for security analysts is that future outcomes and relationships are most important, not historical ones. Therefore, superior performance relies on accurate forecasting, a problematic process under the best of circumstances.

For example even with generally accepted accounting practices, it is difficult to ferret out firm-specific economic events related to accounting number changes. When one contemplates that future financial outcomes are also influenced by events and forces that cannot be put in quantitative or manipulability terms, forecasting becomes even more difficult. Finally, to

realize that positive feedback induces non-linearity in economic relationships is to recognize that the accurate identification of cause and effect is highly unlikely.

But naturalistic decision tasks are also difficult because *of ill-defined shifting and competing goals*. It is well known that decision makers often form their goals "on the fly". But even when they form them in advance, they cannot accurately predict how they will feel about the goal once it is achieved. This situation poses a major problem for the security analysts who must try to satisfy clients by estimating how their goals will change over time and estimate how security market will change.

Stress, the fourth naturalistic decision attribute, is clearly present in many investment tasks. Security analysts face the stress of limited time, high stakes, and personal responsibility.

Lastly, naturalistic decisions are characterized by the requirement that the decision-maker works with and is subject to constraints of decision-making "partners". In the investment decisions task, the investment professional must not only understand the objective of the client, but also comply with codified securities statutes, formal and informal codes of conduct, and norms of behaviour imposed by institutions and professional associations.

Although naturalistic decision theorists have developed a number of alternative models, the 4 primary decision behaviours are as follows (following the structure of Zsambak 1993, and March 1988, 1994).

1. Due to the limited cognitive capacity and time constraints, the decision*maker will not collect or analyze all data information. The decision-maker focuses on *some* alternatives, not all, and hence has an incomplete set of outcomes. The choice of *which* data differs from person-to-person, but is based on subjective expected (but unknown) values of the chosen vs. rejected data (Gaulin 2001).

2. Due to these constraints, neither optimal decisions nor consistent decisions are reached, but is not even necessary or desirable: A satisfactory ("good enough") rather than an optimal decision solution is sought, A given aspirations level is set, and once an alternative that meets that level is found, it is adopted.

3. Decision processes are context-dependent. Most importantly, ill-structured and complex decisions rely more heavily on intuition-inducing procedures focused on selected, qualitative information.

4. Decisions rely heavily on mental imagery and simulation. Problem recognition is based on mental imagery and simulation and cognitive processes emphasize analogical reasoning. Hence prior education, knowledge and experience play an important part in decision-making. Also, what other professionals think are important influences. Thus it is likely that overgeneralization will occur at times, and fad and fashion among analysts (Olsen 2001).

Thus, it is likely that investment professionals such as analysts will sometimes make investment valuation recommendations by "following the crowd". Empirical studies by Skiller and Pound (1989) and Nofsinger and Sias (1998) tend to confirm this.

In general according to March (1988 and 1994) and naturalistic decision theorists, decision makers like investors and analysts tend to pay more attention to information that appears more concrete, that is easier to integrate, and that appears more trustworthy.

I think that this theory helps explaining why analysts in my study did not analyse pension data properly. This is backed by other researchers and my own survey and data gathering from the interviews:

- Several other studies show that analysts' forecasts do not fully incorporate past information available at the time of their forecast: Lys and Sohn (1990), Klein (1990) and Abarbanell (1991).
- My survey shows that many analysts have training in accounting (there were no CPAs/HRS, but 54% have had specific education or training in accounting rules/analysis). However, 88% said that they viewed pension accounting/valuation as complex/very complex, and that they had little or no knowledge of the specific rules (58%). Hence, pensions are time consuming and "difficult to handle" and thus avoided.
- Most analysts do not think that earnings management is frequent (57%) or significant (69%) regarding reported pension data, and do not or seldom perform adjustments on reported data (75%). This was also confirmed in my interviews: "I do not think it is relevant for valuation, and that's why I do not dig into it". Another analyst said: "There was so much focus on pensions some years ago, but the only thing that came out of it was Kværner and SAS – so I do not focus on it any more". This is a cost/benefit priority of information based on *perceived* importance. My study has shown that pension liabilities and the frequence and significance of EM are much more important than the analyst think
- As my survey shows, most of the analysts use only a few standardised valuation models; smoothed cash flow prognosis for 5-10 years are made based on earnings forecast, (75%). Earnings/cash flow prognoses are based on reported historical earnings, with only a few adjustments to "normalize" or properly adjust for non-normal items, accounting differences etc. In addition, the analysts use multiples or

other low cost valuation techniques to verify the primary analysis. Each analyst typically sticks to his standard method for most analysis (89%), a "satisfactory" and not necessarily an optimal model. This way of working was confirmed through my field study.

- Hence, the valuation method itself is a process that filters out what is perceived as less important data, and standardizes which data to use – and only uses the ones the analyst thinks are relevant; all analysts I interviewed had a standardized spreadsheet with standard data to enter from financial reports. Of course this could be altered from case-to-case, but a typical comment to this when I asked about this was: "And I tend to stick to data I know how to handle". Several others had similar statements.

The decision theories discussed are generally also valid for investors' decisions, and hence may partly explain why stock prices perhaps sometimes do *not* include all relevant information: Many analysts responded to my field research regarding pensions that their valuation process is not very technically detailed when analysing accounting/historical data. Specifically, the responses indicate a movement away from analytical procedures towards more intuitive procedures as the decisions become more complex. "Det blir jo mye skjønn til syvende og sist". Olsen (2001) also finds this: 64% of his respondents (256 chartered financial analysts) tended to rely more on judgement and less on formal, quantitative analysis in complex valuations. 89% agreed that quantitative valuation models were less useful in analyzing securities of new or more volatile firms. 80% agreed that they tended to use procedures that were less costly, even though they were less accurate when a high level of outcome accuracy is difficult or costly to achieve. And 62% of the analysts agreed that they made decisions manageable by ignoring unlikely outcomes. Only 10% in the Olsen's survey say that they rank or weight different outcomes/alternatives, and only 18% said they used and recommended the value with greatest "weighted" attribute score. This way of decision-making is not in line with Baye's law. The findings assist in explaining why analysts have deemphasised or ignored pension data (although one should be somewhat sceptical to results from surveys where the respondents should agree or disagree with probing statements: They tend to get biased vs. "agree"; the questions shape the answers (Scwartz 1999), and may explain why analysts' price calculations do *not* include all relevant information.).

7.4.3 Re 2b Analysts bias

The analysts are not the investors themselves, but only professional valuators who sell or give their recommendations to the investors. Hence, understanding the analysts' role and biasness in their analysis might explain why they omit proper valuation of pensions, but these explanations might not be valid for other price formers in the market.

Research shows that analysts tend to be optimistically biased in their recommendation: Lim (1998), Brown (1998) and Richardson et al (1999) have all documented this. Each use over 100.000 firm-quarter observations and analyse IBES forecasts from approximately the same time period (from 1983/1984 to 1996/1997). The bias is measured to be on average positive, although declining. Studies using data also including the late 1990s showed higher bias-tendencies. Li (2002) showed that recommendations are strongly biased; from 1994 to 2000 he analysed over 250.000 analyst-recommendations, the average recommendation was 65% "buy" and only 4% sell (remaining "hold"). Li also reports similar results in other studies. This pattern can hardly reflect unbiased recommendations or a pattern appearing by chance.

To understand analyst recommendations, one must first understand the analyst cycle. This cycle is a description of all the forces that act on analysts in their making of a recommendation.

The first part is the source of much information to an analyst: firm management. Firm management provides financial projections about future earnings, and provides access to the analyst to members of firm management to discuss the firm's prospects. In this part of the relationship, the analyst is a non-paying client of the firm.

There is a second part to the relationship between firm and analyst. Most analysts work for firms that are investment banks or brokers. Investment banks/brokers solicit firms for business such as issuing bonds or additional stock for the firm. The relationship now may be that the firm is the client to the analyst and his firm. Since the analyst works for the firm, he must not get in the way of the investment banking/brokers marketing effort and, in fact, may be asked to help in that effort.

The next relationship is that of the analyst to the investor. The analyst provides the investor with information about a security. In return the analyst needs the investor to trade with the analyst's firm in order for his firm to generate revenues. Many analysts are judged based on the amount of trading flow they bring into a firm.

Finally, there is the link back to the firm. The investor will act on the information provided by the analyst (along with other information). This will affect the price, which is of great concern to firm management. As stock options became more prevalent in the 1990s, the concern of senior management seemed to turn from earning a large cash bonus to getting lots of stock options and maximizing their value. One should expect that this causes senior management of a firm to be very concerned about what investors think about the firm.

So why are analysts positively biased/influenced by this cycle?

- Obtaining direct information from a firm's management is crucial and gives a competitive edge. But it depends on management's willingness to give this information. Lim (1998) and Das et al (1998) have scientific evidence/arguments for management's normal behaviour is such cases: If the analysts are too negative in their analysis/issue sell recommendation, they may be cut off from information flow from a firm. Management is typically measured or receives incentive from increase in stock prices, and would tend to/have get incentives from price promoting analysts. Angwin and Peers (2001) report that Merill Lynch analysts were not able to communicate with the firm as they had downgraded AOL from buy to a neutral rating. During my field study, the analyst who reported SAS as a "pension bomb" and recommended "sell" had difficulties obtaining direct information or having meetings with management after this.
- Lin and McNichols (1998) and Dechow et al. (1999) among others, offer evidence consistent with the hypothesis that analysts are biased due to the link or incentives to the rest of their broker/investment-banking, earning money either on corporate finance activities or on trading stocks.
- Finally, analysts may "follow the crowd" (be positively biased due to the reasons above) in order to maximize their career and reduce career risk. Analysts are (also) measured on their ability to predict correct earnings or stockprices. According to the naturalistic decision theory (Olsen 2001) analysts will equally focus on avoiding failures (ensuring survival). Consistent with this, following the crowd (the other analysts or the "fashion") is less risky than having opposite views. Jagadeesh and Titman (2001, which updates and reconfirms their 1993 study) show short-term momentum on stocks, especially upwards. Hence, when stock prices are up, it is "low risk" to recommend further price increases: "buy" ("your trend is your friend" is a common slogan among analysts) also for "academic" reasons. It should also be easier to explain to the investor after the stockprices fell (after a period of increase), that "everyone else" also was wrong.

The biasness is relevant for explaining why analysts in my study omitted or underweighted the effect of pensions:

- In all my cases, the value effect of adjusting for the pension assumptions/ accounting practices in the valuation model was *negative*.
- According to the research and arguments above, analysts may intentionally or unintentionally like to avoid value-negative information, like the negative pension

information. Easterwood and Nutt (1999) document evidence that analysts overact to good earnings information, but underreact to negative earnings information.

- In my field research period (spring 2005), many respondents said that the market was not focused on the pension issues at that time. They explained that price forecasting in their point of view is a combination of fundamental value analysis and understanding the price effects of trends/fad and fashion. Fad and fashion would lead to over /underweighting certain facts, and moving prices away from unbiased intrinsic values (Camerer 1998). Pension items were viewed as "fashionable" around 2000-2002, but not now according to several of my respondents. Hence, the analysts now might underweight information and value relevance of pensions. This is in line with overall findings of analysts and investors following "fads and fashion" (Camera 1998).

In his 1998 article, Fama discusses the anomalies found in empirical testing of the market efficiency model. He rejects the attacks, and especially the theories of behavioural finance as substitutes or explanation to the (S)EMH. Fama argues against the anomalies studies mostly by using the bad model argument (Roll 1977) or criticises the statistical empirical work in many of the studies. My method in my study is to avoid market price vs. pension data reported tests, but to directly analyse how analysts have used the information in their valuations. Hence Fama's critique is not relevant here.

Following the reasoning of Friedman (1953), Fama concludes that "following the standard scientific rule, however, market efficiency can only be replaced by a better specific model of price formation, itself potentially rejectable by empirical tests" (p. 284). But he admits "like all models, market efficiency … is a faulty description of price formation".

He forgets Friedman's most important criteria for a good theory: It must predict reasonably well the real world in empirical tests (Friedman 1953). I think we have seen enough market anomalies and empirical rejection of EMH the recent years, that we should use the EMH or that "prices (more or less) fully reflect available information" (Fama 1998, p. 284) with caution.

Hence, my study further contributes to this caution: At least not all analysts' price estimates reflect available information. Security prices reflect the results of the analysts' analysis (Schipper 1991, Beaver 2002). Hence, the stock prices might not be unbiased – in conflict with the SEMH.

8. Conclusions, summary and suggestions for further research

"*Pension accounting is a magnificent example of all that is right and wrong with accounting"* (Henriksen and van Breda 1992, p. 757).

My research indicates that influential and skilled market participants, the analysts, have not fully understood pension accounting when they use the pension information in the financial reports as input to their stock valuations. And even more important; they do not seem to discover earnings management performed on pensions and do not adjust for the managed information/numbers in their valuations.

In my research I have discussed pension accounting and how the rules relate to the IASB Frameworks, the FASB Concepts Statements, the basic accounting principles in Norway and asset pricing theories in general. I have then, by using a database I have constructed of pension information disclosed by Norwegian listed firms, tested whether there are earnings management indications re. pensions, and then finally tested whether the analysts following the firms have detected the earnings management and adjusted for it in their valuation models.

The conclusions are:

- The Norwegian, IAS and USGAAP accounting rules for pensions are not in line with the Frameworks and Concepts or in line with the accounting rules treating similar situations.
- However; the valuation of pension assets and pension liabilities disclosed in the notes of financial reports are close to theoretically accepted valuation models, and should fit directly into most analysts' valuation models.
- Hence analysts should adjust the reported/recognised financial numbers with the information found in the notes. However; if these numbers are managed the analysts have to do their own calculations or adjustments using the disclosed information.

So I tested for earnings management in the Norwegian stock market context, and tested how the analysts treated pension information:

- The assumptions used to calculate the pension liabilities are influenced by earnings management (significant at the 5 % confidence interval, twosided test, only firms with significant PBO in % of total assets where included, 40 firms in the sample): firms with low equity ratios use "optimistic" assumptions; assumptions that reduce their recognised pension obligation (to avoid an even lower equity ratio) and vice versa; there are indications that firms with high equity ratios in use "pessimistic"

assumptions, harming their equity ratio somewhat- but as a result (in most cases) improve their future recognised earnings.

- Did the analysts discover this and adjust for it in their valuation models?
  I interviewed and checked the analysts' spreadsheets (94 cases) for the listed firms in Norway with the most abnormal pension assumptions and where adjustments to normal assumptions would have highest impact on the firm's equity ratio: (21 firms). In only 2 of the 94 cases the analysts had done any adjustments at all. The adjustments were done only on the firm that had been heavily focused on using abnormal pension accounting/pension assumptions in the press. Hence the answer to the question posed is clearly no.

I will discuss further some of these findings below.

The pension accounting rules: There are at least 4 fundamental aspects, which are special for pension accounting, and which are not in line with the relevant Framework or Concepts, and are difficult to defend when one compares the rules with the rules in other accounting standards treating similar situations:

- *Deferred recognition*; not to immediately recognise changes in pension asset values, actuarial gains and losses, and new, updated best estimates of the value of the earned pension liability (the PBO).
- *Net cost presentation* of all pension costs and income, normally shown under operating income. However, the net cost includes financial items as the return from pension assets and calculated interest on the pension liability.
- *Offsetting pension assets against pension liabilities.* The assets are at the firm's risk and reward, and the pension contract (and hence the liability) is between the employee and the firm –hence they represent separate risks and should not be netted: The balance sheet is underestimated and equity ratios too low in the presentation in the financial reports.
- *To recognise an average expected return on pension assets:*
  The (estimated) actual return for the period should be recognised.

As shown, at least FASB were fully aware of many of the negative sides even in 1986 when they issued FAS 87. FASB, IASB and NRS have tried to modify the negative sides in two ways:

By explicitly stating at the implementation of IAS 19, FAS 87 and NRS 6 that the development of the standards should be a continuing process towards "good accounting practice". However, little has been changed in the last 10-20 years since the standards were

implemented, but there have been many changes in similar standards with increased focus on fair value measurement and immediate recognition.

Increased requirements of disclosures in the notes are also attempts to modify the negative sides of pension accounting: The notes show a reconciliation of differences between recognised amounts and best estimate amounts, and disclose the key assumptions. The complexity of pension accounting, combined with the unusual accounting treatment is used as the explanation for the high level of required disclosures in all standards. This way of reasoning seems to stem from a point of view that the users and the market may utilize equally, or almost equally, publicly available information, regardless of whether the information is recognised or not, and whether the information is displayed "visibly" on the face of the balance sheet or "hidden" in the notes. Bernard and Schipper (1994) confirm that this tends to be the view of the academics, and that this point of view is followed by the regulators (Dechow and Schinner 2000 and Fields et. al. (2001)). However, as my literature review has shown, this has been proven wrong in many empirical studies (see 4.1.2). More importantly, this view is not in line with the statement in the Concepts or the Frameworks of the relative importance between recognition/non-recognition and where the information is disclosed: "Since recognition means depiction of an item in both words and numbers, with the amount included in the totals of the financial statements, disclosure by other means is not recognition", (FASB Concepts No. 5 § 9). IASB Framework § 21 states that notes are additional information that are relevant to the needs of the user, about risk and uncertainties, and supplementary information, clearly indicating the lower rank (and importance) of notes. The NoU (1995) to the Accounting Act in Norway has an almost identical statement.

Schipper made a speech at the AAA conference 2005 that made considerable attention. She addressed the importance of the balance and relativeness of disclosed information vs. recognised information. She states that "disclosures and recognition are *not* alternatives". She refers to the theory of investors who are not subject to constraints on ability to process information, but concludes that, "based on results of experiments, users appear to underweight (or ignore altogether) disclosures". These viewpoints combined with my findings below, could be worthwhile to consider when discussing revisions of the pension accounting standards: With the increased use of fair values and immediate recognition of estimate changes, there should be no reason not to recognise differences between actual and assumptions, new estimates and plan changes immediately. In fact this would significantly

simplify the accounting rules. (Perhaps a "corridor" should be accepted since precise estimates of assumptions are difficult, but then all differences outside the corridor must be recognised immediately). The net cost and the offsetting feature should not be accepted. More information about assumptions should be disclosed, and more precise rules for the assumptions should be developed.

The findings above also had a major influence on my research questions:

- Do the security prices reflect "properly" the information disclosed about the pensions in financial reports, tested by verifying whether influential market participants here, the sell-side analysts, "see through" earnings management and/or different accounting practices or assumptions regarding pensions – in Norway - when they value stocks?

In order to test this I had to study asset pricing models for stocks, and how the information disclosed in financial reports could be used for valuations. To sum up, based on the most frequently used valuation models and teqniques by analysts (tested in my survey shown in the Appendix), the adjustments an analyst has to do when doing a practical valuation of a firm (then he normally uses operating *income* as the starting point to calculate future cash flows):

- Use the market value of pension assets and the present value calculation of the pension liability (PBO) found in the notes as long as the assumptions represent best estimates and the discount rate is in line with the model requirements.

- View pension assets and earned pension liabilities (PBO) as financial assets and add them to the calculated enterprise value.

  Only the annual service cost (found in the notes and may be used as the basis if it is calculated using the current best estimates) of the pension cost should be included in earnings or cash flow from operations. The annual recognition of a portion of the accumulated actuarial gains and losses must be removed from earnings when calculating an enterprice value, as well as the financial items arising from pension assets and pension liabilities.

But I did not only want to see how analysts treated pension information in their valuation models; I also specifically wanted to see whether they discovered and adjusted for earnings management regarding pensions. The discussion of the pension accounting rules showed that many of the assumptions are left at management's discretion, and different assumptions

significantly affects reported and recognised values. This creates opportunities for earnings management (EM).

There are many different definitions of EM in the literature; but after some discussion I suggested using the definition suggested by Healy and Wahlen (1999) with some minor adjustments:
"Earnings management is when the ones responsible for preparing or accepting external financial information purposefully use their discretion in financial external reporting and in structuring transactions to alter or omit information in financial reports, either to mislead some external users about the underlying economic performance of the firm, or to influence contractual outcomes that depend on reported accounting information".

The context for my analysis was in Norway. There was no database or prior complete analysis of the pension accounting practices for firms listed in Norway. Hence I had to construct a database, and use it to analyse accounting variations for pensions. I used data from 1994 and 2004 (the years that pension accounting had the highest impact on the firms recognised equity since new pension accounting standards were introduced with immediate recognition of the pension liability) from all listed firms in Norway. I found high accounting variances, especially on some assumptions used to calculate the pension liability (the PBO) that should be firm-independent in most cases: the discount factor, the expected salary increase, and the expected regulation of the governmental portion of the pension plan (the g factor). Combining these 3 factors I constructed a combined factor; the PAF, which could be used to compare the firms. My findings regarding earnings management were:

For the 2 years where the full effect of the unrecognised net pension liabilities (in most cases) were charged directly to equity 1994 and 2004, there are strong indications that firms with lower equity ratio chose a combination of pension assumptions resulting in lower pension liabilities (all else being equal) than firms with higher equity ratios. Hence there are strong indications of earnings management in the pension accounting area for listed firms in Norway, and the effect could significantly affect the reported book equity and operating profit.

I have found no specific empirical testing of EM on listed firms in Norway before, so the results should be of high interest.

The EM in pension accounting could be tested vs. stock prices to find out whether "the market" "sees through" EM in the pricing of a stock, as the semi-efficient market hypothesis says it should with publicly, disclosed information. But as Fama (1998) and Kothari (2001) said, most of the market-efficiency empirical studies are "fraught with methodological problems". With few numbers of firms in my sample, the methodological problems would be significant.

Hence, to avoid this I performed a test where I could do more in-depth research on how pensions are treated in stock valuations by influential market participants by doing a field study on analysts. Hence I avoided many of the methodological problems with unknown valuation models and many explanatory factors, since I was directly observing the analysts' valuation models. I have not seen such a comprehensive field-study of analysts' actual valuation models, and hence my study, combined with the survey, also should generate more insight into the work and models of analysts.

Using the database and the earnings management results, I chose the 21 firms with the lowest PAFs and where the pensions (the PBO) were significant in % of total assets, and tested how all the analysts following these firms had treated pension information in their valuation spreadsheets by physical inspection and interviews in the field (this resulted in 94 cases).

The pension assumption sensitivities for the tested firms are illustrated by showing the effect if PAF had been increased from the specific PAF calculated for each firm to a PAF of 1.25 in 2004 (which I calculated as a norm for an average firm). Total PBO would increase by approx. NOK 72 094 mill (vs. recognised pension liabilities of NOK 83 548 mill) for the 21 firms in 2003. This represents 69% of book-equity of the 21 firms as of December 31. 2003. The book equity ratio would have been on average 18% (vs. reported 35%) *if* this PBO had been recognised when implementing IAS 19 as of 1.1. 2004.

I do not claim that the analysts have to adjust reported pension values according to my suggested PAF, but I claim that the analysts should have detected the differences in pension assumptions and made their own value adjustments or received firm-specific satisfactory answers on variances.

Only in 2 of the 94 relevant cases representing one firm (Aker Kværner) had analysts specifically (roughly) recalculated the PBO with a new set of assumptions or tested different assumption scenarios. In only one case were new assumptions actually adopted.

Hence, in almost none of the cases tested (except for a few publicly known abnormal cases) had the analysts adjusted for abnormal pension assumptions/possible EM. Hence, the conclusion is that in a complex accounting area such as accounting for pensions, even an influential group experienced and dedicated to firm analysis, the sell-side analysts analysing listed firms in Norway, does not detect and adjust for abnormal pension assumptions even if they are disclosed.

In my research I have only tested out some elements related to the semi-efficient market hypothesis (SEMH) developed by Fama (1970): Stock prices reflect all relevant, publicly available information. I have only shown that analysts' of Norwegian listed firms do not detect or adjust for abnormal and even earnings managed pension information in their valuations. But this leaves a question mark whether the market has revealed and fully included complex disclosed and perhaps earnings managed information (also including other areas than pension information) in the stock price. Other studies have shown that there are tendencies of analyst bias, but studies also have shown that the market is influenced by the analysts, and hence their biasness. It is true that this research has been done on a small stock market (Norway), where there are few analysts and low numbers of analysts following per firm (1-10). But the findings are so overwhelmingly negative that it is hard to believe that this is the only explanation.

What could the possible explanation be? This I have discussed in my last part of the thesis: The (S)EMH requires that information is available at low cost (including cost of the knowledge to interpret the information) and that the desicion makers are rational and consistant. This might not be true. This follows the arguments of O'Hara (1998): There is an information overload in the market place, and collecting, sorting, and interpreting information is costly and complex for investors. Hence they use or rely on sell-side analysts to perform the most in-depth, complex, time-consuming and costly part of this task. Hence there is a group of informed, non-investing intermediaries who are supplying comprehensive information to (partly) uninformed investors. This leads to 3 problem areas regarding the theory requirements for efficient pricing (the SEMH):

- Information is not available at low cost, and cost-benefit trade-offs must be made by analysts. Here pension information may suffer.
- Rational, consistent decisions are difficult in the stock market due to information overload, uncertainty and complexity. Cognitive constraints, time pressure etc. force

analysts (and others) to simplify decision processes, violating traditional decision theory. A complex area like pensions may be ignored.

- The investor might be profit maximizing and risk averse, but the analyst, who is not investing, might have other, conflicting goals which result in biased analysis. Value-negative information like underestimating pension obligations may be ignored, in particular if analysts tend to be overoptimistic.

Following the reasoning of Friedman (1953), Fama concludes that "following the standard scientific rule, however, market efficiency models can only be replaced by a better specific model of price formation, itself potentially rejectable by empirical tests" (p. 284). But he admits "like all models, market efficiency…is a faulty description of price formation".

He forgets Friedman's most important criteria for a good theory: It must predict reasonably well the real world in empirical tests (Friedman 1953). I think we have seen enough market anomalies and empirical rejection of EMH the recent years, that we should use the EMH or that "prices (more or less) fully reflect available information" (Fama 1998, p. 284) with caution.

Hence, my study further contributes to this warning: At least not all analysts' price estimates reflect available information. Security prices reflect the results of the analysts' analysis (Schipper 1991, Beaver 2002). Hence, the stock-prices might not always be unbiased – in conflict with the SEMH.

The results give suggestions for further research:

- Research most closely related to my study is to follow-up the study after some years (as the IAS 19 has continued deferred recognition principles and discretionary pension assumptions). This will show whether the market participants have learned from my and other studies and would add time-series studies to my cross-sectional study.
- Moreover, although these have methodological problems, market efficiency tests regarding EM in pensions using the PAF could be conducted if/when more data is collected.
- The investigation of whether also other complex accounting areas such as financial instruments, biological assets are not fully understood, interpreted and adjusted correctly in valuation by market participants such as the analysts.
- Further research of the EM tendencies in Norway in areas other than pensions; there has been little empirical research in this field in Norway.

- Further investigation of the analysts' valuation models; how areas other than pensions are corrected for vs. reported earnings numbers when performing DCF-valuations.
- The results from my survey about valuation methods, combined with the findings from the field study of the practical valuations and methodological errors could be investigated further and extended to gain a more general but deeper insight in how analysts work.
- A deeper understanding of how market participants behave vs. the theory of the rational investor, by having more in-depth field studies of the analysts: how they collect, interpret and use information in valuation. As shown there is little deep insight into these problems.

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Most used abbreviations

(S)EMH:	(Semi) Efficient Market Hypothesis
FAS(B):	Financial Accounting Standards (Board) (US GAAP)
IAS(B):	International Accounting Standards (Board)
IFRS:	International Financial Reporting Standards issued by IASB
NOU:	Norges Offentlige Utredninger; Official Norwegian Reports
RL:	Regnskapsloven av 1999; Norwegian Accounting Act
GRS:	God RegsnskapsSkikk; Good accounting practice recommendations issued by NSRF
NSRF:	Norske Statsautorisertes Forening; Norwegian Institute of State Authorized Pu Accountants
NRS:	Norsk RegsnskapsSkikk; Good accounting practice recommendations issued by NRS; No RegnskapsStiftelse; Norwegian Accounting Standards Board
NRS 6:	NRS No. 6; "Pensjonskostnader"; "Pensioncost"
IAS 19:	IAS No. 19; "Employee Benefits"
FAS 87:	FAS No. 87; "Employers' accounting for pensions"
G/G factor:	Grunnpensjon; the base pension level in FT that defines the governmental pension level
FT:	Folketrygden; Governmental pensionplan for all Norwegian citizens
AFP:	AvtaleFestet Pensjon; regulated early retirement plan subsidised by the government
PBO:	Projected Benefit Obligation; the PBO as of a date is the present value of all bene (normally paid in cash from retirement date) attributed by the pension plan's benefit form to the employee service rendered prior to that date
SC:	Service Cost; the annual recognised pension cost related to the present value of the bene attributed by pension plan's benefit formula to the employee service rendered *in the curr period/year*
PAF:	The combined Pension Assumption Factor; a combination of the expected salary increase, G factor and the discount rate used; important assumptions defining the PBO
EM:	Earnings Management
DCF:	Discounted Cash Flows

Appendixes:

- Appendix 1: Descriptive statistics for firms listed in Norway in 2003
- Appendix 2: Survey questionaire to Norwegian analysts
- Appendix 3: Answers to the questionaire to Norwegian analysts
- Appendix 4: Design and results of the survey vs. analysts
- Appendix 5: Interview and data collection schedule used in fieldstudy when interviewing analysts following listed firms in Norway.

Appendix: 1 2003 data

Total number of listed firms that issued annual reports for 2003 when listed is 174. 131 of the firms state that they have defined benefit plans:

- 4 state that they only have unfunded plans.
- 4 firms state that they recognise errors in estimates and changes in pension plans immediately, the remaining 128 defer these effects.
- 1 of them state that they have started/converted to defined contribution plans from now on (but still has defined benefit plans/obligations from the past).

Of the remaining 43 firms, 6 state that they have defined contribution plans, the remaining state that they have no/insignificant pension obligations or say nothing.

Overall 2003 also seems like an average performance year; operating profit on average 10,8%, net profit after tax 4,5%. Average equity ratio is lower than in 1994; 21,9 %.

Total net pension assets in the balance sheet is low; net pension assets of 3.339 mill NOK (0,1% of total assets). Sum of all PBO's are NOK 140.460 mill (6,1% of total assets), and gross pension assets are 112.060 mill NOK (4,9%). Norsk Hydro (29.233/18.719),SAS (20.755/21.378),Aker Kværner (20.086/16.402) and Statoil (17.641/15.143) have the highest NOK amounts. (NOK mill gross pension liabilities and –assets in the notes, respectively). The highest PBO's in % of total assets have Norsk Vekst (82%), Aker Kværner (64%), Stavanger Aftenblad (57%), Adresseavisa (46%) and Schibsted (28%).

From the 2003 data the same pattern as for 1994 can be seen; high variability in significance and absolute values of pensions and pension assumptions.

The combined assumption factor; varies from 0,43 (Kverneland and Q Free) to Amersham (1,34). The discount factor varies a lot; from 8% (Elkem) to 4% (Raufoss).

Descriptive statistics listed firms 2003

Descriptive statistics for firms listed in Norway in 2003*

	NOK mill.	%
No. of listed firms issuing fin.reports	176	
No. of listen firms with defined benefit plans	130	
Total sales for all firms	970.591	
Total operating profit	98.451	10,8% of sales
Total net profit	38.478	4,5% of sales
Total assets	2.300.858	
Total book equity	463.606	21,9% of assets
Pension data:		
Total pension assets in balance sheet	19.155	
Total pension liabilities in balance sheet	15.816	
= Total net pension liabilities (assets) in balance sheet	(3.339)	
Total gross pension assets in the notes (≈market value)	112.060	
Total gross pension liabilities (PBO etc) in the notes	140.460	6,1% of assets
= Total net pension liabilities (assets) in the notes	28.400	
Acc. unrecognised amount	33.107	
Total net charge against equity as of 1.1	NA	
Total (net) recognised pension cost	8.600	
Total (gross) recognised return on pension assets	5.210	
Total (net) recognised financial (income) on pensions	447	

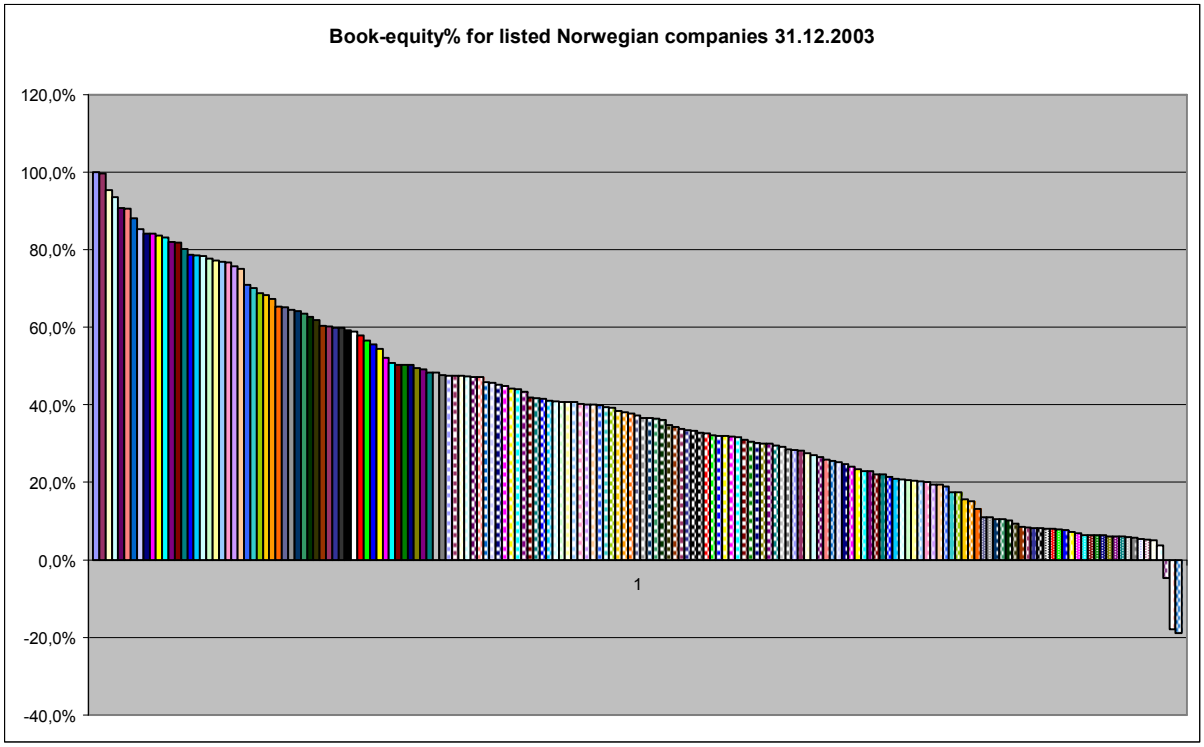
No. of listed firms in Norway listed in the whole of 2003, and listed while issuing financial report for 2003.Balance sheet items as of 31.12

Descriptive statistics of pension assumptions for 2003 datasamples*

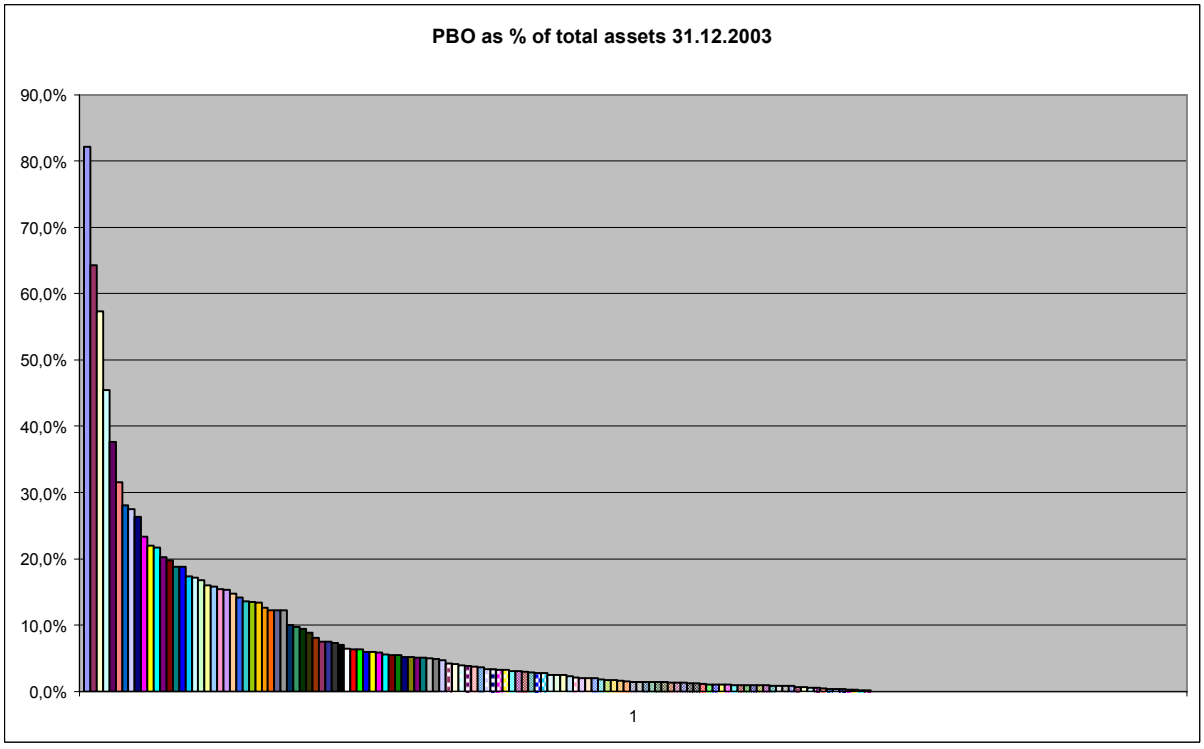
	Meal	Medium	Std.dev.	Mean lower decentile	Mean upper decentile
Return on assets %	6,97	7,0	0,47	6,0	8,0
r= discount factor %	6,01	6,0	0,38	5,2	7,1
s=salary increase %	3,13	3,40	0,35	2,3	4,0
g=G increase %	2,85	3,0	0,38	1,9	3,7
PAF=pensions ass. factor**	0,69	0,63	0,14	0,47	1,04

* 130 listed firms in Norway with defined benefit plans in 2003

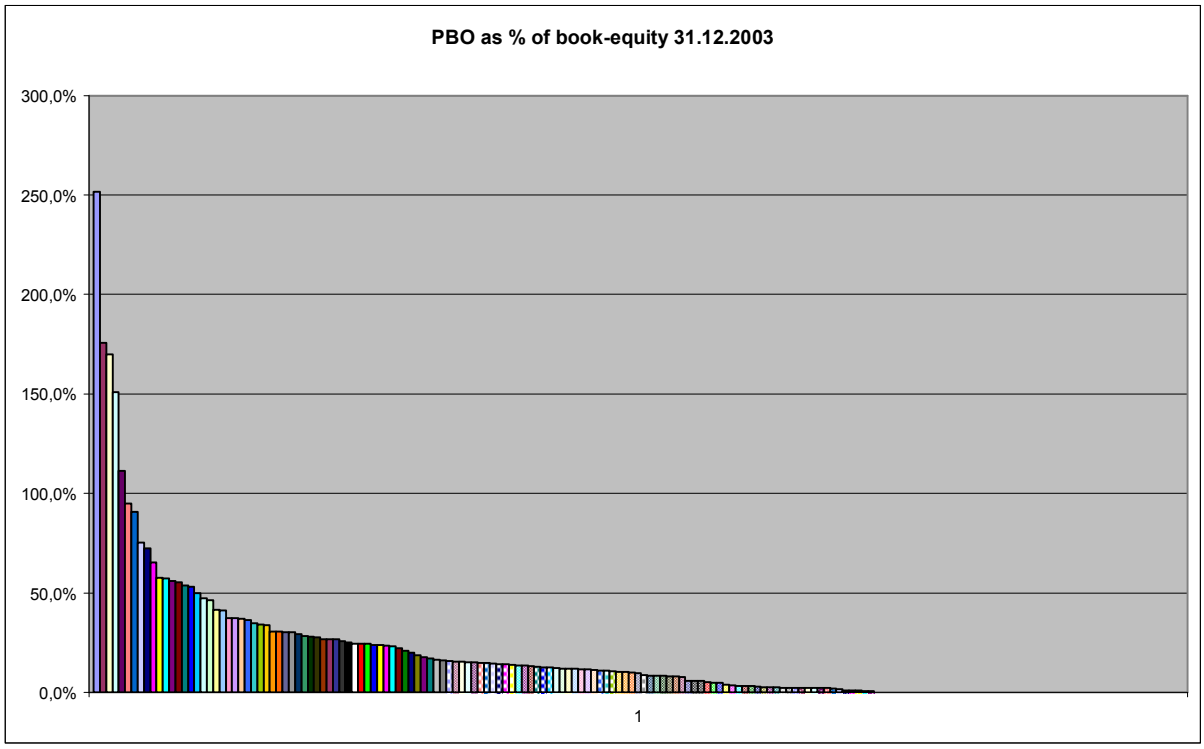
**PAF= combined pension assumption factor= assuming n=20 and y= 75%



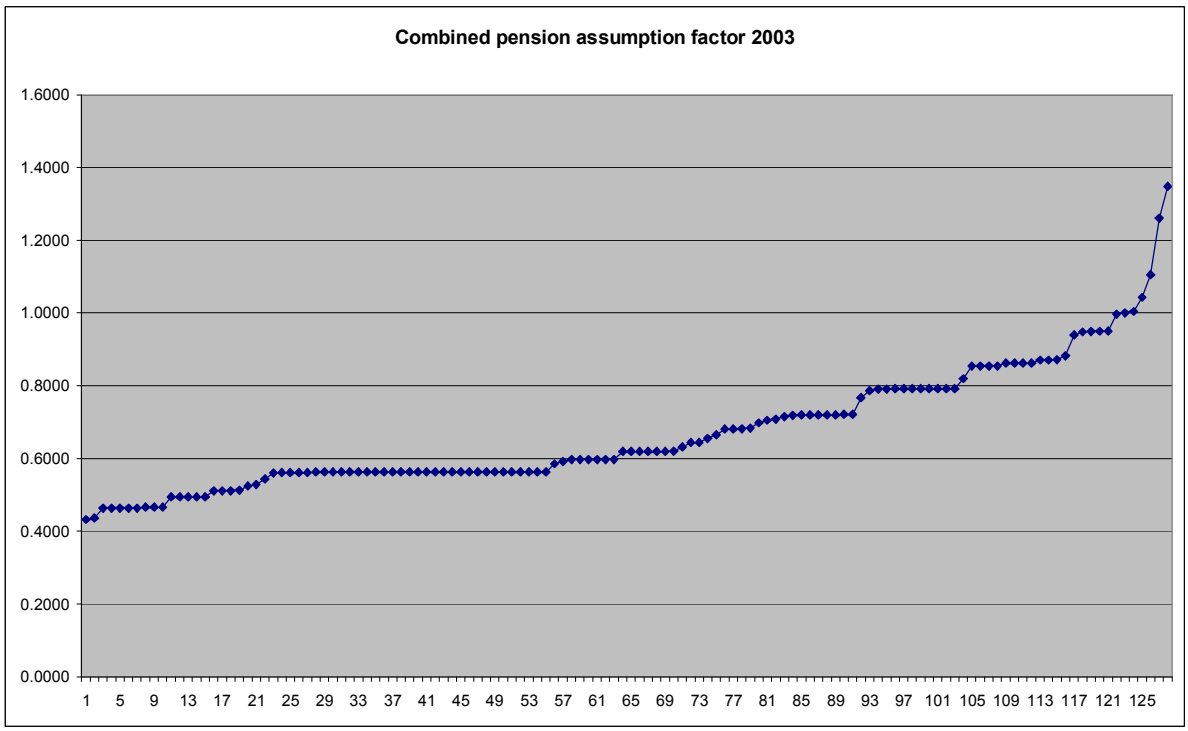
*Equity/total assets per firm who where listed in Norway in the whole of 2003 and issued financial report while listed, 176 firms, recognised figures as of December 31.1994



*PBO/total assets per firm who where listed in Norway in the whole of 2003 who issued financial report while listed, 176 firms, recognised assets and PBO as disclosed in the notes as of December 31.1994

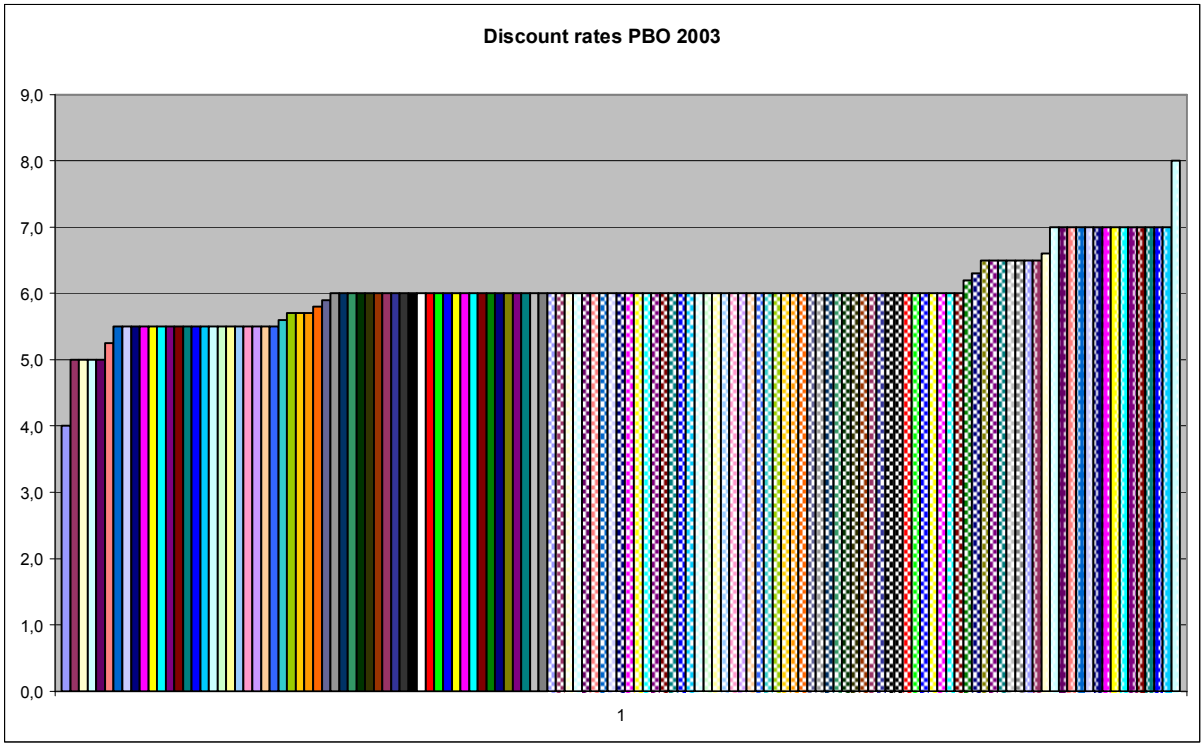


*PBO/equity per firm who where listed in Norway in the whole of 2003 and issued financial report while listed, 176 firms, PBO as disclosed in the notes and recognised equity as of December 31.1994

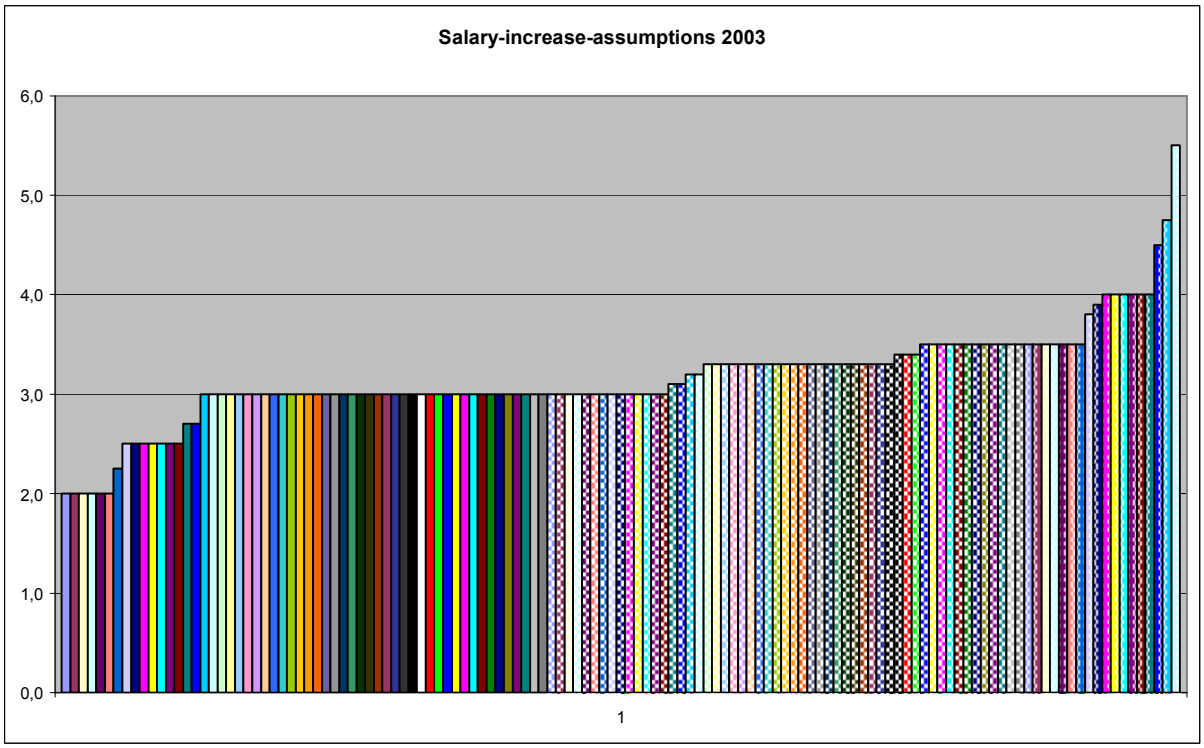


*Combined pension assumption factor (PAF) calculated per firm using the assumptions (r=discount factor, s=expected salary increase, g=expected G increase) disclosed in the notes of the financial report used to calculate the PBO. Shown in ranked order per firm who had defined benefit plans and who where listed in Norway the whole of 2003 and issued financial report while listed. 130 firms. Assumed weighted average time to pensionsettlement 20 years (n=20) and assumped that governmental pensions pays 75% of gross defined pensions (y=75%). PAF= 4((1+s)n y(1+g)n)

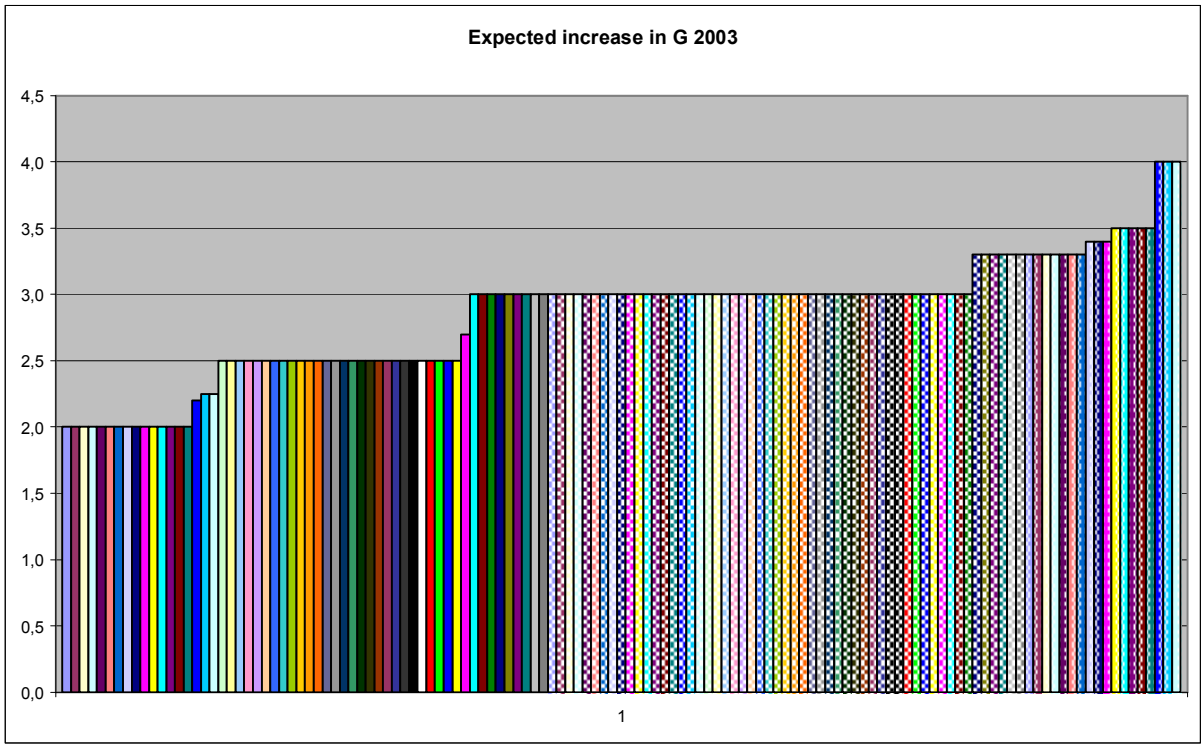
(1+r)n



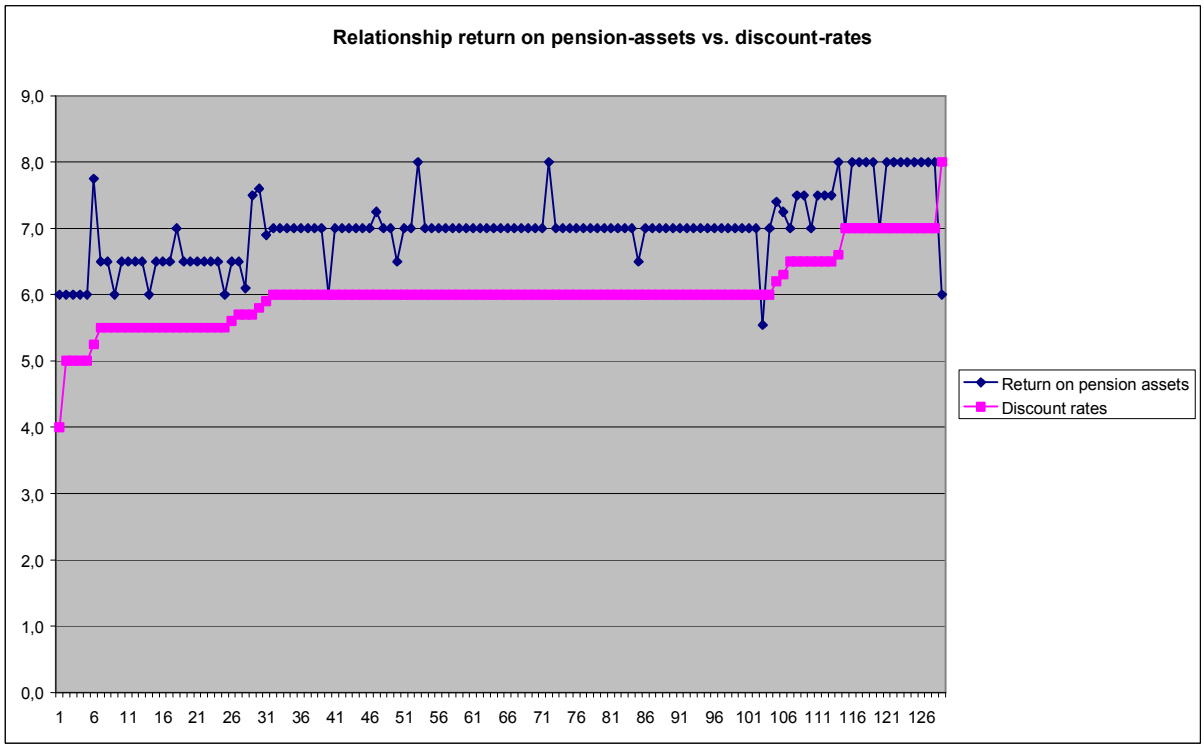
*Discount rates disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (130) who where listed in the whole of 2003 and issued financial reports while listed.



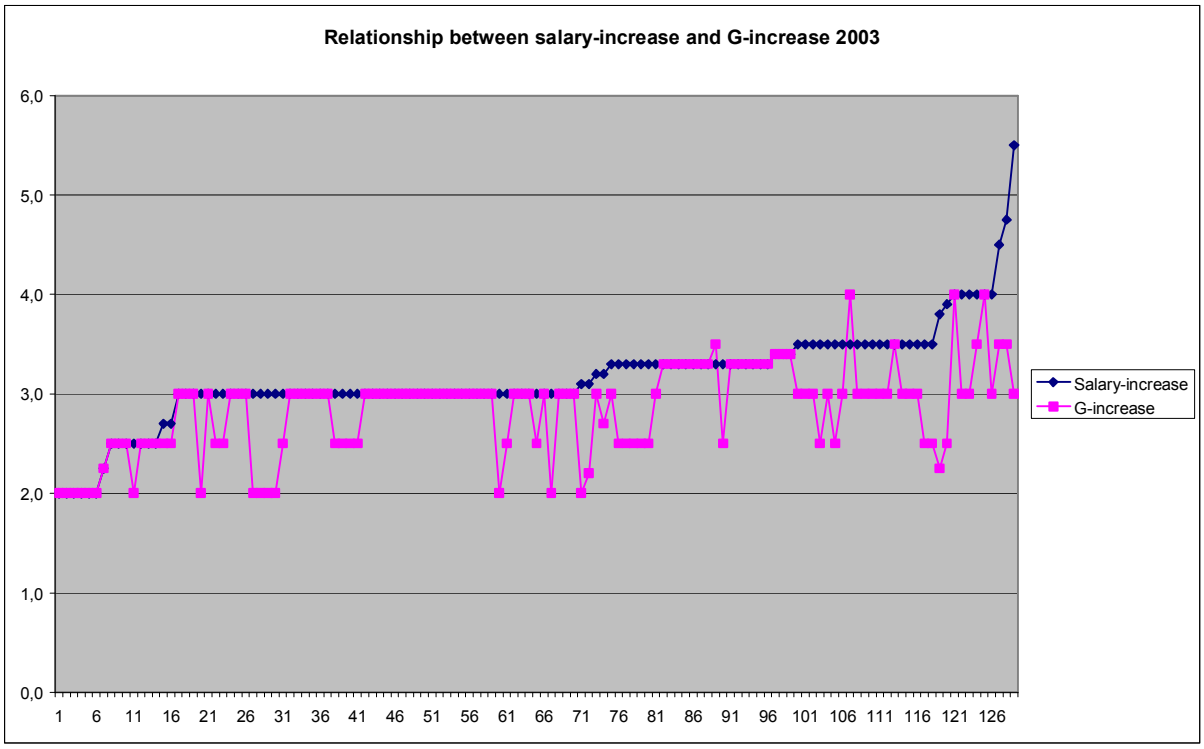
*Expected salary increase disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (130) who where listed in the whole of 2003 and issued financial reports while listed.



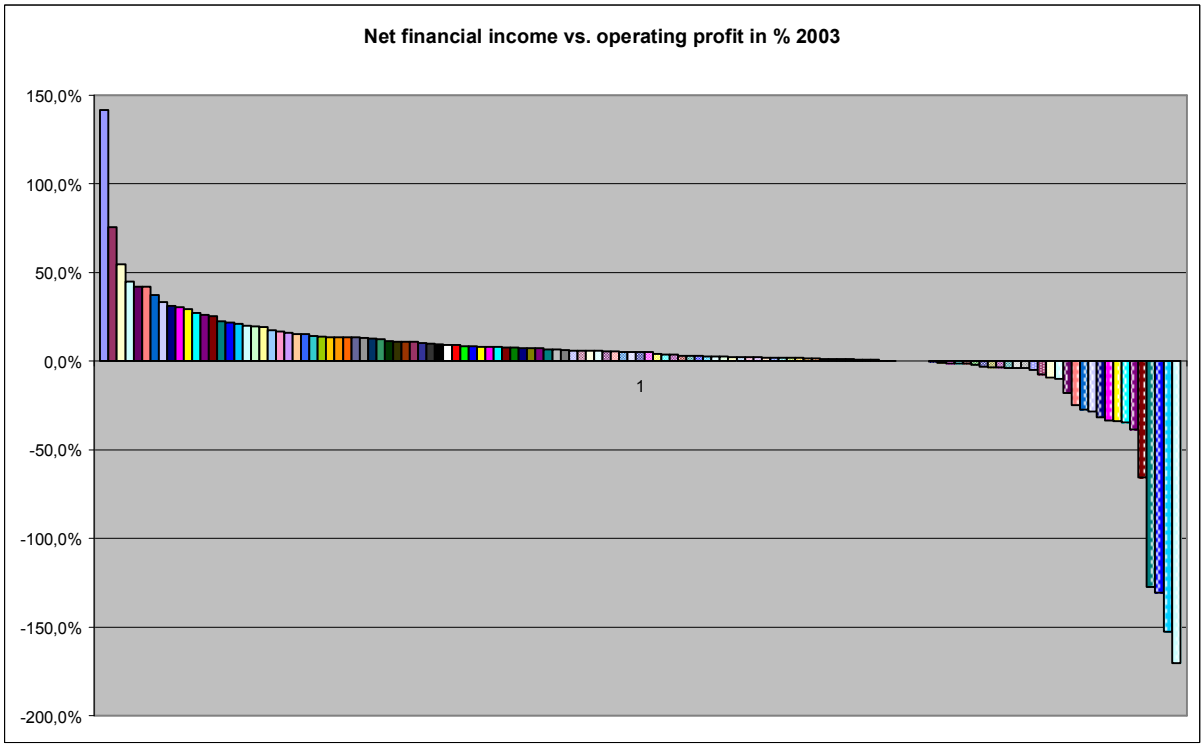
*Expected increase in G factor disclosed in the notes used when calculating the PBO in % per firm. Includes all firms with defined benefit plans (130) who where listed in the whole of 2003 and issued financial reports while listed.



*Recognised returns on pension assets and discount rates used when calculating the PBO shown for the same firm in % ranked by ascending discount rates. Numbers disclosed in the notes. Includes all firms with defined benefit plans (130) who where listed in the whole of 2003 and issued financial reports while listed.



*Expected salary increase and G increase used when calculating the PBO shown for the same firm in % ranked by ascending salary increase. Numbers disclosed in the notes. Includes all firms with defined benefit plans (130) who where listed in the whole of 2003 and issued financial reports while listed.



*Net financial pension income (return on pension assets minus interest cost on PBO) /operating profit in % per firm who where listed in Norway in the whole of 1994 and issued financial report while listed, 111 firms, recognised figures for 1994.

Appendix 2: Survey questionaire to Norwegian analysts

Appendix 3: Answers to the questionaire to Norwegian analysts

Appendix 4: Design and results of survey vs. analysts.

1. The survey vs. analysts

   A main part of my study is to analyse if and how analysts perform the "necessary" adjustments of the reported pension data in financial reports when they use the data as input in stock valuation.

   Hence, for the empirical review I have underlying hypothesis about how analysts work:

- Analysts start with financial statements and particular the earnings, and evaluate firms by using a model from adjusted earnings to estimate future earnings and then translate this to estimated cash flows and then calculate the value based on a DCF model.
- Analysts are expecting some accounting practice differences/ EM, are trying to detect this, and adjust the reported numbers if found.
- Analysts view pension accounting as complex, analyse some of it, do "obvious" adjustments, but seldom the more complex ones.

These hypotheses are supported by empirical findings (see 4.6), but since there are no similar studies done with analysts following listed firms in Norway, I need some background data from this context.

The survey should function as a general background and supporting evidence to the specific field study studying if and which corrections analysts actually perform regarding pensions.

In this chapter I will discuss the design of the survey; target population, reponserates and development of the questionaire and the then discuss the results.

Design of survey

Target population

The target population is:

All the analysts in broker firms analysing listed firms in Norway (sell side analysts).

Broker analysts are commonly understood as persons not investing themselves, but analysing stocks, and giving advice internally or externally, having a perspective on the intrinsic value of a stock or future stock price vs. current stock price. This is their full time job, and their

training, experience and reputation is based on performing good stock analysis. Hence I regard in general as a group the sell side analysts as the most professional group of analysing firms, and hence their financial reports. Since they work in separate analyst departments in brokerage firms, and their names may be found on the listed firms investor pages, the total population is easy to estimate and target in surveys and field studies.

There are also analysts in fund management firms and large firms. However, they have different titles, do not always work full time with company analysis, and there is no place where one could find their names or find which company they follow. Hence it is difficult to estimate the total population and to target them in a survey. This reduces the external validity in a research. I would also expect on average that they have less formalized valuations and less in depth firm analysis and I want to investigate the group that works most with firm analysis and analysis of financial reports. Hence, analysts outide brokerage firms are not included.

Sample selection, coverage and representativity

Analysts in broker firms were found by using Kapitals ranking list of the best analysts in Norway.

The list contains 133 analysts. I spoke to the journalist in Kapital, who mailed me the complete list. According to him the list contains all analysts in Norwegian based brokerage firms (i.e. that includes some analysts physically located in Sweden and Denmark). He collected this by having all broker firms sending their own list of all their analysts to him directly (and they all replied). Any missing analyst was identified by cross checking with the votes (several hundred) of “best analysts” obtained from the firms/investors (“customers”) taking part of his survey (they voted “open”/ without assistance from a list). Hence I have no reason to believe that the list is not complete and accurate.

However, the list only includes Norwegian based brokerage firms. Also foreign based brokerage firms have analysts analysing Norwegian firms (especially UK and Swedish based; I know several of these analysts). Speaking to some of them, and also verified by phoning one of the executives in UK based brokerage firm, they are very restrictive to allow their employees to take part in a survey like mine, and to get permission is a long and bureaucratic process with uncertain results.

Hence, I decided to exclude the foreign based brokerage firms from the survey. The number of analysts is, according to Oslo Børs Informasjon AS, expected to be rather few; less than 20 (vs. the 133 Norwegian based). However, the sample selection I expect is somewhat biased: I would expect the Norwegian based group to be more homogeneous: Higher similarity in education, training and valuation techniques. As the survey will show, they rely on the financial report and earnings especially. They also know the NRS 6 and IAS 19 quite well. According to other studies about analysts valuation techniques in the US (and hence perhaps in UK and Sweden), they rely somewhat less on the financial report, less on earnings/ more on cash flow statements (see Appendix). Moreover, I would expect in general that they would be less familiar with specific Norwegian accounting rules being based (and trained) abroad. The pension accounting rules are, however, quite similar across the countries. Hence, I would expect the answers from foreign based brokerage analysts to be quite similar, but perhaps with a tendency to be less familiar with/ do less adjustment for Norwegian pension liabilities. All in all, I would not expect the exclusion of this group to have a major influence on my findings.

All Norwegian analysts (133) were included in the survey; hence there were no other sample selection problems.

Technical implementation of the survey

The survey was done by e mailing all respondents (all e mail addresses were mostly obtained from the Norske Finansanalytikeres Forening (NFF) database). The questionnaire was typed in the survey database of NFF, and all handling of the dispatch, responses, repeated requests, and data handling and analysis was handled in the system. The system is frequently used by NFF in member surveys and is well tested. My secretary and I tested the questionnaire on the system, by answering a test questionnaire – finding no errors or difficulties when performing the test. The system treats respondents anonymously, but keeps track of who has answered, hence avoiding replicate answers.

A respondent has the possibility of altering the answers as long as he has opened, but not submitted the survey. Hence, “slip of the pen” errors should be avoided. Where only one alternative answer out of several was possible in the survey, the system prevents more than one answer. However, the respondent may refuse to answer a question without the system denying this.

I received some answers by mail or directly from some analysts (who had printed out the survey or had got a printed version from me on request), and an auditor at Ernst & Young punched the answers into the system. I double checked the punching; hence typing errors are not expected. When I performed my field study some weeks after, some of the analysts (10) said that they had not completed or done the survey. I accepted that they completed it before I started my interviews, and have included them in the results. The answers differ only marginally from the other answers, and I expect no bias. Therefore I have included them in the following.

The time is chosen in the period before the details of the IAS 19 pension effects are known (1. quarter 2005) –so it is an "ex ante test" (among other questions) of EM and needed adjustments for pensions, before large equity adjustments are revealed and done by the firms when implementing IFRS.

The survey was sent out January 15, 2005, and closed February 15, 2005. Last 10 responses were received March 31. The respondents were reminded twice, one shortly after the first send out, the last one 3 weeks thereafter. I did not reveal or expect significant differences in respondents or actual underlying information/market events in the period. I have tested on significant differences between the answers from the first and last repondance group, and between the group who answered electronically and the group who answered by filling out the paper version, and have found no significant differences in responses. Hence I have viewed the survey to be a one period survey. I received 66 (50%) responses out of 133 requests to analysts.

The questionaire

The questionnaire is enclosed in appendix. The questions should be self explanatory.

The answer alternatives are typical in 2 categories:

- Categorical/nominal yes/no or more typical the option between difference mutually exclusive and completely exhaustive alternatives ("other" is sometimes an alternative).
- Ranking/ordinal, (most typical the choice between 5 alternatives; "always/almost always, often, once and a while, rarely, never/almost never). In some questions the answers should be ranked from 1 4, 1 7 and so on by the respondent).

I chose to give the respondent normally 5 ranking alternatives; i.e. with a mid alternative. As expected this resulted in an over weight of mid answers – but I viewed this to be a more

unbiased answer alternative than "forcing" the respondents to choose between a mid high and a mid low alternative.

I have tried to ask non leading questions, although direct and with closed alternatives. (How do you view…..In your opinion, how do you etc…..)

In developing the questions I performed a pre test by having 5 company valuators from Ernst & Young (Transaction support department) perform a test survey by filling out the questionnaire, comment difficult wording, non exclusive/exhaustive alternatives, biased questions and questions which could be misunderstood. The input was considered, and some adjustments done. Moreover, Atle Johnsen and Frøystein Gjesdal, professors in the Reading Committee, reviewed the questionnaire and made their comments. The test was corrected according to the responses.

The parts of the questionnaire that are used for analysis had 5 main subjects:

a. Background; mainly to gain insight in the qualifications when evaluating financial reports and accounting for pensions; education background, knowledge of NGAAP, NRS 6 and IAS 19.

b. Valuation techniques and –models used in general and in specific situations.

c. The importance of financial statements and which elements are important when valuing firms/stocks.

d. EM managed questions regarding the general confidence in the financial reports, perception and experience of the magnitude and significance of EM in Norway, and in which areas they tend to occur.

e. Specific questions of the depth of analysis (how/what) of pension information in financial reports, and adjustments made.

The answers in the survey did not indicate serious misunderstandings.

Some questions are factual. How do you perform analysis X etc? I expect few errors vs. the actual situation on these answers.

Some of the questions related to what the analyst think/his view (e.g. "what is your perception of EM, point of view of IFRS" etc.). Different persons have different views of

good/bad, often/seldom, better/worse on the same factual events (Schwartz 1999). Hence, with the low sample sizes, this type of errors might be material, but is difficult to avoid.

The survey states in the introduction that the focus is EM and especially in pensions. This might lead to question context effects described by Schuman and Presser (1996); "over" attention to the subject, and a risk of a too high response to expectancy of EM and a too high response on adjustments/corrections of earning on pensions vs. actual. Since I am doing physical observations on this later, I may have some possibility to perform triangulation tests.

Response

Out of the 133, I received 66 (50 %) responses, all valid.

17 (30 %) of the respondents said that they did not answer the questions because they did not valuate firms frequently (question no. 1). I assume that the most of them are the leaders of the analysis department and/or macro or strategic analyst – not specifically into pure company analysis for the following reasons (I do not have specific knowledge because I did not include title/position in the questionnaire): With 14 different brokerage firms covered by the survey I expect most of them having a leader or macro analysts not following specific firms regularly (my field study confirmed this) (16 persons in the analyst list from Kapital had the title "macro and or strategy"). The over–representation of these "responding, but not answering analysts" (probably close to 100% of all leaders/macro analysts) I assume is caused by the very simple task just responding, but saying that I cannot answer the questions ("1 click") *and* the fact that had spoken and sent introduction letter regarding the survey to all the leaders probably lead to a high participation from this group.

Hence, I expect that 49 (66 – 17) of 116 (133 17) (42 %) of the analysts in Norwegian based brokerage firms performing company analysing frequently, responded. The response rate is high vs. the responses in similar studies in the US (e.g. Block (1999) achieved 34%, and Bruner et.al. refer to several surveys to analysts with response rates between 50% and often as low as 20%. However, the total population in their surveys are often larger than mine (several thousands), where lower response rates than mine still could be generalized). The question is whether the answers in my survey could be generalized. With the high response rate, the remaining question is whether the non respondents are biased vs. the respondents or not:

- One brokerage firm said no to the survey on behalf of all its analysts (9 company analysts). From my fields study I noticed that the many brokerage firms had their "favourite" standard valuation model. On the other hand the analysts were allowed to use their personal valuation technique, and that valuation methods etc. varied internally in each brokerage firm. The analysts also quite frequently move between the different brokerage firms. Hence I would not expect a particular biasness from the non responding firm.
- 78% of the respondents are "siviløkonom", 32 % with AFA or Høyere Avdeling specialisation (both technical/academically advanced courses presumably in finance/valuation etc.) and 53 % have specific education/courses in accounting/ analysis. Based on my knowledge of analysts, it looks like there is an overrepresentation of answers with the background described. The reason for this might (among others) come from the fact that the survey indirectly comes from NHH/a business school that educates "siviløkonom", AFA and Høyere avdeling, and people would probably have a higher tendency to answer surveys from their "own" school or education. I would expect that analysts with this background (siviløkonom/ AFA/ accounting) tend to focus more on the financial report, earnings and DCF (since this is the typical Norwegian valuation education; e.g. by Boye/Knivsflaa at NHH). US surveys (see A4.2.2) show that US educated analysts focus less on the components described above than shown in my survey (see A4.2.2). I would also expect that the respondents have somewhat overweight regarding knowledge of Norwegian pension accounting and on performing adjustments, due to their (Norwegian) accounting based education.

Following Steeh (1981) non respondents are biased. Reasons for not responding could be lack of interest, lack of knowledge etc. In this special case, this might result (again) in an overweight of respondents with good knowledge of accounting based valuations and pensions accounting.

However, in total, I would expect the responses to give a relative representative overview of the way analysts perform valuations, and especially related to pensions – but perhaps a tendency to overweight emphasise on financial statements, earning, DCF, knowledge and adjustments for pensions.

Results of the survey

(All % include non responses for specific questions out of the 49 that answered the survey questions)

Background

All respondents are men. All, except 1, may only give stock recommendations – not buy/sell shares. Their age vary between 25 and 45 years, and average age is 33,5 years. (To me this seems quite young vs. US analysts).

78% are "Siviløkonom" (2/3 from NHH, 1/3 from BI). 6% have an MBA (from abroad), 4% a Bachelor/DH. 20% are engineers, "Sosialøkonom" and "other". Several have additional specialisation; 22% AFA, 10% Høyere Avdeling. No one has HRS/auditing. 59% have specialisation (as part of their education or afterwards) in accounting/ analysis and/or accounting rules. In the US similar surveys show a higher % of MBA's, but a lower % with accounting education (e.g Block 1999).

Valuation methods

The vast majority use a type of discounted cash flow (DCF) method (88%, 73% on simple valuations). 74% of them estimate earnings or cash flow for some years ahead, and calculate the intrinsic value base on a two periodic model: Specific estimates of cash flow (most often an adjusted earnings number as a proxy for a "normalized" cash flow estimate) for some years ahead are discounted, plus a terminal/continuing value based on a single " cash flow" number and Gordons formula (e.g. see Penman 2003). Or else (25%) and especially on simpler valuations (then in 50% of the cases), they use a one period multiple model on today's (adjusted) earnings or cash flows. Residual income models are rarely used; only 11% say that they normally ("som oftest") use this method.

84% of the respondents using the DCF method estimate the enterprise value first, before subtracting net assets/debt. 9% calculate cash flow to equity directly. 81% of all using the DCF model calculate cash flow/earnings after tax.

84% use the CAPM method when estimating the discount rate, the remaining use more judgemental methods. No one use APT or real option methods. In early spring 2005 the discount rate for equity risk after tax (assuming beta=1) that the analysts used was on average 8,7%, varying from 7 to 11%. 39% use the *short* term governmental bonds when estimating the risk free rate, 6% the *medium* long bonds (3 5 years) and approximately 35% the long-term rates (10 years). Average risk premium used early spring 2005 was on average 4,2%, varying from 2% (only 1 respondent, next group is using 3%) to 5%. The Beta is by 33% of

the analysts normally taken from published beta's of the firm or by (the average) of the published beta of similar firms if they exist. The remaining analysts calculate the beta themselves (4% non response).

The analysts not using the DCF model as the most frequent model use the value adjusted equity method (market values or replacement value) (8 10%) or peer reviews of different ratios vs. competitors (10% on full valuations, 18% in simpler analysis). No one use technical analysis (price pattern analysis).

For specific branches (notably shipping, real estate or oil) value adjusted/market values replaces a DCF method.

Use of financial statements for valuation

The analysts were asked to rank 7 different types (including "other") of sources of information regarding valuation of stocks. The results I have ranked based on a combination of most often ranking and weighted average score (A No. 1 ranking receives a score of 1 times number of respondants who ranked the source as No. 1. A No.2 receives a score of 2 times number of respondents a.s.o.). Rank 2, 3 and 4 were close so I show the detailed numbers for these alternatives.

- The financial report in the annual report or semi annual report rank clearly as No. 1 (49% ranked it as No. 1, but 20% ranked it as No. 6 or 7).
- Other parts of the annual/semi annual report ranked as No. 2. (27% ranked it as No. 2, and 48% as nr. 4 or 5) (Weighted average ranking is 3,2).
- Formal/official presentations by the management were ranked 3. (37% ranked it as No. 3, but high variance). (Weighted average ranking is 3,5).
- Direct contact/meetings with management were ranked as nr. 4 (44% ranked it as No. 4, 5 or 6, but 26% as No. 2). (Weighted average ranking is 3,8).
- Other publicly available information (industry reports, news clippings etc) was clearly ranked as No. 5. (41 % ranked it as No. 5).
- Information from other brokerage firms 'analysts clearly was ranked as No. 6. (45% ranked it as No. 6)
- "Other" only received 14 scores in total (out of 40, 26 did not respond on this question at all) indicating that the options above were more or less exhaustive. Seven of these were one of the options above (the respondent probably did not see the alternative). When there was no doubt I regrouped the answer from "other" to assumed correct group. The % above reflects this.

If a prospectus was just released there was a high variance of the relative importance of the prospectus/no clear ranking. In case of going concern problems or for newly established firms (but annual reports were released), the financial report still was regarded as the most important source of information.

59% of the analysts always/almost always and 27% most often *start* with an accounting number from the income, cash flow statement or balance sheet when they perform the valuations, and 82% from an earnings number. 88% of the 82% start (always/almost always, most often) with an earnings number when they do valuations, "normalize" this and use this normalized number as a basis for estimating future earnings and/or cash flow in their "DCF" (could be earnings adjusted proxies for cash flows, hence the " ") valuationmodels.

The income statement is clearly ranked as nr. 1 in importantance when performing valuations (67% ranked as No. 1). The balance sheet (average score 2,6; 39% ranked it as No. 2, 41 % as No. 3) and the cash flow statement (average score 2,8, and higher variance) is ranked quite similar. The notes are clearly ranked as No. 4 (65% ranked it as No. 3 or 4).

These results show the very high importance of the financial report, the income statement and earnings numbers for Norwegian based analysts when performing valuations. This is somewhat in contrast with similar surveys from US, where meetings with management was ranked equally important as the financial report (Breton and Taffler 1998, see 3.5.2) and earnings had less relevance (Kvifte 2004, Block 1999). In his PhD work Steinar Kvifte (2004) reports that 60% of his analyst respondents in his survey stated that the cash flow statement was the most useful of the financial statements. Only 18% and 8% regarded the income statement and balance sheet respectively as the most useful. Block (1999) report of earnings (156 score points) only having marginal higher rank than cash flow (133 score points) in a survey to analysts of the most important input to their firm valuation. Demirakos et. al (2004) however, report of 53% using income statement (earnings) and 21% using cash flow statement (remaining % is "other") as the "most important" input to valuations by content analysis of 104 analysts' reports mainly from UK and US (It should be noted that the analysis only covered 3 industries: beverages, electronics and pharmaceuticals). As discussed in the literature review chapter, it should be noted that some of these results are based on indirect studies of analyst's valuation techniques by studies of analysts' reports.

However, for my study regarding pensions, this shows that since the analysts rely so heavily on the reported accounting numbers and only perform some few adjustments to earnings (net

profit or EBIT(DA) before they are used as proxies for cash flows, the analysts have to analyse and in many cases adjust pension numbers that are "abnormal" or influenced by earnings management when they valuate firms.

The most important accounting number from the income statement is EBIT(DA), (69% of the analysts). (Corresponds well with the 88% of the ones using the DCF model that use a enterprice model). 22% starts with a net profit number before or after tax.

Capital employed (57%) and equity (28%) are the most important accounting numbers in the balance sheet. In the cash flow statement 72 % view cash flow from operations, and 17% cash flow from operations plus/minus cash from finance activities as the most important accounting numbers.

49% view EBIT(DA) or NOPLAT vs. enterprise value as the single most important accounting ratio when valuing firms. 28% view PE as the most important ratio number (the alternatives in the questionnaire of ratios are chosen from the NFF's book regarding recommended ratios, 2004).

Earnings management

In general the confidence ("tillit" in meaning true and fair view in accordance with GAAP) to financial reporting from listed firms in Norway is medium to high:

- Only 8 % had low confidence (1 or 2 on a scale from 1 5), 49% medium (3), and 33% and 8% had high confidence (ranking as No. 4 and 5, respectively).
- The implementation of the IFRS accounting standards are expected only to give unchanged (45% and 49% respectively) or some (33% and 22% respectively) improvements in precision or a more true and fair view ("riktig bilde"). The increased use of fair value accounting in IFRS vs Norwegian GAAP is viewed as not have high impact of the usefulness of financial reports for use in valuations; 49% rate the usefulness as unchanged, and 3,0 (unchanged) as the average score.
- However, 65% have higher confidence in the financial reports from 2003 and 2004 vs. 1998 2002 (only 6% have lower confidence, and 24% have unchanged confidence). Perhaps this is caused by the focus on the financial reports after the accounting scandals the last years that presumably have lead to less earnings management, improved audits etc. However, 45% say they only once and a while or never read the auditors report…(50% reads it often/always).

53% of the analysts believe that minor EM adjustments (cosmetic adjustments or similar wordings are used in international research) happens often or (almost) always. Few believe that EM adjustments more close to the auditors' materiality limits (stated as 1% of turnover,

10% of net profit by me in the questionnaire) or outside these limits/outside GAAP happens frequently; 63% say seldom or never.

Few have experienced (or heard from their colleagues experience) of actual EM cases the last few years (2001 2004). More than 70% say never or rarely. IF there is significant EM, they believe it to happened most often in restructuring cost/write downs related to restructuring (ranked as no.1), defered or too early recognition of income (ranked as no. 2), pension accounting (ranked as no. 3), income recognition in large contracts (ranked as nr. 4), and value allocation and time period of depreciation related to acquisitions and mergers (ranked as nr 5). I expect the answers related to pensions to be biased (too high ranked) since they new that pension had specific attention in the survey.

To sum up, the analysts' reliance on financial reports is not very high, but high occurrence and significance of EM is not expected somewhat in contrast to EM frequency findings in academic research.

Pension accounting vs. valuation

Pension accounting is viewed as complex; 43% regard it as very complex, 39 % as complex. 55% of the respondents do not know or only to a limited extent ("ikke noe særlig") the Norwegian accounting rules for pensions. 67% say the same regarding IAS 19 (only 2 months before the first semi annual report using IFRS accounting rules including IAS 19 is released…,my comment).

61% of the respondents say they only read the notes regarding pensions to some extent or not much ("litt" or "ikke noe særlig") (8% non response). The assumptions and the none recognised amounts are most frequently read (44% and 44%, respectively, say they mostly or often ("som oftest" and "ofte" read this), but at the same time 38% and 38 %, respectively, say rarely or never ("sjelden" or "aldri/så og si aldri") to this. Accounting principles for amortization/ period and employee duties, reasoning for having net pension assets recognised as assets or changes in accounting principles are rarely studied.

When valuations are performed, 69% say they never or seldom perform any adjustments to the reported pension numbers (recognised or disclosed) when they are used as input to the valuation model. 12% say that they adjust for the unrecognised amount in the notes. 22% say they do no adjustments. However, only 20 of 49 responded to this question. Many said that

they did not understand the question… Probably they do no adjustments as confirmed in the field study.

Few believe that there is high frequency (22%) or material effect (16%) of pension EM regarding the valuation of stocks. Logically 71% of the respondents say they never or rarely ("sjelden") do their own adjustments when valuing re pensions in stock valuations. Interestingly 18% say that they adjust for too optimistic or pessimistic assumptions in the pension accounting. This is much more frequent than my field study shows reviewing the actual work/spreadsheets (see 8.2.1). The method of the field study should ensure higher reliance/internal validity. Perhaps the respondents in this survey (as reported or expected in other surveys) tend to be biased vs. trying to give a good impression or answers of what they think they *should* have done. In the other areas than assumptions more than 90% of the respondents say that they never or rarely ("sjelden") perform adjustments caused by biasness/EM to the reported numbers.

Information to perform adjustments (when they are performed hence only approx. 29 have responded) is mostly collected by analysing the financial report. Few analysts ask management when they meet about pension accounting; 71% answer "never" or "rarely" to this question (non response 10%).

To sum up the findings about analysts and pensions, the analysts view pensions as complex, have limited perceived knowledge, review the information regarding pensions in financial reports only to a certain extent, and rarely perform adjustments to the reported pension accounting numbers. This is interesting background information vs. the field study.

The full set of answers is shown in appendix.

Possibilities for generalizations (external validity)

Generalization of the survey from the samples to all Norwegian based sellside analysts, in my opinion, can be done without too much risk of errors, since the coverage is so high, and should be expected to be more or less unbiased.

The survey focus on general valuation methods and treatment of pensions in the financial reports, where the differences between NRS 6 and IAS 19 (used from 2005) are marginal. Hence, some parts of the study may be generalized over a limited time period. However,

questions regarding perceived EM levels (may vary over time, and follows fad and fashions) and specific use of discount rates etc are clearly time dependent and can not be generalized over time.

Since valuation education, EM climate and accounting rules are somewhat different in Norway vs. other countries; I expect environmental validity to be low.

Appendix 5: Interview and data collection schedule used in fieldstudy when interviewing analysts following listed firms in Norway.