

Topics in accounting for impairment of fixed assets

by

Erlend Kvaal

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Contents

Chapter 1 Introduction and summary of findings	5
1.1 Overview	5
1.2 Do impairment losses reflect reductions in current value?	6
1.3 Are there systematic international differences in impairment accounting practice?.....	8
1.4 Impairment review discounting and the treatment of taxes	10
1.5 The historical development of impairment accounting.....	12
1.6 Fixed asset measurements in a Norwegian shipping company 1935-1985.....	15
1.7 Principal research contributions and suggestions for further research.....	15
Chapter 2 Accounting practice under the UK impairment standard.....	19
2.1 Introduction.....	19
2.2 Relationship to prior research	20
2.3 Descriptive statistics	24
2.4 Research design	30
2.5 Regression results	43
2.6 Conclusion	53
References	56
Appendix to Chapter 2. The qualities of impairment reporting of individual company reports. 57	
X.1 Introduction.....	57
X.2 Detecting impairments	57
X.3 Interpretation problems	63
X.4 Disclosure of assumptions	67
X.5 Conclusion	69
Chapter 3 The survival of national differences in the context of harmonised standards: a case study of impairment practices.....	71
3.1 Introduction.....	71
3.2 The content of the accounting standards.....	72
3.3 Relevant prior research	76
3.4 Research design	79
3.5 General characteristics of the selected samples	85
3.6 Patterns of recognised impairments	91
3.7 Regression analysis	92
3.8 Direction of causality of management change and performance	99
3.9 Conclusion	101
References	102
Annex to Chapter 3. Conversions between Prime Standard classification and FTSE classification.	105

Chapter 4 Discounting and the treatment of taxes in impairment reviews.....	107
4.1 Introduction.....	107
4.2 The discounting requirements of the standards.....	108
4.3 Relevant literature.....	111
4.4 The relationship between pre-tax and post-tax discount rates at the time of investment....	112
4.5 Pre-tax discounting subsequent to the time of investment.....	124
4.6 Relationship to deferred taxes.....	128
4.7 Pre-tax discounting of goodwill and composite cash-generating units.....	132
4.8 Conclusions.....	134
References.....	136
Annex 1 to Chapter 4. Differentiation of the constant cash flows relationship between pre-tax and post-tax interest rates.....	137
Annex 2 to Chapter 4. Calculation of Equation 9.	140
Appendix to Chapter 4. Discount rate disclosures of British companies.	141
Y.1 Reported discount rates.....	141
Y.2 Comparative discount rates.....	142
References.....	147
Chapter 5 The international background for the development of Norwegian accounting rules on the impairment of fixed assets.....	149
5.1 Introduction.....	149
5.2 Accounting measurement of fixed assets in old European sources	149
5.3 The write-down obligation of the Fourth Directive	153
5.4 The beginning of American standard setting	154
5.5 Recent American developments.....	157
5.6 The development of the International Accounting Standards (IAS).....	158
5.7 Development of the write-down rules in Norway.....	160
References.....	165
Chapter 6 Fixed asset measurements in a Norwegian shipping company 1935-1985	167
6.1 Introduction.....	167
6.2 The history of Snefonn.....	169
6.3 General financial reporting requirements and trends	172
6.4 Tax implications of accounting choices.....	185
6.5 Fixed asset measurements in Snefonn's accounts.....	189
6.6 Concluding remarks	198
General references:.....	200
Snefonn and Bergesen d.y. Group sources:.....	201

Chapter 1 Introduction and summary of findings

1.1 Overview

This dissertation consists of three topics related to the accounting for impairment of fixed assets, represented by five papers.

The first topic is an empirical research into the functionality of the new generation of impairment standards. By this last term I mean those impairment standards that were approved after and modelled upon the US impairment standard SFAS 121, issued in 1995, encompassing IAS 36, FRS 11 and standards from several other developed countries. It is a clear ambition of these standards to bring about recognition of impairment write-downs whenever they are economically indicated, and prohibit impairment write-downs in all other circumstances. In a broad sense the question I want to give an answer to with the empirical research presented here is whether this ambition is met. In particular I discuss whether recognised impairment losses correspond to an economic value reduction, and whether practice is uniform in different countries.

The empirical research consists of two papers, “Accounting practice under the UK impairment standard” (Chapter 2 in this dissertation) and “The survival of national differences in the context of harmonised standards: a case study of impairment practices” (Chapter 3). A summary of these papers is given in Sections 1.2 and 1.3 of this introductory chapter.

The second topic is an analytical discussion of one particular measurement aspect of the new impairment standards, which is their mandated discounting technique and the treatment of future tax cash flows. This subject is not explicitly treated in the US impairment standards, but the international standard IAS 36 and the UK standard FRS 11 give detailed instructions about the discount rate determination and cash flow projection. These standards prescribe the use of pre-tax cash flows and a pre-tax discount rate, with the justification that it is simpler and more reliable than post-tax discounting. This justification and the properties of pre-tax vs. post-tax discounting are discussed in “Discounting and the treatment of taxes in impairment reviews”, which is Chapter 4 of this dissertation, with a summary in Section 1.4 below.

The third topic is a historical research into the origins of impairment accounting. Although the 1990-generation of impairment standards clearly have an American origin, the obligation to

write down fixed assets to the recoverable amount has been explicitly regulated in many countries. Norway had an accounting standard on the impairment of fixed assets, with strong similarities with IAS 36, as early as 1980, and the write-down obligation has been part of Norwegian company legislation since the beginning of the 20th century.

The historical topic is covered by two papers. “The international background for the development of Norwegian accounting rules on the impairment of fixed assets” (Chapter 5) traces the origins of the Norwegian write-down rules. The second historical paper, “Fixed asset measurements in a Norwegian shipping company 1935 – 1985” (Chapter 6) is about how the accounting measurement of ships and the disclosures about it developed during half a century in a Norwegian joint stock shipping company, Snefonn. Summaries of these chapters are given in Sections 1.5 and 1.6.

In Section 1.7, I indicate the main findings of my doctoral work and suggest further research.

1.2 Do impairment losses reflect reductions in current value?

The research question of the paper on “Accounting practice under the UK impairment standard” is whether accounting practice is such that an accounting impairment loss reflects a reduction in the current value of an asset, or whether it rather reflects some other event. The general hypothesis is that impairment accounting under FRS 11 is unbiased, by which is meant an accounting practice that reflects current value reductions and no other factor. The hypothesis is tested statistically by identifying determinants of the impairment decision that are compatible or not compatible with it.

In order to provide an answer to the research question I have examined all the 2002 financial statements of companies belonging to the FTSE 350 index of the London Stock Exchange, excluding companies of the financial sector and the oil and gas sector. The reason for the sector exclusions is that they follow sector specific accounting rules with respect to impairment. The remaining companies follow the British accounting standard on asset impairments, FRS 11.

Under the null hypothesis one would expect impairments to correlate with variables that reflect asset value changes, and one would not expect them to correlate with variables that are independent of asset value changes. The hypothesis may therefore be tested by observing statistical relationships between the impairment decision and other variables.

For the statistical analysis some of the explanatory variables are selected to proxy the omitted variable, which is the current value reduction. For quoted shares in an efficient market, the share price is supposed to reflect all available information about the relevant company. To the extent that the market, irrespective of the accounting treatment, is capable of detecting current value reductions in the company's assets, such reductions would have the effect of reducing the share price. Under the assumption of unbiased impairment accounting, therefore, we would expect the write-downs to be negatively correlated with prior share performance.

The analysis includes a number of other explanatory variables that have been associated with impairment accounting in prior research. They can be organised into four groups: size, accounting return, accounting conservatism, and management change. Based on prior findings I expect more impairments in large companies than in small ones, more in unprofitable companies than in profitable ones, more in companies with un-conservative accounting policies than in those with conservative policies, more in companies with management changes than those without. However, the finding of any statistically significant relationship between impairment accounting and any of these variables would not necessarily contradict the null hypothesis. Any such relationship therefore would have to be discussed critically.

The dependent variable in the regression analyses is the impairment write-down decision, for which I use two different measures. One is the impairment occurrence, a binary variable that separates impairers from non-impairers. The second measure is the impairment ratio, defined as the recognised impairment loss as a proportion of the end-of-year carrying amount, adjusted for the impairment losses and reversals during the year. Both measures are applied to fixed assets of three main categories, i.e. tangible assets, non-goodwill intangibles and goodwill, and there are separate regressions for each of these.

My study resembles prior research on impairment accounting in many respects, but there are three major differences. First, most available studies analyse accounting behaviour in a field where accounting standards were non-existent, or almost so. By contrast, my paper concerns accounting behaviour under a new generation of impairment standards, which may be representative of present practice under FRS 11, as well as under similar accounting standards, in particular IAS 36. Second, unlike many prior research studies, I use an impairment concept which is identical to that of the accounting standards. Third, there is a difference in the choice of methodology. While most studies depend on what is recorded in aggregate databases, the method chosen for this survey is "hand-picking" information from

the financial statements. The advantage for the subject under study is to avoid bias, to improve the data quality of variables subject to interpretation, and to exploit variables not otherwise accessible.

The analysis shows that the write-down patterns are different for each main category of asset. Only one third of the companies hold non-goodwill intangibles and the number of impairers of such assets is so small that no reliable relationship is found. For tangible assets I find that the impairments decrease with increasing depreciation rates, which is an unsurprising observation. Goodwill impairments, by contrast, are closely related to management changes – more precisely to change of the chairman of the board – and have more complex associations with the accounting return and the depreciation rate. I find statistically significant differences between the coefficients of the tangible asset impairment regressions and those of the goodwill impairment regressions. For all categories of fixed asset the indications of stock market anticipation of the current value reduction of assets to be written down is very weak.

I reject the null hypothesis of unbiased impairment accounting for goodwill impairments, but not for the impairments of other fixed assets. The signs of little economic content in goodwill impairment accounting raise a question whether the increased emphasis on this accounting in both IFRS and US GAAP is justified.

A secondary effect of “hand-picking” accounting data is that the collector acquires information about how impairments are presented in the financial statements. Some of these experiences are assembled in a separate appendix to Chapter 2. I find that the impairment reporting of many companies does not fulfil the requirements of FRS 11 and that there are numerous examples of confusing presentations.

1.3 Are there systematic international differences in impairment accounting practice?

The second empirical study compares the fixed asset impairment practices of UK companies following the UK accounting standard FRS 11 with those of German companies following the international accounting standard IAS 36. The contents of the two standards are considered to be virtually identical with respect to recognition and measurement of impairment losses. The hypothesis is therefore that impairment practices under the two standards are identical. By identical practice is meant that identical situations will be reflected in a like manner in the financial statements.

The hypothesis does not necessarily imply that recognised impairment losses are “true” functions of current value reductions of fixed assets, cf. the hypothesis of the previous study (Section 1.2). The hypothesis of this study does not exclude that recognised impairment losses actually reflect other factors than current value reductions, for instance the occurrence of a management change. It does imply, however, that if impairment losses reflect such other factors than current value reductions, they do so in a similar manner under FRS 11 and IAS 36.

I examine the validity of the hypothesis that accounting practices under FRS 11 and IAS 36 are the same by comparing the information provided in the 2002 annual reports of a sample of British listed companies and a sample of German listed companies. 2002 was a year with poor company performances in many economies, and impairment accounting may have been more intensive than in most years. It might be argued therefore, that 2002 is not a representative year for impairment accounting. However, the objective of the study is not to discuss the importance of different factors that may explain impairment accounting, but rather to assess whether impairment accounting under the UK accounting regime and under the IFRS are likely to provide the same outcome. If the answer to that is affirmative, the outcome should be the same both in years with large economic distress and in years with a smoother climate. The advantage of using observations from a difficult year is that the volume of impairment losses is large, and differences in accounting practice may be easier to detect.

To a large extent I use the same variables and apply the same statistical techniques for this study as for the previous study (cf. Section 1.2). The dependent variable is the impairment write-down decision, which has measures – the impairment occurrence and the impairment ratio. Mostly I also select the same explanatory variables. However, compared with the companies listed on the London Stock Exchange, many of the German IFRS reporters are young companies (many of them were listed on the Neue Markt) with short share performance histories. The reliance on prior share performance data is therefore somewhat limited in this study.

I estimate regression coefficients for each category of asset, for each impairment decision variable, and for each country as well as for both countries together. I test the hypothesis of equal practice by assessing the probability of the “national” coefficients being equal.

Both in the UK and in Germany the impairments patterns vary with asset category. I find little sign of dissimilar impairment patterns for tangible assets. Approximately one fifth of all

companies of both countries recognised an impairment loss on tangible assets, and they were important in aggregate amount. The international variation of the impairment ratio for tangible assets is smaller than for the ratios for the other asset classes.

Non-goodwill intangibles are relatively uncommon in the balance sheets of British companies but virtually universal among German companies. Given the background of alleged conservatism of German accounting, the amount of intangibles in the balance sheets is rather surprising. On the other hand, German companies have generally less goodwill than British companies. These differences in recognition patterns are directly reflected in the impairment patterns. German companies have higher impairment ratios for non-goodwill intangibles than British companies have, meaning that the German holdings of such assets are much more exposed to losses than the British holdings are. The British companies have larger goodwill losses than the German companies have, but those of the German companies are more frequent.

German companies have substantially higher depreciation and amortisation rates than British companies, and the difference is more pronounced for goodwill and for non-goodwill intangibles than for tangibles. This may be seen as an indication of a continued German tendency towards accounting conservatism under international accounting standards. However, the other measure of conservatism used in this paper, the price-book ratio, does not substantiate the assumption of German conservative accounting.

Management changes are associated with impairment accounting in both countries, but the relationships are different in nature. In the UK goodwill impairments increase with the change of the chairman of the board, whereas there is a strong link in the German companies between impairments of non-goodwill intangible assets and CEO changes. There is no evidence in either country that the joint event of an impairment loss and a management change could be explained by poor performance in prior years.

The conclusion of the paper is that identical standards have not brought uniform practice, at least not in 2002.

1.4 Impairment review discounting and the treatment of taxes

Chapter 4 contains an analytical discussion about “Discounting and the treatment of taxes in impairment reviews”. Both IAS 36 and FRS 11 usually measure the recoverable amount (the current value) of an asset as the net present value of related cash flows. Both standards require

that cash flows related to taxes are not included in the cash flows used to determine recoverable amount, which means, for instance, that revenues are included without deduction of payable tax. Consistently with this approach the standards require the discount rate to be the pre-tax rate.

The rational investor of the microeconomics textbook, however, bases his decisions on cash flows after tax, discounted with a post-tax discount rate. Therefore the choice of the standard setters in this respect is curious. The US impairment standard, SFAS 144, does not contain an explicit requirement for after-tax cash flows and discount rates.

According to the Basis for Conclusions of IAS 36 the reasons for the pre-tax choice is that post-tax accounting would have to avoid the double counting of tax cash flows already covered by deferred taxes, and that the computation of value in use by post-tax discounting would be complex. The Basis for Conclusions suggests that the pre-tax rate can be found by grossing up the post-tax rate by the tax rate.

The content of FRS 11 with respect to the treatment of taxes in computing value in use is virtually the same as that of IAS 36.

The objective of my study is to discuss the justifications and consequences of the requirement to use pre-tax rather than post-tax cash flows and discount rates. Insofar as the two methods are defined so as to give the same result, the tax cash flows that are excluded from the cash amounts to be discounted by the pre-tax method will have to be included in the pre-tax discount rate. This transformation from a predicted cash flow to an interest rate premium may become very complex and will require a continuous updating, even when other rates are stable. Therefore, the standard setters' justifications for the choice of the pre-tax method are not valid.

I also discuss which tax cash flows to include in the computation of value in use, irrespective of whether a pre-tax or a post-tax method is used. IAS 36 says that value in use is based on cash flows forecasted by the company itself. It is not clear then whether the tax cash flows necessary for the computation should be company-specific or those of a potential acquirer of the asset. If the latter alternative is correct, the estimation of tax cash flows of the potential acquirer of a composite measurement unit requires a guess as to how the hypothetical purchase price will be allocated to the components of the unit.

A third conclusion is about deferred taxes in the impairment review. The deferred tax liability arising from temporary differences caused by dissimilar depreciation schedules for accounting and taxation represents a tax cash flow realised, but not yet recognised as income. When assessing the recoverable amount of an asset by measuring its value in use, this realised cash flow should logically be added to the future cash flows to be discounted, or, equivalently, the deferred tax liability should be included in the measurement unit to be compared with the net present value of future after-tax cash flows.

An appendix to Chapter 4 contains a survey of British companies' disclosures of impairment review discount rates from the 2002 reports. The financial statements contain information about the carrying amounts and economic lives of goodwill (which is presumed non-depreciable for tax purposes) and tangibles. The company post-tax rate may be estimated by its WACC. With this information it is possible to estimate the pre-tax discount rate for each company that is commensurable with the post-tax rate. I show that nearly all the companies that have disclosed the discount rate, which is approximately one third of the impairers, apply a pre-tax rate that is lower than the estimate.

1.5 *The historical development of impairment accounting*

Impairment accounting is a concept within the historical cost model. When an object is intended for long-term use, the historical cost convention is to allocate the cost of investment through depreciation. The depreciation method is a system for allocating the investment cost over economic life, reflecting wear and tear. Depreciation does not reflect current value changes of the asset. Impairment accounting is a supplement to depreciation within the historical cost model that may apply if the book value of an asset (net of depreciation) exceeds its recoverable amount. Therefore the development of the write-down concept is inextricably linked with the development of depreciation.

The need for special accounting techniques for fixed assets arose with the growth of capital-intensive industries during the industrial revolution. Several accounting methods were applied, of which depreciation was one. The use of depreciation became common in the 19th century, but it was not compulsory in most countries until the first half of the 20th century. An early legal requirement to account for fixed assets by periodic charges was in the German 1884 Company Law, and gradually such requirements were incorporated in company legislation of other countries. However, there is anecdotal evidence that companies also made

extraordinary charges for other reasons, for instance in order to account for an unexpected value reduction. These extraordinary charges were part of accepted practice, but unregulated at the start of the 20th century. The German 1937 Company Law clearly permitted write-downs for impairment, and some authors also claim that it required impairment accounting. An explicit impairment rule was introduced into German law only with the German 1965 Company Law.

The German 1965 Company Law is known to have been the model for the EU Fourth Directive. Indeed, the first suggestion for the Directive (the Elmendorff report) had almost the same wording for fixed asset measurement rules as the German law. However, the wording changed with drafts of 1971 and 1974, and the final text has a content somewhat different from the German origin. Whereas the German law permitted write-downs for temporary value reductions and mandated them for permanent ones, the Directive in the final version contains only the mandatory write-downs. Also, the reversal obligation of the Directive was not part of the original proposal, and explicitly contrary to the 1965 Company Law.

The development in the UK and US followed a different path. The development of accounting rules in the general company legislation was slower than in Germany until the 1930's. However, in the wake of the Wall Street Crash the era of accounting standard setting started. In the early years of this era the objections to write-downs were strong among accounting experts. In the post-war decades impairment write-down was only sporadically treated in authoritative American accounting literature. Only for intangible assets and goodwill impairment was write-down clearly presented as part of US GAAP.

A new debate on impairment write-down took off at the beginning of the 1980s, at the same time as the *conceptual framework project* was finished. The starting point was the recognition of a strong increase in size and frequency of impairment write-downs, and varying practices. The most important challenge for the American standard setter, FASB, was therefore to define limits for impairment write-downs in order to stop abusive practices. SFAS 121, the first of the new generation of impairment standards, was issued in 1995, preceded by a discussion paper (in 1990) and an exposure draft (in 1993). SFAS 121 was substituted by SFAS 144 in 2001. In its main features SFAS 144 represents a continuation of SFAS 121.

Impairment write-down within IAS has a much shorter history. The first standard on fixed assets, IAS 16 *Accounting for Property, Plant and Equipment*, effective from 1983, mentions write-downs briefly. The revision of the standard in 1993 brought about a certain clarification

of the impairment concept and introduced a reversal requirement. IAS 36 was issued in 1998, i.e. five years after the issuance of SFAS 121. It differs from the American standard in not having a write-down test based on nominal cash flows, and by having a reversal requirement.

The development in Scandinavia has been influenced by traditions and currents in the major economies. The Norwegian Company Law of 1910, which was strongly influenced by Continental European traditions, required periodic depreciation charges, but contemporary scholars held different opinions on whether a write-down obligation was part of that. An interesting part of older Norwegian company legislation is the special law for shipping joint stock companies, which more explicitly mandated the current value as an upper limit for measurements. A general impairment write-down obligation for Norwegian companies was introduced with the Company Law of 1957.

In the following decades Norwegian accounting legislation was subject to several important revisions, without altering the main features of the impairment write-down system. The substance of the 1957 Company Law was therefore continued largely until the approval of the most recent Accounting Law of 1998. In the 1970's the Norwegian Institute of State Authorised Public Accountants started up an important work to clarify the concept "good accounting practice", and one of the first recommendations to be issued was "Recommendation on good accounting practice (no. 6) concerning write-down of fixed assets" in 1980. This standard has several similarities with IAS 36, which it preceded by 18 years.

The next step in the Norwegian development came with the 1998 Accounting Law. When it comes to the impairment write-down rule, the 1998 law again represents continuity of the main features of earlier legislation, with a wording adjusted to the Fourth Directive. A new standard on impairment was introduced in Norway in 2002.

Both the company law development and the development of accounting standards show an early attentiveness in Norway to the concept of impairment write-downs. This may be rooted in the Norwegian industry structure with a relatively large production of raw materials, vulnerable to the volatility of world prices, for which an early reporting of adverse conditions may have been suitable.

1.6 Fixed asset measurements in a Norwegian shipping company 1935-1985

A second paper on the historical topic (Chapter 6) is a case study of a Norwegian shipping company, Snefonn, which was incorporated in 1934 and conducted shipping activities until 1986, when it was merged into a larger entity. The purpose of the case study is to describe how Snefonn measured and reported its ships at different stages, and to discuss the possible objectives for the chosen accounting. For this purpose it has been convenient to divide the development of Snefonn's financial reporting into three phases that reflect the changing reporting requirements of the Norwegian company legislation. The early reporting was rather rudimentary cash reports, whereas the reports of the 1980's contained detailed economic analyses and overviews.

Snefonn had a very conservative policy of fixed asset measurements. Up to the middle of the 20th century many shipping companies may have used depreciation accounting to smooth out variations in operating profit. For Snefonn I find a depreciation policy directed at charging the maximum permitted by the tax laws. Accumulated depreciations were further boosted by the practice permitted in shipping companies of treating gains on the sale of ships as extraordinary depreciation credits. Although this practice was based on tax rules, it was carried out in a similar manner in the financial statements. Conservative fixed asset measurements were further strengthened by a provisioning policy, which at least in retrospect looks quite excessive, particularly during Snefonn's early years.

I also discuss whether the fixed asset measurements were structured to support the company's dividend policy. Snefonn had a very stable and successful dividend policy with level or increasing dividends every year for more than half a century. Conservative accounting policies might have been directed at facilitating that policy by providing the potential to smooth income. However, there is little indication that hidden reserves were actually used to this end.

Tax considerations appear as the principal objective of the financial accounting. In retrospect one may say that the taxation priority has been somewhat to the detriment of the informational functions of the financial statements.

1.7 Principal research contributions and suggestions for further research

I will in this section indicate what I consider the main research contribution of this doctoral work.

The most important finding of the empirical studies is about goodwill accounting. The analysis shows that goodwill impairments have little relationship with economic fundamentals. This is not an entirely new observation, since the arbitrary features of goodwill impairments have been indicated in prior research, based on the vaguer rules of earlier years. However, one might have hoped that more explicit impairment standards would reinforce the economic content of goodwill impairments. In recent years goodwill impairment accounting has been given more emphasis in accounting standard setting, with the argument that goodwill amortisation does not convey economic information. The research results of this dissertation raise some questions about the validity of this argument.

In order to say more about the usefulness of goodwill accounting, more research should be done into the questions of its value relevance. It may well be that goodwill impairments have little economic substance, but does that also mean that the stock markets are indifferent to them? The research results presented here give no answer to that question. Prior research has fragmented conclusions, which may not be up-to-date with the present goodwill accounting practice. Any discussion about the value relevance of goodwill should also take into account the differences in the goodwill concept between the US GAAP and the IFRS.

The empirical studies also show that non-economic determinants of impairment decisions may vary between countries. In the research presented here there are examples of corporate officers having different responsibilities in the countries studied. This observation raises a more general question about the link between a company's organisation and structure, and the accounting policies that it adopts. Because differences in corporate structures will prevail, there may be systematic differences in accounting practices that continue with them, in spite of a transition to common accounting rules.

The paper on discounting has some important policy conclusions about the discount rate regulation of IAS 36 and FRS 11. The logical answer to the research presented here would be to change the standard to allow or require for post-tax discounting. Another important conclusion with practical consequences is about deferred taxes. On this point also, the logical answer is to change the standard so that deferred tax liabilities are included in the measurement unit under impairment review.

Discounting appears in other accounting standards as well. Whereas the problems of discounting the cash flows of an investment project (with expected positive future cash flows) is adequately discussed in textbooks of microeconomics and finance, the discounting of

liabilities is little discussed. In contrast to the impairment standard, the accounting standard on provisions and contingencies gives little guidance on the techniques of discounting in these cases. For analytical as well as empirical research this area may be a promising challenge.

The historical research reveals that the origins of impairment accounting are not found by following a single thread. In fact, Norwegian legislation adopted an explicit impairment obligation for “permanent value reductions” before Germany and long before the United States. The research presented here has only tentative explanations for the facts presented. It should be possible, however, to examine more thoroughly whether the Norwegian regulatory advance was a mere historical accident, or whether it corresponded to some underlying economic need.

Chapter 2 Accounting practice under the UK impairment standard

2.1 Introduction

The writing down of accounting values that are not recoverable, whether due to obsolescence, physical damage or market conditions, is a long-lived convention in historical cost accounting.¹ Since the adoption of the EU Fourth Directive requirements into UK company legislation, there has also been a legal obligation to account for impairment losses on fixed assets.² Until recently, however, there was little authoritative guidance on how to detect impairments and to carry out the appropriate accounting. In the absence of authoritative guidance, impairment accounting has been, to a certain degree, at the discretion of each reporting entity.

In the UK, this state of affairs changed in 1998 when the Accounting Standards Board issued FRS 11, *Impairment of Fixed Assets and Goodwill*. The issuance of an impairment standard was not a unique British achievement; rather it should be seen as part of an international trend. FRS 11 appeared shortly after IAS 36, *Impairment of Assets*, was issued by the International Accounting Standards Committee. In spite of different terminology, the two standards have largely the same content. Both also bear resemblance to the US accounting standard SFAS 121, *Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of*, issued in 1995.³ The issuance of these standards was preceded by a long debate on the nature of impairment accounting, originated in the US. The starting point of this debate was an acknowledgement of a large increase in size and frequency of impairment write-downs, and varying practices.

The objective of this paper is to analyse impairment practice under FRS 11 by inspection of the 2002 annual reports of London Stock Exchange listed companies adhering to UK accounting rules. Due to the close similarity of FRS 11 with IAS 36 any findings about UK impairment accounting practice is likely to be relevant far beyond the UK. The research

¹ See for example Daniels (1933).

² Companies Act 1985, Sch. 4, para. 19(2).

³ SFAS 121 was substituted by SFAS 144, *Accounting for the Impairment or Disposal of Long-Lived Assets*, in 2001. In its main features SFAS 144 represents a continuation of SFAS 121.

question raised is whether the accounting impairment write-downs reflect current value reductions, or whether they rather reflect something else. The general hypothesis is that the impairment accounting under FRS 11 is unbiased, by which is meant an accounting practice that reflects current value reductions and no other factor. The hypothesis is tested statistically by identifying determinants of the impairment decision that are compatible or not compatible with it.

The paper is organised as follows: Section 2.2 presents prior research on impairment accounting, and discusses the relationship between that and the present study. Section 2.3 presents the descriptive statistics of the findings. Section 2.4 presents the research design and discusses possible relationships between the impairment write-down decision and factors that are or are not compatible with the hypothesis of unbiased impairment accounting. The selected variables are included in a regression analysis, the results of which are discussed in Section 2.5. Section 2.6 summarises the findings and concludes.

2.2 Relationship to prior research

Prior research on the causes for impairment accounting is overwhelmingly based on data from US companies.

One line of research discusses the motivation of the management for applying impairment accounting. A possible indication that impairment accounting is subject to the management's discretion is the association between changes in management and the incidence of write-downs. An early discussion of this was presented by Moore (1973), who used public press announcements in the period 1966-1969 to select a sample of companies with management changes. By comparing the sample with a control group he found that the frequency of discretionary accounting decisions, including "write-offs" and "write-downs", was higher in the sample than in the control group. Strong and Meyer (1987) conclude, based on data from 120 companies publicly announcing write-downs in 1981-1985, that "the most important determinant of a writedown decision is apparently a change in senior management; this is especially true if the new chief executive comes from outside the company". Elliott and Shaw (1988), studying 240 discretionary "write-offs" detected in *Compustat* companies in the period 1982-1985, found that 39 per cent of the companies with write-offs experienced "changes in the chief executive officer, president, and/or chief financial officer during the

year of the write-off”.⁴ On the basis of “write-off announcements” during 1989-1992, Francis et al. (1996) found that the “write-off” amount increases, among other things, with the incidence of a change in management. The alleged links between management changes and impairment accounting are supplemented with reports of other similar effects of management changes, such as the reduced R&D spending in the final years of office of a CEO (Dechow and Sloan, 1991). Contenders of the management change connection point out that the treatment of the management change as an exogenous phenomenon may be unjustified (Murphy and Zimmerman, 1993; Fields et al., 2001). Rather, the management change might well be the result of the same unfavourable events that brought about an asset write-down. Even if it were exogenous, the association with an impairment write-down might have different interpretations. Wilson (1996) suggests that goodwill may be written down in the event of a management change as a consequence of the new management introducing a new strategy.

A second line of study into the causes of impairment write-downs is related to the theory of earnings management. Zucca and Campbell (1992) analysed 77 write-downs in the NAARS database for 1978-1983. The motivation for the write-down was classified as either a “big bath”, “income smoothing” or inconclusive. A “big bath” is seen as the culmination of a period with low or negative net income. The “big bath” is thought to be a signal to investors that the balance sheet has been made “clean” of negative elements that might otherwise depress future accounting return. Income smoothing implies that a write-down is used to neutralise abnormal net income, creating hidden reserves for later periods.⁵ Thus, when a write-down occurs during or after a period with lower than expected net income, the reporting company is labelled a “bather”. When, on the other hand, net income has been higher than expected, the write-down company is labelled a “smoother”. Zucca and Campbell found that a “vast majority” (*sic*; in fact 58 per cent) of the write-down companies were “bathers”, while 25 per cent were “smoothers” and the rest inconclusive.

The conclusions of Zucca and Campbell contrast with other findings. Strong and Meyer (1987) found that, when controlling for industry sector, write-down companies were neither

⁴ Elliott and Shaw (1988) do not refer to any benchmark for the frequency of management changes, but it is obvious that the percentage observed among write-off companies is considered high.

⁵ An analytical contribution to the strategies of “bathing” and “smoothing” is provided by Kirschenheiter and Melumad (2001).

the best nor the worst performers in the years prior to the write-down. In an effort to explain their findings, the authors argue that the best performers may have adopted conservative accounting policies instead of making discretionary write-downs. The lack of write-downs among the poorest performers is tentatively explained by tax considerations⁶ and undesirable consequences for book equity. Francis et al. (1996) also do not provide support for a hypothesis that write-down companies are either “bathers” or “smoothers”. On the contrary, they find that indicators of asset impairment (e.g. book-to-market ratios) are important to explain write-downs. Rees et al. (1996), analysing NAARS data for 1987-1992, find that write-downs generally occur in years with low earnings (and therefore accentuate these), but find no statistically significant support for the idea that management uses impairment accounting to manipulate earnings. Elliott and Shaw (1988) find that write-down companies earn less than non-write-down firms (adjusted for the write-down), both in absolute and relative terms. Moreover, they find that write-down companies are systematically larger and more highly leveraged than others. Chen and Lee (1995), studying oil and gas companies in the mid-eighties, find that the likelihood of a write-down was larger for firms with accounting losses before the write-down.

Riedl (2004), comparing practice in the period before and after the issuance of SFAS 121, finds evidence that impairment accounting prior to the standard had greater association with economic factors and lower association with “big bath” reporting incentives, relative to the impairment accounting in the post-SFAS regime. Economic factors in Riedl’s study are represented by change in GDP and change in industry return, as well as firm-specific variables like change in sales, earnings and operating cash flows. The “big bath” is proxied by an exceptionally abrupt fall in pre-write-off earnings, and smoothing is proxied by an exceptionally abrupt rise.

A non-US study on impairment accounting is provided by Loh and Tan (2002), who analyse accounting data from Singaporean companies for 1983-1997. They find that macroeconomic factors, such as unemployment rate, GDP growth rate and occupancy rate of properties, are important determinants for the write-down decision. They also find evidence that return on assets and change of chairman are factors related to the decision. Other company-specific

⁶ It is not clear how the taxation argument could be relevant if impairment losses were not deductible in calculating taxable income.

variables tested, such as change in managing director and debt-to-asset ratio, provide inconclusive evidence.

Several studies examine the relationship between write-off announcements and share performance. On the one hand, share performance prior to the announcement may be used as a proxy for asset value decline, to the extent that efficient markets perceive the current value reduction before it is announced. On the other hand, the write-off announcement may also generate a market response. Francis et al. (1996) discuss both aspects. Bartov et al. (1998), together with other studies referred to in their article, report strong share price underperformance in a two-year window before the write-down announcement. Elliott and Shaw (1988) documents share underperformance three year before and 18 months after the announcement, as well as during a narrow window around the announcement.

The study in this paper is different from prior research in three respects. First, most studies cited above analyse accounting behaviour in a field where accounting standards were non-existent, or almost so. With respect to impairment of fixed assets, this is no longer the situation. Therefore, practice revealed in the cited studies may not be representative of present practice.⁷ By contrast, the study in this paper concerns accounting behaviour under a “modern” impairment standard, which may be representative of present practice under FRS 11, as well as under similar accounting standards, in particular IAS 36.

The second point is that the impairment concept of earlier research is not uniform and not necessarily within the scope of impairment of fixed assets as defined by the new generation of impairment standards. For instance, inventory write-downs and restructuring charges are excluded by FRS 11, but explicitly included in the concepts studied by Francis et al. (1996) and Elliott and Shaw (1988). In some other studies, the content of the impairment concept is vaguer. By contrast, the present study is only about fixed asset impairments, as defined by FRS 11.

Whether the write-down concept under scrutiny should be wide or narrow depends on the objective of the study. An analysis of the economic consequences of large non-recurring accounting charges (typically an impairment loss) should probably be based on a wider

⁷ Rees et al. (1996) argue that FAS 121 “has not eliminated managers’ discretion over the timing and amount of asset write downs” (p. 158). While this may be true, the regulatory surroundings of an impairment decision have changed significantly with the adoption of the impairment accounting standards. Elimination of the subjective

concept than the one defined by FRS 11 or IAS 36. However, if the objective is to assess whether practice is conform with the standard, as is the objective of the present study, the wider concept is clearly not appropriate.

Thirdly, there is a difference in the choice of methodology. While all of the above cited studies depend, more or less, on what is recorded in aggregate databases, the method chosen for this paper is direct inspection of financial statements of a chosen population of companies. Large variations in terminology and presentation in the financial statements increase the need for individual interpretation, which justifies this approach. Whereas many of the cited studies select a sample by screening earnings announcement or large special items, the method of this paper is to study the entire population, thereby avoiding the risk of a selection bias. An inconvenience by the method used in this analysis is that it is time-consuming. For that reason also the study is limited to one year, thereby possibly limiting its generality.

2.3 Descriptive statistics

The sample consists of the 2002 group financial statements of listed companies contained in the FTSE 350 index as of 19 September 2003 (an arbitrary cut-off date), which purport to comply with UK accounting regulation and standards. Companies belonging to the financial and petroleum sectors are excluded since they use industry specific accounting rules. The distinction between financials and non-financials follows the FTSE Global Classification System.⁸

There were 352 companies listed on the FTSE 350 index at 19 September 2003, of which 97 were classified as financial enterprises and 10 as oil and gas companies. Of the remainder, four companies were excluded due to use of non-UK accounting principles.⁹ Three companies

elements in accounting practice, both for impairment accounting and more generally, is probably beyond the standard setters' means and ambitions.

⁸ It may be noted that the FTSE system treats real estate companies as financials. For the purpose of this survey, exclusion of real estate companies is appropriate, since, under UK rules, they normally measure their main fixed asset at current value, in accordance with SSAP 19.

⁹ Foreign GAAP reporters are excluded from the sample only when the reporting is clearly non-UK compliant. There are several reporters who claim compliance both with UK GAAP and a foreign GAAP, except for the completeness of the notes in the company statements. These reporters are included in the sample. Those excluded are Autonomy Corporation and Carnival (both US GAAP), Brambles Industries (Australian GAAP) and Eurotunnel (French GAAP).

were the result of recent spin-offs so that there was no relevant 2002 report available.¹⁰ The total number of companies in the sample then adds up to 238.

Ten financial statements in the sample are prepared in a reporting currency different from pounds sterling. Of these, nine are in US dollars and one in euros. The reported amounts of these statements are translated into pounds using the exchange rate at the balance sheet date for balance sheet items, and an average over the accounting year for income statement and cash flow statement items.¹¹

Only impairment losses on historical cost amounts are included in the analysis. Impairment losses on revalued amounts are different in nature (since they depend on an earlier accounting choice) and are subject to a different accounting presentation.

Out of the sample total of 238 companies, 84 reported impairment losses or reversals on tangible or intangible assets in their 2002 group accounts, which is approximately one third. Table 1 summarises the distribution of impairment losses and reversals by main categories of asset.¹² Impairments of tangible assets were the most frequent, with goodwill impairments only slightly less frequent. However, goodwill impairments by far exceed impairments of tangible assets in amount, and the same applies to their impact on equity. Taking all 238 companies together, goodwill impairments in 2002 were equal in size to 3.3 per cent of their aggregate opening equity. The corresponding proportion for tangible asset impairments is 1.3 per cent. By comparison, impairment losses on non-goodwill intangibles are rare and of small financial significance.¹³

¹⁰ Burberry, Kesa Electricals and Mitchell & Butlers.

¹¹ The exchange rates used are collected from the Bank of England web-site statistics. The average exchange rate used for translation of flows items is a twelve month arithmetic average of monthly average spot rates as published there.

¹² The term “main categories of asset” is used for the division of fixed assets into tangible assets, non-goodwill intangible assets and goodwill. “Main category” is a higher level than “class”, which is used in this paper with the same meaning as in the UK and international accounting standards, cf. footnote 16.

¹³ This may be a reflection of a certain prudence in the recognition of such assets. Aggregate non-goodwill intangibles amounted to approximately £ 50 bn for all sample companies. By comparison aggregate tangibles were £ 300 bn and aggregate goodwill £ 200 bn.

Table 2.1. Reported impairments and reversals distributed by main categories of asset

	Tangibles	Intangibles excl. goodwill	Goodwill	Total
Impairment write-downs				
Number of reporters	50	9	46	83
Incidence (per cent) ¹	21.0	3.8	19.3	34.9
Amount (£m)	5247	201	13507	18989 ²
Per cent of adjusted book value ³	1.7	0.4	6.4	3.3
Per cent of opening equity ⁴	1.3	0.0	3.3	4.6
Reversals				
Number of reporters	3	0	0	3
Incidence (per cent) ¹	1.3	0.0	0.0	1.3
Amount (£m)	17	0	0	17
Per cent of adjusted book value ³	0.0	0.0	0.0	0.0
Per cent of opening equity ⁴	0.0	0.0	0.0	0.0

Source: Annual reports.

¹ Number of reporters as proportion of total sample population.

² The amount in the total column exceeds the amounts distributed by main categories of assets by £ 40 m which are unspecified impairment losses on fixed assets.

³ The amount of impairment write-downs (reversals) for the whole sample divided by the amount of assets of each category, measured by the adjusted book value, for the whole sample. The denominator in the total column is therefore book value of tangibles and intangible assets (including goodwill) for the whole sample, adjusted by the amount of impairments and reversals of the year.

⁴ The amount of impairment write-downs (reversals) for the whole sample divided by the sum of opening equity for the whole sample.

Table 2.1 also shows the importance of aggregate impairment losses in proportion to aggregate book value of assets of each category. In order to neutralise the effect of impairment accounting of the same period from the scale, the denominator is the end-of-year book value of the asset, plus impairment losses and minus reversals of the year. In the following this concept is referred to as the adjusted book value of the asset, and the percentage of impairment losses of the adjusted book value of assets is called the impairment ratio. In the sample goodwill impairments were by far the most important also by this measure, at 6.4 per cent. The aggregate impairment ratio of tangible assets was approximately 1.7 per cent. In the group of goodwill impairers, i.e. those companies recognising a goodwill impairment loss, the aggregate impairment ratio was 9.3 per cent.

Comparison of the descriptive statistics in this paper with those of previous research reveals important differences in impairment ratios. In the sample of Elliott and Shaw (1988), which is a selection of “large special items”, the mean “write-off” is 8 per cent of total assets, and in the sample of Francis et al. (1996), which is based on write-off announcements, the mean

goodwill “write-off” is 65 per cent of book value of goodwill.¹⁴ According to Table 2.1 the comparable impairment proportions of the company sample in this paper are much lower. This would be an unexpected outcome if sampling techniques were similar, since 2002 – the observation period of this study – was a year with great financial distress, whereas most of the other studies cover a time span (four years each) with more variable financial performance. A possible reason for the high impairment ratios of the latter studies is that their sampling criteria may have excluded the small-sized impairment losses. By contrast, the study of this paper attempts to capture any impairment loss in the defined company population.

As would be expected, reversals occur less frequently than impairments. Reversals of goodwill and other intangibles were non-existent. There were some reversals on tangible assets in the sample, but both the number and the amounts involved are small. The lack of reversals observed in this study corresponds with the observations of Elliott and Hanna (1996).

¹⁴ Francis et al. (1996) acknowledge that their sample may be biased.

Table 2.2 Reported impairments and reversals distributed by sector

Sector ¹	Number of reporters				Amounts (£m)		Impairment, pct. of	
	All	Impairment	Reversals	Incidence (pct.)	Impairment	Reversals	Opening equity ²	Adjusted book value ²
00 Resources	6	3	0	50.0	778	0	3.3	2.0
04 Mining	6	3		50.0	778	0	3.3	2.0
10 Basic Industries	37	8	1	24.3	299	2	1.2	1.1
11 Chemicals	7	2		28.6	54	0	1.7	0.7
13 Construction & Building Materials	28	4	1	14.3	107	2	0.6	0.7
15 Forestry & Paper	1	1		100.0	32	0	7.3	5.3
18 Steel & Other Metals	1	1		100.0	105	0	3.4	3.4
20 General Industrials	22	9	0	40.9	209	0	1.4	0.9
21 Aerospace & Defence	7	3		42.9	82	0	0.8	0.6
25 Electronic & Electrical Equipment	4	2		50.0	101	0	8.4	2.7
26 Engineering & Machinery	11	4		36.4	26	0	0.7	0.5
30 Cyclical Consumer Goods	5	1	0	20.0	15	0	1.0	0.6
31 Automobiles & Parts	3	1		33.3	15	0	1.1	0.6
34 Household Goods & Textiles	2	0		0.0	0	0	0.0	0.0
40 Non-Cyclical Consumer Goods	27	9	1	37.0	1017	8	2.1	1.2
41 Beverages	4	3	1	75.0	57	8	0.7	0.4
43 Food Producers & Processors	7	3		42.9	220	0	1.9	0.8
44 Health	4	0		0.0	0	0	0.0	0.0
47 Personal Care & Household Products	2	1		50.0	3	0	0.2	0.1
48 Pharmaceuticals & Biotechnology	7	2		28.6	737	0	3.4	3.4
49 Tobacco	3	0		0.0	0	0	0.0	0.0
50 Cyclical Services	105	38	0	36.2	1425	0	1.9	1.2
52 General Retailers	22	6		27.3	175	0	0.9	1.0
53 Leisure & Hotels	17	9		52.9	192	0	1.2	0.7
54 Media & Entertainment	24	12		50.0	918	0	5.0	3.1
58 Support Services	24	6		25.0	140	0	1.9	0.8
59 Transport	18	5		27.8	36	0	0.2	0.1
60 Non-Cyclical Services	14	6	1	50.0	11260	8	5.8	5.4
63 Food & Drug Retailers	7	1	1	28.6	28	8	0.2	0.1
67 Telecommunication Services	7	5		71.4	11232	0	6.3	6.2
70 Utilities	11	4	0	36.4	672	0	2.9	1.1
72 Electricity	4	3		75.0	624	0	6.6	2.8
77 Utilities – Other	7	1		14.3	48	0	0.4	0.1
90 Information Technology	11	5	0	45.5	3278	0	51.8	52.2
93 Information Technology Hardware	3	1		33.3	840	0	58.9	67.8
97 Software & Computer Services	8	4		50.0	2438	0	49.7	48.3

Source: Annual reports; London Stock Exchange website.

¹ Classification according to the FTSE Global Classification System. The sectors written in regular fonts are called *industrial sector* in this classification system, while those written in bold are called *economic groups*. The rows of the economic group include the amounts of all the industrial sectors within the group.

² Sum of impairments for the economic group or industrial sector divided by the sum of opening equity and the sum of adjusted book value of intangible and tangible assets

Table 2.2 shows the distribution of impairment losses and reversals by the sector of the reporting entity. Classification is according to the FTSE Global Classification System, as used by the London Stock Exchange for the composition of the FTSE 350 index. There are two levels of this classification: economic groups (in bold font) and industrial sectors. Impairment accounting has occurred with some regularity within all the economic groups. In fact, the relative incidence was between 20 per cent and 50 per cent of all companies in any economic group. However, the impact of impairments, as measured by proportion of opening equity and of the adjusted book value of tangible and intangible fixed assets, was very different among sectors. Most striking are the extensive impairments within the information technology group, i.e. sectors 93 and 97. In amounts, the largest impairment losses were presented by the telecommunication services sector (67). This feature appears very clearly when impairment losses are ranked by their nominal size, which is done in Table 2.3. Heading the list are the huge impairment losses recognised among the telecom companies.

Table 2.3. Ten largest impairments

Company	Sector ¹	Impairments £m	Per cent of	
			Opening equity	Adjusted book value ²
Panel A: Ranked by amount				
Vodafone	67	4394	3.0	3.4
Cable & Wireless	67	4026	26.4	34.6
British Telecom	67	2247	-98.0	12.1
Dimension Data Holdings	97	1232	55.6	81.1
Spirent	93	840	76.8	79.0
Logicacmg	97	706	69.1	60.0
Shire Pharmaceuticals	48	631	18.6	22.6
Rio Tinto	4	626	12.9	7.0
Colt Telecom	67	551	33.9	28.4
Xansa	97	497	57.8	63.5
Panel B: Ranked by impact on book value of tangible and intangible fixed assets				
Dimension Data Holdings	97	1232	55.6	81.1
Spirent	93	840	76.8	79.0
Xansa	97	497	57.8	63.5
Logicacmg	97	706	69.1	60.0
Cable & Wireless	67	4026	26.4	34.6
Colt Telecom	67	551	33.9	28.4
Shire Pharmaceuticals	48	631	18.6	22.6
United Business Media	54	114	20.3	18.3
Reuters	54	208	18.8	17.0
Securicor	58	72	21.9	14.8

Source: Annual reports.

¹ Industrial sector according to FTSE Global Classification System. See Table 2.2 and note 1 to it.

² End-of-year book value of tangible and intangible fixed assets, plus impairment losses and minus reversals of the year.

The lower panel of Table 2.3 exhibits the largest impairments ranked by their relative impact on the adjusted book value of tangible and intangible fixed assets, which reconfirms the predominance of information technology companies. The relative impact on opening balance equity is also shown for each company. The latter proportion is inappropriate for ranking since some companies have negative equity in the opening balance, which is the case, for instance, for British Telecom.¹⁵

2.4 Research design

2.4.1 Methodology overview

The hypothesis of this paper is that impairment accounting under FRS 11 is unbiased, meaning that impairment losses reflect current value reductions only. Consequently, one would expect impairments to correlate with variables that reflect asset value changes, and one would not expect them to correlate with variables that are independent of asset value changes. The hypothesis may therefore be tested by observing statistical relationships between the impairment decision and other variables.

The impairment decision is represented by two variables. One is the impairment occurrence – a binary variable that splits the population in two: those that recognise an impairment loss (impairers, which are given the value one) and those that do not (non-impairers, value zero). A logistics regression is applied to the binary variable to disclose its determinants. In a logistics function explanatory variables with positive coefficients are understood to increase the probability that a company will have recognised an impairment loss, whereas variables with negative coefficients will reduce this probability.

The second variable to represent the impairment decision is the impairment ratio, defined as the recognised impairment loss as a proportion of the end-of-year carrying amount, adjusted for the impairment losses and reversals during the year. The impairment ratio, which is recorded as a percentage within the interval (0, 100), is the dependent variable of a linear regression with the same explanatory variables as the logistics regression. Whereas the logistics regression includes the whole population of impairers and non-impairers, the linear regression includes only the impairers. The linear regression is designed to show which

¹⁵ British Telecom had a negative shareholders' equity of approximately £2 bn in the opening balance. As a proportion of equity the British Telecom loss is therefore a large negative number.

factors distinguish a proportionately large impairment loss from a small one. Explanatory variables with positive coefficients inflate the impairment amounts, whereas variables with negative coefficients deflate them.

Following Francis et al. (1996) the regressions are carried out for the total and for each main category of asset – tangibles, non-goodwill intangibles, goodwill – separately. Each sample company is therefore defined as impairer or non-impairer separately for each category of asset. Hence, the populations of the various regressions are different. The logistics regressions of tangibles include only those companies that have recorded tangibles in the asset matrix, and the same applies for the non-goodwill intangibles regression and the goodwill regression. Only one third of all companies have recorded non-goodwill intangibles, and the related analyses have therefore a shallower base than those of tangibles and goodwill.

Separation into main categories of asset also means that there is an impairment ratio for each of them. The denominator of the tangible asset impairment ratio of company j is the end-of-year carrying amount of company j 's tangible assets, adjusted with any relevant impairment loss or reversal of the year. The descriptive statistics of Section 2.3 shows that approximately 20 per cent of all companies had impairment losses of tangibles and goodwill, whereas less than 4 per cent (9 companies) had impairment losses of non-goodwill intangibles.

The remainder of this section discusses the explanatory variables to be included in the analysis, followed by a note on the correlation between them. If the null hypothesis were correct, there would be only one explanatory variable for an impairment loss, which is the current value of the relevant asset. Under historical cost accounting, assuming unbiased impairment accounting, there will still not be perfect correlation between impairment losses and current value reductions, since the carrying amounts of identical assets may vary arbitrarily. If two companies hold identical assets subject to declining current values, and they assess the movement of the current value identically, one may recognise an impairment loss while the other does not. The difference in accounting will depend on the company-specific carrying amount being higher or lower than the current value. Such inter-company differences between the current value and the carrying amount may be due to, e.g., the remoteness of the acquiring transaction or the timeliness of any subsequent accounting remeasurement. In a population of companies holding identical assets, these differences in the timeliness of carrying amounts may be assumed randomly distributed. For the whole population, assuming

that each company loyally follows the accounting impairment concept of FRS 11, accounting impairment losses should therefore be a function of current value reductions only.

For the external reader of financial statements it is not possible, for several reasons, to identify directly the asset value reduction that, under the null hypothesis, causes the impairments. First, impairment losses are at best specified by asset class¹⁶, so the external reader will most often not know precisely which asset within the class is impaired. Second, even if the identity of the impaired asset was known, its current value would most often be unobservable, simply because most of this world's assets do not carry quoted prices. In the analysis of this paper, therefore, the current value of the impaired assets is an "omitted variable".

There may exist observable variables that are closely related to the omitted variable, however. For quoted shares in an efficient market, the share price is supposed to reflect all available information about the relevant company. To the extent that the market, irrespective of the accounting treatment, is capable of detecting current value reductions on the company's assets, they would have the effect of reducing the share price. Under the assumption of unbiased impairment accounting, therefore, we would expect impairments to be negatively correlated with share performance. The regressions include variables for share performance, further described in section 2.4.2, which under the null hypothesis would be expected to have negative coefficients, both in the logistics and the linear regression. This approach resembles the one used by Francis et al. (1996).

The remaining explanatory variables are mostly those included in previous research. There are variables for each of company size, accounting return and leverage, with reference to the analysis of Elliott and Shaw (1988). There are two variables covering management change, one related to the CEO and one to the chairman of the board. The relationships between these variables and the null hypothesis are critically discussed below.

In addition to these well-established explanatory variables, variables for accounting conservatism are included. Under historical cost accounting there is an arithmetic link between the amortisation and the impairment of an asset, since, over the life of the asset, they

¹⁶ The term "class" is in the same meaning as in the UK accounting standards, e.g. at a more detailed level than what is here called "main categories of asset", see FRS 15.62. FRS 15.100 (g) requires impairment losses to be specified by asset class. IAS 36.126 requires a more detailed specification of impairment losses by asset class and by income statement item.

will add up to its cost. Therefore the choice of amortisation rate – a high rate being associated with prudent accounting practice – should normally reduce the probability of an impairment necessity. Another possible indicator of accounting conservatism is the price-book ratio. A statistical link between accounting conservatism and impairment accounting will not be considered contrary to the null hypothesis, but it may be considered a random element (“noise”) which limits the isolated information content of write-downs.

For reasons explained in Section 2.3 the regressions include dummy variables for sector belonging to the telecom and IT sectors. These dummies are also considered neutral to the null hypothesis.

When the remainder of this section refers to the scores for impairers and non-impairers, the full sample is generally used as the basis. These scores may therefore differ from those used in the regressions, where the population may be limited to those companies that possess or have written down assets of a specific main category. Only when discussing depreciation (amortisation) rates in Section 2.4.7 the examined sample is limited to those that have assets of the relevant category.

2.4.2 Share performance

In efficient capital markets the share price reflects all available information. A current value reduction of a company’s assets, whenever perceived by the market participants, will entail an instant reduction of the share price and reduce shareholder return, *ceteris paribus*.

Following previous research on the subject (Francis et al., 1996) it is assumed that impairment decisions may reflect prior performance. The expected sequence of events leading to an unbiased impairment decision would be a current value reduction that occurs or starts in one period, with the associated impairment loss being recognised in some subsequent period. Consequently, the market reaction is expected to take place before the accounting decision. The assumption of the stock market’s anticipation of impairment losses is confirmed by several studies (Bartov et al., 1998).

The impairment decisions analysed in this paper are for the financial years ending in 2002, so the balance sheet dates are between 31 January 2002 and 31 December 2002. The share performance variables included in the regression cover periods until 31 December 2001 for all companies. The implicit assumption is therefore that current value reductions, perceived by

the market participants, may have occurred or started at some moment before the end of 2001, which give rise to accounting impairments in the 2002 financial statements.

A statistical relationship between an impairment loss and prior share performance does not necessarily mean that the announcement of a write-down decision is without share price effects. Of course, the more accurate the stock market anticipation of the asset's current value reduction, the smaller would the market reactions be at the time of the write-down announcement and subsequently. Observing that write-down firms typically underperform in at least one year following the write-off announcement, Bartov et al. (1998) claim that there is an instant stock market underreaction to the information of such announcements.

An absolute measure of share performance is the Datastream return index, which shows a theoretical growth in value of a share holding over a specified period, assuming that dividends are re-invested to purchase additional shares at the closing price applicable on the ex-dividend date. It might be useful, however, to separate the part of a company's performance that is common to all companies within a sector and the part of the performance that is specific to each company. For that purpose the industry sector share index performance over the same time span is also included. Both Francis et al. (1996) and Riedl (2004) adjust for common sector characteristics by including variables that represent industry growth. The choice in this paper is to have a separate variable for sector performance, using 28 FTSE 350 sectors share performance indexes from Datastream¹⁷, and a variable for company performance relative to the sector performance. The latter is defined as the company share performance deflated by the sector performance. Assuming efficient capital markets we expect both measures to be negatively related to the impairment decision.

¹⁷ See explanatory notes to Tables 2 and 4.

Table 2.4 Share performance¹ (per cent) prior to 31.12.2001.

	Impairer			Non-impairer		
	N	Mean	Median	N	Mean	Median
One year relative performance	79	-10.4	-12.0	146	10.6	6.1
Three-year relative performance	75	17.5	9.4	139	78.0	53.4
One year sector performance	81	-14.5	-15.4	157	-8.5	-8.9
Three-year sector performance	81	-1.9	-8.6	157	1.1	-7.9

Source: Datastream.

¹ Both company performance and sector performance is measured by the Datastream return index, which shows a theoretical growth in value over the specified period assuming that dividends are reinvested to purchase additional units. The data shown in the table is the percentage increase over one year and three years respectively. The relative performance is the company return index deflated by the relevant sector index. The sector indexes used cover the sectors specified in Table 2.2 (27 sectors), plus a subdivision of the utilities sector into water and gas distribution.

Table 2.4 shows mean and median share performance in the group of impairers and non-impairers respectively. Share performance is measured over one year and over three years. Missing share price data reduces the samples, most severely when the three-year measure is included. As expected, stocks of non-impairers have performed better than those of impairers by all measures, and on average they belong to sectors that have performed better than those sectors that most impairers belong to.

2.4.3 Company size

Table 2.5. Company size (£ m), end-of-year.

	Impairer			Non-impairer		
	N	Mean	Median	N	Mean	Median
Turnover	81	4104	1752	157	2298	784
Equity	81	3033	694	157	920	359
Total assets	81	6371	1916	157	2348	826
Market value	81	4507	973	157	1944	663

Source: Annual reports, Datastream.

Table 2.5 shows differences in size between impairers and non-impairers, measured by four variables: turnover, book values of total assets and of equity, and market value of equity.

By all measures, impairers are larger than non-impairers. This observation is consistent with that of Elliott and Shaw (1988), who reported impairers to be significantly larger than non-impairers, measured by revenues and assets. They did not discuss what could be the reason for the observed difference in size. One possible explanation is that large firms may have

more ample resources available for the preparation of their financial reporting and would therefore be better equipped to discover impairments. A related suggestion might be that larger companies are more closely followed by market participants and supervisors, and therefore are less inclined to violate accounting regulations. If those were the reasons for the difference in size between impairers and non-impairers, impairment accounting would not be unbiased, because an important determinant (the uneven distribution of accounting expertise or attention from market participants) would reflect something that is not a reduction of the current value of fixed assets.

There is, however, another possible explanation for the over-representation of large companies in the group of impairers, which is not in conflict with the hypothesis of unbiased impairment accounting. On average, larger companies tend to have more diversified businesses than smaller companies. Therefore, they may also have a wider range of different assets than smaller companies. The probability that a current value reduction will take place during a period is non-negative for all types of assets. Therefore, all other things being equal, the probability that a current value reduction will hit one of its assets will be higher for a company with many different assets (i.e. a large company) than for a company with few different assets (i.e. a small company). The very clear difference in impairment frequency between larger and smaller companies, which is described in Table 2.5 and likewise observed by Elliott and Shaw, may have this trivial explanation.

If difference in asset diversification were the only factor that causes difference in impairment recognition frequency, the expected relative impairment loss amount (the impairment ratio) should be the same for all companies, irrespective of size. If all other things are equal, except that each large company is more diversified than each small company, the small companies seen together would have the same assets as the large firms. The average impairment loss per asset unit should therefore be the same for large and small companies.

The methodology of this paper may provide an answer to the question whether difference in diversification is or is not the reason for large companies being more frequent impairers. We would then expect the size variable to come up with a positive coefficient in the logistics regression and with a zero coefficient in the linear regression. Such result would not be contrary to the null hypothesis. However, a statistically significant positive coefficient of the company size variable in the linear regression could not be explained by difference in diversification and would hardly be compatible with the null hypothesis.

Different size variables are closely inter-correlated, and only one should be included in the regression. Turnover is selected because it is not closely correlated with any other explanatory variable. Anyway, trials show that the regression results are not very sensitive to which size variable is selected.

Table 2.5 shows that the medians of the size variables are systematically lower than the averages, indicating a skewed distribution. For that reason a logarithmic transformation is applied to the size variable used in the regression.

2.4.4 Accounting return

Several of the researchers cited in Section 2.2 presented a connection between accounting return and the propensity to write down, and discussed their findings in the light of an earnings management hypothesis. If it could be confirmed that earnings management is a driver of impairments, impairment accounting would not be unbiased.

The return measure used in this paper is a gross return ratio, where the numerator is income before tax and minorities, adjusted for impairment losses and reversals of the year, plus interest payable¹⁸, and the denominator is total assets non-adjusted.

This ratio has an economic interpretation in the context of impairments. Recognising an impairment loss normally means that the book value (carrying amount) of an asset is reduced to the net present value of future cash flows related to that asset, with the discount rate being “the rate that the market would expect on an equally risky investment”¹⁹. The asset written down is therefore expected to generate cash earnings as a proportion of the carrying amount (after the impairment loss) equal to the discount rate. Thus, if the earnings in 2002 are representative of earnings in subsequent years – the direct effect on the profit and loss account of impairment accounting being excluded – one should find that an impairer’s accounting rate of return is equal to the required market rate of return.

Even so, observing significant differences in return ratios between impairers and non-impairers would not necessarily mean that unbiased impairment accounting is violated. Under

¹⁸ Some technical choices have been required in order to compute the measure. Income before tax and minorities is easily observed since it is presented on the face of the profit and loss account of any financial statement. The presentation of interest payable varies somewhat between reporting entities. To the extent possible the relative proportion of interest payable in joint ventures has been included, but the one of associates has been excluded. Interest capitalised has been excluded.

¹⁹ FRS 11.41.

the historical cost convention such differences may be self-generated. Accounting return on assets is defined as net income (NI) as a proportion of assets. Assume that all companies hold an identical real asset (and no other assets), and at the balance sheet date the current value of this asset is CV , observed identically by all companies. There are N companies in the population, that have acquired the asset at different moments, at varying prices, and they have (subjectively) adopted different depreciation schedules. Consequently, at the balance sheet date each company, i , has its own book value, BV_i , for the asset. With reference to the impairment standard one would require that $BV_i \leq CV$ for all companies, and for those that have recognised an impairment, $BV_{imp} = CV$. It is assumed that net income before impairment losses, NI_i , is a stochastic variable, symmetrically distributed around some expected normal investment return. Accounting return in company i is measured by $AR_i = \frac{NI_i}{BV_i} \geq \frac{NI_i}{CV} = AR_{imp}$.

So, even if NI_i were identically distributed for impairers and non-impairers, and even if all companies correctly followed the impairment standard, one would expect the observed accounting return of non-impairers to be as high or higher than the accounting return of impairers. This conclusion would hold also when generalising to non-identical assets. In accounting jargon the point here is that non-impairers may have hidden reserves that artificially boost accounting return ratios.

This effect might explain some, but not necessarily all, of the differences in accounting return. In the sample of this analysis the impairers have an average accounting return of 4.8 per cent, which hardly can be a return (before tax) that satisfies market requirements. Non-impairers have an accounting return of 11.6 per cent. The medians are 6.6 per cent for impairers and 10.1 per cent for non-impairers.

2.4.5 Leverage

One of the hypotheses of Positive Accounting Theory (Watts and Zimmermann, 1986, p. 216) is that highly leveraged firms would take income-increasing actions to avoid costly violations of debt covenants. If this behaviour also govern the impairment decisions, we would expect non-impairers to be more leveraged than impairers, because only the moderately leveraged firms could afford an impairment loss. The behaviour suggested in the Positive Accounting Theory would be contrary to the hypothesis of unbiased impairments studied in this paper. Therefore, the relationship between impairment accounting and leverage should be examined.

However, prior research has demonstrated the opposite tendency: Impairers tend to have higher leverage than non-impairers (Strong and Meyer, 1986; Elliott and Shaw, 1988; Zucca and Campbell, 1992). In the present study leverage is measured as total liabilities (i.e total assets minus shareholders' equity) as a proportion of total assets. Comparison between impairers and non-impairers reveals modest leverage ratio differences, in line with previous studies. Mean and median ratios among the 81 impairers are 0.65, whereas they are 0.59 and 0.58 among the 157 non-impairers.

Recent research (Fields et al., 2001) cast doubt about the validity of leverage constructs. An alternative measure, used by Riedl (2004), is a dummy for private vs. public debt. The idea of this measure is that private debt is more likely to have covenants. Indeed, Riedl finds that impairments are negatively related to the existence of private debt.

2.4.6 Management change

The effects of a top management change on impairment accounting have been amply described in prior research, cf. Section 2.2. A close association between impairment accounting and management changes might undermine the hypothesis of unbiased impairment accounting under FRS 11. Demonstration of a close association does not prove, though, which is the cause and which is the effect of management changes and recognition of impairment losses. It may well be that management is replaced as a consequence of poor performance that necessitates impairment losses in compliance with unbiased impairment accounting. The choice of regression model in this paper should capture this important nuance, since it includes variables for prior share performance. If the association between management change and performance is a result of both of them being functions of company performance, this is likely to show up in the regressions and in the correlation tables. Particular attention is given to the multicollinearity problems which may arise in that circumstance.

The information in the annual reports (or separate annual reviews) provides an opportunity to grade different kinds of management changes. Top management is in this paper defined as the CEO and the chairman of the board. It is assumed that the appointment of an external successor represents a more radical shift than an internal succession. Changes in the two top

positions, and whether the succession is internal or external, are therefore recorded separately.²⁰ Only changes that took place within the accounting period are included.²¹

The relationship with impairment accounting is shown in Table 2.6. The clearest association is with the “radical change”, which is when both the CEO and the chairman of the board are replaced by external succession. However, this is a rare event both for impairers and non-impairers. Less than 5 per cent of the impairers experienced such a radical management change.

Table 2.6 Management changes.

	Mean		T-test		MW-test p-value ⁴
	Impairer	Non-impairer	t statistic	p-value ⁴	
Simple change occurrence ¹	26.5	23.2	0.552	0.291	0.287
Radical change occurrence ²	4.8	1.3	1.393	0.083	0.003
CEO, internal succession ³	8.4	9.0	0.156	0.438	0.438
CEO, external succession ³	4.8	5.2	0.115	0.454	0.454
Chairman, internal succession ³	8.4	8.4	0.012	0.495	0.495
Chairman, external succession ³	10.8	5.2	1.469	0.072	0.053

Source: Annual reports and annual reviews.

¹ Proportion (per cent) of companies having changed either CEO or chairman of the board or both.

² Proportion (per cent) of companies having replaced both CEO and chairman of the board with external successors.

³ Proportion (per cent) of companies having replaced CEO (chairman of the board) with internal (external) successor.

⁴One-tailed probabilities.

The information collected about management changes allows the construction of a simple index. The index takes integer values from 0 to 2, where 0 indicates no management change, 1 means change by internal succession, and 2 means change by appointment of external successor. This index is used in the same manner for CEO changes and chairman of the board changes.

²⁰ In several cases the score attributed to a company has been subject to some judgement. Appointment of new CEO or chairman from a merging partner has been treated as an internal succession. Change of management between the balance sheet date and the annual report issue date has been recorded as non-changes, even though one could argue that the new management appointed after the balance sheet date probably have influenced accounting choices as much as a new management appointed before the balance sheet date. In some cases the information on dates of appointment are not accurate, and the score attributed may therefore be uncertain.

²¹ The analysis is based on annual reports of a single financial year, and the report can be expected to cover fully only the events that took place during the year. Consequently, all the changes included in the analysis, took place before the annual financial statements were prepared.

2.4.7 Accounting policies

Within the framework of the law and the accounting standards, companies may adopt accounting policies with varying degrees of conservatism. Companies that adopt conservative policies most likely do it with the aim of avoiding any overstatement of the carrying amount of assets. Therefore, companies with conservative policies would be expected to have less frequent impairment losses than companies with less conservative policies.

For tangible and intangible assets the most conspicuous difference between conservative and less conservative accounting policies lies in the choice of depreciation schedules. A company with conservative policies may tend to apply a shorter estimated economic life for the linear depreciation of a fixed asset than a company with less conservative policies. Therefore, the length of the estimated economic lives of fixed assets may be a measure of the degree of accounting conservatism. Alternatively, this characteristic may be measured by the ordinary depreciation charge in proportion of the original cost of the asset. The latter is the chosen measure of this paper.

If the capital markets are efficient, market participants would not be misled by companies' use of different accounting policies, insofar as they are properly disclosed. In efficient markets identical companies with differences only in the choice of accounting policies would have the same value, provided that market participants are informed about the content of the policies. If this condition holds, one would expect the ratio of market value to book value of equity (price-book ratio) to be higher for the companies with conservative policies than for those with less conservative policies, because the denominator of the ratio will be systematically lower for the former. If impairment losses are caused by lax accounting policies, the price-book ratio of impairers would be expected lower than the ratio of non-impairers prior to the recognition of the impairment loss.²²

²² There may be other reasons for differences in the price-book ratios, for example different acquisition activities.

Table 2.7 Measures of accounting conservatism.¹

	Impairer			Non-impairer		
	N	Mean	Median	N	Mean	Median
Depreciation rate, tangibles	50	6.6	6.3	188	8.6	7.6
Amortisation rate, intangibles	9	4.4	3.2	66	9.6	5.7
Amortisation rate, goodwill	46	5.4	5.0	165	5.8	5.0
Price-book ratio	81	2.68	1.55	157	2.78	1.87

Source: Annual reports, Datastream.

¹ Depreciation and amortisation rates are calculated as the ordinary depreciation (amortisation) as a proportion of gross book value (original cost) of the particular asset category. The price-book ratio is the end-of-year market value of equity divided by the book value of equity.

Table 2.7 compares depreciation (amortisation) rates and the price-book ratio for impairers and non-impairers. To make it meaningful, the average depreciation (amortisation) rate is calculated only for those impairers that have impairments of the relevant class and non-impairers that hold assets of the relevant asset category. For instance, the non-goodwill intangible amortisation rate of companies with non-goodwill intangible impairments (which are 9 companies) compares with the non-goodwill intangible amortisation rate of companies that hold non-goodwill intangibles without having impairments (66 companies). Table 2.7 shows that impairers systematically have lower depreciation (amortisation) rates than non-impairers, and they also have lower price-book ratios.

The research question of this paper is whether impairments are unbiased. Even if we were to find an adverse relationship between impairment accounting and the depreciation (amortisation) rate, it could still be true that the impairment losses reflect current value reductions. Over time there is a mathematical link between depreciation (amortisation) and impairments in the sense that they add up to the historical cost. To some extent, therefore, impairment losses may have the function of adjusting the effects of a chosen depreciation schedule. We would not consider this adjustment function as being a violation of the hypothesis of unbiased accounting, since the precondition of a current value reduction may be fulfilled in those circumstances where the adjustment is needed. However, it is certainly not the intention of the law and the accounting standards that impairment accounting should be used to make up for deficient depreciation policies.

2.4.8 Correlations between explanatory variables

Pearson correlations of explanatory variables are presented in Table 2.8. Correlations are presented for the full sample only (i.e. not for the sub-samples of holders of one particular main category of asset only, or those that include only impairers).

The correlation table reveals that companies with good relative performance in the last year most likely had good relative performance also over the three-year period. Large companies generally had poor relative performance, both in the short and in the longer run. Large companies also tend to be more leveraged. The variables for accounting conservatism (depreciation rates and price-book ratio) are, as expected, positively correlated. The two management change variables are positively interrelated, but the relationship between management change and performance variables is surprisingly small.

2.5 *Regression results*

This section presents and discusses the results of the regressions. As explained in Section 2.4 the analysis encompasses overall impairment regressions (Table 2.9) as well as separate regressions for each of tangible assets (Table 2.10), non-goodwill intangible assets (Table 2.11) and goodwill (Table 2.12). The total impairment patterns as well as those of tangible assets and goodwill are analysed by two regressions, one logistic regression where the binary dependent variable splits the population in impairers and non-impairers, and one linear regression that explains the relative impairment magnitude. The logistics regressions include all the companies with a potential for an impairment loss, which are all the companies in the total impairment regressions, and all those that hold assets of that particular category in the other regressions. The linear regressions include only those companies that recognised impairments. Impairments of non-goodwill intangibles are analysed by the logistics regression only, since the population of non-goodwill intangibles impairers (9 companies) were too small for any statistical analysis. All the linear regressions presented have multicollinearity measures on acceptable levels.

Table 2.9 shows the regression results for impairments of all asset categories. The logistics regression in the left-hand panel has coefficients which are quite in line with expectations. Poor share performance in prior periods coincides with more frequent impairments. Moreover, large companies have more frequent impairments than smaller, and the impairers

are characterised by low earnings before the impairment loss. Rapid depreciation also reduces the propensity to recognise impairment losses.

These familiar results are not fully replicated by the linear regression that covers the impairers only. Poor short-term share performance is related to high relative impairment losses, and there is a close relationship between accounting return and the size of the impairment loss. There is no indication, however, that the magnitude of the impairment increases with the size of the company. The two panels seen together lend support to the suggestion in Section 2.4 that large companies may be more frequent impairers than small companies because they have more diversified business.

The explanatory power of the total impairment regressions is very high. For the linear regression the high explanatory power should be seen in the context of very large and highly significant sector coefficients. Small statistical significance of variables that often are associated with discretionary impairment decisions, like the management change variables, is also an interesting feature of Table 2.9.

The patterns of tangible asset impairments presented in Table 2.10 are different from those of total impairments. The impairment decision analysed by the logistics regression has one highly significant variable, which is the depreciation rate of tangible assets. As we would expect, companies with rapid depreciation schedules are less apt to write down their tangible asset than those with slower depreciation schedules. The coefficient of the previous three year share performance is significant at the 10 per cent level, also with the expected sign.

The right-hand panel of Table 2.10 has only two statistically significant coefficients, which is the intercept and the dummy variable for the telecom sector. Belonging to the telecom sector clearly explains large relative impairment amounts of tangible assets in 2002.

Table 2.8. Pearson correlations of explanatory variables.¹

	1Y rel perf	3Y rel perf	1Y sec perf	3Y sec perf	Turnover log	Return	Leverage	Tang dep	Intang dep	Goodw dep	Price book	CEO change	Chairman ch	Telecom	IT
1Y rel perf	1,000														
3Y rel perf	0,519***	1,000													
1Y sec perf	-0,274***	-0,107	1,000												
3y sec perf	-0,207***	-0,191***	0,451***	1,000											
Turnover log	-0,175***	-0,252***	0,171***	0,080	1,000										
Return	0,143**	0,145**	0,296***	0,090	-0,080	1,000									
Leverage	-0,060	-0,093	-0,066	-0,068	0,279***	-0,125*	1,000								
Tang dep	0,057	0,145**	-0,270***	-0,082	-0,214***	-0,188***	0,129**	1,000							
Intang dep	-0,110*	0,139**	-0,001	-0,039	0,024	0,058	0,035	0,038	1,000						
Goodw dep	0,014	0,025	-0,190***	-0,083	0,002	-0,229***	0,044	0,214***	0,091	1,000					
Price-book	0,010	0,047	-0,055	0,006	-0,097	0,057	0,232***	0,204***	0,078	0,030	1,000				
CEO change	-0,160**	-0,020	-0,040	0,002	0,028	-0,051	0,035	0,047	0,276***	0,110*	0,142**	1,000			
Chairman ch	-0,094	-0,093	-0,066	-0,059	0,045	-0,062	0,085	-0,015	0,075	0,057	0,017	0,322***	1,000		
Telecom	-0,119*	-0,102	-0,209***	-0,165**	0,113*	-0,151**	-0,113*	0,083	0,144**	0,087	-0,113*	0,231***	0,239***	1,000	
IT	0,366***	0,301***	-0,549***	-0,185***	-0,159**	-0,182***	0,002	0,305***	-0,019	0,127*	-0,057	-0,003	0,018	-0,038	1,000

¹ “1Y and 3Y rel perf” are the one-year and three-year relative share performance as defined in Table 2.4. “1Y and 3Y sec perf” are the one-year and three-year sector index performance. The sector indexes applied are described in footnote to Table 2.4. “Turnover log” is the logarithm of turnover. “Return” is income before tax and minorities, adjusted for impairment losses and reversals of the year, plus interest payable, as a proportion of total assets. “Leverage” is total assets minus shareholders’ equity as a proportion of total assets. “Tang dep”, “intang dep” and “goodw dep” are the depreciation (amortisation) rates of tangible assets, non-goodwill intangible assets and goodwill respectively. Depreciation and amortisation rates are calculated as the ordinary depreciation (amortisation) as a proportion of gross book value (original cost) of the particular asset category. “Price-book” is the end-of-year market value of equity divided by the book value of equity. “CEO change” is an index that takes the value 0 if there was no change of CEO during the year, 1 if there was an internal succession and 2 if there was an external succession. “Chairman ch” is a similar index relating to the change of the chairman of the board. “Telecom” and “IT” are dummy variables taking the value one for companies that belong to the sector and zero otherwise.

***, ** and * denote significance at the 0.01, 0.05 and 0.1 level respectively.

Table 2.9 Analysis of all non-financial fixed asset impairments.¹

Model summary ¹	Logistics regression			Linear regression			
	N=214; -2LL=223; Cox&Snell=0.222; Nagelkerke=0.305			N=75; R ² =0.772; adjusted R ² =0.723; Condition index=24.361			
	Coefficient	Wald-statistic	sig	Coefficient	T-statistic	sig	VIF
Constant	-1.769	2.471	0.116	11.572*	1.729	0.089	
1Y relative perform.	-0.002	0.116	0.733	-0.054*	-1.834	0.072	2.036
3Y relative perform.	-0.007**	4.555	0.033	0.035*	1.872	0.066	1.536
1Y sector perform.	-0.007	0.309	0.578	-0.017	-0.246	0.806	2.858
3y sector perform.	-0.003	0.219	0.640	0.025	0.879	0.383	1.385
Turnover, log	0.292**	4.384	0.036	-0.797	-1.016	0.314	1.377
Return	-0.050**	4.087	0.043	-0.429***	-3.274	0.002	1.723
Leverage	0.296	0.086	0.769	5.242	0.963	0.339	1.482
Total depr rate	-0.126*	3.493	0.062	-0.708	-1.656	0.103	1.365
Price-book	0.053	0.646	0.422	-0.009	-0.037	0.971	1.315
CEO change	0.128	0.109	0.742	-0.876	-0.520	0.605	1.340
Chairman change	0.440	1.771	0.183	1.343	0.883	0.381	1.349
Telecom	20.329	0.000	0.999	18.851***	3.592	0.001	1.879
IT	0.690	0.424	0.515	43.613***	8.191	0.000	1.934

¹ Analysis of impairments on tangible and intangible fixed assets of all companies in the sample. The logistics regression has a binary dummy representing the impairment decision (1 = impairment loss recognition, 0 = no impairment loss) as dependent variable. The linear regression, which includes only those with an impairment loss, has the impairment ratio (see Section 4.1) as dependent variable. The explanatory variables (covariates) in the front column are explained in the note to Table 2.8, except “Total depr rate”, which is all ordinary depreciation (amortisation) as a proportion of gross book value (original cost) of tangible and intangible fixed assets.

Significance is denoted as in Table 2.8.

Table 2.10 Analysis of tangible asset impairments.¹

Model summary	Logistics regression			Linear regression			
	N=214; -2LL=176; Cox&Snell=0.196; Nagelkerke=0.303			N=46; R ² =0.568; adjusted R ² =0.393; Condition index=26.094			
	Coefficient	Wald-statistic	sig	Coefficient	T-statistic	sig	VIF
Constant	-1.246	0.971	0.324	9.492*	1.817	0.079	
1Y relative perform.	0.003	0.241	0.624	-0.042	-1.225	0.229	2.846
3Y relative perform.	-0.008*	3.464	0.063	-0.006	-0.232	0.818	2.535
1Y sector perform.	-0.009	0.341	0.560	0.007	0.098	0.923	4.156
3y sector perform.	0.006	1.040	0.308	0.010	0.479	0.635	1.549
Turnover, log	0.234	2.234	0.135	-1.022	-1.382	0.177	2.071
Return	-0.036	2.157	0.142	-0.152	-1.223	0.230	2.920
Leverage	0.003	0.000	0.998	3.747	0.901	0.374	1.638
Tangibles depr rate	-0.217***	8.524	0.004	-0.080	-0.245	0.808	1.879
Price-book	-0.005	0.006	0.938	0.145	0.769	0.447	1.535
CEO change	-0.101	0.049	0.824	-0.575	-0.357	0.724	2.036
Chairman change	0.422	1.537	0.215	-0.532	-0.388	0.700	1.960
Telecom	22.099	0.000	0.999	13.814***	3.259	0.003	3.050
IT	-0.145	0.009	0.926	-5.009	-0.606	0.549	3.112

¹ Analysis of tangible assets impairments for companies holding tangible assets. For explanations, see note to Table 2.9.

Table 2.11. Analysis of non-goodwill intangible asset impairments.¹

Model summary	Logistics regression		
	N=71; -2LL=36; Cox&Snell=0.217; Nagelkerke=0.407		
	Coefficient	Wald-statistic	Sig
Constant	-3.457	1.477	0.224
1Y relative perform.	-0.032	2.040	0.153
3Y relative perform.	-0.014	1.456	0.228
1Y sector perform.	-0.061	2.144	0.143
3y sector perform.	0.011	0.435	0.510
Turnover, log	0.515	2.079	0.149
Return	0.026	0.183	0.669
Leverage	-6.482*	3.721	0.054
Intang. depr rate	-0.009	0.009	0.925
Price-book	0.280*	3.317	0.069
CEO change	-17.440	0.000	0.998
Chairman change	0.407	0.189	0.663
Telecom	-1.292	0.287	0.592
IT	-11.861	0.000	1.000

¹ Analysis of non-goodwill intangible asset impairments (logistics regression only) for companies holding non-goodwill intangible assets. For explanations, see note to Table 2.9.

Table 2.12. Analysis of goodwill impairments.¹

Model summary	Logistics regression			Linear regression			
	N=189; -2LL=158; Cox&Snell=0.210; Nagelkerke=0.319			N=43; R ² =0.851; adjusted R ² =0.784; Condition index=26.237			
	Coefficient	Wald-statistic	Sig	Coefficient	T-statistic	sig	VIF
Constant	-2.807*	3.603	0.058	0.740	0.049	0.961	
1Y relative perform.	-0.004	0.334	0.563	0.021	0.344	0.733	2.378
3Y relative perform.	-0.004	1.087	0.297	-0.001	-0.031	0.975	1.724
1Y sector perform.	-0.014	0.893	0.345	-0.221	-1.531	0.137	3.037
3y sector perform.	-0.002	0.096	0.756	0.024	0.296	0.770	1.352
Turnover, log	0.246	1.956	0.162	-1.582	-0.923	0.364	1.458
Return	-0.056*	3.744	0.053	0.545*	1.883	0.070	2.221
Leverage	1.949*	2.834	0.092	12.849	0.915	0.368	2.593
Goodw depr rate	-0.224**	5.577	0.018	2.271*	2.036	0.051	3.242
Price-book	-0.045	0.607	0.436	-1.777**	-2.178	0.038	1.804
CEO change	0.263	0.362	0.547	-4.494	-1.153	0.258	1.791
Chairman change	-0.035	0.007	0.931	13.994***	3.225	0.003	2.529
Telecom	22.098	0.000	0.999	11.244	1.014	0.319	3.083
IT	1.080	0.886	0.346	52.455***	4.680	0.000	3.148

¹ Analysis of goodwill impairments for companies holding goodwill. For explanations, see note to Table 2.9.

Table 2.13. Test of equality of coefficients of the tangible asset regressions and the goodwill regressions.¹

	Logistics regressions	Linear regressions
1Y relative perform.	0.552	0.367
3Y relative perform.	0.325	0.925
1Y sector perform.	0.648	0.161
3y sector perform.	0.188	0.869
Turnover, log	0.479	0.765
Return	0.587	0.030**
Leverage	0.999	0.536
Depreciation rate	0.433	0.046**
Price-book	0.937	0.024**
CEO change	0.775	0.356
Chairman change	0.044**	0.002***

¹ The table shows the p -values of tests of equality of statistics in Tables 2.10 and 2.12. Coefficient equality of the logistics regressions is measured by the relevant Wald-statistics, which have a chi-square distribution with one d.f., so that their fraction has a F (1,1)-distribution. Coefficient equality of the linear regressions is measured by the two-sided p -value of the t -distribution with $N-(x+2)$ d.f., where x is number of explanatory variables (11 in these regressions), and the test statistic is $(coeff_{tan_g} - coeff_{goodw}) / \sqrt{var_{tan_g} + var_{goodw}}$, where the latter refers to the variance of the coefficients.

In both regressions all the other variables are statistically insignificant, despite the explanatory power of the regressions being quite high. The relationship between prior share performance and tangible asset impairment accounting is very modest. This is contrary to the property, plant and equipment regression of Francis et al. (1996), which has a very low explanatory power, but a statistically significant coefficient for prior year's performance. A possible explanation might be that the tangible asset impairment losses studied in this paper (those of UK companies by 2002) are on average more timely than those studied by Francis et al. (1996), and for that reason less anticipated by the market prior to the financial statement publication. Alternatively, the difference in the observed stock market anticipation may simply reflect the different sampling techniques whereby Francis et. al. have studied a biased selection of large impairments.

Table 2.11 shows the result of the logistics regression of non-goodwill intangible assets impairments. There are complete data for 71 companies among the 75 holders of non-goodwill intangibles in the entire sample. Two variables have coefficients significant at the 10 per cent level. High leverage seems to discourage impairments of non-goodwill intangibles (which is conform with the expectations), and high price-book ratio seems to encourage them (which is counter to expectations).

The coefficients of the goodwill regressions in Table 2.12 give altogether a different picture from the previous regressions. None of the share performance measures have coefficients at valid significance levels. There may be two reasons for that: either the goodwill impairment is void of economic content, or it may have an economic content, but the market has not discovered it before the loss recognition in the financial statements. The result is indeed different from that of Francis et al. (1996) who find a particularly significant relationship between prior share performance and goodwill impairments.²³ As noted above, this may be a result of their sampling technique.

The linear regression also shows a very strong relationship (significant at the 1 per cent level) between the impairment ratio and change of the chairman of the board. The coefficient is large in absolute terms. The impairment ratio is recorded in percentage units, and the coefficient therefore tells that a typical internal succession drives up the goodwill impairment ratio by 13 percentage points. The observation is interesting on the background of the lack of

²³ They also fail to find any statistically significant relationship between goodwill impairments and posterior share performance.

any significant management change coefficient in the logistics regression. Moreover, as already noted in conjunction with the correlation matrix, there is little indication that a management change is a consequence of poor prior share performance. The conclusion is therefore that a goodwill write-down decision is rooted in other events than a management change, but once the decision taken, a simultaneous change of the chairman of the board would drive up its relative size. This finding is compatible with – but nuances the content of – the findings in prior research of higher write-down frequency among companies with management change, when taking into account that these studies may have a selection bias towards large write-downs. For the research question of this paper the most relevant finding is that there is close relationship between goodwill impairment accounting and the specific event that the chairman of the board changes, and this relationship cannot be jointly explained by the share performance of prior periods.

Table 2.12 contains some other interesting findings. The goodwill impairment decision, as analysed by the logistics regression panel, is negatively related to accounting return and the goodwill amortisation rate, as expected. However, the sign of these coefficients, all of them significant at the 10 per cent level, turns from negative to positive in the linear regression panel. The changing sign of the accounting return coefficients remind of the hidden reserve argument discussed in Section 2.4. The suggestion there was that the possible existence of hidden reserves in the group of non-impairers might be an explanation for the accounting return being systematically higher in the group of non-impairers than in the group of impairers. If this were the sole explanation for the difference in return between impairers and non-impairers observed in the sample, a significant negative coefficient would be expected for the return variable in the logistics regression, but not in the linear regression. Indeed, this is the combination of return coefficients in Table 2.12. However, this argument only explains non-negativity of the coefficient in the linear regression; it does not explain why it could be positive and significant.

A similar puzzle is the negative depreciation rate coefficient in the logistics regression and the positive in the linear regression. Rapid goodwill amortisation helps to avoid goodwill impairments, but once the decision to write down has been made, the companies with rapid impairments take the largest losses. Clearly, there may be two opposite effects at play here, one being the shield of conservatism against the risk of impairment losses, the second being the propensity to amortise risky goodwill more rapidly than not so risky goodwill. However,

the existence of opposite forces does not explain why the signs in the two panels are opposites.

Table 2.13 compares the coefficients of the explanatory variables of the tangible asset regressions and the goodwill regressions. The table shows the probability of the “true” coefficients being equal, given the observed statistics. The chairman of the board change variable produces significantly different coefficients, both in the logistics and the linear regressions. There are significant differences also in the return, depreciation rate and price-book variables in the linear regressions.

For all categories of fixed asset we find very weak evidence that current value reductions of the assets are perceived by the stock market participants prior to the write-down announcement, though the association looks more remote for goodwill and non-goodwill intangible asset impairments than for tangible asset impairments. It is interesting then to observe that for all the impairments added together (Table 2.9) we found a statistically significant relationship with prior share performance, not very strong, though. This may indicate that there are write-downs of composite measurement units that are economically justified, but that the allocations of the write-downs to categories of asset follow a different logic.

Summing up, we find that the impairment decisions related to tangibles and goodwill have quite different characteristics. Although we cannot positively confirm that tangible asset write-downs are true functions of current value reductions, the only highly significant coefficients in the tangible asset regressions belong to explanatory variables (depreciation rate, telecom sector) that do not indicate any rejection of the null hypothesis. By contrast, goodwill impairment accounting is related to variables (management change, accounting return) that are not easily compatible with the hypothesis of unbiased impairment accounting.

2.6 Conclusion

The analysis and discussion of this paper give rise to three concluding remarks.

The first is about the research question. The objective of the paper is to assess whether or not impairment accounting under FRS 11 is unbiased in the sense of reflecting current value reductions of the relevant asset only. The discussion of the regression results lead to the conclusion that impairment accounting, except that of goodwill, may be unbiased. Goodwill impairment accounting, however, has characteristics that are not compatible with the

hypothesis of unbiased impairment accounting. The superior size of goodwill impairment amounts exacerbates the importance of this finding.

The second concluding remark is about the methodology used to reach this conclusion. The analysis is based on data that to a large extent have been “hand-picked” from the annual reports, contrasting the analyses based on large sample in standard databases. There are both advantages and disadvantages with this approach. The advantages are 1) that it gives access to a large amount of variables that are not available in databases, and 2) that operational definitions and interpretations are controlled by the researcher. Anyone that endeavours to study impairments of fixed assets by inspecting the annual reports will find a large variation in presentation and terminology that requires individual judgement. This would probably be true for other narrow accounting topics as well. It can therefore be questioned how precisely such topics can be analysed by the use of databases. The disadvantage of “hand-picking” accounting data is that it is time consuming and therefore severely limits the availability of large sample studies.

A related methodological question is the sampling technique. The observation of impairment accounting practice based on direct inspection of a full sample ensures an unbiased sample. The sampling techniques used in much prior research, like the selection of impairers based on public announcements, may not provide a representative view of impairment practice.

My third concluding remark is about the information content of recognised impairment losses. It has not been the purpose of this paper to analyse the consequences of impairment decisions. Nevertheless, the distinction between biased and unbiased impairment accounting is inextricably connected with value relevance, disregarding in this context whether the market perceives the share price consequence of value relevant accounting information before or after the write-down announcement. Based on the findings of this paper, we would expect goodwill impairment write-downs to have less value relevance than tangible asset impairment write-downs, because the former have a more uncertain relationship to current value reductions of the relevant asset than the latter. On this background the increased emphasis on impairment accounting (rather than amortisation) for expensing goodwill under IFRS and US GAAP may be a one-eyed solution. It may be true, as the IASB argues in IFRS 3, that “straight-line amortisation of goodwill over an arbitrary period fails to provide useful information”.²⁴ It is

²⁴ IFRS 3 Basis for Conclusions, BC 140.

not obvious, though, that the impairment accounting that has substituted it, will provide more useful information.

Further studies of the value relevance of goodwill impairment would therefore be a useful follow-up of this paper.

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Appendix to Chapter 2. The qualities of impairment reporting of individual company reports

X.1 Introduction

The paper on “Accounting practice under the UK impairment standard” is based on information extracted directly from individual company reports. This appendix discusses the information quality of the individual reports, with reference to the presentation and disclosure requirements in the law and the accounting standards. Clear and transparent reporting in conformity with the law and the accounting standards would underpin the findings of the paper, while the opposite would cast doubt on their reliability.

X.2 Detecting impairments

An impairment loss implies a credit to an asset account and a debit to an expense account. Conversely, a reversal implies a debit to an asset account and a credit to an income or an expense account. Impairment losses and reversals therefore may be discovered either by inspection of the movements on asset accounts, or by inspection of income and expense accounts, or both.

The Companies Act 1985 Schedule 4 paragraph 42 requires disclosure of the movements of items of fixed assets. “Items” refer to the specification level of the balance sheet formats given in the law. For instance, tangible assets are divided into the following items: land and buildings; plant and machinery; fixtures, fittings, tools and equipment; payments on account and assets in course of construction. The specification level called “item” in the law, is called “class” in UK accounting standards.²⁵

The kinds of movements of tangible fixed assets to be reported are further explained in FRS 15, *Tangible Fixed Assets*, paragraph 100 (g): “a reconciliation of the movements, separately disclosing additions, disposals, revaluations, transfers, depreciation, impairment losses, and reversal of past impairment losses written back in the financial period”. It follows from letter (e), (f) and (h) that cost or revalued amount at the beginning and end of the period, cumulative amount of depreciation and impairment at the beginning and end of the period, and the net

²⁵ See in particular FRS 15.62.

carrying amount at the beginning and end of the period, shall also be disclosed. All disclosures under FRS 15.100 are for “each class of tangible assets”. FRS 10, *Goodwill and Intangible Assets*, has the same disclosure requirements for “positive goodwill, negative goodwill and each class of intangible assets” in paragraph 53.

These requirements correspond to a traditional ledger, with one account for the asset measured at cost and one account for the depreciation. Purchase of the asset is a debit to the asset account, and subsequent depreciation charges are credits to the depreciation account. Net book value, shown in the balance sheet, is the difference between the amount recorded in the asset account and the amount accumulated in the depreciation account. Sale or transfer of the asset is a credit to the asset account and a debit to the depreciation account. The difference between the proceeds of the sale (debit to the cash account) and the double entries in the asset and depreciation accounts, equals the profit or loss on disposal, depending on the sign of the difference.

The movements in the asset and depreciation accounts during a period may be summarised in a matrix, in which different classes of asset are shown in the columns, and the stocks and flows are shown in the rows, as follows:

- A. Opening stock of assets, measured at original cost
- B. Additions during the year (i.e. purchases measured at cost)
- C. Disposals during the year (i.e. scrapping and sales measured at original cost)
- D. Closing stock of assets, measured at original cost (= A + B – C)
- E. Accumulated depreciation and (net) impairment losses on opening stock
- F. Depreciation charge during the year
- G. Accumulated depreciation on disposals
- H. Accumulated depreciation on closing stock (= E + F – G)
- I. Net book value at close (= D – H)

Clearly, a matrix of this design is a convenient way of meeting the requirements of the law and the accounting standards to disclose the movements of fixed assets. Whenever impairment losses or reversals occur, separate lines for those should be included. FRS 15 explicitly says that impairment losses and reversals should be separately disclosed (for each class of assets), so there should be one line for impairment losses and one line for reversals. It also follows from FRS 11.68 that “for assets held on a historical cost basis, the impairment loss should be included within cumulative depreciation: the cost of the asset should not be reduced.” The same will certainly apply to reversals of those losses. In order to comply with the disclosure requirements of the FRS, the matrix therefore should have separate rows for impairments and reversals, for instance between rows F and G.

Although a matrix of the movements in the fixed assets is not compulsory, all the sample companies present one.²⁶ However, a separate line for impairment losses is not a universal solution for those entities that recognise such losses. Out of the total of 83 reporting entities with impairments, 65 used a separate row in the matrices to disclose them. Another 12 made a note in conjunction with the matrix that part of the depreciation charge constitutes impairment losses. The remaining 6 impairers did not give any indication of impairment losses in the matrix.

The other side of impairment accounting is in the expense accounts. One possible specification is a separate line in the profit and loss account. If not specified there, one could expect to find the amount of the impairment loss in the notes to the profit and loss account.

The Companies Act requires the profit and loss account to be presented in one of four formats, replicating the Fourth Directive articles 23 to 26. The format may be by function (formats 1 and 3) or by nature (formats 2 and 4). Another distinction is between the report layout (formats 1 and 2) and the account layout (formats 3 and 4). The account layout for the income statement is seldom used in the financial statements of UK listed companies. In practice, only formats 1 and 2 are used, and for convenience we call the reporting entities using format 1 “function reporters”, and those using format 2 “nature reporters”.

The format by function displays the operating expenses by function, typically cost of sales, administration expenses, distribution expenses, and so on. The format by nature displays the nature of the operating expenses, typically staff expenses, raw materials consumed, depreciation and so on. In the UK sample analysed a clear majority (186 out of 238, or approximately 78 per cent) are function reporters. The remainder are nature reporters or – in a few cases – a mixture of function and nature. A minority (less than 30 per cent), irrespective of reporting by function or by nature, actually show the operating expenses of the statutory formats on the face of the profit and loss account. For the majority the choice of profit and loss account format can only be discovered by inspection of the notes.

The discussion here is about how to find the impairment losses and reversal amounts within the profit and loss account. FRS 11.67 says that “impairment losses recognised in the profit and loss account should be included within operating profit under the appropriate statutory heading, and disclosed as an exceptional item if appropriate.” The latter should be seen in

²⁶ Their completeness can be questioned in a few cases.

conjunction with the definition of exceptional items in FRS 3, such that, for instance, unusually large impairments should be shown separately in the profit and loss account.²⁷

For a nature reporter the relevant statutory heading in the profit and loss account is the item “Depreciation and other amounts written off tangible and intangible fixed assets”.²⁸ It is not explicitly stated that impairment losses and reversals in general should be presented on separate lines, so a presentation together with depreciation should be sufficient. Only when the characteristics of an exceptional item are present, should impairment losses and reversals be shown separately from depreciation. In practice, this is claimed quite often, as explained later.

For a function reporter, the relevant statutory heading for impairment losses may be either cost of sales, distribution costs or administrative expenses. The Companies Act requires that these expense items “shall be stated after taking into account any necessary provision for depreciation or diminution in value of assets”. For function reporters there are additional specification requirements of the nature of expenses to supplement the distribution by function in the profit and loss account.²⁹ A reasonable understanding of this is that the specification requirements for nature reporters (as discussed above) apply quite similarly to function reporters. It is sufficient that the note on the nature of expenses for function reporters states the total amount of depreciation, impairment losses and reversals within operating expenses, except when they are exceptional items.

In spite of the seemingly limited disclosure requirement in the profit and loss account and related notes, impairment losses and reversals often can be detected there. Out of the 83 entities with reported impairments, only 13 did not show the impairment losses in the profit and loss account or in related notes. Of the majority (70) that did report impairment losses in the profit and loss account or related notes, 56 classified it as an exceptional item.

²⁷ FRS 3 defines exceptional items as: “Material items which derive from events or transactions that fall within the ordinary activities of the reporting entity and which individually or, if of a similar type, in aggregate, need to be disclosed by virtue of their size or incidence if the financial statements are to give a true and fair view.”

²⁸ Item 7(a) in format 2.

²⁹ The law requires that “the amount of any provisions for depreciation and diminution in value of tangible and intangible fixed assets falling to be shown under items 7(a) and A.4(a) respectively in Formats 2 and 4” – i.e. the amounts of depreciation, write-down and reversals that would have been shown on a separate line in an profit and loss account format by nature – “shall be disclosed in a note to the accounts (...)”.

Table X.1 Presentation of the impairment loss

Panel A: Specification of the impairment loss in the asset accounts and the expense accounts ¹						
	A. Separate expense line		B. Note to the P&L account		C. Not observable	
	Goodwill impairer	Non-goodwill impairer	Goodwill impairer	Non-goodwill impairer	Goodwill impairer	Non-goodwill impairer
1. Row in the asset matrix	6	2	30	38	1	7
2. Note to the asset matrix	0	0	4	3	4	2
3. Not observable	0	1	1	5		
Panel B: Average impairment ratio ²						
	Goodwill impairer	Non-goodwill impairer				
Complete reporting ³	15.0	4.0				
Incomplete reporting ³	4.0	2.7				

Source: Annual reports.

¹ Number of companies reporting goodwill impairment losses (n = 46) and non-goodwill impairment losses distributed according to specification of the asset accounts (rows) and expense accounts (columns).

² The impairment ratio of goodwill impairers is defined as the goodwill impairment loss as proportion of the adjusted book value of goodwill. The impairment ratio of non-goodwill impairers is defined as impairment of tangible assets and intangible assets other than goodwill as proportion of the adjusted book value of such assets. The amount in the cells are simple arithmetic averages of impairment ratios of the relevant companies.

³ Companies with complete reporting are those that enters into the A1:B2 sub-matrix of Panel A. Companies with incomplete reporting are those that enters into the cells of row 3 or column C of Panel A.

Table X.1 summarises how the entities with impairment losses presented them in the financial statements. The entries in the cells are the number of companies. Goodwill impairers are shown separately, whereas companies with impairments of non-goodwill intangibles are presented together impairers of tangible assets. The rows show how the impairment accounting was specified in the asset accounts, and the columns show the specification in the expense accounts. The alternatives are meant to be exhaustive.³⁰ Obviously, since the entities in the table are the ones with an observed impairment loss, and since impairments can only be observed by specifications of the asset accounts or of the expense accounts (or both), all of the reporting entities must belong to one of the non-shaded cells in the table. Entries in the A1:B2 sub-matrix mean that impairments can be detected both by the asset accounts and by the expense accounts. Entries in the outer cells formed by column C and row 3 mean that the impairment is impossible to detect on one of the sides. Necessarily, C3, representing the impossibility to detect impairments either through the asset accounts or through the expense accounts, must be empty cells, since all entries in the table represent entities with observable impairment losses.

³⁰ In fact, they are exhaustive in the sense that this survey is based on this set of observation possibilities.

There are 6 entities in row 3³¹, and they are clearly not compliant with UK accounting legislation and standards, since they do not show the impairment losses distributed on the different classes of assets. It is not so straightforward to state that the 13 entities in column C are not compliant. The accounting standards do not generally require impairment losses to be specified in the profit and loss account.³² Specification is explicitly required only when the impairment loss qualifies as an exceptional item. Most of the entities in column C do not claim the impairment loss to be exceptional. Only two companies (Rolls-Royce and Weir) claim that the impairment loss is an exceptional item, while at the same time choosing not to disclose the position of the loss in the profit and loss account.

Entries in the A1:B2 sub-matrix represent more complete impairment reporting in the sense that impairment losses are specified both in the asset accounts and in the expense accounts. Panel A of Table X.1 shows that approximately three quarters of the non-goodwill impairers have a complete impairment reporting in this sense, while the remaining quarter have a less complete impairment reporting. In the group of goodwill impairers the proportion of complete impairment reporting is approximately 85 per cent. For both groups the relative importance of the impairment loss is higher among the companies with complete reporting than among the companies with incomplete reporting, cf. panel B. This feature is particularly distinct for goodwill impairers. So, important impairments in general are more thoroughly reported than less important impairments.

However, an entry in the inner sub-matrix does not necessarily indicate a full correspondence between the reported credits and debits. In the sample there are many examples of differences between the amounts reported in the asset matrices and those specified in the profit and loss accounts, some of which are mentioned in the following subsection.³³ Such differences are most likely due to incomplete specification (and not to accounting error or fraud). Lack of correspondence of the reported amounts is not necessarily in conflict with the Company Law

³¹ One of the companies in row 3 has both goodwill and non-goodwill impairment losses.

³² This is one point where IAS 36 requires more transparency than present UK accounting standards. IAS 36.113 states that for *each class of assets* the financial statements should disclose (letter a): “The amount of impairment losses recognised in the income statement during the period and the line item(s) of the income statement in which those impairment losses are included.” Letter b requires the same information for reversals.

³³ In the whole sample there are 26 cases with unexplained differences between credits in the asset accounts and debits in the profit and loss accounts. The credits examined in these cases include amortisation, depreciation and impairment losses.

and accounting standards, but it nevertheless represents deficient accounting transparency for the external user.

Summing up the above observations: The majority of reporting entities present impairment losses adequately as reductions of the carrying amount of an asset class and specified as an expense item. However, a substantial minority of the impairers do not provide a complete presentation of the impairment loss, and some of these cases are clearly in conflict with the requirements. The proportion of complete reporting was somewhat higher among the goodwill impairers than among the others. The impairment losses presented by non-complete reporting are on average small, both for goodwill impairers and for others.

X.3 Interpretation problems

An impairment loss correctly accounted for is shown by a credit entry to the depreciation provision account, called an impairment loss, and a debit to an appropriate expense line within operating profit. As was discussed in Section X.2, the credit entry normally can be seen in the matrix or in the explanations to the matrix, and the debit entry normally can be seen in the profit and loss account or in the explanatory notes. However there are a number of entities in the sample that present accounting entries that almost, but not fully, correspond to the correct impairment accounting. Such cases raise the question whether or not the observed entries represent an impairment loss. This sub-section gives an overview of cases deemed impairment losses, where the accounting technique or terminology chosen raises interpretation problems.

The cases in question have been grouped in four categories, represented by the panels A to D in Table X.2. The first two categories represent cases where there are some irregularities in the credit entry to the asset accounts, while the last two categories represent those with some irregularities in the debit entry.

Table X.2 Cases of irregular impairment accounting

Company	Impairments of ¹					
	Tangibles		Intangibles excl. goodwill		Goodwill	
	Amount (£m)	Ratio	Amount (£m)	Ratio	Amount (£m)	Ratio
A. Credits to inappropriate asset accounts ²						
BBA	0.9	0.1				
Carphone Warehouse	13.1	10.5				
Debenhams	1.1	0.1				
EMI	1.1	0.4			29.3	46.3
Millennium & Copthorne Hotels	23.0	1.0				
SABMiller	17.5	1.3				
Securicor			38.9	59.6	33.0	13.0
B. Credits entries in the depreciation accounts with inappropriate labels ³						
Atkins	2.9	3.7				
Bodycote International						
Corus	82.0	2.8			23.0	18.3
Laird	5.9	8.5				
Manchester United	0.8	0.6				
Wm. Morrison Supermarkets	28.1	1.9				
Rio Tinto	626.0	7.6				
Trinity Mirror	0.3	0.1	125.0	6.8	1.8	17.8
C. Debits to inappropriate expense accounts ⁴						
Croda	9.8	6.5				
Enterprise Inns	4.1	0.2				
Hanson	26.3	1.0			74.3	7.3
Hilton	51.4	2.0				
Kingston Communications	14.1	3.6				
Laing					5.0	35.5
Scottish Power	494.5	4.1				
Tomkins					0.3	0.2
D. Debits to balance sheet accounts ⁵						
BHP Billiton	118.5	0.9				
BOC	44.6	1.5				
TBI	5.7	2.6				

Source: Annual reports.

¹ The impairment amounts in the table represent what has been interpreted as impairment losses for the purpose of this survey. The impairment ratio is the impairment loss as a proportion of the end-of-year book value of the relevant assets, with the impairment loss of the year added back and the reversals subtracted.

² Credits to the asset-at-cost accounts, wholly or partially, under various labels.

³ Credits to the depreciation accounts in addition to ordinary depreciation, carrying various labels like “accelerated depreciation”, “additional depreciation” and “exceptional depreciation.”

⁴ Debits to expenses outside operating items, such as “provisions for loss on disposal”.

⁵ Debits to provisions or negative goodwill.

Companies in category A have inappropriately recorded an impairment loss as a credit to the asset-at-cost account rather than the depreciation account. Such accounting is explicitly forbidden by the standard (FRS 11.68). Most of the category A cases in fact include a double entry, combining a credit to the asset-at-cost account and a debit to the depreciation (or amortisation) account, like the recording of a disposal (see later).

There are examples of category A accounting where the intention of showing an impairment loss is clear. Such examples are EMI, Millennium & Copthorne Hotels³⁴, and SABMiller. There are other category A cases that add to the confusion of incorrect credit entries by applying terms which are outside the terminology of the law and the standard. In particular, the term “write-off” is used so often that there may be a notion that a write-off is something different from an impairment. An example of inappropriate entries combined with confusing terminology is Securicor, which, in a note to exceptional items in the profit and loss account, shows impairment of goodwill and intangible fixed assets of £71.9m . However, there are no impairment losses in the matrices for goodwill and intangible assets respectively. What appears in the matrices are lines called “amounts written out”: in the goodwill matrix under cost, and in the intangibles matrix under both cost and amortisation. The total amount “written out” of the matrices is £72.0m. The external reader’s guess is therefore that what is called impairment losses in the profit and loss account is called “amounts written out” in the matrices. Other examples of similar “double-entry write-offs” are provided by BBA, Carphone Warehouse and Debenhams.

The category B cases of Table X.2 are entities with a credit entry in the depreciation (or amortisation) accounts that have the appearance of an impairment loss, but which carry another name. Examples of confusing labels include “accelerated depreciation”, “additional depreciation” or “exceptional depreciation charge”, in addition to the term “write off” already mentioned. An example of the blurred distinction between depreciation and impairment created by the use of such terms is provided by Corus. In the matrix, both for tangible assets and for intangibles, Corus has one credit for depreciation “charge for the period” and one credit for “accelerated depreciation”. The amounts of the accelerated depreciation correspond with an exceptional item in the profit and loss line called “Rationalisation and impairment exceptional items charges against operating cost”. Corus writes in the policy note: “Accelerated depreciation is provided where an asset is expected to become obsolete before the end of its normal useful life or if events or changes in circumstances indicate that the carrying amount of the fixed asset may not be recoverable.” Atkins has a single “charge for the year” credit for depreciation of tangible fixed assets. There are no indications of impairment losses in the matrices. However, the notes to the profit and loss account specify part of the depreciation charge as an exceptional item, explained as “accelerated depreciation

³⁴ In the case of Millennium & Copthorne Hotels it is also difficult to see how the reported impairment loss of £23 m corresponds with the entries in the matrix.

of redundant assets”. Laird also has a single “charge for the year” under depreciation in the tangible assets matrix. Only by reading the notes to operating expenses will the reader find that part of the charge is an exceptional item called “write down of fixed assets”. There are no further explanations of these items. Other examples of credits in the matrix with similar labels, assumed to be impairment losses, can be found in the reports of Bodycote International, Manchester United, Wm. Morrison Supermarkets, Rio Tinto and TBI.

Category C are cases with debits to inappropriate expense accounts. The most frequent error in this category is the debit to losses on disposal, which, unlike impairment losses, are not included in ordinary operating profit. In principle, the distinction between an impairment loss and a loss on disposal should be straightforward. The latter arises when an asset is sold or scrapped. According to FRS 15.72 the profit is the difference between the net sale proceeds and the carrying amount, and according to FRS 3 profit or loss on disposal is a non-operating item, which would clearly not be the correct treatment of an impairment loss. A disposal leads to the derecognition of the asset in the balance sheet, which in the matrix will appear as a “double entry”: a credit to the asset-at-cost account and a debit to the depreciation provision account.

A single credit entry in the depreciation provision account reflecting an impairment loss should not correspond to a debit in the loss on disposal. In the reports of Croda, Hilton and Laing this is nevertheless what is found. Kingston Communications reports an “exceptional item write-off” as a single credit to the depreciation account, explained as being for “fixed assets held (...) prior to disposal. The amount is included in loss on disposal”. Enterprise Inns presents a “provision for loss on disposal of fixed assets” under exceptional items in addition to profit and loss on disposal. Hanson has a similar entry (“provision for loss on disposal of Texas cement operations”), for which the accounting presentation is explained by a sale completed shortly after the balance sheet date. Scottish Power recognised a loss on selling its interest in Southern Water one month after the balance sheet date. In the matrix the loss is a credit entry in the depreciation provision account labelled impairment, while in the profit and loss account it is presented as “provision for loss on disposal” not included in operating profit. Tomkins has an impairment loss on goodwill related to a sale shortly after the balance sheet date, which is also stated outside operating profit.

Category D represent cases of impairment credits in the asset accounts with correspondence to debits in other balance accounts. The consequence of such accounting is that the impairment loss does not show up in the profit and loss account. TBI has an “accelerated

depreciation charge” to tangible assets of its Stockholm airport investment combined with a similar debit to negative goodwill. BOC also recognises an “impairment” debit to negative goodwill, partially offsetting impairment credits to other assets. BHP Billiton charges provisions for a part of its impairment losses.

Accounting standards are meant to bring about some uniformity in accounting. The examples of irregular reporting show that impairment accounting under FRS 11 is not uniform. Lack of uniformity generates uncertainty for any user of the accounting information. For this reason it also undermines confidence in the aggregate amounts used for the analysis in the paper on UK impairment accounting practice. There may be amounts counted as impairment losses that in fact are not, and there may be impairment losses not counted because they are not presented correctly according to the standard.

Table X.2 shows only those doubtful cases that have been deemed to contain impairment losses for the purpose of this survey, and the impairment amounts involved. Since the analysis of determinants of impairment accounting give such different results for impairers of different categories of assets, the difference in frequency of irregularities between the groups in Table X.2 is noteworthy. Irregular impairment accounting has been observed for 7 goodwill impairers out of a total of 46, and the total goodwill impairment loss of these reporters is £167 m, or 1.3 per cent of total goodwill impairment losses of the whole sample. For those with tangible assets impairment, irregular accounting has been observed for 22 companies out of a total of 50, and the amount involved is £1571 m, or 30 per cent of the total tangible assets impairment losses of the whole sample. The difference is striking. Whereas the cases of irregular accounting of goodwill impairers hardly can shake the results obtained in the analysis presented in the paper, the opposite would be true for the impairers of tangible assets. The irregularities of the impairment accounting of the latter are so important that confidence in the results of the analysis is undermined.

X.4 Disclosure of assumptions

FRS 11.69-73 contains requirements to disclose assumptions underlying the impairment accounting. Only the paragraphs that require disclosure about the discount rate and cash flow estimates will be discussed here. According to paragraph 69 the discount rate applied to the cash flows should be disclosed if the impairment loss is measured by reference to value in use. Paragraphs 72 and 73 require information and justification about the cash flow estimates used in the computation of value in use, if the growth rates of the long-term projections

exceed some normal (and moderate) rates. How these requirements are met by the reporting entities in the sample, is the topic in the following.

In the whole sample there are 31 reporting entities that quantify the discount rate used. Of these 28 have (positive) impairment losses, which means that only one third of impairers disclosed the discount rate. Three entities disclose the discount rate without having impairment losses on tangible or intangible fixed assets. One of the latter, Dixons, disclosed the discount rate in conjunction with impairment losses on fixed asset investments, which is outside the scope of this survey. The remaining two, mmO₂ and Psion, disclosed the discount rate in conjunction with impairment reviews not resulting in any impairment loss.³⁵

In the group of goodwill impairers there were 18 entities that disclosed the discount rate, which is a proportion slightly higher than in the whole sample. These entities had an average goodwill impairment ratio of 27.6, which indicates that discount rate disclosures tend to accompany large goodwill impairment losses. The goodwill impairers that disclosed the discount rate all had complete impairment presentation according to the measurement system of Section X.2³⁶.

In the group of non-goodwill impairers also there were 18 entities that disclosed the discount rate. The proportion is not significantly different from the proportion of goodwill impairers. However, the average impairment ratio of the non-goodwill impairers with discount rate disclosures was not particularly high (3.9), and the group consists of entities with complete reporting (14) as well as incomplete reporting (4), cf. section X.1.

Disclosure of cash flow assumptions is mandatory under FRS 11 only when the long-term assumptions deviate from standard growth assumptions. There are not many reporting entities that make any reference to this rule. mmO₂ makes a clean departure from the main rule of a maximum of five year of forecasts with the following justification: “The projections cover a ten year period as management of the Group consider that the growth in these businesses will exceed the average growth rate for the countries concerned over ten years. Also, the development of the technology and assets required for such growth means ten years

³⁵ The wording of the standard should probably be understood as requiring discount rate disclosures from all entities that undertake an impairment review by computing value in use. The survey sample contains 20 entities that claim to have non-amortisable goodwill or intangible assets. These assets should undergo annual impairment reviews. Six companies in this group recognised an impairment loss. The remaining 14 entities did not recognise an impairment loss. None of these disclosed the discount rate or any other assumption of the impairment review.

³⁶ There were 3 of these entities in cell A1 and 15 in cell B1.

projections would more fairly reflect their long-term values.” The company adds a reminder of the uncertainty attached to the forecasts. Psion is another reporting entity that correctly discloses departure from the general rule about long-term growth rates.

There are a number of examples of clearly inadequate information both about the discount rate and about other assumptions for the calculation of value in use. In Misys’ and Woolworth’s annual reports the information about the discount rate is limited to a statement that “discount rates are based on the circumstances of the individual business”. Computacenter, having recognised an impairment loss on goodwill, gives the following details on the calculation of recoverable amount: “The group has reviewed the carrying value of goodwill and associated future cash flows, and has recognised an impairment to reduce the carrying value to a level that the Directors consider to be appropriate.”

UBM has avoided disclosure of the assumptions for the calculation of value in use by referring to net realisable value: “In determining the amount of the impairment, which was calculated on a net realisable value basis, the directors considered a number of factors, including the current and prospective revenues, earnings and cash flows from the business.”

An overall impression from studying the financial statements of the sample is that the FRS disclosure requirements have to a large extent been disregarded by the reporting entities. This sombre state of affairs is somewhat moderated by a tendency among goodwill impairers to provide more generous disclosures about large impairments than about small impairments. Again, the criticism about deficient reporting quality strikes goodwill impairment less than non-goodwill impairments.

X.5 Conclusion

This appendix documents significant deficiencies in the way that impairment accounting is reported by the companies. Most impairers – but not all – specify impairment losses both on class of assets and as an expense item. In the details, however, there is a great variety in the presentation of the impairment loss, in the techniques of recording the impairment loss in the accounts, and in the applied terminology. There are a number of examples of confusing impairment accounting. The deficiencies of tangible assets impairment accounting are more conspicuous than those of goodwill impairment accounting. It seems that both the company boards, their auditors and the review panel would have to make more effort to ensure that the provisions of the present standard – or its sibling IAS 36 after the transition to a new accounting regime – is actually followed.

Chapter 3 The survival of national differences in the context of harmonised standards: a case study of impairment practices

3.1 Introduction

Will harmonisation of accounting standards bring about uniform practice, or will national accounting differences persist under common rules? This paper compares the accounting practice of UK companies with those of German IFRS-reporting companies with respect to fixed asset impairments, which have been subject to (almost) common rules. In the European context, UK and German accounting traditions are often presented as opposites, the first being more attentive to the informational needs of the equity investors, and the latter being more attached to conservatism related to tax and creditor-protection (Nobes and Parker, 2004)³⁷. The research subject of this paper is whether national differences are still visible in the practice of impairment accounting under a set of similar rules.

Data for this analysis is limited by the fact that IFRS-reporting by German companies has been large-scale only since the financial year 2002. The Deutsche Börse required IFRS or US GAAP reporting from Prime Standard companies from 2003, and most of the companies that opted for IFRS presented financial statements complying with IFRS for 2002.

The paper draws conclusions on the basis of impairment observations of one single year, 2002. The main reason for limiting the analysis to one year is that the data used for the analysis is not available in any databases (to the author's knowledge) and therefore have to be collected directly from the company's annual reports. 2002 was a year with poor company performances in Germany and the UK, and impairment accounting may have been more intensive than in most years. It might be argued therefore, that 2002 is not a representative year for impairment accounting. This may be so. However, the objective of the article is not to discuss the permanence of the causes of write-downs, but rather to assess whether impairment accounting under the UK accounting regime and under German use of the IFRS are likely to provide the same outcome. If the answer to that is affirmative, the outcome should be the same both in years with large economic distress and in years with a smoother

³⁷ Chapters 2 and 4.

climate. The advantage of using observations from a difficult year is that the volume of impairment losses is large, and differences in accounting practice is therefore easier to detect.

The analysis covers fixed tangible and intangible assets as reported in the group financial statements. Only impairment losses of historical cost amounts (not of revalued amounts) are dealt with.

Why is it useful to find out whether British and German companies have the same accounting practice under a similar accounting standard? Such knowledge might provide insight into the accounting (or earnings) quality under different accounting regimes. However, we could not expect to obtain a fair view of the accounting quality by studying impairments alone; for this purpose it would make more sense to examine impairments together with restructuring provisions and similar non-recurring charges. A more modest ambition, which better describes the motivation of this paper, is to provide an answer that gives knowledge about the limits of standard setting. If the intention of the British and international standard setters was to obtain the same practice for impairments, it would be useful to learn whether this was achieved or not.

The paper is organised as follows. Section 3.2 provides an overview of the relevant accounting standards, which are those that govern impairment accounting as well as those that govern recognition and measurement of those assets that potentially may be impaired. Section 3.3 presents relevant prior research, specifically on impairment accounting and on general international comparisons of accounting rules and practice. Section 3.4 explains the research design of the present paper. Sections 3.5 and 3.6 contain the descriptive statistics, first presenting general features of the data samples and secondly the patterns of impairment practice. Sections 3.7 and 3.8 contain the statistical analysis of the observed impairments. The paper concludes in section 3.9.

3.2 *The content of the accounting standards*

An accounting impairment loss means that the carrying amount of an asset is written down to its recoverable amount. Such losses presumably occur as a reaction to some development in the economic surroundings. The amount and frequency of accounting impairment losses will also depend on the content of the prevailing accounting standards. Obviously, the standards that govern impairment of assets are of primary importance. However, these standards will have an effect only on amounts that are recognised on the balance sheet. Therefore, the content of the standards that more generally treat the recognition and measurement of fixed assets is also of importance for the amount of impairment observed.

Under UK domestic rules, impairment accounting is governed by FRS 11 *Impairment of Fixed Assets and Goodwill*, whereas the relevant standard in the IFRS regime is IAS 36 *Impairment of Assets*. Both standards were issued in 1998, the UK standard shortly after the IFRS standard, and they were a result of a common project between the IASC and the ASB. This project inherited concepts and ideas from the US standard SFAS 121 *Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of*, which was the first of the new impairment standard generation of the 1990's. All of these standards have later been revised or replaced, but without profound changes to their overall structure. This paper is based on the content of FRS 11 and IAS 36 as of 2002, which is the year of the data.

The common structure of the two standards starts with a search for indicators that may reveal an (economic) impairment, which is a reduction of the current value. If an indicator exists, the company should test whether the recoverable amount is less than the carrying amount, in which case the company should recognise an impairment loss, equal to the difference. Recoverable amount is the higher of net realisable value, being the amount which an asset could be disposed of, less any direct selling costs, and value in use, which is the net present value of future cash flows generated by continued use. Impairment accounting is carried out for individual assets as well as for more aggregated measurement units that include relevant shares of central (or corporate) assets and goodwill. Impairment losses should in some instances be reversed if the recoverable amount exceeds the carrying amount in periods subsequent to the impairment loss. Both standards have detailed regulations about such reversals.

Apart from the curious fact that the two boards chose a different terminology (despite the language being largely UK English for both institutions), the two standards are virtually the same. Appendix III to FRS 11 describes its degree of compliance with IAS 36. There are some minor differences about the impairment of revalued assets, on the allocation of an impairment loss to the assets included in an aggregate measurement unit, and on the techniques for the projections of future cash flows and retrospective monitoring of such estimates. Also, the disclosure requirements of IAS 36 are somewhat more detailed than those of FRS 11.

Accounting for tangible assets is governed by FRS 15 *Tangible Fixed Assets* and IAS 16 *Property, Plant and Equipment*. The latter was issued for the first time in 1983, but has since been revised several times. By 2002, the year of study of this paper, the 1998 version of IAS 16 was effective (and is referred to here). FRS 15, issued in 1999, and IAS 16 have virtually

the same content. On initial recognition, assets are measured at cost. Subsequent measurement is either at cost less accumulated depreciation (benchmark) or at a current value. If the latter alternative is chosen, a policy of revaluation should be applied consistently to an entire class of assets. Depreciation is mandatory under the benchmark treatment, but FRS 15 allows for no depreciation charge when consumption is immaterial, and requires annual impairment reviews for such cases and for assets with economic lives exceeding 50 years. There are some other differences between the two standards, described in Appendix III of FRS 15, which are not important for this paper.

Accounting for intangible assets other than goodwill (hereafter referred to as non-goodwill intangibles) is regulated mostly by FRS 10 *Goodwill and Intangible Assets* in the UK and by IAS 38 *Intangible Assets* under IFRS. FRS 10, issued in 1997, does not apply to research and development costs, which in the UK accounting regime are governed by SSAP 13, issued initially in 1977 and revised in 1989. IAS 38 was issued in 1998³⁸ and has been considered to be extensively based on FRS 10.³⁹

An intangible asset is in both standards defined as an identifiable non-financial asset without physical substance. FRS 10 has somewhat stricter criteria for control and identifiability than IAS 38. In the former, control should be exercised “through custody or legal rights”. According to IAS 38.13, although control “would normally stem from legal rights”, legal enforceability is not a necessary condition for control. According to FRS 10.2, identifiable intangible assets are those that can be disposed of separately, whereas separability is a sufficient but not a necessary condition for identifiability in IAS 38. Both standards require that intangible assets acquired separately or in a business combination are measured initially at cost. Under IAS 38 this is the rule also for internally generated intangible assets, but there are special guidelines for research and development activities (see below). FRS 10 states that only those internally developed intangible assets that have “a readily ascertainable market value” should be recognised. Subsequent to initial recognition, non-goodwill intangibles are as a rule amortised over the economic life, normally limited to 20 years. The limit on economic life may be waived in special circumstances, and FRS 10 even allows for the non-amortisation in the case of intangible assets regarded as having indefinite economic lives.

Paralleling the standards on tangible assets to a degree, both IAS 38 and FRS 10 allows for

³⁸ IAS 38 was amended in 2004. This paper refers to the 1998 version, effective in 2002.

³⁹ Wilson et al. (2001; 885).

the revaluation of non-goodwill intangibles at fair value if they are traded in an active market, a condition which normally is not filled in the case of intangible assets. Under both standards intangible assets should be written down whenever impaired, and the accounting procedures for impairment are explained in the separate standards on impairment of assets, FRS 11 and IAS 36.

Accounting for research and development activities is outside the scope of FRS 10, but within the scope of IAS 38. SSAP 13 distinguishes between pure research, applied research and development. The research concepts of SSAP 13 roughly correspond to the research concept in IAS 38, and the prescribed accounting treatment for research costs is to recognise them as expenses. Development costs may be capitalised under SSAP 13 when certain recognition criteria about the reliability of the cost measurement and the probability of recovering the costs are met. These criteria resemble the general recognition criteria that govern the accounting treatment of development activities under IAS 38. There is one major difference, though, in that recognition as an intangible asset under IAS 38 is compulsory for development assets meeting the recognition criteria, while it is voluntary under SSAP 13.

Goodwill is defined in FRS 10.2 as “the difference between the cost of an acquired entity and the aggregate of the fair values of that entity’s identifiable assets and liabilities”. In the IFRS regime goodwill was governed by IAS 22 *Business Combinations*, issued for the first time in 1983 and revised several times until the 1998 version that was effective in 2002.⁴⁰ The IAS 22 goodwill definition is virtually the same as that of FRS 10. Goodwill amortisation over estimated useful life, normally not exceeding twenty years, is mandatory under IAS 22. When a goodwill amortisation period exceeds twenty years, an annual impairment test should be undertaken. FRS 10 has the same “rebuttable assumption” about a maximum economic life of twenty years for goodwill, but also allows for assigning an indefinite economic life to goodwill when demonstrable.

Being a residual on acquisition, the recognition and measurement of goodwill reflect the recognition and measurement of all identifiable assets acquired in the business combination. Any difference in accounting for tangibles or non-goodwill intangibles between the UK and the IFRS regime will therefore appear as differences in goodwill recognition. For this study the most important spillover effect is between non-goodwill intangibles and goodwill. Accounting under UK rules might generate less non-goodwill intangibles than accounting

⁴⁰ IAS 22 was replaced by IFRS 3 in 2004.

under the IFRS regime. Some of this difference is likely to be reflected in higher goodwill levels for UK reporters.

3.3 Relevant prior research

Relevant research for this study can be separated in two distinct categories: problems of impairment accounting in general, and international differences in accounting rules and practice, in particular between the UK and Germany.

Most studies of impairment accounting are related to a hypothesis of earnings management and based on data from US companies. An early discussion of the motivation of management for applying impairment accounting was presented by Moore (1973), who used public press announcements in the period 1966-1969 to select a sample of companies with management changes. By comparing the sample with a control group he found that the frequency of discretionary accounting decisions, including “write-offs” and “write-downs”, was higher in the sample than in the control group. Strong and Meyer (1987) also conclude that “the most important determinant of a writedown decision is apparently a change in senior management; this is especially true if the new chief executive comes from outside the company”.⁴¹ The importance of management changes were also confirmed by Elliott and Shaw (1988) and Francis et al. (1996).

As a vehicle for earnings management there may be other circumstances leading to impairment accounting than management changes. Zucca and Campbell (1992) analysed 77 cases of impairment accounting for 1978-1983, and found that most of them could be classified as a “big bath”, being the culmination of a period with low or negative net income. The “big bath” is thought to be a signal to investors that the balance sheet has been made “clean” of negative elements that might otherwise depress future accounting return. Most of the remainder was classified as “income smoothing”, implying that a write-down is used to neutralise abnormal net income in order to create hidden reserves for later periods. The conclusions of Zucca and Campbell largely contrast with other findings. Strong and Meyer (1987) found that, when controlling for industry sector, write-down companies were neither the best nor the worst performers in the years prior to the write-down. Francis et al. (1996) also do not provide support for a hypothesis that write-down companies are either “bathers” or “smoothers”. On the contrary, they find that indicators of asset impairment (e.g. book-to-

⁴¹ Strong and Meyer (1987; 659).

market ratios) are important to explain write-downs. Rees et al. (1996) find that write-downs generally occur in years with low earnings (and therefore accentuate these), but find no statistically significant support for the idea that management uses impairment accounting to manipulate earnings. Elliott and Shaw (1988) find that write-down companies earn less than non-write-down firms (adjusted for the write-down), both in absolute and relative terms, and that they are systematically larger and more highly leveraged than others.

There is a substantial literature on comparative accounting issues. Gray (1988) develops a general system of four contrasting accounting cultural values: professionalism vs. statutory control, uniformity vs. flexibility, conservatism vs. optimism, and secrecy vs. transparency. The latter two values are seen as examples where Anglo-American accounting culture contrasts with Latin and Germanic cultures. Nobes and Parker (2004)⁴² extend these differences to several other aspects. The Anglo-American legal system is based on common law, whereas the German system has its origins in a codified Roman law. There are also differences in financing, where UK and US companies rely primarily on equity financing whereas German companies rely on banks. Another aspect is the linkage between taxation and accounting, which is very close in Germany and more remote in the UK and the US. Nobes (1998) argues for a two-way split of accounting systems in developed countries: i) those with important equity markets and many outside shareholders (typically the UK and the US), and ii) those with a credit-based financing system and with relatively unimportant outside shareholders (typically Germany).⁴³

The general notion that German accounting practices are characterised by prudence in income and value measurement compared with Anglo-American accounting traditions (Gray, 1988) has been subject to some research. Harris et. al. (1994) examine the value relevance of German companies' financial statements (reporting under domestic rules) compared with that of US companies (reporting under US GAAP). Consistent with this notion, they find that the coefficient of earnings in relation to returns is generally higher for German companies than for US companies, and that the explanatory powers of the estimated returns equations (measured by R^2) are approximately the same. When testing how closely stock price movements can be explained by earnings and book value of equity, they generally find that

⁴² Chapter 2.

⁴³ Alexander and Archer (2000) argue on the other hand that there is no Anglo-Saxon unity within accounting. This paper does not take any position to that question, since the focus here is on British – German similarities and differences.

the US financial statements are more value relevant, but that the German earnings coefficient is higher than that of US companies, whereas the equity coefficients may be approximately the same. Their study is based on data for 1982 to 1991, permitting the authors also to examine possible differences caused by the adoption of the EU Seventh Directive into German legislation in 1985.

The effect of EU Directives is also a topic in the comparison of UK, German and French accounting undertaken by Joos and Lang (1994). Based on data for 1982 to 1990 they show that return on equity – where return is net before extraordinary items (and after tax) – is systematically lower in Germany than in the UK, and the same applies for the earnings/price ratio. These differences are interpreted by the authors as a result of more conservative measurement practices. A third measure, the ratio of book value to market value of equity, shows less systematic differences between German and UK companies. The authors also provide data showing that “depreciation, depletion and amortization” expenses as a proportion of the market value of the firm (market value of equity plus book value of debt) is systematically higher in Germany than in the UK, a result which is not due to differences in the volume of fixed assets.

The present paper studies German companies reporting under IFRS, which is an accounting regime conceptually very close to the UK and US accounting rules for listed companies. The comparative studies that are mentioned above, describe German accounting under the national system. The findings of these studies are therefore not necessarily relevant for the analysis of this paper. There may be a question, however, whether the origins of differences in accounting regulation will continue to create different practices under a uniform accounting regulation. Stated in plain words: Will German prudence and the tendency for income smoothing relative to British practice be maintained under IFRS reporting?

A large amount of corporate governance literature that compares corporate structures and behaviour is relevant for the possible development of different accounting practices under a uniform regime. Shleifer and Vishny (1997) in a survey of corporate governance research compare two basic systems (UK/US vs. Germany/Japan), which is in fact the same split as done by Nobes (1998) for accounting systems. German corporate governance relies on legal protection of creditors (rather than shareholders) and the presence of large permanent investors. UK corporate governance (together with that of the US) relies on an extensive shareholder protection and realistic takeover potentials. A takeover will typically bring about a top management reshuffle and a remeasurement of the accounting numbers. Franks and

Mayer (1990) document that the takeover activity in the UK was far greater than in Germany and France in the 1980s, and so was the level of executive dismissal.

3.4 Research design

The null hypothesis of this paper is that impairment practices of UK companies and German IFRS-reporting companies are uniform. By uniform practice is meant that identical situations will be reflected in a like manner in the financial statements.

Impairment accounting practice has two measures in this analysis. One measure is the impairment occurrence, i.e. whether the company has recognised an impairment loss during the year (in which case the company is labelled an impairer) or not (a non-impairer). The second measure is the impairment ratio of the impairers. The impairment ratio is the recognised impairment loss as a proportion of the end-of-year carrying amount, adjusted for the impairment losses and reversals during the year.

The null hypothesis of uniform practice will be tested by regressing each of these impairment practice measures on the explanatory variables, both separately and pooled for the UK and German companies. The relationship between the impairment occurrence and the explanatory variables is measured by logistics regressions, where the regression sample includes all the companies, impairers and non-impairers. The relationship between the impairment ratio and the explanatory variables is measured by linear regressions, where the regression sample includes the impairers only. Under the null hypothesis we expect the British and German coefficients to be close. Of particular interest are any statistically significant differences between the coefficients. Other statistically significant relationships will be discussed as well.

The impairment occurrence or the impairment ratio of a company may be affected by, 1) the accounting regulations, 2) economic conditions and circumstances, and 3) other non-economic and non-regulatory factors. The focus of this paper is on the third of these categories, i.e. whether there are differences in impairment practice that are neither due to variations in economic conditions nor to any differences in the rules. Any such differences then need be discussed critically in relation to the null hypothesis of uniform practice.

The starting point of the analysis is that the accounting standards that governed the 2002 impairment accounting of the British companies and German IFRS reporters, were identical. However, as indicated in section 3.2, there may have been differences in other standards that indirectly influence the impairment measures, e.g. through different patterns of asset

recognition. The potential for such differences will be controlled by executing the analysis for each asset class separately.

Obviously, when comparing the impairment amounts of two companies or two groups of companies for a given period, these amounts may be affected by variations in the specific economic circumstances. When comparing the performance of British and German companies in 2002, attention should be given to possible systematic differences in the economic development at a macro level. There may also have been particular developments within some sectors, whereby differences in the industry composition of the two countries lead to differences in impairment measures.

The analysis does not include any economic explanatory variables. Systematic differences at a macro level should be captured by executing the analysis both pooled with a dummy country variable and separately for each country. There is an obvious risk, however, that the country variable will capture both macroeconomic differences and regulatory differences as discussed above so that the real determinants cannot be identified.

Industry sector differences are intended to be taken care of by sector partition. There is a trade-off between the need to keep the sample sizes at adequate levels and the wish to study sectors separately. In practice, based on a distribution of average impairment ratios by asset class and sector, two sectors (telecom and IT) are treated separately, and the other sectors aggregated.

Based on prior research, four arguments are chosen to represent the non-regulatory and non-economic explanatory factors of impairment practice: company size, return, conservatism and management change. One variable is selected to represent each of size and return, and two variables to represent each of conservatism and management change, so the total number of explanatory variables is six. The following paragraphs discuss the choice of explanatory variables.

Large companies have been found to recognise impairments more frequently than smaller companies, see e.g. Elliott and Shaw (1988). The reason for this is little discussed in the literature. One explanation for this difference in frequency might be that large companies have better accounting procedures. An alternative explanation is that large companies are more diversified than smaller and therefore suffer impairment losses more often (though not necessarily larger). For the purpose of this paper, a difference in the relationship between size and impairments between Germany and the UK would be important only if the first

explanation were correct. If there is such a different relationship, and it reflects that the large companies of one of the countries generally are more diversified than the large companies of the other country, the observation of the different relationship would be irrelevant to the null hypothesis. If, on the other hand, large companies of one of the countries spend large efforts on financial reporting (and therefore frequently discover impairments) whereas the large companies of the other country are less attentive, the observation of the different relationship would contradict the null hypothesis.

The methodology of this paper, with two measures of impairment practice, should provide insight into which explanation is correct. If size is only a proxy for business diversification, company size should appear as an explanatory variable for impairment occurrence (i.e. in the logistics regressions), but not for the impairment ratio (the linear regressions).

Several variables may be considered as a measure of size, e.g. total assets, revenue, market value and equity. Based on inspection of the correlation matrices (not shown), I have chosen revenue as the measure of company size throughout. Anyway, the results are not very sensitive to the choice of size variable. In order to correct distribution asymmetries, the logarithm of revenue has been used.

Impairers are frequently found to have lower accounting return, adjusted for the impairment loss, than non-impairers (Zucca and Campbell, 1992; Elliott and Shaw, 1988; Rees et al., 1996). If impairment losses accurately reflect current value reductions, assets that earn less than the required rate of return are written down to the level that corresponds with this rate. Therefore, when the direct effect of the impairment loss on the profit and loss account is excluded, one should find that the accounting rate of return of impairers as well as non-impairers is equal to or higher than the required market rate of return. If, as documented in the literature, impairers are found to have poor performance, the impairment loss itself being ignored, the cause might be earnings management (the "big bath" hypothesis). If we find that this relationship is different in the UK and Germany, the reason might be that there are different earnings management strategies between UK and German companies, which would contradict the null hypothesis.

Return is defined here as income before tax and minorities, adjusted for the impairment losses and reversals of the year, plus interest payable, as proportion of total assets.

All other things equal, companies with conservative accounting policies should be less exposed to impairments than companies with more aggressive accounting policies, since

conservative policies may create hidden reserves that constitute a cushion to absorb the effect of unexpectedly declining asset values. Therefore, we may expect companies with otherwise prudent accounting to encounter an impairment necessity less often than companies with more aggressive accounting.

For the hypothesis testing we primarily want to observe whether the relationship between conservatism and impairment accounting is the same in the UK and Germany. If the write-down propensity varies with the degree of conservatism in one country and not in the other, this may be understood as a difference in practice that contradicts the null hypothesis.

The degree of conservatism of accounting policies is measured here by two variables: the depreciation / amortisation rate measured by the charge as a percentage of original cost, and the price-book ratio.⁴⁴ When markets are assumed efficient, companies should be valued irrespective of the accounting policies applied, so we would expect conservative policies (implying low book values) to give high price-book ratios, *ceteris paribus* (cf. also the observations for UK and Germany in Joos and Lang, 1994).

Conservatism measured by the depreciation / amortisation rate is of interest here for another reason. Even if the relationship between impairment accounting and the depreciation rate were the same in the two countries, it may be claimed that different levels of depreciation rates correspond to different impairment accounting concepts. At one extreme is the impairment concept of the present principles for goodwill accounting, i.e. all consumption of the asset is to be shown as an impairment loss. At the other extreme is the concept related to an immediate depreciation of an asset, so that there never during the economic life of an asset will be any potential for impairment losses. Historically, immediate expensing has been the accounting treatment of goodwill in many jurisdictions. For any fixed depreciable asset, depreciation and impairment losses will over time eat out of the same carrying amounts, and a policy for one of them is implicitly a policy for the other. Therefore, significant differences in depreciation rates may also raise doubt about the null hypothesis.

The relationship between management change and the propensity to recognise impairment losses has for a long time been a favourite topic for researchers of impairment accounting, see references in section 3.3. It is a tempting assumption that new managers write-down book values of assets shortly after their arrival with the objective of creating hidden reserves, while

⁴⁴ The two variables have very small pair-wise correlations.

at the same time leaving the responsibility for the loss with their predecessors. If this were true, we would interpret a difference in regression coefficients between the UK and Germany as a symptom of national differences in impairment accounting practices.

However, earnings management is not the only possible explanation for any relationship between management change and impairment accounting. Another interpretation is that prior poor performance of a company may be the cause of both an impairment loss and a management change. I will revert to this alternative explanation in section 3.8.

Due to differences in corporate structures between the UK and Germany, it is not evident what constitutes an equal management change. British companies normally have a board of directors comprising executives of the company itself as well as outside directors who have no ownership stake in the company. Germany together with some other continental European countries has a two-tier board, with a management board consisting of executives and a supervisory board elected by the shareholders and the employees (Gedajlovic and Shapiro, 1998). The role and powers of these institutions are not equally distributed. For both the UK and Germany, I have chosen to count separately the change of either the CEO or the chairman of the board.

Prior research has shown that the relationship between management change and impairment accounting is particularly strong when the successor comes from outside the company (Strong and Meyer, 1987). In the case of a management change, the annual reports normally disclose whether the successor originates from inside the company sphere or is an external. For the statistical tests it has been convenient to use a simple management change index, whereby 0 indicates no change, 1 indicates change with internal successor and 2 indicates change with external successor.

The analysis consists of a number of regressions on different subsets of the two samples. Correlations between the explanatory variables have been scrutinised at all sample levels, and all the regressions presented are conditioned by acceptable collinearity levels.

Table 3.1. General data of sample companies

	All companies						Excluding the telecom and IT sectors					
	British companies (n = 238)			German companies (n = 167)			British companies (n = 220)			German companies (n = 114)		
	Total	Mean	Median	Total	Mean	Median	Total	Mean	Median	Total	Mean	Median
Total assets (€m)	1 401 485	5 889	1 770	732 379	4 386	109	1 012 077	4 600	1 799	720 641	6 321	300
Tangibles (€m)	486 535	2 044	440	152 672	914	15	411 329	1 870	464	152 064	1 334	36
▪ Depreciation rate, tangibles (pct.)¹		8.4	7.5		11.6	10.0		8.0	7.3		9.5	7.6
Non-goodwill intangibles (€m)	82 944	349	0	26 184	157	4	43 918	200	0	25 746	226	6
▪ Amortisation rate, intangibles (pct.)¹		9.1	5.6		15.2	13.9		8.5	6.0		13.9	13.5
Goodwill (€m)	318 479	1 338	228	57 795	346	9	149 369	679	220	57 194	502	16
▪ Amortisation rate, goodwill (pct.)¹		5.8	5.0		9.6	6.7		5.6	5.0		8.4	6.6
Revenue (€m)²	1 111 685	4 671	1 791	579 688	3 471	143	990 061	4 500	1 958	573 972	5 035	282
Income before tax and minorities (€m)	26 216	110	86	17 969	108	1	62 240	283	95	21 617	190	10
▪ Return (pct.)³	6.0	9.4	9.1	5.3	-1.9	3.3	9.0	10.3	9.3	4.4	1.9	4.9
Net operational cash flow (€m)	157 742	663	217	50 460	304	7	133 885	609	223	50 482	443	20
Equity (€m)⁴	623 413	2 619	661	136 946	820	53	358 438	1 629	678	134 727	1 182	105
Market value (€m)	1 059 202	4 432	1 175	160 887	963	36	844 578	3 839	1 223	159 133	1 396	88
▪ Price-book ratio⁵	1.70	2.86	1.82	1.17	1.02	0.76	2.36	2.86	1.87	1.18	1.27	0.89
CEO change, internal / external (pct.)⁶	8.8		5.0	16.2		0.6	8.6		4.1	11.4		0.9
Board chairman change, int./ ext. (pct.)⁶	8.4		7.1	7.8		3.6	8.2		5.9	4.4		4.4

¹ The depreciation and amortisation rates are ordinary (scheduled) charge as a percentage of original cost at the end of the year. The means and the medians include only those companies that have positive amounts of original cost of that particular class of asset.

² Revenue in IAS terminology equals turnover in ASB terminology.

³ Return is a ratio, where the numerator is income before tax and minorities, plus interest payable, plus impairment losses and minus reversals of the year. The denominator is end-of-year book value of non-adjusted total assets. The return measure in the total column is the ratio of the aggregate of each component for the whole sample, thereby equaling an average average weighted with the total assets amounts of each company.

⁴ Equity before minorities, end-of-year.

⁵ Market value of equity divided by book value of equity, end-of-year.

⁶ CEO change means change of chief executive officer, or *Sprecher des Vorstandes*. Board chairman change means change of the chairman of the board of directors for UK companies, and change of the chairman of the supervisory board (*Aufsichtsratsvorsitzender*) for German companies. For both countries the distinction between an internal and external succession is based on the information given in the annual report about the composition of these instances.

Source: Annual reports, Datastream.

3.5 General characteristics of the selected samples

The analysis of this paper is based on inspection of the 2002 group accounts of 238 companies listed on the London Stock Exchange (“the British sample”) reporting in compliance with UK accounting regulations and standards and 167 companies listed on the Deutsche Börse (“the German sample”) reporting in compliance with IFRS. The UK sample represents the companies contained in the FTSE 350 index as of an arbitrary cut-off date in September 2003, except those belonging to the financial and petroleum sectors, and the German sample represent the Prime Standard companies classified as IFRS-reporters⁴⁵ in January 2003 on the Deutsche Börse web-site, with similar sector exclusions.⁴⁶

2002 was a year with large impairment losses in both samples. There were write-downs of 31 bn. euros in the British sample and 12 bn. euros in the German sample. The main bulk of these impairment losses are found in the IT and telecom sectors. In the German sample one company, Mobilcom, alone had an impairment loss of 10 bn. euros. The British sample contains similar trends, although not as extreme as the German sample. For an analysis of impairment accounting based on 2002 performance, it seems necessary to treat the impairments of the telecom sector separately.

Table 3.1 presents some general characteristics of the samples, with the left panel covering the full samples and the right panel excluding the IT and telecom sectors. By comparing the two panels one notes that the exclusion of 18 British IT and telecom companies led to a sharp reduction in the amounts of assets etc. shown in the table. In the German sample, however, the accounting data are little affected by the exclusion of the 53 companies belonging to these two sectors, reflecting that the remaining assets of the companies of these sectors at year-end 2002 were modest after the heavy impairment losses of that year.

By most measures, the mean size of the companies of the two samples is rather close. However, the dispersion between large companies and small companies is much larger in the German sample than in the British sample, as evidenced by the low median values in the former. As expected, the proportion of equity financing in the British sample is much higher

⁴⁵ Prime Sector companies are required to report either by IFRS or by US GAAP. A possible selection bias by this choice have not been considered here, cf. Leuz (2003).

⁴⁶ There are exclusions (not specified here) due to foreign GAAP compliance and non-availability of annual report.

than in the German sample. German companies hold a larger proportion of current assets than British companies. Within fixed tangible and intangible assets (for simplicity called total fixed assets hereafter), the relative sizes of asset categories are strikingly equal, with 2/3 being tangible fixed assets, 1/4 goodwill and the remainder non-goodwill intangibles.

There are important differences in the recognition patterns of non-goodwill intangibles that do not show in the table. In the British sample, approximately one third of the companies possess such assets, whereas all the German companies have them⁴⁷. Given German accounting tradition and the very restrictive domestic regulation on the capitalisation of intangibles, this result may seem surprising. One might have expected German companies to exploit the room for judgement in IAS 38 so as to avoid recognition of non-goodwill intangibles, in the spirit of traditional German prudence. Indeed, although non-goodwill intangibles occur more frequently in the balance sheets of German companies than in those of British companies, the typical German holding of such assets is relatively small. By comparison the British holdings are larger and more concentrated. Of the 69 companies that hold such assets in the British sub-sample excluding IT and telecom, the average carrying amount was €636 m, or close to 20 per cent of all fixed assets, as compared to €226 m and 11 per cent for the German companies.

What can be the reason for this difference? A tentative explanation is as follows: IAS 38 gives less room for discretion than the British standards, and especially SSAP 13. A German company adopting the IAS is obliged to recognise intangible assets (retroactively and currently) for some development activities where SSAP 13 allows expensing. Those British companies that opt for capitalisation may have little reason to deflate the capitalised amount for conservatism. The low average figures of non-goodwill intangibles in the German sub-sample compared with the British sub-sample may indicate that German prudence has been in play after all.

The mean amount of income before tax is quite close in the two samples. Return on total assets, computed as the sum of income before tax and interest, adjusted for the effects of impairment losses and reversals of the year, as a percentage of total assets, is also quite close for the totals of the two samples. However, the means and the medians of the return measure follow quite different patterns. The simple average return of the British companies, as well as the median, is substantially higher than the return for the full sample, indicating that smaller

⁴⁷ In one German company the amount was fully depreciated though.

British companies have performed better than the larger ones. In Germany it is the other way round. The average of the returns of all companies is very low (negative for the full sample), and the difference from the return of the whole sample must be explained by the larger German companies having fared better than the smaller German companies.

The mean market value of British companies was much higher than that of German companies. The aggregate price-book ratio for the full British sample is approximately 1.7, and for the German sample approximately 1.2. These pricing differences contrast with findings in prior research. Joos and Lang (1994) report substantially higher price-book ratios among German companies than among British companies and interpret this as a result of German accounting prudence. Harris et al. (1994) observe the same kind of difference between German and US companies.⁴⁸ The superiority of the British price-book ratios is even more pronounced in the reduced sample in the right hand panel. Moreover, for British companies the mean price-book ratios were higher than the aggregate, whereas the opposite was the case for German companies. The statistics indicate that the inflating effect on German price-book ratios of conservative accounting practices was no longer present under IFRS by 2002.⁴⁹

Section 3.4 emphasised the importance for the subject discussed of the other measure of accounting conservatism, the depreciation / amortisation rate, which is the ordinary (scheduled) charge as a percentage of original cost. Joos and Lang (1994) find significantly higher depreciation rates in Germany for 1982-1990 than in Britain and France⁵⁰, and interpret this as being caused by German accounting conservatism. Although the German data collected for this paper belong to a different accounting regime than those used by Joos and Lang, the phenomenon of rapid depreciation schedules in Germany relative to the UK persists

⁴⁸ Joos and Lang (1994) reports mean price-book ratios in the range 1.2 – 2.3 for German companies, and 0.8 – 1.7 for British companies. Harris et al. (1994) report 2.1 for Germany and 1.5 for the US.

⁴⁹ Market values (as well as balance sheet items) are measured at the balance sheet date, i.e. by the end of the annual accounting period. For most German companies the annual accounting period is the calendar year, and for these market value is measured at 31.12.2002. A larger proportion of British companies have balance sheet dates throughout the year. Since 2002 was a year with sharp decline in stock prices, German sample companies may have been measured, on average, on a less favourable time than the British sample companies.

⁵⁰ The Joos and Lang measure of depreciation speed is total depreciation, depletion and amortisation in percentage of the estimated firm market value, which is not directly comparable with the measures of this paper. They observe ratios of approximately 3 per cent for British companies and 8 percent for German companies. A roughly similar measure (which includes impairment losses, but not depletions) for the samples of this paper yields 7.8 per cent for British companies and 6.2 per cent for German companies. One reason for the higher British ratios in my observations (and an alternative explanation to that of Joos and Lang) may be more capitalisation of goodwill in the UK than before, which would also drive up the amount of goodwill amortisation.

for all categories of fixed assets. Table 3.1 contains a line for each of tangible asset depreciation, non-goodwill intangible amortisation and goodwill amortisation. Irrespective of telecom and IT being included or not, the mean German rate is higher than the British. The difference in percentages between the German and British means is modest (1.5) for tangibles outside the telecom and IT sectors, whereas it is very high for intangibles (6.1 for all companies and 5.4, and telecom and IT excluded respectively).

Comparing the depreciation / amortisation rate means by a two-tailed T-test, they are significantly different at the 1 per cent level in all cases. The very clear differences in these rates, especially in those of goodwill and non-goodwill intangibles, are by itself a strong indication that the impairment patterns may be different.

Table 3.1 also shows the frequency of management changes in the two countries. The frequency of CEO changes during 2002 was roughly the same for British and German companies. The observed frequency of CEO changes in Germany is significantly higher than what is reported by Kaplan (1994) for large companies during 1981-1989. Moreover, whereas more than one third of the British CEO successors came from outside the company, there were hardly any external CEO successions in the German sample. For changes of the chairman of the board or the supervisory board, external succession is more usual in both countries. For Germany this is quite natural since the majority of the supervisory board members are shareholder representatives, not employed by the company and appointed for a fixed term.

Table 3.2. Identified impairment losses

Class of asset		All companies				Excluding the telecom and IT sectors			
		Amount (m euros)	Incidence (pct.) ¹	Mean	Pct. of assets ²	Amount (m euros)	Incidence (pct.) ¹	Mean	Pct. of assets ²
Tangibles and intangibles	British	30 590	34.9	129	3.3	7 164	33.2	33	1.2
	German	12 301	47.9	74	1.7	2 069	45.6	18	0.9
Tangibles	British	8 445	21.0	35	1.7	3 746	19.5	17	0.9
	German	1 430	19.8	9	0.9	921	26.3	8	0.6
Non-goodwill intangibles	British	321	3.8	1	0.4	313	3.6	1	0.7
	German	9 875	21.6	59	27.4	409	16.7	4	1.6
Goodwill	British	21 770	19.3	91	6.4	3 066	16.8	14	2.0
	German	971	31.1	6	1.7	714	28.9	6	1.2

¹ Proportion of companies that recognise an impairment loss.

² Proportion of the class of asset in the front column.

Source: Annual reports.

Table 3.3. Average impairment ratios¹ distributed by sector.

FTSE sector ²	A. Number		B. Tangibles and intangibles		C. Tangibles		D. Non-goodwill intangibles		E. Goodwill	
	UK	Germany	UK	Germany	UK	Germany	UK	Germany	UK	Germany
Resources	6	0	1.56		1.71		0.03		0.00	
Basic industries	37	10	0.58	1.46	0.48	5.59	0.00	2.03	0.99	0.51
General industrials	22	21	0.55	1.21	0.84	0.46	0.00	0.11	0.11	1.48
Cyclical consumer goods	5	16	0.17	1.56	0.06	0.92	0.00	0.05	0.47	6.01
Non-cyclical consumer goods	27	19	1.16	2.25	0.48	2.48	0.35	3.32	0.93	0.78
Cyclical services	105	46	1.25	8.10	0.27	0.21	1.15	5.28	3.10	11.35
Non-cyclical services	14	4	6.01	27.63	4.73	20.13	3.95	32.12	13.04	18.89
Utilities	11	2	0.99	0.29	0.74	0.36	0.00	0.00	4.57	0.20
Information technology	11	49	26.21	11.06	0.83	1.05	0.00	8.57	36.17	9.86
All sectors	238	167	2.48	6.79	0.72	1.62	0.78	5.26	4.30	7.36
Excl. telecom and IT sectors	220	114	1.00	4.22	0.45	1.21	0.59	2.89	2.01	5.87
Standard deviation (all sectors)			10.0	16.9	3.0	8.4	6.3	16.1	14.7	20.6

¹ The impairment ratio is the impairment loss of a specific set of assets as a proportion of end-of-year book value of the same assets, with the impairment losses of the year added back and the reversals subtracted.

² See conversion table in annex.

Source: Annual reports, London Stock Exchange web-site, Deutsche Börse web-site.

3.6 Patterns of recognised impairments

Table 3.2 shows the distribution of impairment losses related to different classes of assets, the full samples on the left side and the reduced samples on the right. Total and average impairment amounts were smaller in the German sample, but the frequency of impairments was higher, with almost half the companies having an impairment loss, compared with one third of the British sample. As a proportion of assets, the British impairment losses on tangibles and goodwill were larger than the German losses, but the German losses on non-goodwill intangibles were greater than the British losses.

Comparison of the left hand and right hand panels shows that the IT and telecom sectors had particularly severe losses on goodwill in the British sample and on non-goodwill intangibles in the German sample. The pattern of British companies having goodwill losses and German companies having non-goodwill losses is present in the other sectors as well, albeit on a smaller scale.

Table 3.3 analyses the distribution of impairments in different industries according to the FTSE classification of the London Stock Exchange. The details of the conversion from the Prime Standard sector classification are explained in an annex. The table shows the average impairment ratio (as explained in note 1 to Table 3.3) for different categories of fixed asset. The denominator of the ratio is the book value of assets before the impairment loss, which is the maximum that could have been recognised as an impairment loss. Consequently, the denominator of the figures in columns B is the sum of all tangible and intangible fixed assets; that in columns C is tangible fixed assets; and so on. Since the numbers in Table 3.3 are the simple arithmetic average of the impairment ratio of the companies of each sector, the ratio of small companies has the same weight as that of the large companies. The statistic can be seen as a measure of the relative impact of the impairment losses for the typical company of each sector.

The general trend of Table 3.3 is that, relative to their asset holdings, the German companies' impairment losses are larger than those of the British companies. Looking first at the totals (of all sectors and excluding telecom and IT), the greater size of German losses holds for all classes of asset. For tangible assets the impairment ratios of most sectors in both samples are low, with a notable exception for the non-cyclical services that include the telecom companies. For non-goodwill intangible assets the average impairment ratios of German sample companies are higher than those of the British sample companies in all sectors. These

numbers fit well with the high German impairment amounts on non-goodwill intangibles that were observed in Table 3.2.

More unexpected are the larger German goodwill impairment ratios in columns E. When comparing total and average amounts for the whole population of the two samples in Table 3.2, the British companies had a higher goodwill impairment ratio than the German companies, irrespective of whether the IT and telecom sectors were included. When looking at the non-weighted company averages in Table 3.3, however, the situation is opposite. This holds for the totals as well as for many of the individual sectors. The reason must be that the German companies have more frequent, but on average smaller, losses than the British companies.

The bottom row of Table 3.3 shows the standard deviation of the impairment ratios of the whole population of companies. Generally there is more variation in impairment ratios in Germany than in the UK. For both countries the standard deviation of the impairment ratio of tangibles is the smallest, that of non-goodwill intangibles comes next, whereas the goodwill impairment ratio has the largest variation.

On the basis of Table 3.3, special analytical treatment seems suitable for both the IT and telecom sector with respect to the impairments of goodwill and non-goodwill intangibles. When it comes to tangible assets, the ordinary regressions will include the IT sector and isolate only the telecom sector.

3.7 Regression analysis

Table 3.4 shows the results of the logistics regressions. The dependent variable is binary; it takes the value zero if the company has no impairment loss and one if it has. There are separate regressions for each class of asset, in which only companies that hold assets of that class are included, since only they have the potential of recognising an impairment loss. The number of British companies holding non-goodwill intangibles is particularly small.

The explanatory variables in these regressions can be interpreted as determinants of the impairment decision. Given the form of the logistics regression function, the variables with positive coefficients are understood to increase the probability that a company will have recognised an impairment loss, and the ones with negative coefficients to reduce this probability. With reference to prior research, positive coefficients are expected for size, negative ones for return and conservatism, and positive ones for management change. Indeed,

these are the signs that are found for all statistically significant coefficients in Table 3.4, as well as for most of those that are not statistically significant.

The size variable has indeed highly significant coefficients in the regressions of tangible and goodwill impairments, but not in those of non-goodwill intangibles impairments. Return seems to be an important explanatory factor for tangible and goodwill impairments in UK companies, but again not for non-goodwill intangibles impairments. The amortisation rate coefficients also look more convincing in the tangibles and goodwill columns than in the non-goodwill intangibles columns. There is one significant coefficient of the price book ratio, which is in the German goodwill regression. The measures of explanatory power (the likelihood value (-2LL), the Cox and Snell R^2 , and the Nagelkerke R^2) contribute to more confidence in the tangible regressions than in the non-goodwill intangibles regressions, with the goodwill regressions somewhere in-between.

Significance (the p-value) of the logistics regression coefficients is measured by a Wald statistic that has a chi-square distribution with 1 d.f. Assuming independence, equality of UK and German coefficients may be tested by the F-distributed fraction of the relevant Wald statistics, the p-values of which are shown in Table 3.4. There is no evidence in the table of statistically significant differences between the UK and German coefficients for tangible assets. In the non-goodwill intangibles regressions, the constants as well as the coefficients for the return and CEO change variables have statistically significant differences. In particular, we note that impairments of non-goodwill intangibles occur frequently in German companies with CEO changes, a pattern that is absent in the British sample.

For the return and price-book coefficients of the goodwill regressions equality between the British and German scores is rejected at the 10 per cent level. In the goodwill pooled regression there is also a statistically significant coefficient for the country variable, which indicates that the probability of an impairment loss increases substantially if the company is German. This concurs with the observation already made about higher goodwill impairment frequency among German companies.

Table 3.4 depicts certain characteristics of companies that make a decision to write down assets, irrespective of the amount of the write-down. The large number of significant coefficients in the regressions of tangible asset impairments, their high explanatory power and the absence of significant differences between the coefficients, may indicate that these characteristics are rather similar for British and German impairers of tangible assets.

One cannot draw an equally clear conclusion for non-goodwill intangibles and goodwill. For non-goodwill intangibles impairments the explanatory power is much smaller and there are fewer significant coefficients. So even if there are several significant coefficient differences that may indicate a different impairment decision structure for non-goodwill intangibles in the UK and Germany, the robustness of a conclusion is undermined by the low explanatory power of the regressions. Goodwill is a case in-between, since the statistics of explanatory power of the goodwill regressions are higher than those of the non-goodwill regressions.

Table 3.5 shows the results of the linear regressions with the impairment ratio as dependent variable. These regressions include only the companies with impairments (impairers). The coefficients in this table indicate the determinants of the impairment amount. A positive coefficient means that the relevant variable contributes to an increase in the impairment ratio.

There are striking differences in the signs of the coefficients of the linear regressions in Table 3.5 compared with those of the logistics regressions in Table 3.4. The size variable has negative coefficients in all the linear regressions in Table 3.5, many of them statistically significant, indicating that small companies recognised more severe impairments than larger companies, despite the fact that the larger ones recognised impairments more often than the smaller ones according to Table 3.4. The observations substantiate the alternative explanation of Section 3.4 to any causal relationship between company size and impairments, that it is likely that large companies are more frequent impairers simply because they have more diversified business. When it comes to determine the amount of the impairment loss, the trend seems to be that small companies recognise the largest relative losses, irrespective of asset class and country. The trend is much clearer in Germany than in the UK, though.

In the logistics regressions of Table 3.4, the coefficients of the amortisation rate variable are negative throughout, as expected. Greater depreciation / amortisation is associated with fewer impairment losses, in the UK as well as in Germany. In Table 3.5, however, the amortisation rate coefficients of the British companies are all positive, whereas the German ones are mixed. The amortisation rate coefficient of the UK goodwill impairment regression is positive and highly significant, indicating that companies that amortise goodwill quickly also recognise the largest impairments. I refer to this as the “accelerating effect” of UK goodwill amortisation in the following.

There may be a rational explanation to the paradox of the accelerating effect of goodwill amortisation: Rapid goodwill amortisation may be appropriate for goodwill in enterprises

with high-risk activities. Such goodwill will also be more exposed to a decline in economic values than goodwill in less risky activities. Therefore, the unexpected positive correlation between the goodwill amortisation rate and the goodwill impairment losses among British companies may be a consequence of correct application of the respective accounting standards. However, this suggestion would not explain why the pattern is found in British companies and not in German companies. Moreover, we note that the German amortisation rate coefficient in Table 3.5, significant at the 5 pct. level, in the non-goodwill intangibles regression has the expected negative sign, and that the difference between the British and German coefficients is statistically significant at the 1 pct. level. So there are signs of a different relationship between the amortisation rate and impairment losses in British and German companies, both for goodwill and for non-goodwill intangibles.

The return variable coefficients display something similar. In Table 3.4 these coefficients are negative throughout, showing – like previous research – that poor performers are more apt to recognise an impairment loss, with statistically significant coefficients for UK and not for Germany. In Table 3.5 the return variable coefficients are generally non-significant, and the only significant coefficient (related to German goodwill) is positive. These are the kind of coefficients that we would expect to see if British companies were practicing the “big bath”, whereas the Germans practiced “income smoothing”. The observations may not be sufficiently unambiguous, though, for such a postulate; however, we will retain that the relationship between accounting return and impairment practice is not similar in the two countries, and this is especially so with respect to goodwill.

The regressions also suggest different national patterns in the relationship between the impairment accounting and management changes. The coefficients of German CEO changes in the regression of non-goodwill intangibles impairments are statistically highly significant both in Tables 3.4 and 3.5 – and with the expected sign – whereas there were no such pattern in the British group. On the other hand, there is a very distinct British relationship between goodwill impairments and change of the chairman of the board that is not found among the German companies.

The fact that impairment accounting responds to CEO changes in one country and to changes in the chairman of the board in the other, is clearly not a sign of national variations in accounting practices, but rather that the roles of the company officers are unequally defined in the UK and Germany. The link between management changes and impairment accounting is often interpreted as an indication of earnings management, because a write-down of asset

values may serve the private interests of a newly appointed officer (cf. the discussion in Section 3.4). Indeed, only an officer who normally has the power to make major accounting policy choices could initiate such action. This may well be the chairman of the board in the case of UK companies, and the CEO in the case of German companies. Clearly, the German supervisory board is likely to have a modest role with respect to accounting policy choices. It is somewhat surprising, though, that the impairment decision in the UK apparently is so closely attached to the chairman of the board rather than the CEO.

There are other differences between the findings in the two groups that cannot be easily explained by differences in corporate cultures. The fact that goodwill is the subject of write-downs when the management changes in a UK company, whereas non-goodwill intangibles are written down when the management changes in a German company, is a strong indication of different accounting practice.

For the UK companies the relationship between impairments and management change appears in the linear regression only, and not in the logistics regression. The results seem to indicate that change of chairman in the UK is associated only with large impairments.

The findings of the regressions may be summed up as follows: We have found that impairments of tangible assets are well explained by the selected variables, and there is no signs of any different impairment decision patterns for these assets between British and German companies. En passant, we note that the previous observations of more frequent write-downs in large companies are confirmed in this sample, but it is likely to be the result of more diversified business and therefore without interest for the analysis. We also have found evidence that British and German companies have different impairment patterns for intangible assets, goodwill and non-goodwill. Among the German companies conservative amortisation rates are seen to reduce the volume and frequency of write-downs, whereas rapid amortisation is associated with larger impairments in Britain. Low return increases the probability of goodwill impairments in the UK, but not in Germany; in the latter, on the contrary, high return is associated with large impairment amounts.

There is also a major difference in the fact that the object of management change-related impairments is goodwill in the case of British companies and non-goodwill intangibles in the case of German companies.

Table 3.4 Analysis of the impairment decision determinants.¹

Sectors included		Tangibles			Non-goodwill intangibles			Goodwill		
		All excl. telecom			All excl. IT and telecom			All excl. IT and telecom		
		Pooled	UK	Germany	Pooled	UK	Germany	Pooled	UK	Germany
N		394	231	163	183	69	114	302	196	106
Model summary	-2 log likelihood	329.1	197.3	126.0	142.6	43.9	87.7	285.1	171.7	100.7
	Cox & Snell R sq	0.135	0.124	0.181	0.056	0.078	0.124	0.115	0.089	0.228
	Nagelkerke R sq	0.217	0.198	0.291	0.099	0.152	0.208	0.176	0.143	0.325
Constant	Coefficient	-2.721***	-1.824	-3.274***	-0.938	-4.048*	0.059	-1.046	-2.301*	-0.370
	Significance ³	0.000	0.128	0.000	0.265	0.089	0.954	0.134	0.090	0.681
	Coefficient equality ⁴		0.252				0.022**			0.152
Size (log of revenue) ²	Coefficient	0.396***	0.289**	0.426***	0.042	0.242	-0.037	0.252***	0.279*	0.270**
	Significance ³	0.000	0.036	0.000	0.680	0.396	0.757	0.003	0.066	0.018
	Coefficient equality ⁴		0.309				0.223			0.421
Return ²	Coefficient	-0.032***	-0.059***	-0.012	-0.024*	-0.002	-0.012	-0.059***	-0.075***	-0.010
	Significance ³	0.002	0.002	0.478	0.071	0.961	0.492	0.001	0.003	0.753
	Coefficient equality ⁴		0.142				0.045**			0.068*
Price book ²	Coefficient	-0.016	0.006	-0.147	0.060	0.121	-0.511	-0.055	-0.015	-1.165***
	Significance ³	0.766	0.924	0.561	0.492	0.193	0.209	0.315	0.775	0.007
	Coefficient equality ⁴		0.104				0.489			0.068*
Amortisation rate ²	Coefficient	-0.137***	-0.191***	-0.080	-0.086**	-0.044	-0.095*	-0.154***	-0.162*	-0.145**
	Significance ³	0.000	0.001	0.114	0.033	0.531	0.058	0.004	0.051	0.029
	Coefficient equality ⁴		0.277				0.203			0.465
CEO change ²	Coefficient	0.086	-0.054	0.273	0.550	-16.728	1.483**	0.685**	0.482	1.090
	Significance ³	0.792	0.897	0.655	0.255	0.999	0.026	0.037	0.209	0.156
	Coefficient equality ⁴		0.179				0.001***			0.461
Chairman change ²	Coefficient	0.305	0.151	0.549	0.032	0.434	-0.088	0.067	0.090	-0.263
	Significance ³	0.217	0.627	0.223	0.942	0.549	0.883	0.815	0.795	0.620
	Coefficient equality ⁴		0.242				0.154			0.307
Country ²	Coefficient	-0.525			-1.031*			-1.139***		
	Significance ³	0.102			0.082			0.001		

¹ Logistics regression with a binary dummy representing the impairment decision (1 = impairment loss recognition, 0 = no impairment loss) as dependent variable and the variables in the front column as covariates. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 level respectively.

² The explanatory variables are defined as in Table 3.1. Size is proxied by the (natural) logarithm of revenue as explained in the notes to Table 3.1. Amortisation rate means amortisation or depreciation rate, as appropriate. Country is a dummy with 1 = UK, 0 = Germany.

³ Significance is measured by the p-value of the relevant Wald-statistic, which has chi-square distribution with one d.f.

⁴ Coefficient equality is measured by the p-value of the fraction of the relevant Wald-statistic, which has a F (1,1)-distribution.

Table 3.5 Analysis of the impairment ratio determinants.¹

		Tangibles			Non-goodwill intangibles			Goodwill		
Sectors included		All excl. telecom			All excl. IT and telecom			All excl. IT and telecom		
		Pooled	UK	Germany	Pooled	UK	Germany	Pooled	UK	Germany
N		76	45	31	27	8	19	70	37	33
Model summary	R square	0.267	0.236	0.354	0.135	0.899	0.610	0.341	0.516	0.420
	Adjusted R square	0.191	0.115	0.193	-0.184	0.645	0.415	0.264	0.419	0.275
Constant	Coefficient	17.575***	2.821	23.047**	43.109*	2.531	88.571***	48.261***	21.517	60.137**
	Significance ³	0.001	0.307	0.040	0.071	0.989	0.001	0.000	0.107	0.012
	Coefficient equality ⁴		0.070*				0.621			0.138
Size (log of revenue) ²	Coefficient	-1.832***	-0.087	-2.592**	-3.444	-1.110	-6.639***	-5.748***	-2.221	-7.434***
	Significance ³	0.001	0.789	0.030	0.228	0.969	0.007	0.000	0.136	0.004
	Coefficient equality ⁴		0.036**				0.830			0.061*
Return ²	Coefficient	0.005	-0.056	0.187	0.050	1.247	0.542	0.406	-0.249	1.269*
	Significance ³	0.949	0.132	0.392	0.896	0.635	0.126	0.305	0.385	0.088
	Coefficient equality ⁴		0.267				0.760			0.052*
Price book ²	Coefficient	0.293	0.044	-2.761	-0.513	-2.974	-13.669	-1.442	-0.953	0.880
	Significance ³	0.294	0.657	0.275	0.830	0.477	0.174	0.218	0.105	0.937
	Coefficient equality ⁴		0.261				0.301			0.869
Amortisation rate ²	Coefficient	0.340	0.051	0.846	-0.785	4.394	-2.360**	1.843*	2.152***	0.870
	Significance ³	0.259	0.705	0.236	0.466	0.094	0.017	0.053	0.004	0.630
	Coefficient equality ⁴		0.266				0.001***			0.505
CEO change ²	Coefficient	-1.822	1.331	-5.827	16.717		43.209**	-2.885	-3.308	3.943
	Significance ³	0.394	0.148	0.288	0.370		0.015	0.615	0.306	0.806
	Coefficient equality ⁴		0.192				..			0.655
Chairman change ²	Coefficient	-1.708	-0.406	-0.415	-6.803	8.479	-28.744	6.099	11.239***	-7.909
	Significance ³	0.261	0.521	0.920	0.686	0.753	0.105	0.261	0.001	0.526
	Coefficient equality ⁴		0.998				0.210			0.136
Country ²	Coefficient	-2.570			8.664			2.281		
	Significance ³	0.168			0.586			0.713		

¹ Linear regressions with the impairment ratio as dependent variable and the variables in the front column as explanatory variables. The impairment ratio is defined note 1 to Table 3.3. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 level respectively.

² See note 2 to Table 3.4.

³ Significance is measured by the p-value (two-sided) of the relevant t-statistic.

⁴ Coefficient equality is measured by the two-sided p-value of the *t*-distribution with $N-(x+2)$ d.f., where x is number of explanatory variables (6 in these regressions), and the test statistic is $(coeff_{UK} - coeff_{Ge}) / \sqrt{var_{UK} + var_{Ge}}$, where the latter refers to the variance of the coefficients.

3.8 Direction of causality of management change and performance

Section 3.4 raised the question whether the relationship between management changes and impairments could be the result of both being a function of prior performance. For instance, a poor performance in the previous year could be the origin both of an impairment loss and a management change.⁵¹ Hence, the association between impairment accounting and management change that was shown in section 3.7, could be caused by prior poor performance leading to CEO change and write-downs of non-goodwill intangibles in Germany, and to goodwill impairments and change of the board chairman in the UK.

In order to check for this alternative, I have run the German non-goodwill intangibles regressions and the British goodwill linear regression with relative performance measures for each company. The performance measures are the company-specific total return index of Datastream⁵², deflated by the relevant sector index.⁵³ The performance measures therefore tell how much (in per cent) better or worse than the aggregate of the sector this company has fared. Two such measures have been computed, one for the one-year performance and one for the three-year performance up to the end of year 2001. However, in the case of Germany, the three-year performance was available only for half of the companies, so the regression shown is with the one-year performance measure only. The results are presented in the right-hand columns of Table 3.6. The coefficients of the performance measures are altogether insignificant. Also, the coefficients for change of chairman (in the case of the UK) and the change of CEO (in the case of Germany) are very little affected by the inclusion of the performance measures. Although the analysis of this paper does not provide a basis for concluding about the causes of management changes in general, the findings suggest that the higher management turnover among the impairers of goodwill (in the UK) and non-goodwill intangibles (in Germany) is not caused by poor prior performance relative to other companies of the same sector.

⁵¹ For instance, Franks and Mayer (2001) shows a relationship between CEO change and performance for 1991-93.

⁵² The index shows the theoretical growth in value of a shareholding over a specified period, assuming that dividends are re-invested to purchase additional shares at the closing price.

⁵³ FTSE 350 sector indexes and DAX sector indexes, collected from Datastream.

Table 3.6. Regressions with performance variables included.¹

		UK, goodwill		Germany, non-goodwill intangibles	
		Logistics	Linear	Logistics	Linear
N		194	35	114	18
Model summary logistics regression	-2 log l.hood	155.7		73.7	
	Cox & Snell	0.107		0.190	
	Nagelkerke	0.169		0.314	
Model summary linear regression	R square		0.488		0.647
	Adj R square		0.330		0.400
Constant	Coefficient	-1.363	18.530	0.572	87.536***
	Significance ⁴	0.301	0.181	0.611	0.002
Size (log of revenue) ²	Coefficient	0.225	-2.026	-0.006	-5.849**
	Significance ⁴	0.152	0.215	0.967	0.026
Return ²	Coefficient	-0.068**	-0.313	-0.034*	0.249
	Significance ⁴	0.012	0.324	0.054	0.585
Price book ²	Coefficient	-0.004	-1.107*	-0.422	-12.686
	Significance ⁴	0.937	0.100	0.311	0.224
Amortisation rate ²	Coefficient	-0.191*	2.185***	-0.163*	-2.934**
	Significance ⁴	0.060	0.008	0.010	0.019
CEO change ²	Coefficient	0.170	-2.779	1.824**	42.685**
	Significance ⁴	0.697	0.447	0.019	0.022
Chairman change ²	Coefficient	-0.009	12.074***	-0.646	-34.084*
	Significance ⁴	0.982	0.006	0.372	0.088
One-year performance ³	Coefficient	-0.007	-0.003	0.756	3.743
	Significance ⁴	0.327	0.967	0.193	0.663
Three-year performance ³	Coefficient	-0.003	0.032		
	Significance ⁴	0.374	0.400		

¹ Regressions as in Table 3.4 (columns labeled logistics) and Table 3.5 (columns labeled linear) but with different explanatory variables as indicated in the table. ***, ** and * denote significance at the 0.01, 0.05 and 0.1 level respectively.

² See note 2 to Table 3.4.

³ One (three) year performance is measured as percentage growth in RI_t/SI_t from 31.12.2000 (31.12.1998) till 31.12.2001. RI is the company-specific return index of Datastream, which includes share price changes and dividends, and SI is the relevant sector index, also collected from Datastream. The sector indexes include 16 different FTSE 350 indexes of the series FTS3 and 15 different German indexes of the series CDAX.

⁵ Significance is measured by the p-value (two-sided) of the relevant t-statistic.

3.9 Conclusion

The objective of this paper is to examine whether the accounting practice under two virtually identical standards of impairment accounting is the same for British and German companies. This examination is carried out by analysing the information in the 2002 annual reports for companies listed on the London Stock Exchange and the Deutsche Börse. I examine not only the write-down event as such, which has been the object of several research studies, but also the relative impairment amount, called the impairment ratio in the paper.

Generally, 2002 was a year with great financial distress for many companies in the UK and Germany, resulting in numerous impairments, particularly frequent in the IT and telecom sectors, which have been separated in the analysis for that reason.

Both in the UK and in Germany the impairments patterns vary with asset category, and the analysis has been carried out separately for each of them. There is little sign of dissimilar impairment patterns for tangible assets. Approximately one fifth of all companies of both countries recognised an impairment loss on tangible assets, and they were important in aggregate amount. The international variation of the impairment ratio for tangible assets is smaller than for the ratios for the other asset classes.

Attention is given to the accounting treatments of goodwill and of non-goodwill intangibles. There are important international differences in the recognition pattern of non-goodwill intangibles, which are relatively uncommon in the balance sheets of British companies but virtually universal among German companies. Given the background of a very restrictive German tradition for recognition of intangible assets and the alleged conservatism of German accounting, the amount of intangibles recognised by them is rather surprising. One cause for the low amounts found in British companies may be the continuing effect of SSAP 13. On the other hand, UK companies have generally recognised more goodwill than German companies.

The differences in recognition patterns are directly reflected in the impairment patterns. German companies have higher impairment ratios for non-goodwill intangibles than British companies, meaning that the German holdings of such assets are much more exposed to losses than the British holdings. For goodwill the differences in impairment patterns are not so pronounced. The British companies have larger goodwill losses than the German companies, but those of the German companies are more frequent and on average smaller.

German companies have substantially higher depreciation and amortisation rates than British

companies. The difference is significant for all asset categories, but it is more pronounced for goodwill and non-goodwill intangibles than for tangibles. This may be seen upon as an indication of a continued German tendency to accounting conservatism under international accounting standards. However, the other measure of conservatism used in this paper, the price-book ratio, does not substantiate the assumption of German conservative accounting. The association of conservative policies with the impairment accounting practice is mixed. There is evidence, however, that conservative amortisation policies contribute to reduce impairment losses in Germany – as we would expect them to – whereas they have the opposite effect on British goodwill.

The impairment accounting of British and German companies of 2002 was associated with variables that have been proved explanatory in previous research, like size, return and the occurrence of a management change. However, for these variables there is one kind of association with the write-down event and another kind of association with the write-down amount. It is true that large companies more often than small companies have an impairment loss, but the relative loss amount of the small companies was higher than that of the large companies. The higher write-down frequency of large companies observed several times in the literature may simply be due to them being more diversified than small companies.

Management changes are associated with impairment accounting, both in the UK and in Germany. However, the relationships differ by the kind of asset that is likely to be written down in each country in the event of a management change. In the UK goodwill impairments increase with the change of the chairman of the board, whereas there is a strong link in the German companies between impairments of non-goodwill intangible assets and CEO changes. There is no evidence that the joint event of an impairment loss and a management change could be explained by poor performance in prior years.

Summing up, the examination of impairment practices does not give support to the idea that identical standards have brought uniform practice, at least not in 2002. However, the paper provides limited insight into the underlying causes for the persistence of national differences – whether regulatory, cultural or economical. More knowledge about these matters would require further research.

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Annex to Chapter 3. Conversions between Prime Standard classification and FTSE classification.

Prime Standard classification		FTSE classification	
Sector	Industry group	Sector	Economic group
Automobile	All groups	31 Automobile & parts	Cyclical consumer goods
Basic resources	Forest & paper products	15 Forestry & paper	Basic industries
	Mining	04 Mining	Resources
	Steel & other metals	18 Steel & other metals	Basic industries
Chemicals	All groups	11 Chemicals	Basic industries
Construction	All groups	13 Construction & building materials	Basic industries
Consumer	Personal products	47 Personal care & household products	Non-cyclical consumer goods
	Other groups	34 Household goods & textiles	Cyclical consumer goods
Food & beverages	Beverages	41 Beverages	Non-cyclical consumer goods
	Food	43 Food producers & processors	Non-cyclical consumer goods
Industrial	Advanced industrial equipment	26 Engineering & Machinery	General industrials
	Heavy machinery	26 Engineering & Machinery	General industrials
	Industrial machinery	26 Engineering & Machinery	General industrials
	Industrial, diversified	24 Diversified industrials	General industrials
	Renewable energies	25 Electronic & electrical equipment	General industrials
	Industrial products & services	58 Support services	Cyclical services
Media	All groups	54 Media & entertainment	Cyclical services
Pharma & healthcare	Healthcare	44 Health	Non-cyclical consumer goods
	Biotechnology	48 Pharmaceuticals & biotechnology	Non-cyclical consumer goods
	Medical technology	44 Health	Non-cyclical consumer goods
Retail	All groups	52 General retailers	Cyclical services
Software	All groups	97 Software & computer services	Information technology
Technology	All groups	93 Information technology hardware	Information technology
Telecommunication	All groups	67 Telecommunication services	Non-cyclical services
Transportation & logistics	All groups	59 Transport	Cyclical services
Utilities	Electricity	72 Electricity	Utilities
	Other groups	77 Utilities – other	Utilities

Chapter 4 Discounting and the treatment of taxes in impairment reviews

4.1 Introduction

During the 1990s a new generation of accounting standards about the impairment of fixed assets appeared in leading market economies. The pioneer was the US standard SFAS 121, *Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of*, issued in 1995. It was succeeded in 1998 by IAS 36, *Impairment of Assets*, of the International Accounting Standards Committee, and by the British standard FRS 11, *Impairment of Fixed Assets and Goodwill*. SFAS 121 was substituted in 2001 by SFAS 144, *Accounting for the Impairment or Disposal of Long-Lived Assets*, and IAS 36 was materially revised in 2004.⁵⁴

In many respects the three standards have the same system for measuring impairments, although not for assessing whether there is one. One common feature is the obligation, in certain circumstances, to measure the asset, or group of assets, by the present value of the cash flows that it will generate. There is one striking difference, though. The British and the international standard, which are identical in most respects, require cash flows for the computation of present value to exclude cash flows related to tax, and consistently require the use of a pre-tax discount rate. The US standards (SFAS 121 and SFAS 144) have no requirements in this area.

The objective of this paper is to discuss the implications of the pre-tax rule of IAS 36. The mandatory approach of the standard differs from the approach taken by a rational investor, who values an investment project by its expected net cash flows after tax. The justification for the pre-tax approach of the accounting standard is to avoid double counting of tax cash flows and to simplify the discounting procedure for the financial statement preparers. The paper examines the relationship between the pre-tax and post-tax approaches and discusses the validity of the justification for the pre-tax approach of the accounting standards.

The paper is organised as follows. Section 4.2 presents the content of IAS 36 with respect to the subject of the paper, and compares it with FRS 11 and SFAS 144. Section 4.3 gives a brief

⁵⁴ References in this paper are to the 2004 version of IAS 36, if not specified otherwise.

review of relevant literature about tax and discounting. Sections 4.4 and 4.5 discuss the relationship between the pre-tax and post-tax discount rates, at the time of investment and later. Section 4.6 discusses the connection between the recoverable amount of an asset and the related deferred taxes. Section 4.7 extends the discussion to composite measurement units that include goodwill. Section 4.8 draws together the conclusions and policy recommendations.

4.2 The discounting requirements of the standards

According to IAS 36.59 the carrying amount of an asset shall be reduced to its recoverable amount if the latter is less than the former, and that reduction is called an impairment loss. Paragraph 6 defines the recoverable amount of an asset as the higher of an asset's fair value less cost to sell and its value in use. The value in use is "the present value of the future cash flows expected to be derived from an asset or a cash-generating unit".

Paragraph 50 requires the estimates of future cash flows in the computation of value in use to exclude "income tax receipts or payments". Consistently, paragraph 55 requires the discount rate to be a pre-tax rate that reflects "current market assessments of the time value of money and the risks specific to that asset". The pre-tax discount rate is described as "the post-tax discount rate adjusted to reflect the specific amount and timing of the future tax cash flows" (see BCZ85 and BC94).

The reasons for the treatment of taxes in the computation of value in use are discussed by the IASB in the Basis for Conclusions. According to paragraph BCZ84, value in use should (in principle) include the present value of future tax cash flows that are not covered by any recognised deferred tax asset or liability resulting from a temporary difference arising from that asset. However, it is claimed to

"be burdensome to estimate the effect of that component (...) because: a) to avoid double counting, it is necessary to exclude the effect of temporary differences; and b) value in use would need to be determined by an iterative and possibly complex computation so that the value in use itself reflects a tax base equal to that value in use."

The Basis for Conclusions (BCZ85) further contains a discussion of the relationship between post-tax and pre-tax discount rates. An example is given whereby a post-tax rate of 10 % is grossed up by dividing by the after-tax multiplier (i.e. $1 - \text{the tax rate of } 20\%$), resulting in a rate of 12.5 %. It is admitted, though, that this transformation does not produce the exact pre-tax rate.

The relationship between the value in use measurement of IAS 36 and the way taxes are accounted for under IAS 12 *Income Taxes* is also discussed in the Basis for Conclusions. It is said to be a possible inconsistency with IAS 12 since the latter prohibits discounting for the measurement of deferred assets and liabilities, whereas the recoverable amount according to IAS 36 may be based on a present value calculation (paragraphs BCZ86-87). Further, whenever the recognition of a deferred tax asset or liability is not permitted, the comparison of the value in use with the notional carrying amount may not be relevant (BCZ88).⁵⁵

The content of British standard, FRS 11, with respect to the treatment of taxes in computing value in use is virtually the same as that of IAS 36. According to FRS 11.36 the cash flows relating to tax are excluded, and according to paragraph 41 the discount rate should be “the rate that the market would expect on an equally risky investment (...) and should be calculated on a pre-tax basis.” The pre-tax rate is defined as the rate of return that will, after tax has been deducted, give the required post-tax rate of return. The reasons for this treatment are explained in an appendix to the standard. The UK standard setter (ASB) originally proposed a post-tax basis for the value in use, but changed to a pre-tax approach in order to obtain “harmonisation with the USA and the IASC”. There is also a reference to the non-discounting of future capital allowances under the prevailing tax standard, and to a belief by respondents of an exposure draft that a pre-tax-approach would be easier to apply.⁵⁶ The position on the treatment of tax in FRS 11 is harmonised with the view taken in the ASB working paper on “Discounting in Financial Reporting” of 1997.

The very explicit exclusion of tax cash flows from the present value measurements of IAS 36 and FRS 11 contrasts with the provisions of the US accounting standard SFAS 144, and those of the predecessor SFAS 121, which barely mentions the characteristics of cash flows and discount rates in a present value measurement. According to SFAS 144.7 the impairment loss is the difference between carrying amount and the fair value, and according to paragraphs 22 and 23 a present value technique may provide the best available valuation in cases where fair value cannot be measured by quoted market prices. How this present value shall come about is very superficially discussed, both in the standard and in its appendices. True, the standard contains a rather detailed description of eligible cash flows, but this is only for the purpose of

⁵⁵ The 1998-version of the Basis for Conclusions (B76) claimed that the most important tax adjustment effect is the one of goodwill not deductible for tax purposes. A view is quoted whereby such goodwill, for the impairment review, should be grossed up “by the amount of the unrecognised deferred tax liability”.

⁵⁶ FRS 11, Appendix IV, paragraphs 15 and 16.

testing whether an impairment is necessary. Under SFAS 144 – contrasting with IAS 36 and FRS 11 – an impairment loss shall be recognised if and only if the carrying amount exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the asset (paragraph 7). In the Basis for Conclusions (paragraph B19) the FASB explains its intention to provide guidance in the standard only for determining the cash flows for the impairment test, not for issues of discounting.

SFAS 144 is indeed very modest in its explanations about present value measurements. According to paragraph 24, “the estimates of future cash flows shall be consistent with the objective of measuring fair value. Assumptions that marketplace participants would use (...) shall be incorporated whenever (...) available (...). Otherwise, the entity may use its own assumptions.” The standard refers to Statement of Financial Accounting Concepts No. 7, *Using Cash Flow Information and Present Value in Accounting Measurements* (SFAC 7), for more elaborations of the present value concept. However, SFAC 7 also does not address the question of tax amounts in the cash flows, other than pointing out that entity-specific measurements (such as value in use) will be affected by tax variances.

There is nothing in the US standard that explicitly prohibits pre-tax discounting. Given the general nature of its coverage of the principles of present value measurement, pre-tax discounting may well comply with the standard. There is little doubt, though, that many US practitioners interpret the silence on the subject as being compatible with the use of post-tax cash flows and a post-tax discount rate (see e.g. Mard et al., 2002; Ernst & Young, 2004).

Thus, the British and international standards contain rules about the treatment of tax cash flows that distinguish them from the US standard. There may be other nuances related to that difference. The wording of SFAS 144 clearly designates a fair value hierarchy, with market price on top, present value by market participant assumptions next, and an entity-specific present value last. The British and international standards have no hierarchy; on the contrary, value in use and fair value less cost to sell are alternatives at the same level. Further, there is a disagreement about whether value in use in the IAS/FRS context is an entity-specific concept (i.e. dependent on the specific circumstances of the owner of the asset) or not. Curiously, although SFAC 7 refers to the value in use concept of IAS 36 as entity-specific⁵⁷, the IASB claims that it is not:

⁵⁷Footnote to SFAC 7.24.

“Although the cash flows used as the starting point in the calculation represent entity-specific cash flows (...), their present value is required to be determined using a discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. (...) In other words, an asset’s value in use reflects how the market would price the cash flows that management expects to derive from that asset.”⁵⁸

Section 4.5 of this paper discusses the implications of this statement.

Do the two approaches to tax cash flows constitute a material difference or just a superficial one? The Basis for Conclusion of IAS 36 (BC94) points out that the two methods should give the same result. That argument seems to indicate that the treatment of taxes is not important. For instance, an ordinary post-tax calculation of value in use should be in compliance with the standard, as long as the corresponding pre-tax rate is calculated and disclosed. If that were the intention of the standard, the presentation of the issue is rather bewildering. The very explicit requirement to omit tax cash flows, and the justifications given for that method, leave the impression that this is not an arbitrary choice.

4.3 Relevant literature

There is a rich literature about the effect of taxes on a firm’s value. Starting with Miller (1977), this literature is essentially about the consequence of the different tax treatment of debt and equity (the so-called tax shield of debt), and it therefore concerns the discounting after corporate taxes. Different assumptions about the future leverage of the company correspond to different levels of certainty about the future debt tax shield, and consequently one may arrive at different conclusions about the after-tax discount rate (see e.g. Taggart, 1991). The discussion has been extended to cover also the impact of the investors’ personal taxes.

This literature is relevant for the determination of post-tax discount rates as well as pre-tax discount rates that are supposed to yield the same result. Since this determination problem is identical for post-tax and pre-tax rates, it is not discussed in this paper. This paper starts with the assumption that the post-tax rate is observable and known by the investors, so that the debt tax shield discussion is avoided. Haring and Schwaiger (2004) discuss the influence of the debt tax shield on the discount rate (pre-tax and post-tax) in the context of IAS 36.

⁵⁸ IAS 36, BC60.

Few scholars have discussed the particular question of the relationship between pre-tax and post-tax discounting that is the focus of this paper. A notable exception is the discussion about what kind of tax depreciation would be neutral to valuations, in the sense that pre-tax and post-tax valuations would produce the same ranking of investment projects. Samuelson (1964) has shown that setting tax depreciation equal to economic depreciation leads to tax neutral valuations. Economic depreciations, which originate in the works of Hotelling (1925) and Preinreich (1938), are those that in every period yield an accounting profit equal to a constant return on the opening balance (cf. Stark, 2004). Samuelson's result otherwise stated is that each period's taxable income should be equal to the accounting profit that is consistent with economic depreciation. A practical discussion of this result is found in Bierman and Smidt (1993).

The objective of Samuelson's article is to identify the properties of a tax depreciation that does not distort investment decisions. If the tax laws satisfied Samuelson's conclusion, the discussion of this paper would be superfluous (see Section 4.4.1). The starting point of this paper is that tax laws generally do not comply with Samuelson's conclusion. Moreover, the intention is not to discuss the impact of tax depreciation on investment decisions, but only their consequences for the accounting measurement.

4.4 The relationship between pre-tax and post-tax discount rates at the time of investment

4.4.1 Parameters in the investment decision

A rational investor, i , will value an investment project as the present value of its net estimated cash flows, computed with investor i 's required rate of return as discount rate. Since investor i is rational, there will be congruency between the risk adjustment of the estimated cash flows and the risk premium of the discount rate. Consequently, he will either discount the risk-adjusted cash flow estimates with a risk-free discount rate, or he will discount the risky cash flows estimates with a risk-adjusted discount rate. The risk adjustment is not a topic of this article, and throughout it will be assumed to be adequately performed by the investors. We also make the simplifying assumption that all investors assess equally the risks associated with this kind of project.

The cash flows that investor i cares about are the net cash flows for each future period over the life of the project, i.e. from the time of investment (time 0) till the last productive period,

T . Denoting the project's estimated net cash flows during period t by NCF_t (assumed to flow to the company at the end of the period) and i 's subjective discount rate ρ_i (assumed the same for all time intervals), i will assign the following value to the project at the time of investment (time 0):

$$V_{0,i} = \sum_{t=1}^T \frac{NCF_{t,i}}{(1 + \rho_i)^t}$$

Consequently, investor i will undertake the project if the cost of investment is equal to or less than $V_{0,i}$. Without going into the details of the market mechanisms, we assume that the supply and demand of the project asset is such that investor i faces an equilibrium price that excludes any super-profit, i.e.:

$$(1) \text{ Cost of investment} = V_0 = \sum_{t=1}^T \frac{NCF_t}{(1 + \rho)^t}$$

whereby the omission of subscript i on the discount rate and the cash flow estimates means that these are market assessments, as opposed to individual assessments. Equation (1) implies that there exists a market discount rate for a specific productive asset, and a market assessment of the cash flows that it will generate.

The cash flows being “net” in the above discussion means that cash outflows, including outflows due to taxes, are deducted. However, according to the accounting standards, tax cash flows should not be included when computing value in use, so the cash flows of the impairment review should be before deduction of taxes, and the discount rate should be a pre-tax rate. Therefore, computing the current value as in (1) would not be appropriate for the impairment review, although the rational investment decision is based upon such a calculation. Denoting the pre-tax rate by r , the following relationship will exist at the time of the investment:

$$(2) V_0 = \sum_{t=1}^T \frac{NCF_t}{(1 + \rho)^t} = \sum_{t=1}^T \frac{NCF_t + tax_t}{(1 + r)^t} = \sum_{t=1}^T \frac{CF_t}{(1 + r)^t}$$

By tax_t is meant the cash flows related to taxes in period t . Tax cash flows will be assumed equal to taxable profit multiplied by the corporate tax rate, τ , payable at the end of the period. Taxes are assumed to have symmetric properties, so that negative taxable profit generates a

tax cash inflow in the same period.⁵⁹ It is further assumed that taxable profit is equal to the cash flows before taxes, here denoted CF , minus tax depreciation of the productive asset of the period. All CF 's are assumed non-negative. We denote the depreciation amount of period t by $d_{t,T}V_0$, i.e. as a percentage of the cost of investment, and the full depreciation schedule by the vector $D_{0,T} = [d_{0,T}, \dots, d_{T,T}]$. The paper will mainly consider two depreciation schedules. One, called null depreciation, is that of non-depreciable assets, for which all the d 's are 0. The second is the ordinary depreciation schedule for depreciable assets, for which we will assume the following properties:

$d_{0,T} = 0$ (i.e. no instant depreciation at the time of investment),

$0 \leq d_{t,T} \leq 1$ for all $t > 0$ (i.e. no period with negative depreciation),

$\sum_{t=1}^T d_{t,T} = 1$ (i.e. the aggregate tax depreciation equals the cost of the investment),

$d_{t,T+1} \leq d_{t,T}$ for all $t \neq T+1$ (i.e. one period's depreciation can never be larger in a schedule of $T+1$ periods than in one of T periods).⁶⁰

Taking into consideration tax depreciation (1) could be rewritten:

$$\begin{aligned}
 V_0 &= \sum_{t=1}^T \frac{CF_t - \tau(CF_t - d_{t,T}V_0)}{(1+\rho)^t} = \sum_{t=1}^T \frac{(1-\tau)CF_t}{(1+\rho)^t} + \tau V_0 \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \\
 (2.1) \Rightarrow V_0 \left(1 - \tau \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \right) &= \sum_{t=1}^T \frac{(1-\tau)CF_t}{(1+\rho)^t} \\
 \Rightarrow V_0 &= \sum_{t=1}^T \frac{(1-\tau)CF_t}{(1+\rho)^t \left(1 - \tau \sum_{s=1}^T \frac{d_{s,T}}{(1+\rho)^s} \right)}
 \end{aligned}$$

Equation (2.1) possibly represents what is called an “iterative computation” in the Basis for Conclusions of IAS 36. However, it is easily solvable. Moreover, at the time of investment, any rational investor would take into account all tax consequences in order to evaluate the

⁵⁹ Most tax regimes are not symmetric. The assumption is nevertheless realistic to the extent that the company have other taxable income, from which any deficit of the project under study is deducted.

⁶⁰ This understanding of an ordinary depreciation schedule may be wider than what is customarily thought of as ordinary depreciation. Any depreciation method that effectively distributes the depreciation expense over the economic life, like linear depreciation or reducing balance, would require strictly positive d 's (second condition) and strictly decreasing d_t when the economic life increases (fourth condition). A depreciation method whereby the whole depreciation takes place in the last period of the economic life of the asset, called “extreme” later in this paper, is not an ordinary depreciation method by normal standards, but it satisfies the above criteria.

return on the investment. This complication cannot be avoided by using a pre-tax approach, since the pre-tax rate would have to be determined to reflect these tax consequences.

As noted in section 4.3, Samuelson (1964) identifies one (and only one) neutral tax depreciation schedule, which is equal to economic depreciation. Since economic depreciation by definition gives a constant rate of return, in any period we must have the pre-tax profit given by:

$$\pi_t(\text{pre-tax}) = rV_{t-1}$$

When taxable income is set equal to the pre-tax profit, we get:

$$\pi_t(\text{post-tax}) = (1-\tau)rV_{t-1} = \rho V_{t-1},$$

and hence $r = \frac{\rho}{1-\tau}$. In words, the pre-tax rate would be the post-tax rate divided by the notional after-tax multiplier, $(1-\tau)$. However, this is not a general result, but a result contingent on the tax depreciation being equal to economic depreciation.

4.4.2 The effective after-tax multiplier

The expression in equation (2.1) can be simplified by introducing a parameter θ , which will be described below as the effective after-tax multiplier at the time of investment. The general notation is $\theta_{s,T}$ for an investment in time s with a project life that lasts until period T :

$$(3) \theta_{s,T} \equiv \theta_{s,T}(\tau, D_{s,T}, T) = \frac{1-\tau}{1-\tau \sum_{t=s}^T \frac{d_{t,T}}{(1+\rho)^t}}$$

In this section we discuss the effective after-tax multiplier of investments undertaken at time zero. For a given tax rate τ , depreciation schedule $D_{0,T}$ and project duration T , $\theta_{0,T}$ is a constant. By the introduction of this parameter, (1) reduces to:

$$(1.1) V_0 = \theta_{0,T} \sum_{t=1}^T \frac{CF_t}{(1+\rho)^t},$$

for assets being subject to null or ordinary depreciation.

By comparing (2) and (1.1), we have, at the time of investment, that:

$$(4) \sum_{t=1}^T \frac{CF_t}{(1+r)^t} = \theta_{0,T} \sum_{t=1}^T \frac{CF_t}{(1+\rho)^t}$$

so that it is possible to solve r at the time of investment as a function of $\theta_{0,T}$ and ρ .

We will first analyse the properties of $\theta_{0,T}$ defined by equation (3). First we note that the term

$\sum \frac{d_{t,T}}{(1+\rho)^t}$ in the denominator represents the discounted depreciation fractions of each period. In the case of the ordinary depreciation, the sum of the undiscounted d 's is equal to 1, so the upper limit of the summation term must be one. Since all d 's are assumed non-negative, it is also clear that 0 is the lower limit of the term. Consequently, the denominator of $\theta_{0,T}$ takes values between 1 and $1-\tau$, and the corresponding limiting values of $\theta_{0,T}$ are $1-\tau$ and 1.

The economic interpretation of this is as follows: A tax depreciation that takes place rapidly after the investment has a large present value for the enterprise, and such depreciation would significantly reduce the overall impact of taxes. The extreme case is that the entire tax depreciation cash inflow takes place at the same time as the investment outlays (which is not a property of ordinary depreciation), so that the net cash effect at the time of the investment is $(1-\tau)V_0$. Then, of course, one unique discount rate yields equality between the net investment outlay and the present value of after tax cash flows, and between the gross investment outlay and present value of before-tax cash flows. That extreme is represented by $\theta_{0,T} = 1$, whereby $r = \rho$ according to equation (4). This point is discussed by Bierman (1970).

On the other hand, when tax depreciation takes place a long time after the investment, the present value of the tax deductions is small. In that case the overall impact of taxes is less influenced by depreciation. In the extreme case there is no such influence, which is equal to the null depreciation case, i.e. $d_{t,T} = 0$ for all t 's. In equation (3), this case would be represented by $\theta_{0,T} = 1-\tau$. Under the null depreciation this is the value of $\theta_{0,T}$ for any length of project life, T .

$\theta_{0,T}$ may therefore be interpreted as a measure of the effective after-tax multiplier at the time of investment. When $\theta_{0,T}$ is high (i.e. close to one), the company's effective tax rate is low, and vice versa for a low $\theta_{0,T}$.

We will proceed to discuss how $\theta_{0,T}$ develops as T increases when ordinary depreciation is assumed. The shortest project to identify $\theta_{0,T}$ is the one-period project. By inserting $T = 1$ (and $s = 0$) in equation (3) we obtain:

$$(3.1) \theta_{0,1} = \frac{1-\tau}{1-\frac{\tau}{1+\rho}} > 1-\tau = \theta_{0,T \rightarrow \infty}$$

This result holds for any depreciation method that qualifies as ordinary depreciation according to section 4.4.1. For larger T s the value of $\theta_{0,T}$ clearly depends on the depreciation method. In equation (3), $\theta_{s,T}$ is seen to be made up entirely of constants, except for the summation term in the denominator. There is a monotonic relationship so that $\theta_{s,T}$ increases (decreases) with increases (decreases) in the summation term. Since all the d s in (3) are assumed non-negative and add up to one in an ordinary depreciation, we have that,

$\sum_{t=1}^T d_{t,T} = \sum_{t=1}^{T+1} d_{t,T+1} = 1$, or alternatively written, $d_{T+1,T+1} = -\sum_{t=1}^T (d_{t,T+1} - d_{t,T})$. Hence, the change of the summation term caused by an increase in the project's life by one period (from T to $T+1$ periods) is:

$$\begin{aligned} & \sum_{t=1}^{T+1} \frac{d_{t,T+1}}{(1+\rho)^t} - \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \\ &= \frac{d_{T+1,T+1}}{(1+\rho)^{T+1}} + \sum_{t=1}^T \frac{d_{t,T+1} - d_{t,T}}{(1+\rho)^t} \\ (5) \quad &= -\sum_{t=1}^T \frac{d_{t,T+1} - d_{t,T}}{(1+\rho)^{T+1}} + \sum_{t=1}^T \frac{d_{t,T+1} - d_{t,T}}{(1+\rho)^t} \\ &= \sum_{t=1}^T \left(\frac{1}{(1+\rho)^t} - \frac{1}{(1+\rho)^{T+1}} \right) (d_{t,T+1} - d_{t,T}) \leq 0 \end{aligned}$$

The last inequality holds because the terms of the first brackets are always positive, and the terms of the last brackets are non-positive according to the properties assumed for ordinary depreciation. Equation (5) therefore shows that the summation term of $\theta_{0,T}$ is non-increasing as T increases. Hence, $\theta_{0,T+1} \leq \theta_{0,T}$, for any T . Moreover, for any subset of ordinary depreciation where $d_{t,T+1}$ is strictly smaller than $d_{t,T}$ (like linear or reducing balance), we would also have $\theta_{0,T}$ strictly decreasing in T .

4.4.3 The general relationship between pre-tax and post-tax discount rates assuming ordinary depreciation

We will now discuss the relationship between r and ρ for the general cases with ordinary depreciation, assuming $\theta_{0,T} < 1$. Throughout we consider ρ constant and given by the market equilibrium defined by (1). Rearranging (4) we have that:

$$(4.1) \sum_{t=1}^T \left[\frac{1}{(1+r_{0,T})^t} - \frac{\theta_{0,T}}{(1+\rho)^t} \right] CF_t = 0$$

The subscripts of the r indicate that it is the pre-tax rate at the time of investment (time zero) for a project with the length of T periods. If there were only one period of earnings (i.e. $T = 1$), the relationship between r and ρ would be determined such that the bracketed term would be zero, which would be obtained by:

$$(4.2) 1 + r_{0,1} = \frac{1 + \rho}{\theta_{0,1}}$$

Now, assume that there are two periods of earnings. Equation (4.1) would then be written:

$$(4.3) \left[\frac{1}{1+r_{0,2}} - \frac{\theta_{0,2}}{1+\rho} \right] CF_1 + \left[\frac{1}{(1+r_{0,2})^2} - \frac{\theta_{0,2}}{(1+\rho)^2} \right] CF_2 = 0$$

(4.3) is a second degree equation with $\frac{1}{1+r_{0,2}}$ as the unknown. Retaining only the positive root of the general solution (the negative root is without interest here), we obtain:

$$(4.4) \begin{aligned} \frac{1}{1+r_{0,2}} &= \sqrt{\frac{\theta_{0,2}}{(1+\rho)^2} + \frac{\theta_{0,2}}{1+\rho} \frac{CF_1}{CF_2} + \frac{1}{4} \left(\frac{CF_1}{CF_2} \right)^2} - \frac{1}{2} \frac{CF_1}{CF_2} \\ &> \sqrt{\frac{(\theta_{0,2})^2}{(1+\rho)^2} + \frac{\theta_{0,2}}{1+\rho} \frac{CF_1}{CF_2} + \frac{1}{4} \left(\frac{CF_1}{CF_2} \right)^2} - \frac{1}{2} \frac{CF_1}{CF_2} = \frac{\theta_{0,2}}{1+\rho} \\ &\Rightarrow 1 + r_{0,2} < \frac{1 + \rho}{\theta_{0,2}} \end{aligned}$$

It is instructive to compare the solution for $r_{0,2}$ in (4.4) with the one of $r_{0,1}$ in (4.2). First, since $\theta_{0,1} \geq \theta_{0,2}$, the two-period $r_{0,2}$, if it were defined by (4.2) with $\theta_{0,2}$ in the denominator, would be equal to or larger than the one-period $r_{0,1}$. The partial effect of the effective after-tax multiplier is to push up the pre-tax rate as the project's length increases. However, the

solution similar to (4.2) would obviously give a too high pre-tax rate to satisfy (4.3), as can be seen by the inequality in (4.4). So, there are other mechanisms that work in the opposite direction to the effective after-tax multiplier.

The pre-tax rates for longer periods have to be found by solving higher-degree equations. However, it is possible to study some of the characteristics of the pre-tax rates when the project length increases, by comparing the expression in (4.1) for two projects with a one-period difference in duration. Since both add up to zero, it follows that:

$$\begin{aligned} \sum_{t=1}^{T+1} \left(\frac{1}{(1+r_{0,T+1})^t} - \frac{\theta_{0,T+1}}{(1+\rho)^t} \right) CF_t &= \sum_{t=1}^T \left(\frac{1}{(1+r_{0,T})^t} - \frac{\theta_{0,T}}{(1+\rho)^t} \right) CF_t \\ \Rightarrow \sum_{t=1}^T \left(\frac{1}{(1+r_{0,T+1})^t} - \frac{1}{(1+r_{0,T})^t} \right) CF_t &= (\theta_{0,T+1} - \theta_{0,T}) \sum_{t=1}^T \frac{CF_t}{(1+\rho)^t} - \left(\frac{1}{(1+r_{0,T+1})^{T+1}} - \frac{\theta_{0,T+1}}{(1+\rho)^{T+1}} \right) CF_{T+1} \end{aligned}$$

The brackets of the left-hand side of the last equation contain the difference between pre-tax discount factors for project lengths of T and $T+1$ periods. The fact that the left-hand side adds together discount factors of different powers does not complicate the analysis. If $r_{0,T+1} < r_{0,T}$ all the brackets will be positive, and the sum will also be positive, since all CF s are assumed non-negative, and conversely for $r_{0,T+1} > r_{0,T}$. Hence, the sign of the right-hand side will determine which is the higher, $r_{0,T+1}$ or $r_{0,T}$.

The first term of the right-hand side of the last equation is the partial effect of the change of the after-tax multiplier. Since $\theta_{0,T+1} \leq \theta_{0,T}$, this term is zero or negative, meaning that the change in the multiplier most likely contributes to a higher pre-tax rate for the last period compared with the one just before. The second term is the partial effect of adding one period of income, the sign of which is uncertain at first glance. It can be seen, however, that the term equals zero for $1+r_{0,T+1} = \frac{1+\rho}{\sqrt[T+1]{\theta_{0,T+1}}}$, which approaches $1+\rho$ for an ever larger T , bearing in

mind that the multiplier is less than one and non-increasing in T . Whenever the pre-tax rate is above this threshold, which is what we expect it to be in a normal situation, the argument within the brackets is negative, corresponding to a reduction of the pre-tax rates. Therefore, the partial effect on the pre-tax rate of an increase in the length of the project, disregarding the effect of the effective after-tax multiplier, is normally to contribute to its reduction.

We have therefore identified two opposite forces on the pre-tax rate as the project's life increases. The partial effect of an increased project length, with θ held constant, is to push the pre-tax rate down towards the post-tax rate. The opposite force is produced by the reduction of the after-tax multiplier, which pushes the pre-tax rate up.

Further analysis of the general case is cumbersome. We will therefore continue the discussion with the more convenient case of constant periodic cash flows, which could also easily be extended to the case with cash flows with a constant growth rate.

4.4.4 The special case of constant pre-tax cash flows

Consider the case where the flows of all periods are the same ($CF_t = 1$). Using the formula for the first n terms of a geometrical series,

$$a + ak + ak^2 \dots + ak^{n-1} = \frac{a(k^n - 1)}{k - 1}$$

setting $a = 1$, $k = 1/(1+r)$ and omitting the first term, we obtain:

$$\sum_{t=1}^T \frac{1}{(1+r)^t} = \frac{1 - (1+r)^{-T}}{-r(1+r)^{-T}} = \frac{1}{r} \left(1 - \frac{1}{(1+r)^T} \right)$$

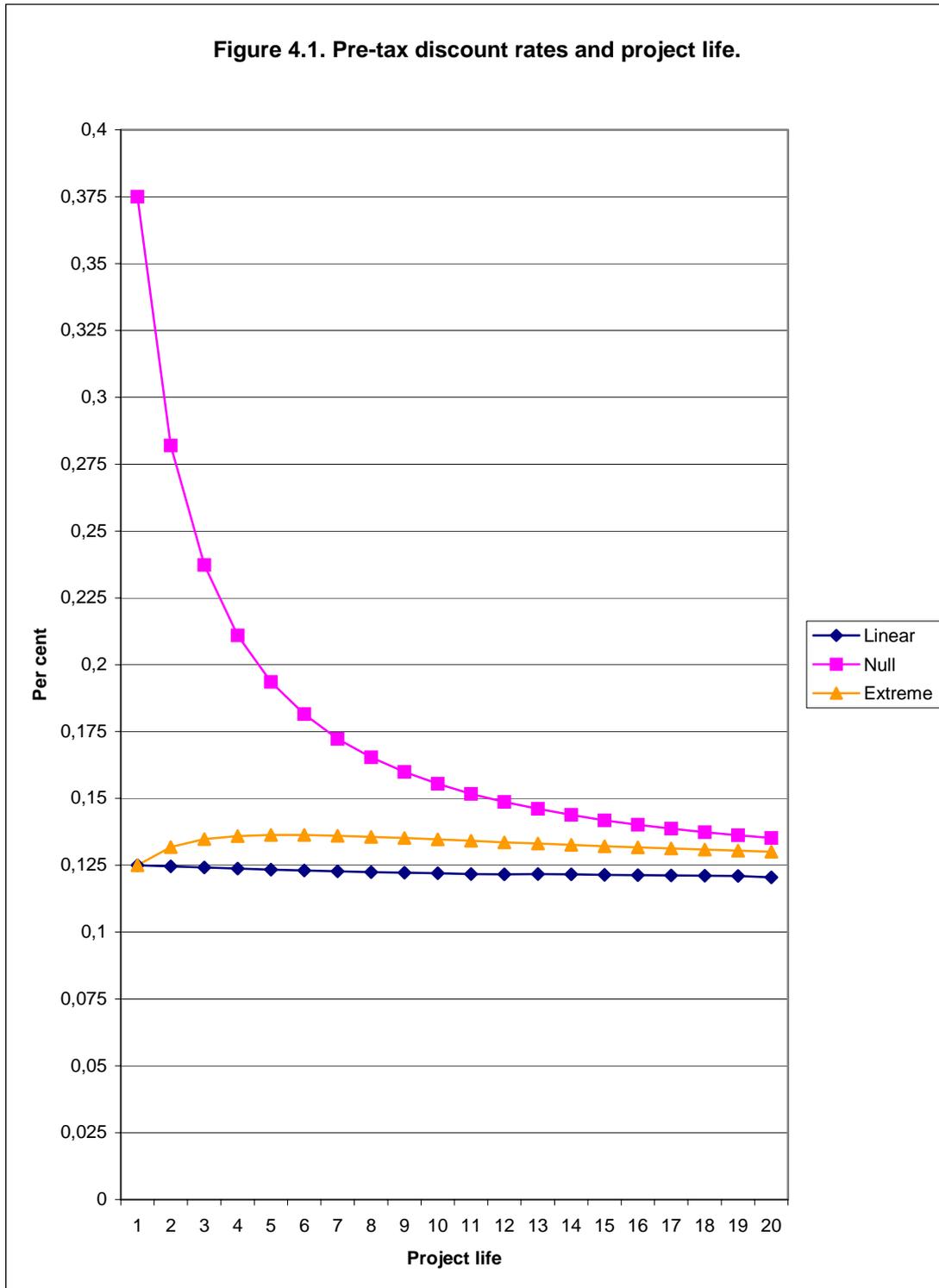
Transforming both sides of equation (4) in the same manner and rearranging yields:

$$(6) \quad r_{0,T} = \frac{\rho \left[1 - \frac{1}{(1+r_{0,T})^T} \right]}{\theta_{0,T} \left[1 - \frac{1}{(1+\rho)^T} \right]}$$

Obviously $r_{0,T}$ will have to be solved by some iterative process. The limiting cases of (6) are $T = 1$ and $T \rightarrow \infty$. The first case is the same as analysed in Section 4.4.3, and it can be easily verified that the result of equation (4.2) is valid also here. The second limiting case is when the life of the project extends over a very long period. The terms of the brackets both move towards 1 as T grows towards infinity. For this limiting case, therefore, we would have

$$r_{0,T \rightarrow \infty} = \frac{\rho}{\theta_{0,T}}$$

Figure 4.1. Pre-tax discount rates and project life.



Note: The curves are the computed r according to equation (5) for different values of T under three alternative tax depreciation schedules. “Linear” means linear depreciation, “Null” means no depreciation, and “Extreme” means that the entire depreciation is in the last period. All the curves are computed with the parameters from the IAS 36 example, i.e. $\rho = 0.1$ and $\tau = 0.2$.

The relationship between the pre-tax rate $r_{0,T}$ at the time of investment and the length of the project life T can now be computed and shown in a diagram. Figure 4.1 contains three curves, two for the cases of tax deductibility through depreciation, and one for the case of no tax depreciation. The latter, which is labelled “null” in Figure 4.1, is the simplest to explain. For this curve $\theta_{0,T}$ is a constant throughout, with the value $\theta_{0,T} = 1 - \tau$. The starting point for the curves is in $T = 1$, i.e. the project life is one period. Inserting the constant value of $\theta_{0,T}$ in the formulas for $r_{0,T}$ for T equal to one and infinite yields:

$$(6.1) \quad r_{0,1}(\theta_{0,1} = 1 - \tau) = \frac{1 + \rho}{\theta_{0,1}} - 1 = \frac{\rho + \tau}{1 - \tau}$$

$$(6.2) \quad r_{0,T \rightarrow \infty}(\theta_{0,T} = 1 - \tau) = \frac{\rho}{\theta_{0,T}} = \frac{\rho}{1 - \tau}$$

It can be shown that, for this curve, $\frac{dr}{dT} < 0$ throughout (see Annex 1). This curve represents the relevant pre-tax rate for goodwill in the group balance sheets. Figure 4.1 is drawn with the parameters from the numerical example of IAS 36, i.e. a post-tax rate of 10 % and a tax rate of 20 %. Those parameters would give a pre-tax rate for goodwill with economic life of one year of $(0.1+0.2)/(1-0.2) = 37.5$ %. With a longer economic life the relevant pre-tax rate will be lower, and it will gradually approach the grossed-up rate applied in the IAS 36 example (12.5 % in Figure 4.1).

The lower curves in Figure 4.1 show how the pre-tax rate develops with the length of the project’s life for a tax depreciable asset. They are more complex to compute, since the effective after-tax multiplier, represented by $\theta_{0,T}$, will change together with T . The starting point of these curves is the pre-tax rate for the one-period project, i.e. $r_{0,1} = \frac{\rho}{1 - \tau}$, which is found by inserting (3.1) into (4.2). As T grows very large, these curves will again approach the one-period level, i.e. $r_{0,T \rightarrow \infty} = \frac{\rho}{\theta_{0,T}} = \frac{\rho}{1 - \tau}$, as a consequence of the effective after-tax multiplier moving towards $1 - \tau$.

Where are the curves between these extremes? In this model, where the profile of the cash flow stream is given, their position will depend entirely on the depreciation method applied, which again determines the value of $\theta_{0,T}$. In section 4.4.2 it was proved that, with an ordinary

depreciation schedule, for any profile of non-negative cash flows, the effective after-tax multiplier is non-increasing as the project life increases, and it would be strictly decreasing for the customary depreciation methods that apportion the depreciation over the economic life. Moreover, it will gradually approach the lower limit $\theta_{0,T} = 1 - \tau$, as noted earlier. From equation (6) it is seen that reducing $\theta_{0,T}$ means higher $r_{0,T}$, all other parameters held constant.

That is what can be observed in the curve labelled “linear” in Figure 4.1, which assumes linear tax depreciation. As the project life increases, the tax depreciation will be distributed over an increasing number of years. This means that the effective after-tax multiplier $\theta_{0,T}$ will decrease as we move to the right. From the shortest (one year) to the longest (twenty years) project life covered by the figure, the effective after-tax multiplier decreases from 0.98 to 0.87, still applying the parameters of the IAS 36 example. Seen in isolation, the reduction in the multiplier leads to a higher pre-tax rate. However, there is an opposite force represented by the bracketed terms in (6). The bracketed term in the numerator is greater than the one in the denominator since $\rho < r_{0,T}$, but the combined fraction will clearly move towards one, asymptotically decreasing with a larger T . In the “linear” curve in Figure 4.1 the latter effect is stronger than the effect of the changing multiplier as far as the diagram goes, so the pre-tax rate decreases monotonically from 12.5 per cent for $T=1$ to 12.1 per cent for $T=20$. Far beyond the range of the chart, the curve strikes a minimum of 12.0 per cent at approximately 31 years and gradually climbs back towards 12.5 per cent for even longer projects.

This profile is not universal for depreciable assets, though. The second curve, labelled “extreme” has a depreciation schedule such that all the depreciation comes in the last year of the project’s life. Clearly, the reduction of the effective after-tax multiplier in this case is much faster than when assuming linear depreciation. The effect of the decreasing multiplier outweighs the effect of the bracketed terms for small T s, but as we move to the right in the diagram the forces of the two effects reverse and the curve moves towards 12.5 %. So, whatever path is correct for smaller T s, the curve will approach $r_{0,T} = \frac{\rho}{1 - \tau}$ as T grows very large.

Although both the $T = 1$ and the $T \rightarrow \infty$ solutions of $r_{0,T} = \frac{\rho}{1 - \tau}$ are general for tax depreciable assets, one cannot conclude generally that $r_{0,T}$ will always be close to it. For very uneven cash flow distributions, $r_{0,T}$ for $T > 1$ may be significantly different from the $T = 1$

solution. Large upfront cash flows require a high $r_{0,T}$, whereas large remote cash flows require a low $r_{0,T}$ (although not lower than ρ).

4.4.5 Conclusions about the pre-tax rate at the time of investment

The conclusion of this discussion is that, for tax-depreciable assets, a simple computation of the pre-tax discount rate by grossing up the post-tax discount rate by the notional after-tax multiplier may be a good enough approximation for an even cash flow pattern over the entire project life. However, this is not necessarily the case for an uneven cash flow pattern. Also, for assets with no tax depreciation, such as goodwill in most cases, the grossed-up discount rate is likely to be lower than the rate that would provide an equal net present value of pre-tax cash flows with that of post-tax cash flows discounted using a post-tax discount rate. So, goodwill impairments reviews carried out with a grossed-up pre-tax discount rate as suggested by IAS 36 is likely to produce too few and too small write-downs. The shorter the economic life of the non-depreciable asset, the larger the error of using the grossed-up rate.

The Basis for Conclusions of the 1998-version of IAS 36 (paragraph B76) refers to a technique of notionally grossing up “the carrying amount of goodwill by the amount of the unrecognised deferred tax liability [that would] permit a valid comparison with value in use, which is based on pre-tax cash flows.” If the carrying amount of goodwill is equal to its

purchase price $V_0 = \sum_t \frac{(1-\tau)CF_t}{(1+\rho)^t}$ (cf. equations 1 – 4), such notional grossing up would

imply dividing by $(1 - \tau)$, so that the imaginary carrying amount of goodwill for impairment review would be $\frac{V_0}{1-\tau}$, and the unrecognised deferred tax liability would be $\frac{\tau V_0}{1-\tau}$ (since the

difference between these two amount equals V_0). Dividing both sides of the purchase price expression by $(1 - \tau)$ reveals that this “notionally grossed up carrying amount” equals the pre-tax cash flows discounted using the post-tax discount rate. So this technique does not constitute a solution to the problem of finding the relevant pre-tax discount rate for non-depreciable assets.

4.5 *Pre-tax discounting subsequent to the time of investment*

The previous section discusses the relationship between pre-tax and post-tax discounting at the time of investment. In well-functioning market economies we would expect equality or a close relationship between the V_0 calculated by the rational investor and the equilibrium

market price for the asset. One precondition for this result, however, is that all investors are subject to the same tax rules. Under the assumption that the post-tax rate of return is common to all investors, they would also face a common $\theta_{0,T}$ at the time of investment. Moreover, if their cash flow projections were identical, the tax cash flows needed to compute the pre-tax discount rate would also be identical.

For the purpose of impairment reviews, however, this result is not very helpful. Normally the need to carry out an impairment review does not arise at the time of investment, but later. At this later stage the future tax cash flows of the present owner will differ from those of a potential buyer of the asset, even under the assumption of identical pre-tax cash flow projections. Which tax cash flows should then be used for computing the pre-tax discount rate?

Consider again investor i who makes the project investment for the price V_0 at time zero based on the arguments given in equations (1) –(4). At time one, investor i 's valuation of the asset will be:

$$(7) V_{1,i} = \sum_{t=2}^T \frac{CF_t - \tau(CF_t - d_{t,T}V_0)}{(1 + \rho)^{t-1}}$$

which might, of course, provide a basis for the calculation of a pre-tax rate in time one. Compared with the pre-tax rate that i calculated at the time of investment – assuming ordinary depreciation – the time one pre-tax rate would be higher, because there is less tax depreciation left and consequently a lower effective after-tax multiplier. This will be shown later in this section.

Contrary to the value at the time of investment (V_0), there is no reason that $V_{1,i}$ should be representative of the market price of the asset. $V_{1,i}$ is a company-specific value that depends upon the past transactions of investor i , as evidenced by the presence of $\sum d_{t,T}V_0$ in the equation. For the same reason, any pre-tax discount rate based on equation (7) would be a company-specific rate.

Consider another investor, j , with the same pre-tax cash flow estimates for the asset and the same post-tax discount rate as i . Investor j is also subject to the same tax rules as i . By acquiring i 's asset second hand, j would be allowed tax depreciation of the full purchase price. j 's depreciation schedule would therefore be $D_{1,T} = D_{0,T-1} = [d_{1,T-1}, \dots, d_{T-1,T-1}]$. So, when no

transactions costs are assumed, j would follow the logic of equations (1) – (4) and arrive at a value:

$$(8) V_{1,j} = \sum_{t=2}^T \frac{CF_t - \tau(CF_t - d_{t-1,T-1}V_{1,j})}{(1 + \rho)^{t-1}} = \theta_{1,T} \sum_{t=2}^T \frac{CF_t}{(1 + \rho)^{t-1}} = \sum_{t=2}^T \frac{CF_t}{(1 + r_{1,T})^{t-1}}$$

Since investor j is representative of any other investor, $V_{1,j}$ can be considered representative of the market price. Hence, $r_{1,T}$ may be considered closer to the pre-tax rate required by IAS 36 for this particular asset, at this particular time, than any pre-tax rate calculated by equation (7).

Generally the pre-tax rate calculated in period 0 according to equation (4) and the one calculated in period 1 according to equation (8) will be different, everything else held unchanged. The relationship between the pre-tax rates for the same asset in two subsequent periods will resemble the relationship between the pre-tax rates of one single period for assets with different economic lives, which is discussed in Section 4.4.4. For depreciable assets, the shorter economic life and the higher effective after-tax multiplier ($\theta_{1,T} = \theta_{0,T-1} \geq \theta_{0,T}$) will have opposite impacts on the pre-tax rate.

Which of $V_{1,i}$ or $V_{1,j}$ (if either) is the correct value in use of the asset under IAS 36 at time one? At this point we have to interpret the standard's insistence in BC 60 (quoted in Section 4.2) on company-specific cash flows and a market-assessment of the discount rate. Both measures use the company's estimation of pre-tax cash flows and a market-based post-tax cost of capital. The question is therefore whether the tax cash flows component of the valuation – which must be included in the pre-tax discount rate if the pre-tax and post-tax valuation are to give the same outcome – are the company-specific tax cash flows of the holder of the asset or of a potential buyer of it.

It is tempting to conclude that the answer must be the latter alternative since the potential purchase price of investor j is closest to a market price. But is this relevant for the impairment review of investor i ? The market is indifferent to the company-specific remaining depreciation schedule of investor i , whereas this may be an important parameter in the after-tax cash flows of i .

The differences in assessments of investor i and investor j may be analysed by isolating the common cash flows of equations (7) and (8). Rearranging investor i 's subjective valuation, and inserting from equations (3) and (1.1), we get:

$$\begin{aligned}
V_{1,i} &= \sum_{t=2}^T \frac{CF_t - \tau(CF_t - d_{t,T}V_0)}{(1 + \rho)^{t-1}} \\
(9) &= (1 + \rho)V_0 - CF_1 + \tau(CF_1 - d_{1,T}V_0) \\
&= \left(1 - \frac{\tau d_{1,T}}{1 + \rho}\right) \theta_{0,T} \sum_{t=2}^T \frac{CF_t}{(1 + \rho)^{t-1}} + \tau \theta_{0,T} CF_1 \sum_{t=2}^T \frac{d_{t,T}}{(1 + \rho)^t}
\end{aligned}$$

where the second equality assumes that forecasted future cash flows are unchanged from the time of investment.⁶¹

Consider how $V_{1,i}$ is formulated in equation (9). The first part is the present value of the remaining cash flows multiplied by the remaining effective after-tax multiplier. The remaining effective after-tax multiplier is now lower than $\theta_{0,T}$, because the first period has consumed part of the total depreciations. Therefore the expression within the brackets is less than one. Also, when comparing with the second equality of equation (8), we recall that $\theta_{1,T} \geq \theta_{0,T}$. So, when the effect of the first period cash flows has been eliminated, the remaining cash flows are likely to have a higher net present value for the new investor than for the present one. The second term of the second equality of (9) is the effect on subsequent periods' depreciation of the original estimate of first-period cash flows in the cost of investment. This term is always positive. Which of i and j comes up with the higher measurement, depends on the parameters.

$V_{1,j}$ is calculable for investor i with the same level of complexity as his own calculation of $V_{0,i}$ at the time of investment.⁶² However, investor i cannot use this measure as the current value of his asset, without again taking into consideration the tax consequences of a sale. A sale to investor j will trigger a tax of $\tau(V_{1,j} - (1 - d_{1,T})V_{0,i})$. Therefore, the “fair value less costs to sell” (or “net selling price” in the previous version of IAS 36) is likely to be a subjective value also. For the same reason, the pre-tax rate relevant to potential buyers (such as investor j) is not necessarily useful for the owner of the asset.

For non-depreciable assets, all d 's are zero, so $V_{1,i}$ and $V_{1,j}$ become identical. Equation (8) is then the same as equation (4), except that both sides of the equation have stepped one period

⁶¹ See details of the calculation in Annex 2.

⁶² Haring and Schwaiger (2004) mention tax consolidation within a group and differences in capital structures as other company-specific features that complicate after-tax valuation. Without discussing here the validity of these arguments, I remark that any such problem will appear likewise in a before-tax valuation that is intended to produce the same result as an after-tax valuation.

ahead. The advantage for the IAS 36 practitioner is that the pre-tax rate for non-depreciable assets can be calculated without simulating its acquisition by someone else, since it will not be company-specific. The disadvantage of this relationship is that the pre-tax rate is not stable. When we analysed the properties of the pre-tax rate at the time of investment, we found that it would be higher relative to the post-tax rate, the shorter the economic life. Since the same relationship holds over time, we will face increasing pre-tax rates as the end of the project's life comes nearer. In Figure 4.1, which illustrates the special case of equal periodical cash flows, this means that we would move backwards on the upper curve.

4.6 Relationship to deferred taxes

According to the Basis for Conclusions of IAS 36 one reason for the choice of pre-tax cash flows and discount rates for the present value measurement is that some future tax flows are claimed to be included in the deferred tax assets or liabilities whereas others are not. By ignoring tax altogether in the cash flows to be discounted, the problem of separating those included in the deferred tax items from those not included, could apparently be avoided. The Basis for Conclusions also warns of a possible inconsistency if future tax flows are discounted when measuring the value for an impairment review, whereas they are not discounted when measuring the deferred tax assets or liabilities. The meaning of this warning is presumably that if tax flows, after all, were to be included in the cash flows to be discounted, it would not be sufficient to adjust for the double counting in relation to the deferred taxes; the different approach with respect to discounting would also have to be accounted for.

There is an inconsistency, however, in the arguments of the standard. If the existence of deferred taxes represents a problem for post-tax valuation, these problems would have to be solved equally when using the pre-tax method, since the pre-tax and post-tax method by definition should give the same present value.

This section discusses the effect of deferred taxes in an asset valuation by the net present value of future cash flows. A good start for the discussion is to look at the cash flows to be discounted and try to identify what balance sheet item corresponds to them; is it the carrying amount of the asset alone, or is it this amount minus the deferred tax liability? And, if the latter alternative is correct, what is the consequence of the deferred taxes being undiscounted whereas the future cash flows are discounted?

The kind of deferred tax assets that are related to the discussion of this paper are those that arise because the depreciation schedules for accounting and taxation purposes are different. It

follows from the liability method of IAS 12 that the deferred tax asset or liability is the tax rate multiplied by the temporary difference, defined as the difference between the carrying amount and the tax base of an asset. At the time of investment the carrying amount is equal to the purchase price V_0 , which will also be the tax base for depreciable assets. Consequently, there is no deferred tax asset or liability related to the purchased asset at the time of investment. At time one, however, the carrying amount and the tax base may have moved apart, which would then give rise to deferred taxes. Depreciation for tax purposes is equal to $d_{1,T}V_0$, and depreciation for accounting purposes is denoted by δV_0 . The deferred tax liability at the end of period one is therefore:

$$\begin{aligned}
 & \text{Deferred tax liability} \\
 & = \tau((1 - \delta)V_0 - (1 - d_{1,T})V_0) \\
 (10) \quad & = \tau(d_{1,T} - \delta)V_0 \\
 & = \tau(1 - \sum_{t=2}^T d_{t,T} - \delta)V_0
 \end{aligned}$$

The last two equalities present the deferred tax liability in two different perspectives. The second last equality shows the cash flow effect of tax depreciation in the present period, $\tau(d_{1,T} - \delta)V_0$. This is the amount of cash received (or saved) in the present period due to lavish tax depreciations upfront. The term $-\tau \sum_{t=2}^T d_{t,T}V_0$ in the last equality is the corresponding cash effect of tax depreciations of future periods. The deferred tax liability has the function of transferring the profit and loss effect of tax cash flows from one period to another. By the technique that is mandatory under IAS 12, this transfer is measured in nominal values of the present period.

The book entries of period one are as follows:

Dr	Cash	$CF_1 - \tau(CF_1 - d_{1,T}V_0)$
Cr	Deferred tax liability	$\tau(d_{1,T} - \delta)V_0$
Cr	Depreciation	δV_0
Cr	Profit before tax	$CF_1 - \delta V_0$
Dr	Tax expense	$\tau(CF_1 - \delta V_0)$

The first three entries are balance sheet items, whereas the latter two are in the profit and loss account. The tax expense of the last line is the (hypothetical) taxation related to accounting profit. The extent to which the tax cash received (or unpaid) is less than the tax expense is the

deferred tax liability. Hence, under IAS 12, the counterpart of the deferred tax liability is cash received. For the entries to balance, the tax cash received would have to be recorded at its nominal value. The non-discounting of the deferred tax liability corresponds with an economic reality. The objective of discounting is to translate a cash flow of a future period into an equivalent amount of the current period. When focusing on the cash received in the present period (rather than in a future period) discounting would obviously not be appropriate.

An alternative view is possible, though. The cash inflow of the present period will reverse in one or more future periods (cf. the last equality of equation 10) and will generate a cash outflow of the same nominal amount. The economic value of that future cash outflow would, of course, be found by discounting, so the deferred tax liability by this concept would be lower than the tax cash inflow of the present period. For the book entries in the table above to balance, then, the difference between the two amounts must be included in the profit and loss account, creating a net income in the present period.

In short: The non-discounting technique of IAS 12 means that the income effect of the cash received in the present period is deferred to later periods. The alternative view implies that the income effect of the discounted future cash reversal is carried back to the present period, together with an item of income to absorb the difference between the undiscounted and discounted amounts. The non-discounting of the first view is as correct as the discounting of the second view. The difference lies in which cash flows are moved to another period for income recognition. The following discussion on how to include deferred taxes in a present value measurement starts with the IAS 12 version of the deferred tax liability, by which the income effect of the undiscounted cash received is deferred, and looks at the version with discounted deferred taxes thereafter.

Reviewing the carrying amount of an asset means to assess whether there will be enough future cash flows, including those related to tax, and cash received not yet recognised as income, to recover the value. The cash inflow from tax depreciation already received, but not recognised as income, is precisely the deferred tax liability under IAS 12. The carrying amount to be recovered by future cash flows is therefore the carrying amount of the asset minus the deferred tax liability.⁶³

⁶³ Bierman (1987, 1990) argues that the deferred tax item that arises from tax depreciation being larger than accounting depreciation, is not a liability, but rather a reduction in the asset. Although Bierman's argument follows a different path, it leads to the same conclusion as in this paper.

This argument can be conveniently demonstrated by analysing the sale of the asset in period one. The carrying amount of the asset in investor i 's balance sheet is $(1-\delta)V_0$. The net sale proceeds, which is in this case the remaining (and terminal) cash flow of the investment, is the selling price $V_{1,j}$ minus tax on the taxable profit of the sale, i.e.:

$$\begin{aligned}
 & V_{1,j} - \tau(V_{1,j} - (1-d_{1,T})V_0) \\
 (11) &= (1-\tau)(V_{1,j} - (1-\delta)V_0) + (1-\tau)(1-\delta)V_0 + \tau(1-d_{1,T})V_0 \\
 &= (1-\tau)(V_{1,j} - (1-\delta)V_0) + (1-\delta)V_0 - \tau(d_{1,T} - \delta)V_0
 \end{aligned}$$

The first term in the last equality is the accounting profit of the sale net of tax, the second term is the carrying amount of the asset and the third term is the deferred tax liability. So the cash inflows cover both the carrying amount of the asset and the deferred tax liability. If the carrying amount is precisely the amount that an external investor is willing to give, the accounting profit is zero and investor i will collect a cash amount equal to the carrying amount minus the deferred tax liability. This is quite logical, since the cash equal to the deferred tax liability has already been received (but not yet recognised as income). By consequence, in an impairment review that uses the market price, the deferred tax liability should be included in the unit that is reviewed. Or, the other way around, there is no need to write down the asset as long as the observable market price plus the cash represented by the deferred tax liability exceeds the carrying amount.

It would be the same when the review is done by discounted cash flows. Consider an asset purchased for the price of V_0 (as in equation 2) which is equal to the net present value of after-tax cash flows, under the initial assumption that tax depreciation is equal to linear accounting depreciation. At the time of the purchase the carrying amount is then exactly equal to the value in use, the calculation of which is insensitive to the use of the pre-tax or post-tax method. Assume that immediately after the purchase it becomes clear that the full investment amount shall be deducted for tax purposes instantly. The investor will therefore receive a tax refund of τV_0 and record a deferred tax liability of the same amount. This change in the profile of the tax cash flows has improved the economic performance of the investment relative to the initial projection, since a cash inflow amount today has been swapped against an equally large cash outflow in future periods. However, when the investor performs an impairment review, he will discover that the net future cash flows (after tax) have decreased with the discounted amount of τV_0 . The net present value of these post-tax cash flows will therefore be

lower than V_0 . The pre-tax method, in which the cash flows are unchanged, should by definition produce the same answer. It is obvious, though, that this change in tax depreciation schedule, which improves the profitability of the investment, should not trigger an asset impairment.

The logical answer in this example is to pool the carrying amounts of the asset and the deferred tax liability for the impairment review. Non-discounting the deferred taxes, as in IAS 12, or discounting them will then make some difference. If they are discounted, the recognised net asset value and the net present value of the future cash flows change by the same amount (i.e. the discounted amount of τV_0), so that the impairment review is insensitive to changes in the tax depreciation schedule. The economic advantage of the change has then been recorded as income, as already noted. If the deferred taxes are not discounted, the reduction in the recognised net asset value by the change in the tax depreciation schedule is larger than the reduction in the net present value of the future cash flows. Hence, this latter alternative produces the more conservative balance sheet recognition, and it reduces the need for an impairment loss recognition by the amount of the discounting element.

The purpose of the discussion in this section is to raise the question whether the reference to deferred taxes in the Basis of Conclusions is a valid justification for the pre-tax discounting technique that is chosen. The argument here is that the deferred tax liability as defined in IAS 12 is not an adjustment to future tax cash flows, but rather an adjustment to tax cash flows of the present and past periods, already realised. As a justification for pre-tax or post-tax discounting it is altogether irrelevant. An important corollary of the discussion is that the related deferred tax liability should be included in the carrying amount when comparing with future cash flows.

4.7 Pre-tax discounting of goodwill and composite cash-generating units

Fixed assets may be reviewed for impairment separately, but more often they will be reviewed as part of a composite measurement unit, and sometimes this will also include goodwill. The reason for this system is that assets generate common cash flows that cannot be properly separated. This means that the pre-tax discount rate used for estimating the present value will have to reflect variations in tax depreciations of the assets included.

At the time of investment, the fact that assets generate common cash flows does not constitute a more complex situation than the single-asset case. The rational investor will assess the cash

flows that he can obtain from the composite unit and decide the upper limits of his willingness to pay for it in the same manner as in the single-asset case of equation (2.1). The only difference is that he will have to split the total purchase price between the assets, both for taxation and financial reporting purposes.

To simplify matters we will here study a case where the cost of investment is allocated to two assets only, one of which is tax-deductible through depreciation, and one of which is not. The purchase price of the composite investment and the proportion to be allocated to the depreciable asset are determined simultaneously by the same calculation as in equation (2.1):

$$\begin{aligned}
 V_0 &= \sum_{t=1}^T \frac{CF_t - \tau(CF_t - \lambda d_{t,T} V_0)}{(1 + \rho)^t} \\
 (12) \quad &= \sum_{t=1}^T \frac{(1 - \tau)CF_t}{(1 + \rho)^t \left(1 - \tau\lambda \sum_{t=1}^T \frac{d_{t,T}}{(1 + \rho)^t} \right)}
 \end{aligned}$$

The only difference between (2.1) and (12) is the inclusion of λ , where $0 \leq \lambda \leq 1$, which indicates the proportion of the cost of investment allocated to the depreciable asset. As before, we can isolate the constant factor $\theta_{0,T}$, which includes λ , in order to compute the corresponding pre-tax rate as in equation (4). Therefore, at the time of investment there is no new challenge arising in the search for the pre-tax discount rate.

Unfortunately, this is not necessarily so in the subsequent period. Section 4.5 discussed two possible interpretations of the value in use concept subsequent to the time of investment; one based on the company-specific cash flows of the owner (investor i), and one based on the company-specific cash flows of a potential buyer (investor j), where the tax cash flows are the only element that separates them. The concept based on the owner's future cash flows, permits the calculation of a pre-tax discount rate after the time of investment, because the λ that enters into the future tax depreciation is given once and for all. However, if the second concept is correct, investor i will have to make assumptions about how investor j will allocate the purchase price to the different components (including goodwill). The reason for this is that the allocation of the purchase price will determine the level and profile of the tax depreciation of investor j and therefore also j 's willingness to pay for the composite unit. This exercise will have to be carried out at each impairment review (which is at least annually for a measurement unit containing goodwill).

The above difficulty relates not only to finding the pre-tax discount rate, but also to estimating the value in use by a post-tax method. As explained in Section 4.2, IAS 36 makes clear that the pre-tax cash flows to be included in the value in use calculation, are those of the owning company itself, but it does not make clear whether the tax cash flows to be reflected in the discount rate are those of the company or those of an external party. Whichever method is used for the calculation of value in use, post-tax or pre-tax discounting, it will be necessary to make up one's mind about this question. Any value in use concept that depends on the hypothetical tax cash flows for a potential buyer of the composite unit will require a subjective, complex and uncertain estimation. If avoiding burdens for the financial statement preparers has priority, the standard setter ought to permit a calculation of value in use that includes the entity's specific tax cash flows.

4.8 Conclusions

There are three sets of conclusions that arise from the analysis of this paper, each of them with possible policy implications.

The primary conclusion concerns whether it would be more appropriate to measure value in use by pre-tax or post-tax cash flows and discount rates. Insofar as the two methods are defined so as to give the same result, one cannot say that one is better than the other, in the sense of producing the more relevant outcome. One may, however, claim that one method is less complex than the other. If tax cash flows are excluded from the cash amounts to be discounted, their effect will have to be included in the pre-tax discount rate. This transformation from a predicted cash flow to an interest rate premium may become very complex and will require a continuous updating, even when other rates are stable. The easiest way to meet this challenge when preparing the financial statements is to carry out the impairment review valuation by post-tax amounts and discount rate, and, once the result is given, calculate the corresponding pre-tax discount rate for disclosure in the annual report. Then, of course, the pre-tax method will only be marginally more complex than the ordinary method. The standard setters' justifications for the choice of the pre-tax method are then not valid, and the text explaining the matter in the accounting standards would be misleading.

Another possibility, though, is that the pre-tax method is genuinely intended as a simplified method, whereby all tax cash flows are ignored and the discount rate is set arbitrarily higher (e.g. by grossing up). This would truly be simpler for the financial statement preparation, but it would not yield the same result as post-tax discounting. Depending on asset structure and

project duration, such pre-tax valuation may produce very distorted results. Goodwill that does not qualify for tax depreciation, requires higher pre-tax discount rates than tax depreciable assets, and this is particularly so for goodwill with short economic life. Present practice is likely to produce pre-tax discount rates that are too low, meaning that there are too few and too small write-downs.

The obvious policy implication of this is that the standard's requirements should be changed to a post-tax valuation.

The second conclusion concerns which tax cash flows to include in the computation of value in use, irrespective of whether a pre-tax or a post-tax method is used. The tax cash flows are included in the cash flows to be discounted when the post-tax method is applied, and cause an adjustment to the discount rate when the pre-tax method is applied. IAS 36 says that value in use is based on cash flows forecasted by the company itself. Should the tax cash flows necessary for the computation also be company-specific, or should they be those of a potential acquirer of the asset?

The policy implication of this is the need to clarify the standard on this point. When choosing among the alternatives, the standard setter ought to be aware that the estimation of tax cash flows of the potential acquirer of a composite measurement unit requires a guess as to how the hypothetical purchase price will be allocated to the components of the unit.

The third conclusion is about deferred taxes in the impairment review. The deferred tax liability arising from temporary differences caused by dissimilar depreciation schedules for accounting and taxation represents a tax cash flow realised, but not yet recognised as income. When assessing the recoverable amount of an asset by measuring its value in use, this realised cash flow should be added to the future cash flows to be discounted, or, equivalently, the deferred tax liability should be included in the measurement unit to be compared with the net present value of future after-tax cash flows. The fact that these deferred taxes are not measured on a discounted basis is no reason for excluding them from the measurement unit. Rather, the non-discounting appropriately reflects the nature of this item. To the extent that assets subject to impairment reviews are related to deferred tax liabilities, the effect of including them in the measurement unit would be to reduce the need for write-downs.

The policy implication of this is the need to redraft the standard so that the measurement units include the relevant part of the deferred taxes.

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Annex 1 to Chapter 4. Differentiation of the constant cash flows relationship between pre-tax and post-tax interest rates.

Equation (6) in Section 4.4.2 contains a general expression for the relationship between pre-tax and post-tax discount rates (r and ρ , all subscripts omitted in this appendix) for the case of constant annual pre-tax cash flows during the life of the project:

$$(6) \quad r = \frac{\rho \left[1 - \frac{1}{(1+r)^T} \right]}{\theta \left[1 - \frac{1}{(1+\rho)^T} \right]}$$

In order to determine how r behaves for different values of T , we differentiate equation (5)

with respect to T . For convenience we write $\wp = \left(1 - \frac{1}{(1+\rho)^T} \right)$ and $\Re = \left(1 - \frac{1}{(1+r)^T} \right)$.

Rearranging (5) with new symbols and differentiating we get:

$$r\theta\wp = \rho\Re$$

$$\Rightarrow \theta\wp dr + r\theta \frac{\partial \wp}{\partial T} dT + r\wp \frac{\partial \theta}{\partial T} dT = \rho \left(\frac{\partial \Re}{\partial T} dT + \frac{\partial \Re}{\partial r} dr \right)$$

$$\Rightarrow \left(\theta\wp - \rho \frac{\partial \Re}{\partial r} \right) dr = \left(\rho \frac{\partial \Re}{\partial T} - r\theta \frac{\partial \wp}{\partial T} - r\wp \frac{\partial \theta}{\partial T} \right) dT$$

$$(*) \Rightarrow \frac{dr}{dT} = \frac{\rho \frac{\partial \Re}{\partial T} - r\theta \frac{\partial \wp}{\partial T} - r\wp \frac{\partial \theta}{\partial T}}{\theta\wp - \rho \frac{\partial \Re}{\partial r}}$$

We examine first the denominator of (*). The first term is positive. The derivative

$\frac{\partial \Re}{\partial r} = \frac{T}{(1+r)^{T+1}}$ is also positive for all T 's, so the sign of the denominator is uncertain at first

glance. However, we observe that $\theta\wp = \frac{\rho\Re}{r}$, so the denominator can be written:

Denominator =

$$\begin{aligned}
& \theta \wp - \rho \frac{\partial \mathfrak{R}}{\partial r} \\
&= \rho \left(\frac{\mathfrak{R}}{r} - \frac{\partial \mathfrak{R}}{\partial r} \right) \\
&= \rho \left(\frac{1 - \frac{1}{(1+r)^T}}{r} - \frac{T}{(1+r)^{T+1}} \right) \\
&= \frac{\rho}{r(1+r)^{T+1}} \left((1+r)^{T+1} - (1+(T+1)r) \right)
\end{aligned}$$

Since the multiplier outside the brackets is positive, the sign of the denominator depends on the terms within the brackets. It is a general result that, for $a > 0$, $(1+a)^n < 1+an$, for $0 < n < 1$, and $(1+a)^n \geq 1+an$ for all other n . The terms within the brackets will be zero for $T = 0$, and positive for any positive T . Therefore, the denominator will be positive for the cases that is analysed here.

The numerator of (*) contains the derivatives of \mathfrak{R} , \wp and θ with respect to T . How θ changes with T is discussed in section 4.4.2 and is not repeated here. For assets with no tax depreciation, like goodwill in the group accounts, θ is constant and $\frac{\partial \theta}{\partial T} = 0$. For assets with

tax depreciation, $\frac{\partial \theta}{\partial T}$ is non-positive.

Solving the derivatives of the first two terms, and inserting the value of r from (6) we get:

$$\begin{aligned}
\text{Numerator} &= \rho \frac{\partial \mathfrak{R}}{\partial T} - r\theta \frac{\partial \wp}{\partial T} - r\wp \frac{\partial \theta}{\partial T} \\
&= \rho \frac{\ln(1+r)}{(1+r)^T} - r\theta \frac{\ln(1+\rho)}{(1+\rho)^T} - r\wp \frac{\partial \theta}{\partial T} \\
&= \rho \frac{\ln(1+r)}{(1+r)^T} - \rho \frac{\left[1 - \frac{1}{(1+r)^T} \right]}{\left[1 - \frac{1}{(1+\rho)^T} \right]} \frac{\ln(1+\rho)}{(1+\rho)^T} - r\wp \frac{\partial \theta}{\partial T} \\
&= \rho \frac{\ln(1+r)}{(1+r)^T} \left[1 - \frac{\frac{(1+r)^T - 1}{\ln(1+r)}}{\frac{(1+\rho)^T - 1}{\ln(1+\rho)}} \right] - r\wp \frac{\partial \theta}{\partial T}
\end{aligned}$$

The sign of the first two terms of the numerator will obviously depend on the sign within the brackets. By studying the properties of a function of the form $f(x) = \frac{x^n - 1}{\ln x}; x > 1$, we find that it is increasing for all values of $n \geq 1$. So the fraction within the brackets must be larger than one so long as $r > \rho$. Therefore the sign of the first two terms of the numerator is negative. This means that when tax cash flows are held constant, the margin between the discount rates that levels the present value of pre-tax and post-tax cash flows (equivalent discount rates), diminishes as the length of the project life increases.

Annex 2 to Chapter 4. Calculation of Equation 9.

Equation (9) is calculated in the following manner:

$$\begin{aligned}
 V_{1,i} &= \sum_{t=2}^T \frac{CF_t - \tau(CF_t - d_{t,T}V_0)}{(1+\rho)^{t-1}} \\
 &= (1+\rho)V_0 - CF_1 + \tau(CF_1 - d_{1,T}V_0) \\
 &= (1+\rho - \tau d_{1,T})\theta_{0,T} \sum_{t=1}^T \frac{CF_t}{(1+\rho)^t} - CF_1 + \tau CF_1 \\
 &= (1+\rho - \tau d_{1,T})\theta_{0,T} \sum_{t=2}^T \frac{CF_t}{(1+\rho)^t} + \left(\frac{(1+\rho - \tau d_{1,T})\theta_{0,T}}{1+\rho} - (1-\tau) \right) CF_1
 \end{aligned}$$

where the second equality assumes that forecasted future cash flows are unchanged from the time of investment. By inserting $\theta_{0,T}$ from equation (3), the expression in the latter brackets may be developed as follows:

$$\begin{aligned}
 &\frac{(1+\rho - \tau d_{1,T})(1-\tau)}{(1+\rho) \left(1 - \tau \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \right)} - (1-\tau) \\
 &= \frac{(1+\rho - \tau d_{1,T})(1-\tau) - \left(1+\rho - \tau d_{1,T} - \tau \sum_{t=2}^T \frac{d_{t,T}}{(1+\rho)^{t-1}} \right) (1-\tau)}{(1+\rho) \left(1 - \tau \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \right)} \\
 &= \frac{\left(\tau \sum_{t=2}^T \frac{d_{t,T}}{(1+\rho)^{t-1}} \right) (1-\tau)}{(1+\rho) \left(1 - \tau \sum_{t=1}^T \frac{d_{t,T}}{(1+\rho)^t} \right)} \\
 &= \left(\tau \sum_{t=2}^T \frac{d_{t,T}}{(1+\rho)^t} \right) \theta_{0,T}
 \end{aligned}$$

Therefore we can finally write:

$$\begin{aligned}
 (9) \quad V_{1,i} &= (1+\rho - \tau d_{1,T})\theta_{0,T} \sum_{t=2}^T \frac{CF_t}{(1+\rho)^t} + \tau\theta_{0,T} CF_1 \sum_{t=2}^T \frac{d_{t,T}}{(1+\rho)^t} \\
 &= \left(1 - \frac{\tau d_{1,T}}{1+\rho} \right) \theta_{0,T} \sum_{t=2}^T \frac{CF_t}{(1+\rho)^{t-1}} + \tau\theta_{0,T} CF_1 \sum_{t=2}^T \frac{d_{t,T}}{(1+\rho)^t}
 \end{aligned}$$

Appendix to Chapter 4. Discount rate disclosures of British companies.

Y.1 Reported discount rates

This appendix contains an examination of discount rates disclosed in the financial statements of London Stock Exchange companies in 2002. IAS 36.134 requires that, for a significant cash-generating unit containing goodwill or intangible assets with indefinite useful lives, the discount rate applied in measuring value in use shall be disclosed. This requirement is somewhat more extensive than the disclosure requirement of the previous version of IAS 36, under which the discount rate should be disclosed in the case of material impairment losses only. FRS 11.69 requires that the discount rate should be disclosed, whenever the impairment loss is measured by reference to value in use. Disregarding the nuances in the wording, one would generally expect companies that recognise impairment losses to disclose the discount amounts. An optimistic reader of financial statements might also hope for discount rate disclosures from companies that carry out impairment reviews without recognising an impairment loss. Unfortunately, the information about the discount rates in the financial statements is not so abundant.

The examination is based on the 2002 group financial statements of listed companies contained in the FTSE 350 index as of 19 September 2003, which purported to comply with UK accounting regulation and standards. The sample excludes companies of the financial and petroleum sectors. The total number of reports examined is 238. In these reports, 31 companies quantified the discount rate used. Of these, 28 had (positive) impairment losses, while 3 companies disclosed the discount rate without having impairment losses on tangible or intangible fixed assets. However, 83 companies reported impairment losses on tangible or intangible assets, so only approximately one third of them (28 out of 83) made discount rate disclosures.

There is no reason to believe that British companies are less generous with discount rate information than companies of other countries under a similar accounting regime. A parallel examination of 167 IFRS reporters on the Deutsche Börse produced 7 cases of discount rate disclosure out of 80 companies with impairments of fixed assets. Table Y.1 shows what each of the 31 UK companies reported as their discount rate (column 9), together with information

useful for the related analysis. Two companies (GlaxoSmithKline and WPP) disregarded the pre-tax requirement of the accounting standards and disclosed the post-tax rate.

Y.2 Comparative discount rates

The reported discount rates compare with the rates in Table Y.1 columns 10 and 11. The first one of these (labelled “grossed”) is the weighted average cost of capital (WACC) grossed up with the tax rate, as suggested in the accounting standards. The other (labelled “computed”) is the computed pre-tax rate that takes into consideration the effect of tax depreciations of a hypothetical buyer of the assets. The rationale of the computation will be presented in the following. The computation is for illustrational purposes only; it does not purport to provide accurate estimates for the companies’ cost of capital.

Both the “grossed rate” and the “computed rate” require an estimate of the relevant WACC. The borrowing cost component of the WACC could have been based on actual borrowing rates. Column 2 shows the actual borrowing rates computed from the reports. The rates computed are interest payable as a percentage of long-term and short-term borrowings, where the latter is the average of opening and closing amounts. The rates found by this measure vary considerably, for reasons due to the company’s term structure of the debt, and, for instance, the existence of convertible debt that has not been adjusted for.

The variations in the actual observed borrowing rates would probably create noise in this analysis. Therefore, for the purpose of computing the WACC used in this analysis, the amounts in column 2 have been discarded, and an equal basic bank rate mortgage of 5.78 per cent has been used for all companies. This represents the average of the opening and closing amount of the 2002 AJVR statistical series from the Bank of England.

Table Y.1 Companies reporting impairment review discount rates in the annual report¹

Name	Borrowings		Market value 3	WACC ³ 4	Tangibles		Goodwill		Discount rates ⁵		
	1 Amount	2 Rate ²			5 BV	6 Life ⁴	7 BV	8 Life ⁴	9 Reported	10 Grossed	11 Computed
Rio Tinto	5789	2.5 %	13212	10.2 %	7600	13.2	633	10.6	7% - 10%	14.6 %	14.2 %
Ultraframe	40	5.5 %	227	10.4 %	26	6.3	65	28.0	14.0 %	14.8 %	15.4 %
Hanson	2553	4.5 %	2031	7.6 %	2615	12.1	940	15.3	10.0 %	10.9 %	11.5 %
Corus Group	1542	6.6 %	853	9.5 %	2871	8.5	103	10.3	9.5 %	13.6 %	13.3 %
Rolls-Royce	1313	7.0 %	1728	9.1 %	1876	9.9	786	15.1	10.0 %	13.0 %	13.7 %
Cookson Group	391	9.9 %	383	11.8 %	408	6.8	598	15.8	10% - 15%	16.8 %	18.2 %
GKN	937	6.4 %	1471	10.1 %	1374	7.8	470	15.2	11.0 %	14.4 %	15.0 %
Shire Pharmaceuticals	258	3.2 %	1924	12.2 %	84	9.3	1901	13.7	8% - 10%	17.5 %	20.1 %
GlaxoSmithKline (post-tax)	4643	4.6 %	72016	5.2 %	6649	8.7	171	14.3	8.0 %	7.4 %	7.3 %
Dixons	548	5.5 %	4511	10.0 %	607	5.8	484	691.7	10.8 %	14.3 %	14.3 %
Kingfisher	1606	6.9 %	5168	9.8 %	3504	16.5	295	15.8	9.2 %	14.0 %	13.5 %
Intercontinental Hotels	1479	12.1 %	0	4.0 %	7641	29.3	173	17.3	10% - 11.5%	5.8 %	5.6 %
Hilton	1566	6.1 %	2634	10.2 %	2515	18.2	1198	17.4	10.0 %	14.6 %	14.7 %
Taylor Nelson Sofres	243	4.7 %	595	11.4 %	56	2.9	175	13.2	9% - 12%	16.3 %	19.0 %
Granada	95	8.1 %	0	4.0 %	232	6.4	1305	35.3	11.4 %	5.8 %	6.9 %
WPP (post-tax)	1602	6.8 %	5685	15.3 %	377	3.2	4407	137.7	8.5 %	21.8 %	21.8 %
Trinity Mirror	706	6.0 %	1263	7.5 %	390	9.0	8	5.5	7.5 %	10.7 %	10.6 %
Stagecoach Group	925	7.8 %	1004	8.8 %	1109	9.8	665	16.0	11.4 %	12.6 %	13.6 %
TBI	209	6.5 %	342	9.3 %	215	17.5	142	18.3	11.0 %	13.3 %	13.7 %
National Express	428	6.5 %	546	7.4 %	421	5.9	468	10.3	9.0 %	10.5 %	13.7 %
Vodafone	13939	6.9 %	88373	7.5 %	18541	6.4	91695	8.4	8.8% - 11.5%	10.8 %	16.5 %
BT Group	18440	7.9 %	24283	10.3 %	16078	4.7	237	0.7	15.1 %	14.7 %	14.5 %
Colt Telecom Group	1194	7.7 %	686	9.1 %	1379	5.3	11	3.8	13.7 %	13.0 %	12.7 %
Kingston Comms	108	10.8 %	343	13.3 %	381	7.4	30	14.1	12.5 %	19.0 %	18.6 %
MMO2	1497	3.6 %	5921	7.5 %	4094	5.5	6361	17.2	9.0 %	10.7 %	12.6 %
AWG	2875	7.6 %	767	4.3 %	4071	20.6	257	15.6	9.0 %	6.2 %	6.1 %
Spirent	247	7.1 %	160	9.5 %	110	3.7	114	2.0	15 % - 20%	13.6 %	24.5 %
Psion	7	4.5 %	214	18.9 %	17	5.0	124	7.7	10.0 %	27.1 %	31.8 %
Logicacmg	231	3.1 %	1123	14.8 %	101	2.6	369	6.6	14.0 %	21.2 %	27.5 %
Xansa	39	7.9 %	540	17.6 %	25	3.1	261	6.1	14.0 %	25.1 %	32.4 %

Notes:

¹ London Stock Exchange FTSE 350 companies reporting under UK financial reporting requirements for the financial year 2002, excluding financial and oil and gas sectors. Information provided in the annual reports. All balance sheet items are end of year amounts.

² Interest payable as a proportion of average borrowings.

³ Weighted average cost of capital, computed with end-of-year borrowings and end-of-year market value of equity as weights. Borrowing rate has been set at 5.78 pct., which is an average of bank basic rate mortgages in 2002. Cost of equity is computed by company betas estimated by Datastream and an equity premium of 8 pct..

⁴ Remaining economic life, computed as book value of asset divided by ordinary depreciation charge.

⁵ Discount rate reported is according to annual report. Grossed discount rate is the WACC divided by $(1 - \text{tax rate of } 30\%)$. The computed discount rate is the internal rate of return of a pre-tax cash flow corresponding to a post-tax annuity that yields the WACC.

The cost of equity component of the WACC has been calculated by beta estimates from Datastream and an equity premium of 8 per cent, based on the recommendations from Ibbotson Associates for the UK market.⁶⁴ The weights of the WACC-calculation are the end-of-year amounts of borrowings and market value of equity as reported in the table. The WACC-calculation is not an exact measure of the relevant capital costs since it is not necessarily identical to the cost of capital for the projects that have been subject to an impairment review.

The “computed discount rate” is calculated on the assumption that the assets held by the companies give a return equal to the WACC over the remaining life. This is, of course, a post-tax return, consistent with the WACC being a post-tax measure. Further, the return is assumed to come in equal nominal cash flow instalments over the remaining economic life of the asset. The remaining economic life is estimated as the fraction of book value over the ordinary depreciation charge (implicitly assuming linear accounting depreciation). On this basis one can find an annuity that corresponds to the book value of the asset, where the WACC is the required rate and the remaining economic life of the asset is the length of the payment stream. This stream is then an estimate of the net-of-tax cash flows (*NCF*) required to give a post-tax return equal to the WACC.

Next we can calculate the before-tax cash flows (*CF*) that correspond to the net-of-tax cash flows described above. The before-tax cash flows add back the cash outflows due to tax on taxable profit. The taxable profit is the gross cash flows minus tax depreciation, which is assumed linear over the remaining economic life. The before-tax cash flows for depreciable assets can be written as,

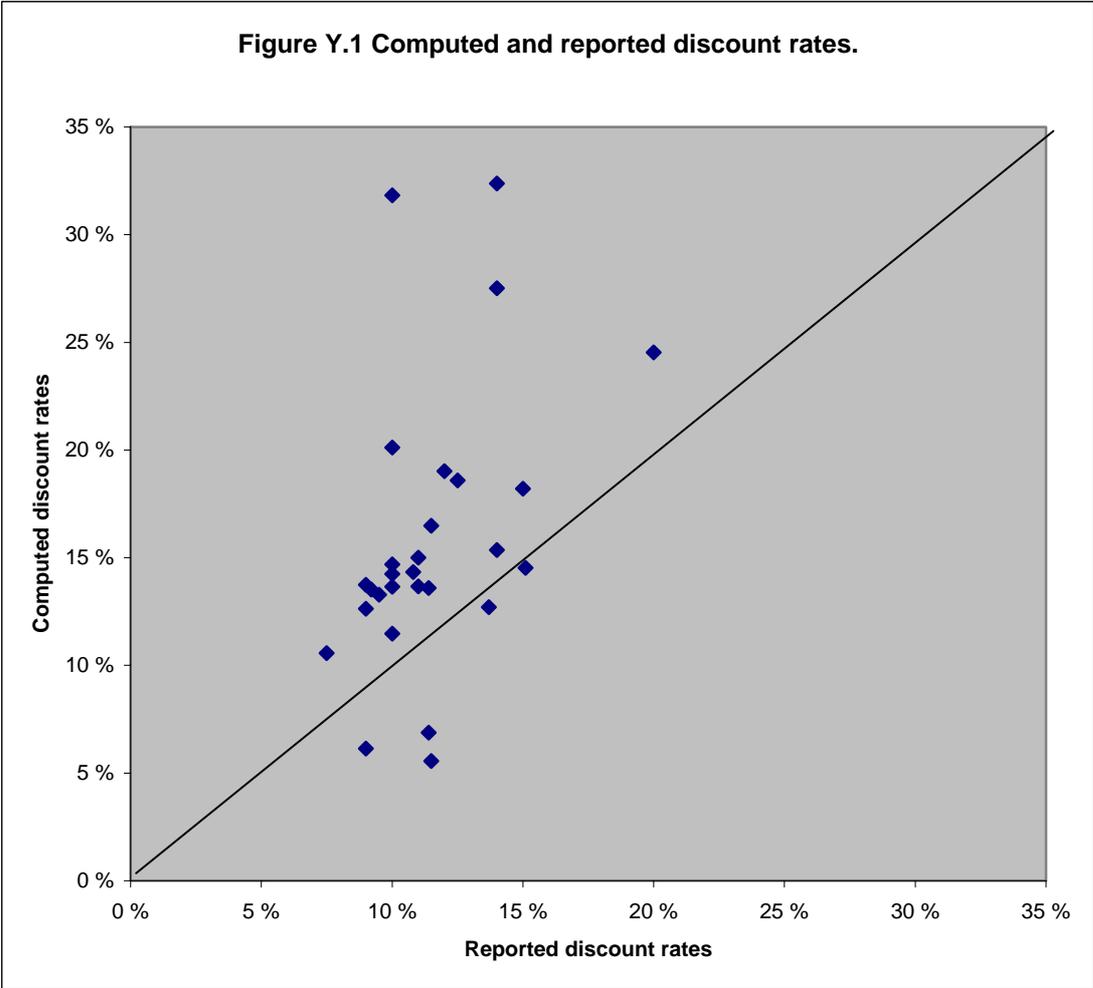
$$CF_t = \frac{1}{1-\tau} \left(NCF_t - \tau \frac{BV}{life} \right)$$

where τ is the tax rate, *BV* is the book value of the assets, and *life* is their economic life. It follows that the latter fraction (i.e. the tax depreciation) is equal to the ordinary annual accounting depreciation. For non-depreciable assets the before-tax cash flows are simply the *NCF* grossed up by the tax rate.

⁶⁴ Dimson and Marsh (2001) observe an equity premium between 6.3 and 9.6 per cent. in the UK market from 1955-2000.

This leaves us with a hypothetical pre-tax cash flow stream over the remaining life of the asset, which, after tax, will yield the WACC. It is now straightforward in an ordinary spreadsheet to calculate the internal rate of return of that pre-tax stream. That internal rate is called the computed pre-tax discount rate in Table Y.1.

The calculation has been done separately for tangible assets and goodwill, presupposing a different tax treatment for each of them. In fact, therefore, the internal rate is based on the sum of two cash flows streams, one for tangible assets and one for goodwill, each of them over the remaining life as shown in the table. Consistent with the findings in the analytical paper, we find that a short remaining life of goodwill and a high proportion of goodwill relative to tangible assets give high computed discount rates, as exemplified by Shire Pharmaceuticals, Granada, Spirent, Psion, Logicamecg and Xansa.



The motivation of these calculations is not to find accurate pre-tax rates for each specific company; it is rather to obtain an overall impression of what pre-tax rates we could reasonably expect, to compare them with the rates reported. Figure Y.1 is a scatter plot where

the reported discount rates are compared with the computed discount rates. The two companies that reported post-tax rates are not included in the plot. For companies that report an interval, the higher end of the interval is used. The 45 degree line in the diagram indicates equality between reported and computed rates. Figure Y.1 reveals that companies generally report lower discount rates than what follows from the computation of this appendix.

A few more reservations should be made. The calculation assumes that all business activities are measured in pounds; obviously this is misleading in many cases. Most companies do not mention which currency the reported discount rate is for, and in this paper this has been interpreted as a sterling rate. The capital cost calculated in dollar would by 2002 probably be lower than for the capital cost in pounds.

There may be a bias in the selection of companies that disclose the discount rate. The above calculation may have left an impression of discount rates being in the lower end of an acceptable interval for those that actually reports them, but one can only guess the kind of discount rates that are used by companies that do not disclose them. In the reports examined there are a number of examples of clearly inadequate information both about the discount rate and about other assumptions for the calculation of value in use.⁶⁵

There may be a number of reasons for a company not to disclose the discount rate applied. One reason may be that the reporting entities do not want to admit publicly a high-risk profile, associated with high discount rates. If that argument were true, the average observed rates (in Table Y.1) should be lower than the “true” average rate applied by the whole population. Another reason might be that many reporting entities try to avoid the recognition of impairment losses and therefore choose discount rates systematically lower than what would follow from a correct risk assessment. Those reporting entities that choose artificially low discount rates would not disclose them, while those that choose appropriate rates would. If that argument were true, the average observed rates would be higher than the “true” average.

References

Dimson, E. and P. Marsh: “U.K. Financial Market Returns, 1955-2000”, *Journal of Business*, Vol. 74, No. 1, 2001.

⁶⁵ See Section X.4 in Appendix to Chapter 2.

Chapter 5 The international background for the development of Norwegian accounting rules on the impairment of fixed assets

5.1 Introduction

In 2002 the Norwegian Accounting Standards Board approved a new standard on the accounting for an impairment of fixed assets. Although in content very similar to the international standard IAS 36, Impairment of Assets, issued in 1996, it is formally based on the 1998 Accounting Law paragraph 5-3, which mandates a write-down of the carrying amount of a fixed asset in the case that it is subject to an impairment that is expected not to be temporary. The 2002 impairment standard was not the first Norwegian accounting standard on the subject. The Norwegian Institute of State Authorised Public Accountants issued a standard on impairment accounting in 1980, based on a paragraph in the 1976 Company Law that had the same content as the write-down obligation of the 1998 accounting Law. In fact, impairment rules had been part of Norwegian company legislation since the 1916 Shipping Joint Stock Company Law.

The purpose of this chapter is to give an overview of the historical background for the development of the rules on impairment accounting.

5.2 Accounting measurement of fixed assets in old European sources

Before any regulation by law or standards was introduced, accounting by double-entry book-keeping came to be considered part of proper financial management. Double entry book-keeping was by nature driven by movements of the cash stock, so the initial measurement of any asset, current or non-current, was the acquisition cost. Early accounting writers (15th to 17th century) were not preoccupied with the asset measurement question; whenever they wrote about it, in particular for the determination of profit, they measured the cost of an asset sold by its purchase price (Schmalenbach, 1962; 17).

The need for a different accounting treatment of fixed assets arose with the industrial revolution (18th century), as a result of the growth of capital-intensive industries and their use of long-lived assets. According to Edwards (1989; 82) five methods were applied: 1) historical cost, by which the asset were held at acquisition cost until sale or disposal, 2) the net balance method, which was the cost plus related expenses, less related receipts, 3) revaluation, meaning periodic appraisals of current value, 4) current expense, meaning that

fixed assets were expensed rather than capitalised, and 5) cost less depreciation. There are early references to depreciation in 16th and 17th century accounting literature, but the “modern” depreciation concept as an allocation of the original cost is known from the 18th century only, and by then only through rare examples (Edwards, 1989; 82). Depreciation became more common in the 19th century, but it was far from a universal method of fixed asset accounting.

As long as its development was unregulated, there may have been more similarities in accounting practice between the countries in Western Europe and North America, than within the countries. Praised textbooks appeared in many countries and in different languages, but to a large extent they were translations from the same sources (Mattessich, 2003). The incorporation of accounting principles into law and statutes, however, took place in a very different manner in the Anglo-American countries and in Continental Europe. Government regulation of accounting practice began in France with the *Ordonnance de Commerce* of 1673, written by Jacques Savary, a deputy of Colbert. The *ordonnance* was primarily a requirement of proper bookkeeping, but it also required the aggregation of the accounts every two years. Some authors claim that an ambition of the *ordonnance* was to have a measure of wealth (Walton, 1993; Schmalenbach, 1962; 19). The *ordonnance* became a model for accounting requirements of commercial law in much of Continental Europe and Scandinavia. Its promulgation was strengthened by its incorporation into the Napoleonic Code in 1807.

The UK was the only major industrial country in Europe not to adopt the French regulation, and the differences in accounting traditions between the UK and the rest of Europe, which is identical with the cleavage between common law and Roman law legal systems, may have started with this fact (Walton 1993, Nobes and Parker, 2004; 20). Having been a forerunner with respect to industrial, commercial and financial innovations for two centuries, the UK was also one of the first nations to have company laws that codified the limited liability, with the Joint Stock Companies Act of 1844 and that of 1856 (Dübeck, 1991). The former included a requirement to keep “proper books of account” and to present a balance sheet to the meeting of shareholders. However, these accounting requirements were repealed in the 1856 law. The UK then entered into almost a century with very few general requirements for financial statements⁶⁶ that numerous writers have described by terms like *laissez-faire*, an unregulated

⁶⁶ As pointed out by Parker (1990) there were quite a few accounting rules in the specific legislation for regulated industries.

economy, and so on (Napier, 1993; Parker, 1990). Although some references to the content of the balance sheet and the profit and loss account were made in the 1900, 1908 and 1929 laws, it was only with the 1948 Companies Acts that substantial accounting requirements were introduced (Napier 1993).

The development in Germany followed a quite different path, and for the Scandinavian countries this was to become the strongest influence. The Prussian Joint Stock Company Law (*Aktiengesetz*) of 1843 was an important contribution to the development. It required the public disclosure of a balance sheet, it defined profit as the change in net assets and it introduced a system of compulsory reserves that were to be copied in Scandinavia and persist for more than 100 years.⁶⁷ However, it was the *Allgemeine Deutsche Handelsgesetzbuch* (HGB) of 1861 that signified the start of the development of a German accounting legislation (Schröder, 1993). It required the preparation of a balance sheet and the determination of accounting policies in the company statutes. It also had a measurement rule for the assets requiring them to be “recorded at the value at the date of making the inventory”.⁶⁸ This wording was, of course, subject to interpretations. The original proposal had employed the term “the true value” (*wahrer Wert*). Whether the law required – or should require – the “true value” (being an equivalent to current value) or another “common value” (*gemeiner Wert*), was to become the object of a severe fight between German scholars on company law and accounting for several decades (Schmalenbach, 1962; 36–39).

The 1884 Joint Stock Company Law was an even more influential document. It designated two purposes for the balance sheet: to give a general view of the net worth of the company, and to set a limit on the distribution of profits (Schröder, 1993). It introduced the definition of “fixed assets” (*Anlagen*) as being those “acquired not for resale, but rather for the continued use in the company”, and it set the production or acquisition cost as the upper limit of the carrying amount for such assets. It also required the use of the fixed assets to be accounted for, either by periodic charges (the word depreciation was not employed), or by appropriations to a renewal fund. For current assets (*Waren und Wertpapiere*) the law required the lower of cost and market.⁶⁹

⁶⁷ In Sweden the 1975 Company Law in force still has a requirement for compulsory reserves (§ 12-4).

⁶⁸ The wording of Article 31 is: “Bei der Aufnahme des Inventars und der Bilanz sind sämtliche Vermögensstücke und Forderungen nach dem Werte einzusetzen, welcher ihnen zur Zeit der Aufnahme beizulegen ist.”

⁶⁹ Article 185 a, reproduced in Barth (1955; 287).

By the early 20th century there were hardly any national legislation that included an obligation to write down the book value of impaired assets. Nevertheless, there was a universal understanding that a ship that sunk or factory burnt down would have to be written out of the books. To what extent did the non-regulated write-out for losses spill over on the accounting practice by other unfortunate circumstances? The “extraordinary depreciation”, a term still in use by many companies for describing a write-down, might be an appropriate action for contrary events. A discretionary tool for the management, it could well be used for different purposes, like accommodating profit to the desired dividend policy. Brink (1992) reports from the Philips’ 1912 annual accounts:

”In the profit and loss account the system was used that, by using extra depreciation, the net profit was made equal to the amount of a ”normal dividend”. This system was widely used at that time. The policy of extra depreciation led to extreme prudence in the valuation of assets, and therefore to the growth of silent reserves.”

The measurement rules for fixed assets were kept unchanged in Germany until the company law revision of 1931. By then depreciation was the only method permitted for the periodic accounting of fixed assets. Depreciation could either be deducted from the carrying amount, or otherwise be recorded in an account for value adjustments. The German 1931 Company Law (*Aktienrechtsverordnung*) introduced single formats for the income statement and the balance sheet, and it was the first law to require the disclosure of the gross movements of each item of fixed assets.

Its successor, the 1937 *Aktiengesetz*, mostly continued these accounting rules. There was no explicit write-down obligation, but § 133 required the loss of value (*Wertverlust*) to be allocated over the useful life. The wording was understood to mandate depreciation of tangible assets (Teichmann and Koehler, 1937; 237 – 251); some authors interpreted the reference to the loss of value to include impairment write-downs. Grossmann (1938; 46-47), for instance, names several reasons for the “value-adjusting depreciations” (*wertberichtigende Abschreibung*). Schmalenbach (1962) distinguishes between value measurements under the assumption of constant prices, and those under the assumption of varying prices. Under the constant price assumption, Schmalenbach sees little reason for extraordinary depreciation charges, except in the case of physical damage. In the case of price reductions of fixed assets

Schmalenbach argues for the different treatment of permanent and temporary price variation, acknowledging that the distinction is difficult.⁷⁰

Properly speaking, the impairment write-down obligation was explicitly stated in German legislation for the first time in the 1965 *Aktiengesetz*, with the introduction in the law of the term *ausserplanmässige Abschreibungen* (§ 154), which separates the impairment write-downs from ordinary depreciation. However, the write-down obligation, although new in wording, was not considered a new invention. Rather, the genuine step forward by 1965 law compared with the predecessors was the limits on the creation of hidden reserves, for instance through write-downs. The law introduced lower limits on the measurement of fixed assets with the clear intention to curb excessive prudence (Gessler et al., 1973; 222 – 226; Niederhoff, 1966; 43).

5.3 The write-down obligation of the Fourth Directive

The Fourth Directive on company accounts was adopted by the European Union (or rather European Community) in 1978. The Directive bears a resemblance to the accounting rules of the prevailing German company legislation, and the German influence on the development of the Directive has been widely commented upon in accounting literature (Evans and Nobes, 1996). The Directive was prepared by the issuance of two drafts in 1971 and 1974, the latter being prepared after the UK, Ireland and Denmark had joined EU in 1973. Before the drafts there was a proposal prepared by an accounting expert, the Elmendorff Report of 1967 (Nobes 1992; 87-95).

Article 35 no. 1 of the Directive contains the measurement rules for fixed assets:

“(a) Fixed assets must be valued at purchase price or production cost, without prejudice to (b) and (c) below.

(b) The purchase price or production cost of fixed assets with limited useful economic lives must be reduced by value adjustments calculated to write off the value of such assets systematically over their useful economic lives.

(...)

(c bb) Value adjustments must be made in respect of fixed assets, whether their useful economic lives are limited or not, so that they are valued at the lower figure to be attributed to them at the balance sheet date if it is expected that the reduction in their value will be permanent.”

⁷⁰ Schmalenbach (1962), chapter F.II and chapter G.I.

Letter a is the measurement rule for the initial recognition, letter b for ordinary depreciation, and letter c bb is the impairment write-down obligation. Moreover, according to letter c dd the write-down should be reversed if the reasons for the write-down have ceased to apply.

The original proposal for the write-down rule in the Elmendorff report had the following wording:

“Ohne Rücksicht darauf, ob ihre Nutzung zeitlich begrenzt ist, können bei Gegenständen des Anlagevermögens ausserplanmässige Abschreibungen vorgenommen werden, um die Gegenstände mit dem niedrigen Wert, der ihnen am Bilanzstichtag beizulegen ist, anzusetzen; sie sind vorzunehmen bei einer voraussichtlich dauernden Wertverminderung.”⁷¹

The Elmendorf proposal was almost identical with the 1965 Company Law § 154. However, the wording of what should become Article 35 c bb of the Directive was changed at each draft, ending up, as quoted above, rather far from the starting point. The outcome was a certain difference in substance: Whereas the German law (and the Elmendorf proposal) permitted write-downs for temporary value reductions and mandated them for permanent ones,⁷² the Directive in the final version contained only the mandatory write-downs. Also, the reversal obligation was not part of the original proposal, and explicitly contrary to the 1965 Company Law.⁷³ It was introduced in the 1971 draft, with the justification to limit the creation of hidden reserves (Schruff 1986; 166).

5.4 The beginning of American standard setting

Until the 1930's American accounting practice was mostly unregulated.

One of the responses of the US Government in the wake of the Wall Street Crash was the creation of the Securities and Exchange Commission (SEC) in 1934 and with it the obligation of listed companies to disclose financial information. The SEC was given broad powers to prescribe accounting procedures, and an early discussion was whether SEC itself should formulate the rules and principles, or whether bodies of the accounting profession should do it. In 1938 the SEC decided to permit the profession formulate the accounting principles, and

⁷¹ Reproduced from Schruff (1986)

⁷² These were called *facultative* and *obligatorische Abschreibung* respectively (Gessler et al., 1973; 224 – 225).

⁷³ Paragraph 154, last sentence, says: “Der niedrige Wertansatz darf beibehalten werden, auch wenn die Gründe der Ausserplanmässigen Abschreibungen oder Wertberichtigung nicht mehr bestehen.”

this was the start of American standard setting, eventually leading the way for global standard setting (Sprouse, 1987).

Initially both the SEC and leading scholars were hostile to fixed asset write-downs. The first chief accountant of the SEC, Carman Blough, warned against excessive prudence in asset measurements,

”For example, it has not been long since it was considered sound and conservative accounting practice for a company to write down its physical properties very materially, the lower the better, in order that the balance sheet might be conservative. Today that practice is frowned upon because it results in an unconservative profit-and-loss statement owing to the fact that by the writedown of depreciable assets annual charges for depreciation are reduced and the income is overstated.”⁷⁴

Nevertheless write-down remained in American practice in the 1930s and the following decades.⁷⁵ According to Paton and Littleton (1940; 129),

”(...) There is nothing in the adoption of the cost basis of plant accounting which precludes a major write-off if the conditions convincingly justify the process. If, for example, it has become apparent that the effective service life of a section of plant has been seriously curtailed by unexpected obsolescence or other special factor, and the accrual of depreciation to date is inadequate, the recognition of the additional cost expiration need not and should not await actual retirement. To postpone a special write-down in this situation would mean the avoiding of the recognition of a loss already suffered (...). The special write-off, in this type of case, should take the form of a lump-sum accrual of depreciation with a corresponding charge to an appropriate loss account (...). The amount of the loss, it should be added, should be clearly reported as such in the income statement.”

Paton and Littleton also advocate write-down in the case of termination of activities. However, neither a temporary low capacity use nor the need for smoothing net income would justify a write-down, in the view of these authors. Apart from these statements, the question of impairment (except what is contained in the argument of obsolescence) is not discussed in their influential document.

In the following decades impairment write-down was only sporadically treated in authoritative American accounting literature. In the document that contains the fundamental

⁷⁴ Blough (1939).

⁷⁵ See for example Daniels (1933). The terms write off and write down (with or without a -) are employed differently by different writers. Daniels uses *write-down* as the opposite of *write-up*, i.e. a revaluation to current cost in order to adjust for inflation. What is here called write-down is called *write-off* by Daniels.

principles of the Accounting Principles Board, the US standard setter from 1959 to 1973, one can find the following cautious comment:

”In unusual circumstances persuasive evidence may exist of impairment of the utility of productive facilities indicative of an inability to recover cost although the facilities have not become worthless. The amount at which those facilities are carried is sometimes reduced to recoverable cost and a loss recorded prior to disposition or expiration of the useful life of the facilities.”⁷⁶

Accounting standards from about 1970 incidentally mention impairment write-down without further explanation.⁷⁷ Only for the impairment of intangible assets and goodwill, initially regulated by ARB 24 from 1944, write-down was presented as part of GAAP.⁷⁸ For intangibles and goodwill, like tangibles, depreciation (or amortisation) was the principal accounting treatment. But for intangibles without “limited life” – this included trade names and goodwill – impairment write-down might be appropriate. Such assets ”should be written off when it becomes reasonably evident that they have become worthless”.

This rule applied until 1970 when APB 17 *Intangible Assets* was approved. It follows from APB 17.14 that current practice under the rules in operation was not uniform; some companies “amortize the cost of acquired intangible assets over a short arbitrary period (...), while others retain the cost as an asset until evidence shows a loss of value and then record a material reduction in one single period”. At this time American standard setting was characterised by a close adherence to the historical cost model. The discussion in APB 17.21 is a showpiece:

”All assets which are represented by deferred costs are essentially alike in historical-cost based accounting. They result from expenditures or owners’ contributions and are expected to increase revenue or reduce costs to be incurred in future periods. If future benefit or the period to be benefited is questionable, the expenditure is usually treated as a current expense and not as a deferred cost. Associating deferred costs with the revenue or period to which they are expected to relate is a basic problem in historical based accounting (...) The basic accounting treatment does not depend on whether the asset is a building, a piece of equipment, an element of inventory, a prepaid insurance premium, or whether it is tangible or intangible.”

⁷⁶ APB Statement no. 4, 1970.

⁷⁷ Impairment of assets is mentioned in APB 30.16 from 1973, in the discussion of accounting for discontinuing operations. It follows implicitly from APB 18 on the equity method from 1971 that there was a certain practice of write-down of fixed assets by permanent impairment. The original text in paragraph 19 h stated: ”A loss in value of an investment which is other than a temporary decline should be recognized the same as a loss in value of other long-term assets.” Write-down is also mentioned in SFAS 5 from 1975 (paragraph 31) without any further guidance.

⁷⁸ ”Restated” as chapter 5 in ARB 43 from 1953.

With APB 17 the special rule on impairment write-down for intangibles almost disappeared. Intangible assets should be subject to depreciation by the same governing principles as other fixed assets. Because economic life of intangibles is difficult to assess, a maximum limit of 40 years for the economic life was introduced. A change of judgment during the economic life would have to be considered a change in depreciation plan, the effects of which should be allocated over the remaining economic life. Within this regime, it was still permitted to make a particular charge in the income statement, which de facto would constitute an impairment write-down (APB 17.31): "Estimation of value and future benefits of an intangible asset may indicate that the unamortized cost should be reduced significantly by a deduction in determining net income."

5.5 Recent American developments

The debate on impairment write-down took off at the beginning of the 1980s, at the same time as the conceptual framework project was finished. To a certain extent the increased importance attributed to the balance sheet by this project, may have played a role for the attention given to question of impairment accounting. However, the fear of overvaluing an asset was not the most striking argument of this debate. The starting point was rather a recognition of a strong increase in size and frequency of impairment write-downs, and varying practices. The most important challenge for the American standard setter FASB was therefore to define limits for impairment write-downs in order to stop abusive practices.

SFAS 121, *Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of*, was issued in 1995. The standard was preceded by a discussion paper (in 1990) and an exposure draft (in 1993). SFAS 121 designed a system for detecting impairment in several steps, which became a model for impairment standard within other accounting regimes. The first step was to observe events in the surroundings that might indicate an impairment. If there were any such indications, an impairment test should be carried out, implying the calculation of the sum of the undiscounted future cash flows originating from the asset. If this sum was lower than carrying amount, the asset should be written down to fair value, otherwise it should not be written down.

An important invention of SFAS 121 was the idea of a cash flow generating unit on a higher level than the single asset. Such an aggregated measurement unit should also, if composed of assets purchased in a business combination, include the corresponding goodwill. In the event

of a write-down, such goodwill should be written down first. Contrary to the EU Directive and IAS 36 SFAS 121 did not allow any reversal of the amount written down.

SFAS 121 was substituted by SFAS 144, *Accounting for the Impairment or Disposal of Long-Lived Assets*, in 2001. In its main features SFAS 144 represents a continuation of SFAS 121. The regulatory amendments in SFAS 144 are a consequence of the large accounting reform for business combinations which was approved 2001.⁷⁹ One part of this reform was to introduce new principles for goodwill accounting, by which goodwill is subject to an impairment test, at least annually, instead of amortisation.

5.6 The development of the International Accounting Standards (IAS)

Rules on impairment write-down within the International Accounting Standards (presently the International Financial Reporting Standards) have a short history. The International Accounting Standards Committee was founded 1973, with the objective to create harmonised accounting principles internationally. In the first decades of this organisation the chosen mechanism was to give guidance for national standard setters.⁸⁰ One consequence of this choice was that the IAS's evolved as the "lowest common denominator" between existing accounting regimes. The existence of a write-down obligation in the EU Directive and in the German accounting tradition, whereas there were very little of it in the US GAAP and UK accounting tradition (although incorporated in UK Company Law by 1980), may have required some tightrope walking by the IASC.

The first standard on fixed assets, IAS 16 *Accounting for Property, Plant and Equipment*, effective from 1983⁸¹, reflects a certain ambivalence towards impairment write-downs. According to the standard (paragraph 41), "if a permanent impairment (...) causes the recoverable amount to fall below the net carrying amount, the net carrying amount should be reduced to the recoverable amount and the difference charged to income immediately". In the explanatory part of the standard (paragraph 20) such impairment was related to the physical condition of the asset: "If the usefulness of an item or a group of items is permanently impaired, for example by damage or technological obsolescence, (...)". Based on this text it

⁷⁹ Cf. SFAS 141 *Business Combinations* and SFAS 142 *Goodwill and Other Intangible Assets*, both issued in June 2001.

⁸⁰ Cf. preface to IAS from 1982, effective until 2002.

⁸¹ IAS 16 came in addition to a separate standard (IAS 4) on depreciation (effective from 1977).

would not be clear whether an observed price reduction would be a sufficient reason for a write-down.

IAS 16 was profoundly modified in 1993. The most significant amendment with respect to write-down in the new version was that permanence of the impairment was no longer mentioned as a criterion. The revised standard required a write-down if the recoverable amount “has declined below the carrying amount” (paragraph 56). The explanations were in most respects identical with the explanations of the predecessor, but in all previous references to “permanent impairment” the word “permanent” was deleted. “Other economic factors” were included in the enumeration of the possible causes of impairment, so supposedly a physical degradation of the asset was no longer a condition for a write-down.

Compared with its predecessor, the 1993 version of IAS 16 represented a very distinct clarification of the impairment write-down system. There was an explicit reversal obligation (paragraph 59) “when the circumstances and events that led to the write-down or write-off cease to exist and there is persuasive evidence that the new circumstances and events will persist for the foreseeable future.” It permitted aggregated measurement units and measurement of the recoverable amount by discounted cash flows.

IAS 36 *Impairment of Assets* was issued in 1998, i.e. five years after the issuance of SFAS 121. The two main differences between the US standard and IAS 16, the nominal value test and the reversal obligation, was not closed with the new standard. The *Basis for Conclusions* of IAS 36 explains that undiscounted cash flows had been considered a possible alternative for determining recoverable amount, but that it was rejected. Also the reversal requirement had been the object of deliberations, which did not lead the IASC Board to a policy change.⁸²

IAS 36 was revised in 2004, together with the standards on business combinations and intangible assets. The most important consequence for impairment accounting was the introduction of non-amortisation and annual impairment tests for goodwill.

The first version of IAS 36 was developed in a joint project with the UK standard setter ASB. The UK standard FRS 11 is very similar in content with the original IAS 36.

⁸² IAS 36, appendix B, B.23-24 and B.109-113.

5.7 Development of the write-down rules in Norway⁸³

The development of accounting practices in Norway has generally been influenced by traditions and trends in economically more advanced nations. For the more limited domain of impairment accounting, however, the development in Norway have at several stages anticipated the development abroad.

The 1910 Company Law, which was strongly influenced by German company law⁸⁴, required that the board prepare "annual accounts and balance sheet (...) in accordance with the principles of proper and prudent business conduct".⁸⁵ The measurement rule for fixed assets – the concept of fixed assets was not yet introduced in the legislation – stated: "Plant, machines, ships and objects, which are permanently designated to business operations, may, notwithstanding a lower current value, be carried at their cost of acquisition, provided a deduction of an amount corresponding to the annual reduction in value caused by age and consumption is set aside to a special replacement fund."⁸⁶

Apparently, then, the 1910 law required depreciation and not write-downs. Augdahl (1926; 205-206) argues for this interpretation:

"The importance of this prescription is that (...) any difference between the cost of acquisition and the current value, caused by other factors than "age and consumption", does not require any depreciation charge. As a consequence of this rule the situation may arise, that the company in compliance with the law prepares a balance sheet that shows a net profit, despite it having lost a major or minor part of its share capital; indeed – pushed to extremes – even if the company is insolvent."

All legal experts were not of the same opinion. Platou (1933; 171) held the view that the reference to "proper and prudent business conduct" would signify that,

"assets should never be recorded at a higher amount in the accounts than the current value. If, subsequent to the acquisition, the price of the assets have declined because of consumption or age, or because of a [general] price decrease, it would be incorrect to continue to carry them at the acquisition price."

⁸³ The texts from Norwegian sources in this section are translated by the author.

⁸⁴ The influence of Germany in the accounting development of the Nordic countries is described by Flower (1994; 233).

⁸⁵ 1910 Company Law, § 47 2nd section

⁸⁶ § 47 3rd section

An interesting feature of early Norwegian company legislation is that shipping companies were not subject to the general company law, but to a special law. The 1916 Shipping Joint Stock Company Law of 1916 was largely in accordance with the general company law, but contained some important special rules (Platou, 1933; 21). One departure from the general law was special measurement rule for fixed assets: "Ships and other items of property shall not be carried at higher values than what is justified by their present state and relevant conditions." This was understood as a write-down obligation. Platou (1933; 175) indicates that shipping companies, contrary to other companies, would have to consider the effects of an adverse business cycle on the measurement of assets.

A general impairment write-down obligation for Norwegian companies was introduced with the 1957 Company Law. The law had a separate measurement rule for "assets designated to permanent ownership or use for the company". The impairment write-down rule had the following wording: "Assets designated to permanent ownership or use shall under no circumstance be recorded at an amount which obviously exceeds their permanent value for the company."⁸⁷ The wording of the law was identical to the proposal from the Joint Stock Company Law Committee of 1947. The committee found it unfortunate that the legislation for some industries only (commerce, shipping) had a prohibition against carrying at higher than current value:

"[In this respect] the order has been that joint stock companies have been permitted what has been prohibited for others, which is quite awkward, since strict rules for the balance sheet of joint stock companies are especially justified. (...) It is evident that ordinary joint stock companies should not be permitted to carry assets at a higher amount than current value. One should be aware however, that the object's current value in this respect means the value for the company. And since the objects here discussed are dedicated to permanent ownership or use for the company, and are not meant for resale, the value for the company will largely be determined by the object's direct or indirect productive importance to the company – its value in use, inner value, and, conversely, not its realisable value. Consequently, fluctuations in the market price for such objects or the reduction of their selling price due an insufficient number of buyers should not have any impact on the measurement. The same is true for the decline in selling price that frequently take place at the moment an object is being employed – and therefore belongs to the category of "used objects" (second hand)."⁸⁸

The committee disagreed with an observed practice to classify the write-down under "appropriation of profits", and affirmed that the write-down should be recognised in the

⁸⁷ 1957 Company Law, § 78 5th section.

⁸⁸ Proposal from the 1947 Company Law Committee, Oslo 1952, p.71.

income statement. To a quoted address from the Norwegian Shipowner's Association that "the enterprises should have the liberty to carry out write-downs whenever it suits them", the committee confirmed that:

"(...) the "enterprises" of course should have full liberty, "whenever it suits them", to carry out larger write-downs than necessary."⁸⁹

In the following decades Norwegian accounting legislation was subject to several important revisions, without altering the main features of the impairment write-down system. The Accounting Law Committee of 1959 issued its report in 1962. The report was the basis for the first general Accounting Law of 1977.⁹⁰ The approval of the Accounting Law was coordinated with approval of the Company Law of 1976, which, in turn, was based on a proposal emanating from a Nordic cooperation on Company Law development.⁹¹ Impairment write-down was not an important topic in any of these documents, and the material content of the 1957 Company Law was therefore continued without further discussion. It therefore appears that the legal basis for impairment write-downs in Norway was largely as formulated by the Company Law Committee of 1947 until the approval of the most recent Accounting Law of 1998.

The impairment write-down rule of the 1976 Company Law had, however, an important supplementary requirement of concordance with "good accounting practice". The wording of the section was: "If the current value of a fixed asset is lower than [acquisition cost net of accumulated depreciation], and this is due to reasons which cannot be assumed to be temporary, the asset shall be written down to the extent that it must be considered necessary according to good accounting practice."⁹²

In the wake of new accounting rules in the 1976 Company Law and the 1977 Accounting Law, the Norwegian Institute of State Authorised Public Accountants started up an important work to clarify the concept "good accounting practice", which appeared in a number of rules.⁹³ One of the first recommendations to be issued was "Recommendation on good

⁸⁹ Ibid. p. 73.

⁹⁰ Cf. Ot.prp. nr. 46 (1975-76)

⁹¹ Cf. Ot.prp. nr. 19 (1974-75) and Company Law Proposal, rendered in March 1970 by Judge Hans Fredrik Mathinussen.

⁹² 1976 Company Law, § 11-10 3rd section.

⁹³ The background for this work is explained in Recommendations on good accounting practice (no. 0) – assumptions and background for the Institute's recommendations on good accounting practice, approved in 1980.

accounting practice (no. 6) concerning write-down of fixed assets”, commonly labelled GRS 6, approved 15 January 1980. Compared with earlier Norwegian accounting literature, the discussion of impairment write-down problems in GRS 6 has a very “modern” structure. According to the recommendation the need for impairment write-downs should always be assessed when financial statements are prepared, but the assessment should be more thorough whenever ”operations are going badly, market conditions are uncertain, product developments are rapid, structural changes are planned or expected, liquidity is strained, and so forth.” (Section 2.1). In many respects, the argument resembles the discussion of indicators in SFAS 121 and IAS 36.

GRS 6 required each single asset to be “measured separately”. However, it also permitted the formation of larger measurement units for assets being part of a common production process or for portfolio considerations (Section 2.1):

”In a number of cases it is impossible or unnatural to undertake a measurement on an individual basis. A single tangible asset may be, for instance, part of a larger plant or a production process in such a way that it cannot be separated from these. The same point of view may be valid in the event that dissimilar assets are grouped in order to pool risk. In such cases it must be justified to undertake a measurement of current value that is consistent with the overall view. (...) Fixed assets which do not belong closely to each other, cannot be measured as a single unit with the consequence of avoiding an impairment write-down.”

According to GRS 6 “value based on the going concern assumption should ideally be based on the discounted future return (cash flow) that the asset is expected to generate.” However, according to the standard-setter this value may be difficult to calculate, and therefore ”a measurement based on current replacement cost (...) may be an expression of value consistent with the going concern assumption” (Section 2.2).

GRS 6 consistently presents the impairment write-down rule as a requirement. Based on the preparatory documents for the 1957 Company Law and the continuity of the requirements of the 1976 Company Law, one could argue that there was a write-down *option* as well as a write-down *obligation*, cf. the content of the German 1965 Company Law described in Section 5.3. Vårdal and Johnsen (1989; 195) argue that the supplementary requirement of concordance with good accounting practice precluded a discretionary use of the impairment write-down system.

This document evidences that the preparations for issuance of accounting recommendations started up as early as

The next step in the Norwegian development came with the 1998 Accounting Law. When it comes to the impairment write-down rule, the 1998 law again represents continuity of the main features of earlier legislation. The wording of the write-down criterion is "impairment expected not to be temporary", a wording which is meant to reflect the Fourth Directive article 35 no. 1 c bb. By this revision, however, the question of how the impairment write-down system was supposed to work became a major subject for discussion in the preparatory documents for the law proposal. The committee that prepared the 1998 Accounting Law, expressed some scepticism about the logic and practicality of a write-down criteria that distinguishes between temporary and permanent impairments. The committee ended up by suggesting continuity in the legal requirements and sketched a write-down system based on nominal value, inspired by an American exposure draft (see Section 5.4 above). By the time that the Norwegian Accounting Standards Board was ready to issue a Norwegian accounting standard on impairments (in 2002), the European Union had adopted the International Accounting Standards for group accounts of listed companies within the European Economic Area, and the standard was given a content that was very close to IAS 36.

Summing up, an explicit impairment write-down obligation was included in the Norwegian shipping legislation from 1916 and in the general company legislation from 1957. An accounting standard with elements resembling the new generation of impairment standards of the 1990's, was adopted in 1980. One can guess that this attentiveness to the proper accounting treatment of adverse conditions is not quite incidental. Compared with other Western nations Norway has an industry structure with a relatively large production of raw materials, vulnerable to the volatility of world prices. Experience may have proven that early reporting of adverse conditions was suitable for this economy.

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Chapter 6 Fixed asset measurements in a Norwegian shipping company 1935-1985^{94 95}

6.1 Introduction

The hundred years covering the second half of the 19th century and the first half of the 20th century saw the evolution of financial reporting as part of proper business conduct of listed companies throughout Europe and North America. How to account for fixed assets was probably the most controversial accounting question during this first evolutionary period, and the one that most extensively has occupied scholars of accounting history.

Edwards (1989; 114) names three fixed asset accounting methods in use in the second half of the 19th century. “Repair and maintenance accounting” means that the assets are capitalised at cost, whereas maintenance and replacement expenses are charged against income. The approach was clearly deficient in that it did not, for instance, reflect the reduction in usefulness due to obsolescence. A second method was “replacement accounting”, by which the company capitalises the initial investments, but charges the expenditure for subsequent replacements against income (Brief, 1965). An essential drawback of this method was the disproportionate effect on net profit at the time of the replacements. The replacement method also had several unsolved conceptual issues, for instance how to account for an asset that was not to be replaced. Finally, “depreciation accounting” constituted an allocation of cost over the productive life of the asset, a concept which has been related to the acceptance of historical cost accounting rather than current value accounting (Littleton, 1933). The more precise content of depreciation accounting remained rather obscure long into the 20th century, however. Was it an expense in the income statement, or was it an appropriation of profit so that there were funds available for reinvestments? And how should the depreciation pattern be determined? Edwards (1989; 132) claims that depreciation was not a universal approach to fixed asset accounting in the early 20th century:

”The examination of published accounts suggests that the systematic depreciation of

⁹⁴ Acknowledgements: I am indebted to Bergesen d.y. ASA by Eva Senstad who generously let me have access to the historical archives of the company. I have also received valuable assistance from Håkon Bjerkan at the library of the Norwegian Maritime Museum in Oslo.

⁹⁵ This paper contains numerous quotations from Norwegian sources that are translated into English by the author.

fixed assets did not become widespread practice until after 1940. The total omission of a depreciation charge was not uncommon and, when a deduction was made, it was often a lump sum, related to the level of profit, and accounted for as an appropriation of profits. (...) The failure to charge adequate depreciation, reduce reported profit and restrict dividends accordingly, may have been one of the reasons why a number of iron and steel companies were forced to make substantial capital reorganisations during the inter-war period.”

Brief (1976) emphasises that the question of determining the amount of profit eligible for dividends was inextricably connected with depreciation. Carlton and Morris (2003), studying the disclosure of depreciation of British companies in the late 19th century, found that companies disclosed depreciation when they had sufficient profits, and that the depreciation amount was related to the size of the profits, rather than the size of the depreciable assets. Hence, they conclude that depreciation appeared opportunistic.

This paper is a historical case study that may throw light on the accounting practice in Norway in the first half of the 20th century, with a focus on fixed asset accounting. The object of analysis is the Norwegian shipping joint stock company Snefonn, incorporated in 1934 and listed on the Oslo Stock Exchange. Snefonn pursued shipping business until 1986 when it was merged into a larger entity. For a study of fixed asset measurements a shipping company is a suitable object, because shipping companies are by nature “heavily loaded” with fixed assets, so the choice of accounting method for these will be particularly important for the determination of net profit. The fact that Snefonn was a listed company from the first day and hence was committed to provide shareholders with relevant financial information, is also an advantage for reviewing its financial reporting retrospectively.

Snefonn was throughout its life subject to accounting regulation by law; at the outset the 1916 Shipping Joint Stock Company Law, thereafter the 1957 Company Law, and finally the 1976 Company Law. An obligation to depreciate fixed assets was included in each of these laws, but the purpose of depreciation accounting was certainly clearer in Snefonn’s terminal years than in the beginning. The same might be said about other elements of fixed asset accounting; the obligation to write down for impairments, the provisions related to maintenance and the gain or loss on disposal. Although the paper follows Snefonn from the start in 1934 till the end in 1986, the main interest of the analysis lies in the early years rather than the later years.

The aim of the paper is to describe how Snefonn measured and reported its ships at different stages, and to discuss the possible objectives for the chosen accounting. Based on the findings of existing accounting history literature, various objectives may explain the accounting policy

choice. One possible objective might be to measure the fixed assets with the aim of matching the current value. A second objective might be to match wear and tear. A third objective, related to the second, might be to ensure the accumulation of funds for future replacement of the assets. A fourth objective could be to minimise tax (to the extent that accounting choice had an impact on taxation). A fifth objective might be to support a specific dividend policy.

The five objectives listed here are not mutually exclusive; Snefonn may well have pursued various objectives at the same time.

The paper is organised as follows. Section 6.2 provides general information about the development of Snefonn over the entire company life. Section 6.3 describes the Snefonn's financial reporting at various instances, with reference to the accounting regulation in force. Three reporting phases are identified, largely corresponding to the succession of laws that regulated its financial reporting. Section 6.4 discusses the tax implications of accounting choices relating to fixed assets. Section 6.5 discusses three aspects of the fixed asset reporting of Snefonn: the depreciation accounting, the reporting of sales gains and the accounting of classification costs. The paper concludes in section 6.6.

6.2 The history of Snefonn⁹⁶

Snefonn (literally “snowpile” in Norwegian) was incorporated 20 March and registered 17 April 1934 as a shipping joint stock company with a paid-in share capital of 1 million kroner. Its shares were from the start listed on the Oslo Stock Exchange. It conducted shipping activities during 52 financial years until 1986 when it was merged with other companies within the Bergesen d.y. Group.

The founder of the company was Sigval Bergesen d.y.⁹⁷ Snefonn was during its whole company lifetime controlled by the Bergesen family and companies within its sphere. Not only did the family hold, directly and indirectly, a majority of the shares. Snefonn was properly speaking a ship-owning company, managed by Sigval Bergesen d.y. AS, which also constituted its board of directors. Snefonn was the pioneer of such ship-owning companies within the Bergesen d.y. Group. A sister company, Bergehus, was founded in 1951, and by

⁹⁶ For a large part this historical resume is based on *The Bergesen Fleet 1935–2003* (2003).

⁹⁷ Sigval Bergesen d.y. (junior) was son of a shipowner, Sigval Bergesen d.e. (senior), who was managing director of a shipping company that carried his name. Father and son disagreed on the terms of the succession of the family firm, and for this reason the latter left the family company and started a shipping company that carried his own name. See Hanisch and Ramskjær (1987), Bergesen (2003).

the time of the 1986 reorganisation there were 8 ship-owning or ship-operating companies that were merging partners within the sphere.

Snefonn had a remarkably stable business strategy during its lifetime. Its first investment in 1934 was a new-built motor tanker, M/T “Président de Vogüé” of 14,920 dwt., which was a large ship for the period. Subsequent investment followed the same line. Snefonn’s fleet was throughout its entire company life characterised by very large and modern tankers, for which the management contracted long-term charters with well-established oil producing companies. True, as the company grew, it also entered into non-tanker business, such as an equity portfolio and some real estate, as well as some dry bulk ships. Nonetheless, relative to the tanker business these other investments were small.⁹⁸

At the outburst of the Second World War Snefonn had three modern tankers in operation. On 20 April 1940 the ships were requisitioned by the Norwegian Government, and set under the command of Nortraship, which operated the Norwegian merchant fleet during the War. One of its ships, “Charles Racine”, was torpedoed in the Caribbean in 1942, the others remained intact. Snefonn continued to be managed from its Oslo offices during the War, but without control of its ships the activity was low. The annual financial statements were prepared each year, but they were entirely redone in 1947 when the indemnities from Nortraship had been decided.⁹⁹

In the 1950’s the Bergesen d.y. fleet had a rapid expansion. From 1951 onwards a jointly managed fleet was co-owned by two other companies within the Bergesen d.y. sphere¹⁰⁰, of which Snefonn was the largest and the only one to be listed at the stock exchange. The co-owned fleet consisted of ever larger vessels. In 1954 the size of a new-built tanker was 33,000 dwt., in 1960 64,000 dwt. and by the end of the 1960’s more than 150,000 dwt. In the 1970’s Bergesen d.y. contracted tankers of size from 200,000 dwt. to 420,000 dwt. from Japanese shipyards.

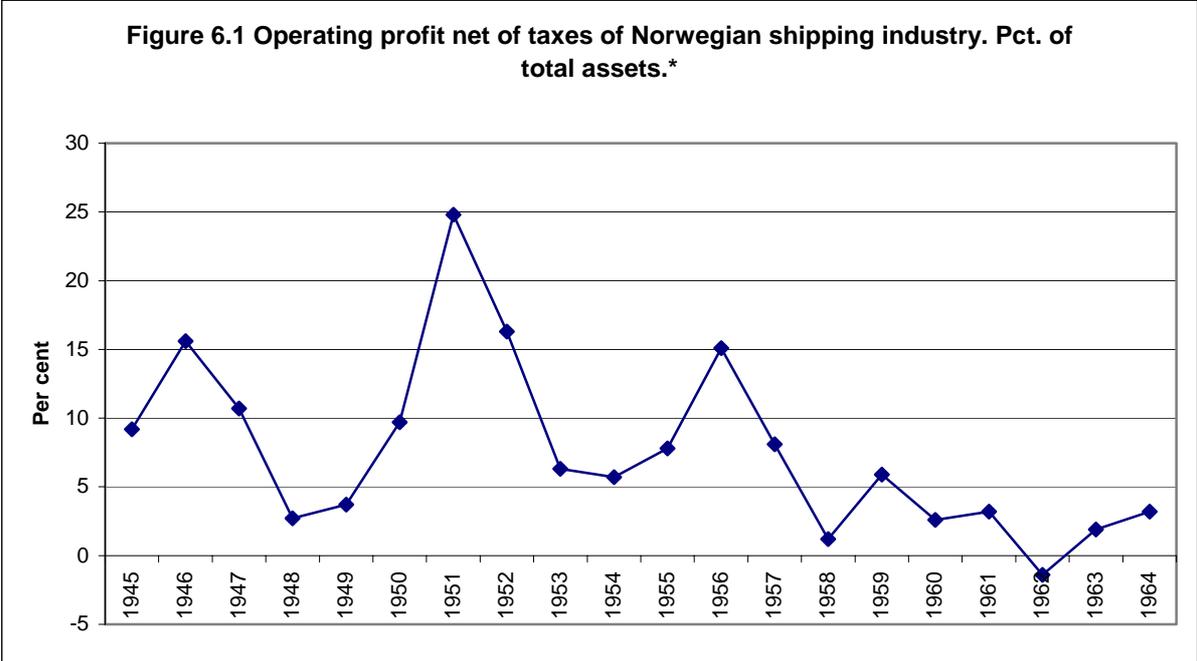
The growth of Snefonn’s fleet coincides with a rapid increase in world demand of ship transportation services. World trade volume more than tripled from 1947 till 1964, whereas the world fleet (measured in tons) almost doubled in the same period. Freight rates had

⁹⁸ In this statement liquid gas carriers are counted as tankers.

⁹⁹ The following discussion refers to the revised financial statements when discussing the financial reporting from 1940 till 1945.

¹⁰⁰ Shipping Joint Stock Company Bergehus and Sig. Bergesen d.y. & Co. (cf annual report 1958).

distinct cycles, related to political events, with peaks in 1951 (the Korean War) and in 1956 (the Suez Crisis) (Gjermoe,1968; 24-27). These cycles are reflected in the profitability of the Norwegian shipping industry as illustrated in Figure 6.1.



* Source: Gjermoe (1968; 30).

The tank market weakened throughout the 1960's. There were temporary freight rates upturns with the closure of the Suez Canal in 1967 and with the interruption of the pipeline from Saudi Arabia to the Mediterranean in 1970 (Gjermoe, 1973; 25), but the long-term trend pointed downwards. The oil crisis following the Middle East war of 1973 badly hurt a number of Norwegian shipping companies, especially the smaller ones. The Bergesen d.y. fleet maintained a good position, thanks to its long-term contracts and to its investment in large-size tankers suitable for voyages around the African Cape. However, the 1980's also became a difficult decade for oil transport, with freight rates remaining low. As a consequence, Bergesen d.y. expanded into liquid gas transportation and became a major owner and operator of LPG carriers.

1 January 1986 Snefonn was merged with the other companies within the Bergesen d.y. sphere, and the merged company, named Bergesen d.y. AS, became the largest shipping company on the Oslo Stock Exchange. In April 2003 a Hong Kong-based company, World-Wide Shipping, acquired the majority of the Bergesen d.y. shares and unlisted the company.

Snefonn asked its shareholders for capital infusions in 1935, 1936, 1937 and 1938, altogether 4 million kroner.¹⁰¹ The company paid dividend every year.¹⁰² Moreover, the dividend never decreased from one year to the next, except in 1946, which was the first of several years with a decreed maximum limit on dividends, and 1985, when the merger had already been decided. The internal rate of return to a permanent shareholder from the dividend stream, when the merger consideration is considered a cash payment equal to its market value, was 11.4 per cent.

The net present value in 1935 of the tax payment stream, calculated with the shareholders' internal rate of return as discount rate, was 3.8 million kroner. Hence, if 11.4 per cent can be considered a fair discount rate for both, the two principal stakeholders of Snefonn, the owners and the Government, received almost equal shares of the value creation over the entire company life.

6.3 General financial reporting requirements and trends

Snefonn's financial reporting has three distinct phases, which reflect the development of legal requirements for financial reporting of companies in Norway. The first phase is from 1935 till 1958, when the company was subject to the reporting requirements of the 1916 Shipping Joint Stock Company Law. This law was substituted by the general Company Law, enacted in 1957 and in force in 1959. The second phase of Snefonn's financial reporting was therefore from 1959 till 1976, when the 1976 Company Law was enacted. The financial reporting requirements of the 1976 Company Law was effective from 1978, but Snefonn altered its reporting already for the financial year 1977. The third phase of financial reporting in the life of Snefonn, then, was from 1977 till the company's terminal year in 1985.

In a historical perspective the most recent phase is the least interesting, simply because the financial reporting of that period is so close to present financial reporting practice. The following portrayal therefore gives most attention to the first two phases.

6.3.1 Financial reporting 1935 -1958

Snefonn was incorporated under the 1916 Shipping Joint Stock Company Law. This law, like the general Company Law of 1910, had a few general rules about bookkeeping and financial

¹⁰¹ Subsequent share capital increases were financed by transfers from own funds.

reporting, together with an audit requirement. There were limits on dividend and board compensation and rules about compulsory non-distributable reserves that were linked to the accounting concepts. The accounting requirements were essentially given in paragraph 48:

”The Board shall provide for proper and sufficient bookkeeping.

By the end of each financial year the annual accounts and balance shall be drawn up in accordance with the fundamental principles of appropriate and prudent business conduct.

Administration costs are not to be recognised as an asset in the balance sheet, but entirely as an expense in the annual accounts. Taxes payable but not paid shall be recognised as debt in the balance sheet even if they are not due. Costs of company incorporation shall be deducted from profit before any dividends can be paid out. Ships and other items of property shall not be carried at higher values than what is justified by their present state and relevant conditions.”

The law did not give any more detailed guidance about how to account for the fixed assets, and neither did the general Company Law of 1910. Depreciation was not explicitly mentioned in the text. However, there is a further rule (paragraph 53) about the right to pay a bonus to the members of the board, by which such bonus is upwards limited by the operating profit of the year, “(...) from which are deducted the amounts for taxes, depreciations and provisions, regulated by law or otherwise necessary.” The term “provisions regulated by law” was understood to refer to the system of compulsory reserves included in all Norwegian company legislation, by which at least one tenth of the profit should be attributed to such reserves until these reserves equalled the paid-in share capital in amount.¹⁰³

The Norwegian Supreme Court ruled in 1925 that shipping companies had an obligation to depreciate ships.¹⁰⁴ Hanssen (1947; 80) in an authoritative commentary on the Shipping Joint Stock Company Law states that

“(...) ships cannot automatically be carried at cost. Their deterioration through wear and age should be accounted for, and, pending the circumstances, the effects of a business cycle decline, irrespective of it having already taken place or being expected. The obligation to write down the value of the ships so that they are not carried at

¹⁰² There were dividends also for the years 1940 – 1945, but they were decided and distributed to the shareholders only after the War.

¹⁰³ The system with compulsory non-distributable reserves was inherited from German corporate legislation, where it was introduced in the 1843 Prussian Joint Stock Company Law. The requirement for compulsory reserves was included in the Shipping Joint Stock Law in 1938 (paragraph 23a).

¹⁰⁴ Rettstidende (Norwegian Court Rulings) 1925, p. 671. The case in litigation was a shipping company, bankrupt by the time of the Supreme Court ruling, in which the board of directors had granted its members a bonus based on a net income calculation with insufficient depreciation.

higher values than what is justified by their present state and relevant conditions, should not be contingent on a profit to cover the write-down. However, by recognising a large write-down in favourable periods, the company may be allowed a more accommodating depreciation in more unfavourable periods.”

The quoted comment conveys some interesting signals about how Norwegian experts understood the concept of depreciation in the early 20th century. First, there was no clear distinction between what would presently be labelled an impairment write-down and the ordinary depreciation. Second, although depreciation could not be avoided in years with no profit, it was perfectly allowed to let the depreciation charge vary with the profits in order to smooth earnings.

Snefonn’s income statements in this phase were brief.¹⁰⁵ The operations were presented as one single credit item, which is operating profit of the year. This single-item reporting system was maintained until 1958, which is the first year that Snefonn reported both operating income and expenses. The debit items of the 1938 income statement are a mixture of what would be labelled either expenses or equity transactions by today’s standards. Exhibit 6.1 shows the 1938 income statement, which is typical for the reporting during the first phase.

Exhibit 6.1 Profit and loss account as of 31 December 1938.

	Debits	Credits
Transferred from previous year		kr. 3 175,60
Operating profit		kr. 1 300 773,15
Interest	kr. 202 855,42	
Taxes	kr. 36 309,69	
Board remuneration	kr. 30 000,00	
Remuneration of shareholders’ committee	kr. 7 929,17	
Dividends	kr. 235 000,00	
Bonus to the Board	kr. 34 377,54	
Allocation to the compulsory reserves	kr. 136 598,00	
Provision for retirement benefits	kr. 18 402,00	
Depreciation of the ships	kr. 596 715,37	
Transferred to following year	kr. 5 761,56	
	kr. 1 303 948,75	kr. 1 303 948,75

The balance sheet for the same year is shown in Exhibit 6.2. The assets consist of ships and money (cash and receivables), whereas the “passives” (i.e. liabilities and equity) consist of shareholders’ funds (share capital, compulsory reserves and the retained earnings), provisions,

¹⁰⁵ The whole annual report including the title page was four pages.

which could either be untaxed reserves or liabilities, and debt. Dividends were always declared as a percentage of nominal share capital, as if it were a contingent interest payment.

Exhibit 6.2 Balance sheet as of 1 January 1939.

		Assets	Passives
Ship account	kr. 5 973 608,48		
- depreciated	kr. 596 715,13	kr. 5 376 893,11	
Debtors		kr. 337 112,96	
Cash and bank		kr. 1 295 999,93	
Share capital			kr. 4 000 000,00
Comp. Reserves			kr. 136 598,00
Shipwreck fund			kr. 30 000,00
Construction loan			kr. 2 083 326,83
Mortgage loan			kr. 650 000,00
Creditors			kr. 104 319,61
Transferred			kr. 5761,56
		kr. 7 010 006,00	kr. 7 010 006,00

In the 1938 balance sheet “hybrid” provisions (i.e. both liability and equity) consist of only one item, the shipwreck fund. In this particular case the provision was the expected costs of necessary repairs on one of the company’s ships. Nevertheless, the shipwreck fund was kept intact with the same amount until 1973, when it was dissolved.

The number of “hybrid” provisions increased substantially during the post-war years. In 1950, for instance, the liability side of the balance sheet included an “amortisation fund”, a “classification fund”, a “dividend fund”, a “shipwreck fund”, a “war insurance fund”, and a “tax fund”, in addition to the compulsory reserves required by the law. From what sources these funds were filled up, was not always very clearly explained. For instance, the initial recognition of a “tax fund” in 1939 is shown as an appropriation of that year’s profit, but the increase of the fund in the following year has no corresponding entry in the income statement, so it must have been included in the single item that represented operating profit. In the same vein the “dividend fund”, when it was established in 1950, had an unclear correspondence with the income statement.

The “classification fund”¹⁰⁶, on the other hand, is built up of explicit appropriations of profit from 1949 onwards. As from 1955 the company begins to draw on these funds. For analytical purposes it would have been interesting to know the relationship between the classification costs and the development of the classification fund. The company became more generous with information (starting in 1958) about how the tax fund was used to cover current taxes.

The most important of the “hybrid” funds was the “amortisation fund”, which, during the 1950’s represents a mixture of gains on the sale of ships, which are not explicitly shown, and some “arbitrary” appropriations of profit. By 1956, when the amortisation fund reached a peak, it amounted to 38 mill. kroner, which was approximately 40 per cent of the net book value of the ships and approximately 55 per cent of debt. The amortisation fund was by then far more important in the financing structure of Snekforn than any other component of equity. The use of the amortisation fund is more extensively treated in Section 6.5.

As can be seen from Exhibit 6.2, the ship account does not show the original cost of the ships (as it would have been in a fixed asset matrix), and the depreciation account does not show the accumulated depreciation, but rather the depreciation charge of the year. The gross amount of the ship account is the net amount (book value) of the account from the previous year plus any additions (at cost) or disposals (at book value) during the year. The net amount of the ship account the previous year (1937) was 5,312,000, so the increase in the net amounts of 65,000 plus depreciation of the year of 597,000 equals the net investment in ships (purchase of ships minus sale of ships) of 622,000. Although this amount is not explicitly shown in the financial statements, the ship investment is explained in the report of the board. The report explains that the company had entered into a shipbuilding contract for a ship to be delivered in the middle of 1939, and had paid £ 33,250 on account. The exchange rate was 19.90 kroner per pound, so the pound amount corresponds exactly with the net investment in kroner found by the calculation. Although there is no doubt retrospectively that payments on account were included in the ship account, it is only in 1947 that this is stated explicitly, and it is only in 1961 that operating ships and ships under construction are presented separately in the balance sheet.

The report of the board was quite brief in the first years – the 1938 report consisted of 16 lines – but it contained relevant information for investors. The size, age, duration of freight

¹⁰⁶ The classification costs of ships are related to technical surveys and maintenance that are carried out with intervals of several years in order to maintain a ship classification. See Section 6.4.2.

contracts together with the freight rates, were disclosed in the report. There was also information for the shareholders about the calculation of dividends and the tax value of the shares. During the Second World War the report had very little content, due to the fact that the company had little control over the ships (see Section 6.2). During the last years of the War there were restrictions by the occupation authorities on the content of the board report.

The report increased in volume instantly after the War. An important element of the board reports in the post-war years was the about the court proceedings for compensation from the Norwegian Government for the wartime requisition of the ships (Nortraship, cf. Section 6.2). During the 1950's the board report gave information about legal disputes about shipbuilding contracts as well.

Of particular interest for this paper is what was said about the current value of the ships. In the early years the insured amount of the ships was disclosed in the report of the board, and could be read as an indication of the market value of the ships. Table 6.1 shows the developments of the insured amounts and the book value in the years before the War:

Table 6.1. The net book value and insured amount of Snefonn's ships 1935 – 1939. (Amounts in thousand kroner and per cent).

	A. Insured amount	B. Net book value	Percentage A/B
1935	3,400	2,689	126
1936	4,000	2,463	162
1937	9,400	5,312	177
1938	8,250	5,377	153
1939	14,980	7,878	190

The information about the insured amounts ceased in 1940 and was not taken up again during the War. The insurance status of the ships may have been uncertain in the wartime circumstances and may even have been unknown to the directors. It has already been mentioned that one of Snefonn's ships was torpedoed and sunk in 1942. The Government, having requisitioned the ship in 1940, paid an indemnity for the loss to the company at terms determined after the War.

The insured amount of the ships was again, exceptionally, disclosed in the 1945 report. According to this report the two remaining vessels at the end of the War were insured for 13 mill. kroner – five times their net book value.

In the following ten years the company gave no information that could indicate the current value of the ships. The size of each ship and conditions of the freight contracts continued to be disclosed, but there was no additional information that might be useful for an external analyst. Only in 1956, perhaps anticipating the need for the more complete reporting that was to come with new legislation, did the company again begin to disclose the insurance value of the ships.

6.3.2 Financial reporting 1959 - 1976

In 1957 a new Company Law, in force from 1959, replaced both the 1910 Company Law and the 1916 Shipping Joint Stock Company Law. The new law put substantially more emphasis on financial reporting than the predecessors, and this is demonstrated among other things by a separate section of the law entitled “annual accounts”. The section starts with general rules about the obligation of the board to prepare annual accounts, the financial year and deadlines for the preparation (paragraph 76). The annual accounts should consist of a profit and loss account and a balance sheet (paragraph 77), for which the law had rules about the minimum specifications (paragraphs 81 – 84). The annual accounts should further be accompanied by a report from the board of directors that provides “information about circumstances that are essential for the assessment of the activities and state of the company” (paragraph 85). There were measurement rules for fixed assets (paragraph 78) and current assets (paragraph 79), and miscellaneous measurement rules for receivables, costs of incorporation, research and development, treasury shares, goodwill and tax accruals (paragraph 80). The law also introduced a requirement to prepare a group balance sheet (paragraph 89).

Fixed assets were defined as those intended for “permanent ownership or use”. They should be recognised at acquisition cost or construction cost, with possible additions for improvements. Deductions to cost should be carried out through a “reasonable depreciation plan” to reflect “age, wear and similar phenomena”. Revaluations were permitted within specified limits. The carrying amount of a fixed asset should under no circumstance exceed its “long-term value” for the company. The law emphasises that depreciation and impairment write-downs should be recognised irrespective of there being a net profit of the year.

The arrival of more advanced reporting practices can be observed in Snefonn’s reports some years before the new law came into effect. A good example is the development of the report from the board of directors in 1957 onwards compared with earlier years. The 1956 board report, like the previous reports, is a single page that enumerates the ship holdings, their

contracts, litigations, details about fees and taxes, and the basis for dividends. The 1957 report is the double in length, and it contains a macroeconomic “tour d’horizon” as background for the company specific information:

“The decline in the market prices of many primary commodities and in freight rates – and hence in ship values – has not yet had its full effects. This value reduction will have consequences for world trade, and will, with the tight money markets in almost all of the world – including Norway – under normal peaceful circumstances lead to a reduction of the speed of the world reconstruction of recent years, and in turn influence prices and world trade. Some prices and freight rates may nevertheless have stabilised, but at an unprofitable level.

The fall in steel prices will to some extent neutralise the effect of the persistently increasing prices of ship construction (...). Labour costs are likely to increase more slowly in the future.

The civilised world has not only been fully employed for a number of years – it has been “overemployed” – with an exaggerated purchase power and an uneconomic use of goods and labour. Norway has got a large share of the cake of economic growth, and distributed it over all social layers and activities. (...)”

Although the report conveys both personal and controversial views, there is little doubt that the reports treated issues relevant for Snefonn’s business. Controversial political issues, Norwegian and international, reappear in several reports. The 1966 report criticises UK shipbuilding subsidies that constitute an unfair competitive advantage for UK shipowners. Sterling devaluation, the international currency system collapse and the closure of Suez are important events of the 1970’s. Later, by the end of the 1970’s, there are frequent references to industrial policies of the Norwegian government. In 1976, for instance, the board complains that the shipping industry is being harassed by Government officials, and in the 1980 report, the board expresses doubt whether any private business subject to international competition can be maintained in Norway.

From 1960 onwards the board reports contains particularly elaborated analysis about supply and demand in the tank market. The 1960 report states:

“Modernisation and replacement of the world tank fleet continue at a rapid pace with substantial scrapping and large deliveries of newly built tonnage, modern in size and type. The tank fleet increased during the year with approximately 2.65 million deadweight tons. The shipyards constructed 5.65 million. 2.2 million were condemned or transformed, and 0.8 million shipwrecked. (...) The observable tonnage was by 1 January 1961 approximately 1.9 million tons lower than the year before. Taken into consideration that the corn trade employs 300.000 tons more, these numbers should indicate that oil transport would need 4.2 million tons more than one year before.”

A more detailed income statement was introduced in 1958. The increase in number of items was modest, though. As a consequence of the 1957 Company Law Snefonn had to report separately operating revenue and expenses, and separately any gain or loss on the sale of fixed assets. The first of these changes meant that Snefonn's practice with a single operating item came to an end, which in itself constitutes a major improvement. More important for the present study is the requirement to show gains on disposal separately. Rapid turnover of the fleet was an essential feature of Snefonn's business strategy, and, as will be shown later in the paper, the accounting treatment of these gains had an important impact on the measurement of the ships.

Sale of ships is mentioned in the reports of the board of directors in 1951 and 1957, and the sales proceeds are disclosed in that context. The gain (being the proceeds minus the book value of the sold ship) is not specified as a separate item in these years, so it must presumably be included in the operating profit. In 1961 Snefonn presented, for the first time, the gain on the sale of ships as a separate item in the income statement, and in the following years Snefonn had an almost unbroken line of gains on ship sales. From 1961 till 1985 Snefonn had such gains in 18 out of 24 years¹⁰⁷, and the total amount was 831 million kroner, which compares, for instance, with 60 million kroner of total dividends paid over the lifetime of the company.

From 1960 forwards Snefonn presented comparative amounts of the previous year for both the income statement and the balance sheet.

In 1961 and for seven consecutive years thereafter Snefonn recorded revaluations of the ships. The aggregate amount of these revaluations was modest, 7 million kroner. The revaluations were recognised as revenue, which was the system of revaluations in the 1957 Company Law. Revaluation of ships ceased with the 1969 report, and the habit of revaluing ships was not taken up again, under either the 1957 or the 1976 Company Law.

It may be questioned whether the ship holdings were reported fully in accordance with the 1957 law requirements. The law introduced the "fixed asset matrix" into Norwegian legislation, insofar as additions and disposals during the year "for each item"¹⁰⁸ and

¹⁰⁷ There were no gains in 1964, 1965, 1975, 1976, 1978 and 1980.

¹⁰⁸ It is not clear what aggregation level is meant by "item" in this context. The law required fixed assets to be reported separately from current assets, but it is uncertain whether fixed tangible assets might be presented as one item or should be subdivided.

depreciations had to be disclosed. Snefonn changed its reporting scheme for fixed assets in 1962, splitting the ship account between the operating fleet and ships under construction. Each of these items was presented with the original acquisition cost and accumulated depreciations. However, the company did not actually show the gross movements due to purchase and sale of ships in the cost account, which was probably the intention of the law requirement. Also, these details were generally not disclosed in the report from the board. Snefonn presented the whole fleet in a table in the 1961 report, but it was for this one year only, and the table did not contain information about costs or book value.

Section 6.3.1 notes for the first reporting phase that Snefonn in the pre-war years disclosed the insured amounts of the ships, which might have been interpreted as an indication of their fair value. The disclosure of the insured amount was taken up again in 1956, but it was slightly different in nature, since it included a larger fleet than the one owned by Snefonn alone. A structural change with consequences for the financial reporting had taken place in 1951, when Snefonn was included in an organisation of co-ownership of ships with other companies within the Bergesen d.y. sphere. In addition to Snefonn, this system included the operating company AS Sig. Bergesen d.y., the shipowning company Bergehus and the shipyard AS Rosenberg Mekaniske Verksted. The proportion held by each of these companies was not the same for every purchased ship, but Snefonn had the largest holdings during the 1950's with a stake of approximately $2/3$ of the total co-owned fleet. The reporting consequence of the structural change was that the information about the fleet was given at the level of the co-owner "group", for which there were no accounts. Hence, the insured amount disclosed was no longer directly comparable with Snefonn's book values. Snefonn's proportion was declining during the sixties; this can be seen from the summary accounts for the whole co-owner group introduced by the end of the 1960's. If we assume, rather crudely, that Snefonn's proportion of the co-ownership was 66 per cent in 1956 and that it declined by one percentage point each year until 1969, we get a gross estimation of the relationship between the insured amounts and the book values, as given in Table 6.2.¹⁰⁹

¹⁰⁹ There is one source of uncertainty in the calculations of Table 6.2 apart from the grossly estimated stake of Snefonn. The book value of the ships includes (as shown above in connection with the 1938 report) the payments on account on shipbuilding contracts, but ships under construction were normally not insured. For 1956 till 1961 it is not possible to separate the ship account in operating ships and ships under construction.

Table 6.2 The net book value and insured amount of Snefonn's ships 1956 – 1969. (Amounts in thousand kroner and per cent).

	A. Insured amount (co-owned fleet)	B. Net book value (Snefonn)	C. Snefonn's estimated share	D. Adj. percent. (A*C /B)
1956	205,000	97,559	0.66	139
1957	190,000	74,197	0.65	166
1958	244,000	76,033	0.64	205
1959	254,000	89,200	0.63	179
1960	308,000	103,372	0.62	185
1961	276,000	80,560	0.61	209
1962	343,000	78,410	0.60	262
1963	571,000	115,236	0.59	292
1964	611,000	120,097	0.58	295
1965	652,000	134,711	0.57	276
1966	799,000	167,848	0.56	267
1967	933,000	183,869	0.55	279
1968	957,000	154,361	0.54	335
1969	1,116,000	110,032	0.53	538

1970 is the last year for which the insured amount is disclosed, at 1,222 million kroner, so the fair value estimation using the insured amount had come to an end. In its 1970 report the board complains about the high insurance costs, and a self-insurance scheme is introduced. During the following years the self-insurance provision is built up rapidly, and it peaks at 26 mill. kroner in 1980.

Both the pre-war development charted in Table 6.1 and the post-war development in Table 6.2 leave an impression of a gradual and intentional build up of hidden reserves by conservative accounting measurement of the fleet. This is confirmed by another fair value indicator mentioned in the board reports, which is a comparison between the book value of the co-owned fleet and the value according to a scale prepared by the Norwegian Shipowners' Association, which was, among other things, used for tax calculations (see Section 6.4.4). For all the years from 1962 till 1970 the board report gave such comparisons. The scale exceeded the book values by 130 million kroner in 1962, and this difference increased almost monotonically to 632 million kroner in 1970.

By 1965 there is a narrative report for the consolidated group included in the annual report of Snefonn, and from 1970 and onwards there is a full consolidated balance sheet for the Bergesen d.y. Group, to which Snefonn belonged. The group included the co-owning

companies described above, and two more recent companies, Sigmalm¹¹⁰ and Siganka. The fair value indicators described above, the insured amount and the value scale of the Norwegian Shipowners' Association were from now on given only at group level. The ratio of scale value to book value was approximately 2 by 1970 and for several of the following years. For the last year of this kind of report, 1976, it had declined to 1.6. The ratio of insured amount to book value increased during the same period from 3.6 to approximately 4.4. Snefonn's share of the group's shipping activities was by the middle of the 1970's approximately 30 per cent.

6.3.3 Financial reporting 1977 - 1985

In 1976, the 1957 Company Law was substituted by a new company law, dated 4 June 1976. Like its predecessor, the 1976 Company Law had a separate section on the annual accounts. Rules on bookkeeping were given in a separate Accounting Law, enacted in 1977, which also contained rules about annual accounts for companies without limited liability. The new set of reporting requirements became effective from 1978.

The accounting rules of the 1976 Company Law were a continuation and an extension of the former rules. The most important changes were the introduction of detailed reporting formats for the income statement (paragraph 11-5) and the balance sheet (paragraph 11-6), a requirement to give supplementary disclosures in notes (paragraph 11-8) and the requirement for a parent company to prepare consolidated accounts (paragraph 11-13). An important development was also the introduction of a supplementary requirement of concordance with "good accounting practice", which came to constitute the basis for Norwegian accounting standard setting.

Snefonn adapted its reporting to the new requirements in the 1977 financial statements. In fact, already the 1976 accounts represented a step forward with the introduction of a table showing Snefonn's fleet, ship by ship, with construction year, size, original cost, net book value, mortgages, provisions for the classification fund and the self-insurance fund, and some information about freight contracts. The 1976 annual report was also issued in English. The enhanced reporting quality may have been pushed ahead by specific events in addition to the

¹¹⁰ Sigmalm was established in 1959 by Berge Sigval Bergesen, the son of Sigval Bergesen d.y, with the business plan to ship iron ore from Mozambique to Japan. The company faced liquidity problems in 1967 and was taken over by Sig. Bergesen d.y. & Co.

arrival of new legislation. That year, the founder of Snefonn and the group, Sigval Bergesen d.y, resigned from office at the age of 83 and was succeeded by junior partners.

The income statement of 1977 and subsequent years was split into operating items, financial items and other items, each of them with the total of the items. The operating profit of these years includes ordinary depreciation, and is therefore different from the operating profit concept of earlier years. Gains on disposal were included in “other items”. Ordinary depreciation was straight line, whereas depreciation for tax purposes in excess of ordinary depreciation was recorded as an appropriation of the profit of the year, together with allocations to several “hybrid” provisions.¹¹¹

The notes of the 1977 report specified the financial assets and included a cash flow statement as well. For the fixed assets (ships and building contracts) there was a matrix, showing the original cost, additions and disposals, and the accumulated depreciations. Also there was an enumeration of sales and purchases of ships during the last five years.

The format of the 1977 report was kept almost unchanged until 1980. However, the 1981 report represents an extension compared with the reports of the preceding years. The notes were supplemented with explanations of the movements of the amortisation fund, the classification fund and the self-insurance fund.¹¹²

A particular policy change introduced that year is the transition to a gross presentation of shipbuilding contracts. Until 1981 these contracts were reported with the amount of payments on account (cf. Section 6.3.1). From 1981 onwards the estimated cost of a ship under construction was recognised as an asset and the remaining payment obligations as a liability. That was a breach with established practice, but in the conceptual framework discussion going on in the United States at that time there were proponents of this way of accounting for contracts. The Oslo Stock Exchange later (in 1991) issued a circular that required gross accounting of ship building contracts, similar to Snefonn’s reporting in 1981. However, the

¹¹¹ The tax-contingent excess depreciation was recorded as an appropriation of profit, and at the same time included in the net book value of the ships, so the articulation principle between the income statement and the balance sheet was broken by this system.

¹¹² The 1981 report also includes for the first time a consolidated financial statement for Snefonn and its only subsidiary, Rosenberg. No change in Snefonn’s shareholding nor in the legal requirements would explain why this consolidated report was introduced in 1981 and not in 1978.

gross contract accounting was never accepted in the United States, and Norwegian practice mostly returned to the traditional payment on account system during the 1990's.¹¹³

The last two reports of Snefonn (1984 and 1985) were issued in a joint publication together with the reports of the sister companies Bergehus and Sigmalm, which were to become merging partners on 1 January 1986.

6.4 Tax implications of accounting choices

Throughout the years covered by this study (1935 – 1985) the determination of taxable income for a company like Snefonn were regulated by the tax laws, in particular the general tax laws of 1911 and the 1921 Law on Taxation of Joint Stock Companies and Shareholders. The financial statements had, prima facie, few direct tax consequences. However, there were strong references in the tax laws to the amounts associated with generally accepted accounting conventions. Of primary importance was the general reference in the tax law paragraph 50, whereby the income and expenses included in taxable income should be determined in accordance with general principles of financial reporting. There were also more specific references to the financial accounting treatment, for instance in the case of depreciation eligible for deduction in taxable income. Hence, although the taxable amounts in principle might be different from those presented in the financial statements, a company would in most circumstances adapt the financial statements so as to obtain full correspondence with the amounts that constitute the basis for taxation.

The tax rules that may have influenced the accounting treatment of fixed assets in Snefonn are essentially those that define taxable income, and to some extent those that determine taxable wealth (see Section 6.4.4). The taxable income rules of interest here are those that determine the amounts of tax-deductible depreciation, repair and maintenance costs and the taxable gain or loss on disposal.

6.4.1 Tax-deductibility of depreciation and impairment write-downs

According to the 1911 Tax Law paragraph 44 c “ordinary depreciation for the value reduction due to wear and age” of fixed tangible assets (including ships) should be deductible in the calculation of taxable income. According to paragraph 50 the tax-deductible depreciation could not exceed the “intended objective”, and a condition for deduction was that the

¹¹³ The accounting treatment of shipbuilding contracts is described in Kvaal (2001).

depreciation was “carried out in the financial statements”. These general rules on depreciation were effective during the whole period under study here, but there were supplementary depreciation rules in force from 1962 (see below).

The basis for tax-deductible depreciation was the cost of the asset, which generally was considered equal to the cost in the accounts. However, the cost of a ship would in many cases include a premium (or a discount) for a freight contract chartered for the purchased ship, in which case it was considered correct to include the contract premium in the cost of the ship, with separate tax depreciations for the two components (Breien 1951; 42). Only depreciation based on wear and age were deductible, so changes in the current value of the ships due to changes in the general rates and business cycles should be ignored. Therefore, any impairment write-down or upwards revaluation would be irrelevant for the computation of taxable income in the year they were undertaken.

Officially, straight-line depreciation was not compulsory, but it was considered best practice (Breien, 1951; 45). From 1923 onwards the Tax Directorate issued guidelines for reasonable depreciation rates, given in per cent of cost. For instance, by the end of the 1940’s the suggested depreciation rate for “diesel tankers” was 7 – 8 per cent, and by 1962 it was set at 6 – 8 per cent for tankers together with other ships for specialised transport (Bugge and Skreiberg, 1962; 54).

The condition that tax-deductible depreciations had to be “carried out in the financial statements” did not mean that depreciation for tax and accounting purposes had to be identical each financial year. The depreciation might be deductible for tax purposes if the accounting depreciation was carried out in the same year or earlier. It would not be deductible if the accounting depreciation was to be carried out later. There might have been a practical consequence of this in the case of an impairment write-down carried out in accordance with the Shipping Joint Stock Company Law. The impairment write-down would not in itself qualify for tax deduction, but it would be taken into consideration for the eligibility of tax depreciation of the following years. Thus, the lower accounting depreciations in the years following an impairment write-down would not imply a reduction in eligible tax depreciation (Breien 1951; 54 – 56).¹¹⁴

¹¹⁴ To what extent this clarification had any practical consequence is uncertain since impairment accounting, although mandated by the Shipping Joint Stock Company Law, apparently was very seldom practiced.

There was a common understanding that the tax laws defined annual depreciation allowances, so that omitted or unaccepted tax depreciation one year would not give right to more depreciation in subsequent years. Therefore, a poorly planned depreciation schedule might reduce the total deduction that a fixed asset might produce during the time it was used. However, any part of its cost not deducted through tax depreciation would in the end be deducted from any gain on disposal (Breien, 1951; 53).

In 1957 the tax depreciation rules were greatly revised. In addition to the ordinary tax depreciation, which might be equal to accounting depreciation, companies were allowed special depreciation schemes for tax purposes, called opening depreciation and additional depreciation. These tax depreciation schemes were clearly independent of accounting depreciation, so the consequences of the accounting choice may have been reduced under the amended tax rules.

6.4.2 Tax-deductibility of repair, maintenance and classification costs

Throughout the period under study, regular repair and maintenance costs on fixed assets were expensed as incurred, both for taxation and accounting purposes. This followed from the general reference in the Tax Law paragraph 50 to the accounting recognition of revenue and expenses.

Ships also had periodic maintenance and repair with time intervals of several years, also called technical surveys. These were necessary to obtain a ship classification, which was required among other things for ship insurance. In the financial statements it was considered good practice to set aside provisions in the years prior to the technical survey, in order to allocate the expense over the years of service. Accounting provisions were generally not eligible for tax deduction, but there was a specific rule applying to the shipping industry and the fisheries for “provisions to cover the costs of classification or boiler fund or insurance premium, to the extent that they do not exceed a reasonable amount” (paragraph 44 i). The limitation to a “reasonable amount” was not an explicit reference to the financial statement amounts. However, the financial statements were required to be “in accordance with the fundamental principles of appropriate and prudent business conduct” (cf. Section 6.3.1), which most likely would produce a “reasonable amount”. It can therefore be presumed that any provision to the classification fund for which tax-deductibility was claimed would have to be recognised by the same amount in the financial statements.

6.4.3 Taxability of gain or loss on the sale of ships

The 1911 Tax Law would normally consider a gain on the sale that was “for business purposes” as taxable income, and a similar loss on disposal as a deduction in the calculation of taxable income (paragraph 42). There was a fierce discussion in the first years of the laws about whether the sale of a ship was an action that belonged to the business purposes of a shipping company, which in the normal course of business would sail the ships rather than selling them.¹¹⁵ However, the Supreme Court ruled in 1918 that gain on the sale of ship should be included in taxable income. Also an insurance indemnity for a lost or damaged ship was considered taxable income, to the extent that it exceeded the tax value of the ship.

For shipping companies the general rule of the 1911 Tax Law was soon to be modified. It began with exemptions for insurance indemnities, introduced in 1917. The reason for this was large losses of Norwegian ships during the First World War, combined with high construction prices due to limited capacity. It was considered undesirable that Norwegian shipowners who lost their ships should pay tax out of amounts insufficient to replace the lost ships. The result was that shipowners were exempted from tax on insurance gains if they used the amounts to purchase new ships. During the following decades this system was extended to gains on sales, some of these subject to individual approval from the Ministry of Finance. As the system gradually developed, tax exemption for sales gains required a plan for the reinvestment to be presented during the year following the sale. The sales gain was then added to the accumulated depreciation, so that the total amount deductible on the new ship was reduced by the untaxed gain. Therefore, the system was more designed as a permanent tax deferral rather than as an exemption.¹¹⁶

6.4.4 Wealth tax

In certain periods the measurement of fixed assets has also been necessary for wealth tax purposes. The value of the ships for wealth tax purposes was their presumed sale price at the beginning of the year (1911 Tax Law, paragraph 36). The value was determined by the local tax authorities of each municipality. It was customary to apply a ship value scale issued by the Norwegian Shipowners’ Association for these measurements, but some municipalities had local valuation expertise (Breien, 1951; 15-18). Financial statement measurements have

¹¹⁵ Cf. *Rettstidende* (Norwegian Court Rulings) 1916, pp. 49-58, 97-99, 100-106, 148-151.

¹¹⁶ The tax rules for sales gains in shipping and their historical background is described in Breien (1951; 104-116).

probably had a very limited role for the wealth computation. However, when the value scale of the Norwegian Shipowners' Association was used, it was recommended to deduct the provisions to the classification fund from the value, as these represented a consumption of the ship not otherwise reflected (Breien, 1951; 24).

6.5 Fixed asset measurements in Snefonn's accounts

6.5.1 Depreciation and impairment accounting

The depreciation reporting of Snefonn developed over the three phases described in Section 6.3. In the first phase depreciation was reported as a single number, which was the depreciation charge of the current year. In the second phase, or more precisely from 1962 onwards, the depreciation charge of the year was still one number, but the accumulated depreciation was also disclosed, together with the original cost of the assets, divided between sailing ships and ships under construction. In the third phase, i.e. from 1977 onwards, depreciations were separated into ordinary depreciations and tax-related depreciations, and this separation was carried out both for the annual charge and for the accumulated amounts.

During its entire company life, Snefonn never recognised an impairment loss in the normal meaning of the term. There was a write-off of 2.2 million kroner from the ship account in 1942, caused by the loss of one ship due to war actions (cf. Section 6.2). Although the details of the book entries are not available, it is likely that the write-off implied that both the cost and the accumulated depreciation account for the lost ship were set to zero.

The fact that there are no clear examples of impairment write-downs in Snefonn's financial statements has at least two possible explanations. One explanation is that the obligation to write down to fair value, that Snefonn was subject to during its entire company life, was never followed very closely in practice. Breien (1951; 13), commenting on the 1916 Shipping Joint Stock Company Law, claims that the write-down obligation for shipping companies was mostly disregarded. Napier (1991), describing the accounting of a British shipping company, states about the practice of writing down that, "(...) such practice in the 1920's, while regarded as desirable, was not considered essential". Even so, it is not likely that the write-down obligation of the 1957 Company Law was disregarded. The 1910 Company Law, contrary to the 1916 Shipping Joint Stock Company Law, had no explicit write-down obligation, and the introduction of such a rule in the new law was a distinct interdiction of overvalued fixed assets. The fair value concept of the new law may not have been so clear,

though. Market value fluctuations were irrelevant for the write-down obligation, which was instead related to a “value in use for the firm”. Moreover, only evident impairments should be the cause of a write-down (Marthinussen 1960; 263).

A more likely explanation for the absence of impairment write-downs in Snefonn’s case is that it was never in a position to do them. Although the market values of the ships and the shipping companies experienced large fluctuations, the net book values of Snefonn’s fleet were all the time far below the estimated fair value of the ships, as documented in Section 6.3.

The sparse information in the first phase about the basis for depreciation makes it difficult to assess its adequacy. During the first sixteen years, however, there were so few transactions that it is possible to estimate the accumulated cost of the ships for every year, even if the ship account was presented by a single number, as explained in Section 6.3.1. From 1951 onwards, there were both sales and purchases of ships every year. The single number then would be the sum of the net book value of the ship account of the previous year (which is known), plus the additions of the year at acquisition cost (unknown), minus the ship sale of the year at book value (unknown), minus the depreciation of the year (known). Since there are two unknowns in this equation, we would not be able to tell by year-on-year change in ship account how the depreciation basis develops.

Figure 6.2 shows the depreciation pattern of Snefonn during the period 1935 – 1950. The lower curve is the depreciation in per cent of original cost. Snefonn purchased ships successively before the Second World War and kept all the purchased ships until 1951, except the one that was lost during the War. Hence, the original cost is calculated by starting with the cost of the first ship in 1935 and adding to that amount the cost of purchased ships the following year, which is the difference between the ship account before depreciation that year minus the net book value the previous year. Depreciation as a proportion of the estimated original cost fluctuates around 8 per cent until 1946. The observed depreciation pattern is likely to be the result of linear depreciation at 8 per cent.¹¹⁷ This would also correspond with the maximum depreciation rate suggested for tax purposes (cf. Section 6.4.1). However, during 1946 – 1948 the depreciation rates are much lower – at 5.1, 3.4 and 3.3 per cent respectively – before rising towards 8 per cent again in the last years of the chart.

¹¹⁷ There are several reasons why the estimation here will not give an exact percentage. One source of error is that purchases have taken place at different moments during the year, so the depreciation for a ship purchased in the current year might be lower than 8 per cent of cost. Another source is that ships under construction were included in the ship account, as explained in Section 6.3.

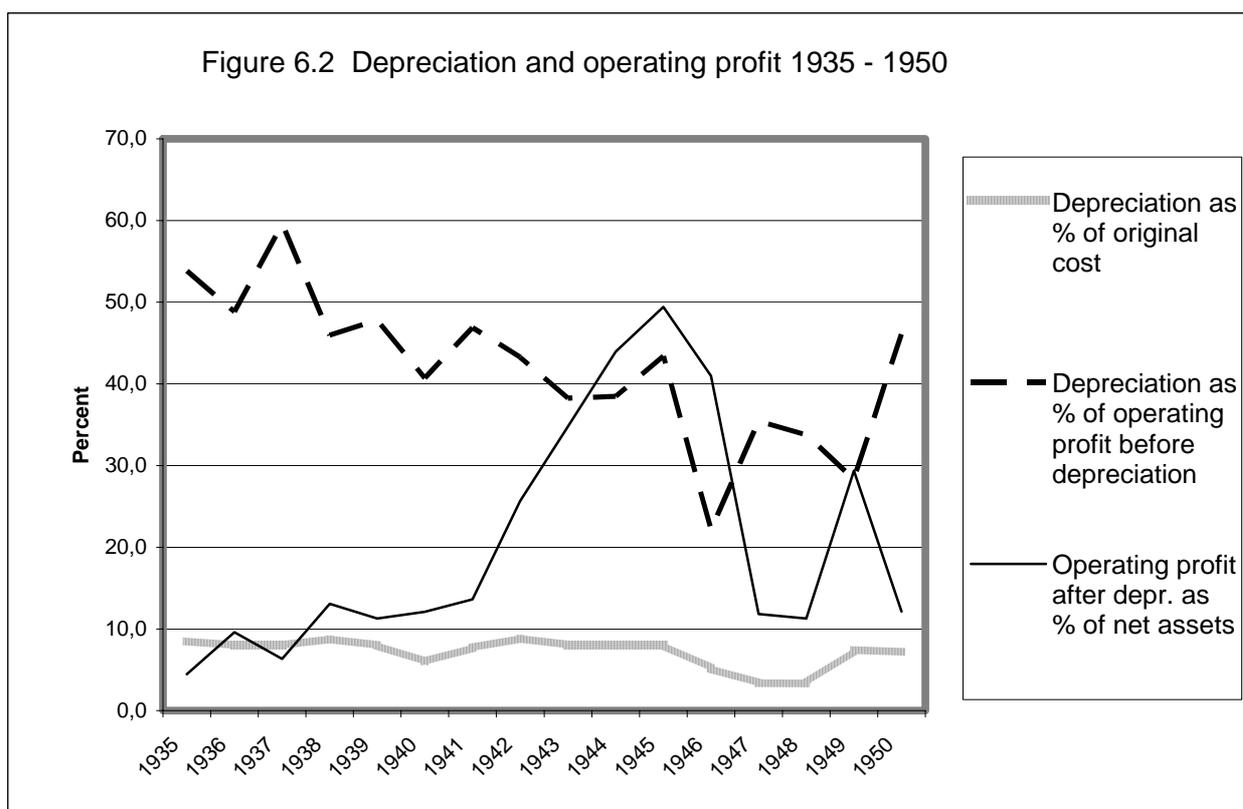


Figure 6.2 contains two other curves. Depreciation is shown as a percentage of operating profit before depreciation (the dotted curve), which could tell something about the capacity to absorb depreciation without having to recognise a loss. The second curve is the operating profit after depreciation as a percentage of the net book value of the ships. Return on assets measured this way was particularly low in 1947 and 1948 relative to the years before. Even so, Figure 6.2 may embellish the true performance during these years. Snefonn had repair costs of approximately 1.5 million kroner from 1946 till 1949 that are not included in the operating profit. In addition, taxes almost doubled from 1946 to 1948. So there is reason to believe that there were financial strains during these years that led Snefonn to reduce the depreciation charges.

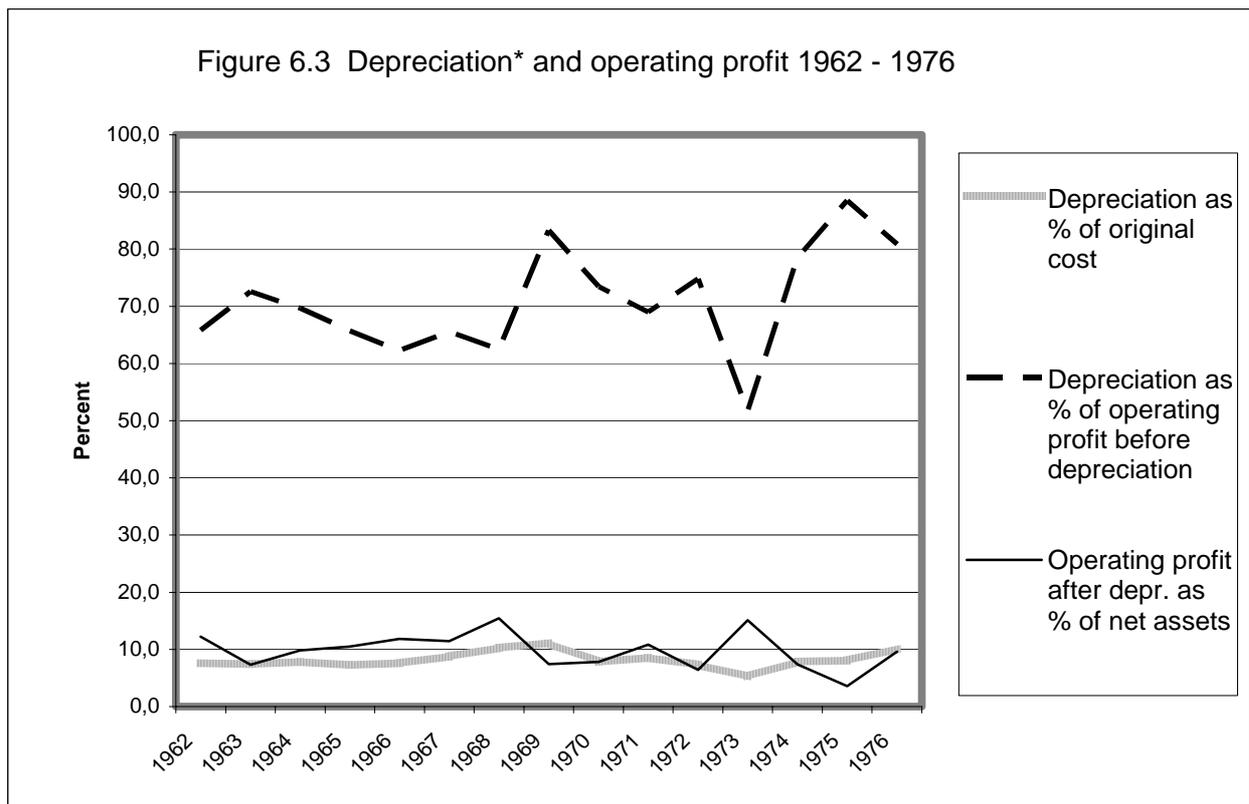
Paulson (1949; 72-74), when analysing Norwegian shipping companies during 1935 – 1939, observes that shipping companies in the 1930's used to vary the depreciation charges with profit, so that in good years the depreciation charge was the maximum permitted by the tax laws, and in poor years the depreciation charge was reduced or even nil. However, he also observes that steamship companies had more variable depreciation than motor ship companies, and that companies without time charters had more variable depreciation than

time charter companies. Motor tankers, which were what Snefonn's fleet contained, used to take the maximum permitted tax depreciation during the 1930's, according to Paulson. His calculations of depreciation of time charter motor tankers as a proportion of operating profit before depreciation show a percentage that declines from 44 in 1935 to 37 in 1939, very close to the Snefonn percentages in Figure 6.2.

However, Figure 6.2 also indicates that the depreciation share of operating profit was increasing in the post-war years. This corresponds with what is known from other sources. Gjermoe (1968; 31-32) shows that, for the Norwegian shipping industry, depreciation as a percentage of operating profit before depreciation increased steadily in the two post-war decades, from approximately one third in 1945 to more than 95 per cent in 1964. Although Gjermoe's calculations are not directly comparable with my calculations,¹¹⁸ they indicate clearly that the relative importance of depreciations grew during these years as a result of the shipping industry becoming capital intensive.

Figure 6.3 shows the Snefonn statistics for 1962 – 1976. This was a period in which Snefonn had large purchases and sales of ships. As will be explained in Section 6.5.2, these gains were absorbed by depreciation, either directly or with a time lag. Therefore the depreciation amount in Figure 6.3 has been adjusted for the accounting of sales gains. As a percentage of the cost of the ships, the adjusted depreciation remained stable just below 10 per cent. As a percentage of operating profit before depreciation, it fluctuates around 70 per cent. It is easy to see in Figure 6.3 that the depreciation ratio and the operating profit are negatively correlated. The fluctuations of the upper curve are caused by variations in net income, not by variations in the depreciation amount. Thus, if there had been any tendency in Snefonn to reduce the depreciations because of low profits by the end of the 1940's, this tendency has completely disappeared from its accounting practice of the 1960's and 1970's.

¹¹⁸ Gjermoe's calculation include all depreciation, e.g. depreciation due to the amortisation of gains on sale of ships that is deducted from the Snefonn numbers.



*) Total depreciation minus depreciation charges due to sale of ships.

Figure 6.3 illustrates to what extent the tank shipping business had become capital intensive. Snefonn's depreciation ratios were representative for the large parts of the shipping industry. In 1971, for instance, the entire Norwegian international shipping industry had an operating profit before depreciation of 3,700 million kroner, and depreciations of 2,780 million kroner, which is a ratio of 75 per cent (Seland 1994; 210). Shipping profitability was declining during the 1960's and 1970's. Although world transportation demand had increased substantially in the post-war era – in particular oil transport – supply had also grown, and freight rates were down in terms of the longer perspective. Seland (1994; 164) reports oil freight rates to be 35 per cent lower in 1966 than in 1954.

From 1977 onwards (Snefonn's third financial reporting phase) the depreciation charge was split into the ordinary linear depreciation and the tax-related excess depreciation. As percentage of cost the ordinary depreciation was approximately 5 per cent, but it varied considerably from one year to another. One reason for these variations was the changes in the composition of the fleet; fully depreciated ships were sold and replaced by new ships with the

potential of high depreciation.¹¹⁹ Accumulated tax-related excess depreciation was in all years a larger amount than the accumulated ordinary depreciation, but these were inflated by the treatment of gains on the sale of ships described in the following section.

The depreciation policy was remarkably stable over the company life of Snefonn. Tax depreciation opportunities were exploited to a maximum, and since Snefonn mostly had a young fleet that qualified for high tax depreciation, the policy contributed to conservative asset measurement in the financial reporting.

6.5.2 Reporting the gains on the sale of ships

Although the policy of renewing the fleet at a rapid pace was not stated explicitly in the board reports, a retrospective view of Snefonn's activities reveals a clear and permanent strategy in this respect.

Snefonn sold a ship for the first time in 1951 and continued to sell regularly afterwards. However, it is only from 1961 that sales gains are reported as a separate item in the income statement. Of the 25 financial years from 1961 to 1985, Snefonn recognises sales gains in 19. The aggregate amount of the gains is 832 million kroner, compared with an aggregate operating profit (before depreciation) of 2,244 million kroner over the same period.

The amount of sales gains is a result of Snefonn's strategy of maintaining a modern fleet. The strategy was probably shared by a number of other Norwegian shipowners. Gjermoe (1968; 33) reports the sales gains for a representative selection of the Norwegian shipping industry to constitute one fourth of operating profit before depreciation during 1946-1964.

The importance of the sales gains is reinforced by the depreciation policies described in the previous section. The accounting gain of a sale is the difference between the net proceeds and the net book value of the ship. By exploiting all tax depreciation opportunities, Snefonn was also storing up future taxable sales gains.

Section 6.3 describes the legal system by which sales gains in shipping companies could be exempt from taxation. This system was fully exploited by Snefonn. The overall result was that the sales gains were added to the accumulated depreciation, thereby further lowering the net book value of the ships. In its details the procedure was not uniform in all the years. From 1961 to 1968 the gains are sometimes credited to the "amortisation fund" and sometimes to

¹¹⁹ Snefonn had at all times a substantial number of fully depreciated ships. On 1 January 1984, for instance,

the accumulated depreciation. From 1969 the procedure is mostly to credit the amortisation fund in the year of the sale, and transfer the same amount from the amortisation fund to the accumulated depreciation the following year.¹²⁰

The first allocation to the amortisation fund actually was carried out in the revised 1942 accounts, which were prepared and issued together with the 1946 report. By then the indemnity to be received for “Charles Racine”, the ship torpedoed during the War, had been determined, and the gain of 6 million kroner was credited to the amortisation fund. For obvious reasons Snefonn was not able to have a plan for reinvestment the following year. The amortisation fund was credited with unexplained lump sums, totalling 518,000 kroner, during 1942 – 1945, which is probably related to the deferred reinvestment.

The Snefonn practice apparently has antecedents. Napier (1990, 1991) reports a similar accounting practice in the British shipping company, P&O, from the 1870’s until 1931 (the terminal year of his two studies). Like Snefonn half a century later, P&O sold ships every year. A slight difference in the commercial practice, though, was that P&O sold ships at the end of their economic lives and thus fully depreciated. The net proceeds would by today’s standards be considered a gain on disposal, but instead P&O credited the amount to the “Stock in Ships”, thereby creating “extra depreciation”.

The purpose of the sales gains accounting of Snefonn was undoubtedly to obtain as much deferral in tax payments as possible. A secondary effect of this accounting practice was to reinforce the conservatism of the fixed asset measurements.

6.5.3 Accounting for the classification costs

How Snefonn accounted for its classification costs belongs only indirectly to the discussion about its fixed asset measurements. It is widely recognised, however, that the boundaries between depreciation and maintenance are blurred. Current accounting standards typically require periodic maintenance costs to be accounted for through depreciation. The question is therefore whether the provisions for classification costs were fair estimates of the future expenditure related to accumulated maintenance needs, or whether they were determined on another basis. Given the background of conservative fixed asset measurements that resulted

Snefonn possessed stakes in 34 ships, of which 17 were fully depreciated.

¹²⁰ It was actually reported as depreciation charge in the year of the transfer, which is the reason why the depreciation amount in Table 6.2 were adjusted for these transfers.

from the depreciation policies and the accounting for sales gains, it is of interest whether the classification cost accounting further reinforced the trend to conservatism, or whether it rather attenuated it.

As explained in Section 6.4.2, reasonable allocations to the classification fund were tax deductible. The annual reports give no reason to believe that the tax authorities have rejected Snefonn's allocations. Snefonn made its first allocation to the classification fund in 1949; the amount was 2.2 million kroner or 12 per cent of book value of the ships, and another allocation of 1.2 million kroner in 1950. There were no more movements of the fund until 1955; from that year, however, there were new allocations and use of the fund every year. The size of the fund increased almost monotonically until it reached a peak at 95.9 million kroner in 1982. Between 1949 and 1982 the end-of-year balance of the fund decreased only five times. Gjermoe (1968; 59), who analyses the post-war period until 1964, reports large fluctuations in the classification funds of a representative selection of the Norwegian shipping industry¹²¹. This observation contrasts with the development in Snefonn, which rather looks like planned accumulation of untaxed reserves.

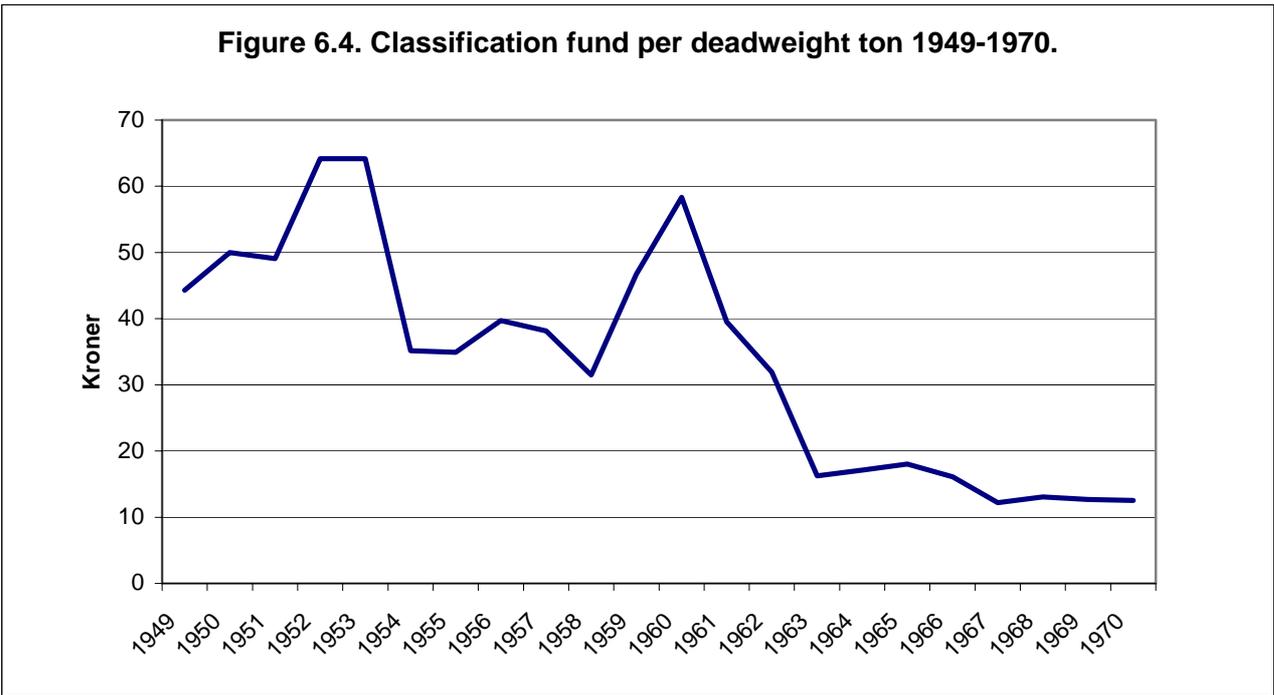
For analytical purposes the disclosures of the classification fund movements in Snefonn's financial statements are deficient until 1981. The fund grew by allocations to it, presented on a line in the income statement (albeit as an operating expense only from 1977), and the fund's balance was shown on a line within liabilities in the balance sheet. However, the use of the fund was not shown. Use of the fund to cover classification costs would reduce the balance, but a balance reduction could also be caused by the sale of ships. The classification fund was allocated to specific ships, so the sale of a ship would also mean the recognition as income of the part of the classification fund related to the ship sold. Most likely the reversal of the classification fund in the case of a ship sale was taken to income as a sales gain and treated accordingly.

Classification was normally carried out in cycles of four years, so a fleet of constant size should normally have a classification fund equal to the expected costs of two years. A growing fleet would by this logic need a provision of less than two years' cost.

¹²¹ Gjermoe has three end-of-year observations only, in 1949, 1954 and 1962, and his selection covers about 1/3 of the entire industry. In 1954 he reports a classification fund total of 3.7 million kroner, whereas Snefonn alone had a fund of 3.4 million kroner.

Since Snefonn’s classification costs can be observed in the financial statements only after 1981, we cannot discover from the accounts whether the classification fund of earlier years was reasonable or not. However, there are some sources that have estimated average classification costs for specific periods. Paulson (1947; 25) estimated the average classification costs for steamships to 2.52 kroner per dwt. per year in the period 1929 – 1938. Paulson (1949; 46) finds an average of 0.83 kroner per dwt. per year for motor tankers on time charter contracts for 1935 – 1938, but he adds that the “numbers vary so much that they cannot constitute the basis for an analysis”.

Figure 6.4 shows the size of the classification fund of Snefonn in kroner per dwt. of the fleet from 1949 till 1970. The tonnage is precise amounts until 1956 and estimated amounts based on Snefonn’s approximate share of the co-owned fleet from that year (similar to the computation of Table 6.2).



Compared with the average classification costs estimated by Paulson for the pre-war years, Snefonn’s provisions are very high. For a fair comparison one has to take into account the inflation of the post-war years and a particularly scarce shipyard capacity. Even so, a provision kept at 30 – 60 kroner per deadweight ton until 1962 seems excessive. In the second half of the 1960’s the fund was kept at levels between 10 and 20 kroner per dwt.

From 1981 onwards the gross movements of the classification fund were disclosed in the notes, and the allocation of the fund on each ship was presented in a table of the whole fleet. The information of the classification movements is reproduced in Table 6.3.

Table 6.3 Movements of the classification fund 1981 – 1985. (Thousand kroner)

	1981	1982	1983	1984	1985
Opening balance	68,800	83,150	95,900	94,900	86,950
Used during the year	5,705	0	3,041	11,153	2,060
Sale of ships	4,000	1,600	4,000	9,950	24,550
Provided during the year	24,055	14,350	6,041	13,153	2,060
Closing balance	83,150	95,900	94,900	86,950	62,400

By 1981 the classification fund per dwt. for tankers was approximately 44 kroner. Taking into consideration that the general price level was more than three times higher in 1981 than in 1965, the classification fund levels in the table may in real terms have been close to those represented by the right end of the curve in Figure 6.4. Even so, the fund levels of Table 6.3 look very comfortable. The average yearly classification cost (“used during the year”) is approximately 4.4 million kroner, so the fund typically represented something like 20 years of classification costs during the years covered by the table.

What constitutes a reasonable provisioning level for classification costs may not have been quite clear, either for the company or for the tax authorities. The uncertainty may have given room for discretion for the management of Snefonn. There is reason to believe that the room for discretion was used to obtain further tax deferrals, more so in the early years than in the more recent years. As a result the general accounting conservatism inherent in the measurement of the ship book values was further strengthened by the provisioning policy.

6.6 Concluding remarks

The history of the financial reporting of Snefonn is essentially about the development from rather rudimentary cash reports to the shareholders in the 1930’s to detailed economic analyses and overviews in the 1980’s. The development closely followed the increased reporting requirements of the Norwegian company legislation during the life of the company.

Snefonn pursued all the time a very conservative policy of fixed asset measurements. Whereas many shipping companies by the middle of the 20th century may have used the depreciations to smooth out variations in operating profit, the policy of Snefonn was rather to charge the maximum permitted by the tax laws. Accumulated depreciations were further boosted by the practice permitted in shipping companies to offset gains on the sale of ships through extraordinary depreciation credits. Although this practice was based on tax rules, it was carried out in a similar manner in the financial statements. Conservative fixed asset measurements were further strengthened by provisioning, which at least in retrospect looks quite excessive, particularly during Snefonn's early years.

Snefonn had a very stable and successful dividend policy. Given the cyclical nature of shipping it is a remarkable performance to distribute level or increasing dividends every year for more than half a century. Conservative accounting policies might have made the task easier, since there were hidden reserves that could be unwound, for instance by selling ships, in difficult years. However, there is little indication that this was the way in which the hidden reserves were actually used in Snefonn's case. Gains on the sale of ships arose as a consequence of the investment strategy that was followed, which was to run a fleet of tankers that at all times was very modern. The sales gains were systematically offset and thus were not available for dividends in the year of the sale.

Of the various possible objectives of the financial accounting, the one that remains is the tax objective. In every accounting choice discussed in this paper, Snefonn seems to have chosen the alternative that gave the most favourable tax outcome. In retrospect one may say that the taxation priority has been somewhat to the detriment of the informational functions of the financial statements. In some periods the company provided additional information about the hidden values, e.g. the insurance values commented upon in Section 6.3. Other effects of the conservative policies, e.g. that of the excessive provisioning, would be difficult for a contemporaneous outsider to discover.

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