

# **OPERATING-LEASE DISCLOSURES**

**An empirical investigation**

**Operationele leases in de toelichting op de jaarrekening**

**Een empirisch onderzoek**

**Proefschrift**

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**Prof.dr. S.W.J. Lamberts**

**en volgens besluit van het College voor Promoties.**

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**geboren te Eindhoven**

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---

<sup>1</sup> Lückerrath, Femke, (2004), "Kooos", NRC Handelsblad, 12 november 2004, p.24, en Lückerrath, Femke, (2005), "Ansichtkaart", NRC Handelsblad, 28 oktober 2005, p.24.



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## LIST OF ABBREVIATIONS

AFM	Autoriteit Financiële Markten (Dutch SEC)
DASB	Dutch Accounting Standards Board (before July 15 <sup>th</sup> , 2005, the English name was the Council for Annual Reporting (CAR))
EIA	Energie Investerings Aftrek (energy deduction tax scheme)
IFRS	International Financial Reporting Standards
FAS	Financial Accounting Standards (US)
FASB	Financial Accounting Standards Board (US)
FW1	IASB Conceptual Framework, paragraph 1
GAAP	Generally Accepted Accounting Principles
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IRS	Internal Revenue Service (US)
MDA	Multiple Discriminant Analysis
NVL	Nederlandse Vereniging van Leasemaatschappijen (Dutch Leasing association)
RJ	Guideline of the DASB (Richtlijn van de RvJ)
RvJ	Raad voor de Jaarverslaggeving (DASB)
SEC	Securities and Exchange Commission (US)
SSAP	Statements of Standard Accounting Practice (UK)
VAMIL	Willekeurige Afschrijving Milieu Investerings (early depreciation tax scheme)
WIR	Wet Investerings Rekening

## LIST OF FINANCIAL RATIOS

AP	Asset proportion (PVA/PVOL)
AT	Asset turnover
BVD	Book value of debt
CF	Cash Flow
CF <sub>e</sub>	Future lease commitment expiring in lease-expiry category e, e=1,2 or 3 meaning expiring within, –one year (e=1), –between two and five year (e=2) or, –after five years (e=3)
CF <sub>t</sub>	Future lease commitment expiring in calendar year t
CR	Current ratio
EBIT	Earnings before interest and tax
EBITDA	Earnings before interest, taxes, depreciation and amortisation
EPS	Earning per share
IC	Interest cover
LTD	Long-term debt
MTB	Market value of equity to book value of debt
MVE	Market value of equity
NI	Net income
NPM	Net profit margin
PE	Price/earnings
PVA	Present Value of (operating) leased Asset
PVOL	Present Value of Operating Lease commitments
ROA	Return on assets
ROCE	Return on capital employed
ROE	Return on equity
TA	Total Assets
TD	Total debt
WC	Working capital

## **PART I INTRODUCTION**



# CHAPTER 1 INTRODUCTION AND RESEARCH OUTLINE

## 1.1 Prologue

In 2000, the International Accounting Standards Board (IASB), in cooperation with the Financial Accounting Standards Board (FASB), issued a new proposal to change the current accounting regulation with respect to leasing to an alternative approach (IASB (2000) and Lennard and Nailor (2000)). This new lease-accounting approach, called the “asset and liability approach”, capitalises all leases on the balance sheet. This contrasts with the current lease-accounting approach, called the “risk and reward approach”, which discriminates between the recognition of financial leases on the balance sheet and the disclosure of operating leases off the balance sheet. Although also the new approach has many opponents, both the IASB and the FASB voted in July 2006<sup>2</sup> to add to its agenda again the project on leasing. This project is expected to result in a discussion paper in 2008 that will fundamentally change the way lease contracts are recognised in the financial statement of lessees and lessors (IASB (2006)).

In 2003, the former chairman of the Securities and Exchange Commission (SEC) Arthur Levitt argues that since the collapse of Enron<sup>3</sup> the SEC needs to grapple with several issues. One of these issues is that investors should ask the following questions: *‘Should companies still be allowed to leave billions of off-balance-sheet debt, such as lease financing, out of a company’s reported liabilities? Off-balance-sheet debt persists, distorting the financial picture investors have been given in companies in many sectors. Markets will discipline themselves and their participants, but only if they have accurate information.’* (Levitt (2003)). In other words, he questions whether the current lease-accounting standards that allow operating leases to be disclosed in the footnotes to the financial statements should remain in place. At the other hand, the Dutch Accounting Standards Board (DASB)<sup>4</sup>, *argues that the elimination of the off-balance sheet character of operating leases will ‘place an undue requirement on a lessee to recognise assets used, but not controlled, by the enterprise’*. And although the DASB supports the initiative to review the current manner of accounting for leases, they suggest *to maintain the current lease accounting standard with additional prescriptive guidance that may address the problems with the existing standard*. In short, the above is the subject of this thesis; Does lease financing indeed distort the financial picture? Do market participants have sufficiently accurate information? Moreover, could additional requirements address (some of-) the problems with the existing standard?

The remaining of this introduction is set up as follows; section 1.2 describes the aim and the relevance of this study. This section also presents the main research questions of this study. Section 1.3 presents the position and contribution of this study to previous research, by first, defining accounting theory and accounting

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<sup>2</sup> The introduction of a new lease-accounting standard did not have the highest priority in 2000 and probably suffered from the attention given to the introduction of the International Financial Reporting Standards (IFRS)

<sup>3</sup> In short: on December 2<sup>nd</sup> 2001, Enron Corporation, one of the largest corporations in the world, filed for bankruptcy. This was mainly caused by its hundreds of Special Purpose Entities (SPEs), which under the US GAAP did not have to be consolidated in the Enron annual accounts, which were afterwards said to be misleading.

<sup>4</sup> Until July 15<sup>th</sup>, 2005, the Dutch Accounting Standards Board (DASB) was known as the Council for Annual Reporting (CAR).

<sup>5</sup> Chairman of the DASB, Johan van Helleman, in a comment letter of August 3<sup>rd</sup>, 2000, to the G4+1 Position Paper on Leasing IASB (2000)

research approaches (1.3.1), and subsequently, places this study within this accounting research spectrum (1.3.2). Section 1.3.2 also shows the outline of this study.

## 1.2 Aim and relevance of the study

In 1976, Miller and Upton began one of their articles with the statement that, ‘ the contrast between the economist's approach and the accountant's approach to problems of corporate decision-making is nowhere better illustrated than in the lease-or-buy decision’ (Miller and Upton (1976, p.1)). The neoclassical economist's choice between leasing and buying depends on non-financial advantages (such as maintenance, disposal, etc.), assuming that the purely financial costs of both choices are equivalent. The accountant, however, takes the non-financial advantages as equal, and his choice depends on *presumed* (financial) advantages of one method over the other. Although the article of Miller and Upton focused on the tax implications of the choice, the contrast between the two professions today with respect to leasing is still relevant. Brealey and Myers (2003) distinguish between sensible economic reasons for leases (offering convenience, tax advantages) and non-sensible accounting reasons for leases (bringing operating leases off the balance sheet to show a better financial performance), (Monson (2001) and Brealey and Myers (2003)).

This study focuses on operating leases and not on financial leases. First of all, this is because the off-balance-sheet character of operating leases is the main issue behind the discussion on the lease-accounting standard. The off-balance-sheet character allows a lease to be structured in such a way that it is less transparent; this has caused many authors to question whether this does not distort the financial picture of a company (see, for example, Levitt (2003) and SEC (2005)). Second, operating leases are by far the dominant lease type, compared to financial leases. This was established, for example, by the SEC in the US<sup>6</sup> (SEC (2005)), and by Beattie, Goodacre and Thomson (2006) in the UK.

The relevance of the disclosure instead of capitalisation of operating leases can be seen in the intensified research and interest from both the IASB and FASB (IASB (2006)) on their proposals that urge capitalisation of all leases on the balance sheet (IASB (2000) and Lennard and Nailor (2000)). The disclosure of important accounting information has been a hot topic ever since the Enron debacle. The Enron case boiled down to the abuse of accounting standards to show a better financial performance; in the end, such manipulation only harms the users of the financial statements. One of the reactions following the bankruptcy of Enron was the Sarbanes-Oxley Act<sup>7</sup>. This act has as its objective (p.1 of the act) to ‘protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws’. In 2005, the SEC released a report on off-balance-sheet activity as required by section 401 (c) of the Sarbanes Oxley Act (SEC (2005)). This report is clear in its opinion of the current lease accounting standards and

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<sup>6</sup> The SEC report showed that for their sample of 200 companies approximately 77% of all companies report operating leases as opposed to 30% reporting financial leases; the future commitments under operating leases were USD 205 billion as opposed to USD 16 billion financial leases. Beattie et al. (2006) showed that of the companies in the FTSE100, 65% had financial leases and 92 had operating leases; the median ratio of operating leases to financial leases was 6.2.

<sup>7</sup> An act issued by the Senate and the House of Representatives of the United States of America in Congress assembled on January 23, 2002.

what it enables; the SEC (p.63) argues that ‘many issuers involved in leasing, structure their lease agreements to achieve whatever accounting objective is desired. This structuring of leases in order to meet various accounting, tax and other goals has become an industry in itself during the last 30 years’.

The study aims to contribute to the discussion of whether the current (international) lease-accounting standards best serve the users of the financial statements. This will be evaluated from two perspectives: first, the perspective of the individual user of the financial statements, and second, the perspective of a company’s management who decide to become (heavily) involved in operating leases. The study will evaluate whether the disclosed information on operating leases is useful from the perspective of the individual user of the financial statements. If the information required on operating leases is neither transparent, nor sufficiently complete nor reliable, and subsequently does not allow a fair comparison between high- and low-leasing companies, then adjustments to the accounting standard on operating leases might be appropriate. Second, a change in the accounting standard with respect to operating leases is also desirable if companies deliberately use the current off-balance possibilities to influence the accounting information. This is separately investigated for companies facing bankruptcy. Therefore, the study is divided in three main parts, first, the decision usefulness of operating lease disclosure for individual users of the financial statements; second, the determinants of the operating-lease decisions by company’s management; and third, whether operating leases have predictive power in financial distress prediction models.

Therefore, the study’s relevance lies in the improvement of the lease-accounting standard. The results of this study might assist standard setters in adjusting the accounting standards with respect to operating leases in such a way that it benefits the users of the financial statements and maintains the sensible economic advantages of leasing for companies. Bowen (1999) analysed the economic determinants of accounting method choices, and he argued that the results should be useful for standard setters. ‘Standard setters must understand the economic motives underlying accounting choices in order to determine how the flexibility allowed in financial reporting is being utilised’, (Bowen, 1999, p.30.)

The descriptive research in this study will be supported by empirical studies using Dutch data. The Netherlands is interesting for this study for three reasons: first, virtually no research has been done with Dutch leasing data; second, operating leasing seems to be a significant source of financing in the Netherlands; and third, comparable studies have been done for the United States, the United Kingdom, Belgium, Australia and New Zealand, which makes international comparison possible.

The main research question of this thesis builds upon the opinions of both the SEC and the DASB as described in the prologue and is formulated as follows:

**Main research question:**

*“While the on-balance treatment of operating leases has both many opponents as proponents, an intermediate solution might be acceptable for both sides: How can the current lease-accounting standard be improved?”*

The purpose of this thesis is twofold, first to investigate whether the current lease-accounting standard provides sufficient transparent information to the user of the financial statement and second whether the current-lease accounting standard drives the decision to choose operating leases instead of sensible business reasons arising from company characteristics. Because the latter is separately investigated for companies facing bankruptcy or financial-distress, three sub questions are deducted from the central research question:

- 1. Do the requirements of the current lease accounting standards regarding operating lease disclosures, result in useful information to individual users of the financial statements?*
- 2. What company characteristics determine whether a company has a high- or low- operating lease intensity?*
- 3. Do financial distressed companies have a higher operating-lease intensity than healthy companies?*

These questions each relate to a different area of accounting research. This is shown in the next section.

### **1.3 Position and contribution of this study to prior research**

As described above, a difference exists between the evaluation of (operating) leases based on the financial advantages and based on the accounting implications of (operating) leases (the economist approach versus the accountant approach, as described by Miller and Upton (1976)). However, finance and accounting research can be very closely related. For example, as Watts and Zimmerman (1986) describe, the efficient-market hypothesis, which found its base in the economics and finance literature, eventually had a major impact in accounting research. In order to understand where this study fits within the accounting research spectrum and what the contribution of this research will be, the next subsection compares the prior literature on leasing with the existing accounting theories.

#### **1.3.1 Accounting theories**

In 1977, the Committee on Concepts and Standards for External Financial Reports (the “Committee”) of the American Accounting Association (“AAA”) published the Statement on Accounting Theory and Theory Acceptance (American Accounting Association (1977)). This statement explored certain theoretical approaches to accounting. According to the Committee (p.1), ‘there has been a persistent, widely held belief among accountants that the accumulation of accounting theory would



eventually lead to a compelling basis for specifying the content of external financial reports'. In the view of the Committee, 'a single universally accepted basic accounting theory does not exist at this time. Instead, a multiplicity of theories has been proposed' and 'it is unrealistic to expect accounting theory to provide unequivocal policy guidance' (p.51). More recently, this was confirmed by Riahi-Belkaoui (2000, p.65), who states that 'it must be recognised that no comprehensive theory of accounting exists at the present time'. Riahi-Belkaoui maintains that the primary objective of accounting theory is to provide a basis for the prediction and explanation of accounting behaviour and events.

The AAA identified three basic theoretical approaches: (1) classical models, (2) decision usefulness and (3) information economics. The three approaches ("paradigms") defined by AAA were discussed extensively by Riahi-Belkaoui (2000). Appendix 1.I summarises the findings of both publications. In short, these three approaches can be described as follows:

**(1) Classical models**

Within the classical models, a distinction can be made between normative (measuring true income) and positive theories. Whereas normative theories are concerned with prescription (what ought to happen), positive theories are concerned with explanation and prediction (what does/will happen) (Ryan, Scapens and Theobald (2002)). Watts and Zimmerman (1986) describe the positive accounting theory extensively.

**(2) Decision usefulness**

While for the normative theories the primary goal was to determine a measure of true income, researchers in the 1970s became aware of the fact that financial reporting is concerned with providing information to various decision makers. Various income-determination models might be used for different purposes. This led to decision-usefulness research (see Beattie in Ryan et al. (2002).) Although the decision-usefulness approach did not succeed in providing the logical basis for accounting choices, it did stimulate two principal types of empirical study: behavioural accounting research (focused on the decision outcome of the individual user) and market-based accounting research (focused on the decision outcome and market security prices).

**(3) Information economics**

Information economics treats information as a conventional economic commodity, the acquisition of which constitutes a problem of economic choice (American Accounting Association (1977, p.21)). This approach is concerned with the costs and prices of information. Rationality is the major assumption underlying this approach.

Although the accounting research approaches in as shown in Appendix 1.I can be useful in defining the research spectrum of a study (such as this study), it is not possible to pinpoint each study in exactly one specific theoretical approach. First, when looking at the main research question of this study, it can be argued that the decision-usefulness approach is the basis for further research on operating-lease disclosure, since transparency and reliability of the disclosed information is the subject of this study. However, this study also seeks to investigate *why* some companies use more leases than other companies, and whether these companies deliberately choose an accounting method that is less useful in decision-making. As

mentioned before, the decision-usefulness approach did not succeed in providing a logical explanation for accounting choices. Research on accounting choice (see, for example, Fields, Lys and Vincent (2001) and El-Gazzar, Lilien and Pastena (1986) on the decision to lease) found its base in the positive accounting research. For example, the debt hypothesis, as first described by Watts and Zimmerman (1986), is connected with the decision to lease, described by El-Gazzar et al.(1986).

Another example of the overlap is the effect of corporate disclosure on the efficiency of capital markets. This has been investigated in general (as disclosure is critical to efficient capital markets, according to Healy and Palepu (2001)), but also specifically, with respect to lease capitalisation. Efficient capital market research has been classified in the decision-usefulness approach (see Appendix 1.I). But again, efficient capital markets are also the subject of positive accounting theory and accounting choices as described by Fields et al. (2001), which classified the accounting choice literature in three groups based on the capital market imperfections that makes accounting important in a given setting: agency costs, information asymmetries and externalities affecting non-contracting parties. The first two were described extensively in the positive accounting theory of Watts and Zimmerman in 1986.

Finally, Beattie (in: Ryan et al. (2002)), states that positive accounting research relies to a considerable extent on finance theories such as the capital asset pricing models and the efficient-market hypothesis. Holthausen and Leftwich (1983) also explicitly mention in a footnote (p.77) that most theories explaining the link between firms, cash flow and reported accounting numbers are commonly referred to as positive theories. This classification of 'positive theory', however, is not their distinguishing feature, since most research in accounting is positive, according to Holthausen et al. (1983).

A more precise classification was therefore needed. Competition between the three abovementioned paradigms led to new streams in accounting research, whereby each new approach acquired the attributes of a distinct paradigm, causing accounting to become a multi-paradigmatic discipline (Riahi-Belkaoui (2000)). These new approaches found their base in the paradigms described above, but are more refined, are summarised in Table 1.1.

**Table 1.1 Accounting Research Approaches (Riahi-Belkaoui (2000))**

APPROACH	OBJECTIVE	RELATED STUDIES
<b>Events approach</b>	To maximise forecasting accuracy of accounting reports	Studies focusing on real events that are transformed by the user to accounting information
<b>Behavioural approach</b>	To explain and predict human behaviour	Five general classes of studies: 1. Adequacy of disclosure 2. Usefulness of financial statement data 3. Attitudes about corporate reporting practices 4. Materiality judgements 5. Decision effects of alternative accounting procedures
<b>Human Information Processing approach</b>	To improve both the information set presented to users of financial data and the ability of the user to use the information	Studies related to: 1. Input of variables that affect the way people process information 2. Processing of information 3. Judgement, prediction or decisions that affect how information is processed.
<b>Predictive approach</b>	To solve the problem of evaluating alternative methods of accounting measurements; predictive ability is related to one purpose of gathering accounting data: facilitation of decision-making	Studies related to: 1. Prediction of an economic event (including time-series analysis, distress prediction and bond ratings) 2. Prediction of market reactions: market-based research in accounting, such as capital market models, efficient market hypothesis
<b>Positive approach</b>	To understand, explain and predict existing accounting practices	Studies on what factors are likely to affect the optimum choice, guided by the assumption of agency and contracting cost theories.

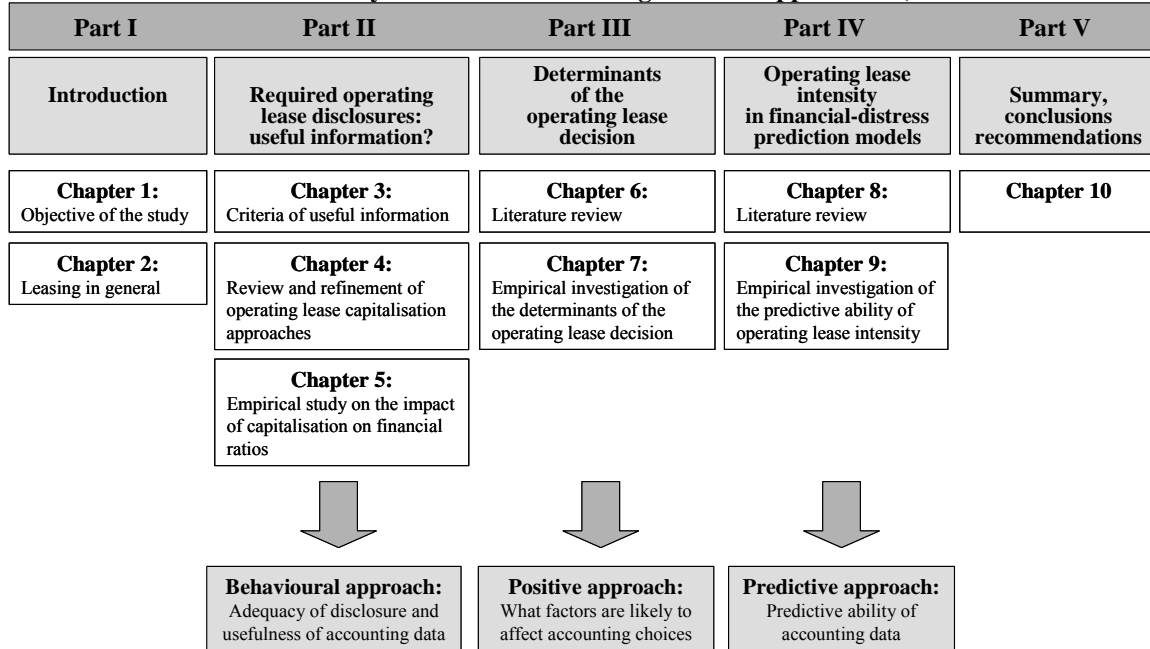
In the next sub-section the three research questions of this study will be placed in these accounting research approaches. Appendix 1.II summarises previous studies with respect to (operating-leasing) and their placement within the (accounting-) research areas.

### 1.3.2 This study within the accounting research spectrum

This study (see section 1.2) aims to contribute to the discussion on whether operating leases should be capitalised on the balance sheet instead of disclosed in the footnote of the financial statements. First under investigation will be the usefulness of the information provided in the footnotes to the financial statement for the users of these financial statements (decision usefulness). Integral to this question is whether the operating-lease commitments are of a material amount, because only then does the entire study make sense. Second, it is questioned what determines the choice of a company's management of operating leases, with an emphasis on the determinants following from the lease-accounting standard (accounting choice)? Third, the study will investigate whether bankruptcy-prediction models would improve if they would include operating leases as an explanatory variable.

This study contains five parts, including an introductory part and a concluding part. The three parts in-between, as shown below, have, due to the particular research questions addressed, their own prior research- and literature section, their own hypotheses or research questions, and methods used for empirical testing.

Figure 1.1 Outline of this study and related accounting research approaches (as described in Table 1.1)



**Chapters 1 and 2** describe the objective of this study and leasing in general.

Whereas this chapter is an introductory chapter on the research subject and research outline, chapter 2 will especially show the specific circumstances with respect to operating leases, with an emphasis on the Netherlands. These particular circumstances, such as the legal aspects, operating leases as opposed to financial leases in volume- and in accounting treatment, and the growth of the leasing industry, will once more underline the relevance of this study.

**Chapters 3, 4 and 5** address the first research question: Do the requirements of the current lease accounting standards regarding the disclosure of operating leases result in useful information to the individual user of the financial statements? The off-balance sheet character of operating leases has an impact on the financial ratios derived from on-balance number. These financial ratios are used in many ways to measure performance— for example, by rating agencies, in financial databases, in management compensation contracts, and in debt contracts. As described by Bowen, DuCharme and Shores (1999), even when neither explicit nor implicit agreements exist, stakeholders may rely on reported accounting numbers in order to make decisions. The impact of operating lease capitalisation on key financial ratios has been investigated using different capitalisation procedures (see Appendix 1.II). The impact that lease capitalisation has on key financial ratios might influence the perceived financial performance of the analysed company and the decisions following from the financial analysis. The first research question investigates whether the disclosed information on operating lease is sufficiently complete and reliable to enable users of the financial statements to capitalise the operating lease commitments. This is will only be relevant when the operating lease commitments are of a material amount.

Therefore, answering the first research question will address the following sub-questions:

- When is accounting information useful for decision-making?
- Does the accounting standard on operating leases fulfil the requirements of decision usefulness?
- How can operating-lease commitments be capitalised?
- Are the operating-lease commitments of a material amount?
- How sensitive is the capitalisation of operating leases to assumptions made by the individual user?
- What is the impact on financial ratios if operating leases are capitalised?
- Do the different capitalisation approaches arrive at consistent and comparable results?

This study improves on the existing capitalisation approaches and investigates whether the available capitalisation methods arrive at significantly different outcomes. Significant different outcomes imply different evaluations of the financial performance of a company or its managers, and therefore different decisions taken, merely by choosing one method over another. This research first describes in chapter 3 the criteria of decision usefulness, as defined by accounting-standard setters such as the IASB and the DASB. Chapter 4 describes the capitalisation approaches that have been previously been developed by different researchers. Chapter 5 then empirically tests the criteria of decision usefulness using the financial statements of 119 Dutch listed companies during the period 2000-2004. The chapter also tests the sensitivity of the results to the assumptions and capitalisation approaches.

**Chapters 5 and 6** address the second research question: What company characteristics determine whether a company is a high- or low-leasing company?, or in other words, what are the determinants of the operating lease decision?

These chapters investigate whether companies with substantial operating-lease commitments have specific characteristics. This provides greater insight into the determinants of the leasing decision. Since an important question is whether the *accounting reason to lease* instead of the economic reasons to lease is an important driver in the leasing decision, prior research on accounting choice will be described. In 2001, Fields et al. described accounting choice, including also a classification of the choice between operating and financial leases (see p.262). They also describe in depth the debt hypothesis (managers select or change accounting methods to avoid covenant violations). Several researchers have investigated especially the accounting choice for leasing. Many researchers, however, investigate the choice for financial leases instead of operating leases. Also the studies that do investigate the determinants of operating leasing choice do not take into account the capitalised value of the leases. This study investigates the determinants of only operating leasing choice. Additionally, this study will take into account the impact on the some of the determinants of the capitalisation of operating leases (as described in chapters 4 and 5) as opposed to the approach of previous studies in using only the unadjusted variables. This might add valuable new information on the leasing decision<sup>8</sup>.

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<sup>8</sup> For example, the before-capitalisation leverage ratio might not show any statistical explanatory power because the company's goal was to lower leverage, and they might have succeeded in this goal. Thus, taking the after-capitalisation debt-ratios of the company may have more explanatory power to uncover the true reason for this particular accounting choice.

Questions addressed in part III:

- What determines the choice of a company's management regarding operating leases?
- What are the characteristics of high-leasing companies as opposed to low-leasing companies?
- Do these characteristics conform to what might be expected according to the accounting-choice literature?

**Chapters 8 and 9** address the third, and last, research question of this study: Do financial distressed companies have a higher operating-lease intensity than healthy companies? These chapters will investigate the use of operating leases as explanatory variable in financial-distress prediction. Financial distress is a characteristic that is not present in the dataset of the Dutch listed, healthy, companies used in the chapters 6 and 7. In addition, financial-distress or bankruptcy-prediction is often based on financial ratios, which ratios will change when operating leases instead of financial leases are chosen (the impact of operating-lease capitalisation as described in chapters 4 and 5). Therefore, the use of operating leases by companies in financial distress, compared to their use among healthy firms, is investigated. Operating leases have been incorporated in bankruptcy prediction by Elam (1975), Altman, Haldeman and Narayanan (1977) and Lawrence and Bear (1986). This study contributes at least two items to this prior research. First, the previous studies are rather outdated. Twenty years ago, leasing was still innovative, and not transparent; nowadays, it is a substantial form of financing, and more information on operating leases has become available during the last ten years. Second, the statistical approach used in the previous studies (multiple discriminant analysis) is updated since; nowadays, logistic regression is preferred in financial-distress prediction. Both arguments provide a call for a more reliable study, regardless of the outcome of the investigation. Questions addressed in this part are:

- What are the previously dominant accounting variables used in financial-distress prediction?
- Are these accounting variables affected by the capitalisation of operating leases?
- Do financial distressed companies use relatively more operating leases?
- Does the inclusion of operating-lease commitments in financial-distress prediction models improve their classification accuracy?

### **Limitations of the study**

This study does not pretend to be the first study addressing (parts of-) these research questions (see also Appendix 1.II). However, this study extends previous research on several aspects. These aspects will especially become clear in each of the following chapters addressing the specific research questions. This study extends previous studies especially on 1) the impact of operating lease capitalisation on financial ratios (including the capitalisation approach, 2) whether the information is sufficiently complete to enable the capitalisation, and 3) on the determinants of the lease-decision (including the non-financial advantages as preserving debt capacity but excluding the lease-or buy-decision as an optimal investment decision).

Furthermore, this study does not answer the question what ultimately serves best the user of the financial statements: all leases on the balance sheet or maintaining the distinction between financial- and operating leases. In my opinion, that discussion is more extensive than only limited to leases. It contains the underlying question whether all kinds of (long-term-) rights and obligations should be capitalised on the balance sheet, regardless of legal- and/or economic-ownership.

This is also acknowledged by for example the IASB who suggest to exclude executory contracts from the proposed lease-accounting standard, based on the idea that the 'both parties are still to perform to an equal degree the actions promised by and required of them under the contract' (IASB (2000, p.11)). This is subject to discussion while the distinction between leases and executory contracts will again bring a degree of artificiality and arbitrariness again in the lease-accounting standard (comment letters to the IASB (2000) proposal). This study does contribute to the knowledge how important the accounting reason to lease is and how the distinction between financial- and operating leases determines the choice for operating leases.

Finally, part II addresses the decision usefulness of information in the financial statements and especially with respect to operating leases. This is done by connecting the qualitative criteria of useful information, with previous research on the use of financial ratios by users of the financial statements and the possible impact operating leases might have on these financial ratios. However, no research has been undertaken amongst users of financial statements in order to directly investigate their attitude towards the decisions usefulness of information disclosed on operating leases. Such a study might be worthwhile to carry out in the future.

This introductory part will now continue with a general description of the specific aspect concerning operating leases (in the Netherlands) in the next chapter 2.

## Appendix 1.I : Accounting research approaches

	OBJECTIVE	BASIC SUBJECT	THEORIES	METHODS
<b>CLASSICAL APPROACH</b>				
* <b>Inductive school</b>	To understand, explain and predict existing accounting practices	<ul style="list-style-type: none"> <li>▪ existing accounting practices</li> <li>▪ management attitudes towards those practices</li> </ul>	<ul style="list-style-type: none"> <li>▪ information economics</li> <li>▪ analytical/agency models</li> <li>▪ income smoothing/earnings management hypotheses</li> <li>▪ <b>positive theory of accounting</b></li> <li>▪ price level adjusted accounting</li> <li>▪ replacement cost accounting</li> <li>▪ deprivation-value accounting</li> <li>▪ continuously contemporary (net realisable value) accounting</li> <li>▪ present-value accounting</li> </ul>	<ul style="list-style-type: none"> <li>▪ techniques used in income smoothing research, earnings-management research and positive theory research</li> </ul>
* <b>Normative Deductive school</b>	To present an alternative to the historical cost model	<ul style="list-style-type: none"> <li>▪ constructing theory based on logical and normative reasoning and conceptual rigor</li> <li>▪ a concept of ideal income based on another method than the historical cost method</li> </ul>		<ul style="list-style-type: none"> <li>▪ general analytic reasoning</li> </ul>
<b>DECISION-USEFULNESS APPROACH</b>				
* <b>Decision-usefulness / <u>decision model</u></b>	Information relevant to a decision model is determined and then implemented by choosing the best accounting alternative.	<ul style="list-style-type: none"> <li>▪ the usefulness of accounting information to decision model</li> </ul>	<ul style="list-style-type: none"> <li>▪ theories that deal with different kinds of business decision-making including <b>buy-versus-lease decision</b></li> <li>▪ theories that deal with different economic events that may affect a going concern (including bankruptcy, bond ratings, takeovers)</li> </ul>	<ul style="list-style-type: none"> <li>▪ empirical techniques to determine the predictive ability of selected items of information. General approach has been discriminant analysis to classify into several <i>a priori</i> groupings</li> </ul>
* <b>Decision-usefulness / decision maker</b>				
<b>aggregate market behaviour</b>	The decision usefulness of accounting information can be derived from aggregate market behaviour	<ul style="list-style-type: none"> <li>▪ the aggregate-market response to accounting variables</li> </ul>	<ul style="list-style-type: none"> <li>▪ based on the theory of capital market efficiency. A change in information will automatically result in new equilibrium. Theories include: <ul style="list-style-type: none"> <li>▪ Efficient market model</li> <li>▪ Efficient market hypothesis</li> <li>▪ Capital asset pricing model</li> <li>▪ Arbitrage pricing theory</li> <li>▪ Equilibrium theory of option pricing</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ market model</li> <li>▪ beta-estimation models</li> <li>▪ event study methodology</li> <li>▪ Ohlson's evaluation model</li> <li>▪ Price-level balance-sheet evaluation models</li> <li>▪ Information content of earning models</li> <li>▪ Models of the relation between earnings and return</li> </ul>
<b>Individual user</b>	Behavioural accounting research is the study of how accounting functions, and reports the influence the behaviour of accountants and non-accountants	<ul style="list-style-type: none"> <li>▪ the individual user response to accounting variable. Accounting is viewed as a behavioural process.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Behavioural accounting theories borrowed from other disciplines to explain and predict human behaviour in an accounting context.</li> </ul>	<ul style="list-style-type: none"> <li>▪ interviews</li> <li>▪ questionnaires</li> <li>▪ experiments</li> </ul>
<b>INFORMATION / ECONOMICS APPROACH</b>				
	Accounting information is evaluated in terms of its ability to improve the quality of the optimal choice.	<ul style="list-style-type: none"> <li>▪ information is an economic commodity</li> <li>▪ acquisition of information amounts to a problem of economic choice</li> </ul>	<ul style="list-style-type: none"> <li>▪ theory of teams</li> <li>▪ statistical decision theory</li> <li>▪ economic theory of choice</li> </ul>	<ul style="list-style-type: none"> <li>▪ analytical reasoning</li> </ul>



## Appendix 1.II: Objectives of previous studies with respect to leasing and their accounting research approach

Leasing has been the subject of many finance and accounting studies. Leasing as a research subject can be divided into three main discussions areas; first, the lease decision; second, the substitutability of leasing and debt, and third, the impact of lease capitalisation on key financial ratios. These areas are summarised in the following table.

OBJECTIVE	ACCOUNTING RESEARCH APPROACH	STUDIES
<b>I. The leasing decision, focussing on either:</b>		
1) Measurable financial variables	Theories of optimal investment decisions, lease-or buy, highest net present value	Myers, Dill and Bautista (1976), Miller and Upton (1976), Smith and Wakeman (1985), Lewellen, Long and McConnell (1976; Franks and Hodges (1987; Grenadier (1995), Sharpe and Nguyen (1995), Trigeorgis (1996),Herst (1983)
2) Non (-direct) financial advantages	Positive approach (accounting choices, financial contracting theory)	Lasfer and Levis (1998), Monson (2001), Mehran, Taggart and Yermack (1999), El-Gazzar et al. (1986), Sharpe and Nguyen (1995), Smith and Wakeman (1985)
<b>II. The lease-debt-substitutability</b>		
	Positive approach, as well as theories of optimal investment decisions (see the lease-or-buy decisions)	Lewellen and Emery (1980; Slovin, Sushka and Polonchek (1990; Lewis and Schalheim (1992), Ang and Peterson (1984), Beattie, Goodacre and Thomson (2000b), Bowman (1980), Deloof and Verschueren (1999)
<b>III. Operating lease capitalisation, either</b>		
1) Impact on financial ratios	Behavioural approach, usefulness and materiality of accounting data	Beattie, Edwards and Goodacre (1998), Goodacre (2001), Imhoff, Lipe and Wright (1991), Imhoff, Lipe and Wright (1997), Bennet and Bradbury (2003), Elam (1975), Wilkins and Zimmer (1983), Monson (2001)
2) Relation with equity risk	Predictive and behavioural approach, testing market efficiency	Slovin et al. (1990; Ely (1995), Beattie, Goodacre and Thomson (2000a), Lipe (2001)

I. **The leasing decision** can be split into research relating to either financial advantages or to non-financial drivers.

**Financial advantages**, the “lease-or-buy” decision, concerns research based on the financial and/or tax differences between leasing an asset and buying the asset. The lease-or-buy decision is more a finance research subject than an accounting research subject (which also can be seen by the number of times that the *Journal of Finance* is the publishing journal). It is very much focused on the direct financial advantages of leasing, particularly on the tax differential between lessee and lessor. The information analysed for the purpose of these studies is mainly financial data (differential tax rates, cash-flow implications of leasing) rather than accounting data. Often assumptions

are made of perfectly competitive capital markets with no transaction costs or information asymmetries (see also Sharpe and Nguyen (1995)), and most of the analyses involve analytical reasoning (choosing leasing instead of buying if leasing has a higher net present value). Most research is based on the Myers, Dill and Bautista model, which does not consider the determinants of optimal capital structure and assumes that the firm has excess debt capacity (Myers et al. (1976))<sup>9</sup>. In the Netherlands an extensive study in this area has been undertaken by Herst (1983). Riahi-Belkaoui (2000) explicitly places the lease-buy decision within the decision-usefulness/decision model approach (see Appendix 1.I). In addition, Riahi-Belkaoui places all finance theory-related research (concerning efficient markets, capital asset pricing model, etc.) within the predictive approach (market-based research). Although this is true when using accounting data, this finance research, as described, focuses on the decision to lease based on NPV-calculation using financial data; this research should therefore be classified within the theories of optimal investment decisions.

**Non-financial drivers**, or non-direct financial advantages, concern research focused on aspects other than choosing the alternative with the highest net present value. Aspects considered include maximizing convenience, preserving debt capacity, avoiding agency costs, and avoiding breach-of-debt covenants. As described before, Brealy and Myers (1998) define some of these non-financial drivers as sensible business decisions (together with the financial drivers), but the decisions are based on keeping the debt off the balance sheet (preserving debt capacity) as a non-sensible accounting reason. The accounting reason to lease is the subject of a specific part of the positive accounting research namely research on accounting choice. The accounting-choice literature describes whether accounting matters. Accounting choice is defined by Fields et al. (2001) as any decision whose primary purpose is to influence the output of the accounting system in a particular way. El-Gazzar et al. (1986) argue that the differences in accounting choice with respect to leasing result from debt covenant constraints, compensation plans based on income and political costs. Accounting choice research is part of the positive approach.

**II. Lease-debt substitutability studies** have close link to the lease-buy decision based on financial drivers. Most researchers of lease-buy decisions also address lease-debt equivalence. However, the discussion of whether leases are substitutes of, or complements to, debt is also based on capital structure theories, accounting choice and the related financial contracting theory. This theory suggests that a firm's characteristics affect its contracting costs, and these costs impact the choice between alternative forms of finance, debt or equity, or classes of fixed-claim finance, such as debt and leasing (Beattie et al. (2000b)). Furthermore, the accounting part of this type of research (in contrast

<sup>9</sup> The Myers, Dill and Bautista model takes the following form:

$$NPV = I_0 - \sum_{t=1}^n \frac{L_t(1 - \tau_c) + \tau_c \Delta_t}{(1 + r^*)^t}$$

where NPV is the net present value of the lease (to the lessee),  $I_0$  is the initial investment at time 0,  $L_t$  is the lease payment at time  $t$ ,  $\tau_c$  is the corporate tax rate,  $\Delta_t$  is the amount of depreciation at time  $t$ , and  $r^*$  is the after-tax cost of debt. This model will be discussed in chapter 4.

to the finance lease-buy research) on the lease-debt substitutability does use accounting data instead of financial data. For example, Beattie et al. (2000b) conducted empirical research on lease-debt substitutability and used variables as debt ratio, expected growth, liquidity and profitability. These ratios are not used in finance research or in the above-described model of Myers, Dill and Bautista.

**III. Operating lease capitalisation** split into either the impact on key financial ratios or the relation with the stock market.

- **The impact on key financial ratios** is often investigated by researchers who mention the use of these ratios in decision-making by users of the financial statements Monson (2001) argues that users (equity investors) analyse the performance of companies based on certain ratios, which are compared with ratios of prior periods or with those of other companies or industries. The extent to which such analyses lead to different conclusions about the creditworthiness or performance of a lessee, due to data differences that result entirely from selecting one accounting convention over another, affects directly the relevance of the data being analysed.
- **The relation with equity risk** concerns studies that investigate stock-market response and uses capital market theories. This refers to the decision-usefulness/decision-maker/market aggregate approach (see Appendix 1.I) or the predictive approach in (Table 1.1).



## CHAPTER 2 LEASING IN THE NETHERLANDS

### 2.1 Introduction

This chapter provides a general description of leasing, with a specific look at the situation in the Netherlands. The purpose is to give an overview of the area in which this study takes place, and to illustrate the timely nature and relevance of this study. This will be done by addressing certain questions: What are the reasons that companies choose leasing instead of non-leasing debt alternatives? What differentiates leasing from other corporate claims? What are the legal, accounting and tax aspects of (operating-) leases, and what distinguishes an operating lease from a financial lease? How are operating leases and financial leases related in terms of disclosure and volume in the financial statements? How important are leases in terms of volume?

This chapter is set up as follows; section 2.2 describes the basic concept of leasing, including the reasons to choose leasing and the differences between (operating) leases and other financial contracts. Section 2.3 describes the legal aspects with respect to leasing and the legal status of Dutch accounting standards. Section 2.4 describes leasing as defined and regulated by the Dutch accounting guidelines, including the differences between financial and operating leases. A comparison is made between the Dutch lease-accounting standard, the International Financial Reporting Standards<sup>10</sup> (IFRS), and the lease-accounting standards in the US and the UK. A comparison is also made between the lease classification in the accounting standard and the tax lease classification. Section 2.5 evaluates the proposal to change the lease-accounting standard, including the comments on the lease-accounting reform. Section 2.6 describes how leasing is used worldwide and in the Netherlands; section 2.7 concludes.

### 2.2 Concept of leasing

Although leasing is often referred to as a relatively new way of financing, leasing has ancient roots. Clay tablets were discovered in 1984 that show that leasing occurred already in the year 2010 B.C., when the priests who governed the ancient Samarian city of Ur rented agricultural tools and land to farmers. Also the Romans, the Greeks and the ancient Egyptians engaged in leasing. The ‘hell-or-high-water’ clause in many lease contracts<sup>11</sup> originates from these days; ships were often the subjects of a lease. From 1900, leases were used more often, especially in the railroad industry. The real growth in the leasing industry came only after the 1950s, however, when different companies were established that specialised as intermediaries in leasing transactions. The first of these was established in 1954: U.S. Leasing Corporation. Many others followed, and the economic advantages

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<sup>10</sup> International Accounting Standards (IASs) are developed by the International Accounting Standards Committee (IASC), whose purpose is to develop a single set of global accounting standards. With regard to the restructuring of the IASC, the new Board on 1 April 2001, as one of its first decisions renamed the IASC as the International Accounting Standards Board (IASB); with regard to future international accounting standards, the Board renamed IAS as International Financial Reporting Standards (IFRS). The International Financial Reporting Standards are the current International Accounting Standards (IAS) and the interpretations thereto (SICs). The International Accounting Standards will remain known as IAS (like IAS 17 for Leasing), but new, yet-to-be-issued accounting standards by the IASB will be indicated as IFRS.

<sup>11</sup> Hell-or-high-water clauses bind the purchaser or lessee to the terms of the contract until the contract's expiration. A contract containing such a clause is also known as ‘a promise to pay contract’.

arising from tax laws and accounting standards in particular led to continuous growth from the 1960s until now<sup>12</sup> (Equipment Leasing Association (2005)). Although Europe and the Netherlands followed somewhat later, new capital tax allowances enhanced the attractiveness of leasing from the 1970s. In the UK, for example, a new capital tax allowance (an accelerated depreciation scheme) was introduced in 1970; in the Netherlands, an investment deduction scheme (WIR) was introduced in 1978. Each is said to have provided an important stimulus to leasing in these countries (Thomson (2003), Bruins Slot (1994), Vereniging voor Belastingwetenschap (2001)).

The growth in the leasing business has led to more regulation. Not surprisingly, in 1976 the US Financial Accounting Standards Board (FASB) was the first to establish a lease-accounting standard: the Statement of Financial Accounting Standards No. 13, "Accounting for leases" (FAS13). FAS13 was subsequently adopted by other countries, and also by the International Accounting Standards Board (IASB) in 1982<sup>13</sup>, as International Accounting Standard No. 17, "Operating Leases" (IAS17). In the Netherlands, the first accounting standard regarding leasing was introduced in 1984 (Guideline 1.05.1 ([www.rjnet.nl](http://www.rjnet.nl))).

The word "Leasing" is a generic term covering several different kinds of contractual relations between a lessee and a lessor. Graham et al. (1998) define leasing as a financial transaction that separates the costs and benefits of asset use. Smith and Wakeman (1985, p.895) distinguish between buying and leasing an asset: "When a firm buys an asset, it obtains both the right of the services of that asset over the period it is owned plus the right to sell the asset at any future date. With a lease, the firm acquires only the right to the asset's services for a period specified in the contract.' The contractual relationship is always of the type that the lessor is the legal owner of an asset, who grants the right of utilisation of the asset to a lessee. The exact formulation in the lease contract should realise the economic consequences that both parties have in mind, taking into consideration the fiscal consequences. The economic intentions of the lease will ultimately determine the (legal) type of the lease contract as either a way of financing, a rental agreement or a credit granting (relating to hire purchase agreements and provision of services);(Beckman and Joosen (1988) and Hees (1997)).

As Beckman (1988, p.9) states: "the acquirement of the right of utilisation of an asset by means of a lease instead of by means of legal ownership, will be a rational decision by the lessee: he will choose leasing instead of buying an asset if he expects that certain advantages are related with the lease agreement, which advantages he would miss without leasing". This implies a business decision based on the measurable and non-measurable advantages and disadvantages of leasing, according to the objectives of the respective parties.

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<sup>12</sup> The history of leasing is described in a number of studies, many of which refer to the discovery of the clay tablets and the establishment of the first lease corporation; see, for example, Equipment Leasing Association (2005).

<sup>13</sup> In 1980 the exposure draft E19 'Accounting for leases' was published and this resulted in 1982 in the publication of the final standard, IAS17 ([www.iasplus.com](http://www.iasplus.com))

### 2.2.1 Leasing as opposed to other corporate liabilities

As will become clear in subsequent sections, a difference exists between operating leases and financial leases. Chapters 6 and 7 will describe and test extensively the determinants of the (operating) lease decision. This section has the task of summarising the specific attributes of operating leases as opposed to other corporate liabilities and the reasons a company might choose leasing. Figure 2.1 is an extension of Table 1 of Barclay and Smith (1995, p.900), in which they illustrated the different dimensions of six types of corporate liabilities, from financial leases through debt contracts to common stock. Barclay and Smith, however, did not include operating leases. Figure 2.1 adds operating leases to the table of Barclay and Smith, and includes three new characteristics: first, who (the company or the claimholder) has the legal title; second, who is considered to be the economic owner; and third, who is entitled to the tax incentives related to the financed assets and economic ownership.

**Figure 2.1 Characteristics of corporate liabilities**

Table 1, page 900, from Barclay and Smith (1995), extended with operating leases. All information in italics is added to the original table.

Types of Corporate Liabilities	<i>Operating Lease</i>	Financial Lease	Secured debt	Ordinary debt	Subordinated debt	Preferred stock	Common stock
Priority of claim	Highest ←————→ Lowest						
Can default trigger bankruptcy	Yes					No	
Control rights	Right to use the asset		Rights limited to covenants in contract			Rights limited to covenants and voting rights of stockholder	Rights limited to voting rights
<i>Legal ownership</i>	No		Yes				
<i>Economic ownership</i>	No	Yes					
Tax shields: Cash flows	<i>Full lease payment deductible</i>	Interest part lease payment deductible	Interest payment deductible			Dividend not deductible	
Depreciation	<i>No depreciation</i>	Asset financed by financial lease, debt or equity is depreciated by economic owner					
<i>Additional tax incentives</i>	<i>Not entitled</i>	<i>Entitled to tax incentives attached to the financed asset</i>					

The differences between operating leases and other corporate liabilities in Figure 2.1 will now be described briefly (see also Barclay and Smith (1995)). Sections 2.3 and 2.4 will elaborate more on, respectively, the legal-, accounting- and fiscal differences between operating and financial leases.

#### Priority of claim

The priority of the claim, from the point of view of the claimholder, is the highest for leases. The lessor retains the legal ownership of the asset, and default gives (in general) the lessor the right to repossess the leased assets. Bankruptcy law in some countries may prevent repossession of the asset by the lessor, in the event that the asset is essential for an ongoing business. However, this does not alter the fact that the priority of the claim is higher

for the lessor than for other debt-holders. The priority of the other claimholders is such that first the debt-holders will be repaid, with a preferred position for the secured debt-holders, and the last position for the subordinated debt-holders. The stockholders are the residual claimants, whereas the preferred stockholders may be in a better position.

### **Trigger bankruptcy**

Default under a debt- or lease contract generally gives the claimholder the right to force the company into bankruptcy. The stockholders are not creditors and cannot trigger bankruptcy.

### **Control rights**

All financial liabilities give some control rights to the claimholder. For example, the common stock holders have voting rights imposed on the company by law, preferred stockholders might have additional rights as laid down in the specific preferred-stock issue. Debt contracts may contain all kinds of different covenants that restrict the company in, for example, extension in financings, preserving financial ratios above a certain level, investment possibilities or payout approvals. Lease contracts may also contain such debt covenants, particularly when the lease is set up as a financing contract comparable with debt financing. Restrictions with respect to the use of the asset will also be incorporated, as well as any obligations the company has in maintaining the asset (in the event that the contract is directly related to certain assets).

### **Ownership**

The differences between the financial contracts often arise from differences in the legal ownership of the assets financed. Liabilities arising from either a debt contract or through equity enable a company to invest the acquired financings by purchasing the assets. With a lease contract, the company obtains the right to use the assets and is obliged to fulfil regular payments during the period of usage. The contractual relationship is always of the type that the lessor is the legal owner of an asset, who grants the right of utilisation of the asset to a lessee. The differentiation between financial and operating leases lies within the distinction of who has the economic ownership, as opposed to the legal ownership. Since this is the fundamental difference between the accounting treatment of operating- versus financial leases, this will be extensively described in section 2.4

### **Tax shields**

The stockholders will receive (if available) dividends that are not tax deductible by the company. Debt-holders receive interest and repayment of the financing provided, of which only the interest payments are deductible. With a financial lease, the lease payment is split in an interest- and repayment part (comparable with) normal debt, and the interest part is deductible. Under an operational lease the entire lease payment is deductible.

### **Depreciation**

The economic owner of the asset is entitled to depreciate the financed asset. Since only with an operating lease the company is neither the legal nor the economic owner of the asset, it is only with operating leases that the lessee



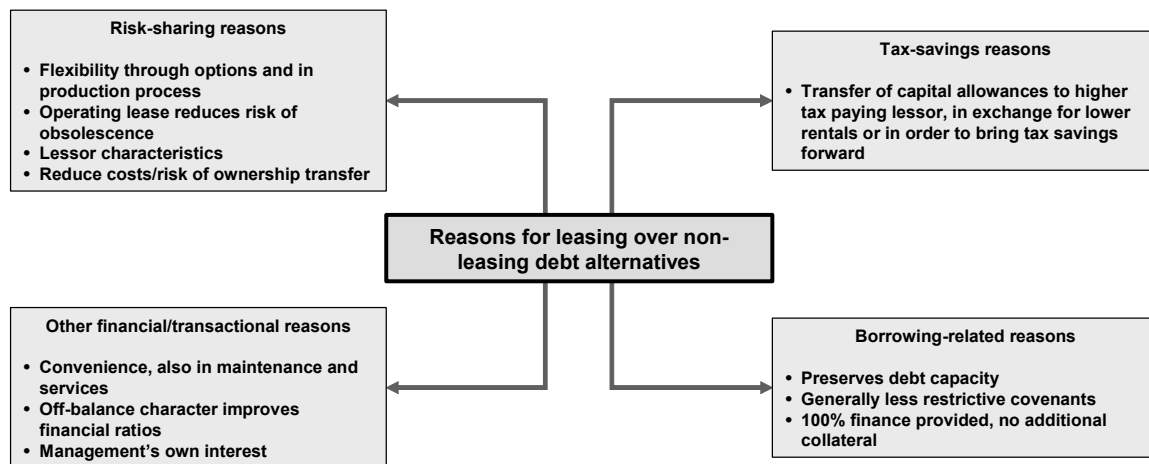
company does not depreciate the asset. Although it might seem that this is a disadvantage of operating leases from a fiscal point of view, this is offset by the preceding characteristic that only in case of an operating lease is the entire lease payment deductible, instead of only the interest part of the lease payment.

**Additional tax incentives**

The economic owner of the asset is also entitled to tax incentives related to the financed assets. Again, this implies that for all financial contracts the company, and not the claimholder, is entitled to these tax incentives. Only for operating leases is it the lessor (claimholder) and not the company who is entitled to eligible tax incentives schemes related to the assets. In the event that the lessor has a higher corporate tax rate than the company, it might be worthwhile for the company to shift the tax incentives to the lessor. This will be described in section 2.4.5 and in chapter 6.

The differences between operating leases, financial leases and other corporate liabilities result in advantages that can only be obtained through operating leases. Therefore, the reason to choose operating leases relate to the above described characteristics. Thomson (2003) grouped the reasons to choose leasing instead of non-leasing debt alternatives into four categories: tax savings, borrowing-related aspects, risk sharing and other financial/transactional reasons. Figure 2.2 summarises the reasons to choose leasing instead of a non-leasing debt alternative. A description for these reasons appears below the figure.

**Figure 2.2 Reasons to choose leasing over non-leasing debt alternatives**  
(based on figure 3.3 of Thomson (2003, p.100))



Some of the reasons to lease relate only to operating leases. The following list of the advantages of leasing to the lessee mentions whether the advantages relate only to operating leases or only to financial leases. When it is not explicitly mentioned, the advantages relate to both types of leasing.

**Risk-sharing reasons**

**Provides flexibility through incorporated options**

Lease agreements often incorporate renewal-, purchase- or cancellation options. When the economic life of equipment is uncertain, a lease can provide protection against the risk of obsolescence. These options allow the risk of obsolescence to be borne by the lessor (purchase option will

not be exercised when the asset has deteriorated to a greater extent than foreseen); companies that are uncertain of their future demand thereby keep some flexibility in their production process (by exercising their cancellation or renewal option). These options often define who bears the economic risk related to the ownership of the asset, and therefore often determine the qualification as operating or financial lease.

### **Related to characteristics of the lessor**

Incentives to lease might be related to characteristics of the lessor—for example, when the lessor is in a better position to acquire or to dispose the assets (Smith and Wakeman (1985)).

### **Reduces costs of transferring ownership**

Leasing may reduce some the costs of the transfer of ownership, such as legal fees and transfer taxes. Especially when the useful life of an asset is significantly longer than the period the company expects to use the asset, and if the costs of transfer of ownership are substantial, this may be a reason to lease rather than buy an asset (Smith and Wakeman (1985))

## **Tax-savings reasons**

### **Distributing tax shields**

When two parties have different tax rates, they might find it worthwhile to shift possible tax advantages through an operating lease from the lower taxpaying entity (lessee) to the higher taxpaying entity (lessor). The lessor thus benefits from the tax incentives and may share these advantages with the lessee by means of lower lease rentals. Section 2.4.5 describes the tax aspects of leasing.

## **Borrowing-related reasons**

### **Preserving debt capacity**

The debt capacity of a company is the amount that it might be able to borrow. This debt capacity may sometimes be limited, due to constraints (debt covenants) or to certain practical rules of lenders (for example, a bank requires a company to maintain at least 30% equity). With an operating lease, the financed amount is not shown on the balance sheet, and this might improve debt capacity. Chapter 3 documents how some lenders indeed do not consider the operating leases when they examine the lending possibilities of a company.

### **Providing 100% financing**

By means of a lease an asset is 100%-financed; while the legal ownership remains with the lessor, the lessee does not have to put up additional collateral for the financing.

### **Containing less restrictive covenants**

Lease contracts may not only contain less restrictive covenants, but may also circumvent covenants in other debt contracts such as maximum debt levels permitted.

## Other financial/transactional reasons

### Convenience

With a lease agreement, the lessee may wish to use the asset without the responsibility and trouble of maintaining it, insuring it or disposing of it at the end of the lease term. The lease agreement may be set up in such a way that this is the responsibility of the lessor. Convenience is probably one of the most important reasons for leasing in, for example, the car leasing industry, where many companies do not want the bother of having an own-car park, involving insurance, service and obsolescence of the cars.

### Off-balance character

Related to the previous advantage, the off-balance-sheet character of operating leases also improves financial ratios such as leverage- and solvency ratios. Although sophisticated financial analysts often will use a capitalisation technique to improve the meaningfulness of ratios, previous evidence has shown that this is not always the case. The impact of operating leases on financial ratios is described and empirically tested in part II.

### Management's own intentions

The off-balance-sheet character of operating leases and the possible improvement of financial ratios might be a reason for the management of a company to choose operating leases, if management compensation is based on these financial ratios.

Chapters 6 and 7 will describe extensively most of the abovementioned reasons to lease.

## 2.3 Legal aspects

### 2.3.1 Leasing in the Dutch Civil Code

In the Netherlands, no legislation (neither civil nor commercial) exists that explicitly mentions the word leasing. This is similar to other European countries and to the US (Vereniging voor Belastingwetenschap (2001)). Most European countries do not have specific lease legislation, except for Belgium, Greece and Turkey<sup>14</sup> (Leaseurope (2005)). The distinction between operating- and financial leases, as widely accepted in practice from an accounting or tax perspective (see the next sections), is not recognised everywhere by the legislator. As in the Netherlands, other classifications do occur in the legislation of other countries to distinguish between different types of leasing. For example, in France a distinction is made between 'location simple' (rental), 'credit bail' (hire purchase) and 'location avec option d'achat' (lease with purchase option); (Leaseurope (2005) and Vereniging voor Belastingwetenschap (2001)).

According to Hees (1997), the fact that leasing is not defined legally as a specific agreement and that it does not occur in legal terminology, is historically explainable

<sup>14</sup> In Belgium 'lease-financing-agreement of movable assets' are defined by law. In Greece a lease agreement is defined as the right of use of movable assets with a purchase or renewal option at maturity, (Vereniging voor Belastingwetenschap (2001))

## CHAPTER 2

as follows: since leasing was not ‘invented’ by lawyers, it was generally accepted as expression for agreements with the same characteristics. These characteristics are that one party (the lessor) undertakes to provide the other party with the use of an asset, in return for a series of payments, for an agreed period of time. Lease agreements are drafted between a lessee and a lessor, and the content determines the legal status of the contract. The legal status of a lease in the Netherlands can be either a rental agreement, a leasehold agreement (*pachtovereenkomst*), or a hire purchase (*huurkoop*), which are legal contracts recognised in Dutch Law.

Therefore, the most important legal provisions in Dutch Civil Law are those articles that refer to the abovementioned legal agreements.

### **Rental; Civil Code Book 7, Title 4, Article 201**

1. Rental is a contract whereby one party, the lessor, undertakes to provide the other party, the lessee, with the use of a thing or a part thereof and the lessee undertakes to render a counterprestation (counter-obligation).
2. Rental may also relate to patrimonial rights (property, rights and interests), in which case the provisions of this Section and Sections 2 - 4 shall apply to the extent that this is not contrary to the necessary implication of such provisions or the nature of the right.
3. Leasehold of land is not considered to be a rental.

### **Hire purchase; Civil Code Book 7A, Article 1576h**

1. Hire purchase is the sale and purchase on redemption, whereby the parties agree that the transfer of ownership will not switch to the purchaser on delivery of the assets, but only after the fulfilment of all obligated payments.
2. All agreements with the same intention, either rental, or other forms or naming, will be considered as hire purchase.
3. Under hire purchase is also considered the agreement where for the sale and purchase, a third party, who obtains the ownership, grants credit to the purchaser as these actions together have the same intention as hire purchase.

### **Law on leasehold (“Pachtwet”), Article 1.1, Leasehold**

- d. Each agreement, in whatever form or naming, where one party undertakes to provide to the other party, with the use of a farm or land for agriculture purposes, and the other party undertakes to render a counterprestation.

As will be shown in section 2.4 The accounting standards in the Netherlands follow the same definitions as the Dutch Civil Law, where leasing is also a generic term that is refers to rental-, hire purchase, or leasehold-agreements.

### 2.3.2 The legal status of Dutch accounting standards

Since 1970, the Act on the Annual Financial Statements of Enterprises (hereafter the Act) is effective in the Netherlands (and was incorporated in 1976 in the Dutch Civil Code, Part 9, Book 2 (*Burgerlijk Wetboek, Titel 9, Boek 2*)). The Act has been adapted several times since then, due to the fourth and seventh Directives on Company Law of the Council of the European Communities (Bouma and Feenstra (1997), Nobes and Parker (2000) and DASB (2002)).

The Act was ratified in 1970; in 1971, the Dutch Accounting Standards Board (DASB) was established at the suggestion of the Dutch Government; (*Raad voor de Jaarverslaggeving*; until 2005 known as the Council for Annual Reporting and from 1971 till 1981 known as the Tripartite Consultative Body). The DASB comprises representatives of the preparers, users and auditors of annual accounts of companies. Boardmembers (each of the three groups has four members) are appointed by the executive board, after nomination by the founding organisations<sup>15</sup> or by other organisations (for example, one of the ‘user’ members is a nominee of the Dutch Association of Investment Analysts).

The sections of the Act provide the basis for the Guidelines of Annual Reporting as defined by the DASB (2002, p.24). However, in contrast to the legal compliance required by the Act (which is part of Dutch law), Dutch companies are not legally obliged to follow the guidelines (this is no longer true for Dutch listed companies, which will be described shortly). The legal binding of the guidelines is not the presumption of the DASB (although the more authoritative statements are printed in bold): each company bears individual responsibility for its own financial accounts (DASB (2002)). Therefore, Vergoossen (1992,p.247) argues that ‘the guidelines can be best described as authoritative opinions of an influential private group’. This is in line with a recent (February 10<sup>th</sup> 2006) decision of the Dutch Supreme Court<sup>16</sup> on the standing of the guidelines in an appeal between Dutch Royal KPN and Stichting Onderzoek Bedrijfsinformatie (“SOBI”). In their judgement of the appeal (6.10 of the decision), the Supreme Court agrees with of the Deputy Procureur-General<sup>17</sup> on his advice on the standing of the guidelines. The Deputy Procureur-General argues that the guidelines are considered by experts to represent a system of generally accepted principles of financial reporting, which is required in article 2:362 of the Dutch Civil Code. The guidelines are therefore authoritative guidelines and form a useful tool to the Enterprise Chamber (Ondernemingskamer).

The Dutch financial reporting system is classified by Nobes and Parker (2000) as unique. They state (p.509), “classifiers of financial reporting systems usually consider the Netherlands to be a country by itself. Unlike other continental European countries, its tax rules have little effect on financial accounting, there is no national accounting plan and as much choice as the European Directives permit is allowed in financial statement presentation. The Netherlands differs in important ways from the United Kingdom and the United States.” According to Nobes et al. (2000, p.21-22), “Standard Dutch” is unique insofar as it has no family resemblance to other systems of accounting standards, but belongs to a class of

<sup>15</sup> Employers organisations: Federation of Netherlands Industry (VNO), Netherlands Christian Employers’ Federation (NCW); Trade Unions: Federation of Netherlands Trade Unions (FNV), Christian National Federation of Trade Unions in the Netherlands (CNV); and the Dutch Institute of Registered Accountants (NIVRA).

<sup>16</sup> Dutch Supreme Court, February 10<sup>th</sup>, 2006, LJN:AU7473, C04/305HR.

<sup>17</sup> Advice of the Deputy Procureur-General Mr. Timmerman of October 7<sup>th</sup>, 2005, paragraph 3.3.

systems suited to strong equity markets, just as UK, IAS and US GAAP (generally accepted accounting principles). The class in which the Dutch accounting standards are placed, Class A, is in particular focused on the 'key cause of international differences in financial reporting', the differentiation between credit/insiders and equity/outside. Countries in Class A are countries with a widespread ownership of companies with shareholders who do not have access to internal information, and there will be more pressure for disclosure, audit and fair information. This is in contrast with countries in Class B, where ownership is kept to a greater extent within banks, families or governments; in these countries the need for published information is less clear.

The non-legal binding of guidelines does not mean that Dutch companies are not legally obliged to disclose their lease commitments (or the commitments arising from the legal agreements, as described in the previous section). The Dutch Civil Code explicitly requires the disclosure of certain items in the notes to the financial statements as specified in the Dutch Civil Code; Book 2, Part 5, Articles 378 - 383. Article 381 is also applicable for lease commitments that are not shown on the balance sheet.

The translation of Article 381 is as follows:

**Civil Code Book 2, Title 9, Part 5, Art. 381**

Any major financial commitments entered into by the legal person for a number of years in the future and which are not disclosed in the balance sheet, such as those arising out of long-term contracts, shall be stated with separate mention of commitments towards group companies. Article 375, paragraph 3, shall apply mutatis mutandis.

This article 381 builds upon the Fourth Council Directive of the EC:

**Fourth Council Directive of 25 July 1978 (78/660/EEC), Section 8, Art. 43**

In addition to the information required under other provisions of this Directive, the notes on the accounts must set out information in respect of the following matters at least: sub (7) the total amount of any financial commitments that are not included in the balance sheet, insofar as this information is of assistance in assessing the financial position. Any commitments concerning pensions and affiliated undertakings must be disclosed separately.

For listed companies, the non-legal binding of the accounting guidelines in the Netherlands has ended. As from 2005, all listed companies in the European Union are obliged to formulate their annual accounts in compliance with IFRS (see footnote 10 and (EC (2002))<sup>18</sup>. This has led to several proposals of amendments of law with respect to the Dutch Civil Code, amongst them a proposal that annual accounts should conform to IFRS<sup>19</sup>. The Dutch amendment proposal requires that if the IFRS are not applied, this should be declared (either comply or explain). The amendment proposal to the Dutch Civil Code also allows companies to have only one annual account, even if a company is listed in several countries. The application

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<sup>18</sup> Reference is made to the Regulation (EC) No 1606/2002 of the European Parliament and the Council of the European Union of 19 July 2002 on the application of international accounting standards.

<sup>19</sup> Dutch House of Commons, Publication 28220, Nr. 1, 2, B and Memorie van Toelichting, February 5<sup>th</sup> 2002,

of US GAAP is especially excluded. According to Ernst&Young (2003, p. 55), this will have a number of implications in the near future for Dutch Listed companies:

- Less freedom in the choice of valuation and income approaches
- More information has to be provided
- Deviation from the IFRS will be almost impossible

This will also have implications for the auditing profession in the Netherlands: there will be less professional judgement, but a rise in more specific supervision on the application of the IFRS. For non-listed companies, the IFRS is not obligatory, and the (non-legal binding) guidelines of the DASB are still applicable.

Since the guidelines had no legal status in the Netherlands, there was no legislation on the supervision of these guidelines. This will also end for the Dutch companies that are now legally obliged to disclose according to IFRS. In the Netherlands, recently two new laws became effective: the law on the supervision of auditor firms (“Wet toezicht accountantorganisaties<sup>20</sup>”) and the law on the supervisions of financial reporting, (“Wet toezicht financiële verslaggeving<sup>21</sup>”). The supervisor under both laws is the Dutch Autoriteit Financiële Markten (“AFM”).

Especially the law on the supervision of financial reporting will enhance the enforceability by law of compliance with the accounting standards by Dutch listed companies. Indirectly, the law on the supervision of auditor firms will also contribute. In section 2.4 the accounting standard with respect to leases will be described, and section 2.4.4 will show that different (alternative) formats for disclosing operating leases are in use in the Netherlands. Chapter 5 will empirically investigate how many companies actually use these alternative formats, of which not all formats comply with the accounting standard. These results might indicate whether the proposals of law to enforce compliance with the accounting standards are indeed necessary (see also Lückerath (2006)).

## **2.4 Current lease-accounting standards: the risk/reward approach**

### **2.4.1 Comparison of lease-accounting standards**

Most lease-accounting standards throughout the world are referred to as ‘risk and reward approaches’. For example, the Dutch RJ292, the International IAS17, the US FAS13 and the UK Statements of Standard Accounting Practice No. 21 (hereafter “SSAP21”) are all risk and reward approaches. The name applies on the basis of a distinction made between operating and financial leases based on who bears substantially all risks and rewards related to the ownership of the underlying asset. Financial leases are those leases for which substantially all risks and rewards are transferred to the lessee. Thus, although the legal ownership remains with the lessor, the economic ownership is transferred to the lessee. RJ292 and IAS17 give a number of examples that ‘would normally’ (RJ292.107, IAS17.8) or ‘could’ (RJ292.108, IAS17.9) lead to a classification as financial lease:

<sup>20</sup> Dutch Congress (House of Commons) official publication, year 2003/2004, 29 658, Nr. 1-2, effective since October 1<sup>st</sup>, 2006.

<sup>21</sup> Dutch Congress (House of Commons) official publication, year 2005/2006, 30 336, Nr. 1-4, effective since December 31<sup>st</sup>, 2006.

**RJ292.107, IAS17.8**

- (a) the lease transfers ownership of the asset to the lessee by the end of the lease term;
- (b) the lessee has the option to purchase the asset at a price sufficiently lower than the fair value at the date of the option (very likely to be exercised);
- (c) the lease term is for the major part of the economic life of the asset
- (d) at the inception of the lease the present value of the minimum lease payments amount to at least substantially all of the fair value of the leased asset; and
- (e) the leased assets are of a specialised nature such that only the lessee can use them without major modifications.

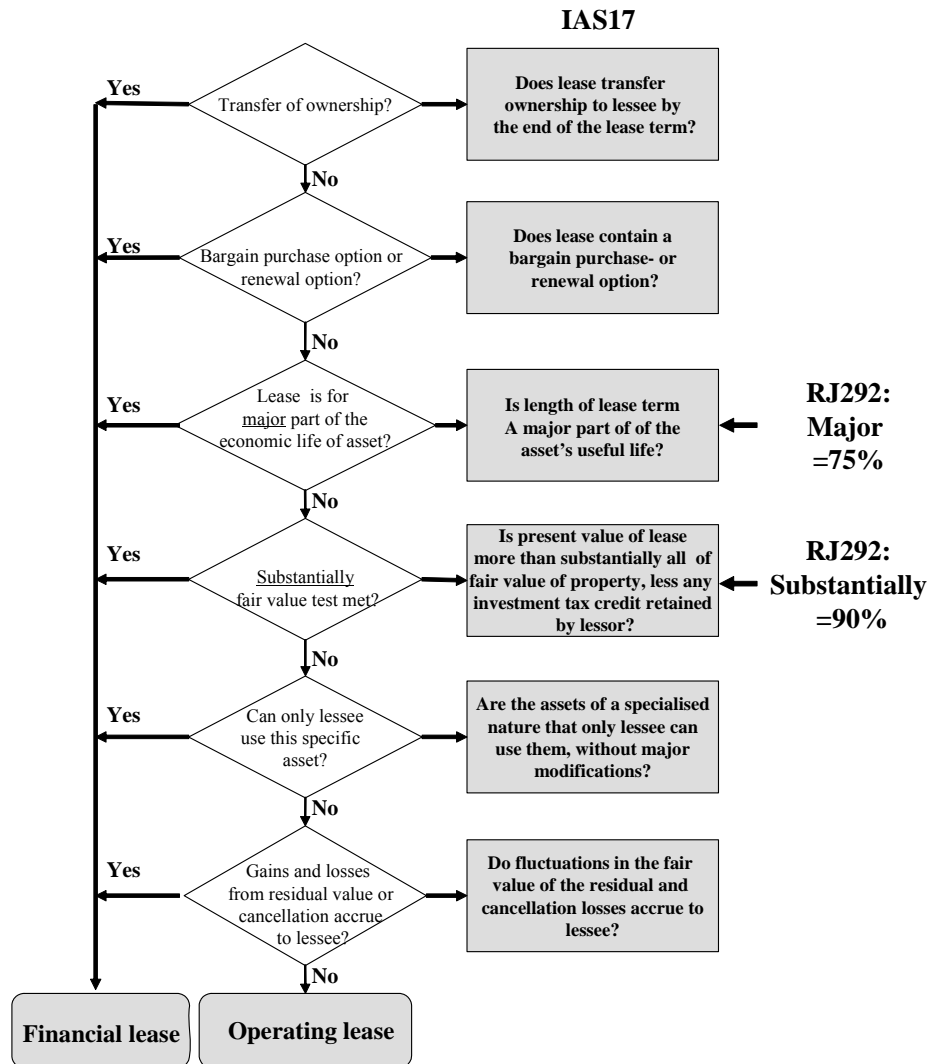
**RJ292.108, IAS17.9**

- (a) if the lessee can cancel the leases, then the lessors' losses associated with the cancellation are borne by the lessee;
- (b) gains or losses in the fair value of the residual value of the assets fall to the lessee; and
- (c) the lessee has the ability to continue the lease for a secondary period at a rent that is substantially lower than the market rent.

Subsequently, operating leases are those leases that are not financial leases. Financial leases are accounted for on the balance sheet, comparable to normal debt financing. Operating leases are disclosed in the notes in the financial statement, and are therefore off-balance. Although the Dutch RJ292.107 follows the same criteria as IAS17.8 to classify a lease as either a financial- or an operating lease, there are some differences. In RJ292, as well as in the United States (FAS13), a quantitative indication is given for the words 'major part' (IAS17.8c) and 'substantially' (IAS17.8d). Figure 2.3 shows the lease-classification according to IAS17, and the related quantitative indications of RJ292.



Figure 2.3 Financial vs. operating leases according to IAS17 and RJ292



Whether a lease is cancellable, or not, is not a distinguishing feature between financial- and operating leases. The classification as financial- or operating lease only takes into account the non-cancellable part of the lease. For example the lease-term is defined by IASB as ‘the non-cancellable period’ and the minimum lease payments are the ‘non-cancellable lease rents’. Therefore leases that are cancellable without restrictions are predominantly operating leases, while both criteria on lease-term and present value of the lease payments direct to an operating lease. However, operating leases disclosed in the financial statements classify as operating leases by their non-cancellable part. Table 2.1 compares four lease-accounting standards (RJ292, IAS17, FAS13 and SSAP21) with respect to the following: the definition of a lease, the qualification as an operating- or a financial lease, the required disclosures and the definition of minimum lease payments. Although all four lease-accounting standards are based on the risk/reward approach, some differences are apparent.

Table 2.1 Comparison of operating-lease accounting of RJ292, IAS17, FAS13 and SSAP21

	DUTCH RJ 292	INTERNATIONAL IAS 17 (revised)	US FAS13	UK SSAP 21
<b>LEASE DEFINITION</b>	<b>RJ 292.102</b> As IAS17.3, but explicitly adds that lease agreements comprise rental agreements, leasehold agreements and hire-purchase agreements.	<b>IAS 17.3</b> A lease is an agreement whereby the lessor conveys to the lessee in return for a payment or series of payments the right to use an asset for an agreed period of time.	<b>FAS13.1</b> A lease is an agreement conveying the right to use property, plant, or equipment (land and/or depreciable assets) usually for a stated period of time. It includes agreements that, although not nominally identified as leases, meet the above definition.	<b>SSAP 21</b> A lease is a contract between the lessor and the lessee for the hire of a specific asset. The lessor retains ownership of the assets, but conveys to the lessee the right to use the asset for an agreed period of time in return for paying specific rents.
<b>LEASE QUALIFICATION</b>	<b>RJ292.104</b> As IAS17.6  <b>RJ292.107</b> As IAS 17.8, with an <i>indication</i> of 'major part' under c) meaning 75% or more, and 'substantially all' under d) meaning 90% or more	<b>IAS 17.6</b> A lease is classified as a financial lease if it transfers substantially all risks and rewards incident to ownership. A lease is classified as an operating lease if it does not transfer substantially all the risks and rewards incident to ownership. <b>IAS 17.8</b> Examples of situations that would normally lead to a lease being classified as a financial lease: a) transfer of ownership b) bargain purchase option c) lease term is major part of the economic life of the asset d) at inception, the present value of the minimum lease payments amount to at least substantially all of the fair value of the asset, e) Specialised nature of the lease assets	<b>FAS13.6</b> a. classification from the standpoint of the lessee: i) capital lease, leases that meet one of the criteria of par.7, ii) operating leases, all other leases <b>FAS13.7</b> If at its inception a lease meets one or more of the following four criteria, the lease shall be classified as a capital lease by the lessee: a) transfer of ownership b) lease contains bargain purchase option c) lease term is equal to 75 percent or more of the estimated economic life d) the present value at the beginning of the lease term of the minimum lease payment equals or exceeds 90 percent of the excess of the fair value of the lease property over any related investment tax credit retained by the lessor.	<b>SSAP 21.15</b> A lease is classified as a financial lease if it transfers substantially all the risks and rewards of ownership of an asset to the lessee. <b>SSAP21.17</b> An operating lease is a lease other than a financial lease. <b>SSAP 21.15</b> It should be presumed that such a transfer of risk and rewards occurs if at the inception of the leases the present value of the minimum lease payments amounts to substantially all (normally 90 percent or more) of the fair value of the leased assets.
<b>OPERATING-LEASE DISCLOSURE</b>	<b>RJ 292.118</b> As IAS17.27, excluding d) (although d) is recommended)	<b>IAS 17.27</b> <i>a. Minimum future lease payments</i> for each of the following periods: period less than one year, period between one and five years, periods over five years. <i>b. Minimum sublease payments</i> receivable in future periods under non-cancellable subleases. <i>c. Current lease and sublease payments</i> recognised in income for the period, with separate amounts for minimum lease payments, contingent rents and sublease payments. <i>d. General description</i> of lessee's significant leasing arrangements	<b>FAS 13.16</b> b. for operating leases having initial or remaining non-cancellable lease terms in excess of one year: i) <i>Future minimum rental payments</i> , in the aggregate and for each of the five succeeding fiscal years. ii) <i>Minimum rentals to be received</i> in the future under non-cancellable subleases <i>c. rental expenses</i> for each period for which an income statement is presented, with separate amounts for minimum rentals, contingent rentals and sublease rentals. <i>d. General description</i> of lessee's leasing arrangements	<b>SSAP21.56</b> The payment that the lessee is committed to make during the next year, analysed between those - expired within the year, - expired between the second & fifth years, and - expiring after five years. The analysis should show the commitments with respect to land and buildings separately from those of other operating leases.
<b>MINIMUM LEASE PAYMENTS</b>	<b>RJ292.102</b> As IAS17.3	<b>IAS 17.3</b> Non-cancellable lease rents, <b>excluding:</b> contingent rentals, service costs and taxes payable or reimbursable to the lessor, <b>including:</b> any guarantee of payments by lessee or lessee-affiliated parties Plus, if applicable, the purchase option price if the option is very likely to be exercised due to the relatively low price.	<b>FAS13.5</b> The payments that the lessee is obligated to make or can be required to make in connection with the leased property, excluding guarantees by the lessee of the lessor's debt and the lessee's obligations to pay executory costs (insurance, maintenance) and taxes in connection with the leased property.	The payments that the lessee is committed to make during the lease term, including initial payments the lessee makes, minimum rentals over the lease term, and any amount guaranteed by the lessee or by a party related to him.

### Differences in lease definition

The lease definition is similar between the four lease-accounting standards described in Table 2.2. It is striking, however, in contrary to the other standards, that the Dutch RJ292 explicitly stipulates that rental-, leasehold-, and hire-purchase agreements also are part of leasing agreements, the other standards only describe leasing. This is probably caused by the fact that leasing is not a Dutch word and in the Netherlands, the term 'leasing' may be assumed to be something different from rental. By incorporating the mentioned agreements that fall within the guideline, the DASB made it clear that leasing includes these agreements too. As mentioned before, leasing is also not defined in Dutch civil law and from a legal point of view is a generic term for the abovementioned agreements, which are defined agreements in Dutch civil law. The reference to these contracts by FASB is less explicit, but also the FASB mention that FAS13 also applies to other agreements that 'although not nominally identified as lease, meet the above criteria'.

### Differences in lease qualification

All lease-accounting standards here described make a distinction between operating and financial leases. However, RJ292 and FAS13 formulate quantitative criteria to define how the words 'major' and 'substantial' should be explained. These quantitative criteria are interpreted differently in RJ292 and FAS13, while for RJ292.107 these quantitative criteria are defined as 'indicative', whereas for FAS13.7 the percentages are included as a bright-line test in de the classification criteria. IAS17 refrains from including these quantitative criteria in the standard. SSAP21 does give a quantitative indication of the word 'substantially'.

There is, however, a major difference between the quantitative criteria of FAS13 and RJ292. Although both apply quantitative criteria to classify a lease as an operating or as a financial lease (the 75% of economic life and 90% of present-value rules), there seems to be a major difference in the 90% rule. With FAS13.7d, the 90% is calculated of the *excess of the fair value* of the leased property over any related investment tax credit, whereas conforming to RJ292.107d, the 90% is calculated over the fair value of the leased property. According to FAS13, the investment tax credit should be deducted from the fair value of the leased property before the 90% rule is applicable. Although the rules look identical, this difference may have major consequences for the lease qualification from both perspectives<sup>22</sup>.

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<sup>22</sup> For example, assume a tax investment credit that allows an additional deduction of 55% of the property in the first year (the Dutch IB2001, art 3.40). If the corporate tax rate is 40%, then the after-tax benefit is  $0.4 * 55\% = 22\%$  of the invested amount. If the fair value of the lease property is 100,000 Euro, then the present value of the lease payments, according to RJ292, may not exceed 90,000 Euro (90% of 100,000). However, according to FAS13, the present value of the lease payments may not exceed 70,200 Euro; 90% of 100,000 minus 22,000 value of investment credit. Thus, the 90% of the RJ292 relates in this example to 70.2% according to FAS13. Depending on the nature of the investment tax credit, this difference will vary.

### Differences in operating-lease disclosure

The disclosure requirements are almost identical for RJ292, IAS17 and FAS13. The requirements of SSAP21 differ meaningfully, however, from the other three lease-accounting standards. According to RJ292.118, lessees should make the following disclosures for operating leases:

- (a) The total of future minimum lease payments under non-cancellable operating leases for each of the following periods:
  - (i) not later than one year;
  - (ii) later than one year and not later than five years;
  - (iii) later than five years;
- (b) the total of future minimum sublease payments expected to be received under non-cancellable subleases at the balance-sheet date;
- (c) lease and sublease payments recognised in the income statement for the period.

This is in line with IAS17 and FAS13, although the latter requires the total commitment for each of the years one 'til five, and one lump sum for the commitments expiring after the fifth year (see Table 2.1). Under UK SSAP21, *next year's* lease commitment has to be disclosed, split into three lease-expiry periods, whereas the other three require the disclosure of the *total future* lease commitment split into three (IAS17 and RJ292) or five (FAS13) lease-expiry periods. According to PriceWaterhouseCoopers (2005), the requirements of UK SSAP21 are sometimes misunderstood; the intention is to show only the annual commitment and not the total amount that will be payable until the end of the lease. This, however, is certainly the intention of IAS17, RJ292 and FAS13. This difference might be the reason that the UK SSAP21 is misunderstood, since users might assume the standards to be equal on this matter. Table 2.2 illustrates the differences between the disclosures of IAS17 and RJ292, FAS13 and SSAP21 using the operating lease commitments of Ahold as disclosed in their 2003-financial statements<sup>23</sup>.

**Table 2.2 Difference between total commitment disclosed (FAS13, IAS17 and RJ292) and annual commitment disclosed (SSAP21)**

Operating-lease commitments (Euro millions) of Ahold in 2003. Ahold discloses according to FAS13. This enables to construct also the disclosure according to IAS17 and RJ292 while these standards require less detailed information. SSAP21 requires the disclosure of next year's lease-payments, split into three expiry periods. The total commitment cannot be derived from SSAP21.

FAS13		IAS17/RJ292		SSAP21	
<b>Expiry in:</b>		<b>Expiry in:</b>		<b>Expiry in:</b>	
One year	747	One year	747	One year	58
Two years	689	Between two and	2,487	Between two and	137
Three years	663	five years		five years	
Four years	583	After five years	5,552	After five years	552
Five years	552				
After five years	5,552				
<b>Total</b>	<b>8,786</b>	<b>Total</b>	<b>8,786</b>	<b>Total</b>	<b>747</b>

The different disclosure rules have consequences for the method to capitalise operating leases. This will become clear in chapter 4, which discusses the different capitalisation methods, with data originating from either the US or

<sup>23</sup> Ahold discloses the operating lease commitments as required by FAS13.

New Zealand (i.e. Imhoff et al. (1991), Bennet and Bradbury (2003)), or from the UK (Beattie et al. (1998)).

### **Differences in minimum lease payments**

The lease-accounting standards all consider the minimum lease payments to be the non-cancellable lease payments or payments that the lessee is obligated to make in connection with the lease property, excluding tax payable. Some differences exist between the standards as to whether guarantees from the lessee to the lessor should or should not be included.

The above shows that although the intention of the lease-accounting standards is the same, harmonisation between the standards is not yet complete. Especially the disclosure requirements in the UK differ from those of the Netherlands, the US and the IASB. Another important difference is the quantitative criteria of FAS13 and RJ292 (although indicative), versus the more qualitative criteria of IAS17 and SSAP21. And finally, the 90% fair-value rule applied by both RJ292 and FAS13 may lead to different outcomes between these two standards, since they use a different measure of the fair value of the leased asset.

### **2.4.2 Capitalisation of financial leases versus disclosure of operating leases**

The qualification of a lease as a financial- or operating lease has consequences for the disclosure of the commitments. Financial leases are recognised as assets and liabilities on the balance sheet of the lessee at amounts equal to the fair value of the leased property at inception, or if lower, at the present value of the minimum lease payments (IAS17.12, RJ292.112). The lease payments should be apportioned between the interest part and the reduction of the outstanding liability, calculated on an annuity basis (IAS17.17, RJ292.113). A financial lease thereby gives rise to a depreciation expense as well as a finance expense for each accounting period (IAS17.19, RJ292.114).

Operating leases, on the other hand, never give rise to recognition of the leased asset in the balance sheet of the lessee (RJ292.116). The Dutch guideline in this respect refers to guideline 310 ('Commitments not recognised in the balance sheet'), (hereafter RJ310). RJ310.101 subsequently refers to the Dutch Civil Code Book 2, article 281, which article requires the disclosure of major financial commitments in the notes (see section 2.3.2). Operating-lease payments should be recognised as an expense in the income statement on a straight-line basis (IAS17.25, RJ292.117).

Table 2.3 shows the difference between the requirements for the capitalisation or disclosure of financial- versus operating leases for, respectively, the balance sheet, the income statement and the notes.

**Table 2.3 Operating and financial leases in the financial statements of lessee**

OPERATING LEASE	FINANCIAL LEASE
<b>BALANCE SHEET</b>	
No information	<b>292.112</b> Fair value of the assets or (if lower) the present value of minimum lease payments
<b>INCOME STATEMENT</b>	
<b>RJ292.117</b> Lease payments should be recognised as an expense in the income statement on a straight-line basis.	<b>RJ292.113</b> Lease payments split into interest part and repayment part <b>RJ292.114</b> Financial lease gives rise to a depreciation expense as well as a finance expense. It is in general inappropriate to equate the two kinds of expenses. (IAS17.21 adds: Accordingly, the asset and the related liability are unlikely to be equal after the inception of the lease.)
<b>NOTES</b>	
<b>292.118</b> a. total minimum future lease payments for each of the following periods, expiring: 1) within one year, 2) between one and five years, and 3) after five years b. total of future minimum sublease payments expected to be received under non-cancellable subleases c. current lease- and sublease payments recognised in income for the period, with separate amounts for minimum lease payments, contingent rents and sublease payments PLUS: Recommended: general description of lessee's significant lease arrangements	<b>292.115</b> a. for each class of assets, the net carrying amount at balance-sheet date b. the total minimum lease payments <b>and their present value</b> for each of the following periods, expiring: 1) within one year, 2) between one and five years and 3) after five years c. total of future minimum sublease payments expected to be received under non-cancellable subleases  PLUS: Recommended: general description of lessee's significant lease arrangements

Appendix 2.I illustrates the consequences of the differences between these requirements. Appendix 2.II shows the differences as found in the financial statements of Royal KPN N.V. for 2004.

The major difference is of course the recognition on the balance sheet of the leased asset and the lease liability for financial leases versus solely the disclosure in the notes for operating leases. This results logically in the depreciation requirement of the asset under a financial lease. Consequently, under a financial lease the lessee needs to distinguish between the repayment of the liability (not recognised in the income statement) and the depreciation of the assets (recognised in the income statement). Under an operating lease, it does not really matter which part is interest and which part is repayment in the lease payment, since the entire lease payment is recognised in the income statement.

Furthermore, for financial leases disclosure is required of both the nominal (total) lease commitments as well as the present value of the lease commitments. Moreover, the amount of the asset on the balance sheet per class of assets must also be disclosed. For operating leases only the nominal commitments are required, which forces the user of the financial statements to calculate the present value of the operating lease himself if he wishes to estimate an on-balance equivalent. Since for operating leases the information provided in the notes is the only information available, it is remarkable that also the disclosure requirements for financial leases in the notes are more extensive than the disclosure requirements of operating leases. The purpose of capitalisation and the available procedures to do so will be described in chapter 5.

However, assuming that companies are capable of calculating a present value for both operating leases and financial leases, and since the present value is also necessary in determining whether the lease is an operating- or a financial lease, the disclosure requirements of operating- and financial leases could be harmonised on this aspect.

### 2.4.3 Previous discussions on the difference between operating- and financial leases

The difference between the disclosure of operating leases and the capitalisation of financial leases has been the subject of many discussions. The risk/reward approach has been described as unsatisfactory for the users of the annual accounts due to the arbitrary way of lease qualification and accounting. For example, a lease that differs only in a small way from another lease<sup>24</sup> may be accounted for in a completely different way. McGregor (1996) argues, “the attractiveness of an operating lease lies within the off-balance-sheet character, since the same rights can be obtained as with debt financing. The leverage-effect of the operating lease increases the measures of return on assets and protects existing debt covenants or allows for the issuances of new debt”. When the purpose of the lease is driven by the desire to show a better financial performance, lease accounting can be seen as a form of creative accounting, which is defined by Shah (1998, p.83) as follows: “Creative accounting can be understood as the process by which management take advantage of gaps or ambiguities in accounting standards to present a biased picture of financial performance. It does not breach the letter of the law or rules, but may breach its spirits.” Wilkins and Zimmer (1983, pp. 749-750) state in their article that lease financing is a controversial topic amongst financial communities of the US, Canada and the UK, and that the two (related) issues of concern are

- i. that the alternative reporting methods, which reflect different debt- and equity structures, may influence creditor evaluations and affect the ability of a lessee firm to raise capital; and
- ii. that financing by a term loan instead of an ‘equivalent’ financial lease affects the ability of a firm to raise capital.

Reither (1998) summarised the results of a survey on the five best and the five worst accounting standards amongst 75 participants<sup>25</sup> of the 1996 FASB conference on financial reporting issues. Approximately 50% of the participants voted for FAS13 (Leases) as one of the five worst accounting standards, by far the winner of the election. Respondents gave the following reasons for rating FAS13 as one of the worst accounting standards:

- It fails to achieve objectives because many obligations that in substance are financial, such as sales-type or direct-financing leases, are recognised as operating leases;
- It is conceptually and operationally a nightmare;
- The bright-line rules for lease capitalisation cause abuse of the standard;
- It is a complicated strand (evidenced by many amendments and interpretations);

<sup>24</sup> For example, a lease with a maturity of 73% of the remaining useful life of the asset is qualified as an operating lease, while a lease with the same characteristics but with a maturity of 75% of the remaining useful life is qualified as a financial lease.

<sup>25</sup> These 75 individuals include 40 academics, 16 standard setters, four regulators, nine public accountants and six financial analysts.

- It relies too heavily on disclosure to assess lease obligations;
- It does not significantly improve accounting for lease transactions.

According to Mason and Gibbins (1991), standard setters should facilitate auditors in the application of the standards by: “reviewing new and existing standards to reduce the large number of ambiguities and other difficulties that detract from the thrust of the standard by requiring interpretive and clarifying judgements rather than judgements on substantive matters”. The same is stated by Hronsky and Houghton (2001): “clearly worded standards provide guidance for auditors in auditor-client situations, and reduce the justifiability of aggressive reporting decisions”.

Before section 2.5 describes the proposed alternative for the beleaguered risk/reward approach, the asset/liability approach, section 2.4.4 first describes the different formats of operating-lease disclosures that can be found in the financial statement of Dutch companies. As will become clear, these formats do not all comply with current lease-accounting standards.

#### **2.4.4 Compliance with accounting standards**

As shown in Table 2.1, the required disclosure of the future minimum lease payments under operating leases leaves no room for different interpretations by the lessee. However, a perusal of the annual accounts of 119 Dutch companies in the period 2000-2004 reveals several forms of disclosure (an extensive description of the sample is given in the empirical chapters 5 and 7). Some of these forms do not comply with RJ292 or IAS17. Table 2.4 shows the eight different formats that were found during the investigation of the annual accounts of Dutch listed firms. The eight are ranked based on how informative they are; the most informative is at the top and the least is at the bottom.



**Table 2.4 Different formats of operating-lease disclosure used by Dutch listed firms**

#	Description	Example:																							
1	<b>FAS 13</b> The future operating lease commitments are disclosed separately for a) each of the next five years and b) cumulative for the period beyond year five. This is in accordance with FAS 13.	<b>Ahold, Annual Report 2003, page 159</b>  The aggregate amounts of minimum rental commitments to third parties as of December 28, 2003, under non-cancelable operating lease contracts for the next five years and thereafter were as follows:  <table border="1"> <tr><td>2004</td><td>747</td></tr> <tr><td>2005</td><td>689</td></tr> <tr><td>2006</td><td>663</td></tr> <tr><td>2007</td><td>583</td></tr> <tr><td>2008</td><td>552</td></tr> <tr><td>Thereafter</td><td>5,552</td></tr> <tr><td><b>Total</b></td><td><b>8,786</b></td></tr> </table> * million Euro	2004	747	2005	689	2006	663	2007	583	2008	552	Thereafter	5,552	<b>Total</b>	<b>8,786</b>									
2004	747																								
2005	689																								
2006	663																								
2007	583																								
2008	552																								
Thereafter	5,552																								
<b>Total</b>	<b>8,786</b>																								
2	<b>FAS 13 &lt; &gt; RJ292/IAS17</b> The future operating lease commitments are disclosed separately for a) the period up to one year, b) the aggregate of the years two and three, c) the aggregate of the years four and five and d) the cumulative for the period beyond year five. This is less than FAS 13, but more than RJ292/IAS17.	<b>SNT, Annual Report 2003, page 29</b>  The commitments given by the group companies can be specified as follows:  <table border="1"> <thead> <tr> <th rowspan="2">Amount (x € 1,000)</th> <th colspan="5">2003</th> </tr> <tr> <th>Total</th> <th>1 year</th> <th>1-3 year</th> <th>3-5 year</th> <th>&gt;5year</th> </tr> </thead> <tbody> <tr> <td>Rental agreements</td> <td>124,688</td> <td>24,411</td> <td>44,868</td> <td>35,867</td> <td>19,542</td> </tr> <tr> <td>Operational lease</td> <td>21,474</td> <td>7,516</td> <td>11,811</td> <td>2,147</td> <td>--</td> </tr> </tbody> </table>	Amount (x € 1,000)	2003					Total	1 year	1-3 year	3-5 year	>5year	Rental agreements	124,688	24,411	44,868	35,867	19,542	Operational lease	21,474	7,516	11,811	2,147	--
Amount (x € 1,000)	2003																								
	Total	1 year	1-3 year	3-5 year	>5year																				
Rental agreements	124,688	24,411	44,868	35,867	19,542																				
Operational lease	21,474	7,516	11,811	2,147	--																				
3	<b>RJ292/IAS17</b> The future operating lease commitments are disclosed separately for a) the period up to one year, b) the aggregate of the years two till five and b) the cumulative amount for the period after year five. This is according to RJ292 and IAS17.	<b>Buhrmann, Annual Report 2003, page 85</b>  <b>RENTAL AND OPERATIONAL LEASE COMMITMENTS</b> These are due as follows;  <table border="1"> <tr><td>Within 1 year</td><td>85</td></tr> <tr><td>After 1 year but within 5 years</td><td>216</td></tr> <tr><td>After 5 years</td><td>135</td></tr> <tr><td></td><td><b>436</b></td></tr> </table> * million Euro	Within 1 year	85	After 1 year but within 5 years	216	After 5 years	135		<b>436</b>															
Within 1 year	85																								
After 1 year but within 5 years	216																								
After 5 years	135																								
	<b>436</b>																								
4	<b>Present Value (PV)</b> The total present value of the future operating lease commitments is disclosed with the discount rate.	<b>Macintosh, Annual Report 2003, page 61</b>  The present value of existing rental and lease commitments relating to immovable property can be broken down by terms as follows:  <table border="1"> <thead> <tr> <th></th> <th>Rental</th> <th>Lease</th> </tr> </thead> <tbody> <tr><td>Due within 1 year</td><td>6,556</td><td>50,789</td></tr> <tr><td>1 to 5 years</td><td>22,170</td><td>132,888</td></tr> <tr><td>Due after 5 years</td><td>20,454</td><td>32,500</td></tr> <tr><td></td><td><b>49,180</b></td><td><b>216,177</b></td></tr> </tbody> </table>		Rental	Lease	Due within 1 year	6,556	50,789	1 to 5 years	22,170	132,888	Due after 5 years	20,454	32,500		<b>49,180</b>	<b>216,177</b>								
	Rental	Lease																							
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1 to 5 years	22,170	132,888																							
Due after 5 years	20,454	32,500																							
	<b>49,180</b>	<b>216,177</b>																							
5	<b>Total nominal commitments (TC)</b> The total nominal value of the future operating lease commitments is disclosed.	<b>Grontmij, Annual Report 2003, page 44</b> The long-term financial commitments relating to rents and operating leases amount to € 84,584,000 (2002: € 61,838,000).																							
6	<b>Annual payment plus remaining life (AP+RL)</b> The annual operating lease commitments are disclosed together with the (average) remaining life of the total lease portfolio.	<b>Wolters Kluwer, Annual Report 2003, page 91</b> As at December 31, 2003 annual commitments under rental and operational lease agreements amounted to EUR 83 million (2002: EUR 79 million). The average term of these commitments is approximately 5.8 years (2002: 6.0 years).																							
7	<b>Annual payment (AP)</b> The annual operating lease commitments are disclosed without the applicable (average) remaining life of the lease portfolio.	<b>Amstelland, Annual Report 2003, page 58</b> The instalments on lease contracts due in 2004 total € 3.7 million (in 2003: € 3.6 million). The rent commitments for 2004 total € 4.5 million (in 2003: € 4.3 million).																							
8	<b>Other</b> Combinations of methods.	<b>Ten Cate, Annual Report 2003, page 58</b>																							

The most informative are those firms that disclose the information as required by FAS13. FAS13 (the first disclosure format) requires lessees to disclose the total lease commitments split into five expiry periods, whereas RJ292 (the third format) requires only three expiry periods. The second disclosure format is a combination of FAS13 and RJ292. Formats four through eight do not comply with RJ292. The fourth discloses the present value of the operating leases instead of the nominal value as required, either split into the three expiry categories or just the total

present value without additional information. Although it can be argued that this is useful information, it is more in line with the disclosure of financial leases and it is a progressive disclosure type (since the user of the financial statements does not have to estimate the present value of the commitments, this format is not as required by the accounting standard). The fifth through eighth disclosure formats do not comply with the standard, and the information disclosed is insufficient to estimate the (present value of) total commitments of the company. This will be described in more detail in chapters 4 and 5. The fifth disclosure format discloses the total nominal leases commitments without dividing these into expiry periods. The sixth disclosure format discloses the annual payment including the (average) remaining life. Because the total commitment can be roughly estimated, this format provides more information than the seventh does. The seventh disclosure format discloses only next year's annual payment without the maturity. The estimation of the total commitment of such a company is a complete guess, and is the least-informative disclosure type. The eighth disclosure format is a combination of the formats described above.

As can be seen from Table 2.4 compliance with the accounting standards may not have priority in at least some companies. This may be a result of the non-legal binding of the accounting standards in the Netherlands, or it is possible that the companies involved might be of the opinion that their lease commitments are of non-material amounts. Chapter 5 presents the results of the analysis of the compliance of all Dutch listed firms during the period 2000-2004.

#### **2.4.5 Accounting lease qualification versus fiscal lease qualification**

From a fiscal point of view, by separating the ownership from the use of the asset, a lease can create value for both lessee and lessor. Most of the research on the lease-or-buy decision (see Appendix 1.II) focuses on the tax differential between lessee and lessors and the possibility of shifting the tax shield for low-tax-rated lessees to high-tax-rated lessors. However, to be entitled to depreciate an asset (and to be entitled to the tax incentives schemes), the lessor must be the economic owner of the asset and the lease will qualify as an operating lease. The increase in operating-lease transactions during the '70s and '80s is supposedly related to the tax-incentive investment programs of the Dutch government. The WIR-premie ("Wet investeringsrekening, available from 1978 until 1988) was an important stimulus for investments and the growth of the leasing business (Bruins Slot (1994, p.1303)<sup>26</sup>, Vereniging voor Belastingwetenschap (2001, p.15)). Nowadays, the government also has tax incentives schemes<sup>27</sup> promoting in particular investments in sustainable energy (like wind farms, co-generation plants, biomass installations).

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<sup>26</sup> Bruins Slot was formerly the tax inspector with the Amsterdam Inland Revenue Service for large companies and was involved in both the tax guidelines (resulting eventually in the Lease guideline 2000) and was a member of "Commission Leasing" of the Dutch Association of Tax Science that published in 2001 the Fiscal aspects of leasing. Bruins Slot withdrew from that commission, however, because of a possible conflict of interest that might have arisen between his dissertation and the commission's report. Bruins Slot defended his PhD-thesis '*Leasing in de vennootschapsbelasting. Een nieuwe kijk op 'economische eigendom'*' on June 7th 2006 at the University of Tilburg Bruins Slot (2006).

<sup>27</sup> In the Netherlands, tax incentives schemes include the following: accelerated depreciation (WET IB 2001, art. 3.31-3.38), small-scale investment deduction (Wet IB 3.41), energy investment deduction (Wet IB 3.42), environmental investment deduction (Wet IB 3.42a) and the movie investment deduction<sup>27</sup> (Wet IB 3.42b). These allow early depreciation or additional deductions that make it advantageous to enter into a lease agreement when the investor has limited or no tax capacity.

To distinguish between the legal and the fiscal owners of the asset, the Dutch tax authorities therefore also distinguish between operating and financial leases for fiscal purposes. (In the US, the distinction between the two types from a fiscal perspective refers to ‘true leases’ (tax transfer allowed) and ‘conditional-sales contracts’ (non-true leases); (Graham, Lemmon and Schallheim (1998)).

As with accounting standards, in order for the lease to qualify as an operating lease, the lessor must bear economic risk in the transaction; otherwise, the tax authorities will consider the lease to be a financial lease, which implies that the lessor will not be allowed to depreciate. Although the principle between the fiscal requirement and the accounting requirements is the same (transfer of economic ownership), the exact qualifications are not, and the same lease can be a financial lease for accounting purposes and an operating lease for tax purposes. Since 1985, several lease guidelines have been issued, meant to give some certainty to the lease industry regarding the boundaries of operating-lease qualification (Vereniging voor Belastingwetenschap (2001)). Until 2000, the guidelines were agreements between the Dutch Association of Leasingcompanies (“NVL”) and the Amsterdam Inland Revenue Service for large companies. Since 2000, the lease guideline is a resolution of the Dutch Undersecretary of Finance (“staatssecretaris van Financiën”). On November 15th 1999, the undersecretary issued the latest lease regulation<sup>28</sup>. Also within the tax regulations, the Dutch government found it desirable that lease agreements are treated equally to the greatest extent possible, as it is mentioned as the objective of the new lease regulation. The investment facilities as incorporated in the Dutch law appear to be one of motives for making the boundaries clear of a distinction between finance and operating leases, since the undersecretary explicitly refers to this matter. The lease guideline 2000 contains the criteria for which the lessor is assumed to be the fiscal owner of the asset, which results in the qualification of an operating lease. Appendix 2.III presents these criteria.

Although the qualifications as operating lease from a fiscal perspective as opposed to the accounting standard are quite similar (no bargain purchase option, asset not too specific for only lessee’s use), some differences exist. Table 2.5 summarises the major differences between the Dutch fiscal and accounting requirements.

**Table 2.5 Operating-lease qualification conditions**

	PV of lease payments less than	Economic useful life less than
<b>Tax</b>	92.5% <sup>1</sup>	85%
<b>RJ-292</b>	90%	75%
<b>IAS 17</b>	‘substantially all’	‘major part’

<sup>1</sup> Minimum residual value is 7.5% and will be increased by 0.5% for lease contracts with a maturity longer than five years.

The differences might lead to a qualification as an operating lease for tax purposes but as a financial lease for the financial statement, as illustrated by Figure 2.4.

<sup>28</sup> Leaseregeling 2000, act of November 15<sup>th</sup> 1999, nr. AFZ 99/3262M, Stcrt.225) which replaced the existing lease regulation of December 4<sup>th</sup>, 1992, and became effective on January 1st, 2000. On June 20<sup>th</sup> 2001 the last amendments were made to this lease regulation (RTB 2001/2423M), but these amendments are not material.

**Figure 2.4** Qualification as operating lease based on lease term as % useful economic life

The equivalent treatment of fiscal- and accounting-lease qualification is not a necessity, according to the Dutch Minister of Justice<sup>29</sup>. However, the Commission of Justice argues that although the equivalence of the two areas may not be an end in itself, harmonisation of the guidelines might lead to a simplification of the leasing matter (Vereniging voor Belastingwetenschap (2001). The difference between the tax and accounting qualifications of leases is also apparent in the US<sup>30</sup> but as Graham et al. (1998) state: *“the tax and accounting guidelines suggest that operating leases (accounting) are predominantly true leases (tax)”*. Although in the Netherlands and the US the fiscal accounts do not necessarily follow the financial statements, this is not applicable to most continental European countries. This was also shown in the classification of Nobes et al. (2000), who argued that in Class-B countries the tax rules dominate the accounting rules. This applies to Germany, Italy, France and Belgium, for example. In Class-A countries, including the Netherlands, the US and the UK, tax rules are separated from accounting rules.

Although the difference between the accounting and tax qualification<sup>31</sup> in the Netherlands is not that large, it may have an influence on the tax reasons to choose operating leases (as investigated in chapters 6 and 7). For example, a tax-driven lease might be structured in a way that it qualifies as an operating lease from a tax perspective. If the accounting treatment is of no interest to the lessee or lessor, the lease might not qualify as an operating lease in the financial statements. This might affect the results in chapter 7.

To finalise this section, Table 2.6 summarises the definition of a lease, the qualification as operating lease and the consequences thereof from a legal, accounting and fiscal point of view.

<sup>29</sup> He said this in answer to the questions of the Commissions of Justice on draft regulations with respect to the financial statements of banks (see Vereniging voor Belastingwetenschap, 2001, p.29)

<sup>30</sup> In the US, the IRS set forth six guidelines to define the difference between true and non-true leases. These are in short: 1) minimum at-risk (20%) requirement for lessor, 2) minimum estimated residual value of 20%, 3) minimum remaining life (20% of originally estimated life), 4) no bargain purchase option, 5) no loan from lessee to lessor, and 6) lessor must demonstrate expectation of profits.

<sup>31</sup> This section focussed on the tax incentives and qualifications of operating leases, since this is often described as an important reason for choosing operating leases instead of buying an asset. However, the fiscal environment of leasing contains in general much more than the Leaseregeling 2000 or tax incentives attached to the fiscal owner of an asset. Other aspects are, for example, transfer taxes on immovable assets, sales taxes or seizure in case of bankruptcy. For an extensive description of these aspects, refer to “De fiscale aspecten van leasing “ (The fiscal aspects of leasing) by the Dutch Association of Tax Science (Vereniging voor Belastingwetenschap (2001)), and to the dissertation of Bruins Slot (2006)Bruins Slot.

**Table 2.6 Summary of definition and qualification as operating leases from a legal, accounting and fiscal point of view**

	LEGAL	ACCOUNTING RJ292	TAX LEASE GUIDELINE 2000
<b>LEASE DEFINITION</b>	Not legally defined, either rental, or hire purchase, or leasehold. Separation of legal ownership and use of an asset	An agreement whereby the lessor conveys to the lessee in return for a payment or series of payments the right to use an asset for an agreed period of time, <i>including</i> rental- leasehold and hire-purchase agreements.	Not defined
<b>OPERATING VS. FINANCIAL LEASE</b>	Lease not legally defined, so neither a distinction between operating and finance leases	Operating- versus financial leases based on who bears substantially all the risks and rewards incident to ownership Fiscal lease qualification differs slightly from accounting qualification. (see Table 2.5)	Operating- versus financial leases based on who is the fiscal owner of the asset
<b>CONSEQUENCES OF DIFFERENCE BETWEEN OPERATING AND FINANCIAL LEASES</b>	Any major financial commitment not disclosed on the balance sheet shall be disclosed in the notes. (Civil Code 2:381)	Operating lease total future nominal commitments are disclosed in the notes; financial leases are capitalised for their fair value on the balance sheet.	With operating leases, the lessor is the fiscal owner, and he depreciates and uses possible tax incentives.

## 2.5 Proposed lease-accounting approach: asset/liability approach

In 2000, a position paper was published by a working group consisting of members of the standard-setting bodies of Australia, Canada, New Zealand, the UK and the US, and the staff of the IASB (the “G4+1 working group”); (IASB (2000) and Lennard and Nailor (2000)). This paper described a relatively new approach<sup>32</sup>, the asset/liability approach, which would overcome the shortfalls of the risk/reward approach. The asset and liability approach is a way to account for all leases, irrespective of a qualification of different types, based on the same principle: the lease is assumed to have assets and liabilities for both lessee and lessor, and is accounted for by valuing these assets and liabilities and incorporating these in some way on the balance sheet. The difficulty inherent in judging and assessing some lease transactions is mentioned by McGregor (1996, p.9) and IASB (2000) as one of the shortfalls of the risk/reward approach, which is said to be improved under the asset/liability approach. If the asset/liability approach has indeed less ambiguity than the risk/reward approach, and the standards are easier to interpret and to apply, then the endorsements above suggest that it would be an improvement.

The proposal of the new accounting approach has surprising number of parallels with studies in the '60s and '70s, before FAS13 was established. For example, the American Institute of Certified Public Accountants published a study in 1962 in which they conclude that leases should be reflected in the balance sheet by capitalising the value of the lessee's rights as an asset and recording the lessee's obligations as a liability. Consequently, this study led to many articles commenting on the lease capitalisation approach. Rappaport (1965) starts his article with, 'the current controversy over accounting for leases highlights once again the necessity for accelerated research in basic accounting theory'. Cook (1963) strongly opposed lease capitalisation, providing six reasons why capitalisation is a misconception of the authors of the G4+1 study. It was also during this period that the first study analysing the impact of capitalisation on financial ratios was performed by Nelson

<sup>32</sup> In 1996, this approach was introduced by another paper of the G4+1, 'Accounting for Leases: a new approach.' (McGregor (1996)).

(1963). The impact of capitalisation of leases is therefore the subject of chapters 4 and 5, which will discuss the issue in more depth. However, based on the above one might conclude that the current new attention for lease accounting has similarities to the earlier flow of lease-capitalisation discussions. Furthermore, the above-mentioned articles showed that the lease-accounting regulation as laid down in FAS13 was probably not received with an overwhelming agreement of all parties. The division between operating- and financial leases is evidently a compromise between proponents and opponents of lease capitalisation. The recently proposed asset/liability approach is then an attempt to undo this compromise.

The conceptual frameworks adopted by the different (national) accounting standards boards provide definitions of assets and liabilities. Table 2.7 gives an overview of the definitions used by FASB and by IASB (IASB (2000)).

**Table 2.7 Overview of definitions of assets and liabilities by FASB and IASB**

<b>ASSETS</b>	
<b>FASB</b>	<b>IASB</b>
Assets are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events.	An asset is a resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise.
<b>LIABILITIES</b>	
<b>FASB</b>	<b>IASB</b>
Liabilities are probable future sacrifices of economic benefits arising from present commitments of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events.	A liability is a present obligation of the enterprise arising from past events, the settlement of which is expected to result in an outflow from the enterprise of resources embodying economic benefits.

Furthermore, the frameworks determine whenever the assets and liabilities should be recognized in the financial statements. In short, recognition is obliged whenever

- it is probable that any future economic benefit associated with the item will flow to or from the enterprise,
- the item has a cost or value that can be valued with reliability.

The originator of the asset and liability approach, Warren McGregor, finds it clear that application of the framework definitions and recognition criteria leads to the conclusion that all financial leases and most, if not all, operating leases qualify for recognition as assets and liabilities in the financial statements (McGregor (1996, p.16-17)). The proposed capitalisation, according to the reports of IASB and FASB, is to capitalise only the fair value of the rights and obligations to the extent these are passed on to the lessee. This is called the ‘financial components approach’ by Monson (2001) or the ‘rights of use approach’ by UBSWarburg (2004). This is in contrast to capitalisation of the full value of the equipment with the obligation to return it at the end of the lease. The G4+1 working group discussed this alternative, and proponents argued that the lessee has full control over the entire equipment during the term of the lease. In addition, this alternative approach would make the balance sheet more comparable to companies that own the assets instead of leasing them (IASB, 2000, p.25). This alternative approach is called the “whole-asset approach” by Monson (2001) and UBSWarburg (2004). This alternative was rejected by the G4+1 working group, because of the following reasons: first, lessee rights relate only to that part of the equipment’s economic life and not the whole of it; second, the economic benefits beyond the end of the lease are not transferred to the

lessee in the first place, and the obligation to return the asset at the end of the lease therefore does not represent economic reality.

Appendix 2.IV illustrates the differences between the risk/reward approach and the asset/liability approach, using both the whole-asset approach and the financial-components approach. For illustrative purposes, the purchase of the assets with 100% debt financing is also included.

As described before, the G4+1 working group has rejected the whole-asset approach. Although both Monson (2001) and UBSWarburg (2004) agree with the principle of capitalising all leases, they both prefer the whole-asset approach because it makes the balance sheet comparable with the purchase and debt financing of the asset. Monson (2001) argues that when comparing the approaches to the criteria of useful information by the frameworks, the whole-asset approach is overwhelmingly superior to the financial-components approach. Monson (p.284) states that “any new lease-accounting standard that does not reduce the volume of lease contracts transacted solely because of their perceived off-balance-sheet advantages is producing information that is neither relevant nor reliable”. He is of the opinion that this approach will lead to further possibilities to structure leases in a way that is convenient to the lessee’s balance sheet.

In July 2006, the board members of both the IASB and the FASB voted to add to the agenda the project on lease accounting. The project will be conducted jointly and is expected to result in the publication of another discussion paper in 2008 (IASB (2006)). New rules are not expected to be issued until 2009. FASB member Leslie Seidman mentioned during the board meeting that ‘reworking FAS13 ranks second behind pension accounting as one of FASB’s top priorities<sup>33</sup>’. The next sub-section summarises a study analysing the comments written in response to the previous IASB- and FASB proposal to change the lease-accounting standard.

### **2.5.1 Comments on lease reform by different users**

Different parties have an interest in lease accounting, either as insiders (lessors, lessees or auditors), or as outsiders (regulators, users of the financial statements or academics). An unpublished paper on the economic interest of lease accounting analysed the comment letters sent to the IASB by 29 parties involved in lease accounting, on the proposed asset/liability approach (Lückerath (2002)). The results of this study are summarised below and will be discussed hereafter.

#### **Attitude towards current and proposed lease-accounting standard**

The two central research questions of the study are the following: first, is the current risk/reward approach perceived to be unsatisfactory, and second, will the asset/liability approach be an improvement? The IASB received 29 letters, which were posted on the IASB website. An overview of these letters is shown in Appendix 2.V. Of the 29 letters, 27 were useful for analysis (one remained undisclosed and one was a delay notice). Table 2.8 shows the division of the letters over the five categories of interested parties. Table 2.8 also shows whether a negative or positive attitude toward the two lease-accounting approaches was expressed in the comment letter.

<sup>33</sup> Citation from Marie Leone, July 19<sup>th</sup>, 2006, [www.CFO.com](http://www.CFO.com)

**Table 2.8 Attitude towards lease-accounting approach**

Respondent:	Total Letters	RISK/REWARD APPROACH		ASSET/LIABILITY APPROACH	
		Positive attitude	Negative attitude	Positive attitude	Negative attitude
Lessor	10	5	2	1	7
Lessee	2	2	0	0	2
Auditor	10	0	6	8	0
Regulator	3	0	1	0	2
Academic	2	0	2	1	0
<b>Total</b>	<b>27</b>	<b>7</b>	<b>11</b>	<b>10</b>	<b>11</b>

Of the total sample of 27 respondents, for eighteen respondents<sup>34</sup> the opinion towards the risk/reward approach was obvious: seven were positive and eleven negative. With respect to the asset/liability approach, for 21 respondents their attitude was clear: eleven were negative and ten positive. However, the division of these attitudes over the interested parties attracts attention. Most striking are the auditors; the auditors for which the attitude could be observed from the letter were all six negative, with respect to the risk/reward approach, and all eight positive, with respect to the asset/liability approach. The two lessees in the sample reacted in an opposite manner, both positive towards the risk/reward approach and both negative toward asset/liability approach. The lessors had mainly the same outcome— although for both approaches there were two (one) exceptions. The two academics in the sample were both negative towards the risk/reward approach, but only one expressed a positive attitude towards the asset/liability approach.

### Reactions on current and proposed lease-accounting standard

Table 2.9 shows the reactions of the respondents on three specific items mentioned in the letters: the method was arbitrary, the information was either unsatisfactory (for risk/reward approach) or incorrect (asset/liability approach), and the risk/reward approach should be maintained, or they agreed with the asset/liability-principle.

**Table 2.9 Specific comments on lease-accounting approaches**

		RISK/REWARD APPROACH					
Respondent:	Total letters	Arbitrary		Unsatisfactory		Maintain Risk/Reward	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
Lessor	10	4	3	0	4	6	1
Lessee	2	1	0	1	0	2	0
Auditor	10	7	0	6	1	1	8
Regulator	3	2	0	1	0	1	1
Academic	2	1	0	2	0	0	2
<b>Total</b>	<b>27</b>	<b>15</b>	<b>3</b>	<b>10</b>	<b>5</b>	<b>10</b>	<b>12</b>
		ASSET/LIABILITY APPROACH					
Respondent:	Total letters	Arbitrary		Confusing/wrong information		Agree with A/L principle	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
Lessor	10	7	0	3	0	2	7
Lessee	2	1	0	1	0	0	2
Auditor	10	2	1	3	0	9	1
Regulator	3	2	0	2	0	0	3
Academic	2	0	0	0	0	1	0
<b>Total</b>	<b>27</b>	<b>12</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>12</b>	<b>13</b>

<sup>34</sup> Five respondents did not express their attitude, and the attitude of four respondents was mixed.



Of the 27 respondents, eighteen reacted to the arbitrariness of the risk/reward approach; three of these (all lessors) disagreed with the qualification of arbitrariness. Both lessees were in favour of maintaining the risk/reward approach, as were six out of seven lessors that reacted on this matter. The major part of the auditors found the risk/reward approach arbitrary and unsatisfactory, and disagreed with keeping this approach. The arbitrariness is presumably not improved by the asset/liability approach, since still twelve respondents found it arbitrary (of these, seven were lessors). The asset/liability principle is not supported by a small majority of the respondents. Striking is the disagreement of the three regulators with the asset/liability-principle. Not surprisingly, these letters did not come from countries directly involved in the IASB paper (letters came from the EU, the Netherlands and Germany).

### **Comments by lessors**

Arguments used by the lessors do not seem to centre on the fear of losing business, but are more related to the usefulness of each approach to the public, the costs of implementation and the possibility of structuring lease transactions to suit off-balance transactions.

### **Comments by lessees**

Unfortunately, but not surprisingly, only two letters came from lessees. This is indeed unfortunate, because of the impact that the change of the lease-accounting approach will have on especially the lessee's balance sheet. It is not surprising because lessees do not participate in leasing as a core business but as a way of purchasing or hiring assets, and they therefore have no interest in leasing itself. This probably explains why the only two comment letters coming from lessees were associations representing groups of lessees (i.e. the International Air Transport Association, IATA, and the Australian Institute of Company Directors, AICD). Both lessees were in favour of maintaining the risk/reward approach. The IATA (p.1) was very clear in the reasons why it favoured the risk/reward approach: *'the manner in which leases are accounted for has a major bearing on the financial statements of most if not all airlines', and 'strong support for the existing R/R approach'*. The arguments of the IATA are driven purely by their own commercial interests in maintaining the current approach, which is also mentioned as a shortcoming of the proposed approach because it overlooks the commercial reasons for companies to lease, according to the IATA. The AICD suggests maintaining the Risk/Reward approach and expanding only the disclosure rules.

### **Comments by auditors**

Eight out of the ten auditors that reacted to the IASB proposal disagreed with the risk/reward approach. Arthur Andersen, for example, (p.1) 'has been concerned for many years that the approach to accounting for leases has been based on a mass of rules and sub-rules designed to support relatively arbitrary conclusions', or the Accountant Association of Canada 'the current treatment requires subjective judgement and is open to abuse, transactions that are essentially the same should be accounted for in the same manner.' The South African Institute of Chartered Accountants finds that the

asset/liability approach increases the comparability and convergence of accounting requirements but adds, “our main concern is that it will remain relatively easy to structure leases so that a lessee can report immaterial amounts on its balance sheet even though the economics of the arrangement are that the lessee has acquired significant property interests”. Moreover, since most of the auditors find the risk/reward approach arbitrary (seven agree, none disagree) and unsatisfactory (six agree, one disagree), the approach seems indeed to be an improvement on this matter, since only two auditors agree with the arbitrariness of the approach (one disagree). Thus, although the auditors also find some shortcomings in the asset/liability approach, the majority favours it.

### **Comments by regulators**

Three regulatory bodies reacted to the proposal of the IASB: the European Commission and the Dutch and German regulators. Two responded negatively towards the proposed asset/liability approach (Dutch and German regulators). The European Commission showed some hesitance because they do not agree with the asset/liability approach principle but do agree, “lease accounting would be brought in line with more recent standards and the various conceptual frameworks of the G4+1-members, because the pronouncements clearly have a different underlying basis”. Also, the DASB does acknowledge that the risk/reward approach operates unsatisfactorily, but does not agree with the proposed asset/liability approach; they argue, however, that only those assets that an enterprise can control should be reflected on the balance sheet. Situations might occur when the asset/liability approach “will place an undue requirement on a lessee” (p.1). Although the asset/liability approach is not preferred, neither is the risk/reward approach. Only the Dutch regulator favours an amended risk/reward approach to address the problems of the existing standard. The other two did not really react to the risk/reward approach and could therefore not be classified.

### **Comments by academics**

Both of the academics that responded oppose the risk/reward approach, citing this rejection based on economic theory. Michael Bradbury, University of Auckland, said, (p.2) it is clear that the existing operating/financial lease distinction does not work. It is based on arbitrary criteria, which do not reflect fundamental economic characteristics; Beattie and Goodacre, University of Stirling, stated, (p 1.) ‘current lease accounting standards fail to capture the economic reality and flexibility of lease contracts. As a result, company-operating ratios based on reported financial statements are significantly distorted’. Furthermore, Beattie and Goodacre do not comment in depth on the asset/liability approach, although they do favour capitalisation of all leases. The lease-capitalisation approach as suggested by Beattie and Goodacre (1998) and Beattie et al. (1998) will be extensively described in chapter 4 of this thesis. Bradbury does believe that ‘the asset/liability approach is a useful alternative to the risk/reward approach, since it is consistent with current economic theory’.

The above discussion allows us to conclude that although the risk/reward approach is often called unsatisfactory, there is also no overwhelming support for the asset/liability approach. Also, different parties have different interests in lease accounting. Lanfranconi and Wiedman (2000) argue that if users of the financial statements truly believe that two types of leases exist (based on the division of the risks and rewards of ownership), then the asset/liability approach appears somewhat draconian. They suggest that in that case a modification of the current criteria seems more appropriate. On the other hand, if all leases are considered to fall within a continuum where the lessor and the lessee share the rights, the risks and rewards to varying degrees, then the asset/liability approach might be a better reflection of this reality. Chapters 3, 4 and 5 investigate the decision usefulness of the current operating-lease disclosure requirements. The empirical analysis of chapter 5 will test whether the information required is sufficiently complete to allow companies to be compared on a fair basis, regardless of whether or not a company has material lease commitments. Insufficient information may lead us to one of two conclusions: either the asset/liability approach is unavoidable, or a compromise between the current and proposed lease-accounting approaches might be worth consideration.

## 2.6 Leasing volume in the Netherlands

Just how important leasing has become worldwide and in the Netherlands will be illustrated in this section. However, as will also become clear, leasing activity in the Netherlands is hard to analyse, and it seems impossible to come up with indisputable numbers of how big the market is. For example, the upcoming analysis of the volume of leasing for only 87 listed companies shows already higher numbers than are disclosed in the World Leasing Yearbook 2006 for the Netherlands as a whole. This section does show, however, how leasing has become relatively more important in the world, in Europe and in the Netherlands.

Figure 2.5 shows the development during the years 1996-2004 of the nominal commitments disclosed in the financial statement for a stable group of 87 Dutch listed companies. The financial statements of the companies in this sample were available for the entire eight-year period. Also these companies disclose information on operating leases (this includes companies disclosing that there are no operating-lease commitments). The disclosed nominal commitments are taken into account as they are disclosed, so that no estimation has been conducted. Thus, for a company that discloses only the annual payment (see Table 2.4), only this payment is taken into account (whereas the total commitment will be larger). The development of the sample is shown in two lines, one including all 87 companies, and one excluding Shell and Ahold, due to the impact they have on the total commitments.

**Figure 2.5 Development of nominal operating-lease commitments disclosed in financial statements of 87 Dutch listed companies**

The increase of nominal lease commitments during the period 1996-2004 for a sample of 87 Dutch listed companies, which had operating-lease disclosures available during the entire period. The top line shows the total disclosed nominal amount of operating leases. The bottom line shows the total disclosed, excluding Ahold and Shell, since they account for a major part of the total.

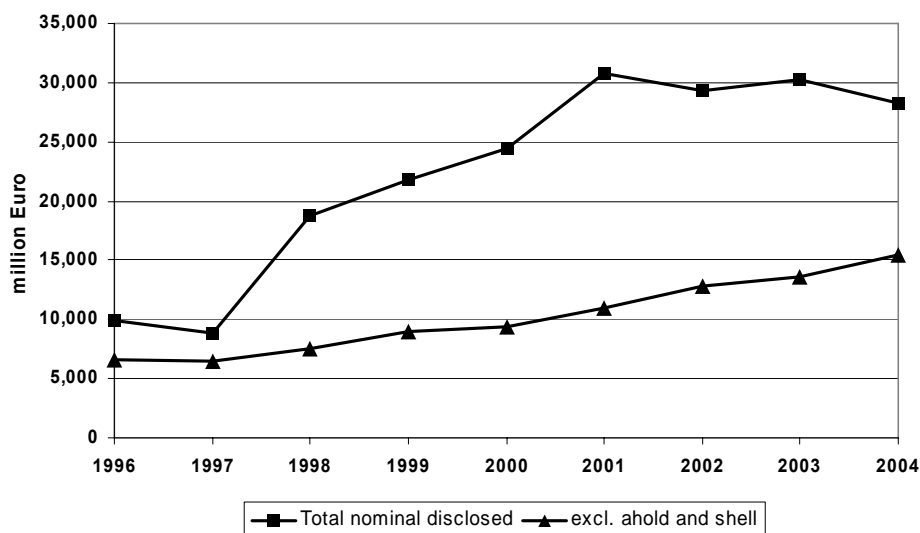


Figure 2.5 shows a continuous growth in disclosed nominal operating-lease commitments as from 1996. The total disclosed commitments in 1996 of 6.6 billion Euro (excluding Ahold and Shell) is attributable to 62 companies, since in 1996 23 companies did not disclose operating leases. This is on average 107 million Euros per company. In 2004, only six of the 85 companies did not disclose operating leases, and the remaining 79 companies disclosed 15.4 billion Euros. This is on average 195 million Euros per company. The increase of the disclosed operating-lease commitments in Figure 2.5 may be caused by several aspects: the increase of companies using operating leases, the increase in total commitments of individual companies, and also the increase in the disclosure of total commitments instead of only next year's annual payment.

Figure 2.6 shows the relative importance of operating leases as opposed to financial leases. The period analysed is 2000-2004 and the number of companies is a stable group of 109 Dutch listed companies<sup>35</sup>. The commitments of the operating leases are the nominal commitments as disclosed in the footnotes to the financial statements. The commitments of the financial leases are the commitments as capitalised on the balance sheet, and are therefore the present value of the future commitments (see section 2.4 for the differences). The present value of the future operating-lease commitments is probably higher than the nominal commitments, due to the number of companies that disclose only the annual payment. The present value of their total commitments will be (much) higher. Therefore, the difference between the volumes of financial and operating leases for these 109 companies is probably even larger. The increased usage of operating leases as opposed to financial leases can also be

<sup>35</sup> The financial lease data was not gathered before the year 2000. This enlarges the stable group of companies used in Figure 2.6 as opposed to Figure 2.5, since for the year 1996-2000 the information availability limited the group to 87 companies for the entire period 1996-2004. The empirical studies of parts II, III and IV analyse the period to the years 2000-2004 because of better data availability during that period. However, to show the relative growth of the nominal operating-lease commitments, Figure 2.5 covers the period 1996-2004 with a limited number of companies.

deduced from the number of companies that disclosed in any form operating leases, as opposed to financial leases. For example, in 2004, of the 109 companies, 103 disclose operating leases. Of these 109 companies, however, only 36 report financial leases. The nominal operating-lease commitments add up to 29.5 billion Euros, as opposed to the capitalised financial leases of 3.9 billion Euros.

**Figure 2.6 Relative importance of operating leases compared to financial leases**

Nominal commitments of operating leases disclosed in the footnotes to the financial statements of 109 companies during the period 2000-2004, and the on-balance capitalised financial leases for the same group of 109 companies during the same period.

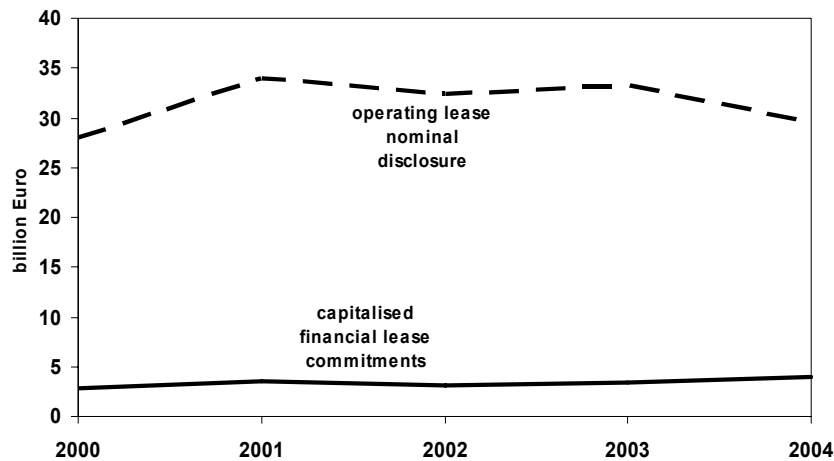
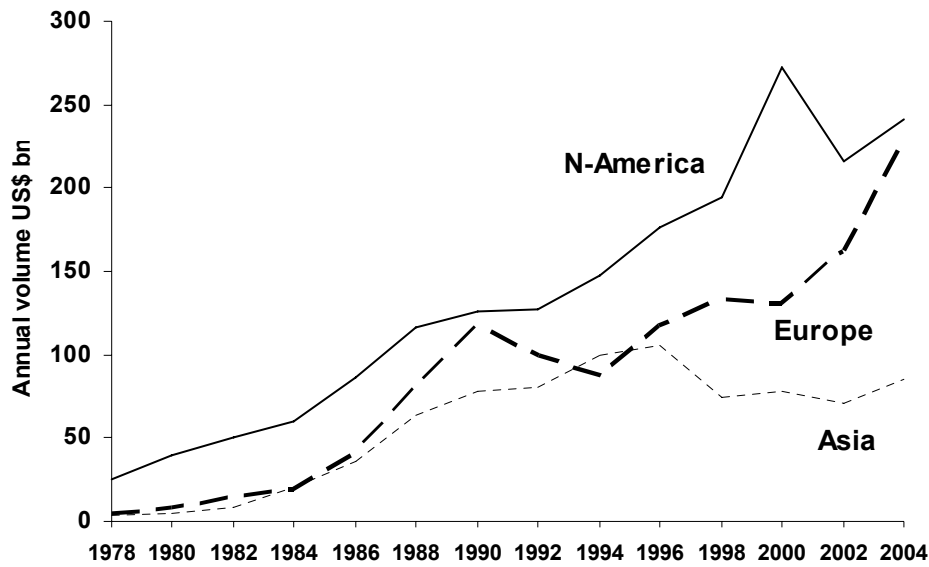


Figure 2.6 shows that the operating leases are a multiple of the financial-lease commitments, and as a financing source are more important. This is in line with studies conducted in the US by the SEC (2005), Mehran et al. (1999) and Graham et al. (1998), for example, or in the UK by Beattie, Goodacre and Thomson (2004). However, in the following analyses of annual leasing volume in the Netherlands and internationally, the two types of leasing are not mentioned separately by the different sources.

Figure 2.5 showed the increase of disclosed operating-lease commitments for a small sample of 87 Dutch listed companies. Also other sources prove the growing use of leasing in general (financial and operating). Leasing has become a growing source of financing for companies over the last decades. Beginning in the 1950s, different countries established specialised leasing intermediates, starting with the US Leasing Corp. in 1954. The US has since then been the fastest growing market in annual leasing volume. From the 1980s, the European leasing industry has also grown each year due to newly established tax and accounting rules. Euromoney Institutional Investor Plc. publishes every year the World Leasing Yearbook, which is the only source of aggregate information on the world leasing industry. Although their information is a useful tool for estimating the size of the market, their results should be interpreted carefully. For example, lease information is gathered through leasing associations. Information from Europe is provided by Leaseurope (the European Federation of Leasing Company Associations), which in turn receives information from national associations such as the Dutch Leasing Association (NVL). Finally the national leasing associations receive information from their associated leasing companies. Thus, information on leases contracted without the involvement of a leasing company is not included.

However, as with Figure 2.5, the information provided by the Leasing yearbook is valuable in illustrating the growing relative importance of leasing. Figure 2.7 shows the annual leasing volume of the three major leasing markets in the world; North America, Europe and Asia. It shows that since 1978 indeed most new leasing volume was attributable to North America. However, in 2004 the market share of Europe (39.6%) approached North America's market share (41.6%). This might indicate that the leasing market in North America has become a mature market (Euromoney (2006)).

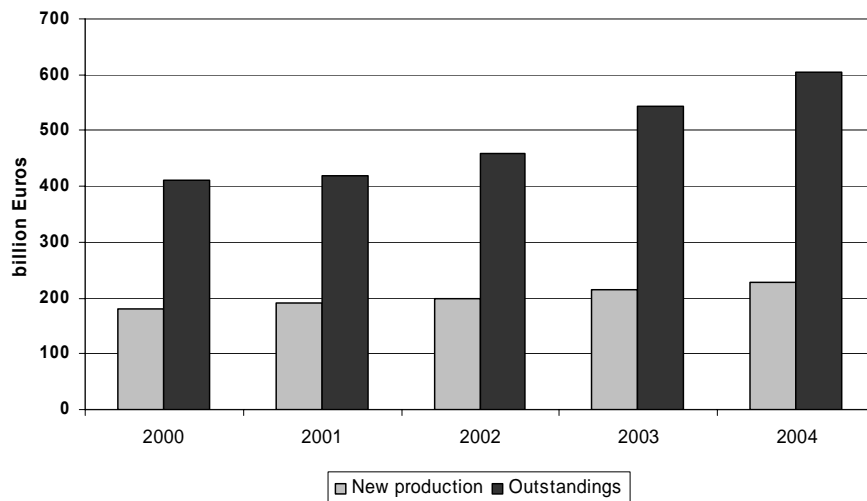
**Figure 2.7 Annual leasing volume of North-America, Europe and Asia, 1978-2004**



Euromoney World Leasing Yearbook 2006

The annual lease volume in Europe and the outstanding lease commitments during the period 2000-2004 are shown in Figure 2.8. Of the annual volume in 2004, 83% was attributable to equipment leasing and hire purchase, and 17% to real estate leasing. This also indicates, however, that the numbers are being processed by national leasing associations, which are mainly involved in equipment leasing. Especially real estate leasing will often be contracted without the involvement of a leasing company. Nevertheless, as concluded by Mills in: Euromoney (2006, p.38), 'it does demonstrate the increasing importance of leasing as a means of financing throughout Europe'.

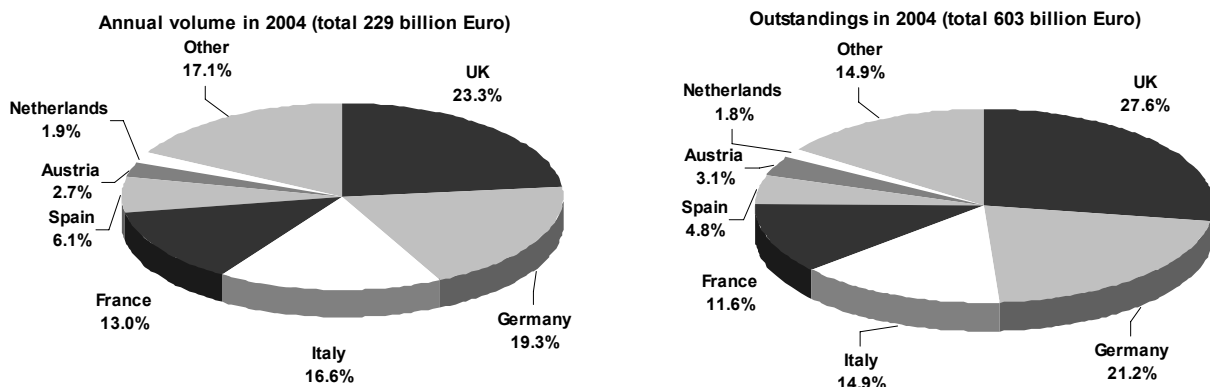
Figure 2.8 Annual leasing volume and outstanding lease commitments in Europe from 2000-2004



Subsequent to the breakdown of world leasing volume, Figure 2.9 shows the share of the Netherlands in Europe’s annual leasing volume and outstanding lease commitments in 2004. For Leaseurope, the Netherlands is too small with regard to its contribution to the total leasing volume in Europe that the Netherlands is combined either with Belgium, Luxemburg and Switzerland or into the category ‘Other’ in tables and figures included in Leaseurope’s reports (Euromoney (2006), Leaseurope (2005)). This study has distracted the Netherlands from the rough data to reconstruct Figure 2.9. This does not mean that countries combined in the ‘Other’ category are less significant leasing countries than the Netherlands.

Figure 2.9 Share of the Netherlands in annual volume (left) and outstanding lease commitments (right) in 2004

source: www.leaseurope.org



In new volume, the Netherlands accounted for 4.4 billion Euros (1.9% of Europe’s new volume) and with respect to the total outstanding, the Netherlands also has a 1.8% share of 603 billion Euros (11 billion Euros). Again, when we compare these numbers to the total nominal commitment disclosed in 2004 for 85 Dutch listed companies (see Figure 2.5), we see that these companies already have a total nominal commitment of 15 billion Euro of exclusively *operating leases* (even 27 billion Euro including Ahold and Shell). How this number relates to the 11 billion Euro of *all leases* in the Netherlands as estimated by Leaseurope is hard to discover. The absolute figure for leasing volume in the Netherlands is definitely

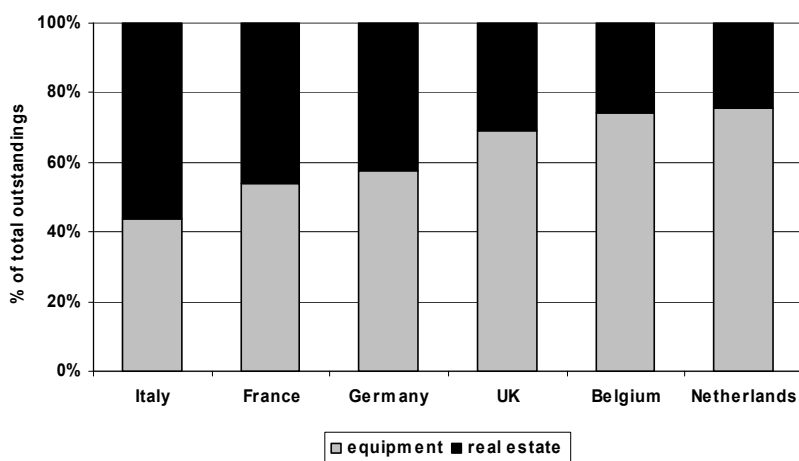
underestimated by Leaseurope. Since this might also be the case for other countries, we cannot conclude that the Netherlands' market share lies above 2%.

Of course, the absolute numbers are dependent on the size of each country and the number of investments in that country. Leaseurope therefore also calculates a relative measure of leasing per country: the 'penetration rate'. The penetration rate is calculated by dividing the total lease- and hire purchase new production by the total amount of investments in a country. It should show the relative importance of leasing in the particular country. However, the penetration rate in the Netherlands estimated by Leaseurope is also one of the lowest in Europe. Leaseurope estimates that the penetration rate is 6.56%<sup>36</sup> in the Netherlands (as opposed to, for example, Belgium (8.83%), France (10.86%), Germany (17.14%), Italy (19.35%) or the UK (24.49%)). The penetration rate in the Netherlands is more in line with countries such as Morocco (6.07%), Romania (6.34%) or Greece (6.81%).

An explanation may be that the leasing companies in the Netherlands are specialised in movable assets (equipment leasing), whereas in other countries leasing companies are more involved in real estate as well. This seems true when analysing Leaseurope's division between 'equipment' and 'real estate' leasing. Figure 2.10 shows this division for Italy, France, Germany, the UK, Belgium and the Netherlands. In the Netherlands, 25% of the outstanding consists of real estate, whereas this is 56% for Italy. This implies that real estate leasing in the Netherlands is outside the scope of the leasing companies and is therefore not accounted for in the World Leasing Yearbook 2006 and by Leaseurope.

**Figure 2.10** Division of total outstanding in equipment and real-estate leasing

source: www.leaseurope.org



This section demonstrates that (in the Netherlands) the leasing business is rather difficult to unravel, and many leasing activities are executed outside the sight of organised leasing associations. Although the analysis of Leaseurope might indicate that the Netherlands is not a country in which leasing plays a major role, the difference between Figure 2.5 and the explanation provided above regarding that difference, indicates the opposite. Chapter 5 presents the results of how important operating leases are as a financing form for Dutch listed companies.

<sup>36</sup> Leaseurope adds in a footnote that the penetration in the Netherlands would increase to 13.55% if data from the Dutch Car leasing Association would be included. It is not explained why this data is not included in the first place.



## 2.7 Summary/Conclusions

This chapter described different aspects of leasing in general. Section 2.2 introduced the concept of leasing and the reasons to choose leasing. Subsequently, sections 2.3, 2.4 and 2.5 respectively described the legal aspect of leasing and its accounting standard, the current lease-accounting standard and the proposed lease-accounting standard. Section 2.6 showed the growing importance of leasing worldwide and the dominance of operating leases as opposed to financial leases. This chapter has made it clear that operating leases are a major financing source, of which the accounting treatment is probably an important stimulus. Although a new accounting standard might bring this to an end, consensus on a new lease-accounting standard seems just out of reach. This stresses the importance and the timely nature of the underlying study, and upcoming chapters investigate whether the lease-accounting standard provides useful information and whether the limitations of the standard provide the incentives to choose unusual numbers of operating leases.

Section 2.3.1 showed that the Dutch Civil Law has no specific laws with respect to leasing, and that leasing is not known as a separate legal agreement. It is the substance of the contracts that defines which articles of the Dutch Civil Law are applicable. The legal status of a lease can be a rental agreement, a leasehold agreement, or a hire purchase, which are legal contracts recognised in the Dutch Civil Law. The most important legal provisions in Dutch Civil Law are therefore those articles that refer to the abovementioned legal agreements. Furthermore, section 2.3.2 described the legal status of the accounting standards. The conclusion: that in the Netherlands the accounting standards are not legally binding, which has changed for the listed companies; the financial statements as from January 1<sup>st</sup>, 2005 have a legal obligation to comply with IFRS. However, companies are legally obligated (Civil Code 2:381) to disclose any major financial commitments that are not disclosed on the balance sheet. This therefore also applies to major operating-lease commitments.

Section 2.4 described the current lease-accounting standard. Section 2.4.1 compared the Dutch RJ292, the international IAS17, the US FAS13 and the UK SSAP21. Although the intentions and basic principles are the same, still some not-to-be-neglected differences exist between these lease-accounting standards. Section 2.4.2 described the differences in the recognition of financial leases versus the disclosure of operating leases. The major difference lies of course within the on- and off-balance character of both types. Also striking, however, is the difference in what should be disclosed. With a financial lease, the present value has to be disclosed (excluding the interest part), whereas for an operating lease the total future lease commitment (including the interest part) must be disclosed. Subsequently, section 2.4.4 provided an overview of the formats used for the disclosure of operating leases in the Netherlands. Not all companies comply with the required disclosure of operating leases in the notes. Companies disclosing according to FAS13 provide the most information; companies disclosing only next year's annual payment, without an indication of the remaining life, provide the least. Chapter 5 will empirically analyse how many companies do not comply. Section 2.4.5 described the difference in the lease qualification between the accounting standards and the Dutch Lease guideline 2000. Also between these two fields no harmonisation exists.

Section 2.5 describes the proposal to change the lease-accounting standard from the risk/reward approach to the asset/liability approach. The latter is a proposal to eliminate the differences between financial- and operating leases, and to recognise all leases on the balance sheet. The proposed asset/liability approach is not as clear-cut as the G4+1-working group suggests, since the two alternatives (either the financial-components approach or the whole-asset approach) differ substantially, each with their own disadvantages. The analysis of the letters written in response to the IASB- and FASB proposals shows that the current risk/reward approach has many opponents, indeed; this is also the case, however, for the proposed asset/liability approach. Standard setters might find a compromise worthy of consideration. Recently, the lease project has been put high on the agenda of both IASB and FASB. However, a new discussion paper is expected to be published in 2008, and IAS17 and FAS13 are not expected to be amended until 2009.

Finally section 2.6 showed the increasing importance of (operating) leases throughout the world, in Europe and in the Netherlands. It was shown that from 1978, leasing has shown continuous exponential growth. The World Leasing Yearbook 2006 concluded that in 2004 Europe approached the US in terms of annual production, and that the US is assumed to be a mature market, whereas Europe has still opportunities to grow. However, these figures from the World leasing Yearbook and Euromoney compared to an analysis of 109 Dutch listed companies revealed that the statistics from these institutions are far from complete. To the extent that this information is provided solely by the Dutch leasing association, and no other association has access to more complete information, the total leasing volume in the Netherlands will remain undisclosed. Section 2.6 also showed that, based on a sample of 109 Dutch listed companies, operating leases are by far the dominant leasing type, compared with financial leases.

The main conclusions of this chapter are therefore as follows:

- operating leases have in particular become an increasing source of financing,
- from a legal, fiscal and accounting point of view, differences still exist (internationally) on what leasing is, and how operating and financial leases can be distinguished,
- current lease accounting as well as the prospect of future lease-accounting reform have both convinced proponents and opponents that consensus will not be easy to reach.

**Appendix 2.I Example of operating- and financial leases in the financial statements of lessee**

The lease payment is calculated as a ten-year annuity of 13.6 per annum (amount of 100, interest 6% and a maturity of ten years). The leased asset has a value of 100 and will be linearly depreciated over the maturity (10 per annum). The interest part in the first year's lease payment is  $6\% * 100 = 6.0$ ; the repayment part is consequently  $13.6 - 6.0 = 7.6$ . Tax rate is 40%.

OPERATING LEASES					FINANCIAL LEASES						
<b>BALANCE SHEET</b>											
	<i>t=0</i>	<i>t=1</i>		<i>t=0</i>	<i>t=1</i>		<i>t=0</i>	<i>t=1</i>			
Assets	0	0	Liability	0	0	Assets	100	90	Liability	100.0	92.4
Cash	<u>0</u>	<u>-13.6</u>	tax	0	-5.4	Cash	0	-13.6	tax	0.0	-6.4
			Retained earnings	<u>0</u>	<u>-8.2</u>				Retained earnings	0.0	-9.6
<b>Total assets</b>	<b>0</b>	<b>-13.6</b>	<b>Total equity and liabilities</b>	<b>0</b>	<b>-13.6</b>	<b>Total assets</b>	<b>100</b>	<b>76.4</b>	<b>Total equity and liabilities</b>	<b>100.0</b>	<b>76.4</b>
<b>INCOME STATEMENT</b>											
				<i>t=1</i>			<i>t=1</i>				
			Lease payment	<u>-13.6</u>		Depreciation	<u>-10.0</u>				
			<b>EBIT</b>	<b>-13.6</b>		<b>EBIT</b>	<b>-10.0</b>				
			Interest	<u>0.0</u>		Interest	<u>-6.0</u>				
			<b>EBT</b>	<b>-13.6</b>		<b>EBT</b>	<b>-16.0</b>				
			Tax	<u>5.4</u>		tax	<u>6.4</u>				
			<b>Net Income</b>	<b>-8.2</b>		<b>Net Income</b>	<b>-9.6</b>				
<b>NOTES</b>											
<i>Operational lease commitments</i>	<i>t=0</i>	<i>t=1</i>			<i>Financial lease commitments</i>	<i>t=0</i>	<i>t=1</i>				
< 1 year	13.6	13.6			< 1 year	13.6	13.6				
1 year < > 5 years	54.4	54.4			1 year < > 5 years	54.4	54.4				
> 5 years	<u>68.0</u>	<u>54.4</u>			> 5 years	<u>68.0</u>	<u>54.4</u>				
	<b>136.0</b>	<b>122.4</b>				<b>136.0</b>	<b>122.4</b>				
					<i>Lease assets</i>	<b>100.0</b>	<b>90.0</b>				
					<i>Present-value lease payments</i>	<b>100.0</b>	<b>92.5</b>				

## Appendix 2.II Financial and operating leases in the financial statements of KPN in 2004

KPN includes the financial leases in the balance sheet for a total amount of 125 million Euros: 67 million Euros under long-term debt and 58 million Euros as short-term debt. These are their outstanding commitments. Furthermore, they include in their notes the net present value of the total of these commitments: 145 million Euro. KPN does not disclose the interest rate used to discount the commitments, but because the present value is higher than the outstanding amount, it can be assumed that the discount rate used is lower than the interest rate applicable in the leases. Finally, KPN discloses in the notes a total nominal commitment of 2,224 million Euro of operating leases, which amount includes the interest portion applicable to the lease.

<b>Financial lease as capitalised on the balance sheet:</b>	
Total long-term debt (excluding short-term portion)	
• Financial lease obligations	67
Total short term portion of long-term debt	
• Financial lease obligations	58
} Total = EUR 125 million	

<b>Financial lease in the notes:</b>
As of December 31, 2004, the outstanding amount under the financial lease obligations of E-Plus, SNT and Digitenne amounted to EUR 125 million. The net present value of the total of these obligations amounts to EUR 145 million as of December 31, 2004.

<b>Operating lease in the notes:</b>
<b>RENTAL AND OPERATIONAL LEASE CONTRACTS</b>
Of these commitments, EUR 324 million are of a short-term nature (2003: EUR 335 million). EUR 969 million is due after five years (2003: EUR 197 million).
The costs of operating leases (including rental charges) in 2004 totaled EUR 139 million (2003: EUR 189 million).
These operating lease and rental commitments mainly relate to tangible fixed assets.

<b>Total operating lease commitments disclosed were EUR 2,224 million, thus expiring as follows:</b>	
-Within one year	324
-Between two and five years	1,231
-After five years	969

## Appendix 2.III Fiscal lease guideline 2000 requirements to qualify as fiscal owner

The lessor will be considered to be the fiscal owner of the asset if,

- a. the lessor acts as fiscal owner;
- b. the lessor has legal title to the asset (legal owner);
- c. bears residual value risk (positive and negative), which implies:
  - i) for contracts with a purchase option or extension option,
    - the option price is a fair value at inception of the lease
    - the option price has a minimum value of 7.5% of the fiscal cost price
  - ii) for contracts without an option it is expected that the fair value of the asset will not be above 7.5% at maturity of the asset. If the lessee obtains the asset at maturity for an amount below this 7.5%, it is assumed that the lessor had no residual value risk.
  - iii) for the contracts mentioned under A. and B., it is furthermore required that
    - the lease period is not longer than 85% of the economic life of the asset
    - the residual value risk has not been mitigated through the lessee or a therewith related party
    - the residual value risk has not been mitigated by a third party for more than 7.5%
    - the lessee in fact has the full economic ownership of the asset (through other agreements)
    - if both lessee and lessor apply for tax investment facilities, the lessor is assumed to have given up this claim
  - iv) for contracts with a maturity beyond five years the minimum required residual value will be increased by 0.5% for each additional year.
  - v) Finally, the above is not applicable for *specific assets*, which are defined as assets that have no value after maturity of the lease except for the lessee or cannot be used after maturity by any party but the lessee.

## Appendix 2.IV Difference between risk/reward- and asset/liability approaches in lease accounting

Example of a lease of an asset worth 100,000 Euro, with a maturity of two years: The economic life of the asset is ten years, with no residual value after ten years. The annual lease payment is 10,291 Euro (which is an annuity using 6% interest and 80,000 Euro residual value after year two). With the risk/reward approach, the operating leases are disclosed in the notes to the financial statements. The nominal commitment is disclosed divided over the three lease-expiry periods (within one year/between one and five years/beyond five years). The impact of the capitalisation of the asset and liability approach on the balance sheet is approximately five times higher when using the whole-asset approach than for the financial-components approach. This demonstrates the difference between the use of the asset during a two-year period, and the economic life of the asset which covers a ten-year period. The financial-components approach capitalises only the rights obtained for these two years, while the whole-asset approach capitalises the whole asset with the obligation to return it after two years. The purchase of the asset results in a lower net leased asset amount than with the whole-asset approach, due to the linear depreciation with the purchase as opposed to the annuity-based depreciation with the whole-asset approach.

	Risk Reward			Asset/Liability						Purchase of asset		
	31-12-00	31-12-01	31-12-02	Whole asset			Financial Components			31-12-00	31-12-01	31-12-02
<b>Balance sheet</b>												
<b>Assets</b>												
Cash	0	-10,291	-20,583	0	-10,291	-20,583	0	-10,291	-20,583	0	-12,818	-25,635
Leased Asset	0	0	0	100,000	100,000	100,000	18,868	18,868	18,868	100,000	100,000	100,000
Accumulated depreciation	0	0	0	0	4,420	8,840	0	9,434	18,868	0	10,000	20,000
Net Leased asset	0	0	0	100,000	95,580	91,160	18,868	9,434	0	100,000	90,000	80,000
<b>Total Assets</b>	<b>0</b>	<b>-10,291</b>	<b>-20,583</b>	<b>100,000</b>	<b>85,289</b>	<b>70,577</b>	<b>18,868</b>	<b>-857</b>	<b>-20,583</b>	<b>100,000</b>	<b>77,182</b>	<b>54,365</b>
<b>Liabilities and equity</b>	<b>31-12-00</b>	<b>31-12-01</b>	<b>31-12-02</b>	<b>31-12-00</b>	<b>31-12-01</b>	<b>31-12-02</b>	<b>31-12-00</b>	<b>31-12-01</b>	<b>31-12-02</b>	<b>31-12-00</b>	<b>31-12-01</b>	<b>31-12-02</b>
Long term debt, due in one year	0	0	0	4,291	4,549	91,160	9,159	9,709	0	6,818	7,227	7,660
Long-term debt, due after one year	0	0	0	95,709	91,160	0	9,709	0	0	93,182	85,955	78,295
Lease liability	0	0	0	100,000	95,709	91,160	18,868	9,709	0	100,000	93,182	85,955
Tax liability		-4,117	-8,233		-4,168	-8,233		-4,226	-8,233		-6,400	-12,636
Retained earnings		-6,175	-12,350		-6,252	-12,350		-6,340	-12,350		-9,600	-18,955
<b>Total Liabilities and equity</b>	<b>0</b>	<b>-10,291</b>	<b>-20,583</b>	<b>100,000</b>	<b>85,289</b>	<b>70,577</b>	<b>18,868</b>	<b>-857</b>	<b>-20,583</b>	<b>0</b>	<b>77,182</b>	<b>54,365</b>
<b>Income statement</b>		<b>31-12-01</b>	<b>31-12-02</b>		<b>31-12-01</b>	<b>31-12-02</b>		<b>31-12-01</b>	<b>31-12-02</b>		<b>31-12-01</b>	<b>31-12-02</b>
Leasepayment		-10,291	-10,291	Depreciation	-4,420	-4,420		-9,434	-9,434		-10,000	-10,000
<b>Operating Income</b>		<b>-10,291</b>	<b>-10,291</b>		<b>-4,420</b>	<b>-4,420</b>		<b>-9,434</b>	<b>-9,434</b>		<b>-10,000</b>	<b>-10,000</b>
Interest expense		0	0		-6,000	-5,743		-1,132	-583		-6,000	-5,591
<b>Gross income</b>		<b>-10,291</b>	<b>-10,291</b>		<b>-10,420</b>	<b>-10,163</b>		<b>-10,566</b>	<b>-10,016</b>		<b>-16,000</b>	<b>-15,591</b>
Tax @40%		4,117	4,117		4,168	4,065		4,226	4,007		6,400	6,236
<b>Net Income</b>		<b>-6,175</b>	<b>-6,175</b>		<b>-6,252</b>	<b>-6,098</b>		<b>-6,340</b>	<b>-6,010</b>		<b>-9,600</b>	<b>-9,355</b>
<b>Notes: operational lease commitments</b>												
due in one year	10,291	10,291	0									
due between one and five years	10,291	0	0									
due after five years	0	0	0									
<b>Total</b>	<b>20,583</b>	<b>10,291</b>	<b>0</b>									

Note: as for the whole-asset approach, the obligation to return the asset is still shown on the balance sheet. However, when the asset is returned to the lessor (and thus this obligation has been fulfilled), the balance sheet will be the same as the other two approaches.

CHAPTER 2

Appendix 2.V 29 Comment letters received by the IASB on lease-accounting proposal

y = yes, agree  
n = no, disagree  
0 = not mentioned

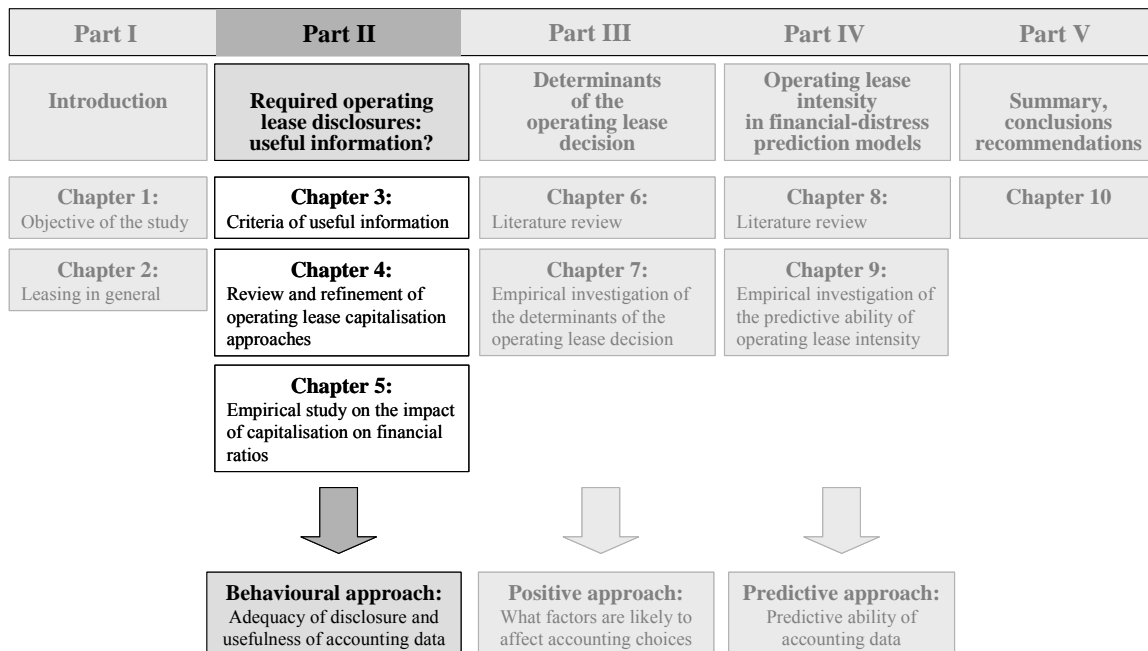
or

0 = not mentioned  
1 = very negative  
2 = negative  
3 = doubtful  
4 = positive  
5 = very positive

Lo=lessor  
Le=lessee  
A = auditor  
R=regulator  
O=other

	<u>Name</u>	<u>Comment Letter:</u>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
			D	F	B	A	A	J	A	A	G	I	C	S	N	I	E	F	N	C	U	-	N	L	A	R	-	A	N	F	A	I
			L	A	L	O	A	A	A	A	A	Le	L	A	O	L	R	A	R	L	L	-	L	L	A	R	-	L	L	Le	A	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
<b>Risk/Reward Approach</b>																																
	-arbitrary		0	0	y	0	y	0	y	y	y	y	y	0	y	0	y	y	y	n	y		y	n	y	0		0	n	0	y	
	-unsatisfactory		0	y	0	y	y	0	y	n	0	0	0	0	y	0	0	y	y	n	0		n	n	y	0		0	n	y	y	
	-maintain risk/reward		y	n	y	n	n	n	n	y	n	y	n	0	n	0	n	n	y	y	0		y	y	n	0		0	y	y	n	
	-attitude towards approach		5	2	3	1	1	0	1	3	1	4	1	0	2	2	2	0	3	5	0		4	4	1	3		0	4	4	2	
	-consistent with framework		0	0	0	0	0	0	0	0	0	0	0	0	0	0	n	0	0	0	0		y	0	0	0		0	0	0	0	
	-in favour of amending risk/reward		0	0	0	0	0	0	n	y	0	y	0	0	0	0	0	0	y	n	0		y	y	0	0		y	y	y	0	
<b>Asset Liability approach</b>																																
	-agreement with asset and liabilities in lease		n	y	n	0	y	y	y	n	y	n	y	y	y	n	n	y	n	n	0		n	n	y	n		y	n	n	y	
	-attitude towards approach		1	3	2	0	4	4	4	3	4	1	4	5	4	2	3	4	1	2	0		2	2	4	2		3	1	2	4	
	-information difficulty		0		y	0	0	y	y	0	0	0	0	0	0	y	0	0	0	0	0		0	0	0	y		0	0	0	0	
	-capitalisation problems		0	0	y	n	0	0	0	y	0	y	0	0	0	y	y	y	0	y	y		0	0	0	0		y	0	y	0	
	-consistent with framework		0	0	0	0	0	0	0	0	0	0	0	0	0	y	0	0	0	0	0		0	0	0	0		0	0	0	0	
	-arbitrary		y	y	y	0	y	0	0	0	0	y	0	n	0	0	0	0	0	y	y		y	y	0	y		0	y	0	0	
	-confusing		y	y	0	0	0	0	0	y	0	y	0	0	0	0	y	y	y	y	0		0	0	0	0		0	y	0	0	
	-wrong info		y	y	0	0	0	0	0	0	0	0	0	0	0	0	0	y	y	y	0		0	0	0	0		0	y	0	0	
	-financial engineering possible		0	y	y	0	y	0	y	0	y	y	0	0	0	0	0	y	y	0	0		y	0	y	0		y	y	0	0	
	-variation through input		0	y	y	0	y	0	0	0	0	y	0	0	0	0	0	y	0	y	y		0	y	0	y		y	y	0	0	
	-inconsistent with other standards		y	y	y	0	0	0	n	y	0	0	0	n	0	0	y	y	0	0	0		0	0	0	0		0	0	0	0	
	-in favour of amending asset/liability		0	y	y	0	y	0	0	0	y	0	0	0	y	0	0	y	0	0	0		0	n	0	0		0	0	0	0	

## PART II: THE USEFULNESS OF OPERATING LEASE DISCLOSURES AND THE POTENTIAL IMPACT OF CAPITALISATION ON FINANCIAL RATIOS



Part II of this thesis concerns the usefulness of operating-lease disclosures. It will try to find an answer to the first part of the research question, whether the current lease-accounting standard provides useful information to the user of the financial statements. This is done by addressing the following research questions: When is accounting information useful for decision-making? Does the accounting standard on operating leases fulfil the requirements of decision usefulness? How can operating-lease commitments be capitalised? Are the operating-lease commitments of a material amount? How sensitive is the capitalisation of operating leases to assumptions made by the individual user? What is the impact on financial ratios if operating leases are capitalised? Do the different capitalisation approaches arrive at consistent and comparable results?

Part II consists of the chapters 3, 4 and 5. Chapter 3 will describe the qualitative criteria of useful information as described by the IASB conceptual framework. Chapter 4 is an extensive comparison of the methodology and the assumptions of seven different capitalisation approaches. Among these seven capitalisation approaches is a suggested ameliorated version of the capitalisation approaches previously used in comparable studies. Chapter 5 will empirically test: —the compliance with the criteria of decision usefulness of operating-lease disclosures, —the impact on the financial ratios of operating-lease capitalisation, and, —the sensitivity of these results to the underlying assumptions and methodology of the seven different capitalisation approaches.





## **CHAPTER 3    CRITERIA OF USEFUL INFORMATION IN FINANCIAL STATEMENTS**

### **3.1    Introduction**

This chapter describes the decision usefulness of accounting information in general, and the disclosure of operating leases, more specifically. Decision usefulness of accounting information is defined by several accounting regulators such as the IASB, FASB and also by the DASB. The chapter is organised as follows. Qualitative criteria are described in section 3.2. Section 3.3 consequently describes these characteristics from the perspective of operating leases. Since the off-balance character of operating leases has especially an impact on financial ratios, special attention is given in section 3.3 to the importance of financial ratios by users of the financial statements. Previous research on the capitalisation of operating leases has focussed on the impact on these financial ratios (Imhoff et al. (1991), (1997); Beattie et al. (1998)). This study expands the focus from the comparability criteria of decision usefulness (impact on financial ratios) to also the other criteria of decision usefulness. For example, when the impact on financial ratios is material, this makes the information on operating leases relevant in decision-making, and this information is therefore classified as useful. Section 3.4 formulates five research questions that will be empirically investigated in the chapters 4 and 5. These research questions should ultimately answer the main question whether the disclosed operating-lease information is useful in decision-making. It will also show the weaknesses of the current lease-accounting standards. Answering these questions might assist standard setters in improving accounting regulations.

As mentioned in chapter 1, the main concern of this part is the decision usefulness of operating-lease information for the individual user (individual decision usefulness approach), and not for the market as a whole (aggregate-market decision usefulness approach). Decision usefulness is also questioned by the FASB special report on operating leases (Lennard and Nailor (2000)). They explicitly mention that their proposal to capitalise all leases on the balance sheet (see section 2.5) is guided by the objectives of financial statements to provide information that is useful to investors and to others who use financial statements as an input to economic decisions. This study will therefore be limited to the information available from the financial statements.

### **3.2    The usefulness of information disclosed in the financial statements**

#### **3.2.1    Characteristics of useful information according to the IASB Framework**

The objectives of financial statements have been defined by several accounting standard boards (i.e. IASB, FASB) and laid down in their respective conceptual frameworks (IASB (2003), FASB (1976)). The DASB has included in their Guidelines the so-called “Stramien”, which is a translation of the Framework of the IASB (the “Framework”). The DASB endorses the Framework, since it is an important basis for the further development of the Dutch Accounting Guidelines. Furthermore, the Framework is a useful tool in the day-to-day accounting practice dealing with situations that are not yet or only summarily regulated in the Guidelines. References in this section will be made to certain paragraphs of the

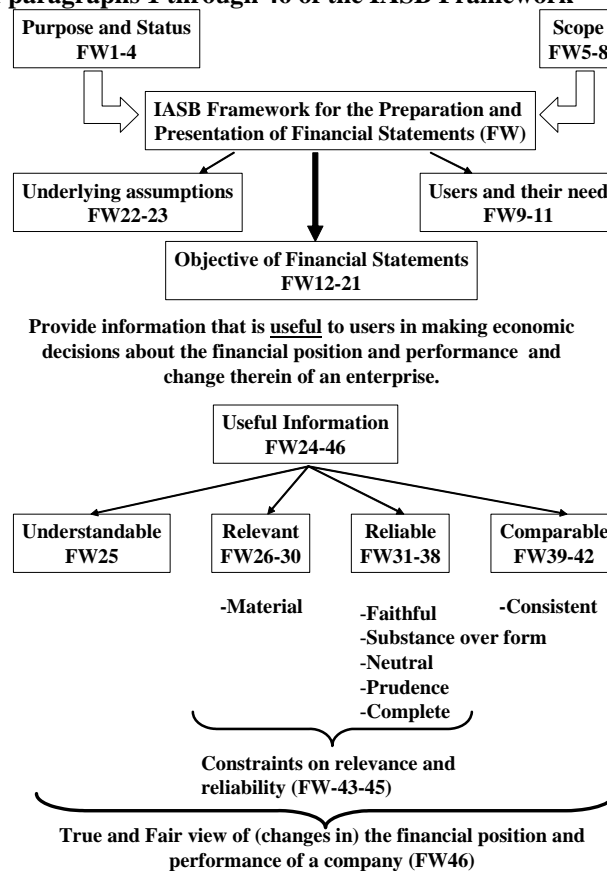
IASB Framework (FW + paragraph number), since the Dutch Stramien is a translation of this Framework.

The Framework has four major objectives:

- 1) To describe the objective of financial statements;
- 2) To define the qualitative characteristics that determine the usefulness of information in the financial statements;
- 3) To describe the definition, recognition and measurement of the elements from which the financial statements are constructed; and,
- 4) To define the concepts of capital and capital maintenance.

Figure 3.1 illustrates parts one and two of the Framework (paragraphs 1 through 46). Parts three and four (paragraphs 47 through 101) are not the subject of this section and therefore are not described in depth here. The IASB is of the opinion (paragraph 46) that the application of the qualitative characteristics (and of appropriate accounting standards) would normally result in financial statements that are generally understood to be a true and fair view of the position and performance of a company. The definition of the financial statements ('de jaarrekening') includes the balance sheet, the income statement, the statement of cash flows and also the notes and other explanatory materials that are an integral part of these financial statements (FW7). The financial statements exclude items such as reports by directors, statements by the chairman, management discussions and similar items that may be included in the full annual report ('jaarverslag'). This thesis will use the same terminology.

**Figure 3.1 Illustration of paragraphs 1 through 46 of the IASB Framework**



The objective of financial statements (FW12) is to provide information about the financial position, performance and changes in the financial position of an

enterprise that is *useful* to a *wide range of users* in making economic decisions. The Framework also defines a) the wide range of users (FW9) and b) when information is useful. The qualitative criteria of information usefulness are described below.

### 3.2.2 Qualitative criteria of information usefulness

According to the Framework (FW24), the *qualitative characteristics* are the attributes that make the information provided in financial statements useful to the defined users. The four principal qualitative characteristics are

- i) Understandability
- ii) Relevance
- iii) Reliability
- iv) Comparability

Section 3.3 discusses the qualitative criteria of information usefulness. Each of the criteria will also be related to the information disclosed for operating leases.

#### **Understandability**

Information provided in the financial statements should be readily understandable by users, who are assumed to have a reasonable knowledge of business, economics and accounting.

#### **Relevance**

Information in the financial statements should be relevant to the decision-making needs of users. Information is relevant when it influences the economic decisions of users. Information about the financial position and past performance is frequently used as the basis for predicting future financial position and performance, as well as other matters, such as the ability of the enterprise to meet its commitments as they fall due (FW28). The relevance of information is affected by its nature and materiality. The nature of information might be sufficient to determine the relevance. For example, a new segment the company is entering may result in additional risks and opportunities, which must be understood. Also information on committed fraud may be relevant information, irrespective of its materiality (FW29). Information is material when its omission or misstatement could influence the economic decisions of users taken on the basis of the financial statements. Materiality depends on the size of the item or of the size of the error caused by the omissions or misstatement.

#### **Reliability**

According to the Framework, the information in the financial statements should be reliable. Information is reliable when it is free from material error and bias and can be depended upon by the users. To be reliable, information should be

- faithful (FW35). Therefore, the IASB is of the opinion that transactions and events should be accounted for and presented in accordance with their substance and economic reality, and not merely on their legal form.
- neutral (FW36). Financial statements are not neutral if, by the selection or presentation of information, they influence how a decision or judgement is made.

- prudent (FW37). Prudence is the inclusion of a certain degree of caution when making estimates under conditions of uncertainty (such that assets or income are not overstated, or liabilities and expenses are not understated).
- complete (FW38). Information in the financial statements should be complete, within the bounds of materiality and cost.

### Comparability

Users of the financial statements should be able to compare (FW39) the financial statements of an enterprise through time and with different enterprises in order to evaluate their relative position, performance and changes therein. Therefore, the measurement and display of the financial effects of transactions and events must be carried out in a consistent way throughout an enterprise and over time for that enterprise, and in a consistent way for different companies.

How these qualitative criteria apply to the information disclosed on operating leases in the financial statements will be discussed in section 3.3.

## 3.3 Usefulness of operating-lease disclosures

Contrary to financial leases, operating leases have, through their off-balance-sheet character, an influence on items disclosed on the balance sheet and in the income statement (not on the cash-flow statement) (see also section 2.4.2). Consequently, the operating leases have an impact on the financial ratios derived thereof. Therefore, an on-balance equivalent of the operating-lease liability can be estimated to adjust the relevant financial ratios ('constructive capitalisation'). The purpose and procedures of capitalisation are described in chapter 4. This section has two aims. First, it will use previous research to demonstrate that financial ratios are still an important source in decision-making in different disciplines. Second, it will describe the issues between the information disclosed on operating leases and the qualitative criteria of information usefulness as described in the previous section.

### 3.3.1 Understandability of operating-lease information

The specific characteristics of operating leases lead to three issues with respect to the understandability of operating-lease information<sup>37</sup>. Are users of the financial statements aware of the following?

- the difference between on-balance financial commitments (including financial leases) and off-balance operating leases (which are not included on the balance sheet and of which the information is available only in the footnotes);
- the difference between the off-balance disclosed *total* commitments of operating leases (*including* future interest) and limitation to only the outstanding amount (*excluding* future interest) capitalised on balance for other financings alternatives, including financial leases;
- the difference in the priority of the claims and in the legal and economic ownership of the financed assets, which are different for operating-, financial- and non-leasing alternatives (see Figure 2.1).

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<sup>37</sup> Section 2.4 describes in more detail the current accounting standards, including the differences described here between operating leases and other corporate liabilities, including financial leases.

First, do users of the financial statements realise that besides the commitments included in the balance sheet, a company may have other commitments not shown in the balance sheet? Operating leases are *non-cancellable* (long-term) commitments that are disclosed *only* in the notes. This is contrary to the notes on other long-term liabilities: these notes serve as additional information on an amount that is already capitalised on the balance sheet. In other words, the notes on operating leases are new information, since the notes on, for example, long-term debt and also for financial leases, are more detailed information on already disclosed numbers. As described in section 2.4.2, the difference between financial leases and operating leases can be rather small and arbitrary; this has caused many authors to object to allowing this major difference in accounting treatment.

Second, is the information as provided in the footnotes understandable? Section 2.4 described the current disclosure requirements. The information that required disclosure in the financial statements (RJ292, IAS17) is straightforward: the sum of the nominal non-cancellable long-term lease commitments divided over three expiry periods (expiring within one year, expiring between two and five years and expiring after five years). The user should be aware that these lease commitments are nominal commitments, including an interest and repayment part, and that these cannot be compared directly to other long-term commitments, including financial leases. Long-term commitments disclosed on the balance sheet incorporate *only the outstanding* amount and not the related interest payments. The operating-lease commitments consist of the *total* commitments in the future: the outstanding amount including interest. To compare the off-balance operating-lease commitments with on-balance commitments, the user should eliminate the interest part of the lease commitments by means of a capitalisation approach. This stresses the importance of a solid capitalisation approach. These approaches are described in chapter 4.

Third, is the difference between the nature of the financial commitments that can be used to finance assets by either operating leases, financial leases or other commitments common knowledge to all users? Figure 2.1 illustrated the differences between corporate liabilities. In general, the difference between the three forms of (debt) financing is that with normal debt, the company is both the legal- and economic owner of the assets; with a financial lease, the company is not the legal owner, although he is assumed to be the economic owner due to the fact he bears most of the risks and rewards attributable to the assets; with an operating lease, the company is neither the legal owner, nor is assumed to be the economic owner of the asset. The above has several consequences for both the claimholder and the company (see Figure 2.1).

Previous studies (Kamp (2001), Wilkins and Zimmer (1983), Abdel-Khalik (1981)) have shown that it is still not commonplace that users do make adjustments to the financial statements for the off-balance lease commitments. Kamp (2001) questions whether other users (aside from rating agencies or banks) of the financial statements have sufficient information to notice the off-balance-sheet effects on credit evaluations and to make the necessary corrections. Wilkins and Zimmer (1983) investigated credit decisions of loan officers. They indicate that loan officers respond differently to different levels of financial leverage, but not to different

methods of fixed-asset financing or reporting of leases. Therefore, it appears that the concern of comparability of companies with or without leases may be misplaced. Wilkins and Zimmer mention that this conclusion relates, of course, to credit decisions: lenders understand the leverage implication of alternative methods of lease accounting, and their evaluations and decisions are not affected by the alternative accounting method (p.761). The findings of Wilkins and Zimmer (1983), that loan officers are indifferent between operating leases disclosed in the footnotes or capitalised on the balance sheet, contradicts the findings of Abdel-Khalik (1981). Abdel-Khalik found that the majority of financial analysts and loan officers in their sample evaluated more favourably a company that kept the leases off the balance sheet than they did an identical company that capitalised leases. This is also found by Thornton and Bryant (1986)<sup>38</sup>, who determined that over half of a sample of leasing companies with public debt, the ratio tests in debt covenants referred to financial statement numbers with no adjustments made.

Furthermore, despite the fact that not all users make adjustments for off-balance-sheet leases, many studies use financial ratios as input for analysis on credit scoring (Wilkins and Zimmer (1983) and Danos, Holt and Imhoff (1996)), bankruptcy prediction (Altman (1968) and Dimitras, Zanakis and Zopounidis (1996)), company rating studies (Moody's Investor Services (1999), Standard and Poor's (2001) and Peavy and Edgar (1984)), and other purposes, and only a few take into account the impact of operating leases (Elam (1975), Lawrence and Bear (1986) and Altman et al. (1977)). Very few articles explicitly explain the ignorance of operating leases and show that it is a deliberate choice (Dambolena and Khoury (1980)).

Finally, also users who extract accounting data from databases will most likely ignore the operating-lease data. The study of Danos et al. (1996) provided evidence that lenders use independent services (in their study: Dun and Bradstreet) as a primary source of initial information about a client. The financial analysis of these independent services might therefore influence lending decisions. However, most databases do not include the operating-lease data in their financial analyses of companies. For example, the international databases Thomson Financial, Datastream, and Worldscope, and the Dutch database Reach, provide approximately twenty ratios derived from financial statements—and none of these ratios is adjusted for operating-lease data. Of these databases, only Worldscope has operating-lease data available if the user would like to adjust the ratios. However, they present only the commitments when the company discloses according to the requirements of IAS17, FAS13 or RJ292. The understanding of the existence of operating-lease data is therefore not improved by experienced financial services that also ignore the operating-lease data.

With respect to the understandability of the operating-lease information, the above suggests that the off-balance-sheet character of operating leases causes some confusion between users of the financial statements; some users make adjustments for operating leases, some do not. Ignorance regarding operating leases is often not explained, and it might be caused either by misunderstanding the provided information or by the expectation that the operating leases are not material. Termination of the off-balance treatment of operating leases, as the asset/liability

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<sup>38</sup> Cross reference Lanfranconi and Wiedman (2000, p.65)

approach suggests, would eliminate this confusion. The accounting difference between operating- and financial leases, which follows from the division of risk between lessee and lessor, would also disappear. The asset/liability approach would probably make it easier for at least the user of the financial statements. The issues with respect to understanding the capitalisation procedure that has to be conducted to eliminate the interest part from the operating-lease commitments will be discussed in chapter 4.

### 3.3.2 Relevance of operating-lease information

For operating-lease commitments to be relevant, they should be either material or relevant by nature. It can be argued that when the operating leases are not material, they have no specific features that make them relevant by nature. The risks involved are not disproportionately higher than those of other financial commitments. This study therefore assumes that the relevance of operating-lease commitments is determined by the materiality of these commitments.

Operating leases are material when they cross a certain threshold value, indicating that the lease liability is of a material amount. Scant literature exists on what this materiality threshold value should be. However, before 1990, a materiality threshold for off-balance-sheet commitments was included in the Dutch accounting Guideline 2.65.2 “off-balance-sheet commitments”. Commitments were assumed to be material when they exceeded the threshold of 5% of total assets (De Bos (1996)). This Guideline was applicable since January 1984; before this date, the threshold of 5% was included in the ‘Considerations V.12’ of the Tripartite Consultative Body (succeeded in 1981 by the DASB, see also section 2.3.2). After 1990, this threshold was removed from the Dutch accounting guidelines.

Based on case studies and experiments, De Bos (1996) recommends in his study (p.291) the re-inclusion of a materiality threshold for operating leases in the guidelines. According to the De Bos, these thresholds should be divided into two materiality criteria: one measuring the materiality of the annual lease payments and one measuring the materiality of the total lease commitments. The corresponding threshold values that De Bos suggests are, respectively, annual lease payments exceeding 10% of net income and present value of the total lease commitments exceeding 25% of long-term commitments (the second materiality test of this study). However, since net income is subject to variability and when net income approaches zero or becomes negative, this materiality test is less reliable.

An alternative measure for testing the materiality of the operating-lease commitments might be the lease-intensity measure of Sharpe and Nguyen (1995). In a study concerning the determinants of the lease decision (the subject of part III of this thesis), they measure the lease intensity by dividing the annual lease payments by the total capital costs of a company. The total capital costs<sup>39</sup> are the costs associated with the use of fixed assets (Sharpe and Nguyen (1995, p.278)), and are calculated as the sum of rental commitments, depreciation expense and the opportunity costs of fixed assets (interest times net-property, plant and equipment). This measure of lease intensity is also adopted by Adams and Hardwick (1998) and

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<sup>39</sup> With total capital costs Sharpe and Nguyen do not mean the capital costs as normally defined in finance as the opportunity costs of capital, or the weighted average costs of debt and equity costs (see for example Brealey and Myers (2003), but as the costs associated with the use of fixed assets.

Mehran et al. (1999). The determinants of leases intensity are the subject of part III of this thesis and therefore, lease intensity will be described in depth in chapter 6. In this chapter, and in the empirical chapter 5, the analysis is restricted to the materiality-test of operating leases. A threshold of 20% for the lease-intensity measure of Sharpe and Nguyen will be used, since this seems to be in line with the other materiality tests.

Table 3.1 summarises the above-described materiality thresholds that will be used in chapter 5 to investigate the materiality of the operating-lease commitments for the sample of Dutch listed companies.

**Table 3.1 Materiality threshold**

	<b>MATERIALITY THRESHOLD</b>	<b>SOURCE</b>
<b>1</b>	Present value of total operating-lease commitments exceeds 5% of total assets	Guideline 2.65.2 (1984)
<b>2</b>	Present value of total operating-lease commitments exceeds 25% of (on-balance) long-term commitments	DeBos (1996)
<b>3</b>	Annual lease payment exceed 20% of total capital costs	Sharpe and Nguyen (1995)

If the operating-lease commitments are material, and the balance sheet is adjusted for these commitments, this will affect the capital structure of a company and the financial ratios derived thereof.

### **3.3.3 Reliability of operating-lease information**

Users of the financial statements rely on the company to provide reliable information (FW31). To a great extent, the reliability of information provided in the financial statements can only be investigated when there is access to the data and to the decisions underlying the financial statements (internal company data). With respect to operating leases, the internal relevant information relates mostly to the lease-classification decision (classification as either a financial- or an operating lease). The formal lease classification criteria of RJ292 (and also IAS17 or FAS13; see chapter 2) make it possible to structure leases in such a way that the commitments are off-balance, and therefore might pose a threat to the 'substance-over-form' principle ('faithfully'). On the other hand, neutrality is enhanced by the formal classification criteria, which makes it relatively easy to classify a lease contract as either a financial- or an operating lease (Vergoossen (1992)).

The reliability of operating-lease data based on externally available information therefore has to do with two aspects of reliability: neutrality and completeness. Information is neutral if all companies present the information in a similar way. The requirements of RJ292 or IAS17 are straightforward and leave no room for different ways of presentation. Chapter 2 showed that in the financial statements of Dutch listed companies used eight different formats for disclosing operating leases, of which four formats are not in line with RJ292. Chapter 5 investigates how often Dutch listed companies use these formats. Non-compliance, although not attributable to the accounting standard, result in information which is not neutral, nor complete.

Furthermore, the completeness of the information disclosed goes beyond the willingness of a company to provide sufficient information, but also relates to whether the information required is indeed complete. Section 2.4.2 showed how the required operating-lease information is less complete than the information provided



on financial leases. The operating-lease commitments are disclosed in nominal amounts, whereas for the financial lease commitments, both the nominal commitments as well as the present value of these commitments have to be disclosed, including the discount rate (RJ292.115). Appendix 2.II presented these differences for KPN's 2004 financial statement.

As has been mentioned already several times, these differences can be rather small, and a lease can be structured in such a way that it qualifies as an operating lease, to make it off-balance. Again, this is one of the major objections to the current risk/reward lease-accounting approach while the accounting treatment determines the choice for operating leases.

Furthermore, with respect to the completeness criteria, if a user wishes to capitalise the operating-lease commitments, he has to make several assumptions on, for example, discount rates and the remaining life of the lease portfolio, because these are not included in the disclosure requirements. These assumptions and estimations that must be made by users explain in part why the G4+1 proposed an alternative lease-accounting approach. Lennard and Nailor (2000): 'capitalisation by financial statements *preparers* should be preferred to constructive capitalisation by financial statements *users*. This is because users can only estimate (with limited accuracy) information held by preparers in calculating the balance-sheet and profit and loss effect of operating leases'. In other words: information required is not sufficiently complete because the individual financial statement user is not able to estimate the fair value of lease commitments. The constructive capitalisation by financial statement users (as defined by Lennard and Nailor) is the subject of the next chapter. Several capitalisation approaches will be compared on the basis of their calculations and assumptions. If the capitalisation of the operating leases is also sensitive to the choice of capitalisation approach, this will also compromise the completeness of the operating-lease disclosures.

The above discussion allows us to conclude that operating-lease information is reliable if all companies disclose their operating-lease commitments in the same way (neutrality) and if the capitalisation of the operating-lease commitments is not sensitive to assumptions or to the capitalisation approach used (completeness).

### **3.3.4 Comparability of operating-lease information: financial ratios in decision making**

The disclosed operating-lease information should be consistent, since that would make the information between companies comparable. Again, the disclosure requirements in RJ292 are unambiguous, which emphasises the consistency. The comparability criteria for operating-lease data address two issues: first, if operating leases are not capitalised and financial ratios are not adjusted, would that make comparison between high- and low-leasing companies unfair; second, if operating leases are capitalised and financial ratios are adjusted, would that make the comparison of companies consistent? Chapter 5 describes the impact of the capitalisation of operating leases on financial ratios; chapter 6 investigates the impact empirically. This section now goes on to describe the way in which different disciplines use financial ratios in order to illustrate the consequences that inaccurate financial ratios might have on decision-making.

Financial ratios as a performance measure of companies are used by different disciplines. Standard and Poor's (2003) define financial ratios as helpful in broadly defining a company's position relative to rating categories. They are not intended to be hurdles or prerequisites that should be achieved by a company in order to attain a specific debt rating assigned by Standard and Poor's. Financial ratios are used to standardise financial statements across firms and over time, facilitating comprehensive analysis. A primary advantage of ratios is that they can be used to compare the risk-and-return relationship of firms of different sizes (White, Sondhi and Fried (2003) and Brealey and Myers (2003)). Standard and Poor's adjust the ratios for operating leases, and do this for all companies. The reason for doing this is that companies that *buy* plants and equipment are put on a more comparable basis with firms that *lease* part or all of their operating ratios. According to Standard and Poor's, the lease adjustment impacts all of the ratios. Financial ratios are thus also important variables of the comparison criterion of decision usefulness.

In their financial analyses, *investment analysts* use not only accounting data but also financial ratios (Hoogendoorn and Mertens (2001) and Bouwman, Frishkoff and Frishkoff (1995)). Hoogendoorn and Mertens (2001), for example, investigated in their survey of 21 Dutch investment analysts i) the importance of different information sources (including the financial statements and ii) the importance of information elements in the financial statements. Their findings showed that the annual report was the second most important source of information (the first was direct contact with management). They also studied which sections of the annual report were indicated as most important; they established that the notes to the financial statements were the most important part of the annual report, followed by the income statement and the balance sheet. Finally, they reported on which criteria financial analysts found most important when evaluating financial statements. Analysts reviewing a total of 1,812 information elements that could be included in a financial analysis ranked 487 elements as most important. These include information on long-term borrowing (score 93.75%), net income (100%), leverage (score 28.33%) and profit per share (score 83.33%). Criteria related to lease contracts were also evaluated. Of all of the 32 criteria related to lease contracts (financial and operating), only three were evaluated as important by the analysts: the value of assets under financial lease contracts (23.08%), the present value of operating-lease contracts (13.73%) and a description of sale- and lease-back transactions (100%).

Bouwman et al. (1995) observed 22 financial analysts while they were formulating decisions (either pursuing or rejecting a stock). They analysed not only accounting information (such as sales, net income, financial ratios) in the five categories mentioned above, but also non-accounting information (such as general company- and segment information, management, stock price etc.). The results of their study affirmed the relevance of accounting information. Ranked at, or near, the top of every analysis activity was income and performance information. The major focus of ratio analysis was performance, with the emphasis on earnings per share, return on investment and income statement components as a percentage of sales.

Financial ratios are also used by *rating agencies* when analysing a company's performance (Moody's (2000) and Peavy and Edgar (1984)). Moody's (2000): 'Financial ratios are related to firm failure the way that the speed of a car is related

to the probability of crashing: there is a correlation, it is non-linear, but there is no point at which failure is certain'. Peavy and Edgar (1984) concluded from their research on commercial paper rating that all of the studies they examined assume that a very large portion of the differences among differently rated bonds can be explained by only a few basic corporate statistics. After examining four major bond-rating studies, Peavy and Edgar found six final explanatory (accounting) variables in bond rating that measure the long-term viability of the issuing company.

The creditability of companies is analysed by *both lenders and researchers* using financial ratios in studies on lending decisions (i.e. Dietrich and Kaplan (1982), Wilkins and Zimmer (1983) and Danos et al. (1996)) and in financial distress prediction (i.e. Altman (1968), Ohlson (1980), Zmijewski (1984) and Dimitras et al. (1996)).

Dietrich and Kaplan (1982) analysed the risk classification of commercial bank loans by loan officers, bank controllers, auditors and bank examiners. According to Dietrich and Kaplan, the loan classification decision can be viewed as an attempt to predict the financial distress or bankruptcy of a firm. The higher the classification a loan gets ("higher" meaning less loan quality), the higher the likelihood that the borrowing firm will go bankrupt. Wilkins and Zimmer (1983) analysed the effect of leasing on credit decisions by loan officers. They quote several studies on the use of leverage ratios in credit assessments and on the deterioration of these ratios when capitalising leases. Wilkins and Zimmer argue that loan officers' credit assessments and decisions would be affected if they ignore operating leases in calculating these ratios. This possible advantage may even lead lending institutions to promote off-balance-sheet financing over alternative debt financing. Because of my own experience as a lending officer at a large Dutch bank, I agree with this conclusion; the off-balance character of operating leases is a 'unique selling point' of these transactions, and is promoted as such (see also Lückcrath (1998)). Also Danos et al. (1996) examined the impact of accounting information on judgements of experienced bank loan officers. Their study confirmed the overall importance of historical and forward-looking accounting information in the lending decision process.

Research on the predictability of financial distress or bankruptcy has been done by many researchers (including Altman (1968), Beaver (1966), Deakin (1972), Ohlson (1980), Elam (1975), Altman et al. (1977), Dambolena and Khoury (1980), Zmijewski (1984) and Lawrence and Bear (1986)). Of these researchers, only Elam (1975), Altman et al. (1977) and Lawrence and Bear (1986) addressed operating-lease commitments. Elam did not adjust the ratios, but incorporated operating-lease data as an input variable, Altman et al. adjusted two ratios with the present value of the operating-lease commitments and Lawrence and Bear both adjusted the financial ratios and incorporated operating-lease data as an input variable. Dimitras et al. (1996) reviewed 47 studies published on bankruptcy prediction in 12 different countries. Their review of bankruptcy-prediction studies provided a summary of the ratios used. The most frequently used financial ratios were as follows: working capital to total assets (16 times), total debt to total assets (15 times), current assets to current liabilities (12 times), EBIT to total assets (12 times) and net income to total assets (11 times).

The above shows that financial ratios have long been, and still are, an important source used in the financial analysis of a company. The off-balance-sheet character of operating leases, of which the alternative is to capitalise the (long-term) liabilities on the balance sheet, has, at the least, an effect on the total commitments as shown on the balance sheet.

### **3.4 Summary and research questions on the decision usefulness of operating leases**

This chapter has described the criteria of decision usefulness of accounting information. These criteria (as defined by the IASB and endorsed by the DASB) are understandability, relevance, reliability and comparability. Each of these criteria also applies to the disclosure of operating leases. However, due to the off-balance character of operating leases, the commitments are often neglected in practice, although they affect the financial ratios that are derived from the balance sheet. This impact is only meaningful when the disclosed commitments are of a material amount and when these financial ratios are used in decision-making. Using the results of previous studies, the study has shown that financial ratios are still an important input in decision-making for different users of the financial statements. Credit analysts, rating agencies, lenders and researchers use financial ratios as an information source. This implies that operating-lease information should not be neglected.

Monson (2001) asserted that it is not possible for a radically different (numerical) representation of the same event (leasing) in the basic financial statement to produce information with equally useful predictive value and feedback value. He also argues (p. 284) that any new lease-accounting standard that does not reduce the volume of lease contracts transacted solely or primarily to take advantage of the perceived off-balance-sheet financing must be producing information that is neither relevant nor reliable. However, as mentioned in chapter 2, the reason a firm chooses operating leases cannot be attributable solely to the off-balance-sheet character. That chapter also questions whether a lease-accounting approach that capitalises all leases on the balance sheets solves all disadvantages of the current lease-accounting standard.

Therefore, the question underlying part II of this thesis is whether the required information provided in the footnotes of financial reports is useful information. Since requiring additional information might solve some of the disadvantages, thereby negating the need for a rigorously different lease-accounting approach. Chapter 5 empirically tests IASB's three criteria of decision usefulness: relevance, reliability and comparability. By not examining the fourth criteria, understandability, the study does not say that understandability is not an issue for the decision usefulness of operating-lease disclosures. On the contrary, to question whether all users are aware of the fact that the footnotes contain important information on the commitments of the company might be interesting. This study, however, focuses on the unambiguous information available from the financial statements, which does not tell us anything about the knowledge level of the user of the financial statement.

In order to come to a conclusion on the decision usefulness of operating-lease disclosures, the study has formulated five research questions that investigate whether the current operating-lease disclosure fulfils the qualitative criteria of decision usefulness as defined by the IASB and other regulators. Most questions can be attached to more than one of the qualitative criteria. For example, one could argue that the question whether the information is sufficiently complete (reliability) to estimate the capitalised value of operating leases (question 3 below), is only interesting when the capitalised value of operating leases is relevant in decision-making. However, the questions one till five below are categorised by the qualitative criterion to which it is mostly related.

### **Relevance**

#### **RQ1                    Are the operating-lease commitments material?**

A company is obliged to provide information on operating-lease commitments in the footnotes in its financial statements. Users of the financial statements might adjust their financial analysis based on the balance sheet or income statement with the capitalised value of the operating-lease commitments. If they do not make adjustments for the operating-lease commitments, the information is omitted from financial analysis, although the information might be relevant in decision-making. The information is therefore relevant if it is material (and when omitted, it may change the decision). Materiality will be tested by analysing and capitalising the operating-lease commitments, and comparing these with the three threshold values as described in section 3.3.

### **Reliability**

#### **RQ2                    Do companies with operating leases comply with the footnote disclosure rules? (neutrality)**

#### **RQ3                    Is the information required by the lease-accounting standard sufficient to permit informed users to estimate the consequences of operating leases? (completeness)**

Information in the financial statements is reliable if it is faithfully represented, neutral, prudent and complete. Two of these criteria, faithfulness and prudence, can only be tested by investigating information that is not provided in the financial statements but is available only at the lessee company. Faithful representation (the substance-over-form principle) and prudence depend on the contractual structure of each lease contract in the entire lease portfolio. The other two criteria can be tested with the information provided in the financial statements. Neutrality is at stake when the information is presented in different forms. Although IAS17 and RJ 292 allow only one way of presentation, companies may not comply with these rules. Although this is not shortcoming attributable to the accounting standard it does harm the reliability criterion of useful information while the information is not neutral between companies. The last criterion of reliability, completeness, is at stake when users who want to capitalise the operating-lease commitments have insufficient information to do so. If the capitalised value of operating leases and its related impact on financial ratios ratio and decisions are sensitive to the assumptions made or the capitalisation method chosen by the users, then the information provided is not complete.

This study will investigate the following: first, whether all companies disclose the information as required by the accounting standard; second, whether the capitalisation results are sensitive to the assumptions on discount rates, remaining lives; and finally, whether the capitalisation results are sensitive to the capitalisation method used.

### **Comparability**

**RQ4**            **Are key financial ratios significantly affected?**

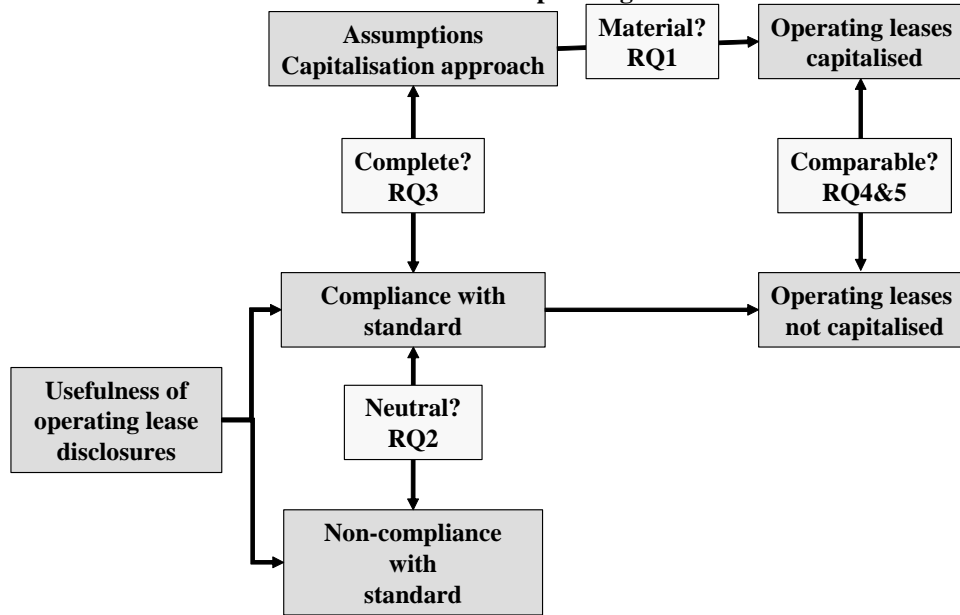
**RQ5**            **Does the capitalisation of operating leases change the ranking between companies (comparability)?**

Finally, the study will investigate the impact on the financial ratios used in decision-making. A significant impact on the financial ratios indicates that the off-balance character of operating leases indeed affects decision-making, which compromises the comparability criterion.

Information in the financial statements is comparable when it allows users to consistently compare companies. Users who do not capitalise operating leases cannot consistently compare companies because the true financial commitments of especially high-leasing companies are ignored. Unfairly, these companies will be preferred above companies with no operating-lease commitments but similar commitments on the balance sheet. The comparability of companies is at stake when the financial ratios used for analysis are changed significantly and when the ranking of companies (as compared to each other based on these ratios) is different for users who do capitalise operating leases as opposed to users who do not. Furthermore, the information provided on operating leases in the footnotes to the annual statements account does not allow a consistent comparison between companies, when the capitalised value of the operating-lease commitments is sensitive to the assumptions made and the capitalisation method chosen.

The research questions follow the same order as the qualitative criteria in the Framework (relevance, reliability and comparability); the answers, however, do not necessarily follow this order. For example, whether the operating leases commitments are neutral (RQ2) will be answered as soon as the disclosures are collected. Subsequently, two of the materiality tests (using PVOL) can be executed only when capitalisation has been conducted. Figure 3.2 shows the relationship between the five research questions and the different stages of answering these questions.

Figure 3.2 Overview of decision usefulness of disclosed operating-lease information



The study now goes on to describe the available capitalisation approaches (chapter 4) and empirically test the research question using a sample of 119 Dutch listed companies (chapter 5).





## **CHAPTER 4    COMPARISON OF LEASE-CAPITALISATION APPROACHES**

### **4.1    Introduction**

The previous chapter described the criteria of decision usefulness. Based on these criteria, also applicable for operating leases, five research questions were formulated. The major issue behind all these questions is whether it would matter if the operating-lease commitments had been capitalised on the balance sheet. Therefore, before the research questions can be empirically tested in the next chapter, first the purpose of capitalisation and the capitalisation approach should be chosen. This choice is, however, not straightforward. In previous literature and also in financial practice, several approaches are in use, with different assumptions and calculations. Therefore, this chapter addresses the capitalisation of operating leases.

Section 4.2 describes the purpose of capitalisation. Section 4.3 then describes a theoretical valuation approach of operating leases, as found in the finance literature. Unfortunately, however, the accounting practice is not a theoretical environment where the necessary information is freely available. Therefore, section 4.4 introduces seven capitalisation approaches. Six of these come from previous studies; the seventh is the approach developed in this thesis. This study builds upon the two approaches of Imhoff et al. (1991) and Beattie et al. (1998), but adjusts these approaches by taking into account the expiry pattern of the lease portfolio of each company. This has especially an impact on the capitalised value of the leased asset, and the depreciation charge derived thereof. The assumptions made by the seven capitalisation approaches are described in section 4.5. Appendix 4.I illustrates the differences between the seven approaches with an example, using the operating-lease commitments as disclosed in the 2004- annual report of KPN. Section 4.6 concludes.

### **4.2    Purpose of capitalisation and previous evidence**

Constructive capitalisation requires the estimation of the amount of debt and assets that would be reported on the balance sheet if the operating leases had been treated as capital leases from their inception (Imhoff et al. (1991), UBSWarburg (2001), Standard and Poor's (2001)). Comparability should thus improve for highly leased companies with companies having limited or no leases. One of the first attempts to investigate the effects of lease capitalisation on financial ratios was Nelson (1963). Nelson suggested two purposes for investigating the effect on financial ratios: first, to determine whether capitalisation would make these ratios more meaningful and second, to analyse whether decision-making would be improved. Nelson argued that the usefulness of many important financial ratios is limited by reporting practices. His argumentation is similar to the more recent argumentation of the opponents of the current accounting regulation with respect to leasing (for example, McGregor (1996) and Lennard and Nailor (2000)). According to Nelson, the limitations do not come from weaknesses in the ratios, but from faulty procedures for reporting leases that are primarily financial in nature. Capitalisation is therefore meant to overcome this weakness in lease reporting, as it reflects the financial impact of leasing in the financial statements. Because capitalisation recognises leasing for what it really is (a means of financing), the financial ratios, which are computed

from statements containing capitalised lease, are meaningful. Nelson argues that operating-lease information is relevant, and that reliability improves when the operating-lease obligations are capitalised.

Ashton (1985) conducted comparable research based on similar motives: namely, testing whether lease capitalisation had a significant impact on the main indicators of financial performance, and whether the decisions of the companies in the sample to voluntarily capitalise leases were dictated by the economic consequences. Ashton (1985) found that only the leverage ratios changed significantly. Imhoff et al. (1991) analysed 14 pairs of US companies, each pair of which consisted of a high- and low-leasing company. The impact on return-on-assets and the debt-equity *ratio* were analysed; on average, these ratios changed -22% and 119%, respectively. Their conclusion: the results suggest that constructive capitalisation of long-term operating-lease commitments that are material may be necessary before an accurate evaluation of financial results within or across firms and industries can be performed. Beattie et al. (1998) found in their analysis of 232 UK companies that capitalisation had a major impact on the profit margin, return on assets, asset turnover and three leverage ratios. Bennet and Bradbury (2003) found evidence that the capitalisation of operating leases not only negatively affects leverage ratios, but also decreases liquidity and profitability for the 38 companies in their sample.

Lennard and Nailor (2000) argued that constructive operating-lease capitalisation by investment analysts and other users (such as credit-rating agencies) appears to be commonplace, suggesting that the present accounting treatment of operating leases is not the most relevant of the choices available. If operating-lease capitalisation is warranted for financial analysis, then capitalisation by financial statement preparers should be preferred to constructive capitalisation by financial statement users; after all, only users can estimate (with limited accuracy) information held by preparers in calculating the balance-sheet effects and profit-and loss effects of operating leases. Lennard and Nailor therefore doubt the completeness of the disclosed operating-lease information.

Users of financial statements should be able to compare the financial statements of an enterprise through time and with different enterprises in order to evaluate their relative position and performance, and the changes therein. The measurement and display of the financial effects of transactions and events must therefore be carried out in a consistent way, over time, throughout an enterprise, and in a consistent way for different companies. The disclosed operating-lease information should be consistent, which would make the information between companies comparable. Again, the disclosure requirements in IAS17 are unambiguous, which enhances consistency. However, previous studies (Kamp (2001), Wilkins and Zimmer (1983), Abdel-Khalik (1981)) have proved that it is still not commonplace for users to make adjustments to the financial statements for off-balance-sheet lease obligations.

The comparability criterion for operating-lease data addresses two issues. The first: if operating leases were not capitalised and financial ratios were not adjusted, would comparison between high- and low-leased companies be unfair? The second: if operating leases were capitalised and financial ratios were adjusted, would comparison of companies be consistent? Different procedures might lead to divergent outcomes, also caused by the unavoidable assumptions a user has to

make to capitalise the leases; this would also pose a threat to the comparability and completeness criterion.

### 4.3 Theoretical value of operating leases

The theoretical value of an (operating) lease has been debated extensively in the finance literature by authors discussing the lease-or-buy/borrow decision at inception of the lease (for example, Myers et al. (1976), Franks and Hodges (1978), Ang and Peterson (1984), Lewellen and Emery (1980), Trigeorgis (1996)). Myers, Dill and Bautista (1976) initiated the discussion on the valuation and they presented a lease-valuation formula. Although this formula has since been clarified and extended by several authors, it has in essence remained the same. Myers et al. (1976) define the value of lease contracts as the advantage of leasing vs. debt financing. In theory, a lessee decides to lease at  $t=0$ , when the present value of a lease compared to normal debt financing is positive. Myers et al. therefore calculate the present value of a lease by considering all changes in cash flows due to the decision to lease. Although many agree with the basics of this equation, some argue that the equation is not complete. For example, Trigeorgis (1996) added to the equation the valuation of the incorporated options in the lease that can be valued using theoretical option-valuation models. Here the focus is on the Myers et al. equation, which relates closely to the hereafter-described capitalisation approaches.

The Myers et al. equation takes the following form:

$$V_0 = I - \underbrace{\sum_{t=1}^{TL} \frac{CF_t \cdot (1-T)}{(1+i)^t}}_{(a)} - \underbrace{\sum_{t=1}^{TL} \frac{\text{depr}_t \cdot T}{(1+i)^t}}_{(b)} + \underbrace{\sum_{t=1}^{TL} \frac{i \cdot T \cdot D_{t-1}}{(1+i)^t}}_{(c)} \quad (1)$$

whereas,

- $V_0$  = the value of the lease at inception
- $TL$  = the total term of the lease, which is most or all of the asset's economic life,
- $I$  = the original investment in the leased asset,
- $CF_t$  = the lease payment during year  $t$ ,
- $T$  = the marginal corporate income tax rate,
- $i$  = the firm's marginal borrowing rate,
- $\text{depr}_t$  = the depreciation in year  $t$ ,
- $D_{t-1}$  = the debt displaced by the asset leased.

The value of the lease at inception ( $V_0$ ) is the difference between the present value of the financial advantages and disadvantages of the lease as compared to normal debt. Equation (1) calculates this value by distinguishing three parts from the original investment in the asset: a) the cash outflow related to the lease, after-tax, b) the fiscal disadvantage of losing the ability to deduct the depreciation of the assets and c) the after-tax financial advantage of not paying interest on normal debt. The first part (a) of equation 1 is the present value of the after-tax lease payments. Lease payments are fully deductible from gross income, which is an advantage to debt financing, where only the interest part is deductible. The second part (b) shows the lower deductible amount for leases caused by depreciation differences between leasing and debt. The lessee cannot depreciate the asset (this will be done by the lessor), since with normal debt financing the asset will be depreciated. This results in a lower deductible amount for the lessee. The last part (c) of Equation (1) expresses the interest costs of debt-financing that are saved by

the lease decision. The interest paid by the lessee is incorporated in the annual lease payments ( $CF_t$ ).

Unfortunately, there are at least four reasons why external users of annual reports cannot use the theoretical Myers et al. equation for the capitalisation of operating-lease commitments. First, the equation is designed such that a choice must be made between leasing and borrowing at the inception of the lease (the investment/finance decision). This is not the case for the capitalisation of operating leases, whereas the capitalisation of operating leases is necessary during the entire period of the lease contract. Second, the equation is an accumulation of all the cash-flow effects of leasing instead of borrowing. This also relates to the investment/financing decision. The capitalisation of operating leases is an accounting issue, however, which begs the question of what the liability of an operating lease should be when it is shown on the balance sheet. Comparable with debt, the capitalisation of leases should therefore not incorporate tax-deductible items such as depreciation and interest on the alternative debt. Third, Myers et al. calculate the value of one single lease, since external users need to capitalise the entire lease portfolio of a company because no individual information is available. This also relates to the difference between the investment/financing decisions of one lease as compared to the accounting treatment of all leases. Fourth, the information necessary to calculate the theoretical value of the operating-lease commitments is not available in the annual report used in the Myers et al. study.

Table 4.1 shows the connection between the finance perspective and the accounting treatment using the elements of the Myers et al.-equation (Eq.1). The theoretical value of operating leases is a useful handle to develop awareness of which information or variables are needed to calculate the value of an operating lease. The required information might be available internally in the company; this information is not available to external users. Table 4.1 shows the necessary information for the theoretical capitalisation of an operating lease during the lease period and the available information according to RJ292 and IAS17.

Table 4.1 Comparison of necessary information (finance theory) and available information (accounting practice) for lease valuation

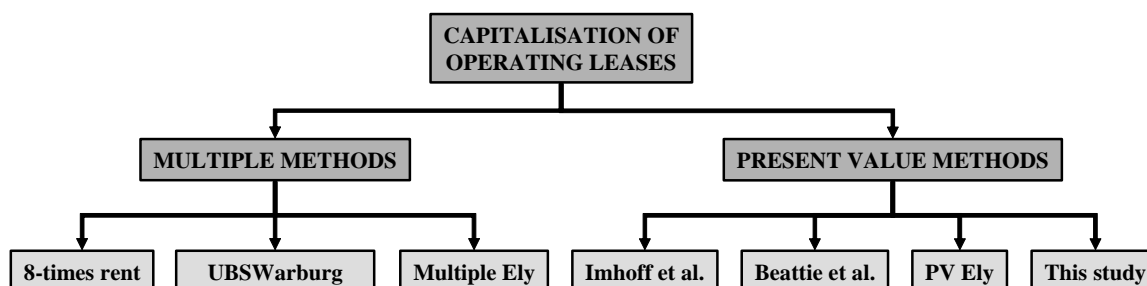
FINANCE THEORY	ACCOUNTING PRACTICE	
Information necessary (for each separate lease contract)	Information available in annual report (for entire lease portfolio)	Assumptions to be made
<b>i</b> , implicit interest rate/or alternative costs of debt	Not disclosed	Estimation
<b>TL</b> , Total Lease Life	Not disclosed	While the Myers-equation is at inception of the lease, and the accounting implications have to be calculated on an annual basis, assumptions have to be made on what the original lease period was ( <b>TL</b> ) and how far this lease period has passed already ( <b>RL</b> ).
<b>RL</b> , Remaining Life	Not disclosed	
<b>CF<sub>t</sub></b> Lease payments for year t	Lease payments are disclosed into three <i>lease expiring categories</i> CF <sub>e</sub> , e=1, 2 or 3. e=1: lease commitments expiring within next year, e=2: expiring between one and five years, and e=3: expiring after year five.	The lease commitments in the three lease-expiry categories, <b>CF<sub>e=1</sub></b> , <b>CF<sub>e=2</sub></b> and <b>CF<sub>e=3</sub></b> have to be divided over the years (t) to come to annual lease payments, <b>CF<sub>t</sub></b> , until the end of the lease term.
<b>V<sub>0</sub></b> Initial value of the lease	Not disclosed	Capitalisation approach to calculate the present value of the lease liability ( <b>PVOL</b> )
<b>I</b> Initial value of leased asset	Not disclosed	Assume how the value of the lease asset ( <b>PVA</b> ) relates to lease liability ( <b>PVOL</b> ): the asset proportion ( <b>AP</b> ).
<b>T</b> company's marginal tax rate	Not disclosed	Estimation
<b>Depr</b> annual depreciation of asset	Not disclosed	The depreciation of the assets (PVA) depends on the remaining life and/or the expiry pattern of the lease portfolio

Since the different capitalisation approaches differ in the assumptions made on the required variables, they subsequently differ in the refinements of the approach. The next sections therefore build upon the information required and the assumptions made. This enhances the comparability of the approaches and shows where the approaches agree and where they do not.

#### 4.4 Capitalisation approaches

This section introduces seven different capitalisation approaches, which can be divided into two major distinctions: first, the multiple methods (see Moody's Investor Service (1999), UBSWarburg (2001), Ely (1995), Unilever Annual Report (2002, p.129)), and second, the present-value methods (see Imhoff et al. (1991), Imhoff et al. (1997), Beattie et al. (1998) and Ely (1995)). Figure 4.1 shows the seven capitalisation approaches described in this chapter; the empirical results in relation to these approaches will be compared in chapter five.

Figure 4.1 Seven capitalisation approaches



### Multiple methods

The multiple methods calculate the capitalised value of an operating lease by multiplying a company's next-year lease obligations with a fixed multiple. The multiple methods can be classified as simple methods or as 'rules-of-thumb' methods. Both Moody's Investor Service (1999) and UBSWarburg (2001) mention in their reports that multiple methods are still used by analysts to capitalise operating leases. The major distinction between the multiple methods and the present-value methods (described in the next section) is the usage of the next-year lease payment, instead of all future lease payments, to determine the lease liability. The multiple methods can also be divided in two different approaches: First, those using a constant (for example 6- or 8-times rent) and second, those using a formula (UBSWarburg (2001) and Ely (1995)).

- Multiple methods using a constant use a fixed number for all companies to multiply the next-year operating-lease payment. For example, the 8-times-rent method (Moody's Investor Service (1999)) multiplies the annual lease payment by eight. Although the most important advantage is its simplicity, Moody's asserts that an important advantage is also, to some degree, the incorporation of borrower creditworthiness. Thus, the annual lease payments will change with the borrower's credit risk, and by applying a constant multiple, an analyst will be able to differentiate between different classes of borrowers. Use of a constant multiple, however, prevents distinctions from being made between interest rates or underlying assets (and their related useful life). The multiple method using a constant may be simple, but professionals also use it in practice, as shown in Unilever's 2004 annual report, where on page 151 net debt is adjusted for lease obligations by adding five times the next year's lease expenses to (non-adjusted) net debt. Unilever uses a constant (five) to calculate the capitalised value of operating-lease obligations.
- Multiple methods using a formula (UBSWarburg (2001) and Ely (1995)) incorporate different interest rates and operating-lease terms, compared with the multiple methods using a constant. First, the multiple methods using a formula assume lease payments based on annuities that will be equal during the remaining lease term. Second, the present values of these annuities can be calculated using the relevant discount rate. Finally, this present value will be a multiple of the first annual lease payment. This multiple will be the same for all leases with the same remaining lease term and applicable discount rate. Ely (1995) uses a multiple method to see whether her present-value method is robust to the assumptions made on lease term (25 years), interest rate (10%) and yearly payments (constant amount each year). The multiple method described by Ely is different to that of UBSWarburg, and therefore both methods will be described in the next sections.

### Present-value methods

Present-value methods calculate the capitalised value of an operating lease by discounting all future lease obligations. Discounting the future lease obligation aims to eliminate the interest part that is incorporated in the future lease

obligations<sup>40</sup>. The present-value methods are most in line with the theoretical model of Myers et al. (1976) (see section 4.3). To understand the development of these methods, this study now describes the three different capitalisation approaches of Imhoff, Lipe and Wright (1991, 1997), Ely (1995) and Beattie et al. (1998).

- Imhoff, Lipe and Wright (1991) were the first to develop a method for capitalising operating-lease obligations based on present values. In 1991, they estimated the effect on return on assets and debt to equity. After their study, several other studies presented an alternative for this approach, including Imhoff, Lipe and Wright themselves in 1997, when they estimated of the impact on income. The method of Imhoff, Lipe and Wright is most used in practice, by Standard and Poor's (2001), Moody's Investor Services (1999) and White et al. (2003), for example.
- Beattie et al. (1998) built upon the procedure as developed by Imhoff, Lipe and Wright in 1991, and therefore start the description of their procedure with Imhoff et al.'s assumptions. Beattie et al. use a very similar approach, but their major contribution is the differentiation between the remaining- and total life of the lease portfolio using the weights of each lease-expiry category (e=1, 2 or 3; see Table 4.1). Furthermore, they differentiate between two asset categories (land and buildings and other) because they have different maturities. However, their data is substantially different from that used in the other methods described, since Beattie et al. use UK companies disclosing according to UK SSAP21. As shown in Table 2.1 in section 2.4.1, SSAP21 companies disclose only next year's operating-lease payment split in three expiry periods. This is substantially different from the disclosure of the total commitments according to RJ292, IAS17 or FAS13. The data available of UK companies does not provide information on the total future lease commitments, and shows only next year's lease commitments categorised into the three lease-expiry categories. This imposed some additional requirements on Beattie et al.'s approach to be able to estimate the present value of the total future commitments.
- Ely (1995) investigated whether investors view operating leases as property rights. According to Ely, the user's perspective toward a lease is instrumental in determining its accounting treatment (balance-sheet recognition or footnote disclosure). Ely explains that the current risk/reward approach with respect to operating leases assumes that users focus on who bears the risk of ownership. This means that lessees with operating leases bear insufficient risk to treat the leased asset as an asset or the obligation as a liability. The main goal of Ely's study was not to investigate the impact on financial ratios but to link the operating leases to equity risk. She therefore only adjusts the debt-equity ratio in her research. Ely is of the opinion (page 403) that the present value collapses to a constant times the first minimum lease payment (the multiple method). She adds in a comment between parentheses that this is true when leases are entered into regularly and when the payment per lease is constant. In her research, she therefore assumes that a firm enters into new leases every year and that the value of these leases is always the

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<sup>40</sup> Contingent rentals, service costs and taxes should already be excluded from the minimum future lease-payments disclosed in the financial statements (see Table 2.1).

same. Therefore, PVOL each year can be characterised as a constant times the first minimum lease payment. The model used by Ely is developed by Bowman in 1997 and relates equity risk to two ratios that are often adjusted by investors to include operating leases: the debt-equity ratio and the return on assets.

- The approach developed in this study is also a present-value approach, since such an approach represents best an on-balance equivalent of the operating leases (thus comparable with financial leases and non-leasing debt). Discounting the total future lease commitments eliminates the interest part. The approach in this study is therefore based on the present-value calculations as first initialised by Imhoff et al. (1991). However, as described by Beattie et al. (1998), companies differ in their lease portfolios, since some companies have more short-term leases and others more long-term leases. As will become clear in the next sections, this has an impact on the assumed remaining- and total life of the lease. This study's approach uses the weights of the three different lease-expiry categories to a greater extent than Beattie et al. do. In this study, the (average) remaining life and total life are adjusted using the payment pattern within the lease portfolio. The consequences of the difference between this study's approach and the other approaches will become evident in the following sections.

## 4.5 Assumptions

This section describes the different underlying assumptions of each method and the subsequent difference in capitalisation results. These methods have been analysed and compared on the following items:

Implicit interest rate	(i)	4.5.1
Remaining Life and Total Life	(RL and TL)	4.5.2
Division of future lease payments	(CF <sub>e</sub> and CF <sub>t</sub> )	4.5.3
Capitalised lease liability	(PVOL)	4.5.4
Capitalised lease asset and asset proportion	(PVA and AP)	4.5.5
(Indirect) impact on other accounting variables		4.5.6

### 4.5.1 Implicit interest rate (i)

The major purpose of the capitalisation approaches is to extract the interest component from the disclosed operating-lease commitments. The capitalised amount should be a fair indication of what should have been the amount on the balance sheet if the operating leases would have been treated as financial lease from the beginning. Each lease will have its own implicit interest rate<sup>41</sup>, which should be used, for example, when defining whether the operating lease is a finance- or operating lease (RJ292.107; IAS 17.8, 17.12). The implicit interest rate should be the most accurate discount rate (Moody's Investor Services (1999), White et al. (2003)). However, firms are not required to disclose the (implicit) interest rate, which might not even be known by the company itself when the lessor is not transparent in the lease-payment calculations. The user therefore needs to choose an alternative.

<sup>41</sup> The lessee pays to the lessor a lease payment that includes both a repayment part and an interest part; these parts, however, are not separately invoiced, as is the case with normal debt. Therefore, the interest rate should be deducted from the lease payment, by calculating what percentage implicitly was used when determining the lease payment.



Table 4.2 summarises the assumptions in interest rate for the different capitalisation approaches.

**Table 4.2 Assumption on interest rate**

CAPITALISATION APPROACH	INTEREST RATE
<b>Multiple methods</b>	
8-times rent	No interest rate required
UBSWarburg	Estimated current borrowing rate of each company
Multiple Ely	10% derived from footnotes representative for entire sample
<b>Present-Value methods</b>	
Imhoff, Lipe and Wright	Interest rate implicit in financial lease, fixed at 10% for entire sample
Beattie, Edwards and Goodacre	Short-term borrowing rate, fixed at 10% for entire sample
PV Ely	10% derived from footnotes representative for entire sample
This study	Alternative cost of debt, fixed for entire sample

**Multiple methods**

The multiple methods using a constant do not take the interest rate into account. However, the constant of eight in the 8-times-rent method was originally conceived by assuming a fixed interest and remaining life for all leases. This will become clear when the multiple methods using a formula are described.

For the multiple methods using a formula the interest rate is relevant, since the implicit interest rate together with the remaining- or total life of the lease defines the multiple. The formula to calculate the multiple used by UBSWarburg (2001) is shown in Equation (2).

$$\text{Multiple}_{UBS} = \frac{1 - \frac{1}{(1+i)^{RL}}}{i} \tag{2}$$

The multiple calculation of Ely is shown in Equation (3)

$$\text{Multiple}_{Ely} = \frac{\sum_{t=1}^{TL} \frac{1 - \frac{1}{(1+i)^{(TL-t)}}}{i}}{TL} \tag{3}$$

UBSWarburg and Ely argue that the estimated current borrowing rate of the company should be used to calculate the multiple. However, Ely uses a fixed interest rate for all companies of 10%. She analysed the footnotes of the annual reports of the companies in her sample, and found 10% to be representative for the entire sample. She therefore does not distinguish between companies.

**Present-value methods**

Coincidentally, the three articles using present-value approaches used a 10%<sup>42</sup> interest rate to calculate these present values. All three use different arguments for choosing 10%. According to Imhoff, Lipe and Wright (1991) the appropriate incremental borrowing rate should be the weighted average historical borrowing rates of each lease in comparison to all operating leases. Since both the historical

<sup>42</sup> Nowadays, a discount rate of 10% would be inappropriate, since interest rates have decreased since the ‘90s. In the Netherlands, for example, the average interest rate charged on a ten-year loan in 1991 was 8.74%; in 2003, this was 4.12% (source: www.statistics.dnb.nl). Another example is the decrease in the mean of the Finance House Base rate as used by Beattie et al. For the six-year period 1998-20004, the mean was 5.4% instead of the 10% used in their study (source: www.fla.org.uk)

rates and the composition of each lease to all operating leases are not known, they assumed in 1991 that this rate is similar to the average historical interest rate for reported secured long-term debt. This rate can be estimated by examining the debt footnote. Imhoff et al. found for its example (MacDonald's) a historic rate of nine percent; they used 10% to produce a conservative measure that avoids overstating the liability. In 1997, they suggested taking the implicit rate in companies' financial leases. Even if this rate is not disclosed, it is possible to calculate it using the footnotes on financial leases.

Also Beattie et al. use an interest rate of 10% in their study; this was based, however, on other arguments. They selected a short-term borrowing rate, the three-month London deposit rate, as a suitable discount rate for the entire sample. According to Beattie et al. this rate is similar to the Finance House Base Rate, used by members of the Finance and Leasing Association. This rate varied during the period of their research (1981-1994), with a mean of 10.8% for the entire period and 10.3% for the period 1988-1994. Beattie et al. found the latter the most suitable rate and rounded it off to 10%. Beattie et al. therefore do not use the interest rates of individual companies.

Ely uses a 10% interest rate, since she assumes that a lease term of 25 years is representative for her sample of 212 firms, and the long-term debt footnotes suggest that an interest rate of 10% is also representative. The assumptions about the lease term, the interest rate and the yearly payments embedded in the lump-sum amount of leases expiring after year 5 are not tailored to the specific firms in the sample. Ely argues that PVOL is not sensitive to these assumptions, since the correlations all exceed 0.9 between PVOL and alternative measures of lease lives, interest and yearly payments.

In their study concerning the relation between tax, debt and leases, Graham et al. (1998) describe the calculation of the present value of operating-lease commitments (p.139). They use a 10% discount rate to calculate the present value, acknowledging that this calculation may be biased when different companies have different costs of (lease) capital. Therefore, they also used as alternative each company's short-term borrowing rate. This led to many missing observations and reduced their sample. Moreover, the use of the alternative did not change the qualitative results of their study.

The above discussion allows formulation of the following conclusions on the interest rate used in the capitalisation procedures:

- Ideally, each lease should be capitalised using the implicit interest rate in each contract; this rate, however, is practically unavailable for both the (lessee) company and the user of the financial statements;
- Alternatively, a lease (or a lease portfolio) should be capitalised using the interest a company pays on similar debt (the alternative cost of debt), which is also recommended by the IAS17 and RJ29. Although this rate will be known to the company, it is often unavailable to the user of the financial statements,
- Finally, as done by most previous studies, a fixed interest rate for all companies will be used.

**4.5.2 Remaining life and total life (RL and TL)**

Whereas the theoretical value of a lease as described in section 4.3 is calculated at the inception of the lease, this is not the case for the capitalisation of operating leases as disclosed in the annual report. The operating leases in the annual report consist of a portfolio of different leases with different maturities, and will differ also in their remaining lives. For example, a lease of a computer will have a different original maturity than a lease of a building. However, a complicating factor of estimating the remaining life of the operating leases is the fact that the entire lease portfolio is disclosed at once, instead of per leased asset. The remaining life of the ‘land and buildings’ in this portfolio will be different from the remaining life of the computer. The total life is relevant, as will be shortly described, to estimate the already depreciated part of the leased asset. This cannot be estimated from the future lease commitments, and additional assumptions have to be made.

How the different capitalisation approaches estimate the remaining- and total life of the lease portfolio will now be described. Table 4.3 summarises the assumptions and calculations used.

**Table 4.3 Assumptions on remaining- and total lives**

CAPITALISATION APPROACH	REMAINING LIFE (RL)	TOTAL LIFE (TL)
<b>Multiple methods</b>		
<b>8-times rent</b>	Irrelevant	Irrelevant
<b>UBSWarburg</b>	Ideally the weighted average remaining life, $RL_{UBS} = \frac{\sum_{t=1}^n t * CF_t}{\sum_{t=1}^n CF_t}$	Irrelevant
<b>Multiple Ely</b>	Irrelevant	Fixed at 25 years
<b>Present-value methods</b>		
<b>Imhoff, Lipe and Wright</b>	$RL_{ILW} = 5 + \frac{CF_{e=3}}{CF_5}$ rounded up to the next full year	2* RL
<b>Beattie, Edwards and Goodacre</b>	Remaining- and total lives distinguished for asset categories ‘Land and buildings’ and ‘Other’	
	$RL_{BEG} = \sum_{e=1}^3 w_e * RL_{base}$ $w_e = \sum_{e=1}^3 \left( \frac{\sum_{t=1997}^{2002} CF_t}{\sum_{e=1}^3 \sum_{t=1997}^{2002} CF_{t,e}} \right)$	$TL_{i,BEG} = \sum_{e=1}^3 w_e * TL_{base}$
<b>PV Ely</b>	Irrelevant	Fixed at 25 years
<b>This study</b>	$w_e = \frac{CF_e}{\sum_{e=1}^3 CF_e}$ $RL = w_1 * 1 + w_2 * 3 + w_3 * (5 + \frac{CF_{e=3}}{CF_5})$	2*RL

**Multiple methods**

In the 8-times-rent method, the remaining life and total life of the operating lease is not required to calculate the capitalised operating-lease liability. As can be seen in the previous sub-section, the formulas of UBSWarburg (equation (2)) and Ely (equation (3)) use either the remaining life or the total life.

Although the remaining life (RL) suggested by UBSWarburg is ideally a weighted average using annual lease payments, a simple estimate may be sufficient (p.3). The weighted average remaining life of the total lease portfolio can be based on the division of future lease payments in the lease portfolio (see next sub-section). A

multiple calculated this way does take into account the future lease obligations. Equation (4) shows how this weighted average is calculated.

$$\text{Weighted Average RL} = \frac{\sum_{t=1}^n t * CF_t}{\sum_{t=1}^n CF_t} \quad (4)$$

$$RL_{UBS} = 5 + \frac{CF_{e=3}}{CF_5}, \text{ rounded up to the next full year,} \quad (5)$$

The formula of Ely is based on the assumption that the operating leases in the portfolio of a company all have different remaining lives equally divided over the total (assumed) lease term. Ely ignores future lease payments and assumes that yearly lease payments are constant; further, she uses a fixed total life of 25-years. Whereas part of the multiple formula is equal to the present value of an annuity, Ely (1995) argues that the multiple method is basically the same as present-value methods, under the assumptions that leases are entered into regularly and the payment per lease is constant. This simplification might be acceptable for equipment leasing, like cars and computers, since these may remain constant over time in a company, but is not very realistic for fixed assets as machinery, or land and buildings.

### Present-value methods

Imhoff, Lipe and Wright (1991) assume that the useful life of the leased assets (equipment, offices, vehicles) is 30 years. Furthermore, they argue that if they assume that the remaining life is 14 years, and they divide the lump sum after year five by nine (14 years minus five years), the annual lease payment after year 5 is higher than the annual payment for the next year. Since this is not logical (lease payments are more likely to decrease over time), they assume a remaining life of 15 years instead of 14 years.

Although their reasoning is not described in depth (see the reasoning of the remaining life of 14 years for MacDonald's), Imhoff et al. suggested a procedure whereby the fifth future year's minimum lease payment, together with the lump-sum payment of the third lease-expiry category (expiring beyond year five), is used to approximate how many years the payment would continue after year five. This procedure is also adopted and described in greater detail in their 1997 article.

$$RL_{ILW} = 5 + \frac{CF_{e=3}}{CF_5}, \text{ rounded up to the next full year}^{43}, \quad (6)$$

Standard and Poor's (2001) also uses this method to calculate the remaining life and consequently the divisions of annual lease payments after year five. Since the actual pattern of annual payments after year five cannot be observed, Imhoff et al. (1997) expected some decay in the cash payments beyond year five, as they do for the first five years. Therefore, they round up the outcome of equation (6) and add a year or two.

In 1997, Imhoff, Lipe and Wright (p. 17) argued that the assumption on the duration of future cash flows is somewhat more ambiguous than the interest-rate

<sup>43</sup> For example, a remaining life of 12.3 becomes 13

assumption. This is even more troublesome, since the lease portfolio often consists of two categories: land and buildings, and other (such as machinery and equipment). Both asset types have significantly different economic lives. This was one of the major objections that Beattie, Edwards and Goodacre (1998) had against the Imhoff et al. approach. They analysed the pattern of operating-lease commitments and concluded that uniform total- and remaining lease lives (as used by Imhoff et al.) are unable to capture the diversity of lease durations. To overcome this shortcoming, Beattie et al. investigated the diversity between lease duration of assets, related to their asset category. They analysed both the UK and the US lease disclosures of 13 companies by asset category ('land and buildings' and 'other') and by lease-expiry date (leases expiring within one year, between one and five years, and after five years). By comparing the US and the UK disclosures, they were able to collect additional information by combining next year's annual lease payments (UK disclosures) and the total minimum future lease payments (US disclosures). This resulted in a base estimation of different remaining lease lives and total lease lives for the two asset categories and the three lease-expiry dates. Table 4.4 shows these base estimations.

**Table 4.4** Base estimates of remaining- and total lease lives  
Beattie, Edwards and Goodacre (1998), p. 243

Lease-expiry category (e)	REMAINING LEASE LIFE (RL <sub>BASE</sub> )		TOTAL LEASE LIFE (TL <sub>BASE</sub> )	
	Land and Buildings	Other	Land and Buildings	Other
Less than one year	1	1	1	1
One to five years	3	3	5	5
More than five years	16	7	25	10

Table 4.4 was used in their sample of 232 UK companies to calculate the weighted average of the remaining- and total lives for each separate company. For example, for a company with a historical lease portfolio that has most leases expiring within the first lease-expiry category (expiring within one year), this lease-expiry category should have a heavier weight on the calculated remaining lives and total lives than the other lease-expiry should have. They use the cumulative historic volumes of leases, since this will give a more reliable indication of the average proportion of lease life expired than the use of data from a single year. The formula used for this weight ( $w_e$ ) of each lease-expiry category ( $e$ ) is:

$$w_e = \sum_{e=1}^3 \left( \frac{\sum_{t=1997}^{2002} CF_t}{\sum_{e=1}^3 \sum_{t=1997}^{2002} CF_{t,e}} \right) \tag{7}$$

The weight for each lease-expiry category is subsequently used to calculate the weighted average of remaining lives (RL<sub>i</sub>) and total lives (TL<sub>i</sub>) of the lease portfolio of company i, by multiplying the weight ( $w_e$ ) with the base remaining lives (RL<sub>base</sub>) and base total lives (TL<sub>base</sub>), as shown in Table 4.4.

$$RL_{i,BEG} = \sum_{e=1}^3 w_e * RL_{base} \tag{8}$$

$$TL_{i,BEG} = \sum_{e=1}^3 w_e * TL_{base} \tag{9}$$

The usage of base remaining lives and total lives described above was essential for UK companies, since this could not be derived from the companies' financial statements themselves. Also, for companies disclosing in conformity with IAS 17,

this procedure can be applied to estimate the weighted total life of each company's lease portfolio (equation (9)). This cannot be derived from the disclosures according to IAS17. The weighted remaining life used by Beattie refines the depreciation charge incorporated in the annual lease payment, while the assumptions of Beattie et al. make it possible to derive that depreciation should be calculated using the average remaining life.

As is the case in the multiple-methods formula, a total lease term of 25 years (total life) is also assumed for the present-value method of Ely, and since she also assumes that firms enter into leases each year, the remaining life becomes irrelevant.

This study takes into account the maturity pattern of the future lease obligations when calculating the remaining- and total life of the lease portfolio. As put forward by Beattie et al., this refines the calculation of the remaining life and total life because it takes into account whether a company has more short-term or long-term leases. However, Beattie et al. used 'base estimates' to calculate the weighted remaining- and total life (see Table 4.4), due to the fact that the (non-weighted) remaining life of the lease portfolio could not be estimated with SSAP 21.

For disclosures according to RJ292 (or IAS17 and FAS13), the (weighted) remaining life can be calculated and therefore the (weighted) remaining life of the entire lease portfolio in this study is calculated as follows. The weight of each lease-expiry category is calculated by dividing the commitment of that particular expiry category by the total commitment (equation 10). This results in three weights,  $w_1$ ,  $w_2$ , and  $w_3$ . These weights are used to calculate the weighted average remaining life, by multiplying each weight with the remaining life of each corresponding lease-expiry category (equation 11). The remaining life of the first lease-expiry category is one year, and for the second we use an average of three years (which agrees with Beattie et al. base estimates). The remaining life of the third lease-expiry category is more complex. The total remaining life of the lease portfolio is the same as that calculated by Imhoff et al. (see equation 6). This differentiates between companies with different payment schedules, instead of using the fixed base estimates of Beattie et al. for this lease-expiry category.

$$w_e = \frac{CF_e}{\sum_{e=1}^3 CF_e} \quad (10)$$

$$RL = w_1 * 1 + w_2 * 3 + w_3 * (5 + \frac{CF_{e=3}}{CF_5}) \quad (11)$$

It is particularly the calculation of the remaining life in this study that will differentiate this study from the studies of Imhoff et al. and Beattie et al.. The remaining life and the weights of each lease-expiry category will influence the depreciation used to adjust net income. This is discussed in section 4.5.6 and illustrated by Figure 4.3 in that section.

This study assumes that the total life is twice the weighted remaining life (in line with Imhoff et al.) because no information is disclosed in the financial statements, which gives some indication of the original maturity of the lease. An equal division

of remaining and passed maturity seems fair. To test this assumption, this study will test whether the capitalisation results are sensitive to this assumption by varying the relation between remaining life and total life.

#### 4.5.3 Division of lease payments over years (CF<sub>e</sub> and CF<sub>t</sub>)

As shown in Table 4.1 and described in chapter 2, with IAS17 and RJ292 the disclosed information of the operating-lease commitments for two lease-expiry categories are summed; the lease commitments of years two through four are summed, and the lease commitments after year five are summed<sup>44</sup>. In order to calculate a present value of these commitments, the commitments have to be divided over calendar years.

Table 4.5 shows the difference in the assumptions of the future lease payments for each of the lease capitalisation approaches.

**Table 4.5 Assumptions on division of lease payments over future years**

CAPITALISATION APPROACH	DIVISION OF LEASE-PAYMENTS
<b>Multiple methods</b>	
<b>8-times rent</b>	Irrelevant; only annual lease payment required
<b>UBSWarburg</b>	Assuming equal lease payments after year 5; no suggestions given, however
<b>Multiple Ely</b>	Irrelevant; only annual lease payment required
<b>Present-Value methods</b>	
<b>Imhoff, Lipe and Wright</b>	Equal annual lease payments after year 5: $CF_t = \frac{CF_{e=3}}{RL_{ILW} - 5}, \text{ for } t > 5$
<b>Beattie, Edwards and Goodacre</b>	For IAS17 companies, as Imhoff et al.
<b>PV Ely</b>	Decreasing annual lease payments after year 5: $CF_{t>5,Ely} = (TL - (t - 1)) * \frac{2 * CF_{e=3}}{(TL - 5)(TL - 4)}$
<b>This study</b>	As Imhoff et al.

#### Multiple methods

The division of lease payments over future calendar years is not relevant for the multiple methods using a constant, since only next year's annual lease payment is required. The lease commitments for the first lease-expiry category (CF<sub>e=1</sub>, leases expiring within one year) are equal to the lease commitments of that year (CF<sub>1</sub>). The commitments for the years after t=1 are ignored.

Although UBSWarburg suggests calculating the weighted remaining life of the lease portfolio using annual payments, they do not describe how the accounting number in the after-year-5 lease commitments (CF<sub>e=3</sub>) should be divided over future years. They assume in three different papers, however, an equal payment during the remaining life of the lease, which they assume is known (UBSWarburg (2001, (2002, (2003). No division of lease payments over future years is necessary for the calculation of Ely's multiple.

#### Present-value methods

The articles of Imhoff et al. (1991. 1997) use the FAS13 requirements of operating-lease disclosure, which means that for each of the first five years the minimum lease payments are disclosed. In their articles, Imhoff et al. therefore did not make

<sup>44</sup> FAS13 requires disclosing the annual lease commitments up to year five and the total of the lease commitments after year five (see chapter 2).

assumptions on the division of lease payments for situations where the obligations for years two through five are summed (RJ292 and IAS17). With respect to the lease obligations after year five, the latter part of the remaining-life formula is used to calculate the minimum lease payments for years 6 until the end of the remaining life. For  $t > 5$ , the minimum annual lease payments ( $CF_t$ ) are

$$CF_t = \frac{CF_{e=3}}{RL_{LLW} - 5} \quad (12)$$

As Beattie et al. analysed UK companies with SSAP 21 disclosure, they use the next year's operating-lease commitments and divide these into the three expiry categories by using the remaining lives derived from the US disclosure. This results in three different annuities (for each lease-expiry category), each with a different base remaining life (see Table 4). For example, for lease-expiry category 3 (leases expiring after year five), Beattie et al. assume a remaining life of sixteen years for the category: 'land and building' and seven years for the category: 'other'. This analysis, however, is based on annuities payments derived from next year's operating-lease commitments. This is therefore not applicable to companies disclosing according to IAS17. From the article of Beattie et al. it appears that they use the equal division of lease payments as in equation (12) also for the US dataset.

Ely assumes a continuous process of lease commitments over the total life of the lease portfolio. She assumes a pattern of decreasing lease payments. The minimum lease payments after year 5 for year  $t$  (thus  $t > 5$ ) are calculated as follows:

$$CF_{t>5,Ely} = (TL - (t - 1)) * \frac{2 * CF_{e=3}}{(TL - 5)(TL - 4)} \quad (13)$$

This equation results in a decreasing pattern of lease commitments compared to the equal division of lease payments used by Imhoff et al. and Beattie et al. This study adopts the equal division of lease payments, as used by Imhoff et al., Beattie et al. and UBSWarburg.

#### 4.5.4 Capitalised lease liability (PVOL)

Ultimately, the main purpose of the capitalisation approaches is to estimate an on-balance equivalent of the operating-lease commitments (see also section 4.2). Table 4.6 summarises the calculations of the different approaches.

**Table 4.6 Capitalised lease liability (PVOL)**

CAPITALISATION APPROACH	CAPITALISED LEASE LIABILITY (PVOL)
<b>Multiple methods</b>	
8-times rent	PVOL = constant * $CF_1$
UBSWarburg	PVOL = multiple * $CF_1$
Multiple Ely	PVOL = multiple * $CF_1$
<b>Present-Value methods</b>	
Imhoff, Lipe and Wright	$PVOL = \sum_{t=1}^n \frac{CF_t}{(1+i)^t}$
Beattie, Edwards and Goodacre	$PVOL = \sum_{e=1}^3 \left[ CF_{1,e} * \frac{1 - \frac{1}{(1+i)^{RL_{base,e}}}}{i} \right]$ for SSAP21 disclosures. (as Imhoff et al. for IAS17 disclosures)
PV Ely	$PVOL_{Ely} = \sum_{t=1}^n \frac{CF_t}{(1+i)^t}$
This study	As Imhoff et al.



**Multiple methods**

The multiple methods multiply the annual lease payment, the next year’s lease obligation, with a multiple that can be either a constant or a multiple derived from a formula. The capitalised lease liability (PVOL) is therefore calculated according to equation (14):

$$PVOL = multiple * CF_1 \tag{14}$$

**Present-value methods**

The present-value methods all calculate the capitalised lease liability (PVOL) by discounting the future obligations. The differences mainly occur from the assumptions made on the implicit interest rate, the remaining- and total life and the division of lease payment. Furthermore a difference arises from the different way of disclosure between FAS13 (Imhoff et al. and Ely) and SSAP21 (Beattie et al.). For FAS13 (and IAS17 or RJ292) the lease commitments can be discounted using a present-value formula for different cash flows on different timings. Under SSAP 21 the disclosed lease obligations can be split into three annuities (for each lease-expiry period) with three different remaining lives, for which the present value can be calculated using the present-value formula for annuities.

Using the implicit interest rate and the annualised lease obligations, Imhoff et al. (1991) calculate the capitalised operating-lease liability as follows.

$$PVOL_{ILW} = \sum_{t=1}^n \frac{CF_t}{(1+i)^t} \tag{15}$$

The present value of the three annuities as used by Beattie et al. is as follows:

$$PVOL_{BEG} = \sum_{e=1}^3 \left[ CF_{1,e} * \frac{1 - \frac{1}{(1+i)^{RL_{base,e}}}}{i} \right] \tag{16}$$

In this equation,  $CF_{1,e}$  is next year’s annual lease payment disclosed under SSAP21, divided into the lease-expiry periods (e). For example,  $CF_{1,1}$  is the part of next year’s lease payment that expires in the next year; the remaining life is one year. It may be assumed that if the lease commitments were not disclosed as an annuity (as in IAS17), Beattie et al. would have used the same equation as Imhoff et al. To calculate PVOL, Ely uses the same formula as Imhoff et al. (1991), the difference arising from the calculations of cash flows after year five (see above). Also, Ely assumes that the company enters into new leases every year and that the value of these leases is always the same,  $PVOL_0$ :

$$PVOL_{Ely} = \sum_{t=1}^n \frac{CF_t}{(1+i)^t} \tag{17}$$

This study also adopts a present-value approach because it best captures the differences in the timing of the future lease commitments and it deducts the interest part of these commitments. This is essential to make the amount comparable to the amount capitalised on the balance sheet for other financing forms such as non-leasing debt and financial leases. Since Imhoff et al., Beattie et al. and this study do not differ in the division of the lease payments after year five and in

the total remaining life (the difference lies within the calculation of the (weighted) remaining life), PVOL is for these three methods the same.

#### 4.5.5 Capitalised lease asset (PVA and AP)

The capitalised lease liability (PVOL) be capitalised on the balance sheet just like other long-term liabilities, and some financial ratios will be adjusted accordingly. However, attached to the liability of the lease, the leased asset should also be capitalised on the asset side of the balance sheet. This capitalised leased asset (PVA) gets less attention than the capitalised lease liability (PVOL). Some of the methods even do not mention the adjustment of the leases asset on the balance sheet, and it may be assumed that the capitalised leased asset is equal to the capitalised leased liability. Table 4.7 summarises the assumptions of the capitalisation approaches to estimate the capitalised leased asset (PVA).

**Table 4.7 Capitalised leased asset (PVA)**

CAPITALISATION APPROACH	CAPITALISED LEASED ASSET (PVA)
<b>Multiple methods</b>	
8-times rent	PVA =PVOL
UBSWarburg	PVA =PVOL
Multiple Ely	See below
<b>Present-Value methods</b>	
Imhoff, Lipe and Wright	$AP = \frac{UA}{UL} = \frac{RL * \left( \frac{1 - (1/(1+i)^{TL})}{i} \right)}{TL * \left( \frac{1 - (1/(1+i)^{RL})}{i} \right)}, \text{ PVA} = AP * \text{PVOL}$
Beattie, Edwards and Goodacre PV Ely	As Imhoff et al.
	$AP_{Ely} = \frac{TL-1}{2} * \frac{1 - \frac{1}{(1+i)^{TL}}}{\sum_{t=1}^{TL} 1 - \frac{1}{(1+i)^{(TL-t)}}$
This study	As Imhoff et al.

#### Multiple methods

None of the multiple methods describes how the leased asset should be capitalised. Therefore, the capitalised lease asset (PVA) is assumed to be equal to the capitalised lease liability.

$$PVA = PVOL \quad (18)$$

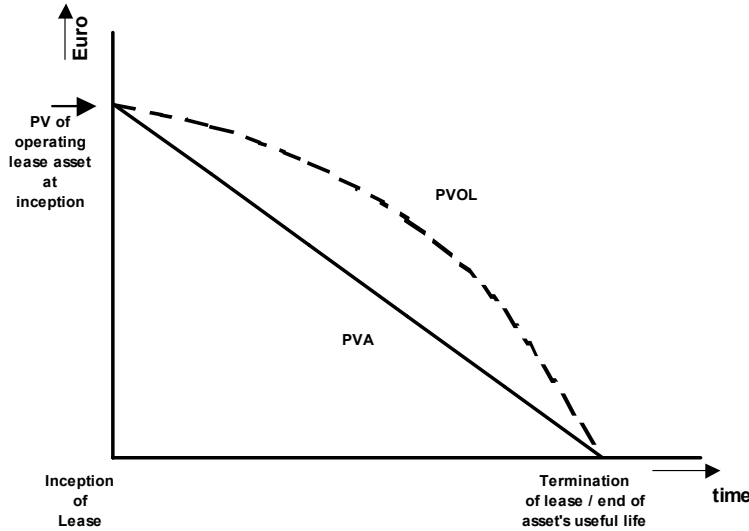
#### Present-value methods

Imhoff et al. (1991) do not limit their study to the effects on the liability side of the balance sheet when capitalising operating leases, but also explore the effects on the asset side. They estimated the associated unrecorded asset (PVA), in order to fully address the overall balance-sheet effects of constructive capitalisation. The unrecorded asset measurement depends on the scheduled lease commitments, the interest rate and the remaining life of the lease.

Three assumptions were therefore introduced. First, the assumed depreciation method for the leased assets is the straight-line method. Second, it is assumed that at the inception of the leases both the unrecorded asset and the unrecorded liability equal 100 percent of the present value of the future lease payment. Third, at the end of the lease period both the unrecorded asset and the unrecorded liability equal zero. These assumptions are comparable with normal (100%) debt financing based

on annuities and a related asset that is depreciated in a straight line. Within the first annuity of the loan, the repayment part is smaller than the first depreciation of the asset, since interest takes a bigger part in the annuity. At the end of the loan and the life of the asset, however, the loan is fully repaid and the asset is fully depreciated. This relation is shown in Figure 4.2.

**Figure 4.2** The relation between the unrecorded operating-lease asset and the unrecorded operating-lease liability (Figure 1 of Imhoff et al. (1991), page 57)



The difference between the capitalised operating-lease liability (PVOL) and the capitalised leased asset (PVA) can be calculated using the asset proportion (AP). The AP defines the relation between PVA and PVOL (see equation 19).

$$PVA = AP * PVOL \quad (19)$$

Although Imhoff et al. use in their study a fixed AP of 70% in 1991, and 75% in 1997, it is a function of the interest rate and the remaining- and total life (see equation 20).

$$AP = \frac{RL * \left( \frac{1 - (1/(1+i)^{TL})}{i} \right)}{TL * \left( \frac{1 - (1/(1+i)^{RL})}{i} \right)} \quad (20)$$

Beattie et al. refined Imhoff et al.'s approach in order to take into account the company-specific duration of the lease portfolio. Therefore, although they use the same formulas (19) and (20) (the basis for Imhoff et al.'s fixed-asset proportion), the difference arises from the usage of the *weighted* remaining- and total life (see section 4.5.2).

Also Ely describes that the asset proportion (called leasehold in her study) is a function of PVOL. In the appendix she describes the calculation (see equation 17) of the asset proportion. As described before, however, Ely uses some specific assumptions (interest is 10%, total life is 25 years and entry into new leases occurs every year), and therefore the asset proportion can be fixed at 0.725.

$$AP_{Ely} = \frac{TL - 1}{2} * \frac{1 - \frac{1}{(1+i)^{TL}}}{\sum_{t=1}^{TL} 1 - \frac{1}{(1+i)^{(TL-t)}}} \quad (21)$$

Equation (21) can be used to calculate the AP of other datasets, using the total life and interest rate estimated for that particular dataset. Equation 21 is sensitive to these assumptions, however, which will lead to an AP of more than 100% when the interest rate is high and total life is low.

In contrast to the fixed-asset proportion used by Imhoff et al., this study uses equations (19) and (20) for each company, to enable an individual calculation for each company based on the respective difference between remaining- and total life. However, in contrast to Imhoff et al. (who use the full remaining life in equation (20)), but in line with Beattie et al., this study uses the weighted remaining life and total life. This again best captures the difference between the differences in lease maturities between companies with long- or short-term leases. Since the weighted remaining- and total lives of this study's approach differ from those of Beattie et al., all three studies in the end differ in the calculated asset proportion (AP) and the related capitalised leased asset (PVA). Since the capitalised lease liability (PVOL) of these three studies is equal, the major differences come from the calculation of the leased asset and the depreciation charge derived thereof (see the next section).

#### 4.5.6 (Indirect) impact on other accounting variables

##### Equity and deferred tax liability

The differences between the methods of the capitalised lease liability and leased asset, PVOL and PVA, have an impact on other accounting variables. The impact on equity and net income is addressed in this section and summarised in Table 4.8.

**Table 4.8 Impact on equity and net income**

CAPITALISATION APPROACH	EQUITY	NET INCOME
<b>Multiple methods</b>		
<b>8-times rent</b>	No change	No change
<b>UBS Warburg</b>	No change	$\text{NetIncome} + (1-t) * (\text{CF}_1 - \frac{\text{PVOL}}{\text{RL}} - i * \text{PVOL})$
<b>Multiple Ely</b>	No change	See PV Ely
<b>Present-Value methods</b>		
<b>Imhoff, Lipe and Wright</b>	$\text{Equity} = (1-t) * (\text{PVOL} - \text{PVA})$	$\text{NetIncome} + (1-t) * (\text{CF}_1 - \frac{\text{PVA}}{\text{RL}} - i * \text{PVOL})$
<b>Beattie, Edwards and Goodacre</b>	As Imhoff et al.	$\text{NetIncome} + (1-t) * (\text{CF}_1 - \frac{\text{PVA}}{\text{weighted RL}} - i * \text{PVOL})$
<b>PV Ely</b>	No change	No change in net income, only in earnings before interest and tax: $\text{EBIT}_{\text{post}} = \text{EBIT} + i * \text{PVOL}$
<b>This study</b>	As Imhoff et al.	$\text{NetIncome} + (1-t) * (\text{CF}_1 - w_1 * \text{PVA} - i * \text{PVOL})$

The impact on equity follows from the difference between the capitalised lease liability and lease asset, PVOL and PVA. This is therefore only applicable to the present-value methods. Although Ely assumes PVA is not equal to PVOL, she only adjusts debt and not equity in the calculation of the debt-equity ratio. The other approaches do adjust equity. Since PVOL always exceeds PVA, this will negatively affect equity. However, due to the existence of taxes, some part of the difference between the PVOL and PVA will also have an impact on the deferred tax liability on the balance sheet. Imhoff et al. use the following equation (which is also adopted by Beattie et al. and in this study) to adjust equity:

$$\text{Equity} = (1-t) * (\text{PVOL} - \text{PVA}) \quad (22)$$

**Net income**

**Multiple methods**

The 8-times-rent method focuses on the capitalised lease liability and ignores the other effects of lease capitalisation, including the impact on net income. UBSWarburg focuses on three adjustments relating to the income statement, opposed to adjustments to the balance sheet. The three adjustments are made to the earnings before interest, taxes, depreciation and amortisation (“EBITDA”), to the earnings before interest and taxes (“EBIT”) and to net income. UBSWarburg maintains that these adjustments would improve the comparability of ROCE (return-on-capital-employed), leverage and other book ratios. Net income is adjusted according to the following equation:

$$\text{NetIncome}_{post} = \text{NetIncome} + (1 - t) * (\text{CF}_1 - \frac{\text{PVOL}}{\text{RL}} - i * \text{PVOL}) \quad (23)$$

**Present-value methods**

Imhoff et al. (1991) only sketch the effect of capitalisation on net income. However, the underlying assumption of Figure 4.2 (the difference between amortisation and depreciation) also affects net income. The annual lease payments of operating leases are fully deductible from pre-tax income, whereas interest and depreciation can be deducted for capitalised lease obligations. Figure 4.2 showed that depreciation and interest in the early years of the asset exceed the annual lease payments (on annuity bases). This relationship is reversed in the last years of the lease term. The effects on net income and operating income were the purpose of the enhanced 1997 version of the 1991 article. In 1997, they examine the effects of operating leases on return on assets, return on equity, price-to-book ratio and the price-earnings ratio. The net-income effect is calculated by adding the tax impact of rent expenses to net income, and deducting the tax impact of depreciation and interest expenses.

The formula of Imhoff et al. to adjust net income is as follows:

$$\text{NetIncome}_{post} = \text{NetIncome} + (1 - t) * (\text{CF}_1 - \frac{\text{PVA}}{\text{RL}} - i * \text{PVOL}) \quad (24)$$

This is identical to UBSWarburg’s approach, except that Imhoff et al. calculated separately the capitalised lease asset (PVA), which is depreciated over time.

Beattie et al. calculate the effect on net income, making the same adjustments as Imhoff et al. (1991) and UBSWarburg (see equation 24). When Beattie et al. deduct the annual straight-line depreciation of the capitalised asset, we must assume that they use the weighted average of the remaining life instead of the total remaining life, to include different weights on each lease-expiry category. We therefore follow their assumption that companies with a heavy weight on the first lease-expiry category (leases expiring within one year) would depreciate faster than those with a heavy weight on the last lease-expiry category (leases expiring after year five).

$$\text{NetIncome}_{post} = \text{NetIncome} + (1 - t) * (\text{CF}_1 - \frac{\text{PVA}}{\text{weighted RL}} - i * \text{PVOL}) \quad (25)$$

Ely does not adjust net income, but only the earnings before interest and tax (EBIT). Although she assumes the PVA not to be equal to PVOL, she does not differentiate between repayment and depreciation. Net income therefore does not change in her study. Ely does adjust earnings before interest (EBIT) by adding the

interest part of the lease rental. Since Ely assumes a fixed interest rate of 10%, the interest part can simply be calculated as 10% times PVOL.

$$\text{EBIT}_{post} = \text{EBIT} + i * \text{PVOL} \quad (26)$$

Ely thus calculates the return on assets (ROA), which is one of the explanatory variables in her study, using EBIT instead of net income.

In this study, PVA is depreciated using the weights of each lease-expiry category. Imhoff et al. fully ignore the expiry pattern of the lease portfolio, and depreciate the assets in a straight line over the total remaining life. The weighted remaining life as used by Beattie refines the depreciation charge incorporated in the annual lease payment. This improvement on the Imhoff method can be explained as follows: imagine company A, with a lease portfolio consisting of many short-term leases (remaining life two years; cars, for example). However, company A also has one long-term lease (remaining life fifteen years; a building, for example) in its portfolio. If the remaining life is not weighted, then all assets are depreciated using the fifteen-year term; by weighting the remaining life, we bring this more in line with the composition of the portfolio.

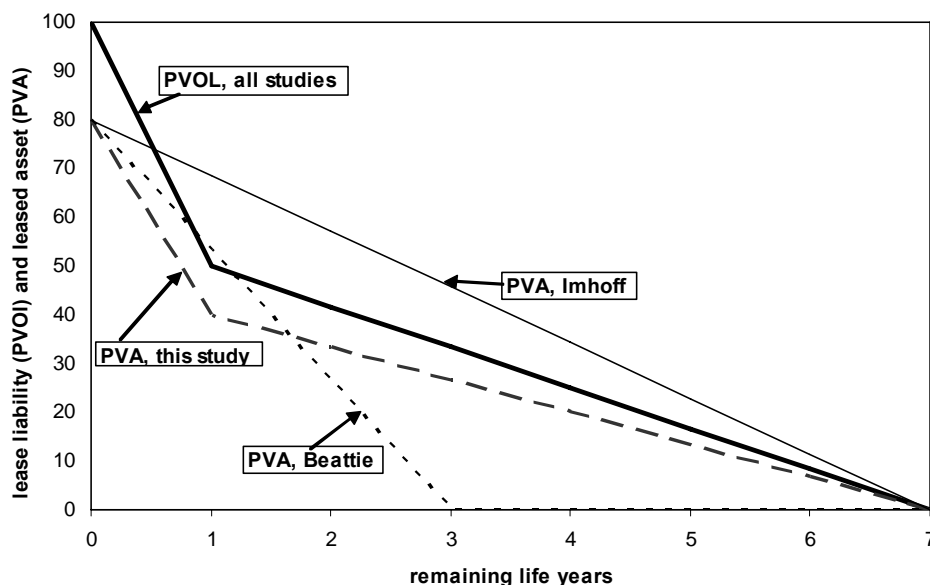
However, the disadvantage of the Beattie et al. approach using a weighted average remaining life is that the assets will be fully depreciated before the total remaining life has ended. Therefore, this study allows the leased assets to be depreciated using the weights of the different lease-expiry categories, instead of a weighted remaining life. This will follow more accurately the remaining lives of all assets in the lease portfolio. Net income in this study will therefore be adjusted according to equation (27). The weights are calculated as shown in equation (10).

$$\text{NetIncome}_{post} = \text{NetIncome} + (1 - t) * (\text{CF}_1 - w_1 * \text{PVA} - i * \text{PVOL}) \quad (27)$$

Using a simplified example, Figure 4.3 illustrates the differences between this study and the approaches of Imhoff et al. and Beattie et al..

**Figure 4.3 Differences in depreciation between this study and those of Imhoff et al. and Beattie et al.**

This figure shows the possible disclosure in the financial statements of a lease portfolio of which the *remaining* commitments expire as follows: 50% expires in the first year and the remaining 50% expire in equal parts during years 2 through 7. The remaining life is therefore seven years, the original total life is unknown. The present value of the lease commitments (PVOL) is for all three methods the same (assumed to be 100). When PVOL is calculated at a certain moment in time (here  $t=0$ ), the lease portfolio has already passed some of the total life, and the corresponding present value of the leased asset (PVA) at that moment is assumed to be 80% of PVOL for all methods. Imhoff et al. depreciate in a straight line over the total remaining life of the asset, resulting in a PVA that is higher than PVOL as from year 1. Beattie et al. depreciate in a straight line over the weighted remaining life, which results in a fully depreciated asset after year 3, since some part of the asset is still leased and in use. This study depreciates the asset following the same pattern as the lease repayment schedule, resulting in a PVA that follows the expiry of the lease.



As described before, PVOL is the same for these approaches. If we assume that the leased asset is also equally set at 80% of PVOL for these three studies (see the description of PVA in section 4.5.5), then the three studies have the same starting point. However, to arrive at an estimate of an adjustment of net income, we must estimate the depreciation charge. The method of Imhoff et al. depreciates the leased assets over a straight line until the end of the remaining life, resulting in a correct assessment of depreciation duration. The method, however, ignores the real expiry of the leases and the related assets, which results in an underestimated depreciation charge in the first year. Moreover, the difference between the repayment part of the lease liability and the depreciation charge of the leased asset is too high, which results in a positive effect on net income that is also too high.

Beattie et al. (1998) do make an adjustment that weights the duration of the lease and the related asset, but the asset is still linearly depreciated, resulting in a fully depreciated leased-asset portfolio before the remaining life has actually ended. As shown in Figure 4.3, this increases the depreciation charge in the net-income adjustment, but still underestimates the depreciation charge of the first year. Therefore, to calculate the depreciation charge in this study, we not only depreciate the leased assets over the full remaining life of the assets (as Imhoff et al.), but also take into consideration the real expiry pattern of the leases and the related assets (as Beattie et al.) It is important to realise that the capitalisation of the lease commitments concerns several assets in one lease portfolio. If only one leased asset was under consideration, it could be linearly depreciated. In the annual report, however, information is available only for the entire lease portfolio. By weighting

the depreciation with the expiry pattern of all leases in the portfolio, we follow more accurately the duration of the lease liabilities. Appendix 4.I shows how the three approaches differ, using the Royal Dutch KPN's ("KPN") 2004 annual report.

## 4.6 Summary and conclusions

This chapter described and discussed the capitalisation of operating leases. The purpose of operating-lease capitalisation is to estimate an on-balance equivalent as if the operating lease had been treated as a financial lease or any other form of on-balance debt from its inception. This should improve comparability between companies with and without leases.

Although in the finance literature a consensus has been reached in the theoretical valuation of operating leases, this valuation is too abstract to use with the information available in practice (section 4.3 described the model of Myers, Dill and Bautista (1976)). The most important differences between theory and practice are first, the valuation of one lease at inception of the lease (theory) versus an entire lease portfolio that has expired already for some part (practice), and second, the availability of variables, such as the discount rate or future annual lease payments, which are essential for the calculations.

Section 4.4 divided the seven different capitalisation approaches into the more simplistic multiple methods and present-value methods. Multiple methods consider only the next-year annual payment and are therefore more rigid than the present-value methods, which consider all future lease commitments. Multiple approaches may not have a theoretical background; since analysts and companies use them in practice<sup>45</sup>, however, they will be included in the empirical test of chapter 5.

Present-value approaches are more in line with the theoretical model of Myers, Dill and Bautista (1976). The future lease commitments are divided over future calendar years and are discounted using a(n) (estimated) discount rate. The method of Ely (1995) was the most rigid of these methods because she does not look at the lease expiry of individual companies, but fixes this at 25 years for all companies. She also assumes the lease portfolio to be the same each year, which means that the estimation of the remaining life is not necessary. Imhoff, Lipe and Wright (1991) developed a lease-capitalisation approach based on present values, which was the basis for the two remaining present-value approaches discussed in this chapter: that of Beattie, Edwards and Goodacre (1998), and that of this study. Beattie et al. improved Imhoff et al.'s approach by introducing the weights of each lease-expiry category to calculate a weighted remaining- and total life, and by taking into account the difference between the asset categories 'land and building' and 'other'.

This study enhances the approaches of Imhoff et al. and Beattie et al. with respect to the weights of the different lease-expiry categories. The difference was described in section 4.5, and illustrated in Figure 4.3. These weights were calculated for each individual company (in contrast to Beattie et al., which used base estimates), and have also been used in the calculation of the capitalised leased asset and the depreciation part comprised in the lease commitments. This especially has consequences for the impact in net income of the capitalisation of operating leases. Since Imhoff et al. and Beattie et al. over- or underestimate the depreciation charge

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<sup>45</sup> See Unilever's 2004 annual report



of the leased asset in the adjustment in net income, these approaches are expected to show a bigger impact on net income, as opposed to this study, where the depreciation charge of the leased asset follows the same expiry pattern as the repayment of the lease liability. This is an improvement of the existing lease-capitalisation approaches.

The next chapter calculates the impact on key financial ratios using the seven lease-capitalisation approaches. These results will be used to address the issue of the decision usefulness of the required operating-lease disclosures.

### Appendix 4.I Differences in operating-lease capitalisation approaches

The 2004 annual report of Royal Dutch KPN (“KPN”) serves as an example for the differences in the lease-capitalisation approaches. This example was chosen for two reasons. First, KPN discloses nothing more and nothing less than the minimum required by RJ 292 and/or IAS 17. The operating-lease obligations are disclosed for each of the three lease-expiry categories  $e_1$ ,  $e_2$  and  $e_3$ , expiring within one year, between one- and five years, and beyond five years. Second, KPN has total nominal operating leases obligations of 2,224 million Euros, which is in nominal terms 10% of their total assets (21,519 million Euro). This is a relatively high lease propensity, but not exceptional for Dutch listed companies.

The financial situation of KPN is shown below, including the disclosures of the operating-lease commitments and the thereof calculated weight per lease-expiry category.

#### KPN 2004 financial statement data and leasing footnote

*In million Euros*

	2004	Operating-lease footnote (p. 166, annual report 2004)	
<b>Balance Sheet</b>		<b>Lease-expiry category</b>	
Total assets	21,519	<b>e</b>	<b>CF<sub>e</sub></b>
Total debt	9,442	1	324
Long-term debt	7,792	2	931
Equity	6,821	3	<u>969</u>
<b>Income Statement</b>		<b>Total</b>	<b><u>2,224</u></b>
Net sales	11,731		
EBIT	2,542		
Net income	1,511		
<b>Financial Ratios</b>		<b>Weights per lease-expiry category</b>	
Return on assets	7.0%	<b>e</b>	<b>weight</b>
EBIT/TA	11.8%	1	0.15
Total debt to total assets	0.44	2	0.42
Long-term debt to capital employed	0.53	3	<u>0.44</u>
Total debt to equity	1.38		<b>1.00</b>

The above shows that the calculated weights for each lease-expiry category are respectively 0.15, 0.42 and 0.55. Thus, 15% of the lease liability (PVOL) expires next year. I am of the opinion that also 15% of the leased assets (PVA) should be depreciated next year. Both Imhoff et al. and Beattie et al. depreciated in a straight line (using respectively the total remaining life and the weighted remaining life). The differences this caused in the depreciation charge of the leased assets is shown below, for all seven approaches the differences in capitalisation results are presented. The subsequent change in five financial ratios is shown for illustrative purposes.

COMPARISON OF OPERATING-LEASE CAPITALISATION APPROACHES

**Capitalisation results of seven different approaches**

See for abbreviations and calculations chapter 4. The adjustments to the financial ratios are described in chapter 5.

<b>CAPITALISATION RESULTS</b>		<i>8-rent</i>	<i>UBS Warburg</i>	<i>Multiple- Ely</i>	<i>ILW</i>	<i>BEG</i>	<i>PV -ELY</i>	<i>This study</i>	
<b>multiple</b>		8.0	3.9	8.1	n/a	n/a	n/a	n/a	
<b>PVOL</b>		2,592	1,267	2,624	1,677	1,677	1,557	1,677	
<b>RL</b>		n/a	10.0	n/a	10.0	10.0	n/a	10	
<b>TL</b>		n/a	n/a	25	20.0	n/a	25	20	
<b>wRL</b>		n/a	4.6	n/a	n/a	6.4	n/a	5.8	
<b>wTL</b>		n/a	n/a	n/a	n/a	9.9	n/a	11.5	
<b>AP</b>		n/a	n/a	n/a	0.78	0.91	0.48	0.86	
<b>PVA</b>		2,592	1,267	2,624	1,306	1,528	747	1,438	
<b>Depreciation next year</b>		n/a	276	n/a	131	238	n/a	209	
<b>Interest</b>		156	76	157	101	101	93	101	
<b>Effect on net income</b>		n/a	-18	n/a	60	-10	n/a	9	
<b>Effect on EBIT</b>		n/a	248	167	223	223	231	223	
<b>IMPACT ON RATIOS</b>		<b>reported</b>	<b>8-rent</b>	<b>UBS- Warburg</b>	<b>Multiple- Ely</b>	<b>ILW</b>	<b>BEG</b>	<b>PV- ELY</b>	<b>This study</b>
<b>ROA</b>	7.02%	6.27%	6.55%	6.26%	6.88%	6.51%	6.79%	6.62%	
<b>EBITTA</b>	11.81%	10.54%	12.24%	11.22%	12.12%	12.00%	12.45%	12.05%	
<b>TDTA</b>	0.44	0.50	0.47	0.50	0.49	0.48	0.49	0.48	
<b>LTDCE</b>	0.53	0.61	0.58	0.60	0.59	0.58	0.60	0.59	
<b>TDE</b>	1.38	1.76	1.57	1.77	1.69	1.65	1.75	1.67	
<b>change in ROA</b>		-10.8%	-6.7%	-10.9%	-2.0%	-7.2%	-3.4%	-5.7%	
<b>change in EBITTA</b>		-10.8%	3.7%	-5.0%	2.6%	1.6%	5.4%	2.0%	
<b>change in TDTA</b>		13.8%	7.1%	13.9%	11.0%	9.9%	12.6%	10.4%	
<b>change in LTDCE</b>		14.5%	8.5%	13.3%	10.6%	9.7%	12.1%	10.1%	
<b>change in TDE</b>		27.5%	13.4%	27.8%	22.1%	19.4%	26.2%	20.5%	

PVOL of the leases of KPN vary from a maximum of 2,642 million Euro for the multiple method of Ely to a minimum of 1,267 million Euro for the multiple method of UBSWarburg. Due to the calculation of an average remaining life, USBWarburg's multiple is a more cautious measure than that of Ely and the 8-rent method. However, due to the fact that for KPN the next annual payment is rather low as compared to the expiries after year 1 (see the weights of each expiry category) UBSWarburg in this case underestimates the real liability.

As described in this chapter, due to the identical calculations PVOL is the same for Imhoff et al., Beattie et al. and this study. Due to the high multiplier, the 8-rent method results in a rather high PVOL. The two methods of Ely differ because both ignore the schedule of lease payments of KPN, and Ely assumes for all leases a fixed maturity of 25 years. Therefore, the multiple of Ely is 8.1 (based on an interest rate of 6% and a total life of 25 years), resulting in a high PVOL. On the other hand, due to the distribution of the future commitments over a period of 25 years, the present value is lower than for the other approaches that do take into account the payment schedule. These results show already the rigidity of Ely's approach in assuming a fixed maturity for all leases in the portfolio for all companies and ignoring the remaining life of the leases<sup>46</sup>.

<sup>46</sup> While a maturity of 25 years seems long I will adjust the 25 years to a more reasonable average for companies in the Netherlands in the empirical investigation in chapter 5. This follows the reasoning of Ely who also took a

The weighted remaining- and total lives as calculated by Beattie et al. and using my approach express the differences in weights of each lease-expiry category. Beattie et al. have the disadvantage of needing their generalised base estimates for all lease portfolios of all companies in order to calculate the weighted remaining- and total lives. This is a result of the UK SSAP21 disclosure of an annuity instead of the disclosure of the total commitments as required under IAS17 and RJ292. Therefore, the weights as used in this study's approach take greater account of the individual remaining lives and total lives of each company. With regard to KPN, this has only a limited effect on the calculation of the asset proportion— for Beattie et al. and for this study.

A closer look at the impact on the financial ratios and the difference between the approaches reveals that the relative change is the highest for the ratios based on the balance sheet, using some measure of debt.

## **CHAPTER 5    EMPIRICAL STUDY OF THE USEFULNESS OF OPERATING-LEASE DISCLOSURES**

### **5.1    Introduction**

This chapter rounds off Part II of this thesis, which questions whether the required operating-lease disclosures are useful to the individual user of the financial statements. Chapter 3 described the general, qualitative criteria of decision usefulness as defined by several accounting regulators. These criteria were also described with respect to operating leases. Based on that analysis, the study formulated five research questions to investigate whether the requirements of operating-lease disclosures satisfy the criteria described. Since the estimation of an on-balance equivalent of operating leases (capitalisation) is an important aspect of the decision usefulness of operating-lease disclosures, this estimation was described separately in chapter 4. Different capitalisation approaches are available, and the choice of the capitalisation approach might influence the results of the capitalisation.

Chapter 5 now turns to test empirically the criteria for decision usefulness of operating-lease disclosures using the information available in the financial statements of non-financial Dutch listed companies during the period 2000-2004. The chapter proceeds as follows. Section 5.2 describes the sample and data collection. Section 5.3 describes the methodology and the difficulties arising when financial ratios are investigated empirically. The results appear in section 5.4, followed by the conclusions in section 5.5.

### **5.2    Sample and data collection**

#### **Companies**

The sample consists of all non-financial listed companies at the Amsterdam Stock Exchange during the period 2000-2004. Financial institutions are excluded because they often act both as lessee and lessor (since leasing is a financial product). Nine companies were eliminated due to lack of data, and five others due to the reporting year ending on a date other than December 31st (this has consequences for data collection and analysis). The final sample consists of 584 firm-year observations.

#### **Lease data**

The operating-lease data were manually extracted from the footnotes in the financial statements of the companies in the sample for the period 2000-2004. As described before, no financial database exists that offers sufficient availability of operating-lease data.

#### **Financial ratios**

The study investigates the impact on several financial ratios once operating-lease commitments have been capitalised. Table 5.1 shows the different ratios analysed in this study, and the impact of the lease capitalisation on each particular ratio. The choice for these ratios follows from the previous studies on the impact of operating-lease capitalisation on facilitating comparison. Table 5.1 also shows the expected signs of the operating-lease capitalisation.

**Table 5.1** Definitions of financial ratios analysed

PVA is the capitalised leased asset, PVOL is the capitalised lease liability,  $PV(CF_1)$  is the present value of next year's annual lease payment,  $i$  is the applicable interest rate, EBIT is earnings before interest and tax, and TA is total assets.

FINANCIAL RATIOS		BEFORE-CAPITALISATION	AFTER-CAPITALISATION	SIGN
<b>PROFITABILITY</b>				
Net profit margin	<b>NPM</b>	$\frac{\text{Profit after tax}}{\text{Total sales}}$	$\frac{\text{Profit after tax} + \text{change in Net Income}}{\text{Total sales}}$	+/-
Return on equity	<b>ROE</b>	$\frac{\text{Profit after tax}}{\text{Total share capital and reserves}}$	$\frac{\text{Profit after tax} + \text{change in Net Income}}{\text{Total share capital and reserves} + \text{change Equity}}$	+/-
Return on assets	<b>ROA</b>	$\frac{\text{Profit after tax}}{\text{Total assets}}$	$\frac{\text{Profit after tax} + \text{change in Net Income}}{\text{Total assets} + \text{PVA}}$	+/-
EBIT/TA	<b>EBIT/TA</b>	$\frac{\text{Profit before tax and interest}}{\text{Total assets}}$	$\frac{\text{Profit before tax and interest} + i * \text{PVOL}}{\text{Total assets} + \text{PVA}}$	-
Return on capital employed	<b>ROCE</b>	$\frac{\text{Profit after tax}}{\text{Total capital employed}}$	$\frac{\text{Profit after tax} + \text{change in Net Income}}{\text{Total capital employed} + \text{PVOL} - \text{PV}(CF_1)}$	+/-
<b>LEVERAGE</b>				
Long-term debt to capital employed	<b>LTDCE</b>	$\frac{\text{Long-term debt}}{\text{Total capital employed}}$	$\frac{\text{Long-term debt} + \text{PVOL} - \text{PV}(CF_1)}{\text{Total capital employed} + \text{PVOL} - \text{PV}(CF_1)}$	+
Total debt-asset ratio	<b>TDTA</b>	$\frac{\text{Total debt}}{\text{Total assets}}$	$\frac{\text{Total debt} + \text{PVOL}}{\text{Total assets} + \text{PVA}}$	+
Total debt-equity ratio	<b>TDE</b>	$\frac{\text{Total debt}}{\text{Total share capital and reserves}}$	$\frac{\text{Total debt} + \text{PVOL}}{\text{Total share capital and reserves} + \text{change in Equity}}$	+
Interest cover	<b>IC</b>	$\frac{\text{Profit before tax and interest}}{\text{Interest}}$	$\frac{\text{Profit before tax and interest} + i * \text{PVOL}}{\text{Interest} + i * \text{PVOL}}$	+
<b>LIQUIDITY</b>				
Current ratio	<b>CR</b>	$\frac{\text{Current assets}}{\text{Current liabilities}}$	$\frac{\text{Current assets}}{\text{Current liabilities} + \text{PV}(CF_1)}$	-
<b>TURNOVER</b>				
Total asset turnover	<b>AT</b>	$\frac{\text{Sales}}{\text{Total assets}}$	$\frac{\text{Sales}}{\text{Total assets} + \text{PVA}}$	-

The impact on net income may be positive or negative for individual companies, depending on the remaining life of the lease portfolio and the weights of each lease-expiry category. The signs of the financial ratios that have net income in the numerator may therefore be either positive or negative.

### Interest rate

The implicit interest rate used should ideally be the interest rate applicable to finance leases or the long-term debt for each individual company, “the incremental borrowing rate” (see section 4.5.1, and also IAS17.3, RJ292.102). The long-term borrowing rate was extracted manually from the financial statements of all companies. The interest rate for financial leases was available for only a few companies, also because only a few companies disclose financial leases (for example, 36 companies disclose financial leases, as opposed to 103 disclosing operating leases in 2004; see section 2.6). The interest rate for other forms of debt was available for approximately 98 companies— although the variance between the interest rates is very large. The minimum interest rate disclosed was 2.4% (Pink Roccade) and the maximum was 15% (Alanheri). This indicates that the interest rates disclosed are probably not a reasonable estimate of the credit risk of the company and would therefore not reflect the alternative borrowing rate of these companies. Using these rates would distort the results, since differences in the capitalisation results do not come from differences in credit risk but from an unreliable underlying assumption.

An alternative could have been to link on an objective basis the interest rate to the ratings of the individual companies, as suggested by Damodaran (2001). Damodaran uses a model where the spread above long-term government bonds depends on the rating issued by Standard and Poor's. This would solve the problem of the large variances that might be caused by aspects other than the credit risk of a company. This also was not applicable here, however, since approximately only twenty companies in the sample have a rating from either Moody's or Standard and Poor's.

Therefore, to be able to compare the methods and the differences arising from these methods without the influence of different interest rates, this study uses a fixed interest rate for all approaches and all companies. This is in line with the studies of Ely (1995), Imhoff et al. (1991) and Beattie et al. (1998), for example, who all used a fixed rate of 10%. Nowadays, a discount rate of 10% would be inappropriate, since interest rates have decreased since the '90s. For example, in the Netherlands the average interest rate charged on a ten-year loan in 1991 was 8.74%, while in 2003 this was 4.12% (source: [www.statistics.dnb.nl](http://www.statistics.dnb.nl)). Another example is the decrease in the mean of the Finance House Base rate as used by Beattie et al. The mean for the six-year period 1998-2004 was 5.4%, compared to the 10% mean for the six-year period 1988-1994 used in their study (source: [www.fla.org.uk](http://www.fla.org.uk)). The average interest rate in 2003 of the 98 companies available in the total sample is 5.8% (median: 5.6%). This is also a reasonable estimate of the long-term debt rate in the Netherlands during the research period. The interest rate is therefore fixed at 6% for all companies during the entire research period. The sensitivity to this assumption will be tested by varying the interest rate by +/- 2%.

## **5.3 Methodology**

### **5.3.1 Research questions related to the use of the sample**

This chapter empirically tests different criteria of decision usefulness. Five research questions were formulated in chapter 3. These are repeated in Table 5.2, together with the requirements that the operating-lease information should fulfil in order to be relevant (RQ1 and 4), neutral (RQ2), complete (RQ3) or comparable (RQ4 and 5). The appropriate part of the sample is included in Table 5.2.

**Table 5.2 Research questions**

SECTION	RESEARCH QUESTION	REQUIREMENTS	SAMPLE
<b>RELEVANCE</b>			
5.4.3	1 Are the amounts material and thus relevant?	Materiality is tested by three different tests (see Table 3.1): 1) PVOL exceeds 5% of total assets 2) PVOL exceeds 25% of long-term debt 3) Annual lease payment (AP) exceeds 20% of total capital costs	Companies for which PVOL or AP is available, including the companies that disclose PVOL themselves as well as non-leasing companies (PVOL=0)
<b>RELIABILITY</b>			
5.4.1	2 Do companies with operating leases comply with the footnote disclosure rules? (neutrality)	Operating-lease disclosures are neutral if all companies disclose according to RJ292/IAS17, since the standard leaves no room for different ways of presentation.	All companies in sample
5.4.4	3 Is the information required by the lease-accounting standard sufficient to permit informed users to estimate the consequences of operating leases? (completeness)	Because financial statement users must make assumptions on interest and remaining life, and must choose a capitalisation approach, the disclosed information is by definition not complete. If PVOL is not sensitive to these assumptions, however, the information provided is sufficient.	Companies for which PVOL had to be calculated, <i>excluding</i> companies that disclose PVOL themselves and the non-leasing companies
<b>COMPARABILITY</b>			
5.4.5	4 Are key financial ratios affected? (comparability and materiality)	Material operating-lease commitments are likely to change also in a material way the financial ratios derived from the balance sheet. If these financial ratios change significantly, this will threaten both the comparability criteria and the relevance criterion (material change in ratios used in decision-making).	Companies for which PVOL is available, including the companies that disclose PVOL themselves and the non-leasing companies (PVOL=0)
5.4.5	5 Does the capitalisation of operating leases change the ranking between companies? (comparability)	Does it matter for the ranking of the companies whether the operating leases are either ignored or capitalised? If it does, then the information provided should be more consistent and complete (reliability) to enable the user to capitalise the leases easily.	

The research questions apply to different parts of the dataset, as shown in Table 5.2. Research question 1 is only feasible for those companies for which PVOL is available (tests one and two), or the annual payment is available (test three). PVOL is not available for all companies. Research question 2 analyses for how many companies of the total sample the capitalisation of the lease-commitments is possible (PVOL is known), and consequently for how many companies PVOL is not available. Subsequently, the sensitivity of PVOL to the assumptions or capitalisation methods applies, of course, only to those companies for which PVOL was calculated. Research question 3 therefore excludes companies that disclose PVOL themselves or where PVOL=0 (the non-leasing companies). The PVOL of these companies is not sensitive to any of the assumptions and would therefore distort the tests. Finally, research questions 4 and 5 include all companies for which PVOL is known, even the companies that disclose PVOL themselves and the non-leasing companies. It can be argued that inclusion of the non-leasing companies lowers the impact of lease capitalisation on financial ratios, but inclusion of these companies (especially, comparing them based on their ranking) is more reliable. Since for the non-leasing companies the financial ratios have not changed, they improve, compared to high-leasing companies that were equally ranked before capitalisation. The comparison between companies based on their ranking is more



reliable than the comparison based on their percentage change. This is described in greater detail in the following sub-section, which describes the usage of financial ratios in statistical tests.

### 5.3.2 Comparison of financial ratios

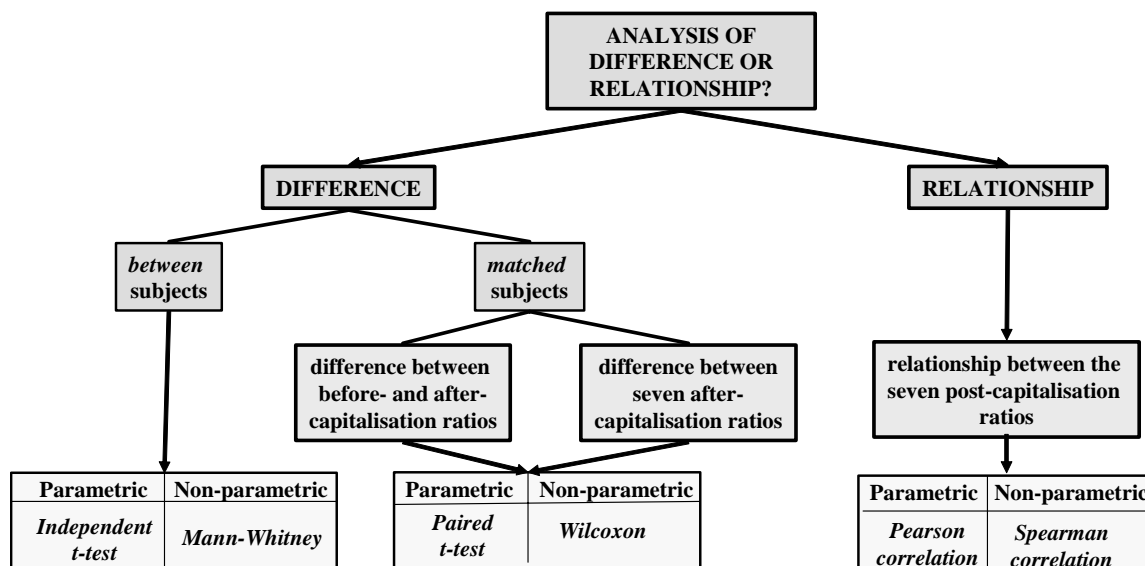
Several methodological studies (Lev and Sunder (1979), Barnes (1987), Whittington (1980), Ionnidis, Peel and Peel (2003), for example) have explored the usage of financial ratios in accounting research. Whittington (1980) identifies two uses of ratios: normative and positive. The normative use is for the measurement of performance in relation with a certain standard. The positive use is in estimating an empirical relationship for predictive purposes. The positive use of ratios in accounting research will be addressed in chapters 6 and 7, which investigate the relationship between company characteristics and operating-lease intensity; chapters 8 and 9 investigate the predictive power of operating leases in financial-distress prediction. The normative use of financial ratios compares a calculated ratio with a standard (Whittington (1980)). This comparison leads to a conclusion whether the calculated ratio is high or low, compared to the standard. The standard may have a theoretical foundation, may be based on the same historical ratio of the studied companies, or may be the ratio of another firm for comparison reasons. The different statistical models available for the normative (comparison) or positive (predictive) use of financial ratio require different statistical properties of the underlying data.

While section 5.4 focuses on the comparison of accounting numbers that are either adjusted or not for operating-lease commitments, this section is a normative study. This chapter compares each financial ratio for each company before- and after-capitalisation of the operating leases. The comparison can be made using the arithmetic mean or the median. Whereas the mean is affected by ‘extreme’ values, however, the median is not, as it takes into account only the rank order of the observations. Tests based on the variances between the data (mean-test) are parametric tests; tests based on the rank order of the observations (median-test) are non-parametric tests. Parametric tests are considered to be more powerful because they not only take into account the rank order of the observations but also are able to calculate the variances. However, a parametric test is only applicable when the data satisfy the assumptions on which parametric tests are based:

- 1) Interval measurement; the data should have equal intervals; financial ratios, which are numerical measures, must have equal intervals in order to permit a parametric test to be conducted
- 2) Normal distribution; the data should be normally distributed in order that the extreme values do not overly influence the test. Distributions with extreme values at one end are skewed, and when the distribution is substantially skewed (the hypothesis of a normal distribution is rejected), a non-parametric test is preferable. Since financial ratios are known to have a skewed distribution and often do not have a normal distribution (Barnes (1987)), it is therefore very likely that a parametric test cannot be conducted.
- 3) Homogeneity of variance; the variance of the data should be equally distributed. Since the financial ratios are compared for the same companies pre- and post capitalisation (paired samples), this requirement of homogeneity of variance will probably be met.

The difference-tests conducted in this study therefore depend greatly on the statistical properties of the data. Figure 5.1 shows which test will be applicable when these statistical properties are known (based on figure 11.1 of Burns (2000)).

Figure 5.1 Type of experimental design in hypotheses of differences



Comparable studies analysing the impact of operating leases use different tests. In a study analysing the impact on three ratios for a sample of 80 companies, Imhoff, Lipe and Wright (1995) focussed on the medians instead of means because of the impact of extreme observations. They therefore used Spearman rank correlations instead of the Pearson correlations. Ely (1995) analysed the sensitivities to certain assumptions by using both the Pearson and Spearman correlations, but did not perform a differences analysis. Beattie et al. (1998) focussed on the differences in mean between the pre- and post capitalisation ratios; they only report the results of the paired t-test. They did acknowledge, however, the non-normal distribution of many ratios (see footnote on p.245), and mentioned that the Wilcoxon non-parametric test produced results of greater significance. Goodacre (2001) conducted a similar study based on the previous Beattie et al. (1998) study (in which Goodacre participated); this time, he did focus on the differences in medians and the significance according to the Wilcoxon test instead of the paired t-test.

This study presents the results of the differences in both means and medians. However, based on the above, the focus will be on the differences in medians. The analysis will be completed by showing the results of the impact on some of the financial ratios for the individual companies. Although statistical tests are certainly valuable in analysing the impact on the entire sample, analysis of the impact on individual companies might add insights that are valuable also from an economics perspective.

## 5.4 Results

This section presents the results of the empirical analysis. The disclosure of the operating leases by the companies in the sample will first be described. Toward that end, sub-section 5.4.1 tackles research question 2, which addresses the neutrality of the operating-lease disclosures by the companies in the sample. Subsequently,

section 5.4.2 describes the capitalisation results of those companies for which the PVOL was available. Section 5.4.3 addresses the materiality of the operating-lease commitments. The results of the sensitivity tests are presented in section 5.4.4. Finally, section 5.4.5 shows the impact of the capitalisation of the operating leases on the financial ratios. Starting from section 5.4.4, the companies that did not comply with RJ292/IAS17, or did not disclose PVOL themselves, are excluded from further analysis because the capitalisation becomes unreliable due to ungrounded estimations.

#### 5.4.1 Neutrality

As described in chapter 2, the financial statements of the companies in the sample revealed eight different disclosure formats, of which only three comply with RJ292 or IAS17. In chapter 2, Table 2.4 showed these eight different formats of operating-lease disclosure and the informativeness of each format. Table 5.3 presents how the companies in the sample used these formats during the research period. Also it shows how many companies did not disclose operating leases at all.

**Table 5.3 Compliance with RJ292/IAS17 from 2000-2004**

For an example of each disclosure type, see Table 2.4 in chapter 2.

#	Disclosure	2000	2001	2002	2003	2004	Total sample
0	No leases	23	22	15	11	6	77
1	As FAS13	17	19	20	22	19	97
2	Less than FAS, more than RJ	1	2	3	4	4	14
3	As RJ292/IAS17	21	25	35	44	44	169
4	Present value of leases	5	5	6	5	5	26
5	Total commitment	15	12	10	6	6	49
6	Annual payment with indication of remaining life	17	15	13	8	8	61
7	Annual payment	10	11	8	8	4	41
8	Other (combinations of other formats)	9	8	9	11	13	50
	N=	118	119	119	119	109	584

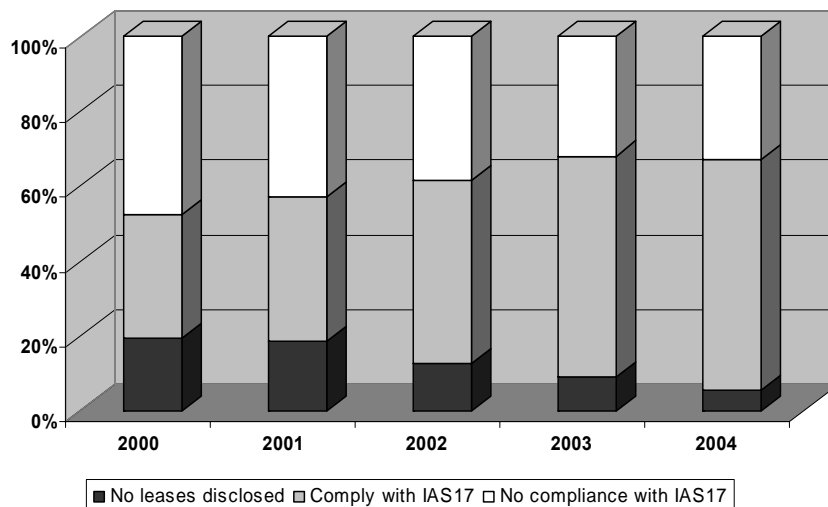
Table 5.3 allows us to conclude that the number of companies disclosing operating leases has increased. In 2000, 23 companies out of 118 did not disclose operating leases; in 2004, this decreased to 6 out of 109 companies. Furthermore, the disclosure according to *at least* RJ292/IAS17 (format types one, two and three) for the remaining companies with leases increased substantially from 39 out of 95 (41%) in 2000, to 66 out of 103 (64%) in 2004. This increase is especially attributable to companies previously disclosing only the annual payment or the lump-sum total commitment. Although this is definitely an improvement of the compliance with the lease-accounting standard, it remains indisputable that in 2004, still 36% of the companies in the sample were not complying with the accounting standard.

Figure 5.2 shows that indeed the companies with no operating leases disclosed become a small minority (dark grey area) in the sample, and also that the companies in compliance increase relatively (light grey area). However, in 2004 still 33% of the companies of the entire sample (n=109) do not comply (white area) with the accounting standards. Relating this number to the companies that disclose operating leases (n=103), this is still 36%. For these companies, the capitalisation of

the operating-lease commitments cannot be performed, since the necessary information is unavailable.

**Figure 5.2** Division of companies in sample in compliance with RJ292/IAS17

The companies in the sample each year are: 2000: 118; 2001 until 2003:119; 2004:109



The great number of companies not complying with the accounting standard (which leaves no room for misinterpretation) permits us to conclude that although the standard itself is neutral, this neutrality is harmed by the lessee companies (and their auditors). Moreover, for more than one-third of the companies in the period 2000-2004, the disclosed operating-lease information, as a consequence of being not complete, is neither reliable nor comparable. Furthermore, the analysis of whether or not the operating leases of these companies are material remains inconclusive. The non-compulsory character of the Dutch accounting regulation until now has probably caused compliance with the standard to be of lower priority. Once the two new laws with respect to the regulatory supervision of auditors (WTA) and financial reporting (WTFV) come into effect (see chapter 2), non-compliance will probably decrease— also because the auditors will be held liable for non-compliance<sup>47</sup> (Lückerath (2006)).

Nevertheless, the data until year-end 2004 suggest that the answer to research question 2 (*Do companies with operating leases comply with the footnote disclosure rules?*) is that the non-compliance of more than one-third of the companies renders the operating-lease information in the financial statements non-neutral.

#### 5.4.2 Capitalisation results

Since not all companies disclose as required by RJ292/IAS17, it is not possible to capitalise the operating-lease commitments for these companies using present-value approaches. The present value of the lease commitments is therefore calculated only for the remaining companies. The results of the capitalisation appear in Table 5.4.

<sup>47</sup> When investigating the involved auditors of the companies that did not comply with RJ292 in 2004, two results were striking. First, of the six financial statements *not* audited by a big four auditing firm (PriceWaterhouseCoopers, Ernst and Young, KMPG and Deloitte) only one complied with the standard. Second, of the remaining 97 financial statements with operating leases and audited by one of the big four auditing firms a 64 complied with the standard. However, this majority is caused by especially PWC of which auditing firm only four out of 27 did not comply.

**Table 5.4 Description of capitalisation results**

Panel A shows the relative usage of operating leases for the entire sample (including the non-leasing companies), and for the sample excluding the non-leasing sample. PVOL/TA refers to the capitalised value of the future lease commitments divided by total assets (to control for size), PVA/TA refers to the capitalised leased assets divided by total assets (before capitalisation). Panel B shows the different weights for each of the three lease-expiry categories (lease commitments due within one year, between two- and five years, and after five years). Panel C shows the impact of the capitalisation on total debt, total long-term debt, total assets and net income.

		EXCLUDING NON-LEASING COMPANIES		INCLUDING NON-LEASING COMPANIES	
<b>PANEL A: PVOL and PVA</b>		PVOL/TA	PVA/TA	PVOL/TA	PVA/TA
	N=	302	292	379	369
<b>mean</b>		17.8%	10.6%	14.2%	8.4%
<b>median</b>		6.3%	5.5%	4.3%	3.6%
<b>PANEL B: WEIGHTS PER LEASE-EXPIRY PERIOD</b>					
		< 1 year	1 year < > 5 years	> 5 years	
<b>mean</b>		0.26	0.52	0.23	<b>RL</b> <b>TL</b>
<b>median</b>		0.24	0.52	0.22	8            16
					7            14
<b>PANEL C: CHANGE IN TOTAL (LONG-TERM) DEBT, TOTAL ASSETS AND NET INCOME</b>					
<b>Excluding non-leasing companies</b>		<b>N</b>	<b>Reported</b>	<b>After capitalisation</b>	<b>% Change</b>
<b>Total debt</b>		277			t-value/z-value
<b>mean</b>			1,712,845	2,101,626	22.7%
<b>median</b>			159,150	231,281	45.3%
<b>Long-term debt</b>		273			
<b>mean</b>			1,199,513	1,509,328	25.8%
<b>median</b>			98,579	164,369	66.7%
<b>Total assets</b>		278			
<b>mean</b>			6,473,178	6,802,590	5.1%
<b>median</b>			868,083	945,535	8.9%
<b>Net income</b>		277			
<b>mean</b>			288,007	292,140	1.4%
<b>median</b>			12,287	13,025	6.0%

Panel A in Table 5.4 shows the capitalised lease liability (PVOL) and the capitalised leased asset (PVA), divided by total assets to correct for size differences between companies. PVOL/TA and PVA/TA are calculated twice, once excluding the non-leasing companies and once including them. Of course, excluding the non-leasing companies lowers the average impact that the capitalisation has on the balance sheet. By presenting both measures, the impact for the entire sample is evident, as is the impact the operating leases have for only the leasing companies.

Panel B of Table 5.4 shows the mean- and median values of the lease-expiry weights, and the remaining- and total lives of the lease portfolios. The mean and median of the weights differ only slightly. From the numbers we can conclude that the lease portfolios for the sample consist of approximately 75% of leases expiring within the next five years. The average remaining life is seven years, and the average total life (assuming that 50% of the lease term has expired) is fourteen years. For the companies in the sample, lease portfolios are seldom with a very long maturity. These results differ somewhat with those of Ely (1995), who estimated an average total life of 25 years of the lease portfolios in her sample of Australian companies. The results also differ from those of Beattie et al. (1998), who estimated for their UK sample base remaining- and total lives of respectively 16 and 25 years for the 'land and buildings' category, and seven and ten years for the 'other assets' category. However, when we assume these categories to be mixed 50:50 for the Dutch situation, the average total life of Beattie's estimates would become 17.5

years (25 plus 10, divided by 2), which is more in line with the current sample. The remaining lives, even when averaged, are definitely shorter in the Netherlands, moreover, as in this study the same basic approach in calculating the remaining lives is used as Beattie et al. did for the US companies in their sample.

Panel C of Table 5.4 presents the impact on total debt, long-term debt, total assets and net income only for those companies for which PVOL could be calculated and was not zero. The *t*- and *z*-values of the differences in mean and median before- and after capitalisation are also presented. All numbers increase significantly at the 10% level. Concentrating on the changes in the median, it is clear that the highest impact is on the leverage of a company, since long-term debt increases by 67% and total-debt by 54%. The increase in the median of total asset is 9%, and of net income it is 6%. Section 5.4.5 describes how this applies to the financial ratios derived from these numbers.

In order to see whether these numbers vary between different industries, Table 5.5 illustrates the division of the two samples (including and excluding the non-leasing companies) over five industries: industrials, consumers, services, information technology, and resources.

**Table 5.5 Mean and median of PVOL/TA for five industries**

	PVOLTA					
	All companies	All	Industrials	Consumer	Services	IT
N=	379	143	65	110	50	11
mean	14.2%	8.3%	4.4%	27.2%	17.5%	4.4%
median	4.3%	1.8%	2.3%	9.8%	7.4%	3.8%
<b>Excluding non-leasing companies</b>	<b>302</b>	<b>96</b>	<b>51</b>	<b>99</b>	<b>45</b>	<b>11</b>
mean	17.8%	12.3%	5.6%	30.2%	19.4%	4.4%
median	6.3%	6.3%	3.0%	10.1%	8.1%	3.8%

The sector with the highest lease commitments is definitely the services sector, based on both the mean- and median values. This is closely followed by the IT-sector. The high proportion of non-leasing companies in the industrials sector lowers the mean and median in the total sample. However, the industrial firms that disclose leases (excluding the non-leasing companies) seem to lease higher amounts than firms in the consumer and resources sectors do. Concerning the determinants of lease intensity, chapters 6 and 7 further explore the relation with the industry sector.

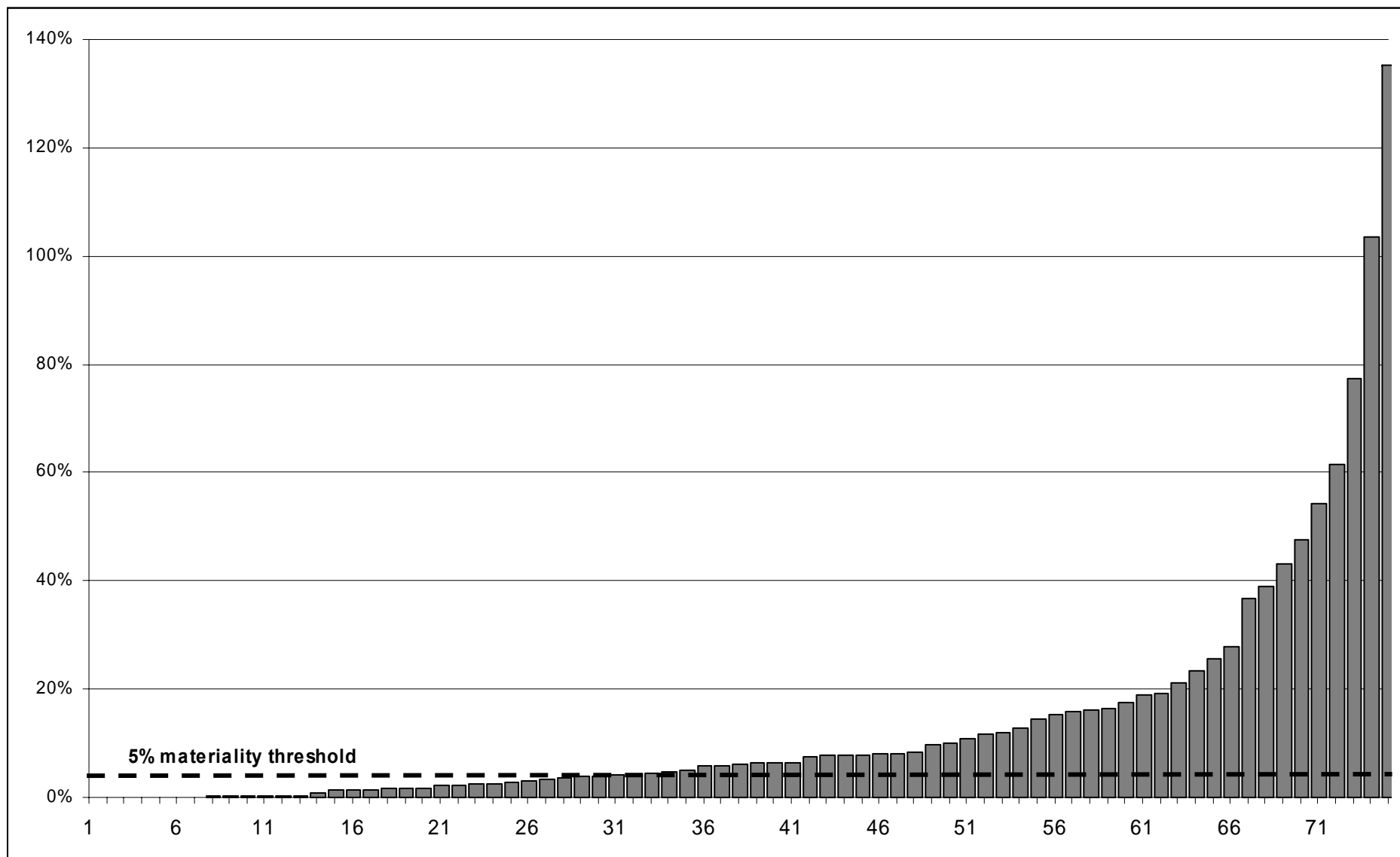
The difference between the mean and median of PVOL/TA for all companies shows the skewed distribution of the relative lease commitments. Although many companies do not lease substantial amounts (lowering the median), the companies after the median do lease substantially higher amounts, resulting in a higher mean. Ignoring the commitments of these companies would probably cause a misjudgement of the financial commitments of the individual companies. To illustrate this skewed distribution of PVOL/TA, and to show how the high-leasing companies influence the mean values, Figure 5.3 shows PVOL/TA in 2004 of the 75 companies for which PVOL was available. Recall that for the other listed companies in 2004 the information was not complete enough to calculate PVOL. Their absence

in Figure 5.3 does not mean that these companies might not be high-leasing companies.

Figure 5.3 reveals that although for a (small) majority of the companies PVOL/TA is less than 5%, the relative operating-lease commitments for the remaining companies increase rapidly. The maximum PVOL/TA is calculated for Tie Holdings, with a PVOL of 135% of total assets. The numbers two and three (Macintosh:104% and Laurus:77%) are rather surprising, considering that these belong to the five companies that disclose the present values themselves. An explanation for this may be that they are very much aware of their high commitments and do try to avoid a too-high capitalisation by other capitalisation approaches.

Section 5.4.3 presents the results with respect to the relevance of the lease commitments, based on the materiality of the amounts and the impact this has on key financial ratios.

**Figure 5.3 Illustration of PVOL (as a percentage of total assets) for 75 companies in 2004**  
 (including non-leasing companies and companies disclosing PVOL)





### 5.4.3 Relevance

#### Materiality

To test the materiality of the disclosed operating leases, three materiality tests with corresponding threshold values were formulated in chapter 3 (see also Table 3.1). The lease commitments are considered to be of a material amount if the capitalised lease liability (PVOL) exceeds 5% of total assets (TA), or 25% of long-term debt (LTD), or if next year's annual lease payment exceeds 20% of the total capital costs as defined by Sharpe and Nguyen (1995)<sup>48</sup>. The results of these tests are shown in Table 5.6.

**Table 5.6 Materiality of operating-lease commitments**

Three materiality tests were conducted. Test I is the percentage of the present value of all future lease payments of reported total assets (PVOL/TA) as a materiality measure. The threshold value is 5%. Test II uses the percentage of the present value of all future lease payments of reported long-term debt (PVOL/LTD) as a materiality measure. The threshold value is 25%. Test III uses the percentage of the annual lease payment to the total costs of capital (AP/TCC). The total capital costs are not the weighted average costs of capital, but the costs associated with the use of fixed assets (Sharpe and Nguyen (1995, p.278)), and are calculated as the sum of rental commitments, depreciation expenses and the opportunity costs of fixed assets (interest times net property, plants and equipment). The threshold value is 20%.

	PVOL/TA>5%	PVOL/LTD>25%	AP/TCC>20%
N=	379	321	439
mean	14.2%	307.5%	27.2%
1st quartile	0.5%	3.9%	4.3%
median	4.3%	27.4%	20.7%
3rd quartile	12.1%	120.9%	45.7%
Exceeding threshold	172	167	224
	45%	52%	51%

Although the materiality tests do not show identical results, they are quite similar, and it can be concluded that the lease commitments are for many companies of a material amount<sup>49</sup>. The highest scores arose from the second test (PVOL/LTD): at least 52% of all observations exceeded the threshold. With the first materiality test, (PVOL/TA) 45% of all observations exceeded the threshold. The third test (AP/TCC) resulted in 51% of the companies exceeding the threshold. The advantage of this test was that more companies were taken into account; the test makes it possible to test the materiality for those companies that disclose only the annual commitment of next year. Due to the fact that in the total 2000-2004 sample 77 observations relate to non-leasing companies and that only six of these observations relate to 2004, these results are even higher for 2004 (54% exceeds PVOL/TA>5%, 61% exceeds PVOL/LTD>25% and 54% exceeds AP/TCC>20%). This demonstrates the ever-growing importance of operating leases.

These tests reveal that the operating-lease commitments for the majority of the companies account for more than 25% of the companies' long-term commitments. Even using the more cautious materiality tests, for 45% of the companies the operating leases are still of a material amount. Also, considering the exponential increase in relative commitments (PVOL/TA) after the median in 2004 (as shown in

<sup>48</sup> The total capital costs as defined by Sharpe and Nguyen (1995) are the costs associated with the used of fixed assets and do not relate to the usual explanation of total capital costs as the weighted average costs of capital.

<sup>49</sup> A fourth materiality test based on the annual payment divided by net income, as suggested by De Bos (see chapter 3) would result in 50% exceeding the threshold of 10% (median 9.9%).

Figure 5.3), one may conclude that for the majority of the companies the operating leases are of a material amount and cannot be ignored in the financial analysis.

Therefore, the answer to research question one, “*Are the amounts material?*”, is for many companies affirmative, which renders the information of the operating leases of these companies as relevant.

#### 5.4.4 Reliability

Two criteria of reliability, neutrality and completeness, are tested in this chapter. Neutrality was described already in section 5.4.1, which showed the results of compliance with the standards. Therefore, this section investigates whether the information required by RJ292/IAS17 is sufficiently complete. As mentioned before, the capitalisation of operating leases requires the user to make assumptions on the interest rate and the remaining- and total life of the lease portfolio. The user can also choose from different capitalisation approaches, from simplistic rules-of-thumb (such as the 8-rent multiple method) to more sophisticated present-value approaches. This section presents the results of the sensitivity to the assumptions and to the capitalisation approaches. The sensitivity tests are only applicable to those observations for which capitalisation was executed. This means that for this analysis both the non-leasing companies as well as the companies disclosing the present values themselves are excluded. Since PVOL of these observations is fixed and is therefore not sensitive to any of the assumptions, their inclusion would distort the results. Before the empirical results are presented of the sensitivity to the assumptions, it will first be illustrated by a simplified example.

##### I. Illustrative example of sensitivity to assumptions

Figure 5.4 shows the sensitivity of the capitalised lease liability (PVOL) and the capitalised leased asset to three assumptions: the interest rate, variances in the remaining life and the variance in the relation between the remaining life and the total life.

Using a simplified example, Figure 5.4 illustrates the relation of PVOL and PVA to the above-described assumptions. The total nominal operating-lease commitment used in Figure 5.4 was 100 (this allows the representation of percentages of PVOL and PVA), and this was divided over the lease-expiry categories by using the median weights as shown in Table 5.4 (respectively, 24%, 52%, 24%). In the base-case scenario, the interest rate was 6%, the remaining life was seven years (calculated as described in chapter 4<sup>50</sup>) and the total life was twice the remaining life. The last assumption leads to an asset proportion of 91%, (PVA is 0.91\*PVOL)<sup>51</sup>. This resulted in the base-case scenario of PVOL and PVA being respectively 81.6% and 74.1%. The interest rate was varied from 3% to 10%. The remaining life was varied by extracting

<sup>50</sup>  $RL = 5 + \frac{CF_{e=3}}{CF_5}$ , where  $CF_{e=3}$ , is the lump-sum lease commitments of the third lease-expiry category, i.e. expiring

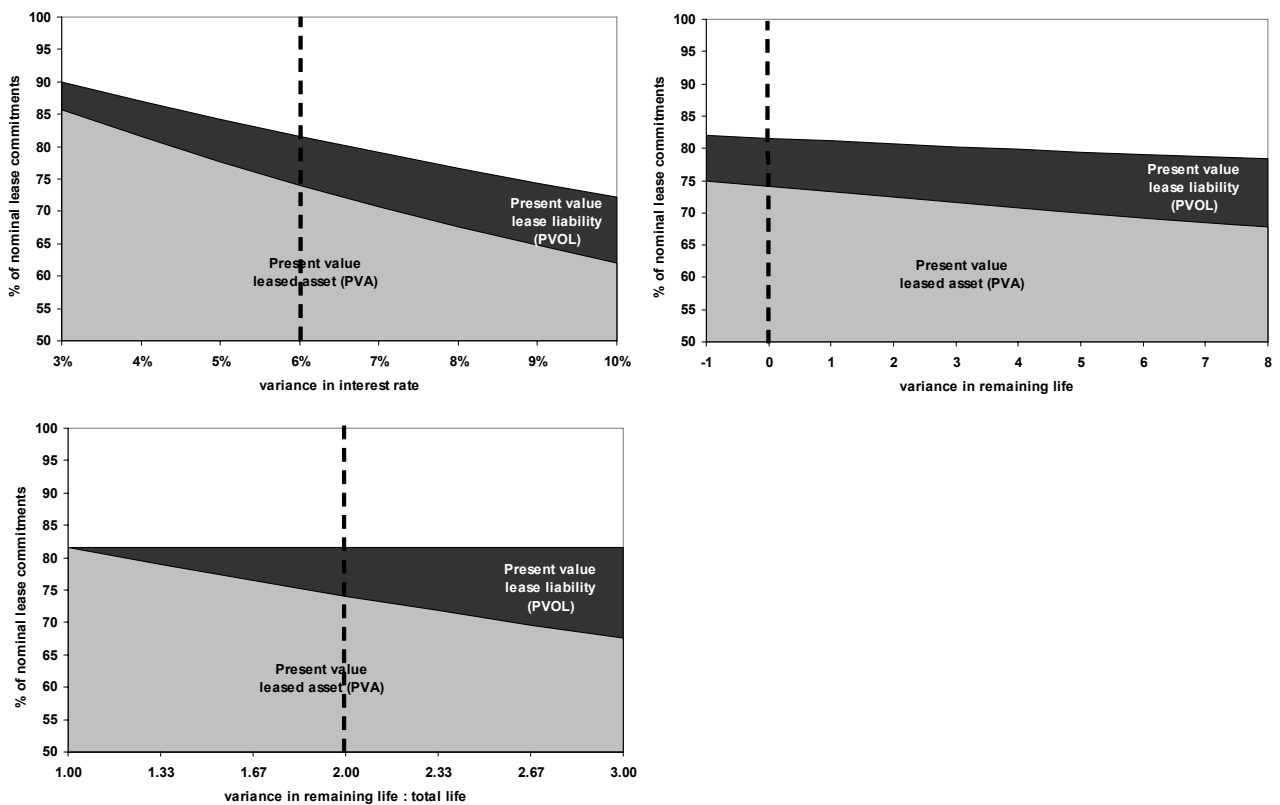
after year 5, and  $CF_5$  is the lease commitment of year 5.

<sup>51</sup>  $AP = \frac{RL * \left( \frac{1 - (1+i)^{-RL}}{i} \right)}{TL * \left( \frac{1 - (1+i)^{-TL}}{i} \right)}$

one year<sup>52</sup> and by adding years one through eight. The relation between total life and remaining life is varied by total life is equal to the remaining life (TL=1\*RL) to total life is three times the remaining life (TL=3\*RL).

**Figure 5.4 Illustration of sensitivity to variance in interest rate (top left), remaining life (top right) and total life related to remaining life (bottom left)**

The three graphs in this figure illustrate the sensitivity of the present value of the lease liability (PVOL) and the present value of the leased asset (PVA) to three of the assumptions. The base case (indicated in each graph by the dotted line) is an operational lease with 100 nominal commitments, an interest rate of 6%, a remaining life of seven years (based on a division of the lease-expiry categories of respectively 24%, 52%, and 24%), which was assumed to be 50% of total life (lease halfway expiry). This resulted in PVOL being 82 and a related PVA of 74 (chapter 4 describes the calculations). The sensitivities of these base-case values are illustrated by varying 1) the interest rate between 3% and 10% (top left graph), 2) the calculated remaining life with minus one and plus eight years (top right graph) and 3) the relation between the remaining life and total life from 1:1 (remaining life is total life, lease has just begun) to 1:3 (remaining life is 33% of total life, 67% has expired) (bottom left graph).



### sensitivity to variance in interest rate

A change in the interest rate definitely has an impact on both PVOL and PVA. For example, if the interest is varied by -2% and +2%, (i.e. 4% and 8%, which are still reasonable discount rates to be used), then PVOL and PVA increase to respectively 87.1% and 81.5% of the nominal commitment for the decrease in the interest rate, and decrease to respectively 76.7% and 67.6% of the nominal commitment for the increase in the interest rate.

<sup>52</sup> Extracting more years was not possible, since the estimated remaining life was seven years; extracting more than one year would lead to a remaining life of less than five years, which does not match with lease commitments expiring after year five.

### **sensitivity to variance in the remaining life**

The impact on a change in the assumption on remaining life seems to be less apparent. A decrease of the remaining life by one year resulted in respectively an increase of PVOL and PVA to 82.1% and 75.0% of the total nominal commitment. On the other hand, an increase of the remaining life by one year leads to a decrease of PVOL and PVA to 81.1% and 73.2% of the total nominal commitment. To achieve a similar decrease in PVOL as the change in interest rate caused, the remaining life should be increased by more than eight years<sup>53</sup>.

### **sensitivity to variance in the relation between remaining life versus total life**

The relation between PVOL and PVA, the asset proportion, depends on the assumption made about how much of the total life has expired. In both Imhoff et al. and this study it was assumed that the leases are halfway through their expiry period, and that the total life of the lease portfolio is twice the remaining life ( $TL = 2 \cdot RL$ ). Varying this assumption has no consequences for PVOL, but only for PVA, because it determines the relation between these two. In the last graph of Figure 5.4 PVOL remains at the level of the base scenario (i.e. 81.6%). If we assume that the remaining life is equal to the total life (the lease portfolio has just commenced), PVA is equal to PVOL<sup>54</sup>. If total life is three times the remaining life (thus, 67% has expired), then PVA decreases to 67.5%. Recall that the differences between PVA and PVOL accrue during the life of the lease due to the differences between the depreciation of the asset and the repayment of the liability. Figure 5.4 makes this clear.

Although the graph with a variance in the interest rate shows the highest impact on the capitalised values, it cannot be concluded from this that the sensitivity is the highest for variances in the interest rates. Such a conclusion can only be made if the variances between the assumptions can be compared with one another—for example, if it can be argued that a change in the interest rate of one percent is as likely to occur as a change in the remaining life of one additional year. However, Figure 5.4 allows a preliminary conclusion that the disclosure of the (average) interest rate implicit in the lease portfolio will allow a more precise capitalisation of the operating-lease liabilities by the users of the financial statement.

## **II. Empirical test of sensitivities**

### **Sensitivities to assumptions**

Table 5.7 shows the empirical results of sensitivities to the three abovementioned assumptions. Section 5.2 described the arguments used in the choice of a fixed 6% interest rate. In this section, the interest rate will be varied with plus and minus two percent, i.e. 4% and 8%. The sensitivity to the remaining life is tested by varying the remaining life for each company with plus or minus two years. Finally, for each company it was assumed that

<sup>53</sup> An increase of the remaining life by eight years resulted in a decrease of PVOL and PVA to respectively 78.3% and 67.8% of the nominal lease commitments.

<sup>54</sup> See also Figure 4.2 in chapter 4, which showed that PVA at the inception of the lease is equal to PVOL.

the total life is twice the remaining life (TL = 2\* RL). The sensitivity of this assumption is tested by varying the maturity expired as opposed to maturity remaining. This assumption is varied by using a relation of a) TL= 1.33 \* RL (meaning 25% of the lease has expired, 75% still outstanding) and b) TL=3 \* RL (meaning 67% of the lease has expired, 33% still outstanding).

**Table 5.7 Sensitivity to interest rate and remaining- and total lives of lease portfolio**

Three sensitivities of the underlying assumptions of PVOL and PVA (both related to total assets, in order to control for size difference) are tested: First is sensitivity to the interest rate. The interest rate in the base model was 6%. In the sensitivity test, this interest rate is varied by plus and minus two percent (i.e. 4% and 8%). Second, sensitivity to the total life compared to the remaining life is tested. The base model uses a relation of TL= 2\* RL, meaning the lease portfolio is 50% expired and 50% still outstanding. This assumption is varied by using a relation of first, TL= 1.33 \* RL (meaning 25% of the lease has expired, 75% is still outstanding) and second, TL=3 \* RL (meaning 67% of the lease has expired, 33% is still outstanding). Third, sensitivity to the remaining life is tested by varying the remaining-life assumption. The base model assumes that the lump-sum payment after year five is divided equally over the future years, using the lease payment of year five; the sensitivity to this assumption is tested by adding or distracting to this assumption two years.

	INTEREST RATES			TOTAL LIFE vs. REMAINING LIFE				REMAINING LIFE				
	i=4%	i=6%	i=8%	TL=1.33RL	TL=2RL	TL=3RL		RL-2	RL	RL+2		
<b>PVOL/TA</b> n=276												
mean	16.3%	15.2%	14.1%	***	15.2%	15.2%	15.2%	no impact	15.3%	15.2%	15.0%	***
median	6.4%	6.0%	5.7%	***	6.0%	6.0%	6.0%	no impact	6.0%	6.0%	6.0%	***
<b>PVA/TA</b> n=278												
mean	10.3%	9.3%	8.4%	***	10.0%	9.3%	8.4%	***	9.5%	9.3%	9.1%	***
median	5.6%	5.1%	4.5%	***	5.4%	5.1%	4.4%	***	5.1%	5.1%	4.9%	***

Table 5.7 shows that the capitalisation of the operating leases is most sensitive to the interest assumption. As described before, the assumption on how much of the lease life has expired has no influence on PVOL. As expected (see Figure 5.4), the increase or decrease in the remaining life has less of an impact than a change in interest on PVOL/TA. The changes in PVA/TA follow mainly the changes in PVOL/TA, except for the assumption on the relation between total- and remaining life. Whereas this has no influence on PVOL/TA, it does affect PVA/TA, due to the impact that depreciation has on the leased asset. All impacts were statistically significant at the 1% level.

### Sensitivity to chosen capitalisation approach

Normally, the sensitivity to the chosen capitalisation approach should be tested without adjusting these approaches; however, some of the assumptions made by the researchers cannot be maintained, due to the differences in data. The adjustments described below do not alter the rationale behind the approaches.

#### *Remaining life and total life by Beattie et al.*

The weighted remaining life used by Beattie et al. requires the distinction between the two asset categories 'land and buildings' and 'other'. The distinction is not required by RJ292/IAS17, and this information is therefore not available for the companies in the sample. To be able to calculate PVOL and PVA using Beattie et al.'s method, we must assume that 50% of the lease liability relates to 'land and building' and 50% to 'other'. The base estimates of remaining- and total life of Beattie et al. (see Table 4.4) are therefore adjusted. However, the

adjustment affects only the base estimates of remaining- and total life in the last lease-expiry category, since for the other categories the remaining- and total life were equal for both asset categories.

**Table 5.8 Adjusted base estimates of remaining- and total lease lives**

Adjustment to estimates of Beattie, Edwards and Goodacre (1998), p. 243, original estimates between brackets (see also Table 4.4)

Lease expiry category (e)	Remaining life RL base	Total Life TL base
Less than one	1 (1)	1 (1)
One to five	3 (3)	5 (5)
More than five	11.5	17.5
	(7 for 'other', 16 for 'land and buildings')	(10 for 'other', 25 for 'land and buildings')

#### *Fixed life by Ely*

The fixed total life of 25 years for all companies as used by Ely does not seem reasonable when looking at the Dutch sample of this study (see Table 5.4), and holding on to this 25 years would make the approach of Ely a priori a bad estimator. Furthermore, Ely herself indicated that she choose 25 years because it served as a reasonable estimation for her sample. For this study's sample, the (not-weighted) remaining life is 7.7 years on average (median: 7.0) for the entire sample (based on the assumption that 50% of total life has passed, the total life is 15.6 on average (median: 14.0)). Therefore, in this study a fixed total life of fifteen years is used for Ely's method. Together with the fixed interest rate of 6%, the asset proportion of Ely is fixed for the entire sample at 0.52. The multiple of Ely is therewith fixed at 5.9<sup>55</sup>.

Table 5.9 shows the mean- and median values of PVOL and PVA (divided by total assets in order to control for size differences), comparable with Table 5.4<sup>56</sup>. Table 5.9 also shows the percentage change in mean- and median value of total debt, long-term debt, total assets and net income for all seven of the capitalisation approaches.

<sup>55</sup> As described in chapter 4, Ely calculates the asset proportion as follows: 
$$AP_{Ely} = \frac{TL-1}{2} * \frac{1 - \frac{1}{(1+i)^{TL}}}{\sum_{t=1}^{TL} \frac{1}{(1+i)^{(TL-t)}}$$

<sup>56</sup> This table is identical to Table 5.4, although PVOL/TA and PVA/TA are included when a capitalisation procedure could be conducted, since the purpose is of the current section is to show the difference in the capitalisation approaches. Companies with no operating-lease commitments (PVOL=0) and those disclosing the present value of operating-lease commitments (format 4 in Table 5.3) are thus excluded. This affects the mean- and median values of PVOL/TA and PVA/TA (compared to Table 5.4), since the companies that disclose PVOL themselves are included in Table 5.4. The mean and median of PVOL/TA are respectively 17.8% and 6.3% in Table 5.4, as opposed to 15.2% and 6.0% in Table 5.9. This decrease due to elimination of 26 observations is explainable when looking at Figure 5.3. Two of the four companies disclosing PVOL themselves are numbers two and three in the list of highest leasing companies. These are now excluded in the comparison, which caused the mean and median to decrease.

**Table 5.9 Percentage change of reported values after capitalisation using seven different methods**

The mean and median of the size of the capitalised operating-lease liabilities (PVOL) and capitalised leased asset (PVA) and the percentage change in total debt (TD), long-term debt (LTD), total assets (TA), and net income (NI). Except for PVOL and PVA also the size according to the balance sheet is given ('reported'). The percentage change is defined as the difference between the before-capitalisation (reported) amount and the after-capitalisation amount, divided by the before-capitalisation amount, i.e.  $(TA_{\text{reported}} - TA_{8\text{times rent}}) / TA_{\text{reported}}$ . Obviously, for PVOL, no percentage change can be calculated.

		REPORTED	MULTIPLE METHODS			PRESENT-VALUE METHODS			
		N	8-Rent	UBSWarburg	Multiple Ely	ILW	BEG	ELY	This study
<b>PVOL/TA</b>	<b>276</b>								
mean			23.7%	9.2%	17.5%	15.2%	15.2%	10.3%	15.2%
median			12.6%	5.0%	9.3%	6.0%	6.0%	5.6%	6.0%
<b>PVA /TA</b>	<b>278</b>								
mean			23.7%	9.2%	9.1%	8.5%	9.7%	5.4%	9.3%
median			12.6%	5.0%	4.8%	4.6%	5.3%	2.9%	5.1%
<b>TD ('000 E)</b>	<b>277</b>		<b>Change in TD %</b>						
mean		1,712,845	41.3%	20.9%	30.5%	22.7%	22.7%	22.7%	22.7%
median		159,150	104.5%	45.2%	76.4%	45.3%	45.3%	45.1%	45.3%
<b>LTD ('000 E)</b>	<b>273</b>		<b>Change in LTD %</b>						
mean		1,199,513	52.8%	23.2%	37.1%	25.8%	25.8%	25.9%	25.8%
median		98,579	164.9%	54.6%	123.0%	66.7%	66.7%	65.5%	66.7%
<b>TA ('000 E)</b>	<b>278</b>		<b>Change in TA %</b>						
mean		6,473,178	10.9%	5.5%	4.2%	4.6%	5.5%	3.1%	5.1%
median		868,083	17.0%	7.9%	5.8%	8.2%	9.0%	4.5%	8.9%
<b>NI ('000 E)</b>	<b>277</b>		<b>Change in NI %</b>						
mean		288,007	0.0%	-1.8%	0.0%	8.0%	0.6%	0.0%	1.4%
median		12,287	0.0%	-3.0%	0.0%	47.1%	7.7%	0.0%	6.0%

The mean- and median values of the 8-rent method give very high estimates. The 8-rent method overestimates the lease liability. An example of the overestimation that can occur due to this method is PinkRoccade. According to the 8-rent approach, the capitalisation of the lease commitment for PinkRoccade in 2003 is more than 400 million euro (8 times 52.9 million euro, next year's lease payment). However, PinkRoccade discloses a total nominal commitment of only 187 million euro (complying with RJ292). The present value of this commitment is 152 million euro. The 8-rent approach overestimates almost 2.5 times the real commitment. Figure 5.5 at the end of this sub-section shows the differences between the method used in this thesis and the 8-rent method.

The second-highest estimator is the multiple method of Ely. The fixed assumptions for all companies in her sample allow a fixed multiple to be calculated. In this study (using a 15-year total life and 6% interest) the multiple was 5.9. Ely ignores company-specific lease portfolios and argues (p.403, see also chapter 4 of this thesis) that indeed the present value collapses to a constant multiplied by the first minimum lease payment (the multiple method). The multiple method of Ely differs, however, from her present-value approach (as can be seen from Table 5.9).

Based on the medians, the other approaches (even the multiple method of UBSWarburg) seem to be more in line with each other with respect to PVOL. When it comes to PVA, however, the methods differ from each other, and also in the mean values some differences are visible. PVA as calculated in this thesis lies in-between the PVAs of Imhoff et al. and Beattie et al. This can be explained by the calculation

of the asset proportion (see section 4.5.5); whereas Imhoff et al. use the full remaining life, Beattie et al. and this study use a weighted remaining life.

The impact on net income applies only to the methods of the underlying study and for UBSWarburg, Imhoff et al. and Beattie et al. The 8-times rent method does not imply an adjustment to net income, and Ely assumes that the depreciation part when capitalising the leased asset is equal to the repayment part in the lease payments. Therefore, Ely asserts that capitalisation affects only EBIT and not net income. For the four remaining methods, some impact on net income is present, although it is less than the impact on the balance-sheet items. The effect for the Imhoff et al. method is the highest and for the other three— the underlying study, UBSWarburg and Beattie et al.— the impact is much smaller. The change in the median of net income for Imhoff et al. is a 47% increase compared +6% (this study), +7.7% (Beattie et al.) and -3% (UBSWarburg). This result reflects the fact that Imhoff et al. depreciate the leased asset (PVA) over the total remaining life of the assets, whereas the three other methods depreciate the asset using a weighted measure. The weighted average remaining life is shorter than the total remaining life, resulting in a bigger depreciation charge for these methods. Since the effect on net income is quite small for these methods, the repayment part for these methods is almost equal to the depreciation part of the lease payment.

The statistical tests to see whether the differences in the calculation are statistically significant are shown in Table 5.10, which reports the results of the comparisons of mean and median of PVOL/TA and PVA/TA between the seven different capitalisation approaches. Subsequently, Table 5.11 shows the correlation coefficients between these approaches. Although the correlation is significant between all approaches, the analysis of differences shows that the approaches differ significantly from each other. When focussing on the median tests it can be concluded that for PVOL/TA it does matter which approach is used to capitalise the lease commitments. Except for this study, Imhoff et al. and Beattie et al., all approaches differ significantly at the 1% level. With respect to PVA/TA, this study's results do not differ significantly from the results of UBSWarburg and the multiple approach of Ely. All other approaches differ significantly at the 1% level.

Table 5.11 shows the correlation coefficients (both Pearson and Spearman) between PVOL/TA and PVA/TA for all seven of the capitalisation approaches).



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**Table 5.10 t- and z-values of comparison of mean and medians of PVOL/TA and PVA/TA using seven different capitalisation approaches**

Paired samples t-test	t-statistics						Wilcoxon signed rank test						z-statistics								
	PVOL/TA	8-rent	UBSWarburg	Multiple Ely	ILW	BEG	Ely	PVOL/TA	8-rent	UBSWarburg	Multiple Ely	ILW	BEG	Ely	PVA/TA	8-rent	UBSWarburg	Multiple Ely	ILW	BEG	Ely
This study	3.5***	3.2***	0.5ns	same	same	3.9***	This study	10.6***	8.6***	8.5***	same	same	9.2***	This study	14.7***	0.4ns	1.2ns	14.8***	14.7***	14.8***	14.8***
8-rent		10.2***	13.2***	3.5***	3.5***	9.6***	8-rent		14.5***	17.2***	10.6***	10.6***	14.4***	8-rent		14.4***	17.2***	14.7***	14.6***	14.8***	14.8***
UBSWarburg			9.6***	3.2***	3.2***	4.0***	UBSWarburg			14.3***	8.6***	8.6***	7.9***	UBSWarburg			1.6ns	8.5***	4.1***	14.2***	14.2***
Multiple Ely				0.5ns	0.5ns	8.5***	Multiple Ely				8.5***	8.5***	13.3***	Multiple Ely				3.7***	3.2***	13.4***	13.4***
Imhoff et al.(ILW)					same	3.9***	ILW					same	9.2***	ILW					14.8***	14.7***	14.7***
Beattie et al. (BEG)						3.9***	BEG						9.2***	BEG							14.8***

**Table 5.11 Correlation coefficients**

N=276	PEARSON							SPEARMAN							
	PVOL/TA	This study	8-rent	UBS Warburg	Multiple Ely	ILW	BEG	Ely	PVOL/TA	This study	8-rent	UBS Warburg	Multiple Ely	ILW	BEG
This study	1	0.414	0.474	0.414	1	1	0.496	This study	1	0.886	0.927	0.886	1	1	0.940
8-rent		1	0.956	1.000	0.414	0.414	0.896	8-rent		1	0.956	1.000	0.886	0.886	0.937
UBSWarburg			1	0.956	0.474	0.474	0.956	UBSWarburg			1	0.956	0.927	0.927	0.982
Multiple Ely				1	0.447	0.447	0.896	Multiple Ely				1	0.886	0.886	0.937
ILW					1	1.000	0.496	ILW					1	1.000	0.940
BEG						1	0.496	BEG						1	0.940
Ely							1	Ely							1

N=278	PEARSON							SPEARMAN							
	PVA/TA	This study	8-rent	UBS Warburg	Multiple Ely	ILW	BEG	Ely	PVA/TA	This study	8-rent	UBS Warburg	Multiple Ely	ILW	BEG
This study	1	0.915	0.957	0.915	1.000	0.999	0.996	This study	1	0.946	0.980	0.946	1.000	1.000	0.998
8-rent		1	0.956	1.000	0.913	0.908	0.896	8-rent		1	0.956	1.000	0.946	0.942	0.937
UBSWarburg			1	0.956	0.954	0.958	0.956	UBSWarburg			1	0.956	0.978	0.981	0.982
Multiple Ely				1	0.913	0.908	0.896	Multiple Ely				1	0.946	0.942	0.937
ILW					1	0.999	0.996	ILW					1	0.999	0.998
BEG						1	0.999	BEG						1	0.999
Ely							1.000	Ely							1

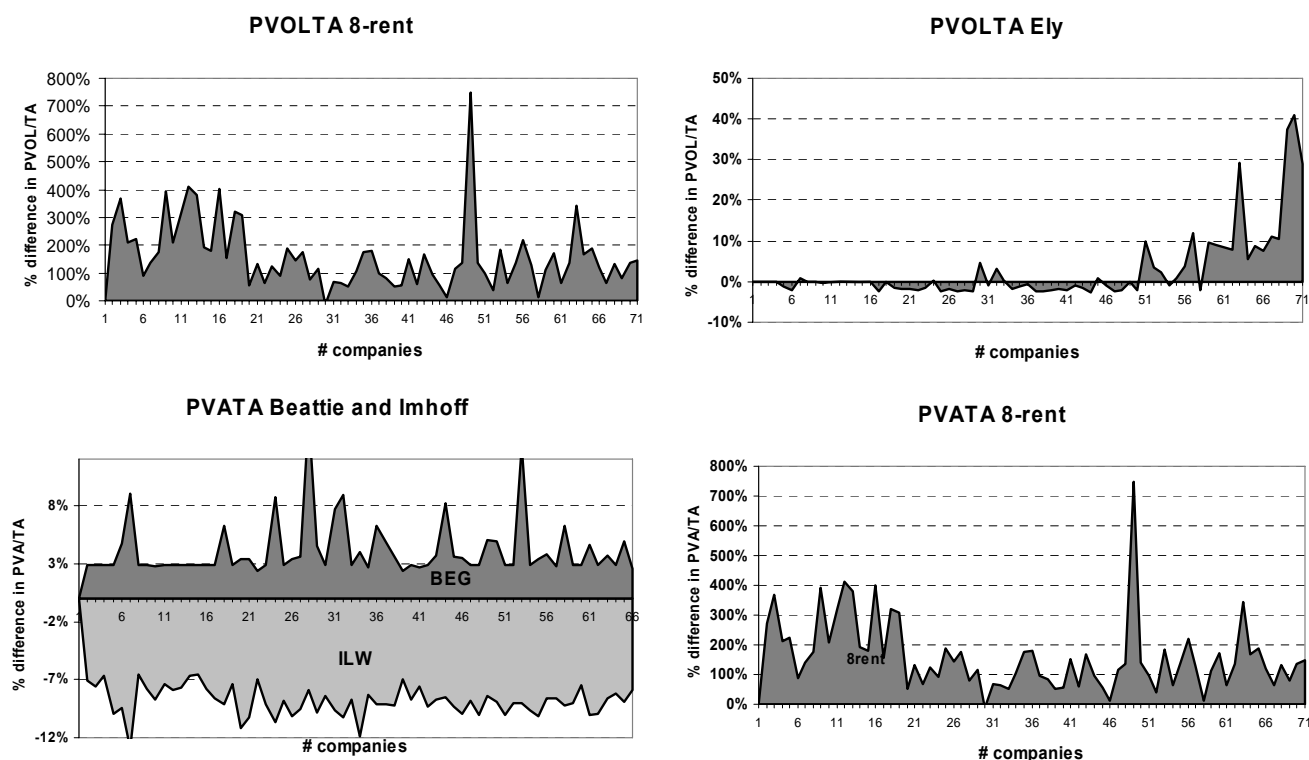
All correlations are significant at the 1% level

The high correlation indicates the relationship between the capitalisation approaches (see Figure 5.1) and is not an analysis of differences. For illustrative purposes, Figure 5.5 shows four different graphs: *At the top left* is the %-difference between PVOL/TA of this study (and of Imhoff et al. and Beattie et al.) and the 8-rent method. *At the top right* is the %-difference between PVOL/TA of this study and the present value calculated using Ely's method. *Below left* is the %-difference between PVA/TA of this study and the PVA/TA of both Imhoff et al. ("ILW") and Beattie et al. ("BEG"). *Below right*, is the difference between PVA/TA of this study and the 8-rent approach.

These figures reveal that the 8-rent method overestimates PVOL/TA in all cases; the present-value approach of Ely overestimates PVOL/TA in approximately twenty cases. PVOL/TA is the same for this study, Imhoff et al. and Beattie et al.; however, PVA/TA differs between the three studies. Compared to this study, Beattie et al. overestimate PVA/TA in all cases with a minimum of 3% and maximum of 16%. Compare the above to this study and the results using Imhoff et al.'s approach, which underestimate PVA/TA in all cases with a minimum %-difference of -7% and a maximum of -13%.

**Figure 5.5 Illustration of % change in PVOL/TA and PVA/TA as opposed to this study's results**

*At the top left* is the %-difference between PVOL/TA of this study (and of Imhoff et al. and Beattie et al.) and the 8-rent method. *At the top right* is the %-difference between PVOL/TA of this study and the present value calculated using Ely's method. *Below left* is the %-difference between PVA/TA of this study and the PVA/TA of both Imhoff et al. ("ILW") and Beattie et al. ("BEG"). *Below right*, is the difference between PVA/TA of this study and the 8-rent approach.



Both the statistical analyses and interpretation of the results from Table 5.9 and Figure 5.5 allow us to conclude that it does matter which capitalisation approach is used. Together with the results of the previous section (the sensitivity to the assumptions), it can be said that if a user of the financial statements wishes to capitalise the operating lease, this will be influenced by the choices and assumptions made by this user. Therefore, the information disclosed on operating leases is not

complete and this poses a threat to the reliable-criterion. The answer to the third research question: “Is the information required by the lease-accounting standard sufficient to permit informed users to estimate the consequences of operating leases?” is therefore negative.

#### 5.4.5 Comparability

The comparability criterion is tested by analysing how the capitalisation of operating leases impacts key financial ratios and by questioning whether the ranking between companies based on these financial ratios would (statistically significantly) change after the capitalisation. As expected (see section 5.3.2), the financial ratios in this study do not have a normal distribution. Even the elimination of a few outliers would not solve this problem. Therefore, the financial ratios are compared with each before- and after capitalisation, using both the t-test (comparison of means) and the non-parametric Wilcoxon test (comparison of medians). Table 5.12 shows the mean and median of the eleven financial ratios analysed. For each ratio, the before- and after capitalisation value is presented. Furthermore, the difference is shown and the percent change. For the differences in mean the t-value is shown, and for the differences in ranks the z-value, both with the significance of the difference.

**Table 5.12 Differences between mean and median of financial ratios before- and after capitalisation of operating leases in 2004**

For the abbreviations and calculation of the ratios, see Table 5.1. The sample includes companies that disclosed according to RJ292/IAS17 (n=67), the companies with no-leases (6) and the companies disclosing the present value of the commitments divided over the lease-expiry categories (n=3). The ratios ROE, ROCE, LTDCE and TDE are excluded for those companies with negative equity or negative capital employed.

	N	MEAN				MEDIAN					
		before	after	%diff	sig.	t-value	before	after	% diff.	sig.	z-value
<b>NPM</b>	72	-24.38%	-24.30%	0.34%	*	1.84	2.81%	2.87%	2.14%	***	4.66
<b>ROE</b>	71	10.71%	11.10%	3.63%	**	2.61	11.54%	11.87%	2.86%	***	4.55
<b>ROA</b>	73	4.00%	3.69%	-7.77%	**	1.99	4.45%	3.92%	-11.91%	***	3.82
<b>EBITTA</b>	65	8.84%	8.85%	0.03%	ns	0.03	8.16%	7.61%	-6.74%	ns	0.03
<b>ROCE</b>	68	7.59%	6.97%	-8.17%	**	2.42	6.94%	6.52%	-6.05%	***	3.52
<b>LTDCE</b>	66	29.25%	43.08%	47.28%	***	5.63	26.17%	41.06%	56.90%	***	6.37
<b>TDTA</b>	74	23.54%	30.99%	31.63%	***	6.75	22.31%	27.67%	24.03%	***	7.13
<b>TDE</b>	68	86.17%	128.14%	48.71%	***	5.36	64.25%	100.69%	56.72%	***	6.85
<b>IC</b>	65	0.36	0.29	-20.16%	ns	1.27	0.15	0.24	61.23%	***	3.05
<b>CR</b>	78	1.91	1.69	-11.05%	***	3.08	1.45	1.35	-7.07%	***	7.48
<b>AT</b>	73	1.64	1.45	-11.74%	***	5.22	1.54	1.42	-7.58%	***	7.12

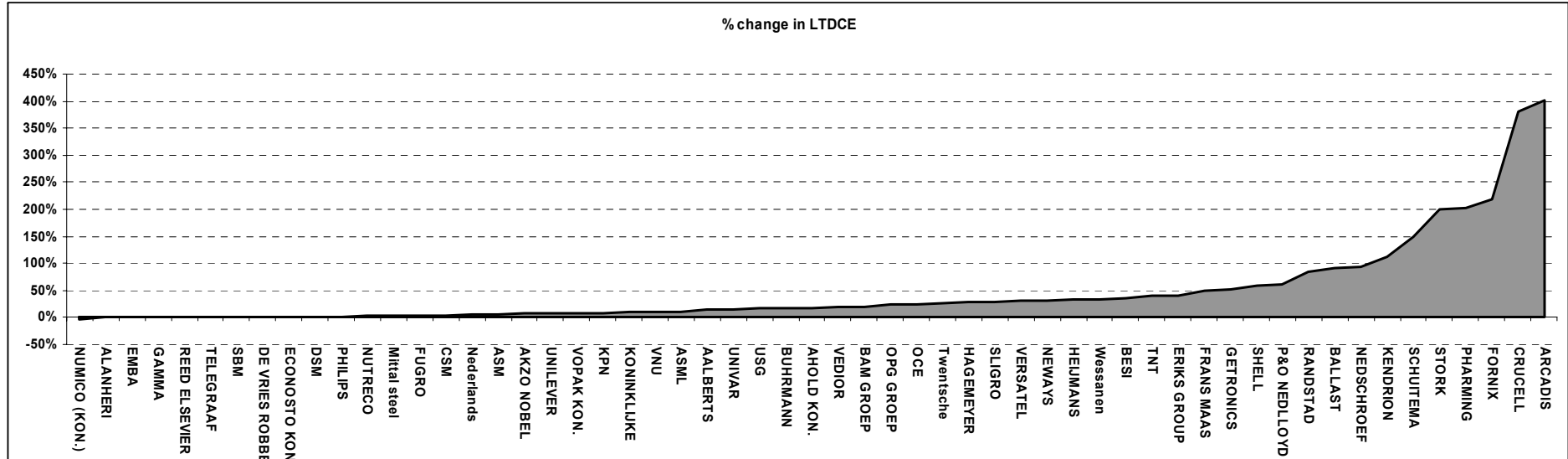
\*, \*\*, \*\*\* means significant at respectively 10%, 5% and 1% levels. ns means not significant

The results of Table 5.12 show that the difference in medians is significant for all ratios except one (EBITTA). The ranking of the companies based on these ratios has thus significantly changed, due to the capitalisation of the operating leases. A closer look at the mean changes of the ratios reveals that the significance is especially limited to those ratios that relate to the capital structure of the company. The percentage change in the median of these ratios varies from 24% for total debt to total assets, to 57% for long-term debt to capital employed. It should be noted that in these ratios also the companies are included that have no leases at all (change is nil). For example, it could be reasoned, based on the table, that a decrease of return on assets from 4.45 to 3.92% is not striking. Even a statistical significance might not change this reasoning. However, it is especially the 50% of the observations that lie beyond the median of which the operating-lease disclosures should be carefully watched. To illustrate this, Figure 5.6 and Figure 5.7 show the percentage change of

## CHAPTER 5

the long-term debt to capital employed ratio (LTDCE) and return on assets (ROA) in 2004 for those companies in the sample for which the leases were capitalised. The financial analysis of the companies in, for example, the last quartile is definitely different between users either ignoring or capitalising the operating leases. Even when it does not apply to the majority, the ratios of a major part of the companies are changed, and ignorance of the operating leases would alter the decisions based thereon. The conclusion is therefore that for the comparability of companies the operating-lease commitments are valuable information and should be taken into account.

Figure 5.6 Percentage change of long-term debt to capital employed



Excluded are Imtech and Pink Roccade with an increase in LTDCE of respectively approx. 4,000% and 2,000% which is caused by very low levels of LTDCE before capitalisation (resp. 0.6% and 2.5%) increasing to high levels of LTDCE after capitalisation (resp. 26% and 57%). Also other high-leasing companies (see Figure 5.3) are not shown in this figure due to negative capital employed (Tie Holdings), LTDCE before capitalisation was zero (Macintosh) or long-term debt portion of PVOL/TA could not be determined due to PV-disclosure type (Laurus).

Figure 5.7 Percentage change of return on assets

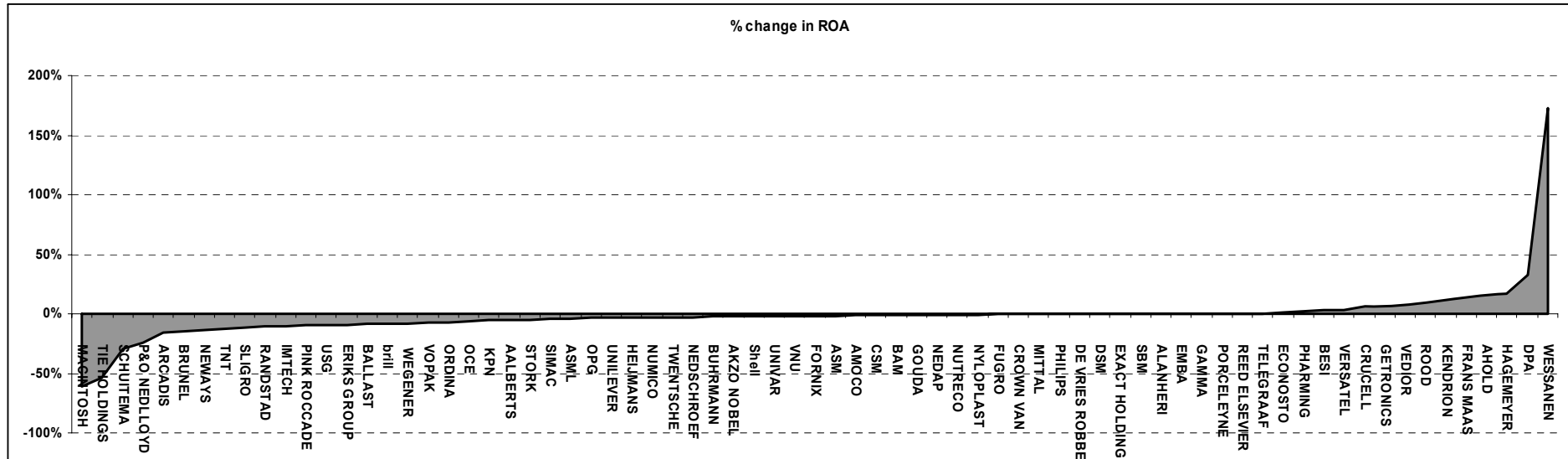


Table 5.13 compares this study's results with the results of previous studies on lease capitalisation. Not every study used the same methodology, of course. Imhoff et al. (1995) focused on the median, instead of means, because of the impact of extreme observations. Ely (1995) analysed the sensitivities to certain assumptions by using both Pearson and Spearman correlations, but did not perform a differences analysis. Beattie et al. (1998) focused on the differences in mean between the pre- and post-capitalisation ratios, and they report only the results of the paired t-test. They do acknowledge, however, the non-normal distribution of many ratios (see footnote on p.245), and mention that the Wilcoxon non-parametric test produced results of greater significance. Also Beattie et al. mention that their study consisted of 16% non-leasing companies. In the underlying study it was shown in Table 5.4 that 77 out of 353 companies were non-leasing companies (22%) and this influences the impact measured. Goodacre (2001) conducted a similar study based on the Beattie et al. study (of which he was co-author), and focused on the differences in medians and the significance according to the Wilcoxon-test instead of the paired t-test. Bennet and Bradbury (2003) report only descriptive values of mean and median, and do not perform a statistical test of significance in difference. The methodology of the underlying study is most in line with Goodacre (2001), since he reports both mean and median tests.

Based on the results of this study and on the results of previous study the answers to the last two questions: "*Are key financial ratios affected?*" and "*Does the capitalisation of operating leases change the ranking between companies?*" is that yes, key financial ratios are indeed significantly affected and that also the ranking of the companies changes after the lease has been capitalised. This again stresses that operating leases should be taken into account in any comparison of companies. The lack of sufficient information to capitalise the operating leases, due to both non-compliance with the accounting standard and insufficiently complete information, is therefore also a threat to the comparability criterion of useful information.

EMPIRICAL STUDY OF THE USEFULNESS OF OPERATING-LEASE DISCLOSURES

Table 5.13 Comparison of present study with previous studies on lease capitalisation

	This study	Nelson (1963)	Ashton (1985)	Imhoff <i>et al.</i> (1991)	Imhoff <i>et al.</i> (1995)	Beattie, Edwards and Goodacre (1998)	Goodacre (2001)	Bennet and Bradbury (2003)
Country	Netherlands	US	UK	US	US	UK	UK	New Zealand
Year of analysis	2000-2004	Not reported	1983-1984	1988	1984-1990	1994	1999	1995
N=	278 companies of which PVOL was available, ratios based on 2004 accounts	11	23	14 matched pairs	Separately for 51 groceries/29 airlines	232	102 only retailers	38
	<i>mean %change</i> <i>median % change</i>	<i>Impact/# companies changed rank</i>	<i>mean</i>	<i>mean % change</i>	<i>mean</i> <i>median</i>	<i>Mean</i>	<i>mean %change</i> <i>median % change</i>	<i>mean</i> <i>median</i>
Increase TD	23.6    53.1							22.9    11.7
Increase long-term debt	27.1    63.8					39.3		
Increase TA	5.2    8.9					6.3		8.8    5.2
Change NI	1.4    -1.8							
NPM	0.3ns    2.1***		1.023			12.1***	51.4***    39.0***	
ROE	3.6**    2.86***		2.85		-12.8/-267.8    2.1/-21.4	4.8**	35.1***    17.6***	
ROA	-7.8**    -11.9***			-22.0	11.9 /-31.9    2.4/2.0	-10.8***	-44.8***    -2.8***	
EBITTA	0.0ns    -6.74ns							-8.73%    -6.80%
ROCE	-8.2**    -6.05***	Yes/0	0.24			-0.6	-32.8***    -19.8***	
LTDCE	47.3***    56.9***					92.8***	433.2***    1,160.7***	
DCE		Yes/9	-20.11***					
TDTA	31.6***    24.0***							10.6    13.4
TDE	48.7***    56.7***	Yes/9		119.0		48.7***	295.0***    220.1***	
IC	-20.2ns    61.2***	Yes/10	2.74			-25.9	-79.3***    -7.73***	
CR	-11.1***    -7.1***	Yes/7						-14.4    -3.4
AT	-11.7***    -7.6***		-0.77			-12.5	-55.2***    -50.7***	

Notes: 1. Beattie et al. (1998) show a similar table in their article in which they compare their results with those of Ashton (1985) and Imhoff et al. (1991). For the sake of completeness, these results are also reported here. 2. The present study calculated the value for the 278 observations with operating leases and for which PVOL could be calculated. The eleven companies of Nelson were all companies with leases. Ashton's sample consisted of 23 companies with only financial leases. The samples of Imhoff et al. (1991) and Bennet and Bradbury (2003) consisted of only companies with leases. The sample of Beattie et al. (1998) consisted of 16% non-leasing companies. Imhoff et al. (1995) and Goodacre (2001) do not mention the elimination of non-leasing companies. 3. Ashton and Beattie et al. calculate the operating profit margin instead of the net profit margin. 4. Ashton (1985) calculates the effect on Debt-to-Capital-Employed, and this ratio declines. Beattie et al. (1998) comment that the decline of the ratio should be a mistake, since the direction of the change must be positive (Table 8, note 3). We do not agree with this, however, since the ratio calculated by Ashton will decline if the increase in capital employed exceeds the increase in (total) debt. The leverage ratio calculated in this study and also by Beattie et al. is long-term debt to capital employed, and the change in this ratio will indeed always be positive (while by definition the change in capital employed cannot exceed the change in long-term debt). 5. Beattie et al. (1998) show only the results of the mean test, but indicate that the Wilcoxon-test of differences in medians produced results of greater significance. 6. Imhoff et al. (1991) matched seven high-leasing companies with seven low-leasing companies. Six pairs were retailers; one pair came from the transportation sector. For each of these pairs they calculated the change in return on assets and debt-equity. The mean values reported here are the average values of these 14 changes in ratios. Imhoff et al. (1991) do not produce any statistical tests. 7. Nelson (1963) reported for each of the eleven companies in the sample the change in 15 ratios. He concluded that the ratios change substantially, and indicated for each ratio whether capitalisation would help the ratio meet its objectives (this is here indicated as 'yes'. Furthermore, he concluded that the ranking changed significantly after capitalisation, indicated by the number of companies that changed in ranking after capitalisation. 8. Bennet et al. (2003) do not produce a statistical test of significance of differences. The percentage changes in the financial ratios were not reported in this article, but are derived from the mean- and median values as reported in the article.

## 5.5 Summary and conclusions

Section 5.4.1 showed that in 2004 36% of the leasing companies in the sample still did not comply with RJ292/IAS17. Although this is an improvement of the percentage in 2000 (when 59% percent of the companies with operating leases did not comply), the conclusion remains that this non-compliance compromises the neutrality of operating-lease disclosure. The user of the financial statements cannot capitalise the operating leases, is not able to estimate the on-balance equivalent of the commitments and cannot determine in many cases whether the commitments are material or relevant. This non-compliance makes the financial statements inconsistent and therefore not neutral; this harms the reliability criterion of useful information. The non-complying companies cannot be compared on a fair basis with the companies that do comply with the standards or that do not disclose operating leases. This is a result from both the non-compulsory character of the Dutch accounting standard until 2005 and the lack of any supervision of the compliance with the accounting standards. By including the compliance with IAS in Dutch law as from financial years starting after 2005 the non-compulsory character is no longer applicable. Also the new regulatory supervision of auditors and financial reporting by the Dutch financial supervisor AFM (the laws of which only became effective in 2006) is definitely a necessity with respect to the leasing standard.

Section 5.4.2 presented the capitalisation results. The relative lease commitments of the companies showed a skewed distribution, the mean of PVOL/TA was 14% and the median 4.3%. This distribution was illustrated by figure 5.3.1, where the companies were ranked in descending order. It appeared that the difference between the lease intensity of the companies in the sample is substantial, varying from no leasing (PVOL =0% of total assets) to PVOL being 130% of total assets. Section 5.4.3 subsequently reported for how many companies the commitments were material, and thus relevant, using three different tests. Even the test with the lowest results (PVOL/TA), indicates that 45% of all companies in the sample had lease commitments of a material amount. The other results were respectively 51% (annual payment divided by total capital costs) and 52% (PVOL divided by long-term debt). The results of all three tests for the year 2004 were even higher, indicating a still-growing importance of operating leases. Information on operating-lease commitments is therefore relevant information.

Section 5.4.4 explored the completeness of operating-lease disclosure. Completeness is part of the reliability criterion of useful information. It was shown that especially the interest rate assumption influences the capitalised value of the lease liability and the leased assets. Furthermore, the chosen capitalisation approach also does matter when capitalising the commitments. This was shown by statistical tests and by interpreting the difference between the approaches for the individual companies. Standards setters should consequently require companies at the least to disclose the interest rate applicable. Preferable, however, would be the requirement of disclosure in the footnotes of the present value of the operating-lease commitments, including the interest rate used. This would also harmonise the accounting standards between financial and operating leases, thereby making the standards more consistent.

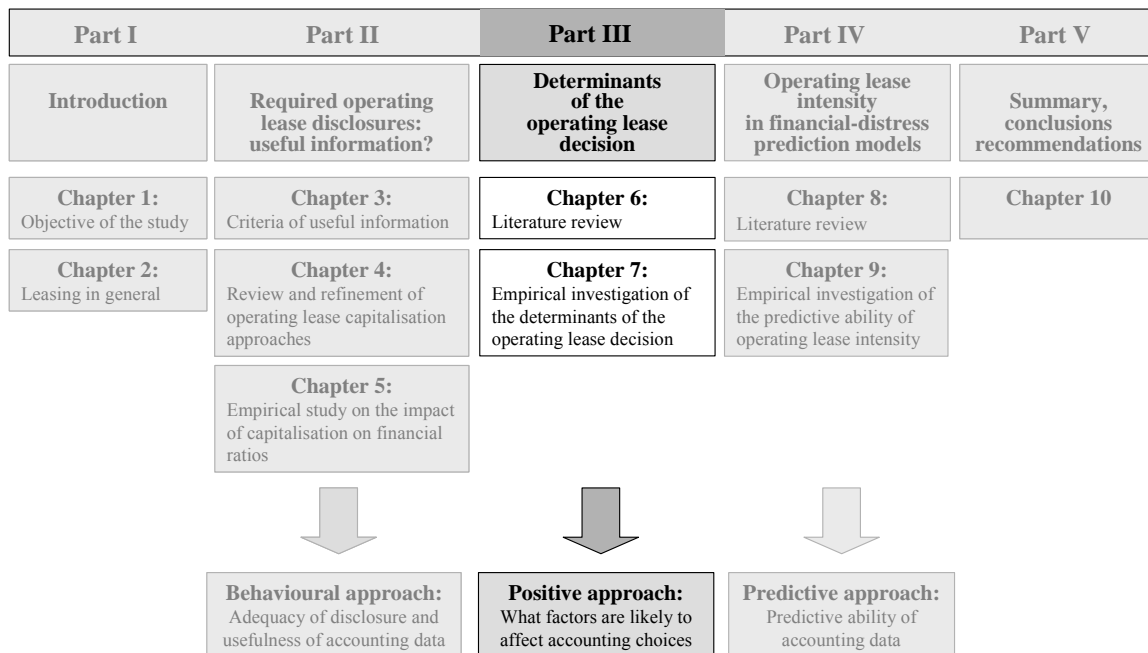


Finally, section 5.4.5 addressed the comparability criterion of useful information. It was shown that the capitalisation of operating leases affected key financial ratios to a greater or lesser extent. The ranking between the companies was statistically significantly changed after the capitalisation. This was to be expected, since the previous section had already concluded that for almost 50% of the companies the operating-lease commitments were of a material amounts and thus relevant. Considering that the other 50% of the companies have no material lease commitments, this will alter the ranking between these companies. However, the calculation of the impact on the ratios could only be performed for those companies that comply with the accounting standards and for which the leases could be capitalised. Furthermore, the previous section concluded that lease capitalisation is subsequently sensitive to choices made by financial statement users. The comparability of companies will therefore also be enhanced first, by enforcing company compliance with the accounting standard and second, by requiring disclosure of the present value of the lease commitments instead of the nominal commitments.

The final chapter of this thesis formulates recommendations that might overcome some of the weaknesses of the lease-accounting standard and its observance.



## PART III: DETERMINANTS OF THE OPERATING-LEASE DECISION



Part III of this thesis concerns the determinants of the operating-lease decision. Chapter 2 described how operating leases offer several advantages to the lessee. Some of these advantages relate particularly to operating leases due to the off-balance-sheet and the fact that they allow the lessor to retain economic ownership of the asset. Part II showed that the off-balance-sheet character of operating leases has indeed a major impact on financial ratios derived from the balance sheet. Part III now empirically investigates the determinants of the operating-lease decision. Chapter 6 describes previous studies in this field and the related theories. Only a few studies have investigated the determinants of operating-lease intensity separately from the determinants of financial leases or all leases. Many studies, moreover, ignore the impact that operating leases have on the variables used in their models, and this has led to an endogeneity problem for determinants related especially to debt and to total assets. Chapter 7 empirically tests an extensive list of possible determinants of operating-lease intensity, based on two different measures: first, a relative measure (the present value of operating leases divided by total assets), and second, a dichotomous variable (dummy with a value of one or zero) classifying each company as either a high- or low-leasing company.

The research questions addressed in chapters 6 and 7 are as follows:

- What determines the choice of a company's management for operating leases?
- What are the characteristics of high-leasing companies as opposed to low-leasing companies?
- Are these characteristics in accordance with what might be expected from accounting choice research?

These questions give some insight into the motives of a company's management to choose operating leases. This is valuable information for standard setters, whether the choice for operating leases is mainly sensible business or whether the company's management objective to choose operating leases is guided by non-sensible accounting reasons.



## **CHAPTER 6 PREVIOUS RESEARCH ON THE DETERMINANTS OF THE OPERATING-LEASE DECISION**

### **6.1 Introduction**

This chapter describes the previous literature of the determinants of the (operating) lease decision. Previous studies investigating the determinants of leasing did not always distinguish between operating- and financial leases (for example, Mehran, Taggart and Yermack (1999); Adams and Hardwick (1998)), or investigated solely financial leases (for example, Lasfer and Levis ((1998); Ang and Peterson (1984); Deloof and Verschueren (1999)), or did investigate solely operating leases but with limited characteristics investigated (for example, Sharpe and Nguyen (1995); Duke, Franz, Hunt and Toy (2002)). For some of the determinants, however, the distinction between operating leases and financial leases is essential, because the underlying reason to choose leasing (for example, preserving debt capacity or improving leverage ratios) is only (or mainly) achieved by operating leases. As shown in chapter 2, however, financial leases are not as important in the Netherlands as operating leases are. This was also found for the US (Duke et al. (2002); Mehran et al. (1999); Graham et al. (1998)), and in the UK (Beattie et al. (2004)).

This thesis investigates particularly the determinants of the choice for operating leases. Since some of these determinants refer to the accounting treatment of operating leases, special emphasis will be on the accounting-choice literature. Studies in the field of accounting choice investigate whether and why accounting matters. Chapter 6 describes the accounting-choice literature and previous studies on the determinants of (operating) leasing choice. This chapter also formulates the hypotheses.

The chapter is set up as follows. Section 6.2 describes the positive accounting theory, financial contracting theory and accounting choices, which are closely related. Section 6.3 describes the main purpose of the different studies, and points out how they differ in the dependent variable (some lease-intensity measure). Also this section addresses the issue of endogeneity problem of several determinants. Due to the substantial list of determinants that might have an relation with the operating-lease intensity, the structure of the sections 6.4 through 6.12 is determined by these determinants; each section addresses one possible determinant. Subsequently, each section will consist of a sub-section addressing the previous results of studies investigating the concerning determinant, followed by the formulation of the hypothesis/(-es). Section 6.13 draws some conclusions.

### **6.2 Positive accounting theory, financial contracting theory and accounting choices**

This section addresses three areas of finance and accounting research (positive accounting theory, financial contracting theory and accounting choices), since most of the determinants, described in the next section, relate to these areas. These areas are very closely related and often refer to the same characteristics.

### Positive accounting theory

The positive accounting theory investigates *why* accounting matters. This theory does not present a rule for choosing among alternative accounting procedures, but rather provides an explanation for accounting and auditing practice (Watts and Zimmerman (1986)). Positive accounting theory views a company as a nexus of contracts; in other words, a company can be described by the set of contracts into which it enters. Furthermore, the company's goal is to minimize the contracting costs associated with these contracts, such as negotiation, monitoring and the expected costs of bankruptcy. Since many of these contracts involve accounting variables, accounting choice or policies is part of this minimizing of contracting costs. Although the accounting choice of a company's management should stay within in the boundaries of the accounting regulation, many accounting issues allow the management some flexibility in choosing from a set of accounting policies, such as depreciation method, historical versus current costs and also operating versus financial leases.

### Accounting choice

Fields et al. (2001) analysed previous studies on accounting choice. The fundamental question on accounting choice addresses *whether* accounting matters. They state (p.256), 'an accounting choice is any decision whose primary purpose is to influence (either in form or substance) the output of the accounting system in a particular way, including not only financial statements but also tax returns and regulatory filings'. According to Fields et al. (2001), this includes the decision to choose operating- instead of financial leases. Chapter 5 showed that operating leases influence importantly the output of the accounting system and would indeed fall within this definition.

### Financial contracting theory

Financial contracting is the theory of what kinds of deals are made between financiers and those who need financing. Financial contracting theory starts with the theorem of Modigliani and Miller: that in an ideal world, where there are no taxes, or incentives or information problems, the way a project or firm is financed does not matter<sup>57</sup>. Much research has been concerned with trying to find what is missing in Modigliani and Miller's world, and the focus has been on taxes and incentive (agency) problems (Hart (2001)). The capital structure of a company, the debt-to-equity ratio, is influenced by these aspects. As shown in Figure 2.1, which illustrates the characteristics of corporate liabilities, operating-lease commitments have the highest priority to the claimholder— higher even than secured debt. According to Sharpe and Nguyen (1995), this makes it a highly desirable financial contract. Other characteristics of (operating) leases may also be considered from the perspective of financial contracting theory. These will be described in section 6.3.

These three topics in finance and accounting research are very closely related. Also Fields et al. (2001) based their classification of accounting choice literature on the theories developed by Modigliani and Miller of complete and perfect markets. In such complete and perfect markets, accounting choice has no role because if

<sup>57</sup> Cross reference from Hart (2001), Modigliani F., and M. Miller, 1958, The cost of capital, corporation finance and the theory of investment, *American Economic Review* 48, 261-297

accounting matters to one or more decision-makers, the markets would be neither complete nor perfect. Three forms of market imperfections make accounting important: agency costs, information asymmetry and externalities affecting contracting parties. First, agency costs relate to contractual issues such as managerial compensation and debt covenants. Second, information asymmetries are associated with better-informed managers and less-informed investors. And third, other externalities relate to contracts with other third parties, such as tax authorities and suppliers, for example.

Furthermore, the classification of Fields et al. (2001) coincides with the positive accounting theory, which suggests that the management of a company will choose the particular accounting policy that is in their own best interest (Scott, 1997). The categories of Fields et al. (2001) are consistent with those of Watts and Zimmerman (1986), with the distinction that Watts and Zimmerman (1986) broadly interpret contracting costs, which include almost all market imperfections. Indeed, this interpretation difference can be derived from the example given by Fields et al. (2001) on information asymmetries. They describe managers attempting to influence stock prices, which should have an impact on their remuneration and reputation. Watts and Zimmerman assume this to be an agency problem.

The three market imperfections as described by Fields et al. can be used as a basis for determining three categories of goals or motivations for accounting choice. Watts and Zimmerman (1986) summarised several studies on positive accounting theory and formulated three hypotheses on the opportunistic behaviour of company's management. Additionally, Fields et al. (2001) also incorporate capital-market effects of accounting choice. The differences, however, are apparently not that big that their hypotheses (Watts and Zimmerman (1986)) and goals of accounting choices (Fields et al. (2001)) cannot be described simultaneously. As stated before, financial contracting theory refers to all kinds of market imperfections that make it relevant which financing structure is chosen. However, in the following list of Fields et al. (2001), financial contracting is assumed to relate to contracts that mitigate internal and external agency conflicts. The two remaining market imperfections (information asymmetry and impact on third parties) are categorised separately.

### **Financial contracting**

*Contracting costs* as defined by Fields et al. (2001) is based on the theory that many contractual arrangements are structured in a way to mitigate internal and external agency conflicts (financial contracting theory). These contracts often rely on accounting numbers that provide incentives to managers to choose among accounting methods to achieve desired financial reporting objectives. The *debt-covenants hypothesis* and the *bonus-plan hypothesis* (see below) of Watts and Zimmerman (1986) fall both within this goal of accounting-choice theory. The first is an external agency conflict (bondholder versus shareholder), and the second is an internal agency conflict (owner versus manager).

### - **The debt-covenant hypothesis**

The debt-covenant hypothesis is based on the evidence that audited financial statements are used to monitor debt contracts. Public and private debt contracts alike include covenants that use accounting numbers to restrict management actions. A breach under such contract is considered to be a default and provides the lender with the possibility of taking action. Debt covenants are effective only if some restrictions are placed on the manager's ability to control whether their choice of accounting numbers is restricted. Typically, these restrictions do not come only from accounting principles but especially in the case of debt covenants, some variations to these principles exist to overcome its shortcomings. To illustrate this, Watts and Zimmerman (1986) give an example of lease liability, which was often required to be included in debt/equity ratios in bond covenants but was a non-recognised liability according to GAAP. The closer a company is to violating accounting-based debt covenants, the more likely the company manager is to select accounting procedures that shift reported earnings from future periods to the current period (Scott, 1997). The primary function of debt covenants is to alleviate agency costs by better aligning the incentives of the parties (Fields et al., 2001). Therefore, companies may make the accounting choice for operating leases instead of financial leases in order to avoid covenant violation.

### - **The bonus-plan hypothesis**

The definition of bonus-plan hypothesis is based on the idea that if bonus plans are based on accountancy-based measures, the management of a company will choose the accounting method that best fulfils their interests. Although this results in a restriction of managerial choice of accounting procedures, it cannot eliminate all managerial accounting manipulation as long as contracting and monitoring is costly.

According to Mehran et al. (1999), a well-designed financial contract can enhance corporate value in three ways: First, it transfers risks between parties. Second, it can affect the incentives of the parties (positive incentives, as in the case of bonus plans; negative incentives, as in the case with debt covenants). And third, a financial contract may transfer tax liabilities.

### **Information asymmetries and asset-pricing motivations**

The second category of motivations for accounting choices concerns accounting choice employed to influence asset prices, which is enabled by information asymmetries between well-informed insiders and less-informed third parties. Accounting choice can be made by companies to influence less-informed parties. Fields et al. (2001) give two examples of this behaviour. First, accounting choice can be made by managers who believe that higher earnings will result in higher stock prices (and consequently higher management compensation and better reputation). The second example refers to accounting choice made in order to meet analyst's earnings forecasts to avoid negative stock price reactions afterwards that might arise in the event a forecast has to be adjusted. Fields et al. state that most research in this field tests market efficiency by examining whether accounting choices



with no direct cash-flow implications are associated with changes in stock prices.

### **Impact on third parties**

The third category of market imperfections that affects accounting choices relates to the attempt to influence other third parties. These third parties include, for example, tax authorities, the government, suppliers and competitors. Through accounting numbers, managers try to influence the decisions made by these third parties. Fields et al. (2001) mention that the most common hypotheses in this category relate to accounting choices that reduce or defer taxes and that avoid potential regulation. These accounting choices often referred to as political costs. Watts and Zimmerman (1986) formulated the political costs hypothesis as follows.

#### **- The political costs hypothesis**

The political costs hypothesis implies that accounting numbers are used in political process. For example, accounting numbers may be used to set price guidelines to control inflation (public utilities), to regulate the quantity and type of services offered (banks). Tax policy may also be influenced by accounting numbers (Watts and Zimmerman, p.223, 1986). Since the political process is a competition for wealth transfers, the management of a company will adopt accounting procedures that reduce the transfers. A special feature of the general political costs hypothesis is the size hypothesis. The size hypothesis assumes that large companies are more politically sensitive than small companies are, and therefore are subject to different incentives in their accounting procedures.

While the goal of this study is the usefulness of the current lease-accounting standard, particularly the distinction between financial- and operating leases and the related accounting choice, the study will focus mainly on the financial contracting motivations, the internal and external agency conflicts, as described by Fields et al. (2001).

### **6.3 Previous literature on the determinants of lease decisions**

The theoretical background of the determinants of leasing policy was described by Smith and Wakeman (1985). They discussed eight non-tax incentives for leasing. Three of these are related to the leased asset, suggesting that leasing is more likely if;

1. the asset is less sensitive to use and maintenance,
2. the asset is not specialised to the company, and
3. the expected period of use is shorter than the useful life.

Two incentives are related to lessor characteristics, suggest that leasing is more likely if;

4. the lessor has market power, and
5. the lessor has a comparative advantage in disposing of the asset.

Finally, three incentives relate to the above-described agency costs and financial contracting costs, and suggest that leasing is more likely if;

6. corporate bond contracts contain specific financial policy covenants,
7. management compensation is a function of return on invested capital, and,
8. the company is closely held.

This study does not investigate the incentives related to the leased asset and to the lessor characteristics, since this relates to information that is not available in the financial statements and does not relate to the lessee. The main purpose of this study is to find evidence on the characteristics of the lessee that determine his choice for (operating) leases. The main emphasis will therefore be on the above-listed incentives six, seven and eight, as defined by Smith and Wakeman (1985).

This section describes nine empirical studies that investigated the relation between the characteristics of leasing- and lessee companies. The different studies on the determinants of leasing choice have different backgrounds. Roughly, the studies can be divided into three categories. First are studies in the field of the lease-debt substitutability discussion (Ang and Peterson (1984) and Deloof and Verschueren (1999)). The second category comprises studies looking for evidence on financial contracting theory and accounting choice (El-Gazzar et al. (1986), Sharpe and Nguyen (1995), Adams and Hardwick (1998), Lasfer and Levis (1998), Mehran et al. (1999) and Duke et al. (2002)). The third category can be typified by the study of Graham et al. (1998), and focuses on the tax reason to lease.

However, before we can describe the characteristics and their relation with leasing choice in the previous studies, we must note that these studies use different definitions and formats of leasing. In other words, the dependent variable varies between these models. For example, some studies concern only financial leases, some concern both financial- and operating leases, and only three studies include a model solely with operating leases. Furthermore, the dependent variable varies in its appearance as a ratio measuring the lease intensity (financial lease share, operating-lease share of total lease share) or as lease dummy (the existence of operating- or financial leases). This section therefore proceeds as follows. After describing the dependent variables used in the studies, the discussion will hone in on the choice of the dependent variable in this study and the endogeneity of certain variables affected by operating leases.

Table 6.1 summarises the previous studies on the determinants of leasing choice. For the purpose of comparison and in anticipation of the hypotheses formulated at the end of each-sub section, a summary of the methodology and data of this study is also included.

**PREVIOUS RESEARCH ON THE DETERMINANTS OF THE OPERATING-LEASE DECISION**

**Table 6.1 Comparison of previous empirical studies on the determinants of leasing choice**

BVE=Book value of equity, MVE=Market value of equity, TA=Total assets, TD=Total debt, LTD=Long-term debt, D/E=Debt/equity, EBITDA= Earnings before interest, tax, depreciation and amortisation, EBIT=Earnings before interest and tax, EBT= Earnings before tax, ROE= Return on equity, EPS=Earnings per share, DPS=Dividends per share, DY=Dividend yield, PPE=Plant, property and equipment, CE=Capital employed, CR=current ratio

<b>Study:</b>	<b>Ang and Peterson (1984)</b>	<b>El-Gazzar et al. (1986)</b>	<b>Sharpe and Nguyen (1995)</b>	<b>Adams and Hardwick (1998)</b>	<b>Lasfer and Levis (1998)</b>	<b>Graham et al. (1998)</b>	<b>Mehran et al. (1999)</b>	<b>Deloof and Verschueren (1999)</b>	<b>Duke et al. (2002)</b>	<b>This study (2006)</b>
<b>Research period</b>	1976-1981	1976	1986, 1988, 1991	1994	1982-1996	1981-1992	1986-1991	1992-1994	1985	2000-2004
<b>Country</b>	US	US	US	UK	UK	US	US	Belgium	US	Netherlands
<b>Companies in sample</b>	600	154	2,000	100	3,008	n/a	176, only manufacturing	1,066	182	119
<b>Observations</b>	3,600	154	6,110	100	23,411	18,193	1,056	3,198	182	584
<b>Method</b>	Tobit	Probit (NPA) and MDA			Logit		OLS	Tobit	Ordered logit and OLS	Logit and OLS
<b>Focus on:</b>	Financial	Financial and dummy	Financial, operating and total	Total lease share	Financial	Operating and financial	Financial and total	Financial	Operating	Operating
<b>-Lease ratio</b>	financial leases/BE.00	financial leases/TA	1. rental commitments/total capital costs <sup>1</sup> 2. net financial leases/net PPE 3. combination of 1 and 2	Total lease share, as Sharpe and Nguyen		1. Operating leases <sup>2</sup> / MVE 2. Financial leases/ MVE	1. financial leases/TA 2. Total lease share, as Sharpe and Nguyen	financial leases /TA	nominal lease payments due in five years/TA	PVOL/TA
<b>-Lease dummy</b>		1 if only operating leases; 0 if only finance leases			1 if company uses financial lease; 0 if not					1 if high-leasing company; 0 if low-leasing company
<b>Explanatory variables:</b>										
<b>Leverage</b>	Debt/BVE	3 D/E ratios		LTD plus prior charge capital/TA	LTD/CE Bank loan/TD		TD/(TD+MVE)	LTD/TA	Covenants dummy LTD/E	LTD/CE TD/TA
<b>Performance measure</b>	EBITDA/sales Return on net PPE CR 10-year sales variability		EBITDA/sales Bond rating No dividend dummy		EBIT EBT ROE EPS DPS DY	3 financial distress measures: Expected costs of financial distress Altman's Z-score dummy for negative book-value equity	4-year average EBIT/TA Prior 2-year average dividend paid/BVE 7-year standard deviation of EBIT/TA	EBIT/TA Variability of income		ROA EBIT/TA EPS CR

CHAPTER 6

Study:	Ang and Peterson (1984)	El-Gazzar et al. (1986)	Sharpe and Nguyen (1995)	Adams and Hardwick (1998)	Lasfer and Levis (1998)	Graham et al. (1998)	Mehran et al. (1999)	Deloof and Verschuere (1999)	Duke et al. (2002)	This study (2006)
<b>Size</b>	TA	Sales	Ln(# employees)	Ln(sales) Ln(sales) <sup>2</sup>	Ln(total assets) Ln(sales) Ln(market value of equity)	Ln(market value company)	Ln(sales) Ln(sales) <sup>2</sup>	Ln(TA)		Ln(TA) Ln(MVE) Ln(sales)
<b>Investment opportunity/growth</b>	PE ratio			PE ratio	Fixed capital investments/TA R&D/sales 2-year sales growth Pay-out ratio MTB	MTB	Market-to-book	3-year TA growth		PE ratio 5-year TA growth MTB
<b>Capital intensity asset structure</b>			Annual capital costs <sup>1</sup> /#employees Equipment age = 1- PPEnet/PPEgros			netPPE/TA ('collateral')		Current assets/TA Fixed financial assets/TA		netPPE/TA TCC/employee sales/employee CA/TA equipment age
<b>Tax</b>		Effective tax rate	Tax/EBT Large tax-loss carry forward dummy		5 tax measures among which Tax/EBT -Tax recoverable=reported tax/future tax liability	Simulated before financing tax rate	Simulated before financing tax rate		Effective tax rate	Effective tax rate tax dummy Sharpe Tax-loss dummy
<b>Management compensation</b>		Management compensation dummy (1 if based on income net of interest)							As El-Gazzar et al.	In(management compensation) change in MC % bonus plan/base salary
<b>Ownership structure</b>				Proportion of shares held by top three shareholders			% common shares held by CEO (and also squared)		Largest of: -% held by officers and directors -% held by largest single owner	% closely held shares
<b>Industry</b>			6 industry dummies			3 industry dummies Regulated industry dummy (telephone and utilities)				5 industry dummies telecom dummy
<b>Other</b>						Year dummy				Year dummy

<sup>1</sup> total annual capital costs = rental commitments + depreciation + i\*net ppe; <sup>2</sup> Lease ratio is calculated by dividing the current rental expenses plus present value of operating-lease commitments for next 5 years, discounted at 10% by the market value of the company. Graham et al. also uses the debt ratio and the capital leases to market value as dependent variable.

**6.3.1 The dependent leasing variable in previous studies**

This thesis concerns particularly operating leases as explained in chapter 2. The main research question of this chapter is what company characteristics determine whether a company is a high- or low- operating leasing company. As shown in Table 6.2, many of the studies that have investigated the determinants of leasing choice concerned only financial leases. Only the studies of Sharpe and Nguyen (1995), Graham et al. (1998) and Duke et al. (2002) include a model in which operating leases are *separately* investigated. El-Gazzar et al. (1986) also investigate operating leases separately, but only by dividing companies into ‘capitalisers’ (only financial leases reported) and ‘non-capitalisers’ (only operating leases reported). Table 6.2 shows that of the remainder of the nine investigated studies, three concern only financial leases and four use financial and operating leases together as a dependent variable in their model. Furthermore, Table 6.2 shows that all studies use a ratio as dependent variable (the lease intensity defined as the lease quantity divided by some other measure). Two studies, El-Gazzar et al. (1986) and Lasfer and Levis (1998), additionally include a model with a lease dummy as a dependent variable, where the dummy takes a value of one if a company discloses operating leases and no financial leases (El-Gazzar) or if a company reports financial leases regardless of whether they also disclose operating leases (Lasfer and Levis).

**Table 6.2 Appearance of the dependent variable in the eight investigated studies**

Different studies are categorised by the type of lease used in the study (either separately financial- or operating leases, or both types combined) and by whether the dependent variable is used in a relative measure (lease intensity) or in a dichotomous variable (lease dummy).

DEPENDENT VARIABLE	FINANCIAL LEASE SEPARATELY	OPERATING LEASE SEPARATELY	COMBINED FINANCIAL AND OPERATING LEASES
Lease dummy	Lasfer and Levis (1998)		El-Gazzar et al. (1986)
Lease intensity	Ang and Peterson (1984) Graham et al. (1998) Deloof and Verschuere (1999) Mehran et al. (1999)	Graham et al. (1998) Sharpe and Nguyen (1995) Duke et al. (2002)	El-Gazzar et al. (1986) Sharpe and Nguyen (1995) Adams and Hardwick (1998) Mehran et al. (1999)

The main purpose of the study of Ang and Peterson (1984) was to find evidence on the lease-debt substitutability question (are leases and debt supplementary or complementary to each other?). They incorporated only financial leases. They used data from the period 1976 through 1981, and mentioned that the percentage of companies with operating (non-capitalised) leases shrank from thirteen percent in 1976 to eight percent in 1977, to one percent in 1978, and to even less than one percent in the years thereafter. They concluded that this sharp decline might be attributable to the lease classification criteria of FAS13 (see chapter 2), which became effective from 1980. This probably resulted in a reclassification of operating leases as financial leases. Therefore, Ang and Peterson assumed that operating leases could not possibly play a role in explaining the lease-debt substitutability coefficient; operating leases were thus not included in their study<sup>58</sup>. In their analysis, the lease ratio is a negative function of the debt ratio and the debt capacity of a company. The debt capacity of a company is a function of six other financial variables; being operating leverage, sales variability, profitability,

<sup>58</sup> Their findings of the insignificance of operating leases is in sharp contrast with the findings of similar studies in the US of for example Graham et al. (1998) or more recently the SEC (2005) who have evidence that the opposite is true (financial lease only a fraction of operating leases).

expected growth, size and liquidity. They concluded (p.1064) that their findings might be declared as ‘an unsolved puzzle’ in finance.

The study of El-Gazzar et al. (1986) aimed to find evidence on managerial lease-accounting choice using leverage-, bonus plan- and political costs variables. They tested two models, one with lease intensity as a dependent variable and one with a lease dummy as a dependent variable. The lease intensity was calculated as both financial- and operating leases divided by total assets (so no separate analysis for operating leases). The operating-lease part within the lease-intensity measure is the present value of the lease liabilities (FAS13 disclosure type; see chapter 2). However, El-Gazzar et al. did not indicate which discount rate they used or how they divided the lease payments after year five over the future years. The second model used a lease dummy with a value of one if a company used only operating leases and zero if a company used only financial leases. El-Gazzar et al. therefore used an all-or-nothing approach in which they tried to distinguish the differences between companies that capitalise leases and companies that do not.

Sharpe and Nguyen (1995) analysed the incentive to lease from the perspective of capital-market imperfections. They included the financial-lease share and operating-lease share as dependent variables— both separately as well as in a total leasing share. The operating-lease share was calculated by dividing rental commitments by total capital costs. (See also chapter 5, where this measure was used to test the materiality of lease commitments). In their paper, Sharpe and Nguyen focused on the role of leasing in alleviating financial contracting costs. Their hypothesis was that companies facing higher costs of external funding might be able to economize on fixed capital costs through leasing. In other words, leasing lowers average capital costs for companies facing high premiums. Their analysis was based on three variables that act as indicators for higher premiums on external funds. These variables are no dividend paid, poor cash-flow generation and low rating. Sharpe and Nguyen (1995) were therefore most interested in the performance indicators of a company. Other variables (such as size and tax obligations) were also included to define what motivates leasing, but these variables were less important in the investigation of their hypothesis.

Adams and Hardwick (1998) included both financial and operating leases in their study by calculating a total leasing share (rental payments divided by total capital costs). Although their approach was identical to that of Sharpe and Nguyen (1995), they did not investigate operating leases separately (as Sharpe and Nguyen did). Adams and Hardwick (1998) aimed to provide evidence on the possible relationship between leasing decisions and four company-specific characteristics: leverage, company size, ownership structure and the investment opportunity set. They argued in a footnote that in contrast to prior UK studies that excluded operating leases, they included operating leases, since their study tested for differences between leasing and non-leasing decisions rather than examining choices between different types of leasing. They assumed with this that the choice for operating- and financial leases is influenced by the same determinants.

The purpose of the study of Lasfer and Levis (1998) was to show the determinants of the leasing decision, and to investigate whether these determinants differ between quoted- and non-quoted companies and between small- and large

companies. Although their study included eighteen different variables to analyse the determinants of leasing decisions, it was limited in two ways. First, they included only financial lease and hire purchase as recognised in the borrowing section of the balance sheet. They explicitly excluded operating leases from their analysis, since these were deemed 'short-term cancellable leases' (p.166). The second limitation of their study was the differentiation made in their analysis between lessee and non-lessee companies (a non-lessee company does not have financial leases and a lessee-company does). This distinction was used in both the univariate- and the logit analysis. Only when investigating the univariate size differences between lessee and non-lessee companies, and quoted and non-quoted companies, did they include an average lease propensity of these sub-samples. This lease propensity is the ratio of financial leases and hire purchases divided by total debt. Of course, this ratio is zero for the non-lessee companies.

The study of Graham et al. (1998) is one of the three studies that also focuses separately on operating leases. Since their major goal was to analyse the relationship of the tax status of a company and the company's usage of leasing, they focussed on operating leases, which are classified as true leases by the IRS. They tested three different models using three different financial claims as dependent variables: debt (excluding financial leases), financial leases and operating leases, all three as a fraction of the market value of the company. The present value of operating leases was calculated as the present value of the current-year rental expense plus rental expenses over the next five years, discounted at 10%. Although they worried about the bias that might have arisen from using a fixed 10% for all companies<sup>59</sup>, they did not mention the bias that might have arisen while they ignored the lump-sum lease commitments after year five. For example, the discussion in chapter 5 of this thesis showed that in the Netherlands, the lump-sum payment after year five accounts for approximately 23% of the total commitments. Ignoring these commitments would seriously distort a lease-intensity measure.

Worth mentioning, furthermore, is the difference between the findings of Graham et al. (1998) compared to those of Ang and Peterson (1984) with respect to the number of companies with operating leases. The sample of Graham et al. consisted of 18,193 company-year observations during the period 1981 through 1992 (Ang and Peterson's period of 1976 through 1981 had 3,600 such observations). Graham et al. showed that 99.9% of these observations had operating leases in their capital structure, against 52.6% financial leases. They explained the high incidence of operating leases by the fact that (p.139) 'most firms lease at least some items, such as office equipment or automobiles'. As mentioned before, Ang and Peterson ignored operating leases, since less than 1% of the companies disclosed operating leases during the period 1979 through 1981. Both studies used US companies and the Compustat database. A reason for this difference might be that Ang and Peterson based their study solely on information from Compustat, whereas Graham et al. might have manually extracted the operating-lease information from annual reports. As described in chapter 5, many databases do not include operating leases in their databases because of the divergent formats that different companies use for disclosing operating leases.

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<sup>59</sup> See also chapters 4 and 5. Graham et al. used as alternative discount rate the short-term borrowing rate of each company; this led to many missing observations but also did not change the qualitative nature of their results.

Mehran et al. (1999) analysed the lease decision also within the framework of financial contracting theory. They argued that financial contracting theory suggests that ownership structure is potentially an important determinant of debt financing and leasing, but that its effect on leasing had not yet been explored. They also controlled for other explanatory variables that had been found in previous leasing studies. The dependent variable in the model of Mehran et al. (1999) was the lease intensity; this variable included operating leases. Mehran et al. (1999) argued that ignoring the operating leases in their measurement of lease intensity would cause them to miss important findings on, for example, the tax effects of leasing. They also referred to Graham et al., who had pointed out that operating leases were more likely to qualify as ‘true leases’ and that under the US Internal Revenue Service guidelines (IRS) only true leases allow the transfer of non-debt tax shields from lessee to lessor. Therefore, in addition to their two models using only financial leases as dependent variables, they also included a model featuring the share of lease payments (financial leases and operating leases) in total capital costs as a dependent variable (see Sharpe and Nguyen, 1995)). Despite their arguments about how important operating leases are in capturing tax effects, Mehran et al. did not include a measure that solely included operating leases.

The study of Deloof and Verschueren (1999) is the only one that analyses companies outside the US or the UK. Unfortunately, they also considered only financial leases. The dependent variable was a lease ratio calculated as financial leases divided by total assets. Their study falls within the lease-debt substitutability discussion (see Ang and Peterson, 1984)); their focus was therefore on the relationship between five different leverage ratios and the lease ratio. They also included variables representing profitability, variability of income, size, growth and the nature of assets.

Duke et al. (2002) aimed to test empirically the company-specific variables that were linked theoretically in prior studies to operating leases. More specifically, they sought to test the theoretical reasoning of Smith and Wakeman (1985). They focused on the three agency costs / financial contracting incentives to lease as described by Smith and Wakeman (1985) (compensation contracts, debt covenants and ownership structure). Although they focused on operating leases, they did compromise on the validity of their dependent variable. According to Duke et al., the best measure as dependent variable would theoretically be the present value of minimum lease payments for operating- and financial leases. However, as they mention, this value is neither disclosed as such in financial statements nor is it available in databases. Furthermore, based on the study of Ely (1992; see also chapter 4), they concluded that using a capitalisation method is problematic due to the underlying assumptions. Therefore, Duke et al. alone took into account the cumulative next five-year’s *nominal* lease payments and divided these by total assets. As an alternative measure, they divided the cumulative figure by purchased assets instead of total assets.

### 6.3.2 Choice of dependent variable in this study

The purpose of this study is to find evidence on the determinants of the choice for operating leases. Four of the above-described studies had a similar purpose (El-Gazzar et al. (1986; Sharpe and Nguyen (1995), Graham et al. (1998) and Duke et al. (2002)). All focused on a limited set of determinants, and Sharpe and Nguyen



(1995) and Graham et al. (1998), for example, both excluded the variable on which operating leases had the highest impact: leverage. Also the study of El-Gazzar et al. (1986) distinguished the usage of operating leases, but theirs was an all-or-nothing approach: a company has either only financial leases or only operating leases. There was no measure for high leasing- versus low-leasing companies. As described in chapter 2, almost all companies have operating leases nowadays, and the method of El-Gazzar et al. (1986) would exclude the majority of companies that report having both types of leases. The study of Duke et al. (2002) did investigate the relative usage of operating leases. However, due to insufficient data and difficulties in capitalising the lease liability, they calculated the lease intensity by taking into account only the nominal lease commitments of the next five years.

The other studies analysed either only financial leases or only total leases (financial- and operating leases combined). The focus on financial leases is easier, due to the availability of data derived from financial databases (see chapter 5). However, many of the hypotheses formulated by the researchers relate to the off-balance-sheet advantage of operating leases. For example, the debt-covenants hypothesis assumes that companies with a high leverage are more likely to lease, since they might avoid the debt constraints on existing debt. However, this refers to off-balance-sheet leases and not on-balance. Moreover, the bonus-plan hypothesis assumes that managers will choose the accounting method that best fulfils their interests. Bonus plans based on accounting numbers are more likely to encourage off-balance leases instead of on-balance leases. Furthermore, the tax transfer between lessees (charged lower taxes) and lessors (charged high taxes) is only applicable for true leases: operating leases.

Smith and Wakeman (1985) argued that since financial leases are not ‘true leases’, but are accounted for on-balance, incentives associated with bond contracts and executive compensation contracts cannot explain the choice of financial leases. Sharpe and Nguyen (1995) found different statistical results between the financial-lease share and the operating-lease share. The results of all studies taking into account only financial leases cannot be applied to a model for operating leases only; the results of the studies with both types of leases combined will also probably be influenced by the proportion of financial leases. It is surprising that El-Gazzar et al. (1986) did not test the lease intensity of operating leases separately. They had the data (the present value of the operating-lease liability), and their main focus was on why companies choose operating leases instead of financial leases. Mehran et al. (1999) argued that consideration of financial leases alone might cause researchers to miss the true effect of some of the determinants. Furthermore, they argued that another difficulty with only using financial leases is that they are not used by many companies. In their sample of 176 companies, only 68 companies reported financial leases. However, their model investigated only the effect of ownership structure on financial and operating leases combined, and did not study separately the effect of ownership structure on operating-lease intensity.

Therefore, an improvement of this study as compared to the prior studies lies within the dependent variable: operating leases alone. In contrast to El-Gazzar et al. (1986), who tested the choice between operating- and financial leases, this study tests how certain determinants relate to the intensity of the (accounting) choice for operating leases. Also, the operating-lease intensity measure used in this study is

more refined than the measure used by Duke et al. This study takes into account all future lease commitments (not only those in the next five years), and calculates the present value of the lease liability (instead of nominal commitments).

### 6.3.3 The endogeneity of certain variables

The argument of Sharpe and Nguyen (1995) that total assets, because of its endogeneity, is not appropriate as explanatory variable for size is also applicable to other variables that are significantly affected by the capitalisation of operating leases. Chapter 5 proved that these variables are especially the ratios in which either debt or total assets are adjusted. However, most studies that analyse the relation between operating-lease intensity and company characteristics ignore the impact that operating leases have on the balance sheet of a company. This study tests the relationship between the determinants before- and after-capitalisation of operating leases and the operating-lease intensity. For example, chapter 5 showed that operating leases significantly affect the leverage ratios of a company. This indicates that a company with an average leverage ratio might choose operating leases instead of on-balance debt to prevent their leverage ratio increasing to above-average levels. The leverage ratio for this company before capitalisation might not have differed with the leverage ratio of a non-leasing company; the company succeeded in its goal to circumvent the disadvantages arising from a too-high leverage. Therefore, the choice of using a leverage ratio before capitalisation or after capitalisation will affect the outcome of the results. This is an important distinction, as will be illustrated by Figure 6.1. It is evident that not all determinants are endogenous (size can be measured by total assets, but also by sales or the market value of equity).

**Figure 6.1** Illustration of determinants before- or after operating-lease capitalisation

Assume two companies A and B with the following balance sheets:

A			B		
Assets	100	Equity	20	Assets	80
		Debt	80	Equity	20
		Total	100	Debt	60
				Total	80

In an attempt to avoid the violation of their debt covenants, the management of company B has successfully decreased their on-balance liabilities in the past by choosing operating leases instead of normal debt financing to finance their assets. Company A has no operating leases. The present value of the lease commitments of company B is 30. (For the sake of convenience, this is also the value of the leased assets.) PVOL/TA of B is consequently 37.5% (30/80).

Total debt to total assets is 0.8 for company A, and 0.75 for company B. Through their leasing policy, company B has successfully lowered their leverage. Based on these numbers, an empirical study would result in a negative relationship between leverage and operating-lease intensity (higher leverage, fewer leases). This would consequently lead to the rejection of the debt hypothesis. Also, when examining size measured by total assets, the relation is negative. A larger company has fewer operating leases. However, if we test the relationship between size and leverage (as if the operating leases would have been capitalised), the results show the opposite. The balance sheet of company B will be adjusted as shown below.

A			B, after lease capitalisation		
Assets	100	Equity	20	Assets	110
		Debt	80	Equity	20
		Total	100	Debt	90
				Total	110

Although the leverage of company A remains 0.80, company B's leverage increases from 0.75 to 0.82. Now the relationship between leverage and operating lease intensity is indeed positive, and the debt hypothesis is confirmed. In addition, the relationship size and operating-lease intensity become positive.

The previous example shows the impact that the capitalisation of operating leases may have on empirical studies investigating the determinants of the operating-lease decision. As a measure of size, variables can be chosen that are not affected by operating leases, which solves for size as a determinant the endogeneity issue. However, no measure of leverage exists that is not affected by the operating leases. Also, many ratios are calculated by dividing by total assets, which expands the endogeneity issue on this variable. Therefore, to bring companies to a comparable base, this study adjusts the explanatory variables for operating leases, if appropriate. It is therefore implicitly assumed that (operating) leases and debt are substitutes and not complements.

Finally, in contrast to all studies discussed, this study does not focus on a limited set of variables, but investigates all determinants discussed above using, at the least, the univariate approach. The hypotheses for each determinant are formulated in the next sub-sections.

Although these differences prohibit a comparison between the studies based on equal variables, the argumentation why certain determinants are included is still relevant and will be discussed in the following sections. However, not only the *dependent* variable (leasing choice in different forms) differs between the studies, also different arguments are used for the same *independent* variable to have an impact on the leasing choice. For example, the variable 'size' is a measure of political costs, according to El-Gazzar et al. (1986), because large companies are more likely to suffer from excess regulation (see section 6.2). However, Lasfer and Levis (1998) argue that company size can be a measure of the extent to which companies have the ability to redeploy assets internally, and this might indicate that large companies are less likely to lease assets. The discussion will now turn to address consecutively the following determinants of leasing choice: leverage (6.4), size (6.5), profitability (6.6), growth/investment opportunity set (6.7), capital intensity/asset structure (6.8), effective tax rate (6.9), management compensation (6.10), ownership structure (6.11) and industry (6.12). Each sub-section presents a literature review and formulation of the related hypotheses.

## **6.4 Leverage**

### **6.4.1 Literature review**

Chapter 5 showed that the capitalisation of operating leases had the highest impact on the leverage ratios of a company. This was in line with previous research on the impact of operating-lease capitalisation (Imhoff et al. (1991, (1997), Beattie et al. (1998) and others). Most studies summarised in Table 6.1 include one or more measures of leverage; Deloof and Verschueren (1998) even include five different measures of leverage. Sharpe and Nguyen (1995) and Graham et al. (1998) did not include a leverage measure. This is especially regrettable, since these two studies analysed separately operating leases as dependent variable. The results on leverage are summarised in Table 6.3 and described thereafter.

**Table 6.3** Prior results on leverage

STUDY	DEPENDENT VARIABLE	MEASURE OF LEVERAGE	SIGN	SIGNIFICANCE
<b>Ang and Peterson</b>	Financial lease	Debt/ book value of equity	Positive	Significant
<b>El-Gazzar et al.</b>	Lease dummy	Change in Debt/Equity	Positive	Significant
		Debt/Equity	Positive	Significant
		Debt/Equity net of industry	Positive	Significant
<b>Adams and Hardwick</b>	Total leases	Long-term debt /total assets	Positive	Significant
<b>Lasfer and Levis</b>	Financial lease dummy	Long-term debt/capital employed	Positive	Not significant
<b>Mehran et al.</b>	Total leases	(predicted) total debt/capital employed	Positive	Significant
			Large companies: positive	Not significant
<b>Deloof and Verschueren</b>	Financial leases	Long-term debt/total assets	Negative	Significant
			Positive small companies	Not significant
			Negative large companies	Significant
<b>Duke et al.</b>	Operating lease	Long-term debt/equity	Positive	Significant
		Covenants existence	Positive	Not significant

As described before, Ang and Peterson's (1984) study falls within the lease-debt substitutability discussion, and they investigated only financial leases. The leverage ratio used by Ang and Peterson is defined as debt-to-book-value-of-equity. They found a significant, positive relationship between the lease ratio and the debt ratio. Their results showed that leases and debt are complementary, meaning greater debt is associated with greater leasing. One of the explanations they formulate is that the market for debt and debt-like securities may not be efficient. They use as an example Abdel-Khalik (1981), who reported that a high percentage of lenders apparently ignore non-capitalized leases. It is surprising that Ang and Peterson quote Abdel-Khalik's conclusion, since they did exactly the same (ignoring non-capitalised leases) and even formulate arguments for their exclusion of operating leases (see discussion above).

El-Gazzar et al. (1986) analysed the differences between companies with either financial leases (the capitalisers) and operating leases (the non-capitalisers). They used three different measures of leverage in their study: the change in the debt-equity ratio, the debt-equity ratio and the industry-adjusted debt-equity ratio. They hypothesised a positive relation between all three measures and the choice for operating leases (instead of financial leases). They based their hypotheses on previous research that indicated that companies with financial ratios closer to the limits of covenants should be motivated to loosen the covenant constraints. Violation of the covenants imposes costs because it restricts investments and financing possibilities (debt capacity) and could also lead to technical default, triggering debt renegotiation costs. All three leverage hypotheses were confirmed by their results.

Adams and Hardwick (1998) argued that high corporate leverage is often associated with increased contracting costs (higher cost of capital and increased monitoring expenditures). Leasing, however, allows company managers to circumvent debt covenants and to generate cash flows that could be used to finance bonuses and perquisite consumption. This is in line with debt and leases being complementary instead of substitutes, because lenders do not view leases as equivalent to debt. Adams and Hardwick (1998) argued in favour of the complementary view of leasing managers in highly leased companies being able to differentiate more easily the claims of shareholders and debt-holders on future cash flow generated from projects. They hypothesised that highly leveraged companies have a higher leasing

share (operating- plus financial leases) because leasing would mitigate incentive conflicts between owners, debt-holders and managers in highly leased companies. Their results confirmed this hypothesis.

Lasfer and Levis (1998) investigated whether the relationship between leverage and leasing is different for small and large companies. They followed Smith and Wakeman (1985), who argued that the results of Ang and Peterson (1984) reflect the difficulties to control for debt capacity. Companies with higher debt capacity may also have other characteristics that make leasing relatively attractive. For example, companies with certain asset characteristics might have a higher debt capacity and therefore can afford to use more debt and leasing than other companies do. They hypothesise that if leasing is a substitute for debt financing, lessee companies will exhibit lower leverage ratios than will non-lessee companies. The results of Lasfer and Levis (1998) showed in a univariate analysis that a high leverage ratio was positively related to more leasing for not only the entire sample, but also the subs-sample of quoted companies. Also in the logit-regression was the leverage ratio significantly positively related to the probability of using leasing for the entire sample. However, when the sample was split into sub-samples, the results were not significant for the quoted companies in the sample. Their results also showed that the reason to lease is different for quoted and unquoted companies and for small and large companies.

Although Mehran et al. (1999)'s major goal was to define the relationship between ownership structure and the lease decision, they also explored the relationship between leasing and other debt financing. A leverage ratio was used indirectly in predicting the lease intensity. In their study lease intensity is a function of debt intensity and control variables<sup>60</sup>. They assume that a company first determines its overall fixed-claim capacity (based on tax considerations and contracting costs), and then considers how to allocate this capacity between debt and leasing. The use of debt (the debt intensity) depends on a set of control variables. Next, the use of leasing depends on the use of debt plus a set of additional control variables. They found evidence of a positive relationship between debt and financial leases, but when they included operating leases, they found no significant interaction.

Deloof and Verschueren (1999) sought to test the debt-substitution hypothesis for Belgian companies. They limited their study to financial leases, whereas the ratio of financial leases to total assets was the dependent variable. Deloof and Verschueren estimated a model with six different forms of long-term debt, and they also incorporated a set of factors determining the overall debt ratio of a non-leasing company. Their results indicate a significant negative relationship between long-term debt and the lease ratio. This relationship is even stronger for larger companies, which have on average higher debt ratios as well as higher lease ratios.

The study of Duke et al. (2002) is set up to test empirically the Smith and Wakeman (1985) model, which theoretically linked certain variables to the choice for leasing. Although Smith and Wakeman did not mention leverage, they were able to conclude

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<sup>60</sup> The indirect approach of Mehran and Taggart (1999) may be expressed as follows: First, calculate debt intensity =  $f$  (control variables); second, use the debt intensity to calculate the lease intensity =  $g$  (debt intensity, control variables).

that operating leasing<sup>61</sup> is more likely if corporate bond contracts contain specific financial policy covenants. Although this is in line with El-Gazzar et al., El-Gazzar did not include the existence of debt covenants in their analysis, but argued that the closer a company is to breaking the covenants, the more operating leases it will have. El-Gazzar therefore used leverage ratios to test this relationship. Duke et al. tested the relationship by including a debt-covenants dummy (with a value of one when covenants existed and zero if not). They also included a leverage ratio (long-term debt/equity) in their study for two reasons. The first has to do with the positive correlation found by El-Gazzar et al. between the debt-equity ratio and the use of operating leases. The second has to do with the explanatory power that the debt/equity ratio has in models that include debt covenants provisions as shown in prior studies. Duke et al. use three different methods (ordered logit, multinomial logit and OLS), each of which yielded different results. Both variables, covenants dummy and D/E ratio show a steady positive relation with operating leases, but for both variables significance occurs only once. Duke et al.'s conclusion: that the method chosen influences the outcome, and that further research is necessary.

#### 6.4.2 Debt hypothesis

Leverage is probably the most investigated variable in explaining the choice for leases. However, although much evidence is available regarding the impact that operating leases have on leverage (see also chapters four and five), it is surprising that only one study (El-Gazzar et al.) takes into account adjusted leverage ratios (change in debt/equity ratio through capitalisation). Most studies hypothesise that companies with a higher leverage are more inclined to lease, since they are closer to breaking their debt covenants or to exhausting their debt capacity. All but one study found a positive significant effect (see Table 6.3). Only Deloof and Verschueren (1999) found a negative relationship between leverage and financial leases for large companies. However, as shown in Figure 6.1 in the previous subsection, a negative relationship between leverage and the operating-lease intensity might occur if companies succeed in lowering their leverage ratios through leasing to a below-average level. The debt hypotheses in this study will therefore be twofold, one tests the leverage ratio before capitalisation and one tests it afterward. Since operating leases are a means of lowering too-high leverage ratios, the leverage ratio *before capitalisation* for high- and low-leasing companies can be evened-out. Since the on-balance equivalent of operating leases has a significant impact on the leverage ratio, however, the leverage ratio *after capitalisation* for high-leasing companies will be higher than for low-leasing companies.

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<sup>61</sup> Although the Smith and Wakeman study concerns both financial and operating leases, they mention that their prediction concerning covenants in bond contracts and executive compensation contracts relate to incentives that are only achieved by operating leases and not by financial leases.

We may thus formulate two hypotheses on leverage. Based on the above, the debt hypotheses are formulated as follows:

hypothesis 6.1. *Leverage-before-capitalisation hypothesis*

No significant relationship is expected to exist between the leverage ratio before capitalisation and the lease intensity.

hypothesis 6.2. *Leverage-after-capitalisation hypothesis*

A positive relationship is expected to exist between the leverage ratio after capitalisation and the lease intensity.

## 6.5 Size

### 6.5.1 Literature review

Most research on the relationship between size and operating leases suggested a negative relationship. One of the reasons for this is that large companies are more diversified. Lasfer and Levis (1998) argue that company size can be a measure of the extent to which companies have the ability to redeploy assets internally, and this might indicate that large companies are less likely to lease assets. This is also addressed by Sharpe and Nguyen (1995), who state that large companies are more likely to have alternative uses for equipment that is no longer used, or that they might have a well-developed mechanism for remarketing equipment. Also smaller companies face great uncertainty regarding their future need for equipment or (office-) buildings. Smith and Wakeman (1985) and Adams and Hardwick (1998) also see a negative relationship between leasing and company size: large companies are more likely to fully utilise fixed assets or have alternative uses for buildings, equipment and other assets. Another reason why a difference might exist between small- and large companies is that smaller companies face higher costs of obtaining external funds (Graham et al. (1998)). This is also the basis for one of the hypotheses of Sharpe and Nguyen (1995), that companies facing high costs of external capital are more inclined to lease. These companies are mainly the young, fast-growing and innovation-intensive companies. Table 6.4 shows the prior results on size, which are not conclusive.

**Table 6.4** Prior results on size

STUDY	DEPENDENT VARIABLE	MEASURE OF SIZE	SIGN	SIGNIFICANCE
Ang and Peterson	Financial lease	Total Assets	Changing signs	Not significant
El-Gazzar et al.	Lease dummy	Sales	Positive	Not significant
Sharpe et al.	Operating lease	# Employees	Negative	Significant
Adams and Hardwick	Total leases	Sales	Negative <sup>1</sup>	Significant
Lasfer and Levis	Financial lease dummy	Total assets	Positive	Significant
		Sales	Positive	Significant
Graham et al.	Operating lease	Market value of equity	Positive	Significant
		Market value of equity	Negative	Significant
Mehran et al.	Total lease	Sales	Negative	Significant
Deloof and Verschueren	Financial lease	Total assets	Positive	Significant

<sup>1</sup> Adams and Hardwick found that the partial derivative  $\delta_{lease}/\delta_{size}$  is negative for small companies and becomes positive for companies larger than 30 million pounds. Therefore, they are not fully convinced by the significant negative relation between size and lease intensity, and argue that this relation changes for different sizes.

Ang and Peterson (1984) used as a measure of size the total assets at year-end. Their results changed each year during the period 1976 through 1981: the sign of the relationship between size and lease intensity changes and only twice is the

relationship significant (1976 and 1981; in both years the relationship was positive). Their results were therefore not unambiguous.

Based on prior studies, El-Gazzar et al. (1986) investigated size as a measure of political cost. Large companies are more likely to suffer excess regulation and/or higher taxes. They argue that large companies have a greater motivation to choose accounting methods that lower current-period income and therefore avoid operating leases. El-Gazzar et al. used total sales as a measure of size, and found (in contrast to their hypothesis) a positive relation, however insignificant, between company size and operating leases.

Sharpe and Nguyen (1995) used as measure of size the log of the number of employees, of which the alternative log of sales gave the similar results. They argued that the standard measure of size, the log of total assets, is inappropriate because of its endogeneity. As they pointed out, companies that lease more will have a lower level of book assets. They preferred the usage of employees since it is, unlike total assets, invariant to the leasing choice. The results confirmed the hypothesis of Sharpe and Nguyen that small companies lease more than large companies. This negative relationship between size and lease intensity was significant.

The Adams and Hardwick (1998) study measured size as annual turnover. In line with Sharpe and Nguyen (1995), they argued that total assets are inappropriate, since assets are part of the dependent variable proxy. The results of Adams and Hardwick provided only limited support for the view that small companies are more likely to lease than large companies are. In their regression, the coefficient of the size variable was significantly less than zero, which suggested the inverse relationship between leasing and size. However, Adams and Hardwick also considered the partial derivative  $\delta \text{lease} / \delta \text{size}$ . They thus investigated whether a change in company size had the same effect on the leasing share for companies of all sizes. Their results showed that the leasing share tended to fall as company size increased for companies up to £30 million turnover, but increased for larger companies.

In the study of Lasfer and Levis (1998), size was included not only as explanatory variable but also as a measure to differentiate between different types of companies. They investigated whether the financial lease decision differs between large- and small companies. While they consider the size of a company as a measure of the extent to which companies can redeploy internally (the diversification argument of why large companies use less leases), they also acknowledge that the difference between the availability of financing opportunities and the costs varies between small and large companies. Size is also used to divide the companies in the sample. Their results showed that the determinants of the leasing decisions are size dependent. For example, tax reasons are less important for small companies; their lease decision is affected more by their growth opportunities. The significance of these determinants is reverse for large companies. The univariate analysis results show that companies that lease are larger than companies that do not. Within the sample of companies that lease, however, they found a negative relationship between size and leasing. Furthermore, in the logit analysis they found a positive relationship between size and leasing. Lasfer and Levis use three measures of size: total assets, market value of equity and sales.



Using size-based theories, Graham et al. (1998) expected that larger companies are more likely to use debt financing (instead of leasing) than are smaller companies. They argued that large companies are more diversified and thus have more stable cash flows. They also mentioned economies of scale when issuing securities for larger companies, and higher issuing costs for obtaining external funds by smaller companies, due to information asymmetry. All three arguments lead to the expectation that size and lease usage are inversely related. Graham et al. (1998) used the natural log of market value of the company as a proxy for company size, but their results were unchanged using total assets adjusted for operating leases or total sales as proxies. Indeed, their results showed a significant negative relationship between size and operating leases to the market value of a company.

Based on the studies of Sharpe and Nguyen (1995) and Graham et al. (1998), Mehran et al. (1999) argued that company size might be a proxy for the cost of issuing securities and for a company's investment flexibility and diversification possibilities. Their study uses total sales as the measure of size. Their results show that size not only has a strong positive effect on debt financing, but also is positively related to the leasing share of total capital costs.

Deloof and Verschueren (1999) also analysed the difference between large- and small companies and the determinants of the financial lease decision, although this difference was not the major intention of their study (as with Lasfer and Levis). Using total assets as a measure of size, they found a significant positive relation for the entire sample, but also for the small-company sample (1<sup>st</sup> quartile) and the large-company sample (4<sup>th</sup> quartile) separately.

Table 6.4 showed previous results on size as an explanatory variable in explaining the lease intensity of a company. All eight studies included size as an explanatory variable. The results are mixed. Six studies found a significant relationship between size and lease intensity, but of these six studies four found a negative relationship and two a positive. The two studies that investigated operating-lease intensity separately both found a negative, significant relationship. However, El-Gazzar et al. found a positive non-significant relationship between companies with only operating leases, in contrast to companies with only financial leases. Of the three studies that investigated separately financial leases, two found a significant positive relationship, and the third was indecisive. These results indicate that size may have a different impact on the financial or operating leasing decision and that a model including only a combination of both types of leases is not appropriate to analyse this relationship.

### **6.5.2 Size hypothesis**

The above-described studies thus differ greatly with respect to their results on the relation between size and leases. Also the hypotheses formulated by the different authors differ greatly. Valid arguments can be made for either a negative or a positive relation between size and operating-lease intensity. A negative relation is explainable when size is related to the flexibility motive in choosing leasing. Flexibility is less important for large companies, since these are more diversified, and therefore capable of redeploying assets internally, or are less sensitive to changes in production or market demand. Also financial contracting theory suggests

that larger companies have better access to financial markets and are less inclined to lease. However, the management of these companies is more capable in enforcing financial contracts that are in their best interest, which might be off-balance financings. Furthermore, also the political cost hypothesis might also lead to the expectation that large companies are more carefully scrutinised and thus have an incentive to improve their financial ratios. The results of Lasfer and Levis (1998) illustrated the mixed results on size as a determinant of the lease decision in one study. They showed the differences between large- and small-, quoted- and unquoted-, lessee- and non-lessee companies— and these results are also mixed. They found that non-lessee companies are smaller than lessee firms (indicating a negative relation), but within the lessee company sub-sample, the smaller firms had a higher lease propensity (indicating a positive relation). The difficulty in explaining the relation was also expressed by Adams and Hardwick (1998, p.493), who argued that, although they found a significant negative relation between size and total lease intensity, “this is only limited support of the view that small companies are more likely to lease than large companies”. They distinguished between very small companies that lease more because they are growing and need to minimize costs, and the largest companies that lease more specific assets such as cars and equipment.

Chapter 5 explained that in our sample only 77 out of 584 observations did not use operating leases; the distinction as made by Lasfer and Levis (1998) between lessee- and non-lessee companies is therefore not worthwhile. However, as suggested by Adams and Hardwick (1998), the relationship between size and operating lease intensity might be the opposite for very small- and very large companies. The outcome of the entire sample is then only an average that can go both ways. This would partly explain the different results of different studies. To solve this issue, we test the relationship between size and operating-lease intensity not only for the entire sample, but also for the smallest and largest companies in the sample.

In this study a positive relationship is expected to exist between size and operating-lease intensity based on the political-cost hypothesis and financial contracting theory. The political-cost hypothesis is based on the idea that since larger companies are watched more closely by external parties, they may be more motivated to improve certain financial ratios. Furthermore, according to the financial contracting theory, larger companies are better informed, and have better access to financial markets, which will allow them to choose the financial contracts that are in their best interest.

hypothesis 6.3. *Size hypothesis*

A positive relationship is expected to exist between the size of a company and the operating-lease intensity.

## **6.6 Performance measures**

### **6.6.1 Literature review**

Six of the eight studies included some measure of performance in their analysis of the lease decision. These performance measures can be related to profit, cash-flow generation, shares or even financial distress as defined by Altman’s z-score. This section combines these measures, since most authors provide the same arguments for including one of these measures: *ceteris paribus*, companies generating poor

cash flow (Lasfer and Levis (1998): lower profitability) probably face higher funding costs: therefore, a greater cash flow enhances a company's debt capacity (Sharpe and Nguyen (1995)). El-Gazzar et al. (1986), and Adams and Hardwick (1998) do not include a profitability measure in their analysis.

**Table 6.5 Prior results on performance measures**

STUDY	DEPENDENT VARIABLE	MEASURE OF PERFORMANCE	SIGN	SIGNIFICANCE
<b>Ang and Peterson</b>	Financial leases	Return on net PPE	Negative	Significant
		EBITDA/Sales (10 years)	Negative	Significant
		Variability of Sales (10 years)	Changing signs	Not significant
		Current ratio	Changing signs	Not significant
<b>Sharpe et al.</b>	Operating leases	EBITDA plus rent/sales	Changing signs	Inconclusive
		Bond rating	Negative for higher ratings	Significant
			Changing signs for lower ratings	Not significant
<b>Lasfer and Levis</b>	Lease dummy	Earnings per share	Positive for all companies	Not significant
			Positive for large companies	Significant
			Negative for small companies	Significant
<b>Graham et al.</b>	Operating leases	z-score	Positive	Significant
		Negative equity dummy	Positive	Not significant
		EBITDA/Total assets <i>times</i> R&D and advertising/TA	Positive	Significant
<b>Mehran et al.</b>	Total leases	EBIT/Total Assets	Not directly tested, but through predicted leverage ratio (see leverage)	
		Dividend/Book value of equity		
<b>Deloof and Verschueren</b>	Financial leases	EBITDA/Total Assets	Negative for all companies	Significant
			Positive for 25% smallest companies	Not significant
			Negative for 25% largest companies	Not significant

Ang and Peterson (1984) used as profitability measure the return on net property, plant and equipment (PPE), although they did not define 'return', which makes it more difficult to compare their results with those of the other studies. Furthermore, they used a measure of operating leverage defined as the ten-year change in operating earnings on sales. The results showed for both variables a significant negative relationship. As with the other variables in their study, they did not ground their choice of variables on any theory or previous research, and they provide no explanation as to why these variables are significantly negative.

As described above, Sharpe and Nguyen (1995) tested their hypothesis that high external financing costs are positively related with leasing intensity. They therefore used a cash-flow measure because it is a proxy for relative funding costs. As an alternative they used the rating of a company (Standard and Poor's) and also a dummy variable for no dividend pay out. These are all indicators that a company faces higher costs of external financing. Their measure of cash flow was equal to the ratio of earnings before interest, depreciation, rent and tax (EBITDA plus rent expenses) to sales. Rental expenses are added back to avoid creating a cash-flow measure that is influenced by the choice between renting and buying. Sharpe and Nguyen (1995) analysed three different models (total leasing share, only financial leasing share and only operating leasing share) for three different years (1986, 1988 and 1991). Focusing on the results in 1991 for the model explaining the operating-lease share, Sharpe and Nguyen found a negative, but not significant, relation between cash flow and lease propensity. In 1986 this relation was positive and significant, however. With respect to the total leasing share model, the relationship was negative and significant (except 1991). For the financial leasing model it was

positive, but only significantly so in 1988. No-dividend has a significant positive relation with the operating-lease propensity, and finally a high bond rating had a significant negative relation with the lease propensity. Although for low bond ratings the sign became positive, this relation was not significant. These results were the same for the total leasing share model, but differences occur within the financial leasing share model (ratings not significant, cash-flow ratio significantly positive). According to Sharpe and Nguyen (1995), this suggests that it may be inappropriate to ignore the operating leases when testing their hypothesis.

Lasfer and Levis (1998) included profitability as an explanatory variable, since previous studies have shown that leasing is used by less profitable companies, since these companies pay higher premiums for external funds (they refer to Sharpe and Nguyen (1995)). They defined six different profitability measures: earnings before interest and taxes, earnings before tax, return on equity, earnings per share, dividend per share and yield. The results of their analysis of differences (univariate) provided empirical evidence that lessee companies in their sample are on average more profitable than non-lessee companies. This applied to all variables but one: the dividend yield. In their regression they take only the earnings per share as a performance measure. These results differed for their sub-groups of large-, medium- and small companies and between listed and non-listed companies. For the entire sample of listed companies (most relevant for this thesis) the earnings per share were higher for lessee companies than for non-lessee companies, but this was not significant. When split into subgroups of large- and small listed companies, the relation was significantly positive for the large companies, and significantly negative for the small companies. Lasfer and Levis concluded from these results that for large listed companies leasing contributes to their profitability, and for small listed companies leasing contributes to their survival.

Graham et al. (1998) did not investigate the relationship between performance measures and lease intensity. They did investigate, however, the relationship between financial distress and lease intensity. They argued that leasing, as opposed to debt, has a higher priority in bankruptcy. Within a bankruptcy, the lease payments have a higher priority than debt payments, and also the legal ownership of the leased asset remains with the lessor. According to Graham et al. (1998), this meant that companies facing financial distress were able to arrange lease financing on more favourable terms than other forms of financing. Graham et al. (1998) therefore expected a positive relation between leasing and financial distress measures. The financial distress measures they used are a modified version of Altman (1968)'s z-score<sup>62</sup>, a negative equity dummy and a variable relating the likelihood of financial distress with the company's level of intangibility (while this indicates the value of the company that will be lost in liquidation). The relationship between financial and operating leasing and the z-score was significantly positive at the 5% level, but Graham et al. concluded (p.154) that the evidence was inconclusive. They ignored the fact that both z-scores lean heavily on total assets (see footnote 62), and their results with respect to operating leases were consequently affected by their off-balance-sheet character.

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<sup>62</sup> Graham et al.'s modified z-score is:  $3.3 \frac{\text{EBIT}}{\text{Total Assets}} + 1.0 \frac{\text{Sales}}{\text{Total Assets}} + 1.4 \frac{\text{Ret.earnings}}{\text{Total Assets}} + 1.2 \frac{\text{Working Capital}}{\text{Total Assets}}$ , as opposed to

Altman's (1968) z-score:  $3.3 \frac{\text{EBIT}}{\text{Total Assets}} + 1.0 \frac{\text{Sales}}{\text{Total Assets}} + 1.4 \frac{\text{Ret.earnings}}{\text{Total Assets}} + 1.2 \frac{\text{Working Capital}}{\text{Total Assets}} + 0.6 \frac{\text{Market value equity}}{\text{Book value debt}}$

As described before, Mehran et al. estimated the usage of leasing by first predicting the debt intensity and then using the debt intensity to predict the lease intensity. Their performance measures were EBIT/total assets and dividends/equity. The results showed a significant and positive relationship with debt intensity, but this was not tested directly in the leasing-intensity equation. The predicted debt intensity, however, had a positive but not significant relation with the total leasing share.

Deloof and Verschueren (1999) included profitability as well as the EBITDA/total assets ratio. Profitability showed a positive relationship with the lease ratio for the 25% smallest companies (1<sup>st</sup> quartile), but a negative relationship for the 25% largest companies (4<sup>th</sup> quartile). However, both relationships were not significant. For the entire sample they found a negative, slightly significant, relationship. Their ratio is less appropriate for testing operating-lease intensity, since it is heavily influenced by total assets, which are lowered through operating leases. Moreover, if size is a determinant of the operating-lease decision, it would be inappropriate to distinguish between small- and large companies based on total assets.

### 6.6.2 Performance hypothesis

Chapters 4 and 5 showed that the impact that operating leases have on income-based performance measures is less significant than the impact they have on the balance-sheet items. El-Gazzar et al. (1986) argued that operating leases shift income from future periods to the current period, and that this provides an incentive for managers to choose operating leases. Chapter 5 showed that this is not necessarily true. The impact on the performance ratio based on net income was, however, less significant than the leverage ratio. Therefore, it is not expected that the goal of shifting net income is driving the decision to lease. Furthermore, the results on performance measures of the studies described were also mixed; see Table 6.5, which is partly attributable to the different measures used. For example, EBITDA is tested by dividing it by sales or by total assets. The EBITDA divided by total assets is influenced by the endogenous variable total assets, and this might cause an increase in EBITDA to total assets for high-leasing companies. Furthermore, since the operating-lease rentals are deducted from EBITDA, and depreciation when owning the assets is not, EBITDA (all else equal) will be lower for high-leasing companies. This effect was rightly adjusted by Sharpe and Nguyen (1995) by adding the annual lease payment to EBITDA. Their results are therefore more trustworthy than those of Ang and Peterson (1984), who use the same measure (EBITDA/sales) but not adjusted.

In any analysis of performance based on ratios relating income to total assets, the results are influenced by the fact that shifting assets off of the balance sheets lowers total assets. These ratios are therefore less appropriate as tools with which to test the relationship between performance and operating leases, unless the high- and low-leasing companies are brought to a comparable base. The hypotheses for performance therefore lean on two ideas: first, lower performing companies may choose operating leases to improve performance ratios derived from the financial statement (accounting choice) based on total assets; second, lower performing companies face higher external financing costs, are closer to exhausting their debt-capacity and their internal funding (financial contracting costs). Although both

explanations hypothesise a negative relationship between performance and operating-lease intensity, the first explanation (choosing operating leases because they improve the financial ratios) will be seen only when the ratio is adjusted to the level before the leasing choice was made.

Therefore, the hypotheses on return on assets will be tested using both a before- and after- capitalisation value. Since operating leases lower total assets, but only have a minor impact on (operating) income, the return on assets (ROA) *before capitalisation* improves when operating leases are chosen. This smooths the difference in ROA between high- and low-leasing companies. No significant difference is therefore expected to exist between the ROA of high- and low-leasing companies before capitalisation. If high-leasing companies succeed in improving their ROA, this adaptation will be undone after the capitalisation of operating leases. Thus, a negative relation should exist between ROA after capitalisation and the operating-lease intensity. ROA after capitalisation will be expected to be lower for high-leasing companies than for low-leasing companies. Performance will also be tested using variables exogenous to the lease decision. Since lower performing companies face higher costs of external financing and will be closer to the exhaustion of internal and external financing possibilities, a negative relation is expected to exist between performance measures and operating-lease intensity. High-leasing companies should perform less well than low-leasing companies do.

This leads to the following hypotheses based on the impact that operating leases have on financial ratios (6.4 and 6.5) and financial contracting rationales (6.6):

hypothesis 6.4. *ROA-before-capitalisation hypothesis*

No relationship is expected between the return on assets (ROA) before capitalisation and the operating-lease intensity.

hypothesis 6.5. *ROA-after-capitalisation hypothesis*

A negative relationship is expected between the return on assets (ROA) after capitalisation and the operating-lease intensity.

hypothesis 6.6. *Performance hypothesis*

A negative relationship is expected between the performance measures and the operating-lease intensity.

## **6.7 Growth/investment opportunity set**

### **6.7.1 Literature review**

Growth opportunities of companies have been investigated by Ang and Peterson (1984), Lasfer and Levis (1998), Graham et al. (1998), Krishnan and Moyer (1994), Deloof and Verschueren (1999) and Adams and Hardwick (1998). Since growth is often used as a measure of investment opportunities, both growth and investment opportunities-measures are described in this section. In this study a distinction will be made between (past) growth and (future) investment opportunities. Table 6.6 shows the results of these studies.

**Table 6.6 Prior results on growth/investment opportunity set (IOS)**

STUDY	DEPENDENT VARIABLE	MEASURE OF GROWTH/IOS	SIGN	SIGNIFICANCE
Ang and Peterson	Financial leases	Price earnings ratio	Changing signs	Not significant
Sharpe et al.	Operating leases	No dividend dummy	Positive	Significant
Adams and Hardwick	Total leases	Price earnings ratio	Negative	Not significant
Lasfer and Levis	Financial lease dummy	Additions to other tangible fixed assets/TA	Positive	Significant
		R&D/sales	0	Not significant
		Sales growth	0	Not significant
		Market-to-book	Positive	Significant
Graham et al.	Operating leases	Market-to-book	Negative	Significant
Mehran et al.	Total leases	Market-to-book	Positive	Significant
Deloof and Verschueren	Financial leases	2-year total asset growth	Negative	Not significant

Note: The market-to-book ratios are calculated differently by the different authors: market-to-book for Graham et al. is calculated as market value of the company divided by total assets plus the present value of operating leases. Lasfer and Levis use the market value of equity divided by the book value of equity. Mehran et al. do not describe their calculation of MTB, although it may be assumed that they use also the measure of Lasfer and Levis, since this is a more generally accepted calculation of market-to-book value (also used in financial databases).

Ang and Peterson (1984) define expected growth as the price/earnings ratio. They did not find a significant relation between growth and leasing, and the direction of the relationship is indecisive. They do not explain why growth is chosen as a variable in their model and they also do not explain why the results change during their research period 1976-1981.

Sharpe and Nguyen (1995) use two growth-related measures to test their hypothesis that companies facing higher costs of external capital are more likely to lease. These measures are the variance in sales growth and a no-dividend dummy. The first measure, variance in sales growth, relates to the uncertainty of production capacity and the need of a company to not fully possess their assets. This measure is therefore described in the next section on capital intensity. Incorporation of a no-dividend dummy as a growth variable can be explained as follows. Sharpe and Nguyen argue that especially companies that are young, fast growing and innovation intensive are likely to have many investment opportunities. These companies also face severe information asymmetries and are forced to finance projects from their retained earnings. Sharpe and Nguyen (p.279) argue the companies that pay no cash dividend are consequently likely to be among those most burdened by asymmetric information. Therefore, Sharpe and Nguyen include a no-dividend dummy as an indicator of information asymmetry. They also consider previous research of Smith and Watts (1992), who argue that dividend pay outs should be lowest for those companies at greatest risk of facing the under-investment problem. Companies with more growth opportunities can tolerate more restrictions on dividends. This strengthens Sharpe and Nguyen in their hypothesis that non-dividend-paying companies have a greater propensity to use leases, since doing so alleviates some of the expected costs associated with the under-investment problem.

Adams and Hardwick (1998) hypothesise that companies with more growth options in their investment opportunity will be more likely to lease than companies with more assets in place. They argue that companies with high growth options are likely to be associated with uncertain future cash flows and therefore encounter high contracting costs. The investment opportunity measure used by Adams and Hardwick is the price/earnings ratio that is based on a study of Booth (1992). They do not elaborate on this choice, however. The study of Booth (1992) uses the earnings/price ratio as a proxy for the company's ratio of assets in place to

investment opportunities. Booth expects an increase in earnings/price to result in lower contracting costs and lower borrowing rates. Since Adams and Hardwick use price/earnings instead of earnings/price, a higher price/earnings would increase contracting costs and would have a positive relationship on the leasing share. Their results therefore show an unexpectedly negative, but not significant, relationship.

Also Lasfer and Levis (1998) relate the growth opportunities of a company to agency and contracting costs. They argue that leasing is more likely to occur if the asset is not specialised to the company and if it is easily redeployable. They expect growth opportunities to be positively related to leasing. They define five variables to measure growth opportunities: market-to-book ratio, fixed capital investments, R&D/sales, sales growth and the payout ratio. Their results provide some evidence on the effect of growth potential on leasing decisions. Companies with high fixed-asset investments are more likely to lease. Also, they found that small companies with growth potential are more likely to lease, which is not the case for medium-sized and large companies with growth potential. The results limited to the quoted companies show that the market-to-book ratio has a positive significant relation with the financial leasing share. Furthermore, they found a significant positive relation for the additions to other than property and building tangible fixed assets.

Graham et al. (1998) hypothesise, based on previous studies, among them Sharpe and Nguyen, that companies with more growth options in their investment opportunity set should have a lower proportion of fixed claims in their capital structure. Fixed claims in the analysis of Graham et al. include the present value of the operating leases. They therefore hypothesise that growth negatively affects the leasing intensity, which they argue should be in line with the financial contracting theories. They used the market-to-book ratio as their proxy for the company's investment opportunity set, and they expect it to be negatively related to both debt and the lease intensity (the fixed claims according to Graham et al.). Graham et al. (1998) indeed found a significant negative relation between the market-to-book ratio and both the financial- and operating lease shares. However, Graham et al. mention only that they include the present value of operating leases in the denominator and not in the numerator of the market-to-book ratio. The ratio is then, by definition, negatively related to the operating-lease intensity: the higher the operating-lease intensity, the lower the market-to-book ratio, since the denominator increases and the numerator does not. On the other hand, Graham et al. base their choice of the market-to-book ratio on Rajan and Zingales (1995), when they calculate the market-to-book ratio as (p.1453): *book value of assets – book value of equity + market value of equity all divided by book value of assets*. Using this calculation would suggest that the present value of the operating leases should be taken into account in both the numerator and the denominator. Also Barclay and Smith (1995) use this market-to-book ratio. They argue that their market-to-book ratio is a measure of growth options, while the balance sheet of a company does not include intangible assets like growth options (which should be included in the market value of a company). Therefore, the higher the market-to-book ratio, the more growth options a company has. They found evidence that the more growth options a company has, the less it will use fixed claims such as debt and leases, and it will choose more preferred stock. The results of Barclay and Smith include only financial leases, and the total assets in their analysis do not incorporate the assets financed through operating leases.



Also Mehran et al. (1999) base their hypothesis of the growth opportunities of a company on financial contracting theories. They argue that the importance of growth opportunities relative to assets in place and the company-specificity of assets will influence both debt-financing and leasing. However, they are also aware of the difference in previous studies on the effect of growth opportunities on both debt and leasing. They summarise previous findings by asserting that high proportions of growth opportunities and company-specific assets are favourable neither for debt nor for leasing. However, for a given level of fixed-claim financing, greater growth opportunities should be associated with more leasing.

Deloof and Verschueren (1999) use as a measure of investment opportunities the three-year average rate of total asset growth; this does not seem to affect the lease decision.

Table 6.6 summarised the results of the seven studies that had a measure of growth in their analysis. The market-to-book ratio is used in three of these. In contrast to the studies of Lasfer and Levis (1998) and Mehran et al. (1999), which both found a positive significant relation with lease intensity, Graham et al. (1998) found a significant negative relation between the market-to-book ratio and both the financial- and operating-lease shares. The market-to-book ratio of Graham et al. is, however, a different measure than the one used by the others, due to using total assets as the book value of a company instead of equity, and due to the inclusion of the present value of operating leases in the book value of a company. The results are thus not comparable.

### **6.7.2 Growth and investment opportunity hypotheses**

Table 6.6 summarised the results on growth and investment opportunities of a company. Most studies expect the leasing choice (both financial and operating) to be positively related to growth and investment opportunities. The studies that found a significant relationship were indeed all positive, with the exception of Graham et al. (1998). The latter used a different market-to-book value than the others, however, dividing the market value of the company by the book value of total assets plus the present value of the operating leases. This measure was also used by, amongst others, Barclay and Smith (1995) and Rajan and Zingales (1995). They hypothesised that the higher the market-to-book ratio, the more growth options a company has. They found evidence that the more growth options a company has, the less it will use fixed claims such as debt and financial leases, and it will choose more preferred stock. Their analysis excluded operating leases, however, and other studies suggest that operating leases may be advantageous for growing companies due to their flexibility and the exclusion of risk attached to economic ownership. Companies that have been growing in the past or that have many investment opportunities in the future are more inclined to lease due to the uncertainty in their production process, and leasing permits more flexibility than owning an asset does. Therefore, a positive relation is expected to exist between operating-lease intensity and growth in the past and investment opportunities in the future. High-leasing companies are expected to have grown more than low-leasing companies, and they also are expected to have more investment opportunities. Therefore, it is hypothesised that both past growth (increase in sales or total assets) as well as possible future growth (investment opportunity set) are positively related to the operating-lease choice.

hypothesis 6.7. *Growth hypothesis*

A positive relation is expected to exist between operating-lease intensity and growth in the past.

hypothesis 6.8. *Investment-opportunity hypothesis*

A positive relation is expected to exist between operating-lease intensity and investment opportunities in the future.

Sharpe and Nguyen (1995) maintain that young, innovative and fast-growing companies might lease more than other companies. Therefore, also the age of a company might be an explanatory variable when investigating operating-lease intensity. Young companies have not yet reached maturity and are therefore less certain of their future production levels as more mature, established, companies. None of the authors has, however, included company age as a measure of growth opportunities in their set of variables. This study uses a dummy to define whether a company has been recently established (and is thus young). Based on the arguments of Sharpe and Nguyen, we expect that more recently established companies lease more than more-established companies.

hypothesis 6.9. *Age hypothesis*

A positive relation is expected between young companies and operating-lease intensity.

## 6.8 Capital intensity/ asset structure

### 6.8.1 Literature review

Only three studies (Sharpe and Nguyen (1995), Deloof and Verschueren (1999) and Graham et al. (1998)) incorporated in their analysis the capital intensity or asset structure of a company.

**Table 6.7** Prior results on capital intensity/asset structure

STUDY	DEPENDENT VARIABLE	MEASURE OF ASSET STRUCTURE	SIGN	SIGNIFICANCE
Sharpe et al.	Operating lease	Total capital costs / #employees	Changing signs	Not significant
		Age PPE	Positive	Significant
		Variance in sales growth	Changing signs	Not significant
Graham et al.	Operating lease	Net PPE/total assets	Positive	Significant
Deloof and Verschueren	Financial lease	Current assets / total assets	Negative	Significant
		Fixed financial assets / total assets	Negative	Significant

Sharpe and Nguyen (1995) use three variables related to the asset structure of a company. First, they include the ratio of total annual capital costs to the number of employees. They expect the capital intensity of a company to be negatively related with the leasing intensity, since capital-intensive companies thus used specialised equipment that is less appropriate for leasing. Second, Sharpe and Nguyen use the age of the PPE as an explanatory variable. However, this variable is designed particularly for their model, where the leasing share is calculated as a portion of total capital costs. They argue that the older the equipment is, the more the book value of the asset will be underestimated, and consequently also the capital costs. The lease intensity will then be biased upward. This effect is measured by the age of PPE variable. Third, they use the sales-growth variable as an uncertainty measure of productivity. Companies with high variance in their sales growth could have

unpredictable or temporary asset needs. Leasing then alleviates the problem of owing assets that are not expected to have productive use on a full-time basis. Only the second variable, the age of PPE, has a positive significant relationship with the lease intensity. However, these results might very well be caused by the bias in the total capital costs used to calculate the lease intensity.

Graham et al. (1998) argue that a leasing contract is by definition tied to a specific fixed asset. Therefore, they argue that companies that use more fixed assets in the production process will use more lease financing. They expect both debt and leases to be positively related to the ratio of net property, plants and equipment to total assets. They call this variable 'collateral,' and it measures asset tangibility. Their results confirm this hypothesis. In a footnote (*p.147, note 17*) they mention that (under the presumption that operating leases are tied to fixed assets) they also examined this relation by adding operating leases to both the numerator as well as the denominator. The unreported results using this definition are qualitatively identical to those reported in the text.

Deloof and Verschueren (1999) found in a previous study that the current assets to total assets and the fixed financial assets to total assets have a significant influence on capital structure. They therefore include these ratios also in this study, and as they expected, both ratios have a significant negative effect.

### 6.8.2 Capital-intensity and asset-structure hypotheses

Table 6.7 summarised the results on the capital structure or asset structure as determinants of lease intensity. It is surprising that only three studies investigated this variable, since, as mentioned by Graham et al. (1998), leasing is by definition tied to a fixed asset. Labour-intensive companies will have less possibilities to lease because they have less fixed assets, than capital-intensive companies will. Yet, operating leasing causes the fixed assets on the balance sheet to be less than would be the case when these assets are bought. It is perhaps this endogenous relationship between fixed assets and leasing that has caused most studies to ignore this variable. Yet, the results of the studies that did investigate the capital structure are not convincing. To overcome the endogenous relation between the variables used and operating-lease usage, this study measures the capital- and labour intensity by relating the total capital costs and the number of employees to sales. Since labour-intensive companies have fewer possibilities to lease, it is expected that low-leasing companies will be more labour intensive than the high-leasing companies. A negative relationship is thus expected between the sales per employee and operating-lease intensity.

hypothesis 6.10. *Labour-intensive companies hypothesis*

A negative relationship between the sales per employee and the operating lease intensity is expected.

Although capital-intensive companies have more choice with regard to leasing, the leased assets are not shown on the balance sheet and the ratio of fixed assets to total assets is not appropriate to test the capital intensity of a company. The on-balance ratio of fixed assets to total assets of a high-leasing company (although it may be a capital-intensive company) may be lower than that of a low-leasing company that is not capital intensive. Consequently, the ratio of current assets to

total assets will increase relatively more for a high-leasing company. The relationship may reverse once these measures have been adjusted for operating leases. This is hypothesised as follows. A positive relationship is expected to exist between the ratio of current assets to total assets before capitalisation and the operating-lease intensity. The relationship is expected to be negative for the ratio of fixed assets to total assets and operating-lease intensity. However, when taking into account the value of the leased assets when calculating the capital intensity, it is expected that the ratio of current assets to total assets will become negatively related to operating-lease intensity, and that the ratio of fixed assets to total assets will become positively related to operating-lease intensity.

hypothesis 6.11. *Capital intensity before capitalisation hypothesis*

A positive relationship is expected to exist between the ratio of current assets to total assets before capitalisation and the operating-lease intensity. The relationship is negative for the ratio of fixed assets to total assets and operating-lease intensity.

hypothesis 6.12. *Capital intensity after capitalisation hypothesis*

A negative relationship is expected between the ratio of current assets to total assets after capitalisation and operating-lease intensity. The relation is expected to be positive between the ratio of fixed assets to total assets after capitalisation and operating-lease intensity.

## 6.9 Effective tax rate

### 6.9.1 Literature review

Taxes are an important reason for leasing rather than buying an asset. Many studies on leasing in the 1970s (such as Myers et al. (1976) and Miller and Upton (1976)) focused their lease-or-buy discussion on the tax incentives of leasing. A true lease allows the transfer of tax shields from the lessee to the lessor. This might be worthwhile when both parties have different tax rates or when the lessee has no tax capacity. As described by Smith and Wakeman (1985), if the lessee and the lessor face different effective marginal tax rates, leasing might reduce the total tax bill. As described in chapter 2, the transfer of tax shields in the Netherlands is also a reason that firms choose leasing. In 1998, energy companies were tax exempt and therefore were not able to benefit from certain tax schemes. Eligible assets under these schemes were leased instead of bought (Lückerath (1998)). The tax advantage of operating leases is one of the (sensible) economic reasons for leasing, compared with some of the (non-sensible) accounting reasons to lease (Brealey and Myers (2003)). This advantage, however, is related to operating leases and not to financial leases (see chapter 2). Nevertheless, five studies (two of which include financial leases) did include a tax measure in their analysis. Three of these studies focus on operating leases. Ang and Peterson (1984), Adams and Hardwick (1998) and Deloof and Verschueren (1999) did not include a tax variable.

**Table 6.8** Prior results on tax rate

STUDY	DEPENDENT VARIABLE	MEASURE OF TAXES	SIGN	SIGNIFICANCE
<b>El-Gazzar et al.</b>	Lease dummy	Tax charge/gross margin	Negative	Significant
<b>Sharpe et al.</b>	Operating leases	Tax charge/EBT	Changing sign	Not significant
		Low tax-loss carry-forward dummy	Changing sign	Not significant
		High tax-loss carry-forward dummy	Positive	Significant
<b>Lasfer and Levis</b>	Financial lease dummy	Tax charge/EBT	Negative	Not significant
		Tax carry-forward/TA	Positive	Significant
		Recoverable advanced corporate tax (ACT) / market-value equity	Positive	Significant
		Provision ACT / ME	Positive	Significant
		Written off ACT / ME	Positive	Not significant
<b>Graham et al.</b>	Operating leases	Before financing marginal tax rate	Negative	Significant
<b>Mehran et al.</b>	Total leases	Before financing marginal tax rate	Positive	Not significant
<b>Duke et al.</b>	Operating leases	Tax charge/gross margin	Negative	Significant

El-Gazzar et al. (1986) use the tax rate for two different hypotheses. First, they argue that the effective tax rate is a measure of political costs. Companies with the highest political costs will be the most motivated to lower their political visibility by minimizing income. They hypothesise that companies with a high effective tax rate are more likely to choose income-reducing options, such as financial leases (instead of operating leases). Second, they agree with the advantages that operating leases have in shifting tax advantages from lessee to lessor. They hypothesise that low-tax-rate companies are more likely to use operating leases instead of financial leases. The results do not support the first hypothesis on political costs, but do support the tax-incentive hypothesis. Again, El-Gazzar et al. focus on the choice between two types of leases (financial and operating).

Sharpe and Nguyen (1995) also focus on the advantages of operating leases in shifting tax advantages from lessee to lessor. They use two different variables for the tax status of a company: tax expense divided by pre-tax income and tax-loss carry-forwards. With respect to the first variable, the tax rate, they expect that companies that pay little or no taxes are more likely to take on operating leases. They argue that the tax rate should ideally be the rate before lease financing. Therefore, as a better proxy they use a dummy variable that indicates the presence of high- or low loss carry-forward. Companies with significant tax-loss carry-forward will be tax-exhausted for a period of years, and thus able to take full advantage of tax benefits of ownership, including accelerated depreciation and investment tax credits. High carry-forward is defined as tax-loss carry-forward exceeding current-year EBITDA. With respect to the tax rate, no significant relationship with leasing was found. Sharpe and Nguyen found a significant positive relation between high-loss carry-forward and leasing.

Although Lasfer and Levis (1998) focus on financial leases, they used the tax differential between lessee and lessor as one of the three main reasons for the existence of leasing. They ignored the fact that this relates most to true leases (i.e. operating leases). They included in their model five different tax variables, three of which relate only to quoted companies. The tax variables related to all companies are the tax charged to profits before tax and the tax carried forward. The tax variables for quoted companies are focused on the Advanced Corporate Tax (see Table 6.8 for the variables). Three of the five variables have a positive significant relation with the (financial) lease intensity for quoted companies, although the results again are different between small- and large (quoted) companies. Their main

conclusion was that companies that use leasing are more likely to have tax losses, although this is not the major determinant for small companies.

The primary goal of Graham et al. (1998) was to analyse the effect of the corporate tax rate. Testing their hypothesis that low-tax-rate companies lease more than high-tax-rate companies do, they found a significant negative relation. Although Sharpe and Nguyen (1995) had already mentioned that the tax rate should ideally be a before-leasing tax rate, Graham et al. were the first to address head-on the issue of endogeneity of the tax rate. They objected to, for example, the findings of Sharpe and Nguyen (1995) that their tax results might have been caused by the endogeneity of corporate tax status because using leases can lower a company's observed tax rate. They also objected to all previous studies investigating the effect of taxes on financial leases, since these are not true leases (as operating leases are). However, they argued that high tax rates have a positive effect on financial leases, since the interest payments of a financial lease are tax deductible (like debt). Therefore, the same positive relationship found by previous studies between debt and the tax rate is assumed to be applicable to financial leasing and the tax rate. Based on the tax implications for true leases (operating leases), Graham et al. argued that the use of true leases should be negatively related to a company's tax rate. To avoid the problem of endogeneity, they simulated the before-financing-decision marginal tax rate. Their estimate was based on a simulation, assuming the company's taxable income follows a random walk. They found a negative, significant relationship with the operating-lease intensity.

Mehran et al. (1999) adopted the approach of Graham et al. to estimate a before-financing marginal tax rate, but they again tried to explain the relationship between *all* leases and the tax rate. They argued that companies with little or no tax liabilities would be less likely to use debt financing, but would be more likely to lease assets. In their conclusions Mehran et al. describe that their findings related to the tax rate were disappointing and opposite to those of Graham et al. They attributed this to the larger sample of Graham et al. and did not mention the difference between the samples (Graham et al. used only operating leases, Mehran et al. used all leases) even though this difference is described extensively (and criticized) in the Graham et al. study. (Although Mehran et al. argued for inclusion of operating leases because of their potentially importance in capturing the tax effect, they were inconsistent with their own arguments, since they did not distinguish between the two leasing types.)

Duke et al. (2002) argued that the reason to lease based on different marginal tax rates between lessees and lessors would be difficult to test directly, given that lessees lease from different lessors, and information regarding their identity (not to mention their tax profiles) is unavailable. However, they decided to include the effective tax rate of a company in their model grounded on the theoretical prediction of Smith and Wakeman, and based on the previous empirical results of such studies as El-Gazzar et al. (1986) and Sharpe and Nguyen (1995). Their results likewise showed a significant, negative relationship between the effective tax rate and operating-lease intensity.

### 6.9.2 Tax hypothesis

The tax advantages of operating leases are an important determinant in choosing operating leases, as proven by the previous literature and empirical studies (see chapter 2). The situation in the Netherlands is no exception to that. Therefore, lessees with a below-average tax rate are more inclined to lease, since this enables them to shift tax advantages from lessee to lessor. Although Graham et al. (1998) referred to the endogeneity of the tax rate, the results of chapter 5 showed that the impact on net income is only marginal, which consequently also applies to the effective tax rate. Only when relating net income to balance-sheet items such as total assets, does the impact become significant. Therefore, this thesis uses the effective tax rate to investigate the tax incentive to lease. Thus, since operating leases enable a low-taxpaying entity (the lessee) to shift tax advantages to a high-taxpaying entity (the lessor), a negative relationship is expected to exist between the effective tax rate of the lessee and the lease intensity. High-leasing companies are expected to have lower effective tax rates.

hypothesis 6.13. *Effective-tax-rate hypothesis*

A negative relationship is expected between the effective tax rate of the lessee and the operating-lease intensity.

## 6.10 Management compensation

### 6.10.1 Literature review

As described in section 6.2, accounting choices may be guided by management’s own interest (bonus-plan hypothesis).

**Table 6.9** Prior results on management compensation

STUDY	DEPENDENT VARIABLE	MEASURE OF MANAGEMENT COMPENSATION	SIGN	SIGNIFICANCE
El-Gazzar et al.	Lease dummy	Bonus dummy (1 if incentive plan based on net income exists)	Positive	Significant
Duke et al.	Operating leases	Bonus dummy (1 if incentive plan based on net income exists)	Positive	Not significant

El-Gazzar et al. (1986) included management compensation in their study, while previous studies on accounting choice proposed that managers of companies with bonus plans would be more likely to choose accounting procedures that shift reported earnings from future periods to the current period. They argued that most of these plans base the bonus on income relative to the book value of assets (ROA) or equity (ROE). They hypothesised that companies whose incentives plans are defined on an after-interest basis would choose the operating method for lease reporting (instead of the financial leases). As with other explanatory variables used in El-Gazzar et al.’s study, they focussed on the income effect of operating leases. Although El-Gazzar et al. explicitly mention the ratios of income related to assets or equity, they did not even mention the impact of capitalizing a lease on the denominator (asset or equity) instead of the numerator (net income). Management compensation was taken into account by a dummy, which took the value of 1 if a compensation plan exists based on net income, and 0 if not. The relationship between management compensation plans and the use of operating leases was found to be positive and significant.

Smith and Wakeman (1985) hypothesised that leasing is more likely if management compensation is a function of return on invested capital (ROIC). They argued that a manager whose bonus depends on ROCE will argue strongly in favour of leasing rather than purchasing office space, since with a purchase the denominator of the performance measure increases. They also mentioned that this incentive could of course be controlled by including the capitalised value of the operating leases in the calculation of invested capital. In contrast to El-Gazzar et al.'s study, Smith and Wakeman focussed on the effect of operating leases on the denominator instead of the numerator. Although Duke et al. (2002) tested the hypothesis of Smith and Wakeman by using the same management compensation measure as El-Gazzar et al., their results did not support the hypothesis. They did not find this surprising, due to several reasons. The first had to do with the poor performance of management compensation variables in past accounting-choice studies. The second reason had to do with the mass of other variables that affect management compensation, and the third with the various forms of management compensation nowadays.

An interesting study on the effect of operating leases on management compensation is the study of Imhoff, Lipe and Wright (1993). They tested whether the executive compensation committee is influenced by the footnote disclosure of operating leases. They related the change in management compensation ( $\% \Delta \text{COMP}$ ) to the change in return on assets (ROA) and the change in return on equity (ROE). Subsequently, they adjusted ROA and ROE by capitalising the operating leases, and again tested the relationship between the change in management compensation and the adjusted ratios. Based on (univariate) rank correlations, the ability of ROA and ROE to explain raises in management compensation diminishes when these ratios are adjusted for operating leases. Thus, the capitalisation of operating leases does not provide incremental explanatory power in determining management compensation. Based on the results of Imhoff et al., Duke et al. (2002) concluded that 'presumably managers are free to engage in compensation-increasing leasing behaviour without the fear that compensation committees will undo their efforts on payday'.

### **6.10.2 Bonus-plan hypothesis**

Imhoff et al. (1993) tested whether the executive compensation committee takes operating leases into account when determining management salaries. They tested whether the increase in management's compensation could be explained by an increase in ROA and ROE. The explanatory power of ROA and ROE adjusted for operating leases diminished instead of increased. This indicates that management compensation does not differ between high- and low-leasing companies. In line with the study of Imhoff et al., this study tests whether the change in management compensation can be explained by a change in operating-lease intensity, and whether this differs between high- and low-leasing companies. When the remuneration of a company's management is based on measures that can be influenced by operating leases, the management will have an incentive to choose leasing. In high-leasing companies one might therefore expect greater use of these easily influenced measures, leading to a positive relation between the increase in management compensation and the increase in lease intensity.



hypothesis 6.14. *Increase in management compensation hypothesis*

A positive relation is expected between the increase in management compensation and the increase in operating-lease intensity.

Duke et al. (2002) mentioned that management compensation as a variable in empirical studies takes various forms. However, due to the attention given to management compensation plans in recently developed international corporate governance codes, the extent to which accounting choices are driven by management compensation incentives has become less clear. For example, the Dutch corporate governance code requires (section II.2) that the remuneration structure is such that it does not encourage management board members to act in their own interest (Corporate Governance Committee (2003)). If the remuneration consists of a fixed- and a variable part, the variable part shall be linked to previously determined, measurable targets, which must be achieved in both the short- and long term. The remuneration of the individual board members must be disclosed in the notes to the financial statements. These developments have two consequences: first, the information on management compensation will become increasingly available from the time the corporate governance codes became effective (January 2004); second, management compensation will be based less on targets that promote earnings management. However, based on the bonus-plan hypothesis and the impact that operating leases have on several financial ratios, a positive relation is thus also expected to exist between the level of management compensation and operating-lease intensity.

hypothesis 6.15. *Bonus-plan hypothesis*

A positive relation is expected between total management compensation and the operating-lease intensity.

## 6.11 Ownership concentration

### 6.11.1 Literature review

Three studies investigated the relationship between ownership structure and the lease decision (Adams and Hardwick (1998), Mehran et al. (1999) and Duke et al. (2002)). Mehran et al. (1999) assume they were the first who included this variable in a lease-intensity model, and do not refer to the earlier article of Adams and Hardwick (1998). The short timeframe between the dates of publishing of the articles makes this rather plausible. Table 6.10 shows the results of the three studies investigating this relation.

**Table 6.10 Prior results on ownership structure**

STUDY	DEPENDENT VARIABLE	MEASURE OF SIZE	SIGN	SIGNIFICANCE
<b>Adams and Hardwick</b>	Total leases	Total shares by top three shareholders	Positive	Significant
<b>Mehran et al.</b>	Total leases	Fraction shares by CEO Fractions shares by CEO squared	Positive Negative	Significant Significant
<b>Duke et al.</b>	Operating leases	Larger of % common stock held by directors or % owned by largest single shareholder	Positive	Significant

Smith and Wakeman (1985) relate ownership structure to specialisation in risk bearing. For a closely held company, risk reduction is more important. According to Smith and Wakeman (1985), large shareholders have difficulty in reducing asset

risk that is obviously related to the ownership of capital assets. Shareholders of closely held firms could mitigate this problem by leasing assets so that the lessor bears some of the risk instead of the lessee. Adams and Hardwick (1998) base their inclusion of ownership structure in their model on the study of Smith and Wakeman (1985). Adams and Hardwick (1998) argue that leasing helps to separate risk bearing from asset utilisation. Their results show a significant positive relation between ownership structure and the share of total leasing: closely held companies are indeed more likely to lease than companies with a more diffuse ownership structure.

The variable measuring top management's share ownership was the focus of the study of Mehran et al. (1999). In seeking to explain both corporate leasing and debt financing, they found operating leases especially important for analysis of the influence of ownership structure on the lease decision. Because the term of an operating lease is less than the asset's useful life (see chapter 2 for the operating-lease qualifications), the use of leasing prevents personal exposure to obsolescence risk. Mehran et al. (1999) argue that this is not the case for financial leases, since these cover substantially all of an asset's useful life. Their results show that CEO ownership has a significant positive effect on both debt financing and the financial- (FLS) and total leasing share (TLS) of a company. The positive effect on both measures of leasing share can be explained by the argument that CEOs with large ownership reduce their exposure to obsolescence and other asset-specific risks. As mentioned before, however, it is remarkable in light of their arguments that they did not investigate separately the operating-lease intensity of a company,

Duke et al. (2002) mention that the conclusion of Smith and Wakeman— that leasing reduces the risk attached to the ownership of the assets— might be difficult to test when focussing only on operating leases. The risk-reduction effect of leasing relates to both leasing types. However, based on the results of Mehran et al., they conclude that combining both types might not be necessary, since financial leases appear to be less important than operating leases (see also chapter 2 of this thesis). In order to capture the effects of both management ownership and non-management ownership, Duke et al. extend the study of Mehran et al. They used both the percentage of common stock owned by officers and directors and the percentage owned by the largest single owner. The variable used in their model is the larger of these two percentages. They found a positive significant relationship between ownership and operating-lease intensity.

### **6.11.2 Ownership hypothesis**

A positive relationship between closely held companies and leasing was argued and found by Smith and Wakeman (1985) and Mehran et al. (1999). Due to the fact that leasing prevents exposure to obsolescence risk, and this is most important to the owner of the company, the risk of owning an asset can be shifted from the owner to the lessor. On the other hand, financial contracting theory suggests that one might expect closely held companies to have less internal agency conflicts (bonus plan), which could lead to a negative relationship between ownership concentration and operating lease intensity. This, however, could be offset by the external agency conflict (debt covenants), which is in the interest of both the company's owner and the company's management. Therefore, this study expects a positive relationship to exist between operating leases and the percentage of closely held shares, since

operating leases shift the risk of an asset’s obsolescence from the owner to the lessor (and the opposite effect arises from internal and external agency conflicts). High-leasing companies are expected to have a higher percentage of closely held shares.

hypothesis 6.16. *Ownership-structure hypothesis*

A positive relationship is expected between closely held companies and operating-lease intensity

## 6.12 Industry

### 6.12.1 Literature review

The industry effect of leasing choice is related to both the investment opportunity set and the asset structure of a company. As mentioned before, leasing is by definition attached to a fixed asset, and industries with more fixed assets have more possibilities for leasing. Table 6.11 shows the results of the studies that previously investigated the industry effect on lease decisions.

**Table 6.11 Prior results on industries**

STUDY	DEPENDENT VARIABLE	DEFINITIONS OF INDUSTRIES	SIGN	SIGNIFICANCE
Ang and Peterson	Financial leases	22 two-digit SIC-codes, no differences between leasing and non-leasing companies		
Finucane	Financial leases	52 two-digit SIC-codes, significant univariate differences		
Adams and Hardwick	Total leases	4 industry groups, ‘services and utilities’ and ‘other’ above-average lease share, construction below-, and manufacturing about average		
Sharpe et al.	Operating leases	Industry means are subtracted from all variables		
Graham et al.	Operating leases	Regulated industries:		
		Telephone	Negative	Significant
		Utilities	Negative	Significant
		Sic-code dummies for sectors <sup>a</sup>		
		2000-2999	Negative	Significant
		3000-3999	Negative	Significant
		4000-4999	Negative	Significant

<sup>a</sup> the study of Graham et al. consists of companies with sic codes between 2000 and 6000; codes between 2000 and 3999 all relate to manufacturing, 4000 ‘til 4999 refer to transportation, and 5000 ‘til 5999 refer to the trade (retail and wholesale) sector.

Although industry is not included in their model, Ang and Peterson (1984) mentioned in a footnote (page 1058) that they investigated the industry effect of leasing. Since they divided their sample into a leasing- and a non-leasing group, they acknowledged that the industry represented in the groups might be quite different. Therefore, they classified the sample into 22 industry groups, based on two-digit sic codes. Their results showed that leasing companies were not concentrated in a few industries, and that leasing occurred in every one of the 22 industries, and that non-leasing companies were found in 21 of the industries (excluding the Amusements industries). Ang and Peterson investigated only the occurrence of leasing in these industries, however, and not the lease intensity.

Finucane (1988) argued that certain industries tend to use leasing to a greater or lesser extent than others. He brings up several reasons for this: the specificity of assets to a certain industry, industry-wide differences in investment tax credits, the availability of assets as collateral, the rate of obsolescence of company-specific assets, the characteristics of secondary asset markets, marginal tax rates and debt capacity. Finucane’s objection to the study of Ang and Peterson was that they did not consider the possibility of different levels of leasing. To overcome this, he analysed the mean ratio of financial leases to total assets over a five-year period for each industry, and found a different pattern. He investigated the relation between

financial leases to total assets and 52 industries (using two-digit sic codes). Using a univariate comparison of mean ratios, Finucane found evidence that the air transportation- and retail store industries use more leasing than other industries.

Industry as a variable was included by Graham et al. (1998) for two reasons. First, they assumed that leasing could be disadvantageous for a regulated company. Their explanation is, (p.138) 'the return for utility shareholders is calculated from the firm's capital base, and operating leases do not count as part of the capital base'. The regulated industries in their sample are telecommunications and gas and electric (utilities). The two industries are included in the model by assigning a dummy to companies that operate in these sectors. The second reason they included industry as a variable is based on previous studies such as Sharpe and Nguyen and Graham et al., which included three industry dummies to control for industry effects. The industries are restricted to one-digit sic groups, and include manufacturing (2000-3999), transportation and public utilities (4000-4999) and trade (5000-5999). The regulated dummies mentioned above are also part of these groups. The trade dummy is excluded from the model and the other dummies all show a significant negative relation with operating-lease intensity. Although not addressed directly by Graham et al., their results seem to permit the conclusion that the sector 'trade' has higher operating-lease intensity than the other sectors.

Adams and Hardwick (1998) classified the companies in the sample into four groups: construction, services/utilities, manufacturing and other. The average leasing share was about 23% for all companies, varying from 29% for 'services and utilities' and 'other' to 9% for 'construction'. The standard deviation of the mean value is rather high, which indicates the high variation in the subgroups. Probably for that reason Adams and Hardwick did not present any statistical tests on these differences. The industry sector is also not included in their ultimate model.

Mehran et al. (1999) investigated 176 manufacturing companies (sic codes 2000-3999), and therefore did not investigate differences between industries. Their results should therefore be seen from this perspective. The main purpose of their study was to investigate the relationship between leasing and ownership. Their main conclusion, that CEOs with large ownership stakes use more leasing to reduce their exposure to obsolescence and other asset-specific risks, might be influenced by the study's choice to limit the analysis to manufacturers alone. Other studies have shown that manufacturers, compared with other industries, are not the heaviest users of leasing.

Other studies have also described the industries in which leasing is more dominant, compared to other industries. For example, Gosman and Hanson (2000) mentioned that leasing is prevalent in airlines and in different kinds of stores and restaurants. They argued (p.53) that 'in many cases a majority, or even all, of an airline's planes or a retailer's stores are leased'.

### **6.12.2 Industry hypotheses**

The previous studies allow us to conclude that industry as a explanatory variable in explaining lease intensity is based on either to what extent an industry is regulated (political costs) or whether the fixed assets in a certain industry are more likely to be leased (such as airplanes or retail stores). Since in the Netherlands only one

airline is listed (Royal Dutch KLM, merged in 2005 with Air France), this is not a sector that can be investigated with regard to possible determinants in the lease decisions in the Netherlands. The retail sector is part of the ‘trade’ sector (sic codes 50-59), which comprises wholesale and retail trade. In line with previous studies, it is expected that in this sector operating leases will be used more often than they are in other sectors. For the other sectors it is expected that no significant relation exists between the lease decision and the respective sector.

hypothesis 6.17. *Industry hypothesis*

It is expected that operating-lease intensity will be higher for the ‘trade’ sector (sic codes 50-59) than in other sectors.

Furthermore, due to privatisation of the post and telecom sector in the Netherlands, the Independent Post and Telecommunication Authority (OPTA) was established on January 1st 1997. The OPTA ensures that companies in the telecom sector do not wrongfully use their economic market power ([www.opta.nl](http://www.opta.nl)). To test the political-cost hypothesis, and in line with Graham et al. (1998), we expect a negative relation to exist between regulated telecom companies and lease intensity<sup>63</sup>.

hypothesis 6.18. *Political-cost hypothesis*

A negative relationship is hypothesised between companies in the telecom sector and the operating-lease intensity.

### 6.13 Summary and conclusions

This chapter investigated the possible determinants of the operating-lease decision. Section 6.2 described from a theoretical perspective the background of accounting choices and the therewith-related positive accounting theory and financial contracting theory. As described by Brealy and Myers (2003), the choice for operating leases may be driven by non-sensible accounting reasons (keeping debt off of the balance sheet) or by more sensible economic reasons to lease (tax advantages, flexibility, shifting the risk of obsolescence). The accounting reasons are defined by Fields et al. (2001) as an accounting choice whose primary purpose is to influence the output of the accounting system. Section 6.2 described how closely the accounting-choice literature is related to the positive accounting theory of Watts and Zimmerman (1986), who formulated three hypotheses that explain the opportunistic behaviour of a company’s management: the debt hypothesis, the bonus-plan hypothesis and the political-cost hypothesis.

Section 6.3 described the possible determinants of the lease decision. Table 6.1 summarised nine different studies on this subject. The results of the described studies clash in many cases with each other, due to two main reasons. First, the dependent variables take many different formats, and often no distinction is made

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<sup>63</sup> Also the utility sector in the Netherlands is a regulated sector (see Graham et al. (1998)), and the Directorate Supervision Energy (DTE) supervises the 1998 Electricity law and the Gas law ([www.dte.nl](http://www.dte.nl)). The utility sector in the Netherlands is not yet fully privatised, and no utility companies are listed on the stock exchange. Furthermore, Dutch electricity companies were, until recently, exempt from the corporate income tax. Due to the Dutch tax investment schemes (see chapter 2 and Lückcrath, 1998), the electricity companies often used lease structure in order to benefit from these tax schemes. The political-cost hypothesis, suggesting that regulated companies will lease less than non-regulated companies, would then be undone by the tax reason to lease. Because of the absence of listed gas- and electric companies, this cannot be investigated.

between financial- and operating leases, Second, the explanatory variables also take many forms, with often the ignorance of the impact of operating leases on these variables (endogeneity). Therefore, sections 6.3.2 and 6.3.3 described two contributions of this study to the previous literature. The improvement lies in the choice of the dependent as well as the independent variables. With respect to the dependent variable, it is important to isolate operating leases from financial leases, since especially the hypotheses based on accounting reasons to choose leasing are applicable to only operating leases and not to financial leases. Including financial leases would inevitably lead to the wrong conclusions. This also applies to the inclusion of explanatory variables that are influenced by the operating-lease decisions (endogenous variables). Figure 6.1 illustrated the effect this might have on empirical results. Investigating the debt hypothesis by including the leverage ratio after the lease decision has already been made will lead to other results than bringing companies to a comparable base as if the decision had not yet been made.

Each of the possible determinants was subsequently described. The three hypotheses from the positive accounting theory were shown to also apply to the operating-lease decision. The accounting choice for operating leases might be driven by motives to improve leverage (debt hypotheses), to increase management compensation (bonus-plan hypothesis) and to avoid excessive regulation (political-cost hypothesis). However, section 6.3 also described the economic reasons to choose operating leases, including tax advantages, flexibility, avoidance of obsolescence risk and asset types. Each sub-section concluded with the formulation of the hypotheses, in which the above economic reasons were included.

The number of possible determinants under investigation in the next chapter is extensive, combining previous studies in order to make the analysis more complete than that of any other previous study.

## **CHAPTER 7    EMPIRICAL STUDY OF THE DETERMINANTS OF THE OPERATING-LEASE DECISION**

### **7.1    Introduction**

This chapter empirically tests the hypotheses formulated in chapter 6. These hypotheses all concern determinants of the operating-lease intensity and explore whether high- and low-leasing companies differ with respect to these determinants or characteristics. This chapter is set up as follows. Section 7.2 describes the dataset and the qualification in high- or low-leasing companies. Section 7.3 presents the results: subsection 7.3.1 shows the univariate differences in each variable between high- and low-leasing companies, and subsection 7.3.2 shows the OLS- and logit results of the multivariate approach.

### **7.2    Data collection and methodology**

#### **7.2.1    Sample**

The sample used in this section is the one described in chapters 2 and 5. The sample consists of non-financial listed companies at the Amsterdam Stock Exchange during the period 2000-2004, with a listing period of at least three years. The financial companies are excluded because they often act both as lessee and lessor, since leasing is a financial product. Six companies were eliminated because the balance-sheet date was different from December 31<sup>st</sup>, and this might have influenced the interaction of the data collected. The final sample consists of 118 companies in 2000, 119 in the years 2001 through 2003, and 109 in 2004. The total sample therefore consists of 584 company-year observations.

#### **7.2.2    Data**

Chapter 6 showed how previous studies on the determinants of leasing choice used two different formats of the dependent variable: either a lease-share- or a lease dummy was used (see Table 6.2). This study uses both formats in order to facilitate comparisons with these previous studies. First, an operating lease-share is calculated, which relates the capitalised operating-lease commitments to total assets (PVOL/TA). Second, an operating-lease dummy characterises companies as high- or low-leasing companies. The dummy has a value of one for the high-leasing companies, and zero for the low-or non-leasing companies.

#### **Operating-Lease intensity measures:**

##### **Relative operating-lease intensity**

The operating-lease commitments were manually extracted from the 2000-2004 annual reports of the companies in the sample (see also chapter 2). The operating-lease commitments were capitalised using the capitalisation approach that was described in chapter 4.

##### **Dichotomous lease dummy**

In order to define what the characteristics are of companies with high-leasing activity, this study uses an operating-lease dummy that categories companies into high- or low-leasing companies. A lease dummy was also used in the studies of El-Gazzar et al. (1986) and Lasfer and Levis (1998). Neither of these studies, however, assigned a dummy based on the operating-lease intensity, but assigned a dummy based on the existence of leasing. The companies in the

sample of El-Gazzar et al. (1986) were classified as either ‘capitalisers’ (companies with only financial leases) or ‘non-capitalisers’ (companies with only operating leases). The companies in the sample of Lasfer and Levis (1998) were classified as either ‘lessee-company’ (a company with financial leases) or ‘non-lessee company’ (a company without financial leases). Lasfer and Levis exclude operating leases. The dummy of El-Gazzar et al. (1986) is not useful nowadays, since most companies use operating leases and less often use financial leases (see also Figure 2.6 and/or Table 5.3). This also renders the dummy of Lasfer and Levis (1998) less useful.

To classify companies in high- or low-leasing companies, this study uses the capitalised lease liability (PVOL) related to total assets:  $PVOL/TA$ .  $PVOL/TA$  can only be calculated for 379 observations, however, due to the non-compliance of many companies to disclose the total future lease commitments (see Table 5.3). Therefore, for companies that did not disclose the total commitments but did disclose the annual lease payment, we use an alternative measure. For these companies the operating lease-share ratio of Sharpe and Nguyen (1995) is used to differentiate between high- or low-leasing companies. This lease-share ratio relates the next annual lease payment to the total costs of capital ( $AP/TCC$ ), and is also not subject to the variability of net income. The threshold value of  $AP/TCC$  is set at 18%. This value was chosen since at this value the dummy variable assigned (one or zero) is fairly similar to the dummy variable assigned by  $PVOL/TA$ , and the two measures can be used simultaneously.

### 7.2.3 Descriptives

A lease dummy was assigned to 464 observations. Of the remaining 120 observations of the total sample of 584 companies the information is insufficient to categorise the company in either one of the two categories. Table 7.1 shows the distribution of the total sample over the research period 2000-2004. Panel A of Table 7.1 shows the available lease-dummy observations, and also shows the distribution of high- and low-leasing dummies over the years covered in this study. Of the total sample of 584 observations, a total of 464 (80.1%) are classified as either high- or low leasing. Of these 464 observations, 237 (41%) are classified as high-leasing companies and 227 (49%) as low leasing. The sample is therefore almost equally divided between low- or high leasing companies, even though this was not a goal when qualifying the companies.

Panel B of Table 7.1 shows the mean and median values of the lease ratio  $PVOL/TA$  for the 379 observations for which this ratio was available. These values are shown for each separate year and for the total sample for which  $PVOL/TA$  was available. The mean and median  $PVOL/TA$  for the total sample are, respectively, 14.2% and 4.3% (see also the description of the capitalisation results in Table 5.4). An annual increase is visible in both the mean and median, with the highest mean- and median  $PVOL/TA$  in 2003; in 2004, a decline is visible. Since the six companies that are missing in 2004 (see chapter 2) were not the heaviest leasing companies in 2003, the decline cannot be explained by the absence of these companies. Panel B also shows the mean- and median values for the two sub-sample high- and low-leasing companies. The mean of  $PVOL/TA$  for the high-leasing sample (170 companies) is 29.8%, compared with 1.6% for the low-leasing sample (209 companies). This difference is significant at the 1% level (t-statistic 8.56). Also, the



difference in medians (13.5% for the high-leasing sample, and 1.0% for the low-leasing sample) is significant at the 0.01 level (z-statistic 16.82).

Finally, Panel C of Table 7.1 shows the mean- and median values of the alternative operating lease-intensity measure; AP/TCC. Again, the mean and median are presented for the sample as a whole, and also for the sample split into the high- and low-leasing companies. For 439 companies AP/TCC was available; the mean is 27.2% and the median 20.7%. The mean of AP/TCC for the high-leasing sample is 43.7%, as opposed to 9.2% for the low-leasing sample. This difference is significant at the 0.01% level (t-statistic 20.59). In addition, the difference in medians (41.9% for the high-leasing sample and 5.2% for the low-leasing sample) is significant at the 1% level (z-statistic 15.0). The significance of the differences between the two samples, shown in panels B and C, confirms the correct classification of the observations into these two sub-samples.

**Table 7.1 Sample characteristics**

The total sample of 584 company-year observations for the research period 2000-2004 is shown in three different panels. Panel A shows, if possible, the classification of the total sample in high leasing (lease dummy=1) or low leasing (lease dummy=0) (see section 7.2 for the classification criteria). Since it was not possible to determine for all companies the lease intensity, 464 observations in the sample were classified as either high- or low-leasing companies. The classification into high-leasing or low-leasing company was subdivided over the five years of the research period. Panel B shows the mean- and median values of PVOL/TA, for the total sample, and for the high- and low-leasing sample separately. The values are also subdivided over the five years of the research period. PVOL/TA is the present value of the operating leases divided by total assets. Panel C shows the mean- and median values of AP/TCC, for the total sample, and for the high- and low-leasing sample separately. The values are also subdivided over the five years of the research period. AP/TCC is the annual lease payment divided by the total cost of capital (see section 7.2). For both Panels B and C the difference in mean and median is statistically tested, t- and z-values are reported in parentheses. \*\*\* means significance at 1% level.

<b>PANEL A: CLASSIFICATION OF ALL COMPANIES IN HIGH- AND LOW-LEASING COMPANIES</b>									
	All companies		Lease dummies		Low-leasing		High-leasing		
	N	%	N	%	N	% of available lease dummies	N	% of available lease dummies	
2000	118	20%	88	75%	53	60%	35	40%	
2001	119	20%	95	80%	52	55%	43	45%	
2002	119	20%	97	82%	47	48%	50	52%	
2003	119	20%	100	84%	38	38%	62	62%	
2004	109	19%	84	77%	37	44%	47	56%	
All	584	100%	464	79%	227	49%	237	51%	
<b>PANEL B: DIFFERENCES IN MEAN- AND MEDIAN VALUES OF PVOL/TA BETWEEN HIGH- AND LOW-LEASING COMPANIES</b>									
	All companies with PVOL/TA			Low-leasing			High-leasing		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
2000	67	5.7%	1.5%	50	1.4%	0.7%	17	18.6%	11.4%
2001	73	5.8%	3.2%	49	1.4%	0.4%	24	14.7%	9.9%
2002	79	10.0%	4.5%	44	1.8%	1.7%	35	20.3%	11.9%
2003	84	32.4%	10.2%	32	1.6%	1.4%	52	51.4%	23.9%
2004	76	14.0%	6.3%	34	1.7%	1.5%	42	24.0%	14.6%
All	379	14.2%	4.3%	209	1.6%	1.0%	170	29.8%	13.5%
					(8.56)***	(16.82)***			
<b>PANEL C: DIFFERENCES IN MEAN- AND MEDIAN VALUE OF AP/TCC BETWEEN HIGH- AND LOW-LEASING COMPANIES</b>									
	All companies with AP/TCC			Low-leasing			High-leasing		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
2000	83	24.7%	14.5%	49	7.6%	3.1%	34	49.5%	57.0%
2001	90	24.2%	18.1%	49	7.7%	4.3%	41	44.0%	40.8%
2002	92	27.3%	22.2%	43	10.7%	5.9%	49	41.8%	40.9%
2003	97	28.5%	22.3%	36	9.1%	6.2%	61	40.0%	38.3%
2004	77	31.3%	25.0%	33	11.8%	10.2%	44	45.9%	46.1%
All	439	27.2%	20.7%	210	9.2%	5.2%	229	43.7%	41.9%
					20.59)***	(15.00)***			

## 7.3 Results

This section presents the results of the empirical tests. The determinants of the leasing decision are analysed by looking at company-specific characteristics. First, section 7.3.1 describes the results of each of the determinants separately (the univariate analysis). The univariate results show the Spearman rank-correlation coefficient between the determinants and the lease-intensity measure PVOL/TA, and also show the difference in mean- and median between the high- and low-leasing companies. The focus is on the differences in the medians due to the statistical properties of the data (for an extensive description, see chapter 5). The correlation results provide a preliminary answer on the relationship between the selected determinants and the operating-lease decisions. Section 7.3.2 then describes the results of two different regression models. First, an ordinary least squares regression (OLS) is performed with the operating-lease intensity PVOL/TA as dependent variable. A logit analysis then tests which determinants have predictive power in distinguishing between high- or low-leasing companies.

### 7.3.1 Univariate results

The univariate results are presented by reporting two relationship indicators for each possible determinant of operating lease intensity. First is the Spearman rank-correlation coefficient between each of the tested variables and the lease intensity (PVOL/TA), followed by the differences in mean- and median values for the high-leasing and low-leasing companies.

### Leverage

**Table 7.2 Leverage differences between high- and low-leasing companies**

Mean- and median values are shown for three leverage variables, both before and after the constructive operating-lease capitalisation. LTD=Long-term debt. The long-term part of PVOL is PVOL minus the present value of next year's annual payment (AP). LTD/CE is LTD divided by total capital employed. LTD/CE-after is calculated by adding to both the numerator and the denominator the long-term part of PVOL. TD/TA is total debt divided by total assets. TD/TA-after is  $(TD + PVOL)/(TA + PVA)$ . PVA is the present value of the leased assets. Difference analysis between high-leasing and low-leasing companies was conducted using both a parametric test (comparison of means) and a non-parametric test (median-test). The available observations (N) for each variable differ due to data-availability. Especially for the variables after capitalisation, PVOL was fundamental (although it was not available for all observations). Correlation coefficients are Spearman-rank correlations.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES						
	N	rank corr.	N	mean	median	N	mean	median	N	Mean	t-value	median	z-value		
LTD/CE	367	0.21***	452	28.3%	24.5%	222	26.1%	20.4%	230	30.3%	1.67	*	30.7%	2.51	**
LTD/CE-after	359	0.49***	360	36.3%	34.1%	204	27.5%	21.3%	156	47.7%	6.00	***	46.5%	7.94	***
TD/TA	379	0.06ns	464	25.8%	24.3%	227	25.4%	23.2%	237	26.2%	0.45	ns	26.1%	0.94	ns
TD/TA-after	369	0.34***	370	31.2%	29.6%	209	26.7%	23.9%	161	37.0%	5.12	***	35.4%	5.71	***
TD/TE	353	0.08ns	427	143.6%	74.4%	210	163.8%	61.6%	217	124.0%	0.62	ns	84.8%	2.48	**
TD/TE-after	360	0.367***	361	203.5%	98.2%	204	205.5%	58.9%	157	200.8%	0.05	ns	128.5%	6.04	***

\*\*\*, \*\* and \* significant at 1%, 5% and 10% levels, ns= not significant, t-values (mean-test) or z-values (median-test) in parentheses

Table 7.2 shows first the Spearman rank-correlation coefficients between the lease intensity PVOL/TA and the three leverage ratios LTD/CE, TD/TA and TD/TE, all before and after capitalisation. The correlation coefficients are all positive, and significant at the 1% level for all after-capitalisation ratios. Only the before-capitalisation of LTD/CE is significantly positively correlated with PVOL/TA. Both TD/TA and TD/TE before capitalisation are not significantly correlated with PVOL/TA. The correlation of the leverage ratios after capitalisation increases substantially. Table 7.2 also presents the differences in the three leverage ratios

between low- and high-leasing companies. Although the high-leasing companies succeed in lowering their leverage ratio to a level closer to that of the low-leasing companies, they still have a higher LTD/CE, TD/TA and TD/TE ratio before capitalisation. The differences in medians are all significant, except for TD/TA. With respect to the TD/TA ratio before capitalisation, the difference is positive but not significant, and the high-leasing company succeeds in equalising this leverage ratio with that of the low-leasing companies. The differences in means show the same results and lead to the same conclusion.

Table 7.2 showed a positive relationship between leverage and operating-lease intensity, both before and after the capitalisation of the off-balance sheet operating leases. Furthermore, the leverage ratio is higher for high-leasing companies compared to low-leasing companies, even without the operating leases having been taken into account when the leverage ratio was calculated.

### Size

Table 7.3 shows the univariate results of the different size variables. Table 7.4 shows the difference between the 25% smallest companies and the 25% largest companies in the sample (as suggested by Adams and Hardwick (1998)).

**Table 7.3 Size differences between high- and low-leasing companies**

Mean- and median values are shown for four size variables (the natural log of total assets (TA), market value of equity (MVE), number of employees and sales). TA is calculated twice: first, without taking the operating leases into account and second, with the operating leases capitalised. TA-after = TA+PVA, where PVA= the present value of the leased assets. Difference analysis between high- and low-leasing companies was conducted using both parametric tests (comparison of means) and non-parametric tests (median-test). The available observations (N) for each variable differ due to data availability. Particularly TA-after, where PVA is fundamental, is not available for all observations. Correlations are Spearman rank-correlation coefficients.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES					
	N	rank corr.	N	Mean	median	N	mean	median	N	mean	t-value	median	z-value	
ln(TA)	379	0.24***	464	12.91	13.00	227	12.78	12.59	237	13.04	1.27	ns	13.20	1.80 *
ln(TA-after)	369	0.27***	370	13.11	13.33	209	12.80	12.47	161	13.60	3.39	***	13.76	3.85 ***
ln(MVE)	374	0.22***	425	12.47	12.43	221	12.32	12.13	223	12.60	1.14	ns	12.79	1.56 ns
ln(employees)	369	0.39***	454	7.84	8.27	218	7.26	7.51	236	8.38	5.08	***	8.79	4.87 ***
ln(sales)	371	0.35***	456	13.13	13.51	221	12.69	12.55	235	13.55	3.86	***	13.79	3.99 ***

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels

**Table 7.4 Difference lease intensity between smallest and largest companies (1<sup>st</sup> quartile-4<sup>th</sup> quartile)**

The total sample of 371 companies with a known PVOL/TA are split into small (1<sup>st</sup> -quartile) and large (4<sup>th</sup> - quartile) companies based on total sales. The table shows mean- and median values of PVOL/TA for all companies and for the small and large companies separately. Also shown is the Spearman correlation between PVOL/TA and ln(sales).

	ALL COMPANIES WITH PVOL/TA			SMALL COMPANIES (1ST QUARTILE)			LARGE COMPANIES (4TH QUARTILE)					
	N	mean	median	N	mean	median	N	mean	t-value	median	z-value	
lnSales	371	13.29	13.60	92	10.00	10.03	95	16.16		15.70		
PVOL/TA	371	14.2%	4.3%	92	7.1%	1.0%	95	18.3%	1.95	***	6.0%	6.34 ***
Correlation	371	0.35***		92	-0.02ns		95	0.03ns				

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels

Table 7.3 presents the correlation between size variables and the differences in mean and medians between high- and low-leasing companies. From the correlation coefficients it can be concluded that size and the PVOL/TA are positively, highly significantly, correlated with the operating-lease intensity. In line with Graham et al. (1998), total assets are less appropriate for testing the size relationship, since

total assets are influenced by the lease intensity. The correlation results of the alternative variables (market value of equity, number of employees and sales) provide, however, quite similar results. For all variables, the numbers of the high-leasing companies are larger than those of the low-leasing companies, and only for the market value of equity is this relationship not significant.

Table 7.4 shows the same relationship between the lease intensity and size— but only for the 25% smallest and the 25% largest companies. This is to test whether the relationship is different for the very small- versus very large companies (as suggested by Adams and Hardwick (1998)). The results of Table 7.4 are consistent with those of Table 7.3: that larger companies have higher lease intensity than smaller companies do. The median of PVOL/TA for the 25% largest companies is 6% (as opposed to 1% for the 25% smallest companies): a highly significant difference. However, the correlation coefficients between PVOL/TA and size are not significant for both the small- and large companies in the sample, although they are highly, positively, significant for the entire sample.

## Performance

Table 7.5 presents the univariate results of the performance variables.

**Table 7.5 Performance differences between high- and low-leasing companies**

Mean- and median values are shown for six performance variables (Return on Assets (ROA), earnings-before-interest-and-tax (EBIT) divided by total assets (TA), earnings-per-share (EPS) and current ratio (CR)). Except for EPS, all variables are calculated twice: first, without taking into account the operating leases and second, with the operating leases capitalised, if appropriate. ROA is net income divided by total assets. ROA-after is calculated by adding to net income the effect caused by the difference between the depreciation of the asset and the repayment part of the lease payment (for an extensive description, see chapter 4). EBIT-after is calculated by adding to EBIT the annual payment of next year and deducting the depreciation part of PVA. TA-after = TA+PVA, where PVA = the present value of the leased assets. Difference analysis between high- and low-leasing companies was conducted using both parametric tests (comparison of means) and non-parametric tests (median-test). The correlation coefficient is Spearman's rank correlation.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES						
	N	rank corr.	N	mean	median	N	mean	median	N	mean	t-value	median	z-value		
ROA %	378	-0.09*	462	-1.5%	3.7%	227	-3.2%	4.1%	235	0.1%	1.25	ns	3.2%	-1.35	ns
ROA-after %	368	-0.12**	369	-2.3%	3.2%	209	-3.8%	3.9%	160	-0.4%	-1.11	ns	2.5%	-2.40	**
EBITDA/sales	362	-0.32***	444	-0.1%	7.9%	218	-6.9%	11.8%	226	6.5%	0.60	ns	5.9%	-5.10	***
EBITDA+rent/sales	362	-0.18***	444	2.0%	10.2%	218	-5.8%	12.3%	226	9.6%	0.70	ns	8.9%	-2.50	**
EPS	375	-0.11**	458	0.55	0.84	223	0.70	0.93	235	0.41	0.75	ns	0.65	-1.80	*
CR	360	-0.13**	440	1.69	1.31	208	1.87	1.34	232	1.52	2.31	*	1.28	-1.72	*
CR-after	360	-0.24***	440	1.56	1.25	208	1.80	1.32	232	1.35	3.47	***	1.15	-3.76	***

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

From the correlation coefficients in Table 7.5 it can be concluded that the performance measures ROA, EBIT/TA, EPS and CR all show a negative relationship with the operating-lease intensity. This relationship is significant both before- and after capitalisation, with one exception: EBIT/TA-after, for which the relationship is not significant. These results are in line with previous studies showing that leasing is used by less profitable companies, which face higher premiums for external funds (Lasfer and Levis (1998)). The comparison of the medians between high- and low-leasing companies is also negative for these performance variables, although not significant for ROA and EBIT/TA before capitalisation. The differences become significant after the operating leases have been capitalised, but only at the 10% level. Also the difference between the medians of EPS and CR is significant at the 10% level.

### Growth/investment opportunity

Table 7.6 shows the relationship between growth and investment opportunities and operating-lease intensity. Table 7.7 show the cross-tabulation of an age-dummy with the high- or low-leasing companies dummy, since Sharpe and Nguyen (1995) rightly relate younger age to growth opportunities (but do not test this relationship themselves). Although the market-to-book ratio is used by many studies as a measure of investment opportunity, this measure was calculated differently in previous studies (see section 6.7). Therefore, the analysis was conducted for two different market-to-book ratios: first, calculated as the market value of equity divided by the book value of equity (Lasfer and Levis (1998) and Mehran et al. (1999)), and second, calculated as the market value of the firm (book value of assets *minus* book value of equity *plus* market value of equity) divided by the book value of total assets (Graham et al. (1998), Rajan and Zingales (1995), Barclay and Smith (1995)).

**Table 7.6 Growth and investment opportunity**

Mean- and median values are shown for the price/earnings ratio (PE ratio), two different market-to-book ratios (MTB) and the 5-year average growth in sales and in total assets. MTB-equity is calculated as the market value of equity divided by the book value of equity. MTB-Rajan is the market-to-book ratio using the Rajan and Zingales (1995; Graham et al. (1998) calculation, being the market value of the firm (book value of assets – book value of equity + market value of equity) divided by the book value of total assets. Both MTB ratios are calculated before and after the capitalisation of operating leases. Difference analysis between high- and low-leasing companies was conducted using both parametric tests (comparison of means) and non-parametric tests (median-test). The correlation coefficient is Spearman's rank correlation.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES						
	N	rank corr.	N	mean	median	N	mean	median	N	mean	t-value	median	z-value		
PE ratio	194	-0.02ns	242	17.20	11.40	120	15.38	12.50	122	18.99	1.00	ns	11.10	-0.61	ns
MTB-equity before	347	0.03ns	425	2.77	1.73	202	2.82	1.70	223	2.72	-0.14	ns	1.76	0.91	ns
MTB-equity after	329	0.08ns	330	3.02	1.77	180	3.38	1.73	150	2.59	-0.71	ns	1.83	-0.48	ns
MTB-Rajan before	347	0.04ns	425	1.52	1.24	202	1.51	1.26	223	1.53	0.22	ns	1.24	-0.46	ns
MTB-Rajan after	337	0.00ns	338	1.47	1.21	184	1.52	1.26	154	1.40	-1.36	ns	1.19	-0.71	ns
5-year sales growth	350	0.12**	431	10.6%	9.0%	207	7.0%	7.1%	224	13.9%	3.48	***	10.8%	3.69	***

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

The investment opportunity set measures (measuring possible future growth) are all non-significant in both the correlation with the operating lease intensity and the comparison of mean and medians between high- and low-leasing companies. With respect to the market-to-book ratios, it does not matter whether one uses the market-to-book value of total assets (Rajan and Zingales (1995)), or the market-to-book value of only equity. Moreover, capitalisation of the operating lease does not materially change these outcomes. However, past growth of total sales does show a significant positive relation with the operating-lease intensity, and the high-leasing companies experienced a significantly higher growth rate than the low-leasing companies. The above discussion leads to the conclusion that companies with an above-average growth rate use more operating leases than do companies with a below-average rate. However, the choice for operating lease is not made in anticipation of future growth opportunities.

To test whether younger companies (which are assumed to have more growth opportunities) lease more than older companies, we assigned an age dummy to each company. The dummy takes the value of one if a company was established less than ten years ago; if the company was established more than ten years ago, the dummy takes the value of zero. Since the age of ten years was arbitrarily chosen, the

analysis was also conducted with a discriminating value of establishment within the past five years and within the past fifteen years. These dummies, however, did not change the results as reported in Table 7.7 below.

**Table 7.7 Age differences between high- and low-leasing companies**

Companies classified as ‘young’ if the company was established less than ten years ago. These companies were assigned a dummy of one; other companies have a dummy of zero.

	ALL	LOW-LEASING	HIGH-LEASING
Age<10 years	73	32	41
Age>10 years	380	187	193
<b>Pearson chi-square</b>		0.40	Ns

ns=not significant, changing in 5 or 15 years does not change the results

From Table 7.7 it can be concluded that the age of a company does not determine the operating-lease decision, since based on the age dummy no significant difference is revealed between high- and low-leasing companies.

### Capital intensity/asset structure

**Table 7.8 Capital intensity/asset structure differences between high- and low-leasing companies**

TCC, total capital costs as calculated by Sharpe and Nguyen (1995), is calculated as follows:

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES			t-value	median	z-value	
	N	Rank corr.	N	mean	median	N	mean	median	N	mean					
TCC/#employees	351	-0.09ns	436	26.69	10.53	207	38.37	11.41	229	-16.14	-3.12	***	9.90	-2.95	***
TCC/sales	354	-0.02ns	439	0.11	0.06	210	0.13	0.07	229	0.09	-1.90	**	0.06	-1.87	*
Ln(sales/employee)	368	-0.15***	453	308.93	180.13	218	331.73	195.66	235	287.78	-0.90	ns	160.24	-2.8	***
Net PPE/TA	374	-0.17***	459	27.2%	22.6%	224	32.9%	32.2%	235	21.8%	-6.22	***	16.3%	-5.67	***
Net PPE/TA-after	364	0.06ns	365	33.3%	31.0%	206	33.6%	33.0%	159	33.0%	-0.28	ns	29.0%	-0.08	ns
CA/TA	360	0.11**	440	56.1%	57.1%	208	52.3%	54.0%	232	59.5%	3.58	***	61.8%	3.64	***
CA/TA-after	350	-0.08ns	351	51.2%	53.2%	192	51.7%	53.2%	159	50.7%	-0.49	ns	53.7%	0.26	ns

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

Most variables suggested by previous studies to measure capital intensity are affected one way or another by operating-lease intensity. For example, the total capital costs as suggested by Sharpe et al. (1995) include the lease payments; excluding them leads to different results. The relationship between total capital costs per employee is negative (in line with the results of Sharpe et al.), which according to Sharpe et al. was due to more capital extensive companies using more specialised equipment (which is less appropriate for leasing). However, the correlation is not significant. The difference in median is significantly negative. Also the alternative measure, ‘sales per employee’ is negatively related to the operating-lease intensity, and the difference between high- and low-leasing companies is significant. This is as expected, since the higher the sales per employee, the more labour intensive a company is and the fewer possibilities it will have, compared to a more capital intensive company, to lease. The other variables show similar results, but these are less reliable, due to the impact of total assets in the denominator.

The ratio of current assets to total assets (not adjusted) is significantly positively related to operating-lease intensity. The fixed asset- to total-asset (net PPE/TA) ratio is negatively related to operating-lease intensity. This is consistent with hypothesis 6.11, which hypothesises that if the leased asset is not taken into account, the capital-intensity measures will not be appropriate to test whether capital intensity is a determinant in the operating-lease decision. The results are not in line with Deloof and Verschueren (1999), who found a negative significant relationship between lease intensity and the ratio of current assets to total assets.

However, since they investigated only financial leases, fixed assets were not removed from the balance sheet. This also emphasises the different determinants of the financial- and operating-lease decision; not only can these not be investigated at the same time, but also the results cannot be compared to each other as if these leases are the same. The above-described relationships are not significant after the leased asset has been adjusted to both the numerator and the denominator.

Due to the endogeneity of the capital-intensity measures (including total assets), the regression will be executed using the sales per employee as explanatory variable to explore the relationship between capital intensity and operating-lease intensity.

## Tax

Table 7.9 shows the univariate results of the relation between the effective tax rate and the operating-lease intensity and differences in the effective tax rate between high- and low-leasing companies.

**Table 7.9 Tax differences between high- and low-leasing companies**

Tax-rate = income-tax/income-before-tax, this rate is only calculated for companies with positive income tax.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES					
	N	rank corr.	N	mean	median	N	mean	median	N	mean	t-value	median	z-value	
<b>Tax rate</b>	260	0.14**	326	35.7%	33.2%	167	35.1%	31.7%	159	36.4%	0.30	ns	34.4%	3.15 ***
<b>5-yr average</b>	176	0.14*	224	35.8%	33.5%	105	32.3%	32.0%	119	38.9%	1.38	ns	34.2%	2.38 **

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

The correlation coefficient for both the 5-year average tax rate as well as last year's effective tax rate is +0.14, and in both cases significantly related. This is contrary to what could be expected on the tax rate, since a negative relationship was expected. Low-taxpaying entities can still benefit from certain tax schemes through operating leases, and this implies a negative relationship between the tax rate and operating-lease intensity. Also the differences in medians show a significantly higher effective tax rate for the high-leasing companies (34.4%) than for the low-leasing companies (32.0%). This is not the case for the differences in means.

## Management compensation

Table 7.10 shows the correlation of total management compensation and operating-lease intensity and the differences with regard to management compensation between high- and low leasing companies. Also it shows the relationship in 2004 between the lease-intensity and the percentage of the bonusplan related to the basic salaries of management. In line with the study of Imhoff et al. (1993), it shows the correlation between annual increases in management compensation and annual increases in operating-lease intensity.

**Table 7.10 Differences in management compensation between high- and low-leasing companies**

lnCOMP is the natural log of the absolute amount of management compensation. %change COMP is the percentage change in management compensation calculated as  $(COMP_t - COMP_{t-1})/COMP_{t-1}$ , the total compensation of the current year minus the total compensation of last year divided by the latter. Also given is the rank correlation of the change in operating-lease intensity  $(PVOL/TA_t - PVOL/TA_{t-1})/PVOL/TA_{t-1}$ . The correlation coefficient is Spearman's rank correlation.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES						
	N	rank corr.	N	mean	median	N	mean	median	N	mean	t-value	median	z-value		
COMP	335	0.27***	410	7.10	7.22	193	6.92	6.93	217	7.26	2.94	***	7.32	2.72	***
Bonus/ base salary	67	0.14ns	67	45.0%	40.7%	29	38.4%	31.6%	38	50.2%	1.51	ns	47.0%	1.49	ns
<b>% change PVOL/TA</b>															
%change COMP	101	0.20**													

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

The total amount of management compensation reported in the financial statement is significantly positively related to the operating-lease intensity. Also, a look at the differences in mean and medians between the high- and low-leasing companies reveals that high-leasing companies have significantly higher management compensations. This is consistent with the bonus-plan hypothesis. However, the total amount of management compensation is affected by other factors, such as number of members of the management board or size of the company, and is therefore not a relatively measure that can be compared from company to company. The percentage of the bonuses paid to management related to base salaries also show as positive relationship with the lease-intensity. Both the Spearman correlation as the differences in mean and median between high- and low-leasing companies show that bonuses take a greater part in total management compensation for high-leasing companies. Whereas for the low-leasing companies the median of bonus related to basic salary is 38%, this is 47% for high-leasing companies. The differences are, however, not significant.

In line with the analysis of Imhoff et al. (1993)<sup>64</sup>, this study tests whether the change in management compensation is related to a change in operating-lease intensity. Although this reverses the relationship to be explained, these variables are indeed significantly positively correlated: the management of a company indeed succeeds in increasing their salaries by increased operating-lease activity. Based on the results of Imhoff et al., Duke et al. (2002) concluded that 'presumably, managers are free to engage in compensation-increasing leasing behaviour without the fear that compensation committees will undo their efforts on payday'.

### Ownership concentration

The univariate results of ownership concentration are shown in Table 7.11. Ownership concentration is measured by the percentage shares that are closely held and is available in DataStream. Closely held shares are those shares that are held a) by officers, directors and their immediate families, b) in trust, c) by any other corporation (except shares held in a fiduciary capacity by banks or other financial institutions), d) by pension/benefit plans and e) by individuals who hold 5% or more of the outstanding shares.

<sup>64</sup> Imhoff et al. (1993) tested whether the change in return on assets caused by operating-lease capitalisation resulted in a change in management compensation; see also chapter 6.



**Table 7.11 Ownership differences between high- and low-leasing companies**

%shares closely held are the shares held by insiders divided by total common shares \*100%. It includes shares held a) by officers, directors and their immediate families, b) in trust, c) by any other corporation (except shares held in a fiduciary capacity by banks or other financial institutions), d) by pension/benefit plans and e) by individuals who hold 5% or more of the outstanding shares.

	PVOL/TA		ALL COMPANIES WITH LEASE DUMMY			LOW-LEASING COMPANIES			HIGH-LEASING COMPANIES						
	N	Rank corr.	N	mean	median	N	mean	median	N	mean	t-value	median	z-value		
%shares closely held	293	0.06ns	363	39.6	37.5	162	37.0	36.1	201	41.8	1.67	*	42.5	1.73	*

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

Previous studies found a positive relationship between more closely held companies and operating-lease intensity, explained by the risk related to the ownership of a company (see chapter 6). This is confirmed by the results of the underlying sample, only with respect to the differences between high- and low-leasing companies. The correlation between the percentage of closely held shares and the operating-lease intensity is positive but very small, and not significant. The median of the percentage of closely held shares is higher for high-leasing companies (42.5%) than for low-leasing companies (36.1%). This relationship is only significant at the 10% level, based on both the mean and the median.

## Industry

Table 7.12 shows mean and median of PVOL/TA, and the difference in the classification of high- and low-leasing companies, for five different sectors (construction, manufacturing, transport & public utilities, trade, and services). The classification in the sectors is based on the two-digit Standard Industrial Classification codes (sic codes). In line with Graham et al. (1998), also a telephone dummy was assigned to the companies active in this sector to test the hypothesis that regulated firms use less lease financing.

**Table 7.12 Industry differences between high- and low-leasing companies**

sic-codes	15-17		20-39		40-49		50-59		70-89	
	TOTAL	CONSTRUCTION	MANUFACTURING	TRANSPORT & PUBLIC UTILITIES	TRADE	SERVICES				
<b>PVOL/TA</b>										
<b>N</b>	379	17	173	43	64	82				
<b>Mean</b>	14.2%	35.9%	11.1%	7.8%	24.1%	12.0%				
<b>Median</b>	4.3%	16.0%	3.9%	4.4%	8.6%	2.9%				
Between groups analysis of difference		F-statistic	3.9***							
<b>COMPANIES WITH LEASE DUMMY</b>										
	<b>TOTAL</b>	<b>CONSTRUCTION</b>	<b>MANUFACTURING</b>	<b>TRANSPORT &amp; PUBLIC UTILITIES</b>	<b>TRADE</b>	<b>SERVICES</b>				
<b>N</b>	<b>464</b>	<b>30</b>	<b>200</b>	<b>44</b>	<b>87</b>	<b>103</b>				
<b>Low-leasing companies</b>	227	11	105	25	33	53				
<b>High-leasing companies</b>	237	19	95	19	54	50				
<b>Pearson chi-square</b>	8.4*									

\*\*\*, \*\* and \* significant at 1%, 5%, and 10% levels, ns= not significant

The median of PVOL/TA suggests that the 'construction' and 'trade' sectors use significantly more operating leases than the other three sectors do. Whereas the median of PVOL/TA for all sectors is 4.3%, the 'construction' and 'trade' sectors have medians of PVOL/TA of 16.0% and 8.6%, respectively. The median of the 'transport' sector (4.4%) is slightly higher than that of the total sample. The inter-

group analysis of variance shows that the difference between the operating-lease intensity of the five sectors is significant at the 1% level (F-statistic 3.9).

The results of the qualification in high- and low-leasing companies for the five sectors allow us to conclude that the majority of companies in the ‘construction’ and ‘trade’ sectors are high-leasing companies, whereas for the ‘manufacturing’, ‘transport’ and ‘services’ sectors this is opposite. Especially for the latter three sectors, however, the division between high- and low-leasing companies is close to a fifty-fifty division. Still, the Pearson chi-square (8.4) shows that the difference between the sectors in the classification as high- or low-leasing companies is significant at the 1% level.

To test the political-cost hypothesis that companies in a regulated sector are more active in leasing, we assigned a telecom dummy to the companies in the sample that were active in the telecom sector. Of the total of 379 observations with a known PVOL/TA, seventeen were assigned with a dummy of one, since the company is active in the telecom sector. The results of these seventeen observations showed a mean and median of PVOL/TA of 3.9% and 3.2%, respectively. For the 362 non-telecom companies, the mean and median of PVOL/TA were 14.7% and 4.5%, respectively. In line with the results of Graham et al. (1998), the telecom companies indeed use fewer operating leases, although in our sample the difference is not significant<sup>65</sup>. Also the classification in high- or low-leasing companies does not result in significant differences for telecom companies.

### 7.3.2 Regression models

This section presents the results of the regressions. As with the univariate analysis, both the operating-lease intensity (PVOL/TA), and the dichotomous lease dummy (high- vs. low-leasing companies) are tested. The relation between the selected determinants and PVOL/TA is tested using the linear regression method, since PVOL/TA is a continuous variable. The classification in high- or low-leasing companies resulted in a binary dependent variable (with value of one or zero), and the relationship between this variable and the selected determinants is tested using the binary logistic method (Logit). Appendix G briefly describes both methods.

#### Model construction

To avoid multicollinearity and an overabundance of models, we selected one measure for each of the determinants discussed in chapter 6 and tested in the univariate analysis. The choice was based on the results of the univariate analysis, and the aim was to choose variables that were not affected by operating leases (avoiding the endogenous variables). The models to be estimated take the following forms:

$$\begin{aligned} \text{LEASE} = & \beta_1 + \beta_2 (\text{LEVERAGE}) + \beta_3 (\text{SIZE}) + \beta_4 (\text{PERFORMANCE}) + \beta_5 (\text{GROWTH}) \\ & + \beta_6 (\text{INVESTMENT OPPORTUNITY}) + \beta_7 (\text{CAPITAL INTENSITY}) + \beta_8 \\ & (\text{TAX}) + \beta_9 (\text{COMPENSATION}) + \beta_{10} (\text{OWNERSHIP-} \\ & \text{CONCENTRATION}) + \beta_{11} (\text{TELECOM-DUMMY}) + \beta_{12} (\text{TRADE-} \\ & \text{DUMMY}) + \beta_{13} (\text{YEAR-DUMMY}) + \varepsilon \end{aligned}$$

<sup>65</sup> Both the difference in means and medians are not significant (t-value is -1.25 and z-value is -1.46)

whereas the dependent variable, LEASE, is measured as either PVOL/TA in the linear regression models or LEASE dummy (one for high-leasing companies and zero for low- or non-leasing companies) in the logit-regression model. The explanatory variables are LEVERAGE, measured by the ratio of total debt to total assets (TD/TA); SIZE, measured by the natural log of sales (lnSales); PERFORMANCE, measured by earnings per share (EPS); GROWTH, measured by the 5-year average sales growth; INVESTMENT OPPORTUNITY, measured by the market-to-book value of equity (MTB); CAPITAL INTENSITY, measured by the natural log of sales divided by the number of employees; TAX, measured as the effective tax rate; COMPENSATION, measured by the natural log of the absolute amount of management compensation; OWNERSHIP CONCENTRATION, measured by the % closely held shares in a company; TELECOM-DUMMY, used to distinguish between regulated and non-regulated sectors (dummy is assigned a value of one for companies active in this sector); TRADE-DUMMY, is the industry dummy with value of one if a company has a sic code between 50-59 (Trade) and zero otherwise, and finally a year-dummy, used to control for differences in lease intensity for the years 2000-2004.

Appendix 7.II shows the Spearman rank correlations between the different determinants that appear in the regression models. Both the leverage ratio (TDTA) and the investment opportunity set measure (MTB) appear twice in the table; once without the operating leases capitalised and once with them capitalised. Due to the sometimes-significant correlation between leverage and the other determinants, we construct one of the models excluding leverage. The numbers of observations of the ownership variable (% closely held shares) and management compensation are relatively small, and this would limit the number of observations included in the models. Therefore, model 3 is equal to model 1, but with the inclusion of ownership and management compensation. Models 1 through 3 include leverage and MTB, unadjusted for the capitalised operating leases. Models 4 and 5 include leverage and MTB, both after the operating leases have been capitalised. As with the before-capitalisation models, one model excludes ownership (model 4), and one includes ownership (model 5). Especially the impact on leverage changes the results between the before-capitalisation models (models 1 through 3) and the after-capitalisation models (4 and 5). An after-capitalisation model excluding leverage and including size (a variation on model 2) does not change the results. Model 2 is therefore not included in the table.

Table 7.13 shows the results of the linear regression, and Table 7.14 shows the results of the logit analysis. Table 7.15 summarises the findings of each of the investigated determinants of both the univariate analysis and multivariate regressions. Thereafter, the conclusions on the hypothesis will be formulated.

**Table 7.13 Linear regression**

This table summarises the results from four different linear regressions. The dependent variable is the percentage of the present value of the operating leases of total assets (PVOL/TA) as a measure of operating-lease intensity. Observations with a PVOL/TA exceeding twice the standard deviation are excluded. This concerns four observations with a PVOL/TA exceeding 84%. Models (1) and (2) include explanatory variables that ignore the presence of operating leases in the footnotes, and the variables are not adjusted by the capitalisation of the lease liability (PVOL) or the leased asset (PVA). Models (3) and (4) adjust the explanatory variables with PVOL or PVA, if appropriate. This concerns the ratio of total debt to total assets (LEVERAGE) and the market value of equity divided by the book value of equity (MTB, as a measure of INVESTMENT OPPORTUNITY). The explanatory variables used: SIZE, measured by the natural log of sales (lnSales); PERFORMANCE, measured by earnings per share (EPS); GROWTH, measured by average 5-year sales growth; CAPITAL INTENSITY, measured by the natural log of sales divided by the number of employees; TAX, measured by the effective tax rate; COMPENSATION, which is the natural log of total management compensation; OWNERSHIP, measured by the % closely held shares in a company; TELECOM, which is a dummy with a value of one if the company is a telecom company; TRADE, which is a dummy with value of one if a company has sic codes between 50-59, and zero otherwise; and a year-dummy for each of the calendar years 2000-2004. Models (2) and (4) exclude OWNERSHIP and MANAGEMENT COMPENSATION, since these variables limit the total number of valid observations. Absolute t-values are presented in parentheses, \*, \*\* or \*\*\* is significant at respectively the 10%, 5% or 1% levels.

Variable	WITHOUT OPERATING LEASES CAPITALISED		WITH OPERATING LEASES CAPITALISED		
	Model:	(1)	(2)	(3)	(4)
<b>Intercept</b>		-14.38 (1.09)	10.06 (1.03)	-5.70 (0.42)	15.72 (1.66)*
<b>LEVERAGE</b>		-18.89 (3.09)***	-14.23 (2.56)**	12.09 (1.63)	19.26 (3.08)***
<b>SIZE</b>		3.80 (3.01)***	1.89 (3.73)***	1.77 (1.27)	0.65 (1.26)
<b>PERFORMANCE</b>		-1.67 (2.45)**	-1.65 (2.80)***	-0.50 (0.69)	-0.62 (1.02)
<b>GROWTH</b>		6.67 (0.98)	10.63 (1.71)*	4.51 (0.64)	8.53 (1.38)
<b>INVESTMENT OPPORTUNITY</b>		-0.30 (0.66)	-0.17 (0.52)	-0.36 (0.65)	-0.37 (1.13)
<b>CAPITAL INTENSITY</b>		-3.08 (2.20)**	-3.68 (2.84)***	-2.52 (1.76)*	-3.13 (2.45)**
<b>TAX</b>		0.42 (0.20)	-0.03 (0.02)	1.45 (0.68)	0.77 (0.39)
<b>OWNERSHIP</b>		0.20 (4.03)***		0.16 (2.98)***	
<b>COMPENSATION</b>		-1.32 (0.54)		-0.03 (0.01)	
<b>TELECOM-DUMMY</b>		-6.48 (0.98)	-3.60 (0.60)	-8.27 (1.23)	-5.54 (0.95)
<b>TRADE-DUMMY</b>		10.56 (3.09)***	9.96 (3.42)***	8.37 (2.37)**	6.73 (2.30)**
<b>YEAR-DUMMY</b>		-0.91 (1.14)	-0.86 (1.28)	-1.78 (-2.15)**	-1.69 (2.69)**
<b>n</b>		155	196	151	192
<b>R2</b>		0.29	0.19	0.22	0.17
<b>adj-R2</b>		0.24	0.15	0.16	0.12
<b>F-statistic</b>		5.31***	4.61***	3.58***	3.84***

The adjusted R<sup>2</sup> increases from a maximum of 0.18 in the models without the operating leases capitalised (models 1, 2 and 3) to 0.27 in the models with the operating leases capitalised in leverage and MTB (models 4 and 5). These adjusted R<sup>2</sup> are in line with the study of Sharpe and Nguyen (1995) (adj-R<sup>2</sup> between 0.17 and 0.21), Adams and Hardwick (1998) (R<sup>2</sup> 0.20) and Graham et al. (1998) (R<sup>2</sup> of operating-lease model 0.25). As with the linear regression models, the models after capitalisation of the operating leases show increased predictive power.

**Table 7.14 Logit analysis**

This table summarises the results from four different logit regressions. The dependent variable takes the form of a dummy, where the dummy has a value of one for high-leasing companies and zero for low- or non-leasing companies. Models (1) and (2) include explanatory variables that ignore the presence of operating leases in the footnotes, and the variables are not adjusted by the capitalisation of the lease liability (PVOL) or the leased asset (PVA). Models (3) and (4) adjust the explanatory variables with PVOL or PVA, if appropriate. This concerns the ratio of total debt to total assets (LEVERAGE) and the market value of equity divided by the book value of equity (MTB, as a measure of INVESTMENT OPPORTUNITY). The explanatory variables used: SIZE, measured by the natural log of sales (lnSales); PERFORMANCE, measured by earnings per share (EPS); GROWTH, measured by average 5-year sales growth; CAPITAL INTENSITY, measured by the natural log of sales divided by the number of employees; TAX, measured by the effective tax rate; COMPENSATION, which is the natural log of total management compensation; OWNERSHIP, measured by the % closely held shares in a company; TELECOM, which is a dummy with a value of one if the company is a telecom company; TRADE, which is a dummy with a value of one if a company has sic codes between 50-59, and zero otherwise; year-dummy is a dummy for each of the calendar years 2000-2004. Models (2) and (4) exclude OWNERSHIP and MANAGEMENT COMPENSATION, since these variables limit the total number of valid observations. Wald-statistics are shown in parentheses. \*, \*\* or \*\*\* is significant at respectively the 10%, 5% or 1% level.

Variable	WITHOUT OPERATING LEASES CAPITALISED		WITH OPERATING LEASES CAPITALISED	
	Model: (1)	(2)	(4)	(5)
<b>Constant</b>	-1.59 (0.59)	-2.40 (2.59)	-0.77 (0.10)	2.50 (1.92)
<b>LEVERAGE</b>	-2.37 (4.70)**	-1.98 (5.03)**	2.28 (3.08)*	3.31 (8.77)***
<b>SIZE</b>	0.74 (12.06)***	0.25 (9.88)***	0.40 (2.37)	0.25 (6.82)***
<b>PERFORMANCE</b>	-0.24 (4.08)**	-0.22 (4.82)**	-0.17 (1.51)	-0.23 (3.40)*
<b>GROWTH</b>	1.52 (1.88)	2.56 (7.48)***	1.55 (1.27)	2.78 (5.54)**
<b>INVESTMENT OPPORTUNITY</b>	0.12 (1.86)	0.03 (0.42)	-0.08 (0.48)	-0.07 (1.52)
<b>CAPITAL INTENSITY</b>	-1.25 (17.47)***	-0.91 (17.48)***	-1.21 (12.84)***	-1.10 (15.43)***
<b>TAX</b>	-0.42 (1.46)	-0.37 (1.29)	-0.42 (1.26)	-0.46 (1.62)
<b>OWNERSHIP</b>	0.02 (7.91)***		0.02 (3.10)*	
<b>COMPENSATION</b>	-0.23 (0.44)		0.19 (0.70)	
<b>TELECOM-DUMMY</b>	-1.08 (0.78)	-1.22 (1.12)	-1.36 (1.15)	-1.23 (1.01)
<b>TRADE-DUMMY</b>	0.59 (1.36)	0.58 (1.97)	0.74 (1.51)	0.66 (1.56)
<b>YEAR-DUMMY</b>	-0.10 (0.77)	-0.14 (1.81)	-0.31 (4.12)**	-0.37 (8.54)***
<b>n</b>	217	270	168	208
<b>Nagelkerke R2</b>	0.35	0.23	0.36	0.38
<b>Chi-square</b>	65.7***	49.9***	53.3***	55.1***
<b>%correct</b>	72%	66%	74%	69%
<b>No-model</b>	52%	52%	52%	55%

Table 7.15 summarises the results of the univariate analyses, and the multivariate analyses. It also indicates whether the results are consistent with the formulated hypothesis or whether the hypothesis is rejected.

Table 7.15 Summary of results

	HYPOTHESES	VARIABLE	EXPECTED SIGN	UNIVARIATE ANALYSIS		MULTIVARIATE ANALYSIS		
				PVOL/TA	LEASE DUMMY	LINEAR REGRESSIONS; PVOL/TA	LOGIT REGRESSION: LEASE DUMMY	
<b>DETERMINANTS</b>								
<b>LEVERAGE</b>	hypothesis 6.1	Rejected	TD/TA-before capitalisation	-	+ns	+ns	_.***	_.**
<b>SIZE PERFORMANCE</b>	hypothesis 6.2	Consistent	TD/TA-after capitalisation	+	+***	+***	+***	+***
	hypothesis 6.3	Consistent	Ln(Sales)	+	+***	+***	+*** <sup>1</sup>	+***
	hypothesis 6.4	Rejected <sup>2</sup>	ROA-before capitalisation	0	-.*	-ns	endogenous	
	hypothesis 6.5	Consistent <sup>2</sup>	ROA-after capitalisation	-	_.**	_.**	endogenous	
<b>GROWTH</b>	hypothesis 6.6	Consistent	EPS	-	_.**	_.*	_.*** <sup>1</sup>	_.**
	hypothesis 6.7	Rejected	Average 5-year sales growth	+	+**	+***	+ns	+*** <sup>3</sup>
<b>INVESTMENT OPPORTUNITY</b>	hypothesis 6.7	Rejected	MTB-before capitalisation	+	+ns	+ns	-ns	+ns
	hypothesis 6.9	Rejected	MTB-after capitalisation	+	+ns	-ns	-ns	-ns
<b>CAPITAL INTENSITY</b>	hypothesis 6.9	Rejected	Age dummy (one if age<10 years)	+	n/a	+ns	n/a	n/a
	hypothesis 6.10	Consistent	Ln(sales/#employees)	-	_.***	_.***	_.**	_.***
	hypothesis 6.11	Consistent <sup>2</sup>	CA/TA-before capitalisation	+	+**	+***	endogenous	
<b>TAX MANAGEMENT COMPENSATION</b>	hypothesis 6.12	Rejected <sup>2</sup>	CA/TA-after capitalisation	-	-ns	+ns	endogenous	
	hypothesis 6.13	Rejected	Effective tax rate	-	+**	+***	-ns	-ns
	hypothesis 6.14	Consistent <sup>2</sup>	Change in compensation- /change in lease intensity	+	+**		#N/A	
	hypothesis 6.15	Rejected	Ln(management compensation)	+	+***	+***	-ns	+/-ns
<b>OWNERSHIP CONCENTRATION INDUSTRY</b>	hypothesis 6.16	Consistent	% closely held shares	+	+ns	+.*	+***	+**
<b>TRADE REGULATED INDUSTRY</b>	hypothesis 6.17	Consistent	Trade-dummy	+	+***	+.*	+***	+ns
	hypothesis 6.18	Rejected	Telecom-dummy	-	-ns	n/a	-ns	-ns

<sup>1</sup>Only significant in the model before lease capitalisation, <sup>2</sup>Based on univariate analysis only, <sup>3</sup>Only significant in the models that exclude ownership concentration and management compensation

### **Leverage**

With respect to leverage, both the linear- and the logit models show consistent results. Leverage unadjusted for operating leases is significantly, negatively related to the operating-lease intensity. When leverage is adjusted for operating leases the relationship becomes significantly positive. The debt hypothesis of Watts and Zimmerman (1986) that higher leverage leads to more operating leases is confirmed by these results. However, as described in the previous chapter, leverage is affected by the decision to use operating leases; the choice for operating leases might cause the leverage ratio to become lower for high-leasing companies than for low-leasing companies. Therefore, the adjustment of the leverage ratio with the operating-lease commitments is essential when testing the debt hypothesis. This is easy to identify by the change of the coefficient's sign of leverage before and after capitalisation. The results of both models are consistent with hypotheses 6.1 and 6.2. However, since the univariate analysis does not show results that support hypothesis 6.1, this hypothesis is rejected. It cannot be concluded that by choosing operating leases the high-leasing companies improve their leverage ratio to a level even better than the low-leasing companies. The results are, however, supportive of the debt hypothesis: that companies with a higher leverage ratio will have higher lease intensity.

The above allows us to conclude that improvement of the leverage ratio is an important determinant in the operating-lease decision, and that investigation of this determinant can only be executed by including operating leases in the leverage measure.

### **Size**

As mentioned before, the previous studies had mixed results on size as a determinant in the (operating-) lease decision. Also El-Gazzar et al. (1986) were confused by their unexpected results on this measure. In line with the results of El-Gazzar et al., this study finds the relationship between size and operating leases significantly positive, both in the univariate analysis and in the regressions. The endogeneity of total assets as size measure was confirmed by the univariate analysis (before- and after capitalisation of operating leases), and in the regression size was therefore measured by the natural log of total sales (as suggested by Sharpe and Nguyen (1995)). A separate analysis of the 25% smallest and the 25% largest companies did not alter the results. The different results from the previous studies might be caused by the high correlation of size with some of the other determinants (see Appendix 7.II). In most models the coefficient on size is positive and highly significant: the results are consistent with hypothesis 6.3 that larger companies choose relatively more operating leases than smaller companies do.

### **Performance**

In the univariate analysis, return on assets was negatively related with operating-lease intensity, and this relation was significant only at the 10% level. The difference in means and medians between high- and low-leasing companies was negative, but not significant. The first hypothesis on ROA (before capitalisation), hypothesis 6.4 (that operating leases are a means of equalising performance based on ROA and therefore no difference was expected between high- and low-leasing companies), is rejected.

However, when looking at ROA after the operating leases have been capitalised, the results are consistent with hypothesis 6.5. hypothesis 6.5 hypothesised that ROA after capitalisation results in a significant difference between high- and low-leasing companies. Indeed hypothesis 6.5 is confirmed, since ROA after capitalisation is significantly lower for high-leasing companies than for low-leasing companies. The results on both hypotheses indicate that by means of operating leases companies increase their ROA, although high-leasing companies have not fully reconciled their ROA with those of the low-leasing companies; ROA before capitalisation is still lower for the high-leasing companies than for the low-leasing companies. Also the correlation between ROA before capitalisation and the operating-lease intensity is negative and significant at the 10% level. ROA was not included in the regressions due to its endogeneity.

In the regressions the performance measure included is earnings per share, as an exogenous measure. In the univariate analysis, EPS was negatively related to the operating-lease intensity—and in all cases this relationship was significant. The negative relationship implies that the better the performance of a company, the less it will choose operating leases; this is in line with financial contracting theory, which says that better performing companies have better access to cheaper financing forms. Also in the regressions is the coefficient of EPS in all models significantly negative. The results of both the univariate and the multivariate analyses are consistent with hypothesis 6.6, and the hypothesis cannot be rejected.

### **Growth/investment opportunity**

Growth was measured by both past growth (increases in sales) and future growth (investment opportunity set measured by market-to-book ratio). Furthermore, it was tested whether the age of a company, as a measure of future growth possibilities, could be a determinant explaining the lease decision. The average growth rate of total sales<sup>66</sup> in the univariate analysis is significantly positively related with the operating-lease intensity at in any case the 5% level. High-leasing companies had a significantly (1% level) higher growth rate than low-leasing companies. In the regression models this relationship is in all models positive, although it was significant in only three out of the eight models. Growth is significantly positively related to operating-lease intensity only when management compensation and ownership concentration are excluded from the model. This is probably caused by the significant correlation between growth and management compensation, which causes multicollinearity when both variables are included in the model. Therefore, the results are not all consistent with hypothesis 6.7, and this hypothesis is rejected.

Also the results on the future growth options, the investment opportunity set, are mixed. The relationship between the MTB before capitalisation is (as expected) predominantly positive in the univariate analysis and in the regressions. After the MTB ratios were adjusted for operating leases (changing the book value of equity in the denominator, which lowers the ratio), the correlation with PVOL/TA remained positive; although the difference between high- and low-leasing companies becomes negative, neither of these relations is significant. MTB is not significant in any of

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<sup>66</sup> Growth of total assets was excluded from the regressions due to its endogeneity.



the eight regression models (neither before nor after operating leases are adjusted). hypothesis 6.8 is therefore rejected.

To test whether younger companies lease more than older companies do, we assigned an age dummy. The dummy (one if a company was established less than ten years ago, zero otherwise) did not show a relation with operating-lease intensity. Also hypothesis 6.9 is rejected.

### **Capital intensity**

A negative relationship between capital intensity was hypothesised by Sharpe and Nguyen (1995): companies that are highly capital intensive have more specialised equipment, which is less appropriate for leasing. A positive relationship was hypothesised by Graham et al. (1998), based on the principle that leasing is, by definition, attached to fixed assets and the more fixed assets a company uses, the more possibilities the management has to choose operating leases. This study focuses on sales per employee, since the value of the fixed assets is of course heavily affected by operating-lease intensity, since assets are removed from the balance sheet. This, together with the different results of previous studies, leads to a hypothesis that focuses more on the labour intensity of a company, which can be measured exogenously from the operating leases. The more sales per employee, the less labour intensive a company is, and the fewer possibilities that will be available to the management of the company to choose operating leases (comparable with the argumentation of Graham et al. (1998)). Sales per employee were therefore expected to negatively relate with the operating-lease intensity, and this was confirmed by both univariate- and regression models. The relationship was highly significant at the 5% level, at the least. The above is consistent with hypothesis 6.10, that more labour-intensive companies less often choose operating leases.

### **Tax**

As described by Hart (2001), taxes are one of the missing ingredients of the complete and perfect markets of Modigliani and Miller. The tax differential between lessee and lessor has therefore often been described as an important reason to choose leasing instead of other forms of debt financing. Operating leases allow lower taxpaying lessees to shift tax advantages to higher taxpaying lessors. The relationship between the tax rate and operating leases was therefore expected to be significantly negative. The results of this study, however, do not confirm this hypothesis. In the univariate analysis the relationship is even significantly positive, although in the regression the relation is predominantly negative but not significant. Therefore, hypothesis 6.13 is rejected. This permits us to conclude that in the Netherlands the listed companies do not choose operating leases to shift tax shields from a low taxpaying entity to a high taxpaying entity.

### **Management compensation**

The management-compensation hypothesis was based on the bonus-plan hypothesis of Watts and Zimmerman (1986). The univariate analysis showed a significantly positive relation between operating-lease intensity and the absolute amount of management compensation. In addition, it showed that an increase in management compensation (which makes the variable a relative measure instead of an absolute measure) is positively related to an increase in operating-lease intensity in the

same year. These results are consistent with hypothesis 6.15 and hypothesis 6.14, respectively. The increase in management compensation related to the increase in operating-lease intensity was only limitedly available, and this variable was not used in the regressions. The absolute amount of management compensation in the regression models showed a negative relationship three times, and a positive only once; in none of the four models was the relationship significant. Therefore, hypothesis 6.14 is rejected.

### **Ownership**

The results on ownership concentration are positively related with operating-lease intensity in the univariate- and regression models. In both regression models this relation is significant at the 5% level, at least. Also the univariate analysis regarding the differences between high- and low-leasing companies shows that high-leasing companies have a significantly higher ownership concentration than low-leasing companies. The correlation between PVOL/TA and the % closely held shares is positive but not significant, indicating that the relation is not linear. Therefore, the results are predominantly consistent with hypothesis 6.16, that ownership concentration is a determinant positively affecting the operating-lease decision.

### **Industry**

The univariate analysis shows that the industry of a company is a determining factor in its operating-lease decision. The 'trade' sector has (as expected in hypothesis 6.17) an above-average median usage of operating leases. Also the 'construction' sector has an above-average higher median of operating-lease intensity. However, the coefficient of the trade dummy is significant only in the linear regression. In the logit analysis, neither of the industry dummies is a significant contributor in the classification in high- or low-leasing companies. This was already to some extent visible in Table 7.12, which shows a fairly equal division between high- and low-leasing companies within each of the sectors. The above proves that operating leases are a well-accepted financing form within all sectors, so that within each sector companies choose to lease more or less, but that the trade sector as a whole is an above-average leasing industry.

With respect to hypothesis 6.18, that regulated companies will lease less than other companies, the results do not show significant outcomes. The only regulated sector within the dataset is the telecom sector, and only seventeen company-year observations were available. These companies indeed report fewer operating leases than the average or median of the total sample. However, no conclusions can be drawn from this, since the telecom companies are part of the 'transport and public utilities' sector (sic 40-49), which is not a sector heavily involved in leasing. The telecom sector is no exception to that, and the low-leasing intensity of telecom sector companies may not arise from the fact that these companies are closely watched. Therefore, hypothesis 6.18 cannot be accepted.

## **7.4 Summary and conclusions**

This chapter presented the results of the empirical tests of the determinants of the operating-lease decision. Possible determinants had been described in chapter 6, where hypotheses were also formulated. As described in chapter 6, the choice for

operating leasing is often driven by financial contracting rationales, and operating leases have many features that make a difference in the choice between normal debt, or even financial leases. This contrasts with the complete and perfect markets of Modigliani and Miller, who argued that in such markets the way a project is financed does not matter. However, as pointed out by Fields et al. (2001), also the accounting environment causes the market to be neither perfect nor complete. Accounting choices (including the operating-lease decision) do matter in the financial contracting. Fields et al. (2001) defined three market-imperfection categories<sup>67</sup>, which all relate more or less also to the operating-lease decision. Most important for this study were the financial contracting reasons, including the internal agency conflicts (bonus plans) and external agency conflicts (debt contracts). In addition, characteristics of the lessee company may determine the choice for operating leases— as pointed out by Graham et al. (1998), operating leases are by definition attached to a fixed asset, and more capital-intensive companies will thus lease more.

Chapter 6 described how the endogeneity of certain variables might have an impact on studies like this. This chapter demonstrated for several variables that it does matter whether the variable used is affected by the operating-lease decision— most strikingly, because many studies use an explanatory variable, the usage of the leverage ratios as a determinant. The relationship between operating-lease intensity and leverage changes signs after leverage is adjusted for operating leases. This confirms the formulated hypothesis, because operating leases are a means of lowering the leverage ratio. The same applies for return on assets (as a performance measure) and the ratio of current assets to total assets (as a capital intensity measure), and to a lesser extent for the market-to-book value. Using these variables either adjusted or unadjusted will significantly alter the results of a study like this. Some of the previously described studies have therefore become less meaningful.

This study has therefore aimed to include in the regression only those variables that are not directly influenced by lease intensity. Only with leverage and the market-to-book value was no alternative available. The determinants with a positive significant relationship with operating-lease intensity were leverage (but only after capitalisation), size, ownership concentration and ‘trade’ companies. The determinants with a negative significant relationship were leverage (before capitalisation), performance (earnings per share) and labour intensity. Recalling the division of Brealy and Myers (2003) of economic versus business reasons to lease, the above suggests that both the accounting and the economic reasons to lease determine the lease decision. Whereas size, (the identity as) trade companies and labour intensity related to the ‘sensible’ economic reasons to lease, also the debt hypothesis was confirmed (the accounting reason to lease). Furthermore, although the bonus-plan hypothesis was rejected, the univariate results indicate that further research might be interesting on this subject, and a relationship is indisputable. Finally, the concentration of ownership relates to both economic reasons (avoiding risk of obsolescence) and accounting reasons (avoiding breaching debt covenants).

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<sup>67</sup> See section 6.2, these three market imperfections were, first, financial contracting aspects (both internal and external agency conflicts), second, information asymmetries and market efficiencies and, third impact on third parties.

## Appendix 7.I :Description of linear and logistic regressions

### Linear regression

In linear regression the goal is to find the best-fitting line by minimising the residuals. The linear regression model with several explanatory variables takes the following form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \quad (1)$$

where Y is the dependent variable,  $X_1 \dots X_n$  are the explanatory variables,  $\beta_1 \dots \beta_n$  are the coefficients showing the relationship between X and Y, and  $\varepsilon$  is the residual. The  $R^2$  statistic (goodness of fit) measures how well the model explains the relation between Y and X. Since  $R^2$  does not decrease when additional variables are added, the adjusted  $R^2$  is more often used, since the adjusted  $R^2$  is 'penalised' for adding too many explanatory variables.

### Logistic regression

Logit analysis (logistic regression) can be used to discriminate between two classes, for example high- vs. low-leasing companies or bankrupt vs. non-bankrupt companies (see also chapter 8 on financial-distress prediction). The model estimates a logistic regression equation and then uses a critical level of Z to classify observations into one class or the other (Collins and Green (1982)). The dependent variable takes the form of a dummy variable and can either be 1 or 0.

The logistic model can be calculated as:

$$P(Z) = \frac{1}{1 + e^{-\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon}} \quad (2)$$

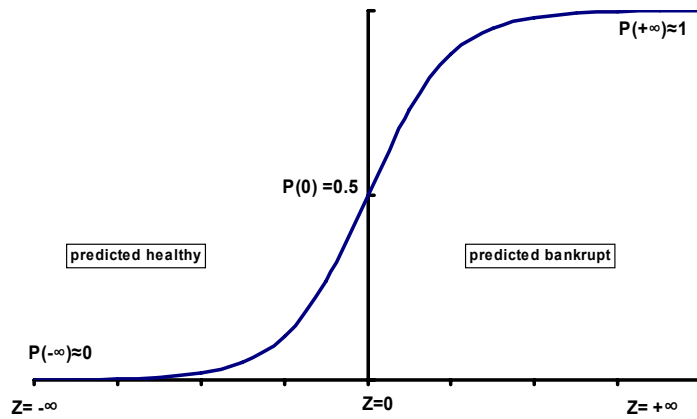
which is equivalent to:

$$\ln_e \frac{Z}{(1-Z)} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \quad (3)$$

where  $P(Z)$  is the chance of the dependent variable reaching its maximum value, or obtaining a successful outcome,  $\frac{Z}{(1-Z)}$  is the likelihood ratio (the "odds"), the probability that a successful outcome ( $Z=1$ ) is obtained,  $\beta_1 \dots \beta_n$  are the coefficients showing the relationship between X and the odds ratio, and  $X_1 \dots X_n$  are the independent variables.

Next figure illustrates the cumulative probability curve of logistic regression used for bankruptcy prediction. The probability ratio  $P(Z)$  varies between 0 and 1 for Z varying from minus infinite to plus infinite. When the value of Z is 0, then the probability of default  $P(Z)$  is 0.5, which is often used as the critical value to classify companies in either one of the categories.

## Cumulative probability curve of logistic regression



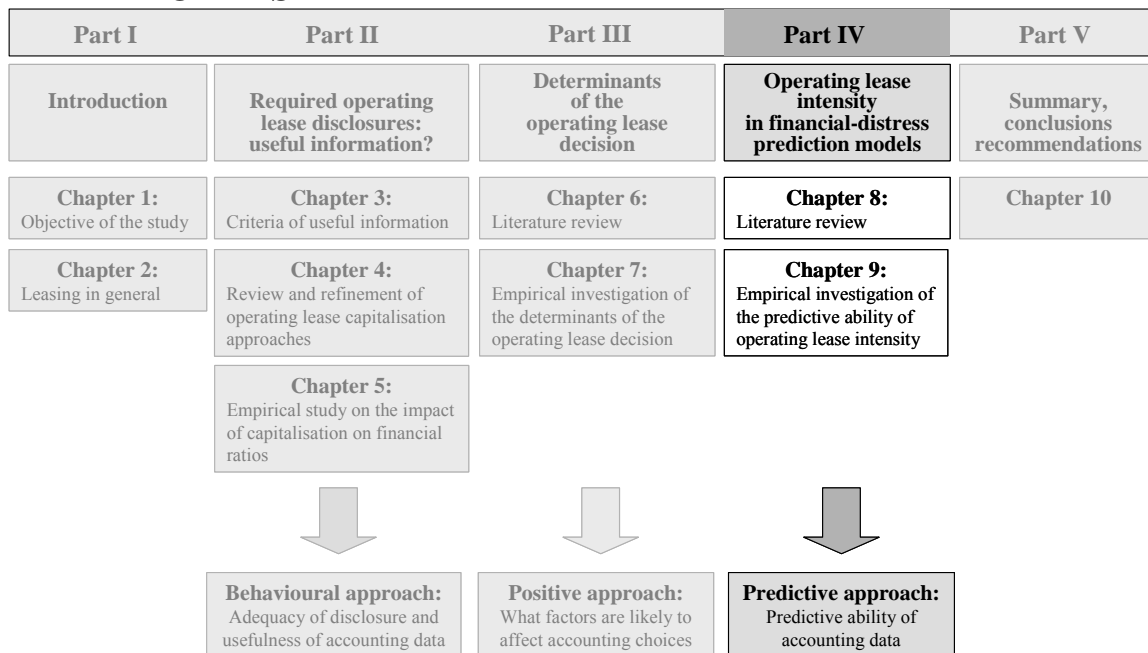
Because with logistic regression the dependent variable is not a continuous one, the goal of logistic regression is different; the model predicts the likelihood that  $Y$  is equal to one (rather than zero), given certain value of  $X$ . If  $X$  and  $Y$  have a positive linear relationship, the probability is that  $Y=1$  will increase as values of  $X$  increase. Instead of the  $R^2$  in linear regression models measuring the overall fit of the model, with logistic regression the chi-square measures the goodness of fit of the observed and the expected values.

## Appendix 7.II Spearman correlation matrix

**Table 7.16** LEVERAGE is measured by total-debt-to-total-assets ratio, once before the operating leases are capitalised and once after. SIZE is measured by the natural log of sales (lnSales), PERFORMANCE measured by earning per share (EPS), GROWTH is measured by the average 5-year sales growth, INVESTMENT OPPORTUNITY is measured by the market value of equity divided by the book value of equity, (MTB), TAX is measured by the effective tax rate, COMPENSATION is the natural log of total management compensation, OWNERSHIP is measured by the %-closely held shares in a company, CAPITAL INTENSITY is measured by the natural log of sales divided by the number of employees.

		PVOL/TA	LEV- before	LEV- after	SIZE	PERF.	GROWTH	IO- before	IO- after	TAX	OWN	COMP	CAP intens
<b>PVOLTA</b>	coeff.	1.00	0.06	0.34	0.34	-0.11	0.12	0.03	0.08	0.13	0.06	0.27	-0.16
	sig.		0.27	0.00	0.00	0.03	0.03	0.62	0.14	0.03	0.33	0.00	0.00
	n		379	369	371	375	350	347	329	260	293	335	366
<b>LEVERAGE-before</b>	coeff.		1.00	0.89	0.34	-0.08	0.10	0.03	0.14	-0.11	0.10	0.24	0.08
	sig.			0.00	0.00	0.06	0.02	0.49	0.01	0.02	0.03	0.00	0.05
	n			370	575	578	533	528	330	406	455	528	570
<b>LEVERAGE-after</b>	coeff.			1.00	0.33	-0.05	0.13	0.10	0.20	-0.05	0.12	0.25	-0.06
	sig.				0.00	0.36	0.02	0.06	0.00	0.44	0.05	0.00	0.26
	n				362	365	341	338	330	258	284	327	357
<b>SIZE</b>	coeff.				1.00	0.27	0.19	0.04	0.05	0.03	-0.25	0.83	0.27
	sig.					0.00	0.00	0.35	0.41	0.51	0.00	0.00	0.00
	n					573	526	518	323	399	447	526	570
<b>PERFORMANCE</b>	coeff.					1.00	0.13	0.08	0.02	-0.14	0.03	0.14	0.16
	sig.						0.00	0.08	0.71	0.00	0.51	0.00	0.00
	n						530	520	325	401	453	524	565
<b>GROWTH</b>	coeff.						1.00	0.23	0.18	0.08	-0.02	0.11	0.08
	sig.							0.00	0.00	0.11	0.61	0.02	0.09
	n							485	306	377	431	486	519
<b>INVESTMENT OPPORTUNITY BEFORE</b>	coeff.							1.00	1.00	-0.02	-0.09	0.08	-0.10
	sig.								0.00	0.78	0.06	0.09	0.02
	n								330	361	419	483	513
<b>INVESTMENT OPPORTUNITY AFTER</b>	coeff.								1.00	-0.02	-0.12	0.19	-0.16
	sig.									0.79	0.05	0.00	0.00
	n									230	262	299	318
<b>TAX</b>	coeff.									1.00	-0.06	0.06	-0.06
	sig.										0.30	0.22	0.26
	n										328	366	396
<b>OWN</b>	coeff.										1.00	-0.44	-0.01
	sig.											0.00	0.85
	n											421	445
<b>COMP</b>	coeff.											1.00	0.11
	sig.												0.01
	n												522

## PART IV: THE CONTRIBUTION OF OPERATING-LEASE CAPITALISATION IN FINANCIAL DISTRESS PREDICTION MODELS



Part IV investigates whether operating leases can improve the classification accuracy of financial-distress or bankruptcy-prediction models. While bankruptcy-prediction studies often investigate companies that are not yet bankrupt but are financially distressed (for example companies with a suspension of payment), in this study the usage of ‘financial-distress’ prediction is preferred to ‘bankruptcy’-prediction. Since the 1960s, financial-distress prediction studies have emerged as a particular focus in the methods used. The usage of financial ratios in financial-distress prediction does not seem to be based on any theory but on logical sense and intuition. Financial ratios have proven to be useful, however, in financial-distress or bankruptcy prediction. Leverage-, profitability- and cash-flow ratios have particularly proven their usefulness in financial-distress prediction. Only three previous studies on bankruptcy prediction incorporated operating leases in their analysis (Elam (1975), Altman et al. (1977) and Lawrence and Bear (1986)). Elam and Lawrence and Bear tested whether the classification accuracy improved when operating-lease information was included; both concluded that the classification accuracy did not improve. However, the following results of the previous parts of this thesis can be used to support a renewed analysis of this subject: (1) the increased usage of operating leases in the last decennia, (2) improvements in the information disclosed (part I), (3) the impact that operating leases have on financial ratios, (4) the ignorance of operating leases that distorts a fair comparison between companies (part II), and (5) the avoidance of a too-high leverage as an important determinant in the operating-lease decision (part III). Furthermore, the analyses of Elam and Lawrence and Bear may be updated regarding the method they used (multiple discriminant analysis versus logit analysis).

Chapter 8 describes previous financial-distress prediction studies with a special emphasis on the studies that incorporated operating leases. At the end of the chapter the hypotheses will be formulated. Chapter 9 empirically tests the hypotheses and presents the results. The chapter concludes with an answer to the question of whether operating leases do, or do not, improve the classification accuracy of bankruptcy prediction.





## **CHAPTER 8    PREVIOUS RESEARCH ON FINANCIAL-DISTRESS PREDICTION AND OPERATING LEASES**

### **8.1    Introduction**

Financial ratios have been used for decades to predict financial distress. Starting with the early work of Beaver (1966) and Altman (1968), subsequent research on the predictability of financial distress emerged especially in the method used. Whereas Beaver and Altman used discriminant analysis, the statistical properties of accounting data forced research to use methods with less restrictive assumptions such as logit- and probit analysis, or even the relatively new neural network models (see Ohlson (1980), Collins and Green (1982), Altman, Marco and Varetto (1994) and Lennox (1999)). However, with respect to financial ratios (the explanatory variables), less progress has been made. Previous studies established that especially profitability-, leverage- and cash-flow ratios have important effects on the probability of bankruptcy (Lennox (1999)).

Parts II and III of this thesis demonstrated the impact that operating leases have on the financial ratios of a company, and showed also that a company's management deliberately chooses operating leases to improve their leverage ratio. It was shown, for example, that a leverage ratio not adjusted for operating leases does not allow a fair comparison between high- and low-leasing companies. Also, high-leasing companies improved their leverage ratio to a level equivalent with that of low-leasing companies. Chapter 6 (Figure 6.1) explained how this might lead to incorrect conclusions if non-adjusted ratios are used in empirical studies.

Only a few studies used disclosures of operating leases in the financial-distress prediction model. Elam (1975) and Lawrence and Bear (1986) investigated separately the impact that operating leases have on the accuracy of bankruptcy prediction. Both concluded that adjusting financial ratios with regard to the operating-lease liability did not improve the accuracy of prediction. Although Altman et al. (1977) adjusted their 1968 model (Altman (1968)) to include the capitalisation of operating leases, they did not mention whether this improved the accuracy of the model. Although Elam (1975) and Lawrence and Bear (1986) presented disappointing results on the explanatory power of operating leases (which led other researchers to ignore operating leases (see Dambolena and Khoury (1980), for example)), there are at least three reasons why it is surprising that operating leases get so little attention in the recent financial-distress prediction literature.

First, the lease-debt substitutability discussion has received a great deal of attention in the finance and accounting literature with the question of whether leasing is complementary or supplementary to debt (among others: Ang and Peterson (1984), Beattie et al. (2000b), Lewis and Schalheim (1992), Myers et al. (1976), and Deloof and Verschueren (1999)). Although it seems that no consensus has been reached on this subject, it is clear that debt and leases are comparable. Yet, in financial-distress prediction models leverage is one of the variables with the highest predictive power. These two facts combined (leasing similar to debt, leverage having high predictive power) might suggest that the relative amount of operating leases would also have predictive power. Or, as put forward by Lawrence and Bear (1986, p.573): 'to the extent any lease, financial or operating, may be a

substitute form of debt, the improvement (if any) from including this additional information in bankruptcy models should be investigated’.

Second, the early financial-distress prediction models (Altman (1968), Beaver (1966), Ohlson (1980)) might not have incorporated operating leasing data as useful information. Leasing was still considered to be an ‘innovative’ way of financing, and was applied by a small minority of companies. Moreover, the information disclosed might have been insufficient to estimate the real (on-balance equivalent) liability. In the last decade, however, leasing has shown a constant growth in new businesses each year and although operating-lease disclosures are still not ideally transparent, data on these disclosures have become more available in recent years and might be suitable now for analysis in bankruptcy prediction (see chapters 2 and 5).

Third, as shown in Part III, the off-balance-sheet character of operating leases is often a reason that a firm seeks financing through operating leases. The debt hypothesis was confirmed by the results of chapter 7. What the ultimate effects might be of bringing too many obligations off the balance sheet has been shown by the Enron bankruptcy. Therefore, any available data of off-balance-sheet liabilities might be interesting for bankruptcy prediction.

Part IV aims to measure the impact of operating leases on the *ex post* classification accuracy of financial-distress prediction models. This is in line with the study of Lawrence and Bear (1986). The impact of operating leases will be analysed by testing the accuracy of financial-distress prediction models using models with- and without operating leases. This chapter is set up as follows. Section 8.2 describes previous studies on bankruptcy prediction. Sub-section 8.2.1 first describes two methods often used in bankruptcy prediction: multiple discriminant analysis and logit analysis. Sub-section 8.2.2 subsequently describes the classification accuracy, which can be used as a measure of success of a financial-distress prediction model. Sections 8.2.3 and 8.2.4 describe respectively the financial ratios often used in bankruptcy prediction, and the selection of the bankrupt versus healthy sample in the studies. Sub-section 8.3 describes extensively three financial-distress prediction studies that included operating leases in the model. Section 8.4 concludes with the formulation of the hypotheses that will be empirically tested in chapter 9.

## **8.2 Financial-distress prediction studies**

### **8.2.1 Methods used in predicting financial-distress**

Previous research into predicting financial-distress used several methods. A distinction can be made between univariate models, or single ratio predictive models, and multivariate models. Univariate models examine the predictive ability of one ratio at a time (for example, Beaver (1966)); multivariate models examine the predictive ability of ratios using several ratios at the same time (for example, Altman (1968), Elam (1975)). Laitinen and Kankaanpaa (1999) argue that new methods have been applied in an effort to increase the accuracy of financial-distress prediction. Their brief historical overview of methods starts in 1960 with the multiple discriminant analysis (MDA) as used by Beaver (1966) and Altman (1968). Logistic regression (Logit-analysis, as used by Ohlson (1980), for example) subsequently replaced MDA in the 1970s and 1980s. Thereafter, alternative methods occurred as recursive partitioning and survival analysis, which never

became as popular as MDA and logit, according to Laitinen et al. More recently, neural networks have been introduced (see also Pompe and Bilderbeek (2000)).

Dimitras et al. (1996) reviewed 47 studies published on financial-distress prediction in twelve different countries. They described ten different methods used in these studies. Some studies used more than one method (thus, the total of methods used is larger than 47), but their study still showed a clear distinction between the preferred methods: 26 times MDA, 15 times logit analysis, six times linear probability model and all other methods either once or twice. Laitinen and Kankaanpaa (1999) comparison of the above-described methods resulted in their conclusions that no superior method has yet been found, and no significant differences between the results were found. They stated (p.84): ‘one of the latest applications, neural networks, is in its present form as effective as discriminant analysis was thirty years ago’. Similar conclusions were formulated by Pompe and Bilderbeek (2000) and Altman et al. (1994).

Since this study will be compared with the studies of Elam (1975) and Lawrence and Bear (1986), which both used discriminant analysis (see the section 8.3), discriminant analysis will also be used in this study. However, since the use of MDA decreased after the ‘80s and logit-analysis has become more popular since the study of Lawrence and Bear (1986), also this method will be used as an alternative approach (Dimitras et al. (1996), Laitinen and Kankaanpaa (1999)). Both methods will now be described.

### **Discriminant analysis**

Multiple discriminant analysis (MDA) is used to classify observations into discrete categories (for example, bankrupt or non-bankrupt) dependent on the observation’s characteristics. With (linear) MDA, a linear combination is derived that best discriminates between these categories. This discriminant function can have the following form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

Where  $\beta_i$  are the discriminant coefficients, and  $X_i$  are the independent variables ( $i=1,2,\dots,n$ ).  $Y$  is the score that is calculated for each company. Based on the sample results a cut-off point is calculated so that the companies below the cut-off point are classified as bankrupt, and those with a score above the cut-off point are expected to remain healthy (Laitinen and Kankaanpaa (1999)).

The statistical requirements of linear MDA are that the independent variables for both groups have a normal distribution, and that the covariance matrices of both groups are the same. As described in chapter 5, financial ratios are often not normally distributed (see also Lennox (1999), Barnes (1987), Pompe and Bilderbeek (2000)). Despite the remark of Elam (1975) that many researchers postulate that the financial ratios are normally distributed, it is to be expected that this statistical requirement is often violated in linear MDA financial-distress prediction models. The second statistical requirement can be avoided by using quadratic discriminant analysis, which does not require equal covariance matrices. Nevertheless, MDA has been ‘the most popular technique

of bankruptcy studies' (Ohlson (1980, p.112)) and is 'by far the dominant methodology' (Altman (2002, p.192)). Pompe and Bilderbeek (2000) compared the classification accuracy results of (linear) MDA with the results of neural networks, and concluded that although the statistical requirements may be violated, the accuracy of (linear) MDA was similar to that of the neural networks used. Also Altman et al. (1977) compared linear MDA with the quadratic MDA and found equal accuracy results in the classifications. The accuracy of the linear MDA was even superior to that of the quadratic MDA when a hold-out sample was used.

### Logit analysis

Ohlson (1980) mentioned three issues when using MDA: first, the statistical requirements limit the usage of the model to only a discriminating device; second, the outcome of MDA is only a 'score', with little intuitive interpretation; and third, the matching procedures<sup>68</sup> typically used in MDA make it uncertain what these matching procedures add to or detract from the predictability of the model. The violation of the two statistical requirements is also mentioned by Collins and Green (1982, p.350). Ohlson (1980) and Collins and Green (1982) (among others) therefore both prefer logit analysis, the main advantages of which are that no assumptions have to be made regarding prior probabilities of financial-distress and/or the distribution of predictors, and lower type-1 errors (type-1 and type-2 errors are described hereafter in the sub-section on classification accuracy).

As described in chapter 7, logit analysis (logistic regression) can be used to discriminate between two classes (for example, bankrupt vs. non-bankrupt, or high-leasing vs. low-leasing companies). The model estimates a logistic regression equation and then uses a critical level of Z to classify observations into one class or the other. The dependent variable takes the form of a dummy variable and can be either one or zero.

The logistic model may be calculated as follows:

$$P(Z) = \frac{1}{1 + e^{-\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon}}, \quad (1)$$

which is equivalent to

$$\ln_e \frac{Z}{(1-Z)} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon, \quad (2)$$

where P(Z) is the chance of the dependent variable reaching its maximum value, or obtaining a successful outcome;  $\frac{Z}{(1-Z)}$  is the likelihood ratio (the "odds"), the probability that a successful outcome (Z=1) is obtained.  $\beta_1 \dots \beta_n$  are the coefficients showing the relationship between X and the odds ratio, and  $X_1 \dots X_n$  are the independent variables (see also Appendix 7.I).

Although logit seems preferable to MDA because of the limitations of MDA, studies comparing the two methods have not proved higher classification accuracy for logit

<sup>68</sup> Failed and non-failed firms are matched according to criteria such as size and industry. This might be arbitrary.

as opposed to MDA (Dimitras et al. (1996), Pompe and Bilderbeek (2000)). The next chapter section will test this for the underlying study.

### 8.2.2 Classification accuracy

Financial-distress prediction models categorise companies in two categories: those that are expected to go bankrupt and those that are expected to remain healthy. The classification accuracy is measured as the percentage of correct classifications of the total number of companies classified. As with the R<sup>2</sup> in regression analysis (where R<sup>2</sup> measures the success of the regression in predicting the values of the dependent variable within the sample), the classification accuracy percentage in financial-distress prediction is also a measure of how much of the variation in the dependent variable is explained by the independent variables in the model. However, since no perfect method exists that has 100% prediction accuracy, some companies are classified in the wrong category. Two potential errors can be made: a bankrupt company is classified as healthy or a healthy company is expected to go bankrupt. The first situation is called a Type-1 error; the second is called a Type-2 error (see Table 8.1)

**Table 8.1** Classification accuracy

	PREDICTED GROUP MEMBERSHIP	
	Bankrupt	Healthy
Bankrupt	correct	Type-1 error
Healthy	Type-2 error	correct

Type-1 errors are sometimes found to be more severe than Type-2 errors. This can be explained as follows. Assume that a bank lends money to a company based on the expectation that this company will stay healthy. If the company goes bankrupt (Type-1 error), the misclassification costs might include the non-repayment of the loan. If, however, a company is expected to go bankrupt but in fact should be classified as healthy (Type-2 error), the bank may have denied the loan and the misclassification costs include the lost (interest-) income on the loan, which is probably less than the cost of the non-repayment of the loan. Therefore, models with the same overall accuracy but lower Type-1 errors will be preferred above models with higher Type-1 errors (Collins and Green (1982)). Alternatively, researchers may assign different weights to each type of error (see Altman et al. (1977)), or lower the cut-off point that determines whether a company is classified as bankrupt or as healthy. However, it is also common to attach no weights to the different types of errors. As expressed by Holmen (1988, p.54), users have their own ideas regarding the relative seriousness of each type of error; he therefore leaves the weighting of the errors to each reader.

Financial-distress models can be compared to each other based on their prediction accuracy. The z-statistic that tests the null hypothesis that a new model (model two) does not significantly outperform the old model (model one) is calculated as follows (see also Heij, Boer de, Franses, Kloek and Dijk van (2004), Laitinen and Kankaanpaa (1999), Elam (1975) and Lawrence and Bear (1986)):

$$z = \frac{CR_2 - CR_1}{\sqrt{p * (1 - p) * N}}$$

where  $CR_{1,2}$  is the classification rate of model one compared with the alternative of model two, and  $p$  is the random hit rate, calculated as

$$p = \frac{n_b}{N} + \left(1 - \frac{n_b}{N}\right)^2$$

where  $n_b$  is the number of bankrupt companies in the total sample.

The null hypothesis of no significant differences is rejected when  $z$  exceeds the critical value of the chi-square distribution with one degree of freedom. In this study these tests will also be used to test whether the differences between the different models are statistically significant.

### 8.2.3 Financial ratios

Financial-distress models focus on three financial ratios: profitability-, leverage- and cash-flow ratios. Previous empirical research established that a company is more likely to fail if it is unprofitable, highly leveraged and suffers cash-flow difficulties (Lennox (1999), Beaver, McNichols and Rhie (2005)). Independent variables are often selected not based on any theory, although they are the ones most often used in the literature (Ohlson (1980), Lawrence and Bear (1986), Elam (1975), Altman (1968)). Due to the lack of a unified financial-distress prediction theory, some variables are chosen 'intuitively' (Laitinen and Kankaanpaa (1999), Mossman, Bell, Swartz and Turtle (1998)). Scott (1981) mentioned that since the financial-distress models are not based on explicit theory, their success suggests the existence of a strong underlying regularity. He argued that the models<sup>69</sup> he analysed relied on accounting data, which implies that such data does contain useful information.

In their review of 47 financial-distress prediction studies, Dimitras et al. (1996) also summarised the ratios used in twelve different countries. The most frequently used financial ratios: working capital to total assets (16 times), total debt to total assets (15 times), current assets to current liabilities (12 times), EBIT to total assets (12 times) and net income to total assets (11 times). As argued by Mossman et al., the 'debt to equity' and 'current assets to current liabilities' ratios seem intuitively related to the probability of financial-distress, as they indicate the relative debt burden and the liquidity of a company. They also argued that although ratio models have been implemented successfully, there is little agreement regarding the best financial ratio to determine the likelihood of financial distress.

Beaver et al. (2005) investigated in their study whether financial ratios have become less informative over time in financial-distress prediction. They reported that the results of previous financial-distress prediction studies were robust with respect to financial statement data. They also stated that the precise combination of financial ratios used in financial-distress prediction seems to be of minor importance with respect to the overall predictive power, because the explanatory variables are correlated. Their conclusion: that the robustness of predictive models is strong over time, with a slight decline, which is offset by an improvement in the predictive abilities of market-related variables.

<sup>69</sup> Scott (1981) compared the bankruptcy models of Altman (1968), Altman et al. (1977), Beaver (1966), Deakin (1972) and Sinkey (1975).

The above leads to the conclusion that the choice of the financial ratios in the analysis is not guided by any theory and that many combinations lead to the same conclusions. In their study investigating the impact of operating leases, Lawrence and Bear (1986) decided to include all of their chosen variables (15) simultaneously in their models. They made no attempt to eliminate the variables that did not make some minimum contribution to the model. Since this study also aims to find evidence for the predictive power of operating leases in financial-distress prediction, the choice has been made to select other financial ratios based on previous studies.

#### **8.2.4 Sample selection**

##### **Matched pair- versus full-control samples**

Finally, in constructing a financial-distress prediction model the sample is an important factor. Many studies use matched-pair samples in their research; each bankrupt company is matched with another company according to industry classification and size (Holmen (1988), Deakin (1972), Altman (1968), Altman et al. (1977), Beaver (1966), Elam (1975), Dambolena and Khoury (1980), Lawrence and Bear (1986), Mossman et al. (1998), Laitinen and Kankaanpaa (1999)). With a matched-pair sample, the size of the bankrupt sample is equal to the size of the healthy sample. Other studies use a full-control sample, where no match is achieved between bankrupt and healthy companies, and the size of the full sample is therefore bigger than the bankrupt sample (Grice and Dugan (2001), Ohlson (1980), Beaver et al. (2005), Pompe and Bilderbeek (2000)). The use of a full sample, according to Ohlson (1980, p.117), is 'ideal', and he criticises the matching principle, since 'variables should be included as predictors rather than to use them as matching criteria, the matching criteria tend to be somewhat arbitrary and it is by no means obvious what is gained or lost by different matching procedures' (p.112). This study uses and compares both sample selection procedures.

##### **Definition of financial distress**

Most studies limit their research to companies that actually filed for bankruptcy. However, some studies extend the research to financially distressed companies. Johnsen and Melicher (1994) included a definition of financially weak companies; these companies had stock ratings from Standard and Poor's of B, B- or C. Grice and Dugan (2001) and Grice and Ingram (2001) also included companies in their distressed sample that are 'vulnerable' to default. As criteria they used Standard and Poor's bond and stock ratings: companies with a bond rating of CC or below, or stock rating of 'low B' or below were classified as financially distressed. They argued that some financial-distress prediction models might be more generally useful for predicting financial distress, not just bankruptcy. Hill, Perry and Andes (1996) distinguished financially distressed- from bankrupt companies and defined financially distressed companies as those that have cumulative negative earnings over a three-year period. Altman et al. (1994) distinguished between healthy and 'unsound' companies, defining unsound as follows: being involved in some form of bankruptcy proceedings, being wound up in temporary receivership or having stated that they are unable to fulfil their payment to the bank.

In order to discover the differences, this study investigates both the more broadly defined financially distressed companies as well as the bankrupt companies.

### 8.3 Operating leases in financial-distress prediction studies

This section describes three financial-distress prediction studies that incorporated operating leases (Elam (1975), Altman et al. (1977) and Lawrence and Bear (1986)).

#### Elam (1975)

Elam (1975) was the first to incorporate operating-lease data into the model of predicting bankruptcy. His study aimed to contribute to the discussion over the footnote disclosure of operating leases and the need for new information about the reporting of leases<sup>70</sup>.

Elam analysed 48 firms that went bankrupt during 1966-1972 and which reported leases in the footnote to their financial statements. Each bankrupt firm was matched with a non-bankrupt company with the same ESI classification (“Enterprise Standard Industry”) that also reported operating leases. Matching was thus achieved only if both companies reported operating leases. Elam analysed 28 different ratios, and adjusted them according to the capitalised operating leases, if appropriate. The necessary data was abstracted from the footnotes, and Elam described four types of disclosures<sup>71</sup> and the therewith-related method of converting them into annual lease payments. The estimated annual lease payments were consequently discounted using a six percent interest rate. The capitalised leased liabilities were added to the company’s net value of plant, property and equipment, the long-term liabilities and total assets. Elam adjusted total assets by the total amount of capitalised lease liability, and therefore did not differentiate between the leased asset and the lease liability (assuming  $PVA = PVOL$ ; see chapter 4). The capitalisation affected 13 out of the 28 ratios analysed by Elam, and as he argued (p. 31), ‘no new ratios were ‘invented’ because the purpose of the study was to examine the effect of capitalisation on already established tools of the financial statement user,’ and ‘the development of new ratios incorporating capitalised lease data was left to subsequent research’.

Elam (1975) used multiple discriminant analysis (MDA) to predict bankruptcy. Although Elam refers to the statistical requirement of MDA<sup>72</sup> that the variables should be normally distributed within each class, he ignores this issue by mentioning that (p.35) ‘most researchers have postulated the normality of financial ratios when using discriminant analysis’. He (p. 35) mentioned two limitations of his research: the data were chosen precisely and were not a statistical sample of all firms (with or without leases) and the focus on financial ratios and lack of attention paid to economic indicators, ratio trends etc. might weaken the conclusions.

<sup>70</sup> It is remarkable that thirty years later this discussion is again as vivid as ever.

<sup>71</sup> Four disclosure types found by Elam (1975) were 1) the annual payments for each year through the expiration of the leases, 2) the annual payment with the remaining life, 3) the annual payment with no remaining life, and 4) the total commitment with some indication of the expiry of the commitments.

<sup>72</sup> Section 8.2.1 described the statistical properties of MDA.



The null hypothesis (that the probability of correct classification of bankrupt versus non-bankrupts classes with ratios including lease data is less than, or equal to, the probability of correct classification without lease data) was tested using a chi-square test for differences in probabilities. Elam tested ten different models: five years before bankruptcy were analysed each year, once with and once without lease data. Only for the models with variables from the years two and three before bankruptcy did the prediction accuracy improve, but only for the third year was this significant. The models with data from one, four and five years before bankruptcy did not improve the classification-accuracy. Elam's main conclusion (p.41) is that his findings do not support the hypothesis that: 'Addition of capitalized lease data to a firm's financial statements will increase the power of financial ratios for predicting firm bankruptcy'. He adds that this does not necessarily mean that leases should not be capitalised, since the data may be important information for other uses of the financial statements.

Altman (1976) commented on the article of Elam (1975). He argued that Elam's conclusion is not very convincing because he failed to investigate rigorously the relative use of leases by failed versus non-failed-companies, he omitted several proven ratios and potentially new ratios in his prediction model, and the discriminant package and discussion found in the paper were somewhat dated. Altman (p. 410) asserted that the analysis should include at least the ratio of capitalised leases to total assets, and preferably other proven ratios such as working capital to total assets, and earned surplus to total assets.

**Altman (1968) and Altman et al. (1977)**

In 1968, Altman developed a model to predict bankruptcy in which he calculates a Z-score on the basis of five ratios (after analysing 22 ratios). The z-score was calculated using the following formula.

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5 \tag{1}$$

- Where,  $X_1$  = working capital/total assets
- $X_2$  = retained earnings/total assets
- $X_3$  = earnings before interest and taxes ("EBIT")/total assets
- $X_4$  = market value equity/book value of total debt
- $X_5$  = sales/total assets
- $Z$  = overall index

Altman called this model the Z-score model.

Despite the criticism that Altman expressed in 1976 on the work of Elam (1975), Altman adjusted his own 1968-work by incorporating the capitalised operating-lease liability (Altman et al. (1977)). Altman's second model took operating leases into account, which even seemed to be an important reason for changing the model. The article refers to six recent (thus before 1977) and important accounting modifications that required an adjusted Z-score model, of which the most '*important and pervasive*' was the capitalisation of all non-cancellable operating and finance leases (Altman, Haldeman et al. 1977, p.33).

Altman et al. make an adjustment for operating leases as mentioned in the footnotes, according to the following equation:

$$CL = \sum_{t=1}^N \frac{L_t}{(1+r+0.1r)^t},$$

CL = capitalised lease,

$L_t$  = lease payment in period  $t$ ,

$r$  = average interest rate for new issue high-grade corporate bonds (0.1 $r$  is used as risk factor)

$N$  = the number of years of leasehold rights and obligations.

Instead of using five variables, the second model (the “ZETA®-model”) consisted of seven variables: two of which were the same ( $X_2$  and  $X_3$ ), one of which was very similar ( $X_4$ ), and four variables that were new: stability of earnings (variance in  $X_3$ ), EBIT/total interest payments (debt service), current assets/current liabilities and size (total assets). The capitalised lease obligations were taken into account in the debt-service ratio, since Altman et al. calculated interest payable on the lease obligations and in the adjusted  $X_4$ , where book value of total debt was replaced by total capital, which included then capitalised lease obligations.

Both in 1968 and in 1977 Altman et al. used discriminant analysis. Unfortunately, the 1977 study did not test whether the capitalised lease liabilities improved the accuracy of the prediction model. Many studies nowadays that compare financial-distress prediction models refer to Altman’s studies and seem to relate more often to the 1968 model instead of the 1977 model (Grice and Dugan (2001), Mossman et al. (1998)).

Dambolena and Khoury (1980, p.1021) explicitly mentioned the ‘significant’ adjustment of lease capitalisation made by Altman et al. (1977), and mentioned the following two reasons not to forego this adjustment. First, they found the conclusion (see above) of Elam (1975) sufficient evidence to exclude operating leases. They argued that there was still no proof that that capitalisation of leases improved the predictive power of a model, and that if there were such a proof, then the good models would turn out to be even better. According to Dambolena and Khoury (1980), a proof would be to run the Zeta-model without leases. However, they did not undertake this themselves, because (p.1021) “attempts of the authors to obtain adequate information on leases, and to carry out a lease capitalisation worthy of the time required, have failed”. They argue that the very small information set publicly available on leases restricts the usefulness of any lease capitalisation. The capitalisation process would be too precise. As mentioned in the introduction of this chapter, the second argument of Dambolena and Khoury (1980) sounds valid in the 1980s. However, due to the emphasis nowadays on transparent information in financial statements (corporate governance), the improved lease-accounting standards and the increasing usage of operating leases, this argument is no longer valid, which enhances the relevance of this study (see also chapter 2).

### **Lawrence and Bear (1986)**

Also Lawrence and Bear (1986) tried to find evidence that operating leases might improve the accuracy of financial-distress prediction models. They attempted to measure the impact that operating-lease capitalisation has on the prediction of corporate failure. In line with Elam (1975), but in contrast to Altman et al. (1977)

and Dambolena and Khoury (1980), they tested models with- and without operating leases capitalised. Their hypothesis was similar to that of Elam (1975): adjusting financial statements for long-term leases will not improve the ex-post classification accuracy of bankruptcy prediction.

Also in line with Elam (1975), Lawrence and Bear (1986) used a matched-pair sample<sup>73</sup>. Pairs were matched according to industry and size (net sales). Sales were used instead of total assets, since the authors acknowledged the endogeneity of total assets (see also chapter 6). Also Lawrence and Bear (1986) used discriminant analysis, and constructed models with- and without leases capitalised. Comparing the accuracy of these models should provide a reasonable test of the usefulness of capitalised leases in bankruptcy prediction. The financial ratios used were based on what was commonly used in previous research, and this led to thirteen explanatory variables. They then added two lease-related variables (ratio of capitalised leases to total assets and capitalised leases to net sales). This is contrary to Elam (1975), who explicitly excluded new 'invented' ratios.

The matched-pair sample of Lawrence and Bear (1986) included 42 bankrupt and 42 non-bankrupt companies (31 manufacturers and 11 retailers). Another major difference with Elam (1975) is that Lawrence and Bear (1986) used non-bankrupt companies with no operating leases. Elam (1975) only used non-bankrupt companies that did disclose operating leases, since approximately twenty percent of the non-bankrupt companies of the sample Lawrence and Bear (1986) did not disclose operating leases. They argue that the restriction used by Elam (1975) might have understated the impact of leases if bankrupt companies tend to lease more than non-bankrupt companies.

The capitalisation procedure used by Lawrence and Bear (1986) is the technique used by Altman et al. (1977), which they argue is an improvement of the technique used by Elam (1975). However, the only difference noticed between the technique of Altman et al. (1977) and Elam (1975) is the use of the discount rate and the risk premium added by Altman et al.

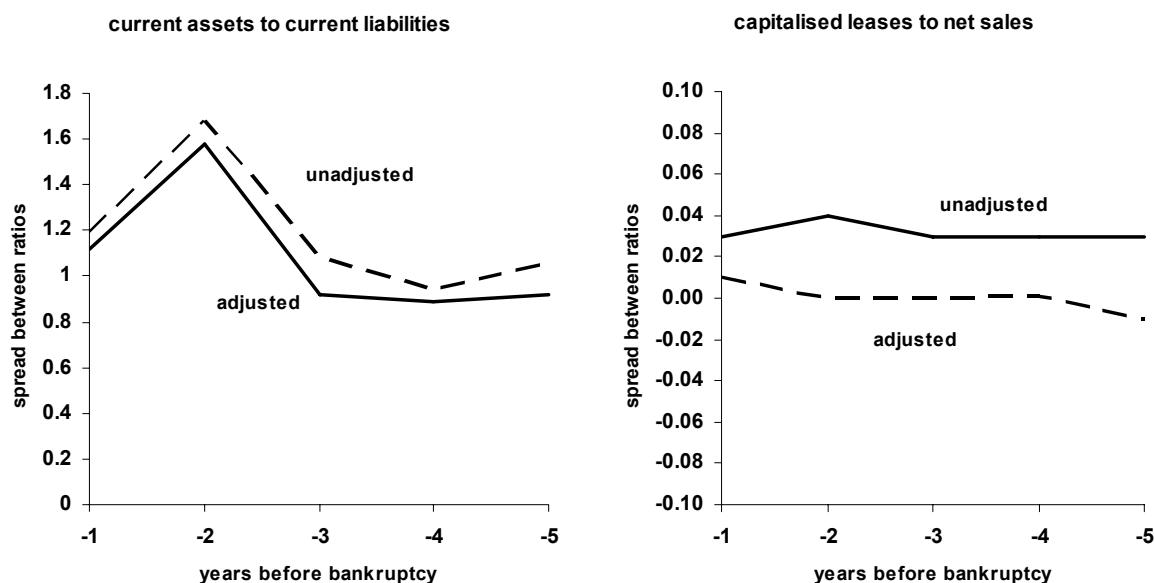
Lawrence and Bear (1986) showed for two ratios (current assets to current liabilities and capitalised leases to sales) the mean spreads between bankrupt and non-bankrupt companies both before- and after- the ratios were adjusted for operating leases, and over a period up to five years before bankruptcy. These results are shown in Figure 8.1.

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<sup>73</sup> See section 8.2.4 on sample selection.

**Figure 8.1 Spreads between bankrupt and non-bankrupt companies in the study of Lawrence and Bear (1986), left; figure 1 p.578, right: figure 2 p.579**

These graphs show for two ratios (current assets to total assets (left) and capitalised leases to net sales (right) the difference (spread) between healthy and bankrupt companies. Each graph shows two lines: one is the spread between healthy and bankrupt companies unadjusted for operating leases, and one shows the spread calculated between the ratios adjusted for operating leases. The ratio of capitalised leases to net sales in Lawrence and Bear's study includes also financial leases, whereby the unadjusted ratio incorporates only financial leases to net sales, and the adjusted ratio incorporates all leases (including operating leases) capitalised to net sales.



Lawrence and Bear (1986) argued that *a priori* the larger the difference between the lines, the more likely (*ceteris paribus*) the ratio will be useful in building a discriminant model<sup>74</sup>. For most of their variables the leasing adjustment did not appear to be substantial, with the exception of the two new variables that related the capitalised leases to total assets or sales. Furthermore, they compared the ratio of capitalised leases to total assets with the results of Elam (1975). The major difference between lease utilisation by bankrupt and non-bankrupt companies between these two studies was that Elam's results showed a decrease of lease utilisation in the last year before bankruptcy for the bankrupt sample, whereas Lawrence and Bear (1986) results showed a stable lease utilisation for both the bankrupt and the non-bankrupt sample. Based on the information disclosed in both articles, the differences are illustrated by Figure 8.2.

<sup>74</sup> This is similar to conclusions based on a univariate analysis.

**Figure 8.2 Ratio of capitalised leases to total assets of Elam (1975) and Lawrence and Bear (1986)**

The two graphs show the results of Elam's (left) and Lawrence and Bear's studies of the differences in average capitalised leases to total assets between bankrupt and non-bankrupt companies. The bold line shows the average capitalised leases to total assets of bankrupt companies, whereas the dotted line shows the average capitalised leases to total assets for the non-bankrupt companies.

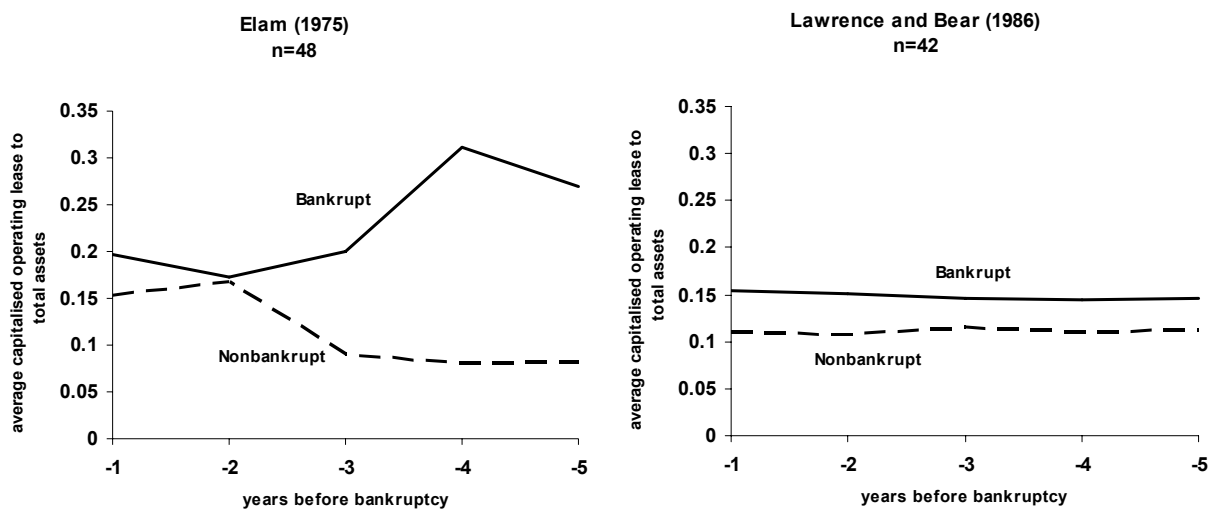


Figure 8.2 show that in both studies the bankrupt companies had a higher average capitalised lease ratio than the non-bankrupt companies did. However, this difference seemed to be constant over time for the Lawrence and Bear study, since in Elam's study the differences became smaller when bankruptcy was approaching.

Subsequently, Lawrence and Bear (1986) tested several discriminant models in which they included all variables simultaneously. As mentioned before, they did not try to find the variables with the highest contribution, since their goal was to see whether prediction accuracy was improved by adding capitalised leases to the model. This goal was in mind in their choice of the evaluation criterion (p.581); 'this research was never intended to be a test of ex ante predictability', and therefore a measure of ex post classification was used. Lawrence and Bear therefore did not use a hold-out sample as did Altman (1968), for example<sup>75</sup>. The results of the twenty different models<sup>76</sup> indicated that the lease-adjusted data did not improve the prediction accuracy of these models. None of the differences were significant at the 5% level. Finally, they tested separately whether the two new leasing variables (ratios of capitalised leases to either total assets or sales) improved the classification accuracy. Again, neither of the models improved significantly, as had been expected by Lawrence and Bear, due to the narrow spreads between these ratios of bankrupt and non-bankrupt companies (see Figure 8.1 and Figure 8.2).

Their major conclusion was that additional lease capitalisation did not improve the ex-post classification accuracy of bankruptcy models. This was in line with the findings of Elam (1975), which led them to agree with the conclusion of Dambolena and Khoury (1980) that no proof of improved predictive power due to operating-lease capitalisation has yet been offered.

<sup>75</sup> Observations in a hold-out sample are not included when the model is estimated, but will be classified by the estimated model.

<sup>76</sup> 5\*2\*2: five years prior to bankruptcy, adjusted and unadjusted; and linear and quadratic discriminate analysis

## 8.4 Conclusions and formulation of hypotheses

This chapter has described previous financial-distress prediction studies, focusing in particular on studies that incorporated operating leases. A few remarks may be appropriate here.

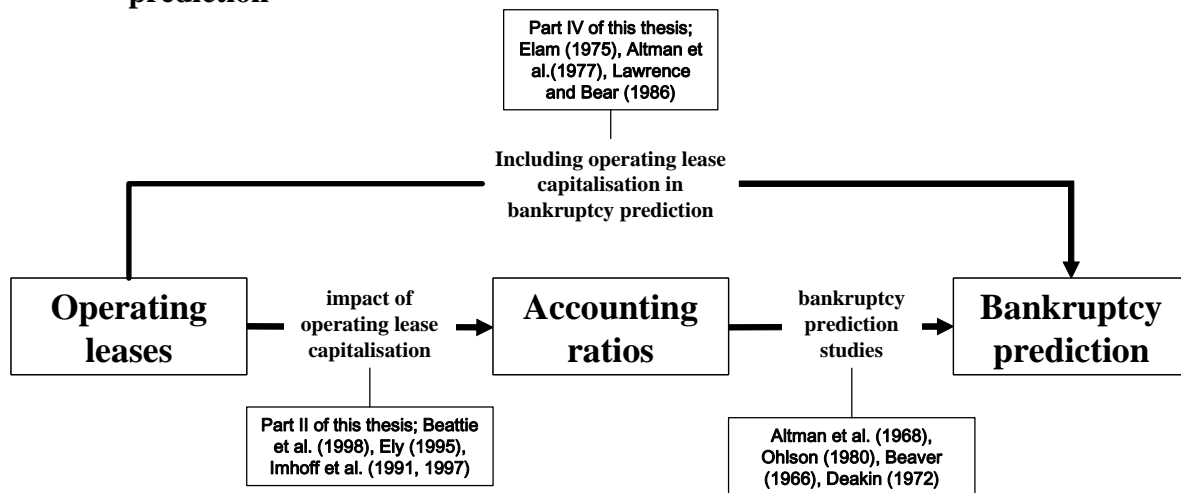
- Financial-distress prediction studies have especially emerged in the methods used. Since the 1980s, logit analysis has caught up with multiple discriminant analysis. Other methods have gained attention as well, but have never become as popular as discriminant analysis and logit analysis.
- Although the use of financial ratios in bankruptcy prediction is not based on any theory, they have proven useful in bankruptcy prediction. Especially leverage-, profitability- and cash-flow ratios have proven their usefulness in bankruptcy prediction.
- Researchers are divided with regard to the samples they use (matched pair-versus full-control samples) and in their definition of ‘distressed’ companies (limited to only bankrupt companies or including ‘vulnerable for default’ companies).
- The only two studies that investigated whether the incorporation of operating-lease data improved the accuracy of bankruptcy prediction both concluded that this was not the case (Elam (1975), Lawrence and Bear (1986)).
- One study explicitly mentioned that the information on operating leases— a small set of publicly available information— made it impractical to include the operating-lease data (Dambolena and Khoury (1980)).

The relationship between financial ratios and operating leases was described extensively in Part II of this study. Figure 8.3 (below) shows the relationship between the research on bankruptcy prediction described above and the research on the impact that operating leases have on financial ratios— and the possible relation between these two. Several researchers (Imhoff et al. (1991), Beattie et al. (1998), Ely (1995)) investigated the impact that capitalisation of operating leases has on financial ratios. These studies were extensively described in part II. Other researchers tried to predict bankruptcy using financial ratios without taking into account operating-lease obligations (Altman (1968), Ohlson (1980), Dambolena and Khoury (1980), Pompe and Bilderbeek (2000), among others). Only three studies incorporated operating leases in their bankruptcy models: Elam (1975) and Altman et al. (1977) by adjusting the leverage ratio by capitalising operating leases, and Lawrence and Bear (1986) by adjusting financial ratios with the capitalised operating leases and by using the lease intensity<sup>77</sup> as explanatory variable.

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<sup>77</sup> See section 8.2; lease intensity is measured as either PVOL to total assets, or PVOL to total sales.

**Figure 8.3 Relation between research on operating-lease capitalisation and bankruptcy prediction**



It appears that no study has been undertaken since the article of Lawrence and Bear in 1986 on the explanatory power of operating leases in bankruptcy prediction. The increased usage of operating leases during the past decades, the increased transparency of operating leases and the renewed discussion as to whether operating leases should be capitalised on the balance sheet (see chapter 2) validates a new look at this issue. Furthermore, the results of the previous parts of this thesis validate the expectation that operating leases might add useful information in bankruptcy prediction:

- Part II showed the significant impact operating leases have on especially the leverage ratio of a company. The leverage ratio of a company is in many bankruptcy studies the variable with the highest predictive power.
- Part II also showed that companies couldn't be compared on a fair basis when operating leases were ignored in the analysis. In bankruptcy prediction, bankrupt companies are compared to healthy companies. Only when both sub-samples use operating leases relatively equally, can one ignore the influence of operating leases and not alter the results of the bankruptcy prediction<sup>78</sup>. The comparison between bankrupt and healthy companies will become unfair if one of these two groups uses significantly more operating leases.
- Part III showed that one of the determinants of choosing operating leases is avoiding a too-high leverage ratio (which confirmed the debt hypothesis). Again, the predictive power the leverage ratio has in financial-distress prediction studies may cause operating leases to have a similar predictive power.

Finally, more recently logit analysis has become preferred above the discriminant analysis of Elam (1975), Altman (1968) and Lawrence and Bear (1986). Therefore, this thesis tests once more the hypotheses of Elam (1975) and Lawrence and Bear (1986)<sup>79</sup> using both the 'old' discriminant analysis and the 'updated' logit analysis.

<sup>78</sup> If both sub-samples use operating leases relatively equally, the financial ratios used in bankruptcy prediction will change, but for both samples in the same proportion; this may therefore not alter the results.

<sup>79</sup> The null hypothesis of both Elam (1975) and Lawrence and Bear (1986) is negatively formulated; it does not expect increased classification accuracy.

## CHAPTER 8

Two hypotheses are now formulated to test, first, whether the relative usage of operating leases differs between financially distressed and healthy firms and second, whether a different usage of operating leases improves the prediction accuracy of financial-distress prediction models.

hypothesis 8.1. *Financially distressed companies use more operating leases*  
Companies in financial distress will use relatively more operating leases than healthy companies will.

hypothesis 8.2. *Increased classification accuracy hypothesis*  
Financial statements that are adjusted for operating-lease capitalisation will improve the *ex post* classification of bankruptcy models.

These hypotheses will be empirically tested in the next chapter.



### Appendix 8.I Financial ratios used in financial-distress prediction studies

Explanatory variables	Bankruptcy prediction									
	Beaver (1966)	Altman (1968)	Deakin (1972)	Altman (1977)	Elam (1975)	Ohlson (1980)	Dambolena (1980)	Zmijewski (1984)	Lawrence and Bear (1986)	Hill (1996)
<b>I. Cash flow ratios</b>										
Cash flow to sales	X				X				X	
Cash flow to total assets	X				X					
Cash flow to net worth	X				X					
Cash flow to total debt	X		X		X	X			X	
<b>II. Profitability ratios</b>										
Net income to sales	X		X		X		X		X	
Net income to total assets	X				X	X		X		
Net income to net worth	X				X					
Net income to total debt	X				X					
Net income to Net Working Capital	X						X			
Net income to Fixed assets							X			
Return on total capital										
Retained earnings to total assets		X		X					X	
EBIT to total assets		X		X					X	X
Net operating profit to sales					X					
Net operating profit to interest					X					
Net income dummy (1 if 2 years negative, 0 if positive)							X			
EBIT to capital employed				X					X	
EBIT to total interest payments				X						
EBITDA to total interest payments										
Funds from operations to total debt				X		X				
Measure of change in net income (stability of earnings)										
<b>III. Debt ratios</b>										
Current liabilities to total assets	X				X					
Long term liabilities to total assets	X								X	
Debt to equity										
Long-term debt to capital										
Total Debt to capital										
Current plus long term plus preferred stock to total assets	X	X			X					
Market value equity to book value total liabilities	X			X						
Total debt to total assets			X		X	X	X	X	X	X
Total debt to total assets dummy (1 if TD>TA)										
Total debt to EBITDA										
Net worth to total liabilities					X					
Net worth to long-term liabilities							R			
Net worth to current debt							R			
Net worth to fixed assets							R			
Funded Debt to Net working capital							X			
Times interest earned							X			
Capitalised leases to total assets									X	
Capitalised leases to net sales									X	
<b>IV. Liquidity ratios</b>										
Cash to total assets	X		X							X
Quick assets to total assets	X		X							
Current assets to total assets	X		X	X						
Working capital to total assets		X	X			X			X	
Current assets minus inventories to current liabilities							X			
Cash to current liabilities	X		X		X				X	
Quick assets to current liabilities	X		X		X				X	
Inventory to net working capital							X			
Current debt to inventory							X			
Current assets to current liabilities	X		X		X	X	X	X	X	
<b>V. Turnover ratios</b>										
Cash to sales	X		X		R					
Accounts receivable to sales	X				R					
Inventory to sales	X				R					
Cost of Sales to Inventory							R			
Quick assets to sales	X		X							
Current assets to sales	X		X							
Working capital to sales	X		X		R		R			
Net worth to sales	X				R		R			
Total assets to sales	X				R				R	
Sales to capital employed		R								
Sales to Fixed assets					X				X	
<b>VI. Other</b>										
Cash interval	X									
Defensive interval	X									
No credit interval	X									
Qualified opinion (1 if qualified, 0 if not)								X		X
Size				X		X		X		
Age										
<b>VII. Economic indicators</b>										
Unemployment rate (lag 1 year)										X
Prime rate (lag 1 year)										X
<b>METHOD</b>										
<b>Univariate approaches</b>										
Comparison of means	X	X	X	X		X				X
Dichotomous classification										
Likelihood ratios	X		X		X					
<b>Multivariate approaches</b>										
Linear probability										
Logit						X				
Probit								X		
Event history analysis										
Discriminant analysis		X	X	X	X		X		X	X
<b>Sample Size/Selection</b>										
Financial distress firms	79		32	53	48	105	23	81	42	75
Healthy firms	79		32	58	48	2058	23	1600	42	--
matched pairs	X	X	X	X	X		X		X	

X = ratios used in analysis, R = ratios used but reversed.



## **CHAPTER 9    EMPIRICAL STUDY OF THE IMPACT OF OPERATING-LEASES ON FINANCIAL-DISTRESS PREDICTION**

### **9.1    Introduction**

In the previous chapter, two hypotheses were formulated to test first, whether bankrupt companies use more operating leases than healthy companies and second, if the capitalisation of operating leases improves the classification accuracy of financial-distress prediction models. This chapter tests the hypotheses empirically using two different financial-distress prediction approaches (discriminant and logit analysis), and two different sample selections (matched pairs and full healthy sample), which have been derived from previous financial-distress studies.

The chapter proceeds as follows. Section 9.2 describes the research design, including the methodology, sample selection and the financial ratios used in the empirical models. Section 9.3 presents the results, starting with the descriptive statistics in sub-section 9.3.1, and followed by the results of the multivariate models in sub-section 9.3.2. Section 9.4 concludes.

### **9.2    Research design**

#### **9.2.1    Methodology**

As described in chapter 8, previous studies on financial-distress prediction showed that the differences in classification accuracy between the methods used are minimal. Although multiple discriminant analysis (MDA) is sometimes labelled outdated, and in many studies the data do not meet the statistical requirements of MDA, the method has not yet been abandoned in financial-distress prediction studies. This is due, among other things, to the still-encouraging results of this method. Furthermore, while in this study the results are compared to those of Elam (1975) and Lawrence and Bear (1986), which both used MDA, this study also uses MDA to test the hypotheses. However, due to the development and popularity of logit analysis since the article of Lawrence and Bear, and due to the less restrictive statistical requirements, also logit analysis will be used to test the hypotheses.

Therefore, besides the univariate, descriptive statistics of each individual financial ratio, two methods are used: MDA and logit analysis. For each method different models are constructed, based on financial ratios with- and without the adjustment for operating leases. To test whether the classification accuracy improves after operating leases enter the model, we compare the classification accuracy of the models with and without the adjustment for operating leases using the chi-square distribution (with one degree of freedom) and the procedure that was described in the previous chapter (see section 8.2.2).

#### **9.2.2    Sample selection**

The companies in the sample are, or were, listed on Euronext Amsterdam during the period 1996-2004. A sample of financially-distressed firms and a sample of healthy firms were constructed as follows:

### Selection of firms in financial distress

The concept of financial distress is not limited to bankruptcy but is defined as the occurrence of one of the following financial problems:

- Bankruptcy;
- Suspension of payment;
- Liquidation or takeover to keep the company from further financial decline;
- Suspension of quotation by the stock market because liabilities exceed equity;
- Three-year negative net income;
- Negative equity.

The last three criteria are financial-distress criteria and do not necessarily imply that companies experiencing these go bankrupt. As described in section 8.2.4, Grice and Dugan (2001) and Grice and Ingram (2001) also included companies in their distressed sample that are ‘vulnerable’ to default. This study includes the above-mentioned financial distress criteria, since limiting the sample to only the bankrupt companies leads to a rather small dataset. The financially distressed companies are, as mentioned by Grice and Ingram (2001), vulnerable to default, and this might add valuable information. However, to test whether this choice of the sample has influenced the results, we conduct tests using both the sample limited to only the bankrupt companies as well as the larger financially distressed sample.

The events above were tracked by using database archive of the Dutch financial newspaper *Het Financieele Dagblad*. Furthermore, to be sure not to exclude any firm that experienced financial distress at a certain stage, we searched Statline<sup>80</sup> on inactive Dutch listed firms. Subsequently, *Het Financieele Dagblad* was used again to check what the reason was behind the inactive listing. Information on equity and net income was derived from the Worldscope database. The fact that hardly any information on operational lease obligations before 1996 is available and that the analysis covers a period of four years before financial distress, limited the research period to the years 2000-2004. Eventually, 38 companies were defined as financially distressed, 21 of which eventually went bankrupt. Appendix 9.I shows the financially distressed companies and their last year of financial statement data.

Whether or not the company disclosed operating leases was not a criterion. As described in section 8.3, this is in line with Lawrence and Bear (1986), but contrary to Elam (1975). The non-leasing companies also add information to the financial-distress prediction model, by contributing to greater classification accuracy. Furthermore, their inclusion in the model is a more reliable reflection of reality because in the real world not all companies use operating leases, and their exclusion might cause an upward bias. Elam (1975, p.35) himself stated that he chose the data too precisely and his sample was not a statistical sample of all firms.

Although the sample size in this study is limited, it is not exceptional in financial-distress prediction studies. Deakin (1972) (32 bankrupt companies), and Dambolena and Khoury (1980) (23 bankrupt companies), for example, used smaller sample sizes, and the samples of Elam (1975) and Lawrence and Bear (1986) also consisted of only respectively 48 and 42 bankrupt companies.

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<sup>80</sup> Database of all companies on the Euronext Amsterdam since 1997 with a code (99) if the company is still on the Euronext or another code if not, and why it has been mutated (for example, 25 in case of bankruptcy).

### **Selection of healthy firms**

As described in 8.2.4 some controversy exists whether the control sample, the healthy companies, should be matched based on industry and size, or whether a full control sample is more appropriate, since it is less arbitrary. This study therefore uses both approaches, one using a matched-pair sample (38 healthy companies) and one using a full healthy sample (62 healthy companies).

#### *Full healthy sample*

The full healthy sample consists of 62 companies listed on Euronext Amsterdam (during the period 2000-2004). These were derived from the sample used in parts II and III of this thesis. However, that sample also includes companies that are not bankrupt but are classified as financially distressed, and are still listed. Naturally, these firms were eliminated from the healthy sample because they were incorporated in the financially distressed sample. Also companies that are the successors of bankrupt firms were eliminated (for example, when a company was taken over as a consequence of the financial distress). Furthermore, for reasons of practicality, only those companies are selected for which the present value of the operating leases could be calculated (including those for which this value is zero; thus, companies not disclosing operating leases).

The use of a full sample is according to Ohlson (1980, p.117) 'ideal', and he criticises the matching principle (see 8.2.4). The difficulty with a full control sample is, however, that for healthy companies the years of financial distress cannot be defined. With a matched-pair sample, the researcher can choose for each pair the same years of financial distress and consequently the same  $t-1$  through  $t-n$  before the financial distress occurred. With a full control sample this is not possible, and a random selection procedure is used to choose the 'financial distress' years for the healthy sample. Due to reasons of impracticality and high costs, Ohlson (1980) did not gather all the information for each healthy company but for each company only one calendar year. The year of any given firm's report was obtained by random procedures. This study uses the division over the calendar years of the financially distressed companies to define which percentage of the healthy companies should have a specific calendar year as their last financial statement year. For example, of the 38 financially distressed companies, the year 2000 was for ten the year of financial distress. For these 26% of the companies in the sample, 1999 was the year with the last financial statement. Therefore, also for 26% of the healthy sample (a-select chosen) 1999 is used as the last year with available financial statement and for the other years accordingly.

*Matched-pair healthy sample*

Most of authors mentioned earlier (Holmen (1988), Deakin (1972), Altman (1968), Altman et al. (1977), Beaver (1966), Elam (1975) and Lawrence and Bear (1986)) used matched-pair samples for their research based on industry classification and size. Notwithstanding the above-mentioned arguments of Ohlson (1980) against the usage of matched pairs, the method will be used in this paper for the purpose of comparing the results with those of Elam (1975), Altman (1968) and Lawrence and Bear (1986). Each of the companies in financial distress was matched with a company with the same sic code and similar measure of sales, as an indicator of size. As described in chapter 7, total assets is a less appropriate measure, due to the endogeneity of this variable. The advantage of discriminant analysis is that the year before the financial distress occurred can also be matched with the same year of the matched company (with the full control sample, the years prior to financial-distress are randomly chosen for the healthy sample). Appendix 9.I shows the matched-pair sample.

**9.2.3 Financial statement data**

As described in the previous chapter many combinations of the chosen financial ratios as explanatory variables give similar results in financial-distress prediction models. For reasons of comparability, the financial ratios as used by Lawrence and Bear (1986) were chosen to be included in this study. These ratios include one or two ratios as a measure of liquidity, profitability, leverage, turnover, and cash flow. Furthermore two separate measures describe lease intensity. Table 9.1 shows the financial ratios that are included in the analysis and the adjustment made to each ratio if the operating leases are capitalised.

**Table 9.1 List of independent variables**

This table shows the independent variables used in the financial-distress prediction models of this study. Each variable is shown twice, once unadjusted for operating leases and one adjusted with operating leases, if appropriate. PVOL = present value of operating-lease commitments, PVA = present value of leased asset, EBIT= earnings before interest and taxes

	UNADJUSTED MODEL	ADJUSTED MODEL
<b>Operating-lease ratios</b>		
Capitalised operating leases to total assets		$\frac{\text{PVOL}}{\text{Total Assets} + \text{PVA}}$
Capitalised operating leases to sales		$\frac{\text{PVOL}}{\text{Sales}}$
<b>Liquidity ratios</b>		
Current ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{\text{Current Assets}}{\text{Current Liabilities} + \text{annual lease payment}}$
Working capital to total assets	$\frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Total Assets}}$	$\frac{\text{Current Assets} - \text{Current Liabilities} - \text{annual lease payment}}{\text{Total Assets} + \text{PVA}}$
<b>Profitability ratios</b>		
EBIT to total assets	$\frac{\text{EBIT}}{\text{Total Assets}}$	$\frac{\text{EBIT} + 6\% * \text{PVOL}}{\text{Total Assets} + \text{PVA}}$
Net income to net sales	$\frac{\text{Net Income}}{\text{Sales}}$	$\frac{\text{Net Income}}{\text{Sales}}$
<b>Leverage ratio</b>		
Total debt to total assets	$\frac{\text{Total Debt}}{\text{Total Assets}}$	$\frac{\text{Total Debt} + \text{PVOL}}{\text{Total Assets} + \text{PVA}}$
Market value of equity to book value of debt	$\frac{\text{Market capitalisation year end}}{\text{Total Debt}}$	$\frac{\text{Market capitalisation year end}}{\text{Total Debt} + \text{PVOL}}$
<b>Turnover ratios</b>		
Sales to total assets	$\frac{\text{Sales}}{\text{Total Assets}}$	$\frac{\text{Sales}}{\text{Total Assets} + \text{PVA}}$
<b>Cash flow ratios</b>		
cash flow to total debt	$\frac{\text{Cash Flow}}{\text{Total Debt}}$	$\frac{\text{Cash Flow}}{\text{Total Debt} + \text{PVOL}}$
cash flow to sales	$\frac{\text{Cash Flow}}{\text{Sales}}$	$\frac{\text{Cash Flow}}{\text{Sales}}$

The capitalised value of the operating-lease liability is included, both as a separate explanatory variable and as an adjustment made to other variables, if appropriate. Unfortunately not all distressed companies disclose according to the accounting standards. Although it is acknowledged that the present value cannot be calculated as advocated in chapter 4, it would cause the elimination of thirteen financially distressed companies from the analysis. Therefore, based on the mean- and median results of chapter 5, the present value of the lease commitments is estimated alternatively. The following procedures were used to estimate the capitalised value of the lease commitments of the financially distressed sample:

- For companies disclosing at least as required by RJ292 (14 companies<sup>81</sup>), the capitalisation approach was used (described in chapter 4).
- Two companies disclosed the present values themselves, and this was used.
- Seven companies did not disclose operating leases.

The other companies did not comply with RJ292;

- For companies disclosing the total commitment (five companies), nominal operating-lease commitments were multiplied by 0.80. This 0.80, based on the results of chapter 5, is approximately the average (0.81) of PVOL divided

<sup>81</sup> The number of companies indicated refers to the year before financial distress. The disclosure type used by each company may vary during the four year period analysed.

by the total nominal commitments for the companies that do disclose as required by RJ292 during the period 2000-2004.

- For companies disclosing only the annual payment (six companies), the lease portfolio was assumed to have a weighted remaining life of five years, and the present value of an annuity formula was used to discount the annual payments. The average remaining life for the companies in the sample was shown (see chapter 5) to be seven years. However, since the annual payment is most likely to decline during the remaining life, it would be more appropriate to use the shorter weighted remaining life (see also the capitalisation approach of Beattie et al. (1998), which is described in chapter 4). The discount rate used was 6%.
- For companies disclosing the annual payment including the remaining life (two companies), the same procedure as above was used, and the fixed five years were replaced by the disclosed remaining life.

As described above, the full control sample included only those companies for which PVOL could be calculated using the capitalisation approach (described in chapter 4). However, for the matched-pair sample this was not always the case, and the same procedure as above was conducted; thirteen companies disclosed as required by RJ292, five disclosed the total commitments, eight disclosed the annual payment, four disclosed the annual payment including the remaining life, seven did not disclose operating leases, and one disclosed a combination of the above.

## 9.3 Results

### 9.3.1 Univariate analyses

In the univariate analyses the ratios of Table 9.1 are compared between the financially distressed and healthy samples. This is done for both the matched-pair healthy sample and the full control healthy sample. The financially distressed sample remains the same in both analyses.

#### Matched pairs

A univariate analysis is used in this study because it provides some information; a significant difference between the ratios of financially distressed- versus healthy companies may indicate that this ratio has predictive power in multi-ratio models. However, as pointed out by Elam (1975, p.33), 'no single ratio can describe a firm any more than a single financial statement number fully describes a company; some ratios may point to bankruptcy while others indicate financial stability'. Table 9.2 shows the mean values of the capitalised operating leases divided by total assets (PVOL/TA) of both the financially distressed- and the healthy samples. The results of Elam (1975) and Lawrence and Bear (1986) are also both shown. The latter also compare the study of Elam with their own study, but ignore the fact that Elam calculates the ratio without adjusting the total assets (see p.31), while they do adjust total assets (see p.576). This also explains partly why the ratio is higher for Elam's study than for Lawrence and Bear's study, since for the latter both numerator and denominator increased, which is not the case with Elam. Table 9.2 shows both ratios, with- and without adjusting the denominator (total assets).



**Table 9.2 Capitalised operating leases to total assets, matched-pair sample**

Source: Elam (1975) table 2 p. 31, Lawrence and Bear (1986) table 2 p. 580. Since Elam and Lawrence and Bear use a different measure of total assets as denominator, the comparison is split between these two approaches. Elam used total assets without adjustment of operating leases, while in the measure of Lawrence and Bear, total assets is adjusted according to the capitalised operating leases. The results of this study are calculated twice, once using Elam's approach, and once using Lawrence and Bear's approach.

		YEARS BEFORE FINANCIAL DISTRESS			
		-1	-2	-3	-4
<b>PVOL to total assets (not adjusted)</b>					
<b>This study,</b>	<b>n=</b>	36	34	33	28
	<i>Financially distressed</i>	0.174	0.165	0.147	0.095
	<i>Healthy</i>	0.136	0.131	0.155	0.165
	<i>t</i>	0.94	0.76	-0.13	-1.16
<b>Elam's study,</b>	<b>n=</b>	48			
	<i>Bankrupt</i>	0.197	0.173	0.200	0.311
	<i>Non-bankrupt</i>	0.154	0.167	0.090	0.080
<b>PVOL to Total assets (adjusted)</b>					
<b>This study,</b>	<b>n=</b>	36	34	33	28
	<i>Financially distressed</i>	0.136	0.128	0.105	0.072
	<i>Healthy</i>	0.109	0.102	0.118	0.122
	<i>t</i>	1.02	0.93	-0.35	-1.37
<b>Lawrence and Beaver' study, n=</b>		42			
	<i>Bankrupt</i>	0.154	0.151	0.146	0.145
	<i>Non-bankrupt</i>	0.110	0.108	0.116	0.110

None of the differences between the means of the financially distressed and healthy companies is significant (10% level)<sup>82,83</sup>. The matched-pair analysis is influenced by an outlier in the healthy sample, which is a company<sup>84</sup> with a ratio of capitalised operating leases to total assets (adjusted) of 0.48 in the year t-1. When this outlier is removed, the mean of the ratio of capitalised leases to total assets of the healthy sample for t-1 decreases to respectively 0.117 (total assets not adjusted) and 0.098 (total assets adjusted). The differences between the samples are still not significant however.

The differences in means of the other variables appear in Appendix 9.II. The results are most significant in the year before the financial distress (t-1): the differences in mean of five of the twelve investigated ratios are (highly) significant. These are (level of significance between brackets): sales to total assets (5% level), interest cover (1% level), total debt to total assets (1% level), EBIT to total assets (1% level) and market value of equity to book value of debt (5% level)<sup>85</sup>. The adjustment of the operating leases to the variables leads to the same results; the same ratios show significant differences in mean, and it is striking that even the levels of significance of the adjusted variables remain the same.

<sup>82</sup> The results are similar when the sample of financially distressed firms is limited to the 21 companies that went bankrupt or had a suspension of payment. PVOL/TAs (TA also adjusted) for these firms (healthy firms within brackets) were respectively: **t-1** 0.16 (0.11), **t-2** 0.16 (0.10), **t-3** 0.14 (0.12) and **t-4** 0.07 (0.13).

<sup>83</sup> Also the change in the lease intensity was analysed to see whether *the increase* in PVOL/TA between financially distressed- and healthy companies is significantly different. This was also not the case.

<sup>84</sup> The company is ICT-Automatisering

<sup>85</sup> Footnote 82 applies also to the other ten ratios with the following remarks: the difference between sales-to-total assets, both adjusted and unadjusted, is no longer significant; the difference between the current ratio unadjusted becomes significant. For the other ratios the results are the same, although differences in each ratio become less significant.

The results of this study might indicate that due to a similar adjustment of the ratios of healthy- and financially distressed companies, the use of operating leases between the two samples does not differ significantly. For example, the difference between the financially distressed- and healthy samples in mean in the ratio of total debt to total assets (unadjusted) is 18.9%, significant at the 1% level (TD/TA is 18.9% higher for the financially distressed sample compared to the healthy sample). After operating leases are adjusted to the ratio of total debt to total assets, the difference is 16.4%, and still significant at the 1% level. Figure 9.1 illustrates the differences between the financially distressed- and the healthy samples for four different ratios: PVOL to total assets, total debt to total assets, sales to total assets, and market value of equity to book value of debt. Each ratio is shown once unadjusted for operating leases (graphs at the left), and once adjusted for operating leases (graphs at the right).

**Figure 9.1 Illustration of differences between financially distressed- and healthy companies (matched pairs), before (left graphs) and after (right graphs) the operating leases were included**

Differences in three ratios (total debt to total assets, sales to total assets and market value of equity to book value of debt) between financially distressed- and healthy firms (matched pairs), once unadjusted (a, c, e) and once adjusted for operating leases (b, d, f).

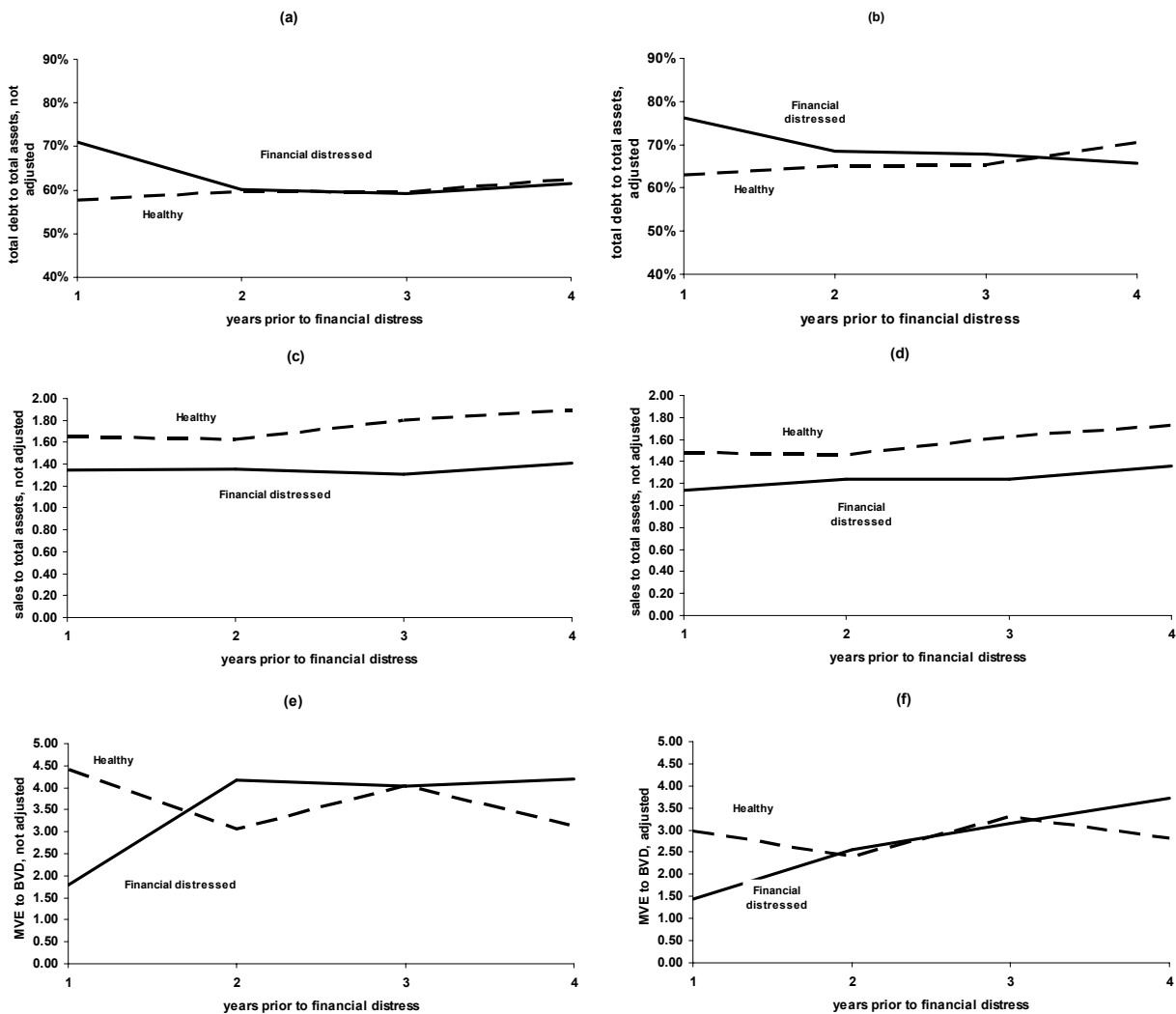


Figure 9.1 confirms that the differences are biggest in year t-1. Also it clearly shows that this is true for both the unadjusted- and the adjusted ratios, although for both samples the ratios deteriorate. The lines in the graphs keep the same development, but shift up or down, depending on the ratio. In other words, the spread in the ratios between financially distressed- and healthy companies remains constant for both the adjusted- and unadjusted lines. The same conclusion was made by Lawrence and Bear (1986), who mentioned that the larger the spread between adjusted and non-adjusted ratios of bankrupt and healthy companies, the more likely that the ratio will be useful in building a discriminant analysis. Their leasing adjustment did not appear to substantially alter the spreads of variables between the groups (see Figure 8.1).

For this study, Figure 9.2 shows the spreads between the financially distressed sample and the healthy sample of i) the ratio of total debt to total asset and ii) the ratio of EBIT to total assets, adjusted and unadjusted.

**Figure 9.2 Spreads between financially distressed- and healthy companies**

The figures show the spread between the total-debt-to-total-assets ratio (left) and the EBIT-to-total-assets ratio (right) of the financially distressed- and healthy samples, once unadjusted for operating leases (the continuous line), and once adjusted for operating leases (the dotted line).

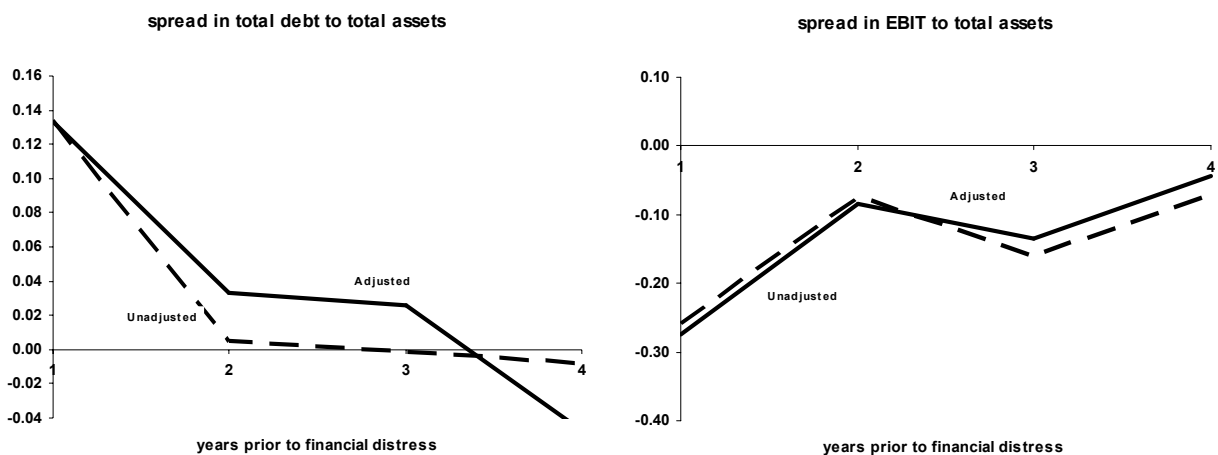


Figure 9.2 shows that the year before financial distress the largest difference is visible between the financially distressed- and healthy companies for the two ratios (total debt to total assets and EBIT to total assets). This difference, however, is hardly influenced by the operating leases adjusted to this ratio.

**Full control sample**

The results of the univariate analysis for year t-1 using the full control sample appear in Table 9.3. The results are somewhat different than those of the matched-pair univariate analysis. Most important for this study, the difference between financially distressed- and healthy companies in all three lease ratios is significant at least at the 5% level. This is obviously caused by the lower means of the full sample (PVOL to total assets or to sales between 5% and 7%), as opposed to means of the matched-pair sample (between 10% and 13%). Furthermore, the differences in mean between financially distressed and healthy companies with regard to the sales-to-total-assets ratio and the market-value-of-equity-to-book-value-of-debt ratio are not significant (as opposed to the matched-pair sample, where the differences

were significant). The differences in the interest cover and the ratios of total debt to total assets and EBIT to total assets remain unchanged but highly significant<sup>86</sup>.

**Table 9.3 Univariate analysis: full control sample for the year before financial distress (t-1)**

For abbreviations and differences between adjusted and non-adjusted ratios, see Table 9.1

	FINANCIALLY DISTRESSED		HEALTHY		ANALYSIS OF DIFFERENCE		
	n	mean	n	mean	difference in mean	t-statistic	significance
PVOL/TA	36	0.174	61	0.067	159.4%	3.84	**
PVOL/TA-adj	36	0.136	62	0.068	100.7%	3.04	***
PVOL/sales	36	0.181	61	0.059	208.9%	3.25	**
CR	36	1.428	61	1.704	-16.2%	-0.81	ns
CR-adj	26	1.439	60	1.598	-9.9%	-0.42	ns
WC/TA	36	0.109	61	0.149	-27.1%	-0.92	ns
WC/TA-adj	35	0.105	61	0.140	-24.7%	-0.84	ns
Sales/TA	37	1.343	62	1.527	-12.0%	-1.00	ns
Sales/TA-adj	36	1.142	62	1.419	-19.5%	-1.71	ns
Interest cover	36	-12.885	54	9.589	-234.4%	-3.77	***
Interest cover-adj	35	-8.895	55	9.974	-189.2%	-2.96	***
TD/TA	37	0.709	62	0.587	20.9%	2.84	***
TD/TA-adj	36	0.761	62	0.620	22.8%	3.19	***
EBIT/TA	36	-0.222	58	0.065	-439.8%	-4.07	***
EBIT/TA-adj	35	-0.197	58	0.065	-404.0%	-4.04	***
NI/sales	37	-0.441	61	-0.292	-51.1%	-0.36	ns
CF/TD	37	-0.318	62	0.000	n/a	-1.01	ns
CF/TD-adj	36	-0.294	62	0.022	-1416.5%	-1.26	ns
CF/sales	37	-0.325	61	-0.223	-45.5%	-0.26	ns
MVE/BVD	37	1.739	61	3.485	-50.1%	-1.38	ns
MVE/BVD-adj	36	1.402	61	2.826	-50.4%	-1.42	ns
LnSales	37	11.680	61	13.380	-12.7%	-3.64	***

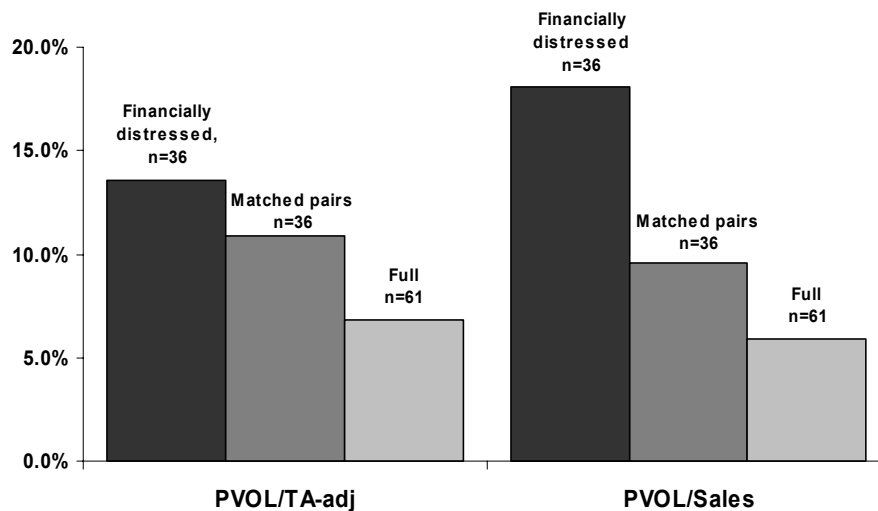
Looking at the year before financial distress, we see that the univariate analyses using either a matched pair or full healthy sample are consistent in their results on the more common ratios (excluding the lease-intensity ratios). Both samples show the same ratios that have predictive power in predicting financial distress and bankruptcy: EBIT-to-total-assets ratio, the total-debt-to-total-assets ratio and the interest cover. All three differ significantly between healthy and financially distressed companies. The results are similar using these ratios adjusted or unadjusted for operating leases. This was demonstrated for the matched-pair sample in Figure 9.2, which showed that the spreads between financially distressed and healthy companies, although increasing when companies approached financial distress, are similar for adjusted and unadjusted values.

With respect to the 'new' lease-intensity ratios, the univariate results show somewhat conflicting results. Figure 9.3 shows for the year before financial distress the mean of the ratios of PVOL to total assets (total assets also adjusted in accordance with capitalised leased assets) and PVOL to total sales, for the three samples: the financially distressed sample (n=36), the matched-pair healthy sample (n=36) and the full healthy sample (n=61).

<sup>86</sup> When limiting the sample to only the bankrupt companies (21) the univariate analysis using the full control sample, the same ratios show differences at the same level of significance, the only addition to Table 9.3 is a significant difference at the 5% level of sales-to-total assets when adjusted for operating leases.

**Figure 9.3 Lease intensity of financially distressed, matched pairs- and full healthy-sample**

Two lease intensity measures, capitalised operating leases (PVOL) divided by either total assets (adjusted for the capitalised leased asset) or sales, are shown for three different samples. First the financially distressed sample (n=36), second the matched pair’s healthy sample (n=36) and third, the full healthy sample (n=61).



Both lease-intensity measures show that the year before financial distress the financially distressed sample used relatively more leases than the healthy sample. However, the matched-pair sample did not differ significantly from the financially distressed sample (t-values respectively 1.02 and 1.64), whereas the full healthy sample did differ significantly from the financially distressed sample (t-values respectively 3.04 and 3.25). Therefore, the non-parametric median test was conducted to determine whether the outliers in the matched-pair sample might have influenced the results of this analysis. The results are shown in Table 9.4.

**Table 9.4 Significance of differences in medians for the year before financial distress (t-1)**

The median of the capitalised lease liability (PVOL) divided by total assets (including the capitalised leased asset) or by sales, for three samples: the financially distressed sample (n=36), the matched-pair healthy sample (n=36) and the full healthy sample (n=62). The z-statistic shows the significance of the differences between the financially distressed sample and the two healthy samples.

	FINANCIALLY DISTRESSED	MATCHED-PAIR HEALTHY SAMPLE	z	FULL HEALTHY SAMPLE	z
	N=36	N=36		N=61	
PVOL/TA	9.9%	6.4%	1.11ns	3.9%	2.82***
PVOL/sales	8.9%	7.4%	1.55ns	3.1%	3.42***

These results are similar when the differences in the medians are analysed, the z-values of the differences between the matched pair- and the financially distressed samples are not significant, and the difference in the medians between the full healthy sample and the financially distressed sample is significant.

The multivariate analysis compares the two sample selection approaches (matched-pair sample versus full healthy sample) on the grounds of their usefulness in financial-distress prediction models.

**9.3.2 Multivariate models**

Also for the multivariate models, different approaches are used to construct a financial-distress prediction model. Each model is constructed using once the matched-pair healthy sample and once the full healthy sample. Furthermore, the models are constructed using discriminant analysis and logit analysis. Finally, each

model is calculated once including the unadjusted ratios, once including the adjusted ratios, once including adjusted ratios *plus* also the lease-intensity ratio and finally, once with unadjusted ratios but with the lease-intensity ratio. Thus, sixteen models ( $2 \times 2 \times 4$ ) are analysed. To avoid an even longer and more confusing list of models, and because the year before financial distress showed the biggest difference between the financially distressed- and the healthy samples, the models were limited to  $t-1$ . As with the study of Lawrence and Bear (1986), all variables were included at once, since the purpose of this study is to test the impact of operating leases on the classification accuracy of financial-distress prediction models, and not the choice of the ideal combination of variables. Table 9.5 and Table 9.6 show respectively the results of the sixteen models. Before discussion of the results, the differences between the selected samples and the chosen method are first described. As will become clear, this keeps the description of the results focussed on the full-sample logit analysis.

### **Comparison of classification accuracy between sample selection and methods**

As described before, two different samples were used (matched-pair sample and full healthy sample) and two different methods were used (MDA versus logit). These choices also affect the classification accuracy of the financial-distress prediction models. The differences between these approaches have therefore been statistically tested as well. This was done by comparing the starting models (model 1) with each other, in order to ignore the impact that operating leases have on classification accuracy.

#### *matched-pair sample versus full healthy sample*

As suggested by Ohlson (1980), the matching devices of the matched-pair sample, industry and size (measures by sales), are used in the full models as explanatory variables. The classification accuracy of both the discriminant analysis and the logit analysis increases when the full sample is used instead of the matched-pair sample; in the discriminant analysis the classification accuracy increases from 71.9% to 86.2%; in the logit analysis the classification accuracy increases from 83.8% to 89.7% (see Table 9.5 and Table 9.6). For both methods the increase is significant at the 1% level (z-value respectively 5.6 and 6.3). The main focus in this study is therefore on the classification accuracies of the full healthy sample.

#### *multiple discriminant analysis versus logit analysis*

The methods are also compared for the matched-pair sample and for the full healthy samples. Logit analysis has for both sample sizes higher classification accuracies, from 86.2% to 89.7% in the full healthy samples and from 71.9% to 83.8% in the matched pairs sample (see Table 9.5 and Table 9.6). Only for the matched-pair sample is this significant at the 1% level (z-score=2.67). With the full healthy samples the difference is not significant (z-score=0.64). This improvement is, however, not significant (z=0.64). The main focus of this study will therefore be on the logit analysis— not only because of these results, but also because the statistical requirements of MDA are not met.

## Discriminant analysis

**Table 9.5 Results of discriminant models**

Eight models are calculated, four using the matched-pair healthy sample and four using the full healthy sample. Model one is the starting model, and the classification accuracy of the other models is compared with this model. Models two, three and four are models that incorporate operating leases. In models two and three, the ratios WC/TA, Sales/TA, the interest cover, TD/TA, EBIT/TA, CF/TD, and MVE/BVD are calculated including the capitalisation of the operating leases (see Table 9.1). CR is not adjusted in all models, since the limited information available on the annual lease payment reduces the number of observations. Model three adds the operating-lease intensity measures, PVOL/TA and PVOL/Sales, to model two. Model 4 is model 1 plus the operating-lease intensity measures. Z is a measure of the significance of the difference between the classification accuracy of two models. Z is presented twice, once for all models compared with the classification accuracy of a random model (using the random hit rate, p) and once for models 2 through 4 compared with the classification accuracy of model one. Z and p are calculated as described in section 8.2.2. The table shows the rank of each variable in the discriminant function based on the absolute correlation within the function.

DISCRIMINANT ANALYSIS								
	MATCHED PAIRS				FULL MODEL			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
PVOLTA-adj			10	11			7	7
CR	10	10	12	12	11	12	13	12
WC/TA	8	9	11	10	10	11	12	11
Sales/TA	9	8	9	9	9	9	10	10
Interest cover	2	1	1	2	3	6	6	3
TD/TA	7	7	7	7	8	7	8	9
EBIT/TA	1	2	2	1	2	1	1	2
NI/sales	5	5	5	5	6	5	5	6
CF/TD	3	3	3	3	4	4	4	4
CF/sales	4	4	4	4	5	3	3	5
MVE/BVD	6	6	6	6	12	10	11	13
lnSales					1	2	2	1
Industry dummy		used for matching			7	8	10	8
classification accuracy	71.9%	80.6%	80.6%	79.0%	86.2%	87.4%	87.4%	86.0%
z as opposed to random model <sup>1</sup>	3.50	4.83	4.83	4.57	6.40	6.53	6.53	6.29
z as opposed to model one <sup>2</sup>		1.00	1.000	0.75		0.21	0.21	-0.21

<sup>1</sup> all significant at the 1% level, <sup>2</sup> none significant at the 10% level

Table 9.5 shows which variables have the highest absolute correlation with the discriminant function. The results show very little variation in the top-three discriminating variables in the matched-pair sample (EBIT-to-total-assets ratio, the interest cover and cash-flow-to-total-debt ratio). When size, measured by LnSales, enters the model with the full healthy sample, this variable enters this top-three list, and the cash-flow-to-total-debt ratio falls back to the fourth position. The highest position for PVOL/TA is the seventh position in the full sample models. This is the same for the models with or without the relevant variables adjusted for operating leases. Models two and three (including the variables adjusted for operating leases) for the full healthy sample show a small increase in classification accuracy, compared with model one, but this is not significant. However, as described above, the results of the full healthy sample using the logit approach will lead the way in answering the hypotheses, due to the statistically better foundation.

## Logit analysis

**Table 9.6 Results of logit models**

Eight models are calculated, four using the matched-pair healthy sample and four using the full healthy sample. The independent variable is a dummy with a value of 1 for financially distressed companies and 0 for healthy companies. Model 1 is the starting model; the classification accuracy of the other models is compared with this model. Models 2, 3 and 4 are models that incorporate operating leases. Models 2 and 3 calculate the ratios WC/TA, Sales/TA, the interest cover, TD/TA, EBIT/TA, CF/TD, and MVE/BVD including the capitalisation of the operating leases (see Table 9.1). CR is not adjusted in all models, since the limited information available on the annual lease payment reduces the number of observations. Model 3 adds the operating-lease intensity measures, PVOL/TA and PVOL/Sales, to model 2. Model 4 is model one plus the operating-lease intensity measures. Z is a measure of the significance of the difference between the classification accuracy of two models. Z is presented twice, once for all models compared with the classification accuracy of a random model (using the random hit rate, p), and once for models 2 through 4 compared with the classification accuracy of model one. Z is calculated as described in section 8.2.2. The table shows the coefficients of each variable. \*, \*\* and \*\*\* means significant at the 10%, 5% and 1% levels. Nagelkerke R square is presented.

	LOGIT ANALYSIS							
	MATCHED PAIRS				FULL MODEL			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
constant	-0.57	-2.69	-2.32	-0.59	6.70	7.74	7.28	9.94
PVOLTA-adj			1.78	6.88*			-1.23	10.27**
CR	0.04	-0.18	-0.26	-0.1	4.77**	1.01	1.29	2.93
WC/TA	0.71	3.89	4.21	1.98	-13.37**	-2.44	-3.20	-8.45
Sales/TA	-0.44	-0.69	-0.68	-0.73	-1.41	-1.26	-1.26	-1.62*
Interest cover	0.01	0.02	0.02	0.01	-0.23	-0.42**	-0.45*	-0.15
TD/TA	2.93	5.37*	4.68	2.7	5.34	4.94	5.59	3.26
EBIT/TA	3.14	-3.4	-3.4	3.34	27.32***	36.68***	38.12***	29.04***
NI/sales	2.78	-1.51	-2.01	2.85	34.92*	16.94	17.12	29.77
CF/TD	-8.88	-8.34	-8.35	-9.99	-14.61	-36.11**	-36.73**	-30.02**
CF/sales	-4.01	5.68	6.11	-3.78	-57.43*	-21.84	-21.91	-41.45
MVE/BVD	-0.11	-0.14	-0.17	-0.21	-0.14	-0.05	-0.04	-0.1
lnSales					-0.99***	-0.81***	-0.83***	-0.97***
Industry dummy		used for matching			0.90**	0.58	0.62	0.73
Nagelkerke R <sup>2</sup>	0.51	0.52	0.52	0.57	0.59	0.67	0.78	0.8
classification accuracy	83.8%	83.8%	82.4%	82.4%	89.7%	92.0%	92.0%	93.0%
z as opposed to random model <sup>1</sup>	5.58	5.58	5.34	5.34	7.05	7.39	7.39	7.58
z as opposed to model one <sup>2</sup>		0.00	-0.24	-0.24		0.43	0.43	0.43

<sup>1</sup> all significant at the 1% level, <sup>2</sup> none significant at the 10% level

Also for logit models 3 and 4, compared with the first model using a full sample, the results show that for neither of the models does the classification accuracy improve significantly. None have significantly better classification accuracy than when the assignment to each class was done randomly. Also, as mentioned before, the full healthy samples do not outperform the matched-pair samples at a significant level. Size, measured by the natural log of sales, is in all full healthy samples a significant variable, indicating that the chance that a company becomes financially distressed increases when size decreases. This also affects the variable EBIT to total assets, which is unexpectedly positively related to the chance of financial distress. This is, however, caused by the significantly smaller denominator (total assets) and not by a significantly higher EBIT. This is in line with the discriminant analysis, where size also was a variable with high discriminating power. In the best model (model 4, full healthy sample) the lease-intensity measure is positively related to the chance of getting into financial distress. The significance of the variables when comparing models 3 (adjusted variable plus PVOL/TA) and 4 (unadjusted variables plus PVOL/TA) is not fundamentally different. In both models the natural log of sales, EBIT/TA and cash-flow-to-total-debt, are significant at least at the 5% level. In



model three also the interest cover is negatively related to the chance of getting into financial distress, whereas in model 4 this is replaced by sales-to-total-assets. Both relations are only significant at the 10% level.

#### **9.4 Conclusion**

Chapters 8 and 9 examined the impact of operating leases on financial-distress prediction models. Based on previous studies, the changing (leasing) environment and the impact of the capitalisation of operating leases on especially the leverage of a company, two hypotheses were formulated in chapter eight. The first hypothesised that companies in financial distress use more operating leases than their healthy counterparts; the second consequently hypothesised that incorporation of operating-lease liabilities in financial-distress prediction models would increase the classification accuracy of such models.

This chapter empirically tested these hypotheses. Since the two studies (Elam (1975) and Lawrence and Bear (1986)) with which this study could be compared also used a matched-pair healthy sample and discriminant analysis, this was also the starting point of the underlying study. However, since both the matched-pair technique and discriminant analysis have their own disadvantages and haven't been updated since the above-mentioned studies, the same models were also analysed using a full healthy sample and logit analysis.

Use of the full healthy sample increases the classification accuracy of the financial-distress prediction models significantly (in both the discriminant and the logit analysis). Comparison of the full healthy sample with the financially distressed sample in the univariate analysis revealed significantly higher (minimal at the 5% level) lease intensity for the financially distressed sample. This was true for all three lease-intensity measures used. The same conclusion would also have been drawn when the sample was limited to only the bankrupt companies in the sample. Therefore, the hypothesis that financially distressed companies use more operating leases cannot be rejected. This is in line with the debt hypothesis of Watts and Zimmerman (1986), who argued that companies closer to breaking their covenants more often choose operating leases than companies that do not have this characteristic (see chapters 6 and 7). This suggested that the lease-intensity measure might have predictive power in financial-distress prediction.

The adjustment of the other explanatory variables in accordance with operating-lease commitments did not alter the results of the univariate analysis; the same variables remained significant or not significant— not even the levels of significance changed. This suggested that the adjustment of the ratios would not improve the classification accuracy of the multivariate financial-distress prediction models.

Comparison of the multivariate models using either discriminant analysis or logit analysis revealed that logit analysis showed higher classification accuracy than discriminant analysis. This improvement was not significant, however, although the arguments above could be used to show that the logit model using the full healthy sample provided the best results in the classification accuracies. The results of the univariate analysis suggest that the lease intensity might increase the classification accuracy, although the adjustment of the variables would not.

This was indeed the case. Model 4, using unadjusted variables but including the lease-intensity measure, showed the highest classification accuracy (93% correct predictions). In this model the lease-intensity measure was, indeed, significantly positively related to the financially distressed qualification. The increase in the classification accuracy is, however, not significant. Therefore, hypothesis 8.2, that including operating leases in financial-distress prediction improves the classification accuracy of such models, has to be rejected. This is in line with the results of Elam (1975) and Lawrence and Bear (1986).

Therefore, although chapter 8 showed that the studies of Elam (1975) and Lawrence and Bear (1986) should be updated (particularly in light of the growing importance and disclosure of operating leases, and the financial-distress prediction approach used), their conclusions on one point remain the same: ‘the additional lease capitalisation does not improve the classification of bankruptcy prediction models’ (Lawrence and Bear, 1986, p.582). However, we take exception to the conclusion of Lawrence and Bear that ‘the usage and accounting treatment of leases by bankrupt companies is not an important distinction from their healthy counterparts’. Although classification accuracy has not significantly improved, the usage of operating leases does differ significantly between financially distressed and healthy companies. However, the results of this study do alleviate the suspension of operating leases as a indicator of financial distress, the economic reasons to lease are as valuable for healthy companies as the accounting reason might be for financially distressed companies.

**Appendix 9.I :Financially distressed sample and matched-pair sample**

<b>last financial statement</b>	<b>Financially distressed sample</b>	<b>FD</b>	<b>sic-code</b>	<b>Not-financially distressed matched pairs</b>
1999	Baan Company	Taken over after substantial loss	73	Simac Techniek
1999	Atag group	Suspension of payment	36	Nederlands Apparatenfabriek
1999	Alanheri	NI 3-yr negative	51	Amsterdam Commodities
1999	Burgman Heybroek	NI 3-yr negative	50	Econosto
1999	Dico International	NI 3-yr negative	50	Oranjewoud
1999	EVC International	NI 3-yr negative	28	Fornix Biosciences
1999	Begemann Koninklijke Groep	Liquidated	67	HAL Trust
1999	Management Share	Suspension of payment	73	ICT Automatisering
1999	And International Publishers	Suspension of payment	73	Brunel International
1999	RING!ROSA PRODUCTS	Bankrupt	73	Hitt
2000	HES-Beheer	NI 3-yr negative	42	Smit International
2000	De Vries Robbe Groep	Suspension of payment	17	Batenburg Beheer
2000	LCI Technology	Bankrupt	73	Unit 4 Agresso
2000	Pharming Group	Suspension of payment	80	Crucell
2000	Toolex International	Bankrupt	35	Draka Holding
2000	KPNQwest	Bankrupt, NI 3-yr negative	73	PINKROCCADE
2000	Koninklijke textielgroep Twenthe	Bankrupt	23	Blydenstein-Willink
2000	Landis	Bankrupt	73	Athlon Holding
2001	Getronics	NI 3-yr negative, neg Eq	73	USG People
2001	Tie Holdings	NI 3-yr negative	73	Blue Fox Enterprises
2001	Vedior	NI 3-yr negative	73	Randstad Holding
2001	EMIS	Bankrupt	87	Rood Testhouse
2001	Laurus	Negative EQ	54	Schuitema
2001	UPC	Suspension of payment	29	TNT
2001	Punch Technix	Negative EQ	35	Tulip Computers
2001	CSS	Bankrupt	48	Exact Holding
2001	AINO	Bankrupt	73	Scala Business Solution
2001	Versatel Telecom International	Suspension of payment, negative eq	48	KPN
2002	Asml Holding	NI 3-yr negative	35	ASM International
2002	BE Semiconductor Industries	NI 3-yr negative	35	Airspray
2002	Qurius	NI 3-yr negative	50	Kendrion
2002	Priority Telecom	NI 3-yr negative	48	NEW SKIES SATELLITES
2002	Neways Electric International	NI 3-yr negative	50	Eriks Group
2002	Numico	Negative EQ	20	CSM
2002	Van heek-Tweka	Bankrupt	23	McGregor Fashion Group
2003	Vilenzo International	Suspension of payment	23	Ten cate
2003	Exendis	NI 3-yr negative	36	Docdata
2003	RT Company	Suspension of payment	73	Ctac

## Appendix 9.II :Univariate analysis – matched pairs

	Years prior to financial distress	n=	Difference in mean	t-statistic	Sign		Years prior to financial distress	n=	Difference in mean	t-statistic	Sign
<b>PVOL/TA</b>	-1	36	21.6%	0.944	ns	<b>TL/TA</b>	-1	37	18.9%	2.823	***
	-2	34	20.6%	0.761	ns		-2	37	0.8%	0.113	ns
	-3	33	-5.6%	-0.132	ns		-3	38	-0.3%	-0.036	ns
	-4	28	-73.8%	-1.159	ns		-4	35	-1.3%	-0.202	ns
<b>PVOL/TA-adj</b>	-1	36	19.9%	1.022	ns	<b>TL/TA-adj</b>	-1	36	17.5%	2.929	***
	-2	34	20.7%	0.929	ns		-2	34	4.9%	0.765	ns
	-3	33	-12.3%	-0.346	ns		-3	33	3.8%	0.584	ns
	-4	28	-68.5%	-1.367	ns		-4	28	-7.2%	-1.084	ns
<b>PVOL/sales</b>	-1	36	47.0%	1.645	ns	<b>EBIT/TA</b>	-1	34	-148.4%	-3.577	***
	-2	34	59.9%	2.058	*		-2	34	-2065.7%	-1.983	*
	-3	33	69.4%	1.751	ns		-3	34	-522.2%	-1.425	ns
	-4	28	-41.5%	-0.799	ns		-4	32	-124.8%	-0.712	ns
<b>CR</b>	-1	35	-49.9%	-1.642	ns	<b>EBIT/TA-adj</b>	-1	33	-146.5%	-3.34	***
	-2	35	6.8%	0.581	ns		-2	31	-524.3%	-1.775	*
	-3	35	21.1%	1.310	ns		-3	29	-408.6%	-1.489	ns
	-4	32	18.0%	1.254	ns		-4	26	-353.5%	-1.023	ns
<b>CR-adj</b>	-1	21	-57.7%	-1.333	ns	<b>NI/sales</b>	-1	37	11.9%	0.103	ns
	-2	21	4.9%	0.305	ns		-2	38	-103.8%	-2.195	**
	-3	20	21.2%	1.215	ns		-3	38	95.8%	0.733	ns
	-4	15	26.1%	1.742	ns		-4	35	-23.3%	-0.198	ns
<b>WC</b>	-1	35	-103.6%	-1.925	ns	<b>CF/TL</b>	-1	37	-55.6%	-0.431	ns
	-2	35	5.9%	0.255	ns		-2	37	-346.6%	-2.473	**
	-3	35	7.1%	0.311	ns		-3	38	-906.1%	-2.064	**
	-4	32	11.0%	0.496	ns		-4	35	-3134.5%	-0.956	ns
<b>WC-adj</b>	-1	33	-81.4%	-1.611	ns	<b>CF/TL-adj</b>	-1	36	-64.4%	-0.574	ns
	-2	31	-6.9%	-0.230	ns		-2	34	-487.3%	-2.811	***
	-3	30	-0.9%	-0.030	ns		-3	33	-696.0%	-1.915	*
	-4	25	31.0%	1.495	ns		-4	28	-567.5%	-1.198	ns
<b>Sales/TA</b>	-1	37	-23.1%	-2.383	**	<b>CF/sales</b>	-1	37	26.7%	0.178	ns
	-2	37	-19.1%	-1.623	ns		-2	37	-137.1%	-2.201	**
	-3	38	-37.1%	-2.815	***		-3	38	87.9%	0.743	ns
	-4	35	-33.6%	-2.648	**		-4	35	-21.3%	-0.148	ns
<b>Sales/TA-adj</b>	-1	36	-29.2%	-3.182	**	<b>MVE/BVD</b>	-1	36	-147.4%	-2.581	**
	-2	34	-18.2%	-1.666	ns		-2	35	26.9%	1.025	ns
	-3	33	-31.7%	-2.621	**		-3	31	0.1%	0.005	ns
	-4	28	-27.3%	-2.506	**		-4	24	25.8%	0.722	ns
<b>EBIT/interest</b>	-1	33	-316.3%	-3.366	***	<b>MVE/BVD-adj</b>	-1	35	-107.1%	-2.172	**
	-2	31	-80.8%	-0.547	ns		-2	33	7.0%	0.279	ns
	-3	32	3.4%	0.015	ns		-3	30	-3.9%	-0.127	ns
	-4	31	-267.4%	-1.054	ns		-4	23	24.7%	0.623	ns
<b>EBIT/interest-adj</b>	-1	32	-215.9%	-3.423	***						
	-2	28	-1061.2%	-2.209	**						
	-3	27	-133.6%	-1.400	ns						
	-4	26	-385.6%	-1.176	ns						

## **PART V: CONCLUSIONS**

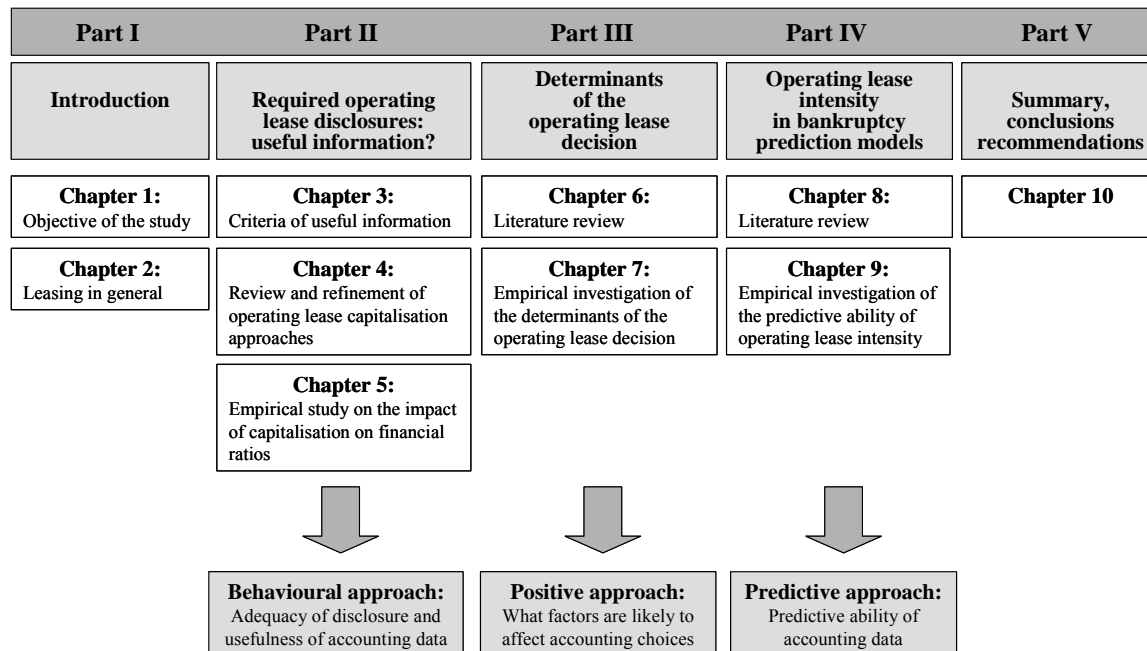


# CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

## 10.1 Introduction

This study has explored whether the current lease-accounting standard provides useful information to the individual user of financial statements and what determines the choice of a company to choose operating leases. This study examined the operating-lease disclosures from two perspectives: the first investigates the operating-lease disclosures from the external user's perspective, and the second investigates the operating-lease decision from the internal company's management perspective. Both perspectives are useful investigations that may help standard setters decide whether the current lease-accounting standard should be revised. This is straightforward with regard to the usefulness of the lease-accounting standard, since this is an aim defined by the standard setters in their own framework. However, also the decision to use operating leases might be of interest for standard setters. As mentioned by Bowen (1999), 'standard setters must understand the economic motives underlying accounting choices in order to determine how the flexibility allowed in financial reporting is being utilised'. While the management bankrupt or financially distressed companies might have additional motives in choosing operating leases, it was separately investigated whether these companies use relatively more operating leases than healthy companies. Therefore the study contained three main parts, addressing three research questions. The outline of the study was as follows;

Figure 1.1 Outline of the study



The main research question was derived from the discussion between opponents and proponents of both the current lease-accounting standard as the proposed new lease-accounting standard.

*“While the on-balance treatment of operating leases has both many opponents as proponents, an intermediate solution might be acceptable for both sides: How can the current lease-accounting standard be improved?”*

Whereas the intention of the introductory part was to describe the setting and relevance of this study, the sub-research questions related to each of the parts II til IV were:

- 1. Do the requirements of the current lease accounting standards regarding operating lease disclosures, result in useful information to individual users of the financial statements?*
- 2. What company characteristics determine whether a company has a high- or low- operating lease intensity?*
- 3. Do financial distressed companies have a higher operating-lease intensity than healthy companies?*

In this concluding chapter, the chapters 2 through 9 are summarised in section 10.2. The conclusions will be described for each of research questions in section 10.3. concludes this study with recommendations for standards setters concerned with the lease-accounting standard.

## **10.2 Summary**

### **Part I: Introduction**

Part I consisted of chapters 1 and 2, which described respectively the research proposal and the specific aspects of (operating) leases. Chapter 1 described the research proposal and the outline of the study. In addition, it placed this study in the accounting research spectrum. Chapter 2 started with a general description of the history of leasing, the reasons why companies choose leasing and how (operating) leases relate to other corporate liabilities. This was followed by a description of the legal aspects of leasing as a financing source and a summary of the legal status of the accounting standards. Leasing is not explicitly mentioned in Dutch law, which only refer to rental-, hire purchase- or leasehold agreements as legally defined agreements. These were later included as the legal agreements that fall within the boundaries of the lease-accounting standard. Until 2005, the Dutch accounting standards were not legally binding guidelines, but merely authoritative opinions of an influential private group. This has changed for the Dutch listed companies, since they are from 2005 obliged to adapt IFRS. For non-listed companies, however, the guidelines are still not legally binding. The compliance with IFRS by listed companies will also be supervised in the near future, thanks to two new supervision laws that will become effective.

Chapter 2 proceeded to show that although the intention of the current international accounting standards is the same, the harmonisation between the



standards is not yet complete. Three differences cannot be ignored. First is the difference between the disclosure requirements (annual payment) of SSAP21 in the UK and those required (total commitments) by the DASB in the Netherlands, by FASB in the US and by the IASB. The second difference has to do with the quantitative criteria of FAS13 and RJ292 versus the qualitative criteria of IAS17 and SSAP21. Finally, the 90% rule applied by both RJ292 and FAS14 may lead to different outcomes between these two standards, since they use a different measure of the fair value of the leased asset.

The differences between financial- and operating leases were also extensively described in chapter 2. The main difference, of course, has to do with the differences between the on-balance recognition for financial leases and the off-balance disclosure of operating leases. Whether this difference is a sensible distinction continues to be the subject of many discussions. The current lease-accounting standard has many opponents arguing that the classification is arbitrary. However, the difference between financial- and operating leases also has to do with the way the commitments are presented. While financial leases are recognised for their present value (excluding the interest part), for operating leases the full nominal commitments have to be disclosed (including the interest part).

Although the first proposal to change the current lease-accounting standard dates from 1996, and was updated in 2000, in July 2006 the boards of both the IASB and the FASB voted to add (again) to their agendas the issue of lease accounting. However, the comments received on the 2000 reports of IASB and FASB suggest that although the risk/reward approach is often perceived as unsatisfactory, there is also no overwhelming support for the proposed asset/liability approach.

Chapter 2 concluded with the description of leasing volume in the Netherlands and throughout the world. Leasing, it was shown, has grown enormously, and operating leases are by far the dominant leasing type for the Dutch listed companies. This is in line with the situation in the US and the UK. However, it also became clear that the amount of (operating) leases in the Netherlands is not easy to ascertain, and many leasing activities are executed beyond the sights of organised leasing associations.

## **Part II: The usefulness of the lease-accounting standard regarding the operating-lease disclosures**

Part II consisted of chapters 3, 4 and 5, and investigated the decision usefulness of the operating leases disclosed in the financial statement. Chapter 3 described the qualitative criteria of information disclosed in the financial statement, as laid down in the conceptual framework of the accounting standard setters. These criteria, which should lead in the end to a true and fair view of the financial position and performance of a company, include understandability, relevance, reliability and comparability. It was shown that each of these criteria also relates to the disclosure of operating leases. However, due to the off-balance-sheet character of operating leases, these commitments are often neglected, and this affects the financial ratios utilised by the users of the financial statements. Since for the operating leases the total nominal commitments are disclosed, whereas the present value is recognised for financial leases, an on-balance equivalent has to be calculated for the operating leases. Therefore, chapter 4 compared seven lease-capitalisation approaches to each

other; six derived from previous studies and one improved approach developed in this study. The improvement of the approach used in this study is that the other approaches depreciate the leased asset using a depreciation schedule that does not follow the payment schedule of the lease commitments. This does not reflect best the difference between the lease liability and the leased asset, while the difference becomes bigger than reasonable. In this study, the depreciation pattern of the leased assets closely follows the repayment schedule of the lease commitments and this is a better reflection of the reality.

Chapter 5 analysed the impact of the capitalisation of operating leases on key financial ratios, and tested the sensitivity of the capitalisation to the assumption of the interest rate used for discounting the remaining life and to the capitalisation approach used. The results showed some remarkable results.

- Still in 2004, 36% of the companies that disclosed operating leases did not comply with the accounting standard; this harms the reliability and the comparability criteria of decision usefulness, since these financial statements are neither neutral nor consistent, nor can they be compared with those of other companies. Whether the commitments are relevant cannot be defined.
- For at least 45% of the companies for which the lease commitments could be capitalised, these commitments were of a material amount— and this makes the information relevant.
- Due to the sensitivity of the capitalisation to changes in the assumptions on the interest rate, remaining life and chosen capitalisation approach, the disclosed information on operating leases is not sufficiently complete, which threatens the reliability criterion of decision usefulness.
- The comparability criterion of the disclosed operating-lease commitments is at stake, due not only to the statistically significant impact the capitalisation has on key financial ratios, but also to the sensitivity to the assumptions and the non-compliance with the accounting standard by many companies.

### **Part III: The determinants of the operating-lease decision**

Part III consisted of chapters 6 and 7, and addressed the decision to use operating leases. This part investigated which company characteristics determine a company's choice for operating leases instead of other financing forms. The choice for operating leases might be driven by an accounting reason to lease or by an economic reason to lease. The accounting reason to lease falls within the area of the accounting choice literature, which was described at the beginning of chapter 6. It was shown that accounting choices are closely linked to the positive accounting theory (investigating whether accounting does matter) and the financial contracting theory (investigating what the imperfections are in the financial markets that make the financial structure matter). Especially agency-related conflicts (internal conflicts such as bonus plans and external conflicts such as debt covenants) were described. The decision to use operating leases is not only limited to the accounting reasons, however, as was shown also in chapter 2. Avoiding risks attached to the economic ownership, flexibility and tax reasons are also important drivers of the lease decision. Several studies have investigated this issue, and these were described in chapter 6. Some remarks could be made on these studies:

- Many studies ignored the difference between financial- and operating leases, and the focus was on financial leases. However, some of the determinants

related especially to operating leases (shifting tax shields or preserving debt capacity), and investigation of the relation with financial leases seems meaningless.

- Most studies ignored the impact that the decision to use operating leases has on the determinants. This caused endogenous variables and conclusions to be opposite to what is true. This was illustrated with an example (Figure 6.1).

Related to the literature review of previous studies investigating this subject, chapter 6 formulated hypotheses that were tested in chapter 7. Ten possible determinants were chosen and their relation with the operating-lease intensity was evaluated using both univariate analysis and regression models. Lease intensity was measured by both a relative measure (the ratio of capitalised operating leases to total assets) and a dichotomous lease dummy (one if a high-leasing company and zero if a low- or non-leasing company). The regression models were respectively linear regression models or logit regression models. In the univariate analysis also endogenous variables (before- and after the operating leases are capitalised) were tested to show the impact operating leases might have on this analysis. In the regression, an exogenous variable was chosen for each of the determinants (leverage, size, performance, growth, investment opportunity, capital intensity, tax, management compensation, ownership concentration, and industry). This was not possible for the determinants leverage and investment opportunity (market-to-book value of equity). Each regression was therefore tested with leverage and market-to-book value of equity, once with the operating leases adjusted and once without. The results showed the following:

- The determinants with a positive significant relationship with the operating-lease intensity were leverage after lease-capitalisation, size, ownership concentration and 'trade' companies.
- The determinants with a negative significant relationship were leverage before lease-capitalisation, performance (earnings per share), and labour intensity.
- The results are consistent with the debt hypothesis that companies closer to breaching their debt covenants will lease more. The bonus-plan hypothesis and the political-cost hypothesis were rejected, although with respect to the bonus-plan hypothesis the univariate analysis was consistent with this hypothesis. Further research could be worthwhile.

#### **Part IV: Operating leases in financial-distress prediction models**

Part IV investigated whether including the operating-lease commitments in financial-distress prediction models would increase the classification accuracy of these models. The classification accuracy measures the percentages of correctly classified companies in either one of the two categories (healthy or financially distressed). This study is relevant for three reasons: first, no such study on this subject has been conducted since the early studies of Elam (1975) and of Lawrence and Bear in 1986; second, since these studies were conducted, statistical approaches (in methods and in sample selection) have been updated; third, the importance of operating leases and the frequency of their disclosure have been increasing (see chapter 2). The results of the previous chapters have indicated that operating leases might be a useful tool in financial-distress prediction. The impact of ignoring operating leases, shown in the comparison of companies in chapters 3, 4 and 5, is likely to be applicable also when comparing bankrupt- with healthy companies.

Also, the debt hypothesis, that companies choose operating leases when they are closer to breaching their covenants, was described in chapter 6 and confirmed in chapter 7.

In chapter 8 two hypotheses were formulated: the first hypothesising that financially distressed companies use more operating leases than healthy companies do, and the second hypothesising that adding operating leases to a financial-distress prediction model increases the classification accuracy of the model. Sixteen models were constructed. Different models addressed the differences in sample selection, the differences between methods, and, of course, the differences between models with or without the capitalised operating leases added to the model. A full healthy sample outperformed, in a statistically significant way, the matched-pair sample. Logit analysis, although showing higher classification accuracy, did not show significantly better classification accuracy than the discriminant analysis.

Based on the superiority of the full healthy sample, the results are consistent with the first hypothesis (that financially distressed companies use relatively more operating leases than healthy companies). The financially distressed companies used significantly (at least 5% significance) more operating leases than the healthy sample. However, since the classification accuracy did not improve when adding the capitalised operating leases to the model, the second hypothesis was rejected. Although the improvement of the classification accuracy did not significantly improve, the best-predicting model (93% correctly classified) was the logit model including the not-for-leases-adjusted variables but including the lease intensity PVOL/TA ratio (which was one out of four variables with significant explanatory power). This is in line with the univariate analysis of the difference between the financially distressed and healthy companies.

### 10.3 Conclusions and Recommendations

**Chapters 1 and 2's** (part I) particular aim was to demonstrate the relevance of the underlying study. The conclusions drawn from chapter 1 and 2 are:

- No full harmonisation yet of the lease-accounting standard internationally;
- Difference between financial and operating leases not only in balance-sheet recognition but also in amount (present value of lease commitments as opposed to nominal commitments) to be disclosed;
- A new lease-accounting standard to recognise all leases on the balance sheet is an ongoing debate, with no solution expected in the short term;
- Leasing has become a major financing source throughout the world, which is mainly attributable to operating leases

Therefore, the intention of the IASB and FASB to jointly proceed on the lease-accounting project seems a sensible decision. The difference between operating and financial lease may even seem bigger due to the differences between the disclosure requirements of both leasing types. The opponents to a new lease accounting approach to recognise all leases on the balance sheet are many, and not only the parties that will be most affected (lessees and the leasing industry). The importance of the operating leases as opposed to financial lease indicates a major impact on the leasing business. Also, as mentioned by several opponents of the proposed lease-accounting standard, the recognition of all leases will place an undue requirement

on a lessee to recognise asset used, but not controlled, by the company. Therefore, maintaining the current lease-accounting standard, but improved, might be a welcome compromise between the opponents and the proponents of both alternatives. From the conclusions and recommendation following from the next parts, it may become clear whether this is achievable.

**Chapters 3, 4 and 5** (Part II) investigated whether: *‘the requirements of the current lease accounting standards regarding operating lease disclosures, result in useful information to individual users of the financial statements.* These chapters showed that the decision usefulness of the current lease-accounting standard is at stake, since the required disclosure is insufficiently complete and compliance with the accounting standard is often ignored and not (yet) supervised. The answer to the first research question is therefore negative. The conclusions of chapters 3, 4 and 5 are:

- Non-compliance harms the reliability criterion of useful information; compliance with the accounting standards must be enforced by law and carried out through supervisors.
- Operating-lease information is relevant information, and financial statement users should consider this information when making decisions on individual companies.
- The information disclosed is insufficiently complete. Capitalisation is sensitive to the choices and assumptions of an individual financial statement user, which renders the information disclosed unreliable. The disclosure of the present value of the operating-lease commitments would solve this capitalisation problem. This would also create harmony between financial and operating leases, since for financial leases the present value is disclosed.
- The comparability between companies will be enhanced if all operating-lease commitments are taken into account in the financial analysis of a company; the disclosure of the operating-lease information should for that purpose be neutral (compliance with the standard) and reliable (present-value disclosure instead of nominal values).

The requirement in the lease accounting standards to disclose the nominal operating lease commitments, with no additional information on implicit interest rate (or the alternative costs of debt), and no information on remaining and total lives, leaves the user of the financial statements with the trouble of making certain assumptions in order to estimate the capitalised operating-lease commitments. By not estimating the on-balance equivalent of the operating-leases the user of the financial statement would miss serious liabilities, while the operating-lease commitments are often of a material amount. From that perspective, the statement of former SEC-chairman Levitt (2003) that (operating-) lease financing distort the financial picture is correct (see the prologue of this thesis). Furthermore, he stated: ‘markets and their participant will discipline themselves, but only if they have accurate information’. Part II also showed that the information is not accurate. Not only because the requirements of the lease-accounting standards are incomplete and capitalisation is sensitive to the assumptions made, but also because a great part of the financial statements do not comply with the requirements of the accounting standard and disclose even less information than required.

Therefore, the current lease-accounting standards which allow the off-balance sheet disclosure of operating leases can only be maintained if additional information is provided to the user of the financial statements. To my opinion, the information disclosed is only sufficiently complete, when the required disclosure of the operating-lease commitments disclosed are equal to the required recognition- and disclosure of the financial lease commitments. I recommend, therefore, that the accounting standard setters require the disclosure of the present value of the operating-lease commitments instead of the total nominal commitments.

Furthermore, the information disclosed should be reliable, and here I see a task for different parties in the process of informing the individual user of the financial statements. First, each individual company should give priority to reliable financial statements and consider the importance of this information to the user of the financial statements. They should comply with the accounting standards in order to enhance the consistency of financial statements. Second, auditors should ascertain themselves that indeed the financial statements of these companies comply with the accounting standards. Third, as suggested by the results of this study the supervision on the compliance with the accounting standard is essential if the previous mentioned parties do not fulfil their task as recommended. Finally, I see a task for the intermediaries to users of the financial statements, such as financial databases and financial analysts publishing financial reports. If their intention is to provide their clients with a complete overview of the financial situation and performance of a company, they cannot ignore the impact operating-lease have on the financial ratios. Therefore, they should incorporate at least a leverage-ratio that is adjusted for operating-lease in order to facilitate the users who rely on their information.

**Chapters 6 and 7** (part III) investigated the second research question, *‘what company characteristics determine whether a company has a high- or low-operating lease intensity’*. The answer to this question is that companies with the following characteristics have a higher operating-lease intensity: higher leverage, bigger in size, higher capital-intensity, (or lower labour-intensity), higher concentration of ownership, lower performance, and/or active in the trade-sector. As mentioned in chapter 1, the results of this chapter may facilitate standard setters to understand the economic or accounting motives to choose lease in order to determine how the flexibility of the lease accounting standard is being used. The determinants that relate to the off-balance treatment offered by the lease accounting standard are often considered to be the ‘accounting reasons’ to lease, the other determinants are then the ‘economic reasons’ to lease<sup>87</sup>. However, the off-balance treatment of operating leases is a result of the underlying question of who is the economic owner of the asset. As shown in Figure 2.1 one of the characteristics of operating lease as opposed to other corporate liabilities, but also to financial leases, is the separation of the economic-, from the legal-ownership of an asset. The current lease accounting standards is based on this distinction, but is now considered to be arbitrary and misleading. One might argue that at the time leasing became an attractive financing form, the lease accounting standard provided for

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<sup>87</sup> Beware, this does not relate to the determinant (effective tax rate) relating to the fiscal operating-lease qualification: the purpose of shifting tax shields from lessee to lessor may result in a financial advantage and is considered to be an economic reason to lease.

regulation that both addressed the economic reasons to choose operating leases as the wish for useful information in the financial statements. The economic reasons to choose operating leases (in addition to economic reasons to choose leases that also relate to financial leases) related then to evading the risk of economic ownership and the wish for useful information required the disclosure of the total operating lease commitments.

However, the off-balance treatment of operating leases as a result of the distinction between the legal and economic ownership of the asset, became a purpose in itself and probably contributed to the substantial growth of the leasing industry. The results of chapter 7 showed that this true; improving the leverage ratio is an significant determinant in the lease decision. This might be a reason for standard setters to decide that the current lease accounting standard misses its goals and should be adjusted. However, chapter 7 also showed that the economic reason to choose operating leases, using an asset but not controlling nor bearing the risk of ownership are still important reasons to choose operating leases. Avoiding the risk of obsolescence may be the reasons why closely held companies, trade companies, companies with many fixed assets, and companies that experience past growth choose more often operating leases than companies without these characteristics may.

The elimination of the off-balance treatment of operating leases will not lead to the end of the leasing-industry; although chapter 2 showed that the majority of the leases are operating leases, chapter 7 showed that this is not only attributable to the off-balance treatment. Reasons to lease that can also be achieved by financial leases are for example flexibility, or tax reasons.

The question that now remains is whether the separation between the economic and legal-ownership of the asset should still lead to a distinction between financial and operating-leases (i.e.on- or off-balance), or that the elimination of the accounting reason to choose operating leases, has a higher priority. In line with the arguments of the DASB, to my opinion assets that are used but not controlled by a company should not be recognised on the balance sheet. A greater emphasis should be on the notes to the financial statements, which are still an integral part of these financial statements. The information there disclosed should be reliable, and easy to interpret by the user of the financial statements. As soon as the disclosures of operating leases are really transparent, and it becomes common usage to indeed take these commitments into account when analysing a company, the current lease-accounting standard may still reflect best the risk of ownership attached to the assets and the accounting reason to lease may become less interesting for companies taking advantage of the standard.

**Chapters 8 and 9** (Part IV) questioned ‘*whether financial-distress prediction models improve when operating lease are included in these models*’. The answer to this question is that financial-distress prediction models do not significantly improve. However, when comparing the operating lease-intensity of companies in financial distress to healthy companies, the financially distressed companies do use on average more operating leases. The last part of this study is more or less an extended study on the previous question of the distinguishing characteristics of companies that choose more often operating lease than other companies do.

Whereas the previous chapters 6 and 7 showed already that both the accounting- as the economic reasons determine the choice for operating leases, the underlying chapter 8 and 9 address a similar issue. When financial-distress prediction models improve when operating leases are added to the list of explanatory variables, this might confirm the idea of operating lease as a way of improving ratios or avoiding debt covenants, instead of operating leases as a sensible economic decisions.

The results were in line with the results of chapter 6 and 7,

- Financially distressed companies use relatively more operating leases,
- Operating-lease commitments do not significantly improve financial-distress prediction models,
- Differences between financial ratios between these two groups of companies are not significantly altered when operating leases are taken into account.

This leads to the conclusion that in line with previous Part III operating leases have advantages for all kinds of companies, but also have specific features that make the financial contract interesting for financially distressed companies. Avoiding the risk attached to the ownership of an asset will also have additional advantages for financially distressed companies. Again the standard setters should ask themselves which lease-accounting best reflects the distinction between assets owned and assets used by a company, and whether elimination of the off-balance treatment is of greater importance than maintaining the distinction in risks attached to the financial contract.

#### **Some remarks on the results in an international context**

The major part of the conclusions and recommendations as formulated above are not exclusive to the Dutch situation but also apply internationally. As shown in chapter 2 the intentions and basic principles of the lease-accounting standards internationally dictated (FAS13, IAS17, SSAP21) are similar with some differences in the formulation. Furthermore, chapter 2 showed that leases have become a major financing source worldwide, mainly attributable to operating leases. The difficulties in capitalising operating leases and the impact on financial ratios were also found in international studies in the USA, the UK, Canada, and New Zealand. From this perspective, users of the financial statements in the USA have somewhat more detailed information, whereas in the UK the information is even less transparent to be able to estimate the capitalised value of the operating leases. The requirement of the present value of the operating leases in the footnotes to the financial statements would therefore be an improvement for all lease-accounting standards worldwide.

However, the Netherlands has some distinguishing features, which could have resulted in different results of the different parts if investigated in other countries. First, as described in chapter 2, in the Netherlands tax rules have little effect on financial accounting, which differs from other European countries but is in line with the USA and the UK (Nobes (2000)). This would presume that in countries where tax-rules dominate the accounting rules it will even be more troublesome to change the current risk/reward-approach to the asset/liability-approach while consensus must be reached with the tax authorities. The recommended intermediate step in lease accounting to provide the present value of the operating leases in the footnotes



(increased transparency and reliability) might even be more appreciated in these countries. Also the result of chapter 7 that for the Dutch sample the effective tax-rate does not determine the operating-lease choice, might be caused by the separation of the tax- and accounting-rules. As put forward by Nobes (2000, p.32), 'the treatment of taxation constitutes a major example of differences in financial reporting'. Furthermore, the results that a great part of Dutch listed companies did not comply with the accounting standard (chapter 5) are a consequence of the non-legal binding of the Dutch accounting standard. Also the absence until recently of for example an institution as the SEC to supervise the compliance with the standard, indicate that these results are not expected in other countries as well.

#### **10.4 Final remarks**

This thesis addressed operating-lease disclosures. It investigated whether the information disclosed is useful to the users of the financial statements and if the off-balance sheet character of the operating leases makes it a desirable financing form due to dubious, accounting, reasons. Although, the latter cannot be denied, several sensible, economic, reasons to lease are also apparent and although financially-distressed companies lease on average more than healthy companies, when taking other variables into account operating lease have no predictive power in predicting financial distress. Also, the information disclosed in the financial statements are maybe not optimal, but this can be fairly easy be recovered by requiring the present value to be disclosed.

To my opinion, the user of the financial statement is best served with a transparent, reliable disclosure in the notes to the financial statements of the operating-lease commitments. This will enhance the comparability between companies but will also reflect the differences in the risks attached to the economic ownership that now distinguish financial- from operating leases. Indeed this leads to the maintenance of the often criticised arbitrary distinction between operating leases and financial leases, it still allows companies to structure a lease contract in such a way that it will be treated off-balance. However, the increased transparency by disclosing the present value of the operating lease commitments (in line with the requirement of financial leases recognised on the balance sheet) should result in less 'abuse' of the lease-accounting standard. Furthermore, often quoted by opponents of the recognition of operating leases on the balance sheet, the recognition of operating lease on the balance sheet will also lead to financial structures that avoid a too high burden on the balance sheet. The question is whether this provides more reliable and transparent information, and whether this forces companies to choose financial contracts that less optimal (for example by evading long-term commitments).

Therefore, recalling the quotes of the former chairmen of both the SEC and the DASB in the prologue of this thesis and the questions they asked the answers are: yes, lease financing distort the financial picture, and no, market participants do not have sufficiently accurate information, but additional requirement will address (some of) the problems with the existing standard. The disclosure of the operating-lease commitments in a transparent and consistent way will give the user of the financial statement a more reliable view of the financial position and performance of a company than the recognition on the balance sheet of assets the company does not own, nor control.



## NEDERLANDSE SAMENVATTING (DUTCH SUMMARY)

In dit proefschrift is de informatie betreffende operationele leases in de toelichting op de jaarrekening van ondernemingen onderzocht. De informatie over operationele leases in de toelichting op de jaarrekening wordt voorgeschreven door de lease-accounting standaarden, zoals in Nederland de Richtlijn 292 van de Raad voor de Jaarverslaggeving (RJ292), Internationaal de International Accounting Standard No. 17 (IAS17), en in de Verenigde Staten de Financial Accounting Standard No. 13 (FAS13). De huidige lease accounting standaarden maken een onderscheid tussen financiële- en operationele lease op basis van wie (lessor of lessee) substantieel de risico's en de opbrengsten samenhangend met het eigendom van een (geleasd) actief draagt; is dit de lessee (de gebruiker van het actief) dan is het een financiële lease en is het de lessor (de verhuurder van het actief) dan kwalificeert de lease zich als een operationele lease. Er wordt daarmee een onderscheid gemaakt tussen financiële en operationele lease op basis van het economisch eigendom van het actief; het juridisch eigendom ligt in beide gevallen bij de lessor. Als gevolg van dit onderscheid wordt een financiële lease als een actief respectievelijk een schuld op de balans van de lessee verantwoord en worden de onopzegbare toekomstige operationele leaseverplichtingen vermeld in de toelichting op de jaarrekening ('off-balance'). De kwalificatie als financiële-, danwel operationele lease heeft derhalve consequenties voor onder andere de schuldverhouding en het balanstotaal van een onderneming. Tegenstanders van de scheiding tussen financiële- en operationele leases beargumenteren dat de scheiding arbitrair is en dat leaseovereenkomsten veelal gestructureerd worden om zo deze langlopende, onopzegbare, verplichtingen niet op te hoeven nemen op de balans. De International Accounting Standards Board (IASB) en de Amerikaanse Financial Accounting Standards Board (FASB) zijn daarom beide in 2000 met een voorstel gekomen om geen onderscheid meer te maken tussen financiële- en operationele leases, en alle leases op de balans te verantwoorden (IASB (2000) en Lennard en Nailor (2000)). Deze voorstellen hebben vooralsnog niet tot een veranderende regelgeving geleid; mogelijk gebeurt dit wel in de nabije toekomst aangezien in juli 2006 beide instanties het onderwerp opnieuw op de agenda hebben gezet, en daar ditmaal een hoge prioriteit aan hebben toegekend.

Off-balance financiering heeft sinds het faillissement van Enron<sup>88</sup> in 2001 een verhoogde interesse. Volgens de voormalig topman Arthur Levitt van de Securities and Exchange Commission (SEC) dienen de SEC en beleggers zich sinds dit faillissement af te vragen *'of het ondernemingen wel moet worden toegestaan om miljarden aan off-balance verplichtingen, zoals lease-verplichtingen, buiten de balans te houden. Hij betoogt dat deze off-balance verplichtingen het financiële plaatje verstoren en dat financiële markten en haar participanten dit wellicht kunnen doorzien maar slechts dan als ze voldoende informatie hebben'* (Levitt (2003)). Aan de andere kant betoogt de Nederlandse Raad voor de Jaarverslaggeving (RvJ) dat als alle leases op de balans vermeld zouden moeten worden, *dit vereist dat lessees activa op de balans moeten vermelden die ze wel gebruiken maar die ze niet controleren. De RvJ suggereert vervolgens dat de huidige standaard wellicht in stand kan worden gehouden als het wordt aangepast met additionele vereisten*<sup>89</sup>.

<sup>88</sup> Enron ging in 2001 failliet door onder meer honderden special purpose entities (SPE's) die onder US GAAP niet geconsolideerd hoefden te worden (dus ook off-balance) en waarvan achteraf gezegd werd dat deze SPE's misleidend waren.

<sup>89</sup> Voorzitter van de RvJ, Johan van Helleman in een reactie van 3 augustus 2000 naar aanleiding van het voorstel van de IASB (2000) om alle lease op de balans te verantwoorden. Zie hiervoor ook paragraaf 2.5.

Bovenstaande meningen weerspiegelen de discussie tussen de voor- en tegenstanders van de huidige-, maar ook de voorgestelde-, lease accounting standaard. Dit proefschrift probeert een bijdrage te leveren aan deze discussie door met empirisch onderzoek de omvang-, het gebruik-, het doel- en de informatie- omtrent operationele leases te beschrijven. De vragen die in dit proefschrift onderzocht worden zijn aan het bovenstaande ontleend: Verstoren de operationele leaseverplichtingen inderdaad de financiële analyse van een onderneming? Hebben de participanten op de financiële markten voldoende informatie om hiervoor te corrigeren? Kunnen de tekortkomingen opgelost worden door additionele eisen aan de informatie in de toelichting te stellen? En tenslotte, waarom kiezen ondernemingen voor operationele leases: is de accounting reden om te leasen hier doorslaggevend?

De centrale probleemstelling van dit proefschrift is daarom afgeleid van de discussie tussen voor- en tegenstanders van het passiveren cq activeren van operationele leases, waaronder de hiervoor beschreven uitlatingen van de SEC en de RvJ, en luidt:

*“Aangezien het op de balans vermelden van operationele leases zowel vele voor- als tegenstanders kent, is wellicht een tussenoplossing acceptabel voor beide partijen: Hoe kan de huidige lease-accounting standaard worden verbeterd?”*

Het onderzoek bestaat uit vijf delen (inclusief een inleidend en afsluitend deel), waarbij elke deel één onderzoeksvraag betreft.

1. *Resulteren de vereisten onder de huidige lease accounting standaarden met betrekking tot operationele leases in nuttige informatie voor de individuele gebruiker van de jaarrekening?*
2. *Welke karakteristieken van ondernemingen bepalen of een onderneming een hoge- of een lage- operationele lease intensiteit heeft?*
3. *Gebruiken ondernemingen met een naderend faillissement relatief meer operationele leases dan gezonde ondernemingen?*

Deze zijn weergegeven in onderstaande figuur. In het navolgende zal per deel een samenvatting van de uitkomsten worden gegeven.

Deel I	Deel II	Deel III	Deel IV	Deel V
Inleiding	Vereisten tav operationele leases in de toelichting: nuttige informatie?	Determinanten van de operationele lease beslissing	Operationele leases in faillissement voorspel modellen	Samenvatting, conclusies aanbevelingen
<b>Hoofdstuk 1:</b> Doel van de studie	<b>Hoofdstuk 3:</b> Criteria nuttige informatie	<b>Hoofdstuk 6:</b> Literatuur overzicht	<b>Hoofdstuk 8:</b> Literatuur overzicht	<b>Hoofdstuk 10</b>
<b>Hoofdstuk 2:</b> Beschrijving leasing algemeen	<b>Hoofdstuk 4:</b> Overzicht en verbetering van operationele lease kapitalisatie-methoden	<b>Hoofdstuk 7:</b> Empirische studie naar de determinanten van de operationele lease beslissing	<b>Hoofdstuk 9:</b> Empirische studie naar de voorspellende kracht van operationele lease-verplichtingen	
	<b>Hoofdstuk 5:</b> Empirische studie naar de impact van operationele leases op financiële ratios			

## Deel I

Deel I van dit proefschrift is een inleidend deel met als doel de actualiteit en de relevantie van het onderzoek (hoofdstuk 1) en daarnaast de leasing in het algemeen (hoofdstuk 2) te beschrijven.

**Hoofdstuk 2** toont de bijzonderheden en verschillen van operationele lease ten opzichte van andere financieringsvormen waaronder financiële leases, zowel vanuit juridisch, fiscaal en accounting perspectief, als in omvang. De bijzondere karakteristieken van operationele lease maken deze financieringsvorm interessant omwille van zowel economische redenen (belastingvoordeel, gemak, uitsluiten van vroegtijdige veroudering, flexibiliteit) als om accounting technische redenen (schuld buiten de balans houden en daarmee financiële ratios beïnvloeden). Hoofdstuk 2 laat zien dat civielrechtelijk een wettelijke definitie van leasing niet voorkomt in Nederland, maar dat het een verzamelnaam is van contracten met dezelfde karakteristieken. Deze karakteristieken zijn dat één partij (de lessor) aan een andere partij (de lessee) gedurende een bepaalde periode een actief ter beschikking stelt met als tegenprestatie een serie betalingen. De inhoud van het contract bepaalt de civielrechtelijke status van de lease, oftewel een huurovereenkomst (art.7:201 BW), een huurkoop (art.7A:1576h BW) of een pachtovereenkomst (art.1.1 Pachtwet). Vanuit juridisch perspectief is nog van belang dat de leaseregels tot 2005 niet wettelijke verankerd waren. Vanaf 1 januari 2005 is dit voor de Nederlandse beursfondsen gewijzigd en zijn zij wettelijk verplicht de International Financial Reporting Standards toe te passen<sup>90</sup>.

In hoofdstuk 2 is vervolgens aangetoond dat de huidige lease accounting standaarden voorgeschreven in Nederland (RJ292 en IAS17<sup>91</sup>), in de Verenigde Staten (FAS13), en in het Verenigd Koninkrijk (SSAP21) in grote lijnen op hetzelfde neerkomen, maar er toch nog geen sprake is van volledig geharmoniseerde voorschriften. Zo wordt om te bepalen of het economische eigendom van het actief bij de lessor of de lessee ligt, kwantitatieve criteria gehanteerd door RJ292 (als indicatie) en FAS13 (als 'bright line-test')<sup>92</sup>, terwijl IAS17 kwalitatieve criteria hanteert (termen als 'substantieel' en 'grootste gedeelte'). Verder vereist SSAP21 slechts de weergave van de leaseverplichting voor het komende jaar, terwijl RJ292, IAS17 en FAS13 de totale toekomstige leaseverplichtingen vereisen.

Ook de fiscus maakt een onderscheid tussen financiële- en operationele lease, en net als in de RJ292 wordt het onderscheid bepaald door wie de economische eigenaar is van het actief. De economische eigenaar activeert het actief en schrijft hierover af, of is gerechtigd tot eventuele fiscale regelingen. Dit kan een motief zijn om een operationele lease aan te gaan om zo fiscale voordelen aan de lessor over te dragen (als economisch eigenaar) indien de lessee onvoldoende belastingcapaciteit heeft (zie ook Lückerath (1998)). Zo heeft in Nederland bijvoorbeeld de WIR-premie geleid tot een groei van operationele leases in de 70-er en 80-er jaren (Bruins Slot (1994)). De kwalificatie criteria volgens de RJ292 en de Leaseregeling 2000 wijken enigszins van elkaar af en volgens het Ministerie van Justitie is het ook geen doel op zichzelf om de

<sup>90</sup> Tweede Kamer, 2002, publicatienummer 28 220, nr. 1,2.

<sup>91</sup> Standaard van de IASB en sinds 2005 in Nederland verplicht voor beursfondsen.

<sup>92</sup> Deze (indicatieve) kwantitatieve criteria zijn: een lease is een financiële lease als de looptijd van de lease langer is dan 75% van de economische levensduur van het actief, en als de contante waarde van de toekomstige leasebetalingen hoger is dan 90% van de reële waarde van het actief.

regelgeving op dit gebied te harmoniseren (Vereniging voor Belastingwetenschap (2001)).

Zoals beschreven leidt het onderscheid tussen financiële- en operationele lease tot verplichtingen die ofwel als schuld gepassiveerd en als actief geactiveerd zijn op de balans (financiële lease) ofwel alleen vermeld staan in de toelichting op de jaarrekening (operationele lease). Daarnaast dient voor een financiële lease de periodieke leasebetalingen gesplitst te worden in een rente- en aflossingdeel, en wordt op de balans en in de toelichting de contante waarde van de financiële leaseverplichtingen opgenomen. In de winst- en verliesrekening van de lessee wordt vervolgens het rentedeel opgenomen en wordt een afschrijvingslast opgenomen. Dit in tegenstelling tot een operationele lease waarbij de gehele leasebetaling in de winst- en verliesrekening wordt verantwoord en geen onderscheid wordt gemaakt tussen rente- en aflossing. Dit heeft voor operationele leases bovendien tot gevolg dat in de toelichting de totale nominale toekomstige leaseverplichtingen vermeld dienen te worden, dus zonder onderscheid in aflossing- of rente-deel. De gevolgen hiervan worden in hoofdstuk 4 en 5 beschreven. Een analyse van de 27 'comment letters' die de IASB ontving na hun voorstel uit 2000 om het onderscheid tussen financiële- en operationele leases op te heffen, laat zien dat deze voorgestelde methode ook door velen als een onbevredigend alternatief wordt gezien.

Tenslotte toont hoofdstuk 2 aan dat wereldwijd leasing een belangrijke bron van financiering is geworden. Nadat in 1950 de eerste leasemaatschappij is opgericht (US Leasing Corp.) nam jaarlijks het volume in leasing toe, eerst vooral in de Verenigde Staten en vanaf de 80-er jaren groeit ook de omvang van leasing jaarlijks in Europa en Azië. Verschillende onderzoeken in de Verenigde Staten en in het Verenigd Koninkrijk hebben aangetoond dat operationele leases een veelvoud zijn van financiële leases. Ook voor de Nederlandse beursfondsen, die in deze studie zijn onderzocht, zijn de operationele leaseverplichtingen zes keer zo groot in omvang als de financiële leaseverplichtingen. Dit is vergelijkbaar met het Verenigd Koninkrijk (studie van Beattie et al (2006)), maar minder dan de Verenigde Staten waar een onderzoek van de SEC een veelvoud van veertien liet zien (SEC (2005)). In het 'World Leasing Yearbook' (Euromoney (2006)) levert Nederland een kleine bijdrage aan het totaal van Europa: 1,8% (11 miljard Euro) van de totale uitstaande bedragen. Echter deze gegevens worden aangeleverd via de nationale lease verenigingen (in Nederland de Nederlandse Vereniging van Leasemaatschappijen) en voor de 109 beursfondsen onderzocht in deze studie, bedragen de nominale uitstaande operationele leaseverplichtingen al veel meer dan de genoemde 11 miljard Euro, namelijk ongeveer 30 miljard Euro. Duidelijk is dat een groot deel van de leases in Nederland zich buiten het gezichtsveld van de leasemaatschappijen afspeelt. Een verklaring voor het verschil kan verder zijn dat in Nederland de leasemaatschappijen zich gespecialiseerd hebben in roerende zaken (equipment leasing) terwijl in andere landen leasemaatschappijen meer betrokken zijn in onroerend goed en dat deze bedragen in omvang veel groter zijn. De relatieve omvang en belang van operationele leases bij de Nederlandse beursfondsen zal ook blijken uit de resultaten van hoofdstuk 5.

De conclusies van deel I zijn:

- er is nog geen harmonisatie van de lease accounting standaarden wereldwijd;
- het verschil tussen financiële- en operationele leases bestaat niet alleen uit verwerking op de balans of slechts in de toelichting, maar ook in het bedrag dat vermeld moet worden (contante waarde versus nominale waarde);
- het voorstel om alle leases op de balans te kapitaliseren is een voortgaande discussie, met geen verwachte consensus op de korte termijn<sup>93</sup>;
- leasing is wereldwijd een belangrijke vorm van financiering geworden waarbij operationele leases domineren.

## Deel II

Deel II van dit proefschrift betreft de vraag of de informatie over operationele leases in de toelichting op de jaarrekening nuttige informatie voor gebruikers van de jaarrekening verschaft. Volgens de RJ en de IASB is het doel van de jaarrekening<sup>94</sup> om informatie te verstrekken over de financiële positie, resultaten en wijzigingen in de financiële positie van een onderneming, die voor een grote reeks van gebruikers nuttig is voor het nemen van economische beslissingen.

**Hoofdstuk 3** beschrijft vervolgens wat de kwalitatieve eisen zijn die gesteld worden aan nuttige informatie in de jaarrekening. Deze kwalitatieve criteria zijn ook neergelegd in het Stramien van de RJ (paragraaf 24 tot en met 42) en in het Framework van de IASB. De vier kwalitatieve criteria zijn:

- **Begrijpelijkheid**; de informatie moet begrijpelijk zijn voor gebruikers met een redelijk kennisniveau;
- **Relevantie**; de informatie is relevant indien het de economische beslissingen van een gebruiker kan beïnvloeden. De informatie kan relevant zijn door de aard van de informatie of doordat de informatie materieel is door haar omvang. Materialiteit verschaft daarmee een drempel of een kritische grens voor relevantie; boven deze grens is de informatie per definitie relevant.
- **Betrouwbaar**; de informatie is betrouwbaar indien zij vrij is van onjuistheden of vooroordelen. Hiervoor dient de informatie een getrouw beeld te geven, gaat de economische realiteit boven de juridische vorm ('substance over form'), is de informatie neutraal en voorzichtig opgesteld, en is de informatie volledig.
- **Vergelijkbaar**; gebruikers van de jaarrekening moeten in staat gesteld worden de jaarrekeningen van één onderneming over verschillende jaren te kunnen vergelijken alsook verschillende ondernemingen onderling te kunnen vergelijken.

Niet al deze criteria zijn te toetsen aan de hand van de jaarrekening; bijvoorbeeld of de informatie vrij is van onjuistheden is niet te toetsen zonder te beschikken over informatie vanuit de onderneming, en of bijvoorbeeld de informatie begrijpelijk is kan alleen een enquête onder gebruikers uitwijzen. In hoofdstuk 3 zijn vijf onderzoeksvragen geformuleerd, welke in hoofdstuk 5 empirisch getoetst worden.

<sup>93</sup> Een nieuw voorstel van IASB en FASB wordt verwacht in 2008, en nieuwe regels worden niet verwacht voor 2009 (IASB (2006)).

<sup>94</sup> Zoals neergelegd in paragraaf 12 van het Stramien voor de opstelling en vormgeving van jaarrekeningen. Het Stramien is een vertaling van het Framework for the preparation and presentation of financial statements van de IASB

Deze vragen luiden als volgt:

1. Zijn de operationele leaseverplichtingen materieel (relevantie)?
2. Wordt RJ292 door de ondernemingen nageleefd (betrouwbaar door naleving)?
3. Is de informatie compleet om gebruikers in de gelegenheid te stellen de operationele leaseverplichtingen te kapitaliseren (betrouwbaar)?
4. Worden financiële ratios significant beïnvloed door de kapitalisatie van operationele leases? (relevantie; vergelijkbaarheid)
5. Verandert de positie van ondernemingen op basis van financiële ratios als de operationele leases gekapitaliseerd worden (vergelijkbaarheid)?

Vanwege de overzichtelijkheid bij de beantwoording van deze vragen zijn de vragen gekoppeld aan één van de kwalitatieve criteria. Deze vragen zijn vaak ook te koppelen aan een ander criterium. Bijvoorbeeld of financiële ratios significant beïnvloed worden door de kapitalisatie van de operationele leaseverplichtingen (vraag 4) hangt ook samen met hoe materieel de verplichtingen zijn (relevantie). Toch is deze vraag ondergebracht onder het criterium 'vergelijkbaarheid' omdat onder andere getoetst wordt in hoeverre de vergelijking tussen ondernemingen wijzigt door de operationele leaseverplichtingen. Verder dient nog opgemerkt te worden dat de niet-naleving van de leaseaccounting standaard (vraag 2) niet zozeer een tekortkoming van de informatievereiste accounting standaard is, maar van het toezicht op de naleving van de standaard. Met vraag 2 wordt in deze studie toch een koppeling gemaakt met het betrouwbaarheidscriterium van de informatie in de jaarrekening.

Om bovenstaande vragen te kunnen beantwoorden dienen de (off-balance) operationele leaseverplichtingen omgerekend te worden naar een on-balance equivalent. De gebruiker van de jaarrekening dient een kapitalisatiemethode toe te passen, dit wordt beschreven in **hoofdstuk 4**. Voorgaand onderzoek toont aan dat verschillende kapitalisatiemethoden voorhanden zijn, onder te verdelen in 'multipliemethoden' en 'contante-waarde methoden'. De multipliemethoden schatten de gekapitaliseerde waarde van de operationele leaseverplichtingen door de verplichting van het komende jaar te vermenigvuldigen met een vaste waarde, de multiplier. Deze multiplier kan een vaste waarde zijn (bijvoorbeeld zes of acht) of kan berekend worden aan de hand van een variërende rente en geschatte resterende levensduur van de lease portefeuille (zie onder andere UBSWarburg (2001)). De multipliemethoden worden vanwege hun eenvoud in de praktijk gebruikt<sup>95</sup> maar negeren de leaseverplichtingen na het eerste jaar, waardoor ze minder betrouwbaar zijn dan de contante-waarde methoden. De contante waarde methoden berekenen de contante waarde van alle toekomstige leaseverplichtingen. Hiervoor dienen wel enkele aannames gemaakt te worden betreffende de rente waartegen contant gemaakt wordt, over de resterende looptijd van de leaseverplichtingen en over de verhouding tussen de nog resterende looptijd- en de oorspronkelijke totale looptijd van de leaseverplichtingen. De (geschatte) resterende looptijd bepaalt hoelang, en volgens welk schema de vermelde leaseverplichtingen vervallende-na-vijf-jaar nog doorlopen. De verhouding tussen de resterende looptijd en de originele totale looptijd

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<sup>95</sup> Zie bijvoorbeeld jaarrekening van Unilever 2004 waar de netto schuld wordt herberekend door vijf keer de leaseverplichting voor het komende jaar op te tellen bij de niet-aangepaste netto schuld.



van de leaseverplichtingen is van belang voor de relatie tussen de contante waarde van de lease *verplichtingen* en de resterende waarde van geleasede *activa*<sup>96</sup>.

Hoofdstuk 4 vergelijkt vervolgens zeven verschillende methoden op basis van de aannames en de calculaties. Van deze zeven verschillende methoden betreffen drie methoden een multipliermethode, en vier een contante-waarde methode. Van deze contante-waarde methoden komen er drie uit eerdere studies van Imhoff, Lipe en Wright (1991; 1997), van Beattie, Thomson en Goodacre (1998) en Ely (1995). De vierde methode is een verfijning op deze methoden aangebracht in dit proefschrift. De verfijnde methode stemt het afschrijvingschema van de geleasede activa af op het aflossingsschema van de operationele lease verplichting. Een onderneming met het merendeel korte termijn leases (bijvoorbeeld auto's of computers) heeft een ander aflossingsschema in de leaseverplichtingen dan een onderneming met overwegend lange termijn leases (bijvoorbeeld onroerend goed), terwijl ze beide een even lange resterende looptijd kunnen hebben<sup>97</sup>. De eerder genoemde studies houden hier geen of onvoldoende rekening mee en dit leidt vooral tot verschillen in de ratios waarbij de afschrijving van de activa een rol speelt (bijvoorbeeld bij de aanpassing van netto winst). Hoofdstuk 4 sluit af met een voorbeeld (aan de hand van de jaarrekening van KPN) dat illustreert waartoe de verschillen tussen de zeven kapitalisatiemethoden kunnen leiden.

**Hoofdstuk 5** toetst vervolgens de vijf vragen, zoals in hoofdstuk 3 geformuleerd, aan de hand van de informatie in de jaarrekening van 119 Nederlandse beursfondsen gedurende de periode 2000-2004. De jaarrekeningen van financiële instellingen zijn niet in het onderzoek opgenomen. De informatie over de operationele leaseverplichtingen zijn handmatig verzameld uit de toelichtingen, aangezien er geen financiële database bestaat waarin de verplichtingen compleet zijn opgenomen. Dit wordt mede veroorzaakt doordat veel ondernemingen de leaseaccounting standaard niet naleven, waardoor de verstrekte informatie moeilijk in een standaard vormgeving van een database past. In 2004 voldoet 36% van de ondernemingen in de dataset niet aan RJ292. Dit is een verbetering ten opzichte van 2000 waar 59% nog niet voldeed aan de regelgeving, maar betekent dat nog steeds 37 van de 103 ondernemingen met operationele leases in de toelichting onvoldoende informatie verstrekt. Hoewel dit niet te wijten is aan de accounting standaard zelf, de standaard wordt niet nageleefd, is dit wel een bedreiging voor het betrouwbaarheids criterium van nuttige informatie. De informatie is onvolledig, niet neutraal en geeft geen getrouw beeld van de financiële situatie van deze ondernemingen. Bovendien kan voor deze ondernemingen geen gekapitaliseerde waarde van de operationele leases berekend worden, zodat deze ondernemingen niet vergeleken kunnen worden met andere ondernemingen of bepaald kan worden of de bedragen materieel zijn.

Uiteindelijk kan voor 379 waarnemingen de contante waarde van de operationele lease berekend worden (hiervan hebben 77 waarnemingen geen operationele leases

<sup>96</sup> Vanwege het verschil tussen de annuïtaire aflossing van de leaseverplichtingen en de lineaire afschrijving van de activa, gaat de afschrijving in eerste instantie harder dan de aflossing en zal bij kapitalisatie van de lease, het geleasede actief voor een lager bedrag op de balans geactiveerd worden dan de leaseverplichting. Zie hiervoor figuur 4.2. Dit verschil tussen geleasede activa en leaseverplichtingen heeft een effect op de aanpassing van de (netto- en operationele) winst en voor het eigen vermogen.

<sup>97</sup> Bijvoorbeeld als ze beide leaseverplichtingen hebben met een nog resterende looptijd van 20 jaar en dit betreft bij de ene onderneming 50% van de totale verplichtingen en bij de ander slechts 10%. De resterende looptijd is dan gelijk maar het aflossingsschema verschilt.

en is de contante waarde dus nul). Gemiddeld hebben deze 379 ondernemingen ruim 14% aan operationele leaseverplichtingen ten opzichte van het balanstotaal (mediaan 4,3%). Indien de ondernemingen zonder leases bij de berekening worden uitgesloten (deze ondernemingen verlagen uiteraard het gemiddelde) is het gemiddelde 17,8% (mediaan 6,3%). Gemiddeld neemt het totale vreemd vermogen, het lange termijn vreemd vermogen, het balanstotaal en de netto winst toe met respectievelijk 23%, 26%, 5% en 1%. Deze toename is in alle gevallen significant (1%-niveau). De operationele leaseverplichtingen zijn materieel voor tenminste 45% van de 379 ondernemingen waarbij als materialiteitsmaatstaf het percentage van de contante waarde van de operationele leaseverplichtingen ten opzichte van het balanstotaal (PVOLTA) is genomen, met een grenswaarde van 5%. Dit betekent dat voor minimaal 45% van de ondernemingen de operationele leaseverplichtingen relevant zijn en deze verplichtingen bij de financiële analyse meegenomen moeten worden.

Vervolgens is berekend hoe gevoelig de berekening van de contante waarde van de operationele leases is voor aannames betreffende de rente, de resterende looptijd, de oorspronkelijke looptijd en de gebruikte kapitalisatiemethoden. De uitkomsten tonen aan dat vooral de kapitalisatiemethode en de rente de uitkomsten beïnvloeden, waarbij vooral de simplistische multiplier methode afwijkt van de overige methoden. Dit zou voorkomen kunnen worden door het vermelden van de contante waarde van de operationele leaseverplichtingen. Hierdoor hoeft de gebruiker van de jaarrekening zelf geen aannames te maken of kapitalisatieprocedures uit te voeren en neemt de gebruiksvriendelijkheid van de informatie toe. Bovendien zou dit ook leiden tot meer harmonisatie en een betere vergelijkbaarheid tussen de weergave van financiële leases en operationele leases.

Tenslotte toont hoofdstuk 5 aan dat de vergelijkbaarheid van ondernemingen in het geding is als de operationele leases niet worden meegenomen bij de berekeningen van financiële ratios. De impact op de financiële ratios is het grootst bij ratios waar een schuldverhouding berekend wordt. Bijvoorbeeld vreemd vermogen ten opzichte van totaal vermogen neemt gemiddeld toe met 32% (mediaan 24%) of lang-vreemdvermogen ten opzichte van geïnvesteerd kapitaal neemt toe met gemiddeld 47% (mediaan 57%). Dit betekent dat hoewel een kleine meerderheid van de ondernemingen geen materiële leaseverplichtingen in de toelichting vermeldt, het ten behoeve van de vergelijkbaarheid tussen ondernemingen de operationele leaseverplichtingen van alle ondernemingen in de financiële analyse dienen te worden meegenomen. De vergelijking van weinig-leasende ondernemingen en veel-leasende ondernemingen op basis van financiële ratios zal anders een verkeerd beeld geven.

Naar aanleiding van bovenstaande resultaten zijn de belangrijkste conclusies en aanbevelingen voor deel II als volgt:

- De niet-naleving van de lease-accounting standaard tast het betrouwbaarheids criterium van nuttige informatie aan;
- Voor veel ondernemingen is de informatie over operationele leaseverplichtingen relevant en gebruikers van de jaarrekening dienen deze informatie in acht te nemen bij de financiële analyse van de jaarrekening van een onderneming;
- De vereiste informatie in de toelichting is onvoldoende compleet. De kapitalisatie van de operationele leaseverplichtingen is gevoelig voor de keuzes en aannames

van de individuele gebruiker en dit maakt de informatie onvoldoende betrouwbaar.

Bovenstaande resultaten pleiten voor een wettelijke verplichting de accounting standaarden na te leven en een strenger toezicht op de naleving in Nederland<sup>98</sup>. Daarnaast is het wenselijk de accounting standaard te wijzigen zodat in plaats van de nominale waarde, de contante waarde van de operationele leases wordt vermeld in de toelichting. Dit vergroot de transparantie en de betrouwbaarheid van de informatie; de kapitalisatie door de gebruikers is niet meer gevoelig voor aannames en kan efficiënter plaatsvinden; en de informatie zal naar alle waarschijnlijkheid eenvoudiger beschikbaar komen door financiële databanken. Het opnemen van de contante waarde leidt bovendien tot een harmonisatie van de wijze van vermelden tussen financiële- en operationele leases.

### Deel III

Deel III van dit proefschrift onderzoekt de vraag welke karakteristieken van een onderneming mede bepalen of een onderneming relatief veel- of weinig operationele leaseverplichtingen heeft ('lease-intensiteit'). Het antwoord op deze vraag geeft inzicht in de keuze van een onderneming om operationele leases te kiezen als financieringsvorm. In hoofdstuk 2 is beschreven dat deze keuze zowel op grond van financieel/economische redenen (bijvoorbeeld belastingvoordelen, gemak) gemaakt kan worden als omwille van accounting specifieke redenen (schuld buiten de balans houden). De resultaten van dit deel II kunnen bijdragen in de discussie of alle leases op de balans geactiveerd dienen te worden en de accounting reden om leases te kiezen daarmee vervalt.

**Hoofdstuk 6** beschrijft het theoretische kader en het voorgaande onderzoek op het gebied van de determinanten voor de leasebeslissing. Paragraaf 6.2 beschrijft de relatie tussen de positieve accounting theorie, de literatuur over accounting keuzes en de financiële contracten theorie. De positieve accounting theorie beschrijft het (mogelijke) opportunistische gedrag van het management van ondernemingen en de relatie met accounting variabelen. Financiële contracten hebben vaak tot doel agentschapkosten<sup>99</sup> te verminderen, waarbij de accounting keuze literatuur dit splitst in interne agentschapkosten (managementbeloning, '*bonusplan hypothesis*') en externe agentschapkosten (maximale schuldverhouding in leenovereenkomsten; '*debt-covenant hypothesis*'). In paragraaf 6.3 worden vervolgens negen verschillende studies beschreven waarin eerder onderzoek naar de determinanten van de leasebeslissing is gedaan. Deze onderzoeken worden vergeleken op basis van de afhankelijke variabele in het onderzoek (een bepaalde lease-intensiteit maatstaf) en de verklarende variabelen. Er zijn slechts drie studies die als afhankelijke variabele operationele leases gebruiken. De overige studies onderzoeken, ofwel alleen de financiële leases, ofwel de financiële- plus operationele leases gezamenlijk. Dit is verwonderlijk aangezien de meeste studies specifiek aandacht schenken aan het off-

<sup>98</sup> Sinds 1 januari 2005 zijn beursgenoteerde ondernemingen in Nederland wettelijk verplicht de IFRS na te leven (Tweede Kamer, 2002, nr. 28 220). Het toezicht op de naleving is per 31 december 2006 wettelijk geregeld bij het inwerking treden van de Wet toezicht financiële verslaggeving (Staatsblad 2006, nrs. 569, 570, 571).

<sup>99</sup> Agentschapskosten vloeien voort uit contracten waarmee één partij (de principaal) een andere partij (de agent) werft, en beslissingsbevoegdheid geeft, om in zijn naam een bepaalde taak uit te voeren. Hoewel in deze agentschapsrelatie in eerste instantie de relatie tussen aandeelhouder (principaal) en manager (agent) werd bedoeld (Jensen and Meckling (1976)), is ze ook algemener te definiëren en dekt ze meerdere relaties tussen twee partijen waarbij de situatie van de één, afhangt van de actie van de ander.

balance karakter van operationele leases en de gevolgen hiervan voor de schuldverhouding. Dit kan bovendien tegengestelde uitkomsten van empirisch onderzoek tot gevolg hebben, wat door middel van een voorbeeld (figuur 6.1) is aangetoond.

Op basis van de determinanten van voorgaande studies zijn tien verschillende determinanten en/of karakteristieken van ondernemingen beschreven, waarna voor elke determinant één of meerdere hypothesen zijn geformuleerd. Deze determinanten zijn; de schuldverhouding, de omvang van de onderneming, de financiële prestaties, de groei in het verleden, toekomstige investeringsmogelijkheden, de kapitaal- en arbeidsintensiteit, de effectieve belastingdruk, managementbeloning, de eigendomsconcentratie en de sector waarin de onderneming actief is. Voor enkele van deze hypothesen is een verschil gemaakt tussen de verwachte relatie met-, en zonder de operationele leases te kapitaliseren. Dit, vanwege de mogelijke invloed van de operationele leases op de betreffende determinant. Zoals eerder beschreven geldt dit bijvoorbeeld voor de schuldverhouding.

In **hoofdstuk 7** worden de hypothesen vervolgens empirisch getest. De invloed van de kapitalisatie van de operationele leases op zowel de afhankelijke-, als de verklarende-variabelen wordt hier getoetst door sommige tests tweemaal uit te voeren als de operationele leases hier invloed op kunnen hebben. Eenmaal zonder de operationele lease te kapitaliseren en eenmaal door de operationele leases wel te kapitaliseren. Verder is de relatie met de lease-intensiteit zowel getest voor elke determinant afzonderlijk (univariate analyse), als gezamenlijk in een model (regressie analyse). Tenslotte is de afhankelijke variabele (lease-intensiteit) in deze analyses op twee manieren berekend; ten eerste als een relatieve maatstaf (contante waarde operationele leases ten opzichte van balanstotaal; PVOLTA) en ten tweede als een absolute maatstaf, een lease-intensiteit dummy (1 voor veel-leasende ondernemingen, 0 als weinig-leasende ondernemingen). Deze indeling is gemaakt op basis van de materialiteitstoetsen uit hoofdstuk 5.

Vervolgens is voor elk van de determinanten een univariate analyse uitgevoerd waarbij steeds twee statistische tests zijn uitgevoerd. De eerste univariate test betreft de correlatie<sup>100</sup> tussen de relatieve omvang van de operationele leases (PVOLTA) en de betreffende determinant. Uiteraard betreft dit alleen die ondernemingen in de dataset waarvoor de contante waarde van de operationele leaseverplichtingen berekend kon worden. De tweede univariate test betreft de verschillenanalyse tussen de twee groepen, te weten de veel- en weinig-leasende ondernemingen, aan de hand van het gemiddelde en de mediaan van de determinanten. Vervolgens is de relatie tussen de verschillende determinanten en de lease-intensiteit ook in een regressie getest. Vanwege de twee vormen waarin de lease-intensiteit is gemeten, de relatieve maatstaf en de dummy variabele, zijn er ook twee regressie methoden gebruikt: een lineaire regressie voor de relatieve lease-intensiteit en de logit-regressie voor de lease-intensiteit dummy (1 of 0).

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<sup>100</sup> Spearman rank correlatie: correlatie tussen de medianen.

Naar aanleiding van de resultaten van hoofdstuk 7 zijn de voornaamste conclusies van deel III als volgt:

- de schuldverhouding, berekend met inachtneming van de operationele leases, is een belangrijke determinant bij de beslissing om voor operationele leases te kiezen (bevestiging van de *debt-covenant hypothesis*);
- indien de schuldverhouding niet wordt aangepast voor de operationele leases, wordt een tegengestelde relatie gevonden, wat aangeeft dat de onderneming er in slaagt schuldverhouding te verlagen door operationele leases;
- naast de schuldverhouding hebben ondernemingen met een grotere omvang, een geconcentreerde eigendomstructuur (% aandeelbelang bij één partij) en ondernemingen in de sector ‘handel’ significant meer operationele leases dan ondernemingen zonder deze karakteristieken;
- een significante negatieve relatie met de operationele lease intensiteit werd gevonden voor ondernemingen met een betere financiële prestatie en voor arbeidsintensievere ondernemingen;
- voor de overige determinanten werd in de modellen geen significante relatie gevonden.

Bovenstaande resultaten tonen aan dat de ondernemingen operationele leases kiezen zowel vanwege het off-balance karakter (accounting reden) als om economische redenen (zoals het vermijden van risico's verbonden aan economische eigendom of vanwege flexibiliteit).

#### Deel IV

Deel IV onderzoekt of het meenemen van de operationele leaseverplichtingen in faillissementvoorspelmodellen de nauwkeurigheid verbetert van de classificatie als gezonde- danwel ondernemingen in financiële problemen (‘probleemondernemingen’). Deze nauwkeurigheid wordt berekend aan de hand van correct geclassificeerde ondernemingen. Vergelijkbare studies zijn uitgevoerd door Elam (1975) en Lawrence en Bear (1986). De resultaten van de voorgaande hoofdstukken hebben echter laten zien dat een hernieuwd onderzoek op zijn plaats is. Ten eerste is het gebruik van operationele leases de afgelopen decennia toegenomen en is er meer en betere informatie beschikbaar gekomen (hoofdstuk 2 en 5). Ten tweede hebben de operationele leases een significante impact op sommige financiële ratios waaronder de schuldverhouding (hoofdstuk 5), welke ratios bovendien vaak voorspellende waarde hebben bij het voorspellen van faillissement. Ten derde kan het ontwijken van een te hoge schuldverhouding, een reden zijn om voor operationele leases te kiezen (hoofdstuk 7). Dit zou vooral op ondernemingen in financiële problemen van toepassing kunnen zijn. Tenslotte is er sinds voornoemde studies veel veranderd in zowel de statistische methoden, als in het gebruik van de datasets, bij het voorspellen van financiële problemen. De impact van operationele leases op de onderlinge vergelijking van ondernemingen is aangetoond in hoofdstuk 5, en deze impact kan wellicht ook een invloed hebben bij het vergelijken van gezonde ondernemingen met ondernemingen in financiële problemen.

In **hoofdstuk 8** wordt voorgaand onderzoek naar het voorspellen van faillissementen beschreven. Aangetoond wordt dat in veel studies financiële ratios gebruikt worden om faillissement te voorspellen. Vooral financiële ratios met betrekking tot performance, schuldverhouding en kasstromen blijken voorspellende waarde te hebben bij het voorspellen van faillissement. In het gebruik van de financiële ratios

in de voorspelmodellen zit weinig variatie en de keuze wordt veelal niet bepaald door onderliggende theoretische argumentatie maar door resultaten van voorgaande studies. In de afgelopen decennia zijn echter wel de statistische technieken veranderd, waarbij een verschuiving heeft plaatsgevonden van het gebruik van multiple discriminant analyse (MDA) naar logit analyse. Deze verschuiving heeft vooral te maken met de statistische vereisten voor de dataset waar bij MDA vaak niet aan voldaan werd. Toch hebben verschillende onderzoeken aangetoond dat de voorspellende kracht van logit-analyse niet groter is dan die van MDA (zie bijvoorbeeld Altman et al. (1994) en Pompe and Bilderbeek (2000)).

In hoofdstuk 8 worden vervolgens de drie studies beschreven die operationele leases meenemen in hun model: Elam (1975), Lawrence en Bear (1986) en Altman et al. (1977). Alleen de eerste twee doen een uitspraak over de toegevoegde waarde van operationele leases in hun modellen. Elam concludeert dat de toevoeging van operationele leases niet de voorspellende kracht van financiële ratios in faillissement voorspelmodellen vergroot. Deze conclusie wordt in 1986 gedeeld door Lawrence en Bear. Alledrie deze studies gebruiken multiple discriminant analyse en een dataset waarbij elke failliete onderneming gekoppeld wordt aan een gezond bedrijf op basis van industrie sector en omvang van de onderneming (*matched pairs*). Bovendien zaten in Elam's dataset alleen ondernemingen met operationele leases. Het matchen van ondernemingen wordt vaak bekritiseerd omdat de variabelen waarmee gematched wordt, beter als verklarende variabele in het model kunnen worden gebruikt dan als matching variabele (zie Ohlson (1980)). Een alternatief is de failliete bedrijven af te zetten tegen een zo groot mogelijke dataset van gezonde bedrijven (*full sample*).

Het empirisch onderzoek in **hoofdstuk 9** wordt op verschillende manieren uitgevoerd om zowel een vergelijking te kunnen maken met voorgaand onderzoek, alsook de verbeterde inzichten omtrent methoden en dataverzameling toe te kunnen passen. Daarom wordt allereerst als statistische methode zowel discriminantanalyse, als logit-analyse toegepast. Ten tweede wordt elke test uitgevoerd met zowel een *matched pairs* (36 gezonde- en 36 probleemondernemingen) dataset als met een *full* dataset (61 gezonde- en 36 probleemondernemingen). De classificaties van de verschillende modellen worden vergeleken, en aan de hand van de kritische z-waarde wordt een uitspraak gedaan over de statistische significantie van de verschillen.

De univariate resultaten laten zien dat in het jaar voor de financiële problemen de volgende ratios significant verschillen tussen gezonde- en probleemondernemingen: operationele winst (EBIT) en vreemd vermogen (beide ten opzichte van het balanstotaal), en de rentedekking. Het maakt voor deze resultaten niet uit of de operationele lease wel of niet in de ratios zijn meegenomen. Wat betreft de lease-intensiteit laten de resultaten zien dat de lease-intensiteit ratios (operationele lease ten opzichte van balanstotaal of ten opzichte van omzet) het hoogst zijn bij de bedrijven in financiële problemen (gemiddeld respectievelijk 14% en 18%) waarbij dit voor complete set gezonde ondernemingen significant lager is (respectievelijk 7% en 6% voor de full dataset). Voor de matched set gezonde ondernemingen (n=36) zijn de lease-intensiteit ratios ook lager maar niet statistisch significant verschillend met de ondernemingen in problemen.

In de regressie analyses zijn zestien verschillende regressies uitgevoerd. Er zijn steeds vier modellen getest: model 1 zonder inachtneming operationele leases, model 2 waarbij de ratios zijn aangepast voor operationele lease, model 3 is als model 2 plus de lease-intensiteit als extra variabele erbij, en model 4 zijn de onaangepaste ratios met de lease-intensiteit als extra variabele erbij. Aangezien elk model getest is met discriminant- en logit-analyse, en met matched- versus complete-set gezonde bedrijven, zijn er voor zestien regressies resultaten. Alle zestien modellen voorspellen significant (1%-niveau) beter dan een randommodel. De regressie modellen laten zien dat de beste voorspelling wordt behaald door de logit-regressies met gebruik van de complete set gezonde ondernemingen. In het beste model (model 4, logit, complete set) wordt een classificatie van 93% correcte voorspellingen behaald. In het slechtste model (model 1, discriminant, matched pairs) wordt een classificatie score van 72% behaald. De verschillen tussen de methoden is niet significant, het gebruik van de complete set gezonde ondernemingen ten opzichte van de matched pairs wel. In het beste model (93% correct) is de relatie tussen operationele lease-intensiteit en financiële moeilijkheden positief significant (5%), maar wordt het voorspelmodel niet significant beter ten opzichte van het model waar de operationele-leases niet in zitten (90% correct).

Op basis van voorgaande resultaten wordt de hypothese, dat ondernemingen in financiële problemen relatief meer operationele leaseverplichtingen hebben, bevestigd maar wordt de hypothese, dat de operationele leaseverplichtingen de accuratesse van de voorspelmodellen vergroot, verworpen.

## Deel V

In deel V wordt een samenvatting van elk deel gegeven en worden conclusies getrokken en aanbevelingen gedaan. De belangrijkste conclusies zijn:

- dat operationele leases wereldwijd een omvangrijke vorm van financiering zijn;
- dat zowel de activering op de balans (voorstel IASB/FASB), als de verwerking in de toelichting (huidige standaarden), voor- en tegenstanders heeft;
- dat de huidige internationale lease-accounting standaarden te weinig informatie vereisen, zodat de gebruiker van de jaarrekening niet goed in staat is om de leaseverplichtingen betrouwbaar en consistent te kapitaliseren;
- dat de leaseverplichtingen voor sommige ondernemingen dusdanig materieel zijn, dat het negeren van deze verplichtingen een financiële analyse onbetrouwbaar zou maken;
- dat in Nederland in ieder geval tot 2004 de lease accounting standaard bovendien slecht werd nageleefd en dat de wettelijke verplichting de standaard na te leven wenselijk is;
- dat de keuze om voor operationele lease te kiezen mede bepaald wordt door de mogelijkheid verplichtingen off-balance te brengen (accounting motieven) maar dat ook economische motieven een belangrijke rol spelen;
- dat faillissements-voorspelmodellen niet significant verbeteren door de inachtneming van operationele leases, hoewel ondernemingen in financiële problemen gemiddeld wel relatief meer operationele leases hebben dan gezonde ondernemingen.

Het doel van dit proefschrift was een bijdrage te leveren aan de discussie of alle leases op de balans gepassiveerd/geactiveerd-, danwel in de toelichting vermeld

dienen te worden. Op basis van de resultaten uit deel II kom ik tot de conclusie dat de huidige lease accounting standaard niet voldoet en de gebruiker van de jaarrekening voorziet van onvoldoende informatie over de operationele leaseverplichtingen. Mijn aanbeveling is dan ook dat de contante waarde van de operationele leaseverplichtingen vereist moet worden. Dit vergroot de transparantie van de informatie, is efficiënter voor de gebruiker van de jaarrekening die de verplichtingen voor zijn analyse wil kapitaliseren, voorkomt daarmee verkeerde schattingen en is bovendien meer in lijn met de informatie-vereisten van financiële lease waarbij ook de contante waarde vermeld dient te worden. Daarbij maakt het niet-naleven van de accounting standaard bij de Nederlandse ondernemingen de informatie nog minder betrouwbaar en transparant voor de gebruiker van de jaarrekening. De wettelijke verplichting de accounting standaarden te volgen (per 1 januari 2005) en wettelijk toezicht (per 31 december 2006) hierop is daarom noodzakelijk.

De resultaten van deel III en IV tonen aan dat het gebruik van operationele lease mede bepaald wordt door het off-balance kunnen brengen van verplichtingen, wat veelal als een dubieuze reden wordt aangedragen. Echter, ook de economische redenen voortvloeiende uit de aard van de transactie (geen juridisch en economisch eigendom) hebben een positieve relatie met de mate waarin een onderneming voor (operationele) leases kiest. En ondanks het feit dat de operationele leases vaak gekozen worden vanwege de verbetering van financiële ratios, zijn meer operationele leases geen voorbode van financiële problemen bij een onderneming.

Nu de IASB en de FASB zich in de nabije toekomst zullen buigen over een nieuwe opzet van de accounting standaard betreffende leasing, hoop ik met dit proefschrift een eerste aanzet te hebben gegeven voor een alternatief tussen twee uitersten. De discussie of rechten en verplichtingen uit langlopende overeenkomsten wel of niet op de balans opgenomen dienen te worden strekt zich namelijk veel verder uit dan alleen leasecontracten<sup>101</sup> (denk aan contracten waarbij een verplichting is aangegaan maar de prestaties nog niet geleverd zijn, zgn executory contracts) en zal daarom eerst gevoerd moeten worden. In de tussentijd is een aanpassing van de huidige standaard gewenst als het gaat om de betrouwbaarheid en transparantie van de informatie. Dit zal bovendien het negatieve imago van operationele lease als puur accounting instrument verbeteren.

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<sup>101</sup> De IASB (2000) maakt een onderscheid tussen lease-contracten en 'executory contracts's welke laatste zij wil uitsluiten van de nieuwe accounting standaard. Het gaat hier bijvoorbeeld om contracten waarbij de verplichting al wel is aangegaan maar de tegenprestatie nog niet is geleverd, of om service contracten. Reacties hierop zijn onder andere dat de IASB het ene arbitraire onderscheid (financiële versus operationele leases) inruilt voor een andere (leases versus executory contracts), British Bankers Association (2000) en Mullen (2000), beide reacties op het IASB-voorstel.



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