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What is the impact of the implementation of IFRS 16 on key financial leverage and profitability ratios for heavy users of operating lease capital as compared to light users of operating lease capital?

Name Student: Jordan Luijten
Student ID number: 448375

Supervisor: drs. K.D. Miljoen RA
Second assessor: drs. R. van der Wal RA

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Abstract

The purpose of this study is to investigate the ex-post impact of the implementation of IFRS 16 on key financial leverage and profitability ratios for heavy users of operating lease capital as compared to light users of operating lease capital. On an ex-ante basis, previous studies indicated important differences in impact between industries depending upon the level in which operating leases are used within the industry. Based on results of these previous studies, this thesis uses companies operating in the airline industry to represent heavy users whilst utilities companies represent the group of light users. In line with previous studies on the impact of IFRS 16, three key ratios are analyzed: two leverage ratios, the Interest Coverage and Debt to Total Assets, and one profitability ratio, Return on Assets. The study is unique in that previous studies performed have been done on an ex-ante basis while this study is done on an ex-post basis. The study thus contributes to the evaluation of the direction and magnitude of the impact of IFRS 16 on the selected key financial ratios.

The paper finds that for both leverage ratios studied the impact on the heavy user group differs significantly from the light user group. This lends credibility that IFRS 16 has addressed the distortion in the financial ratios studied between companies which do and companies which do not use off balance sheet leasing. However, there is no clear and statistically significant difference between the two user groups on the Return on Assets. This ratio, therefore does not seem to be directly related to the magnitude of the use of operating leases. Given the limited sample size, however, further investigation is recommended to widen both sample size and extending the analysis to other key financial ratios.

Chapter 1: Introduction

Leasing is an important source of funding for a number of companies, with leasing activities extending to all kinds of goods from equipment like machinery to laptops and from movables such as vehicles to immovables such as real estate. The current total annual leasing market is large, estimated at approximately USD 1 trillion worldwide by Gleeson (2017).

Accounting treatment of leases was very different under IAS 17, the predecessor of IFRS 16, depending whether it was classified as an operating lease or a finance lease. An operating lease was treated as a commitment that did not need to be reflected in the balance sheet by lessees whereas finance leases were treated as both an asset and a funding liability, which needed to be taken into the balance sheet. This difference in treatment led according to IASB (2016) to some 85% of the lease commitments in 2014 not being capitalized. The difference in treatment has led to a lot of discussion over the years and was resolved with the implementation of IFRS 16. Under this standard there is essentially no difference in the accounting treatment of operating and finance leases with both having to be taken into the balance sheet by lessees.

The introduction of IFRS 16 is expected to have a major impact when analyzing its consequences in line with agency theory. According to Eisenhardt (1989) who conducted a review of agency theory literature, agency theory is concerned with resolving problems that occur in agency relationships e.g. the relationship between managers and shareholders. Relating this to IFRS 16 and the capitalization of operating leases, the authors Imhoff et al (1991) stated that by avoiding capitalization of operating leases, managers improve their performance and leverage ratios compared to on balance sheet forms of financing. Imhoff et al based this upon a previous study by Imhoff & Thomas (1988), in which it was found that companies, in reaction to the adoption of SFAS13, increased operating leases at the expense of financial leases.

Along similar lines, Cornaggia et al (2013) predicted that new accounting standards requiring capitalisation of operating leases would have wide ranging impacts in terms of debt covenants, regulatory capital metrics and employee compensation. Their study found that the difference in treatment between operating and capital leases led to a distortion between companies which do and companies which do not use off balance sheet leasing. In their study key financial ratios, derived from the financial statements, underestimated risk and overstated the performance of firms, which relied heavily on off balance sheet leasing. In relation to the agency theory, the incentives for managers to increase off balance sheet operating leases at the expense of on balance sheet

financing can be viewed as problematic and not in the best interest of external shareholders, since performance and leverage ratios are widely used for decision analysis, executive compensation and debt covenants. Thus, the introduction of IFRS 16 is expected to provide a solution for this agency problem. Previous empirical studies of which are done an ex-ante basis have indicated important differences on the impact of IFRS 16 on key financial ratios between industries depending on the degree to which operating leases are used by the industry. This paper aims to extend these studies and the analysis conducted by Carnaggia et al (2013) by investigating the impact of the IFRS 16 implementation on two different groups of users, heavy users and light user of operating leases. The main research question which will be investigated is as follows:

What is the impact of the implementation of IFRS 16 on key financial leverage and profitability ratios for heavy users of operating lease capital as compared to light users of operating lease capital?

The risk and performance ratios, selected in this study, are consistent with the ratios analyzed in previous studies on the assessment of the impact of operating leasing. The selection consists of two specific financial leverage ratios and one profitability ratio. The leverage ratios selected are the Interest Coverage ratio defined as ratio of EBITDA to Interest Expense and the ratio of Debt to Total Assets. The profitability ratio selected is the Return on Assets defined as EBIT divided by the Total Assets.

Heavy users of lease capital are defined as companies where the lease intensity ratio -calculated as current year operating lease expense divided by total liabilities- is higher than 0.03. Light users are defined as companies with a lease intensity ratio equal or less than 0.01. Consistent with previous studies on operating lease intensity, this study chooses airline companies to represent heavy users of operating lease capital and utilities companies to represent light users of operating lease capital.

This investigation presents a great opportunity to add to existing literature on this topic as existing literature only investigates capitalizing operating leases on an ex-ante basis, prior to the actual implementation of IFRS 16. This investigation is conducted on an ex-post basis, thus being able to evaluate the actual impact of IFRS 16. By comparing the ex-post impact on a number of key financial ratios between two groups of users of operating leases, it will allow a more accurate view of which of the key

financial ratios are most impacted by the capitalization of the operating leases. It will thereby improve financial analysis and forecasting of these ratios.

The practical relevance of this study is that it will help users of financial statements understand the actual impact of IFRS 16 for industries which are heavy users of lease capital. The comparison between the two groups will also give an indication on the difference in impact between heavy and light users on key leverage and profitability ratios when IFRS 16 is not applied.

In Chapter 2 the main theoretical concepts will be discussed, which are relevant in answering the research question. It also contains the sub-questions and hypotheses to the central research question. Based upon the research methodology outlined in Chapter 3 and subsequent data gathering, the main results are presented in Chapter 4 and 5. These results are then summarized into main conclusions in Chapter 6 with suggestions for further research.

Chapter 2: Theoretical Framework

This chapter covers the review of previous literature in regard to the impact of capitalizing operating leases on companies. Additionally, this chapter addresses the sub-questions necessary to confront when answering the research question and formulates the hypotheses drawn from previous literature.

Lease accounting has been researched frequently as lease accounting has been the subject of hot debate well before the issuance of IFRS 16 in January 2016. Morais (2011) conducted a literature review of more than 80 papers on operating leases and categorized them in the following five areas: economic consequences of lease accounting standards, determinants of leases, lease valuation, value relevance of lease accounting standards and the impact of leases on financial ratios. The last category of study was selected as being particularly relevant to answer the research question of this paper. Studies on the impact of leases on financial ratios concentrate on estimation of specific financial ratios used in the industry as a result of the use of leasing. Key financial ratios in these studies are generally separated into two categories: performance ratios such as Return on Assets and risk/leverage ratios such as Interest Coverage ratio to EBITDA and Debt to Equity or Debt to Total Assets ratios. A number of the studies have attempted to estimate the expected impact of IFRS16 on these key financial ratios. To calculate these estimates two methods are used: the constructive method and the factor method. Barone, Birt & Moya (2014) note that the factor method is much simpler as compared to the constructive method. However, authors maintain that the factor method is rarely referred to in the literature and that its usage is mainly constrained to credit rating agencies.

Impact of operating leasing on Financial ratios

In the agency theory one of the relationships studied is between shareholders/ investors as principals and company managers as agents. Eisenhardt (1989) noted that two types of problems can occur in the principal-agent relationship. Problems due to difficulty in verification what the agent does and problems due to conflicting goals between the principal and the agent. In terms of conflicting goals, differences in interest can occur between the interests of shareholders and managers if reward structures do not match shareholders interest. In this respect, both Singh (2012) and Cornaggia et al (2013) in their studies noted the impact of key financial ratios on executive and employee compensation plans. The use of operating leases has important consequences for a number of these key financial ratios. In this context, Imhoff and

Thomas (1988) in their paper studied a significant increase in the use of operating leases compared to capital leases following the adopting of SFAS 13, which allowed operating lease obligations to be accounted for off balance sheet whereas capital leases needed to be recognised on the balance sheet as obligations. Referring to this study, Imhoff et al (1991) put forward that by using operating leases, managers were trying to improving leverage and profitability ratios of their companies and that public data bases did not routinely correct for this. Imhoff et al (1991) recommended therefore the usage of the constructive method to capitalize operational lease commitments for purposes of calculation of key financial leverage and profitability ratios. In the 1991 publication, authors mainly concentrated on the balance sheet impact of capitalizing the operating leases by taking McDonald's as an example and extending this to a sample of seven other companies. By using the constructive method, Imhoff et al (1991) showed the impact of capitalization of operating leases on widely used leverage ratios such as the Debt to Equity ratio. Imhoff et al (1997) extended this study in 1997 by also looking at the impact of capitalization of operating leases on a key profitability ratio: Return on Assets.

The constructive methodology consists of a calculation of the present value of the operating leases, using the information on these lease commitments disclosed in the notes of the annual accounts. With that information, the constructive method calculates for the operating leases both a lease commitment and a lease asset. Imhoff et al (1997) concluded that applying the constructive method clearly increased the leverage ratios. However, the impact on the return on asset was found to be ambiguous. This was due to two offsetting effects: an increase in profitability and a decrease in efficiency. In the study, Imhoff et al (1997) defined profitability as operating income divided by sales and efficiency was defined as sales divided by total assets.

Cornaggia et al (2013) studied the impact of off-balance sheet leasing from the perspective of the users of the financial statements, such as shareholders and banks. Authors argued that users, in calculation of key financial performance and risk ratios such as Debt to Total Assets and Return of Assets, should not rely on information readily obtained from the balance sheet and income statement. Like Imhoff et al (1991) authors concluded that the use of off-balance sheet leasing distorted the risk and performance ratios between companies which hardly use off balance sheet leasing and companies which rely heavily on off balance sheet financing. They therefore recommended that users, in calculation of above key financial ratios, carefully examine the disclosures on off balance sheet leasing. Cornaggia et al (2013) further predicted that implementation of new accounting standards (IFRS16) would have wide ranging

impacts in terms of debt covenants, regulatory capital metrics and employee compensation for companies, which were heavy users of off-balance sheet financing. These findings were in line with Singh (2012), who studied the impact of proposed changes in accounting standards by FASB and IASB to capitalize operating lease obligations. The study concentrated on restaurant and retail businesses as being heavy users of operating leases and was based upon of sample of 234 U.S. companies. Author noted that proposed changes would have a significant impact on key leverage and profitability ratios of these sectors and thereby would also have major implications on debt covenants, executive compensation plans, and lease versus buy decisions.

Selected papers studying the impact of IFRS 16

The study by Sacarin (2017) contained an analysis of the impact of applying IFRS 16 versus IAS 17 on key financial ratios. The study concluded that leverage ratios such as Debt to Equity and Debt to Total assets would be negatively impacted by the implementation of IFRS16. However, the impact on other key ratios such as the Interest Rate Coverage ratio, Return on Capital and Return on Equity could not be predicted beforehand. Impact of these ratios would be dependent upon specific circumstances of the company such as the lease portfolio, characteristics of the lease contracts and tax regulations.

Using the constructive method, Fito et al (2013) undertook an ex-ante analysis on the impact of IFRS16 on key financial ratios of different sectors of industry. Sectors identified by authors were energy, retail, real estate and technology with an overall expected increase as result of IFRS 16 in non-current liabilities of some 18%. A sample of 52 companies was studied over a three-year period. By comparing the estimates with reported numbers, they predicted in total an increase in Debt to Total Assets of some 4% whereas Return on Assets was estimated to decrease with 17%. However, they noted a difference in impact by sector and found that sector of industry is a determinant factor for the impact of IFRS 16. The sector expected to be mostly heavily impacted by IFRS 16 was retail services (which included air transportation).

Building upon this, Diaz & Zamora- Ramirez (2018) expanded the analysis of the estimated impact of IFRS 16 by industry sector by using a mixture of the constructive and factor method for capitalization of operating leases. A sample of 646 European listed companies was used to analyze the financial statements for operating leases reported at the end of 2015. For each of the sectors authors calculated a lease intensity ratio, defined as current operating lease expense divided over total liabilities. Based

upon this ratio, the four sectors with the highest lease intensity were identified as retail, hotels, transportation and commercial. The four sectors with the lowest lease intensity were identified as banks and insurance, real estate, household products and the utility sector. Authors concluded that the magnitude of the impact on key financial ratios depended upon the sector in which the company operates and they predicted significant difference in impact of IFRS 16 between the sectors.

Key financial ratios studied by the authors were Return on Assets, Interest Coverage ratio and two leverage ratios, Debt to Equity and Debt to Total Assets. For the four sectors with the highest lease intensity, authors predicted that that implementation of IFRS 16 would lead to a decrease in Interest Coverage of between 13% to 25% and an increase of Debt to Total Assets of between 12% to 23%. For the four sectors with lowest lease intensity, the estimated impact of IFRS was much lower with only between 0% to 5% decrease in Interest Coverage and between 0% to 5% increase in Debt to Total Assets. Contrary to Fito, et al (2013), however, their finding on impact of lease accounting on the Return on Assets was inconclusive for all sectors and not statistically significant.

Deloitte (2016) undertook an empirical study on the impact of IFRS 16 for Dutch listed companies. In the publication, the impact of IFRS 16 was investigated on two main ratios being the leverage and value ratios. The leverage ratio defined as the ratio of Net Debt to EBITDA and value ratio defined as the Ratio of Enterprise Value to EBITDA. Although authors did not define operating lease usage, their analysis, in line with Diaz & Zamora- Ramirez (2018), also pointed to the transportation sector being one of the sectors most impacted by IFRS 16 in terms of both Net Debt and EBITDA.

Selection of key financial profitability and leverage ratios

The risk and performance ratios, selected in this study, are consistent with the ratios analyzed in previous studies on the impact of leasing (Cornaggia et al 2013, Imhoff 1991,1997, Sacarin, 2017 and Diaz & Zamora-Ramirez, 2018). The selection consists of two specific financial leverage ratios and one profitability ratio. The leverage ratios selected are the Interest Coverage ratio defined as ratio of EBITDA to Interest Expense and the ratio of Debt to Total Assets. The profitability ratio selected is the Return on Assets defined as EBIT divided by the Total Assets.

Selection of heavy and light users of operating leases

In line with the study of Diaz & Zamora-Ramirez (2018), lease intensity- calculated as current year operating lease expense divided by total liabilities- is used to distinguish

between heavy and light users of lease capital. Heavy users of lease capital are then defined as companies where this ratio is higher than 0.03. Light users are defined as companies with a ratio of equal or less than 0.01. Based upon the outcome of Deloitte (2015) and Diaz & Zamora-Ramirez (2018), the airline industry was selected as an example of a heavy user and the utility sector was selected as a light user.

Sub-questions and Hypotheses

In order to answer the main research question, sub-questions will be formulated for each of the selected key financial ratios to assess the impact of IFRS 16, comparing the impact of the heavy user group of operating leases with the light user group. Additionally, using the literature review of chapter 2, hypotheses have been formulated with the objective of answering the stated sub-questions.

Interest Coverage ratio

The first sub-question, needed to answer the research question, relates to the Interest Coverage ratio as a key ratio used in assessment of risk/leverage:

What is the impact of the implementation IFRS 16 on the Interest Coverage Ratio for heavy users of operating lease capital as compared to light users of operating lease capital?

The study by Sacarin (2017) found the Interest Coverage ratio in general to be undetermined as under IFRS 16 both EBITDA and interest expense will increase. However, Diaz & Zamora- Ramirez (2018) concluded that Interest Coverage will be negatively impacted for industries with high usage of operating leases. From above studies following hypotheses are derived:

H_1: *The implementation of IFRS 16 has negatively affected the Interest Coverage ratio for heavy users of operating lease capital.*
H_2: *The implementation of IFRS 16 has no impact on the Interest Coverage ratio for light users of operating lease capital.*

Investigating the first and second hypothesis will clarify the difference in impact of capitalizing operating leases on the Interest Coverage ratio for both heavy and light users of operating lease capital.

Debt to Total Assets

The second sub-question, needed to answer the research question, concerns the leverage ratio of Debt to Total Assets as the second key financial risk/leverage ratio:

What is the impact of the implementation IFRS 16 on the Debt to Total Assets ratio for heavy users of operating lease capital as compared to light users of operating lease capital?

The authors Diaz & Zamora- Ramirez (2018) found in their study that capitalizing operating leases increased the Debt to Total Assets ratio of companies for any use of operating leases above zero. However, the degree to which the Debt to Total Assets ratio increased, did vary depending upon the operating lease intensity of the sector of industry. Based upon above study, hypotheses three and four are as follows:

H_3: *The implementation of IFRS 16 has increased the leverage ratio of Debt to Total Assets for heavy users of operating lease capital.*
H_4: *The implementation of IFRS 16 has increased the leverage ratio of Debt to Total Assets for light users of operating lease capital.*

Investigating the third and fourth hypothesis will clarify the difference, if any, in impact of IFRS16 on the Debt to Total Assets ratio for both heavy and light users of operating lease capital.

Return on Assets

The last set of sub-questions needed to answer the research question relate to the Return on Assets ratio, defined as EBIT divided by Total Assets:

What is the impact of the implementation IFRS 16 on the Return on Assets ratio for heavy users of operating lease capital as compared to light users of operating lease capital?

Fito et al (2013) found that the Return on Assets is negative for sectors with high usage of operating leases. However, Diaz & Zamora-Ramirez (2018) did not find a clear relationship between Return on Assets and the operating lease intensity of the sector of industry. Sacarin (2017) concluded that the impact of the implementation of IFRS 16 on the Return on Assets is not clear and depends upon company specific

circumstances. Given that current study is based upon listed Western European companies like the study performed by Diaz & Zamora- Ramirez (2018), the following hypotheses were derived:

H_5: *The implementation of IFRS 16 has no impact on the Return of Assets for heavy users of operating lease capital*
H_6: *The implementation of IFRS 16 has no impact on the Return of Assets for light users of operating lease capital*

Investigating the fifth and sixth hypothesis will clarify if there is a difference in impact of IFRS16 on the Return on Assets ratio between heavy and light users of operating lease capital.

Having stated the sub-questions and related hypotheses, the next chapter covers the research methodology undertaken in this study.

Chapter 3: Research methodology

In this chapter the research methodology, used to answer the sub-questions, is detailed in various subsections. Firstly, the approach to sampling is discussed. Secondly, the definitions of the data collected are detailed and the approach to data gathering clarified. Lastly, the statistical tools used for analysis are specified.

3.1 Population and sampling

The purpose of the study was to determine, for three specific financial ratios, the impact of IFRS 16 for heavy and light users of operating lease capital. The study was therefore done as a cross-sectional study with the target population being West- European listed companies. Methodology applied was to obtain a sample of ten companies for one sector of industry, representing heavy users of operating leasing and ten companies of another sector of industry, representing light users. Based upon the outcome of the studies by Diaz & Zamora-Ramirez (2018), the airline industry was selected as industry of high usage of operating leases and the utility industry as the industry with low usage of operating leases.

The time period selected depended upon the time of implementation by the company of IFRS 16 and the way the impact of IFRS 16 was detailed. When transitioning from IAS 17 to IFRS 16, companies detailed the impact of IFRS 16 in one of two ways. The first approach was to revise the prior year actuals and showing the impact of the implementation of IFRS 16 in the year prior. The second approach was to create an impact statement on the current year of reporting.

For the selection of the sample Orbis data base was used. The selection criteria are summarized in *table 3.1.1* below.

Table 3.1.1 industry selection criteria

Search Criteria	Airline Industry	Utility Industry
World region	Western Europe	Western Europe
Listed/Unlisted companies	Public listed companies	Publicly listed companies
NACE Rev. 2, core code	511 – Passenger air transport	3511 – Utility
Results (Total population of companies)	22	90

The utility industry list contained a large amount of companies with very small turnover. In order to ensure a representative sample, this list was cut off for companies with revenues lower than 1 billion euros, which reduced the list to 33 companies.
In order to ensure a representative sample of the whole region, the population was sorted by country name and company name. These were then divided in samples of 3 groups out of which respectively 3 or 4 names were drawn until 10 names for each industry were secured. If the information needed was not provided by the company in their annual account, a new name was drawn from the sample the company was assigned to. Appendix 1 and 2 provide a list of the selected airline and utility companies from their respective populations.

3.2 Data gathering and calculation

The three key financial ratios used to assess the impact of the implementation of IFRS 16 on heavy users were selected in line with the study of Diaz & Zamora-Ramirez (2018). The key financial ratios include the Interest Coverage ratio, Debt to Total Assets ratio and the Return on Assets ratio.
In order to calculate these ratios, the following definitions were used and information was collected for every company accordingly:

Annual interest cost – Taken as stated in Profit & Loss statement (P&L) section of the annual report
Operating income – Defined as EBIT deducting any items indicated by the sampled company as non-recurrent
EBITDA – Calculated by taking the operating income and adding the depreciation and amortization from the P&L section of the annual report.
Debt – Calculated using the balance sheet section of the annual report. In principle classification used by the company was followed, whereby both long- and short-term debt at book year end was added.
Equity – calculated using the Balance sheet section of the annual report. Classification used by the company in their report was followed.
Assets – This was defined as all the long-term assets plus net working capital, deducting provisions and other long-term liabilities which were not classified as debt by the company. The total of this needed to equal the total financing by Debt and Equity at year end.
Interest Coverage ratio – this was calculated by dividing EBITDA through the interest costs.

Debt to Total Assets – this was calculated by dividing the Debt at year end by the Assets at year end.

Return on Assets – Calculated by dividing the Operating Income of the year by the Assets at year end. Diaz & Zamora- Ramirez (2018) noted that authors do not calculate this ratio in a consistent manner, with a number of authors including interest in their calculation and mixture of using year end numbers and averages. Consistent with the approach of Diaz & Zamora- Ramirez (2018) interest has been excluded. Given that the impact of IFRS 16 was only given at one year end for the majority of the companies, it was not possible to calculate an average for the Assets, including the IFRS 16 impact for both years. In this study therefore assets are taken as at year end of the year the IFRS impact was shown by the sampled companies.

3.4 Data analysis

For each of the above defined financial ratios, two data points were created for the data gathered. The two data points are as follows:

- Actual prior to IFRS 16 implementation, actuals excluding the impact of the IFRS 16 implementation.
- Actual after IFRS 16 implementation, the actual financial ratios calculated including the impact of IFRS 16.

Concerning the calculation of the actual after IFRS 16 implementation, three companies reported estimates rather than actuals in the impact statement of IFRS 16. These estimates have been used as proxy for actuals.

Based upon the research methodology and data collection outlined in this section, the main results will be discussed in Chapter 4, followed by the statistical analysis in Chapter 5.

Chapter 4. Results

Following the questions as detailed in Chapter 2, this chapter will give an overview of the impact on the sampled heavy users and light users of operating leases with respect to the three financial ratios as defined in Chapter 3. In sections 4.1 - 4.3, a comparison is made between heavy and light users for each financial ratio. To make comparison between heavy and light users possible a simple and weighted average is calculated for each of the financial ratios. The simple average is simply the average of the ratios of the sample. The weighted sample is calculated by adding all underlying financials of the sampled companies together and then calculating the ratios of the total. It does take the relative size into account of the company selected in the sample and thus gives a better reflection of the total impact on the sample of heavy versus light users than the simple average.

4.1 Interest Coverage Ratio: EBITDA/Interest Expense

This section compares the impact of IFRS 16 on heavy users detailed in Table 4.1.1 with the impact on light users in table 4.1.2 for the Interest Coverage ratio: EBITDA divided by interest expense.

Compared to light users, the impact of the application of IFRS 16 has been profound on the Interest Coverage ratio for heavy users leading to an average worsening of this ratio of around 65% compared to only 1.2 % for the light user sample. Heavy users reporting the biggest impact are Finnair and Wizair which companies prior to application of IFRS 16 reported hardly any interest expense but post implementation showed substantial interest on leases.

Smallest impact in the sample of heavy users was experienced by Lufthansa and Aegean. The impact on Aegean is even slightly positive as EBITDA improves more than the rise in interest expense.

In the sample of heavy users, Norwegian Airlines actually reported a negative EBITDA prior to IFRS 16, which became slightly positive post IFRS 16. Given this, it was decided to exclude Norwegian from the statistical analysis.

Table 4.1.1 Results heavy user industry Interest Coverage Ratio: EBITDA/interest expense

EBITDA/Interest Expense	Before	After	Impact %
IAG	27.10	11.58	-57%
KLM	16.44	9.05	-45%
Lufthansa	29.57	24.21	-18%
Finnair	20.03	4.01	-80%
Easy jet	23.26	16.25	-30%
SAS	5.68	0.33	-94%
Norwegian	-1.88	0.29	-115%
Wizair	95.78	6.01	-94%
Aegean	6.48	6.86	6%
Pegasus	7.38	4.70	-36%
Weighted average	17.74	6.26	-65%
Simple average	22.98	8.30	-64%

Table 4.1.2 Results light user industry Interest Coverage Ratio: EBITDA/interest expense

EBITDA/Interest expense	Before	After	Impact %
EVN	12,60	12,27	-2,6%
RWE	2,04	2,06	1,2%
Iberdrola	4,68	4,56	-2,6%
EDF	8,33	7,86	-5,6%
Drax	6,93	6,95	0,2%
Endesa	9,30	9,30	0,0%
Elia	6,54	6,50	-0,6%
Enel	3,67	3,67	0,2%
EON	2,23	2,30	3,1%
Terna	22,41	22,43	0,1%
Weighted average	4,38	4,33	-1,2%
Simple average	7,87	7,79	-1,1%

4.2 Debt to Total Assets

This section compares the impact of IFRS 16 on heavy users detailed in Table 4.2.1 with the impact on light users in table 4.2.2 for the Debt to Total Assets ratio.

The data suggest that the application of IFRS 16 has led to a worsening of the Debt to Total Assets ratio of around 22% on weighted basis for the heavy user sample compared to only 1.3% for the light user sample. The biggest impact on the heavy user sample observed was on Aegean and Wizair. Both companies prior to application of IFRS 16 reported hardly any debt. The smallest impact on the heavy users' sample observed was on Norwegian airlines as the company was already substantially indebted prior to the IFRS 16 implementation.

Table 4.2.1 Results heavy user sample Debt/Total assets

Debt/Total assets	Before	After	Impact %
IAG	62%	73%	17%
KLM	76%	85%	13%
Lufthansa	42%	48%	15%
Finnair	42%	67%	58%
Easy jet	43%	49%	12%
SAS	68%	84%	24%
Norwegian	95%	98%	2%
Wizair	2%	62%	3320%
Aegean	15%	62%	313%
Pegasus	67%	72%	7%
Weighted average	55%	67%	22%
Simple average	51%	70%	36%

Table 4.2.2 Results light user sample: Debt/Total assets

Debt/Total assets	Before	After	Impact %
EVN	29%	30%	2,6%
RWE	26%	27%	4,1%
Iberdrola	55%	55%	1,0%
EDF	58%	60%	2,4%
Drax	32%	33%	3,0%
Endesa	57%	57%	0,7%
Elia	60%	60%	0,6%
Enel	60%	60%	0,8%
EON	75%	75%	0,5%
Terna	66%	66%	0,0%
Weighted average	58%	59%	1,3%
Simple average	52%	53%	1,6%

4.3 Return on Assets

This section compares the impact of IFRS 16 on heavy users detailed in *table 4.3.1* with the impact on light users in *table 4.3.2* for the Return on Assets.

The application of IFRS 16 has led to a worsening of the Return on Assets ratio of around 6% for heavy users on weighted basis compared to 4.3 % for the light users. Biggest impact in the sample of heavy users is on Aegean and Wizair, which companies saw a substantial increase in lease assets and thereby worsening of the Return on Assets.

Norwegian Airlines EBIT changed to positive due to the IFRS 16 implementation. This data point will therefore be excluded in the statistical analysis.

Table 4.3.1 Results for heavy user sample Return on Assets (EBIT/Total assets)

EBIT/Assets	Before	After	Impact %
IAG	21%	18%	-15%
KLM	(25%)	(14%)	-45%
Lufthansa	18%	16%	-10%
Finnair	12%	9%	-19%
Easy jet	8%	8%	-2%
SAS	7%	6%	-20%
Norwegian	(11%)	7%	-169%
Wizair	19%	7%	-61%
Aegean	28%	14%	-50%
Pegasus	12%	12%	6%
Weighted average	12%	11%	-6%
Simple average	9%	8%	-5%

Table 4.3.2 Results for light user sample Return on Assets (EBIT/Total assets)

EBIT/Assets	Before	After	Impact %
EVN	6%	6%	-0,6%
RWE	1%	1%	8,4%
Iberdrola	6%	6%	1,3%
EDF	4%	3%	-18,0%
Drax	3%	3%	-0,9%
Endesa	9%	9%	-0,7%
Elia	5%	5%	-0,8%
Enel	6%	6%	-0,9%
EON	1%	2%	3,1%
Terna	9%	9%	0,0%
Weighted average	5%	5%	-4,3%
Simple average	5%	5%	-0,9%

The next chapter contains the results of the statistical analysis on the hypotheses formulated.

Chapter 5. Statistical analysis and testing of hypotheses

This chapter addresses the statistical analysis of the data collected. The chapter is structured in line with Chapter 2; it addresses the three key financial ratios, Interest Coverage ratio, Debt to Total Assets ratio and Return on Assets. The result of the statistical analysis for each ratio is discussed referring back to the expectations made in the hypotheses formulated.

5.1 Statistical analysis performed

Each of the 6 hypotheses was tested with the Wilcoxon signed-rank test. This test does not need the assumption of normal distribution and works well with relatively small sample sizes. A (two sided) *p* value lower than 0.05 was deemed statistically significant.

5.2. Interest Coverage ratio

5.2.1 Actual impact: Heavy users of operating leases

Figure 5.2.1 displays the result of a Wilcoxon signed-rank test that investigates whether there is a statistical difference between the EBITDA/interest expense before and after the implementation of IFRS 16. The null hypothesis for the test is as follows:

Median of EBITDA/Interest expense after - EBITDA/interest expense before = 0

Figure 5.2.1 states that the tests null hypothesis must be rejected. This means that statistically, Interest Coverage ratio worsened for the heavy users of operating leases with the implementation of IFRS 16.

Figure 5.2.1 Heavy user sample Wilcoxon signed-rank test Interest Coverage ratio results

		N	Mean Rank	Sum of Ranks
EBITDA/interest expense after - EBITDA/interest expense before	Negative ranks	8	5,50	44,00
	Positive ranks	1	1,00	1,00
	Ties	0		
	Total	9		

Test Statistics

	EBITDAinterestexpenseafter - EBITDAinterestexpensebefore
Z	-2,547
Asymp. Sig. (2 -tailed)	0,011

5.2.2 Actual Impact: Light users of operating leases

Like the sample of heavy users before, Wilcoxon signed-rank test is performed to test whether there is a statistical difference between the Interest Coverage ratio before and after the implementation of IFRS 16. The null hypothesis for the test is as follows:

Median of EBITDA/Interest expense after - Median of EBITDA/interest expense before = 0

Figure 5.2.2 displays the results of the test. However, unlike the test conducted on the sample of heavy users, this test provides ambiguous results. From *figure 5.2.2,* it cannot be stated that there is a statistically significant impact of IFRS 16 on Interest Coverage ratio for companies included in the sample of light users of operating leases. This results from the insignificance of the test statistic of *p=0.575*. Additionally, the first table does not indicate any clear result: 4 out of the 10 companies experienced a worsening of their Interest Coverage ratio, whilst the other 6 experienced an improvement. Concluding this test, the null hypothesis cannot be rejected.

Figure 5.2.2 Light users sample Wilcoxon signed-rank test Interest Coverage ratio results.

		N	Mean Rank	Sum of Ranks
EBITDA/interest expense after - EBITDA/interest expense before	Negative ranks	4	8,25	33,00
	Positive ranks	6	3,67	22,00
	Ties	0		
	Total	10		

Test Statistics

	EBITDAinterestexpenseafter - EBITDAinterestexpensebefore
Z	-0,561
Asymp. Sig. (2 -tailed)	0,575

5.2.3 Interest Coverage ratio: Hypotheses 1-2.

From the tests conducted in 5.2.1 and 5.2.2, it can be concluded that IFRS 16 has had an significant impact on the Interest Coverage ratio for the companies in the sample of heavy users of operating leases while there was no statistically significant impact for the light users.

H_1: *The implementation of IFRS 16 has decreased the Interest Coverage ratio for heavy users of operating lease capital.*

This hypothesis is accepted. The tests conducted support that the implementation of IFRS 16 has worsened the Interest Coverage ratio of heavy users of operating leases

H_2: *The implementation of IFRS 16 has no impact on the Interest Coverage ratio for light users of operating lease capital.*

This hypothesis is also accepted as the test preformed in section 5.2.2 cannot reject that the Interest Coverage ratio prior the implementation of IFRS 16 and after the implementation of IFRS 16 are the same.

5.3 Debt to Total Assets

5.3.1 Actual Impact: Heavy users of operating leases

A Wilcoxon signed-rank test was performed to test whether there is a statistically significant impact of IFRS 16 on the leverage ratio of the companies belonging to the sample of heavy users of operating leases. The results of the test are shown in *figure 5.3.1.* The Null hypothesis for this Wilcoxon test is as follows:

Median of Debt/Total assets after - Median of Debt/Total assets before = 0

From the first table *figure 5.3.1*, it can be concluded that the IFRS 16 implementation has had a statistically significant effect on debt financing. The direction of this effect is indicated in the first table of *figure 5.3.1.* It shows that all 9 companies experienced an increase of the leverage. The null hypothesis for the test must be rejected, there is a clear indication that heavy users of operating leases increased their leverage as a result of IFRS 16.

Figure 5.3.1 Heavy users Wilcoxon signed-rank test leverage ratio results

		N	Mean Rank	Sum of Ranks
Debt/total assets after – Debt/total assets before	Negative ranks	0	0,00	0,00
	Positive ranks	9	5,00	45,00
	Ties	0		
	Total	9		

Test Statistics

	Debt/total assets after – Debt/total assets before
Z	-2,666
Asymp. Sig. (2 -tailed)	0,008

5.3.2 Actual impact: Light Users of operating leases

The following Wilcoxon signed-rank test was run to investigate whether IFRS 16 has a statistical impact on the leverage ratio of the chosen companies belonging to the sample of light users. The null hypothesis for the test is as follows:

Median of Debt/Total assets after - Median of Debt/Total assets before = 0

Figure 5.3.2 displays the results of the test. The first table of *figure 5.3.2* shows that all 10 companies increased their leverage, thus indicating that the leverage ratio has increased as a result of IFRS 16 Implementation. Additionally, the second table of *figure 5.3.2* supports states that this observation is statistically significant, thus the test null hypothesis is rejected.

Figure 5.3.2 Light user sample Wilcoxon signed-rank test leverage ratio results.

		N	Mean Rank	Sum of Ranks
Debt/total assets after – Debt/total assets before	Negative ranks	0	0,00	0,00
	Positive ranks	10	5,00	55,00
	Ties	0		
	Total	10		

Test Statistics

	Debt/total assets after – Debt/total assets before
Z	-2,803
Asymp. Sig. (2 -tailed)	0,005

5.3.3 Debt to Total Assets ratio: Hypotheses 3-4

For both heavy and light users the increase in Debt to Total Assets ratios as reported in Chapter 4 is statistically significant. To summarize the study's investigation on the impact of IFRS 16 on the leverage ratio, the following can be stated.

H_3: *The implementation of IFRS 16 has increased the leverage ratio for heavy users of operating lease capital.*

The test conducted in *section 5.3.1* supports the view that the implementation of IFRS 16 increases the leverage ratio of heavy users of operating lease capital. Therefore, this hypothesis is accepted.

H_4: *The implementation of IFRS 16 has increased on the leverage ratio for light users of operating lease capital.*

The test conducted in *section 5.3.2* supports the view that the implementation of IFRS 16 increases the leverage ratio of light users of operating lease capital. Therefore, this hypothesis is accepted.

5.4 Return on Assets

5.4.1 Actual impact: Heavy users of operating leases

A Wilcoxon signed-rank test was conducted to test whether there was a statistically significant impact of IFRS 16 on the Return on Assets ratio of the companies in the sample of heavy users of operating lease capital. The results of the test are displayed in *figure 5.4.1* and the null hypothesis for the test is:

Median of EBIT/Total assets after - Median of EBIT/Total assets before = 0

As seen below in *figure 5.4.1,* the first table seems to indicate that the Return on Assets worsens with the introduction of IFRS 16 as 7 out of the 9 companies experienced negative ranks within the test. However, the results of this test are not statistically significant as indicated from the second table of *figures 5.4.1* as the *p=0.110*. This ultimately means that the test null hypothesis cannot be rejected.

Figure 5.4.1 Heavy user sample Wilcoxon signed-rank test Return on Assets results.

		N	Mean Rank	Sum of Ranks
EBIT/ Total Assets after – EBIT/ Total Assets Before	Negative ranks	7	5,14	36,00
	Positive ranks	2	4,50	9,00
	Ties	0		
	Total	9		

Test Statistics

	EBIT/ Total Assets after – EBIT/ Total Assets Before
Z	-1,599
Asymp. Sig. (2 -tailed)	0,110

5.4.2 Actual impact: Light users of operating leases

For the companies belonging to the sample of heavy users of operating leases a Wilcoxon signed-rank test was performed to investigate if there was a significant impact on the Return on Assets for companies in the sample of light users of operating lease capital. The null hypothesis for the test is as follows:

Median of EBIT/Total assets after - Median of EBIT/Total assets before = 0

The results of this test as shown in *figure 5.4.2* indicate similar results as those found for the sample of heavy users. As seen on the first table of *figure 5.4.2,* 7 out of the 10 companies experienced a worsening of the return of assets. However, this observation is not statistically significant, thus the tests null hypothesis cannot be rejected.

Figure 5.4.2 Light user sample Wilcoxon signed-rank test Return on Assets results.

		N	Mean Rank	Sum of Ranks
EBIT/ Total Assets after – EBIT/ Total Assets Before	Negative ranks	7	4,86	34,00
	Positive ranks	3	7,00	21,00
	Ties	0		
	Total	10		

Test Statistics

	EBIT/ Total Assets after – EBIT/ Total Assets Before
Z	-0,663
Asymp. Sig. (2 -tailed)	0,508

5.4.3 Return on Assets: Hypotheses 5-6

Although in Chapter 4 the Return on Assets was negative for both heavy and light users sampled, the difference in the ratio before and after IFRS 16 implementation was found not to be statistically significant for both user groups. From test results ran in *section 5.4*, the following can therefore be stated concerning the investigation on the impact of IFRS 16 on the Return on Assets ratio.

H_5: *The implementation of IFRS 16 has no impact on the return of assets for heavy users of operating lease capital*

In respect to heavy users of operating leases, the test conducted in *section 5.4.1* cannot reject that the return on asset ratio before and after the introduction of IFRS 16 are the same; Therefore, this hypothesis is accepted.

H_6: *The implementation of IFRS 16 has no impact on the return of assets for light users of operating lease capital*

The test conducted in *section 5.4.2* cannot reject that the return on asset ratio before and after the introduction of IFRS 16 are the same for light users of operating leases Therefore, this hypothesis is accepted.

Chapter 6. Conclusion and limitations

In this chapter, a brief summary will be given of the most important findings of the investigation regarding the impact of IFRS 16 on key financial profitability and leverage ratios of heavy and light users of operating leases. Additionally shortcomings and improvement for future research will be provided.

6.1 Conclusion

The impact of the implementation of IFRS 16 on three key financial leverage and profitability ratios was investigated being Interest Coverage, Debt to Total Assets and Return on Assets ratios. This study compared the impact of IFRS 16 on these ratios on an ex-post basis between heavy and light users of operating lease capital. Motivated by the findings of previous literature, this investigation used airline companies to represent heavy users of operating leases and utilities companies to represent light users of operating leases.

Interest Coverage ratio

This study found that there is a difference in the impact IFRS 16 has on heavy and light users of operating leases in respect to the Interest Coverage ratio. Heavy users experienced a significant negative impact of IFRS 16 on the Interest Coverage ratio with a decrease of some 65% on average, much larger than the ex-ante estimate of between 13-25% in the study of Diaz & Zamora- Ramirez (2018). Comparing this to the light users of operating lease capital, this investigation was unable to determine any significant impact of implementation of IFRS 16 on the Interest Coverage ratio.

Debt to Total Assets

This study found that there is a substantial difference in impact IFRS 16 has on heavy and light users of operating leases regarding the debt to total assets ratio. In line with the ex-ante study Diaz & Zamora- Ramirez (2018), the heavy user group experienced a significant negative impact on the Debt to Total Assets ratio of 22% while the light user group also experienced a significant negative impact but the negative impact was limited to 1.3% only on average.

Return on Assets

This study found that there is no substantial difference in impact of IFRS 16 between heavy and light users of operating leases regarding the return on assets ratio. The impact of IFRS 16 on both groups was undetermined and not significant.

In summary, for both leverage ratios studied the impact on the heavy user group differed significantly from the light user group. These findings confirm the study of Diaz & Zamora-Ramirez (2018) that lease intensity is a determinant factor for the impact of IFRS 16 on leverage ratios. It also lends credibility that IFRS 16 has addressed the distortion noted by Cornaggia et al (2013) in these financial ratios between companies which do and companies which do not use off balance sheet leasing. However, there was no clear and statistically significant difference between the two user groups on the Return on Assets. With respect to the Return on Assets, above study seems to confirm the statement of Sacarin (2017) that the impact is dependent upon specific circumstances of the company.

6.2 Limitations and suggestions for future research

There are various limitations to this paper:

Firstly, the airline and utility sectors were selected as being representative of heavy and light users of lease capital. While the actual data showed these sectors to fall within the criteria set in terms of lease intensity, it needs further investigation if these sectors represent the outcome of all sectors within these classifications.

Second shortcoming refers to the selection process and the representativeness of the sample. When selecting the companies within the sample, some companies had to be replaced due to the lack of relevant information within the annual reports stated by said companies. Additionally, one company was excluded from the statistical analysis leading to only 19 companies being included in the statistical analysis within this study. The relatively small sample size was mainly a result of the labor- intensive process of data collection and analysis of the annual reports necessary to determine the impact of IFRS 16.

Another limitation to the study is the disclosure by the companies on the actual impact of IFRS 16. Five of the ten utility companies reported the impact on the P&L in the year of introducing IFRS 16 but the impact of IFRS 16 on the balance sheet at year end of year prior. Four companies did not report depreciation impact and estimates for depreciation impact had to be made using the constructive method. This lack and mismatch of data might have led to mistakes in the measurement of the actual impact of IFRS 16.

Based upon the shortcomings of this study and the findings of this studies two suggestions are made for future research in this field.

The first suggestion is to expand the research to other sectors within and outside the ranges set for each of the heavy and light users of lease capital. This will answer the question whether findings of this study are representative for all sectors falling within each of the classifications

and what the impact of IFRS 16 is on companies falling in between heavy and light users of operating lease capital.

Above study is limited to only three financial ratios. Although these ratios are widely used, it is suggested to do further research on the impact on other financial ratios than the ones selected as part of this study.

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Appendix 1: Selection of airline companies

Referring back to Chapter 3, random selection within the 3 sub-groups.

Yellow highlight = Companies incorporated into study

Red highlight = Companies that were initially chosen but unable to use due to information constraints

	Country Code	*Rank by Operating Turnover*	*Company name*
Group 1	DE	1.	DEUTSCHE LUFTHANSA AG
	ES	3	INTERNATIONAL CONSOLIDATED AIRLINES GROUP S.A.
	FI	10.	FINNAIR OYJ
	FR	17.	COMPAGNIE AERIENNE INTER REGIONALE EXPRESS
	FR	19.	AIR MARINE S.A.
	FR	2.	KLM-AIR FRANCE
	GB	8.	DART GROUP PLC
Group 2	GB	9.	AIR BERLIN PLC
	GB	11.	WIZZ AIR HOLDINGS PLC
	GB	16.	GAMA AVIATION PLC
	GB	5.	EASYJET PLC
	GB	18.	DP AIRCRAFT I LIMITED
	GB	21.	B W A GROUP PLC
	GR	14.	AEGEAN
Group 3	IE	4.	RYANAIR HOLDINGS PUBLIC LIMITED COMPANY
	IS	13.	ICELANDAIR GROUP HF.
	NO	7.	NORWEGIAN AIR SHUTTLE ASA
	SE	20.	AVTECH SWEDEN AB (PUBL)
	SE	6.	SAS AB
	TR	22.	TURK HAVA YOLLARI ANONIM ORTAKLIGI
	TR	15.	CELEBI HAVA SERVISI A.S.
	TR	12.	PEGASUS HAVA TASIMACILIGI A.S

Appendix 2: Selection of utility companies

Referring back to Chapter 3, random selection within the 3 sub-groups. The table includes western utilities companies with operating turnover larger than 1 billion euros.

Yellow highlight = Companies incorporated into study

Red highlight = Companies that were initially chosen but unable to use due to information constraints

	Country code	Rank by Operating Turnover	Company Name
Group1	AT	16.	VERBUND AG
	AT	25.	EVN AG
	BE	24.	ELIA SYSTEM OPERATOR S.A
	CH	33.	ENERGIEDIENST HOLDING AG
	DE	3.	E.ON SE
	DE	4.	RWE AG
	DE	7.	ENBW ENERGIE BADEN-WURTTEMBERG AG
	DE	17.	MVV ENERGIE AG
	DE	18.	NORDEX SE
	DE	20.	ENERCITY AKTIENGESELLSCHAFT
Group 2	DE	22.	MAINOVA AKTIENGESELLSCHAFT
	DE	28.	LECHWERKE AG
	DK	10.	VESTAS WIND SYSTEMS A/S
	ES	5.	IBERDROLA, S.A.
	ES	6.	ENDESA, S.A.
	ES	21.	ELECNOR SA
	ES	26.	RED ELECTRICA CORPORACION, S.A.
	ES	27.	EDP RENOVAVEIS, S.A.
	ES	31.	AUDAX RENOVABLES S.A.
	FI	12.	FORTUM OYJ
	FR	2.	ELECTRICITE DE FRANCE
Group 3	GB	9.	SSE PLC
	GB	13.	DRAX GROUP PLC
	GB	30.	CONTOURGLOBAL PLC
	GB	32.	ATLANTICA YIELD PLC
	GR	14.	PUBLIC POWER CORPORATION S.A.
	IT	1.	ENEL SPA
	IT	11.	A2A S.P.A.
	IT	15.	IREN S.P.A.
	IT	19.	ACEA SPA
	IT	23.	TERNA S.P.A. - RETE ELETTRICA NAZIONALE
	PT	8.	EDP - ENERGIAS DE PORTUGAL, S.A.
	TR	29.	ZORLU ENERJI ELEKTRIK URETIM A.S.

Appendix 3: Data of selected airline companies

IAG EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	impact	After		before	Estimated	After	
EBITDA	4.932	997	5.929		4.932	917	5.849	
EBIT	3.678	255	3.933		3.678	176	3.854	
Interest expense	182	330	512		182	296	478	
Other provisions	13.805	-65	13.740					
Debt	11.140	5.195	16.335		11.140	5.304	16.444	
Equity	6.720	-550	6.170		6.720	-120	6.600	
Total assets	17.860	4.580	22.440		17.860	5.184	23.044	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	27,10		11,58	-57%	27,10		12,23	-55%
EBIT/Assets	0,21		0,18	-15%	0,21		0,17	-19%
Debt/Total assets	0,62		0,73	17%	0,62		0,71	14%
Debt/EBITDA	2,26		2,76	22%	2,26		2,81	24%

KLM EUR MLN	Actual impact				Constructive method estimate			
Year 2017	Before	impact	After		before	Estimated	After	
EBITDA	1.496	567	2.063		1.496	456	1.952	
EBIT	-939	170	-769		-939	70	-869	
Interest expense	91	137	228		91	-116	207	
Other provisions	1.468	439	1.907					
Debt	2.880	1.945	4.825		2.880	1.974	4.854	
Equity	927	-108	819		927	-45	882	
Total assets	3.807	1.837	5.644		3.807	1.928	5.735	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	16,44		9,05	-45%	16,44		9,44	-43%
EBIT/Assets	-0,25		-0,14	-45%	-0,25		-0,15	-39%
Debt/Total assets	0,76		0,85	13%	0,76		0,85	12%
Debt/EBITDA	1,93		2,34	21%	1,93		2,49	29%

LUFTHANSA EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	impact	After		before	Estimated	After	
EBITDA	4.701	432	5.133		4.701	511	5.212	
EBIT	2.897	31	2.928		2.897	89	2.986	
Interest expense	159	53	212		159	148	307	
Other provisions	7.259		7.259					
Debt	6.843	1.958	8.801		6.843	2.594	9.437	
Equity	9.573	6	9.567		9.573	59	9.514	
Total assets	16.416	1.951	18.367		16.416	2.535	18.951	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	29,57		24,21	-18%	29,57		16,98	-43%
EBIT/Assets	0,18		0,16	-10%	0,18		0,16	-11%
Debt/Total assets	0,42		0,48	15%	0,42		0,50	19%
Debt/EBITDA	1,46		1,71	18%	1,46		1,81	24%

FINNAIR EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	impact	After		Before	Estimated	After	
EBITDA	321	184	505		321	144	465	
EBIT	208	55	262		208	28	235	
Interest expense	16	110	126		16	47	63	
Other provisions	134	-13	121					
Debt	743	1.105	1.848		743	835	1.577	
Equity	1.022	-99	922		1.022	-19	1.003	
Total assets	1.765	1.005	2.770		1.765	816	2.580	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	20,03		4,01	-80%	20,03		7,42	-63%
EBIT/Assets	0,12		0,09	-19%	0,12		0,09	-22%
Debt/Total assets	0,42		0,67	58%	0,42		0,61	45%
Debt/EBITDA	2,32		3,66	58%	2,32		3,39	46%

EASYJET EUR MLN	Actual impact				Constructive method estimate			
Year 2019	Before	impact	After		Before	Estimated	After	
EBITDA	1.003	103	1.107		1.003	166	1.169	
EBIT	502	33	535		502	19	520	
Interest expense	43	25	68		43	29	73	
Other provisions	927	11	916					
Debt	2.748	590	3.338		2.748	465	3.214	
Equity	3.573	49	3.524		3.573	11	3.562	
Total assets	6.322	541	6.862		6.322	455	6.776	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	23,26		16,25	-30%	23,26		16,12	-31%
EBIT/Assets	0,08		0,08	-2%	0,08		0,08	-3%
Debt/Total assets	0,43		0,49	12%	0,43		0,47	9%
Debt/EBITDA	2,74		3,02	10%	2,74		2,75	0,35%

SAS AB EUR MLN	Actual impact				Constructive method estimate			
Year 2019	Before	impact	After		before	Estimated	After	
EBITDA	298	-245	53		298	375	674	
EBIT	113	65	178		113	65	178	
Interest expense	53	109	161		53	109	161	
Other provisions	391		391					
Debt	1.082	1.630	2.712		1.082	1.892	2.973	
Equity	515		515		515	-43	472	
Total assets	1.597	1.630	3.227		1.597	1.848	3.445	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	5,68		0,33	-94%	5,68		4,18	-26%
EBIT/Assets	0,07		0,06	-22%	0,07		0,05	-27%
Debt/Total assets	0,68		0,84	24%	0,68		0,86	27%
Debt/EBITDA	3,63		50,93	1305%	3,63		4,41	21,73%

NORWEGIAN EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	Impact	After		Before	impact	After	
EBITDA	-221	535	315		-221	429	208	
EBIT	-389	905	516		-389	59	-330	
Interest expense	117	975	1.092		117	102	219	
Other provisions	3.987		3.987					
Debt	3.409	3.310	6.718		3.409	2.982	6.391	
Equity	171		171		171	-43	128	
Total assets	3.579	3.310	6.889		3.579	2.939	6.519	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	(1,88)		0,29	-115%	(1,88)		0,95	-151%
EBIT/Assets	-0,11		0,07	-169%	-0,11		-0,05	-53%
Debt/Total assets	0,95		0,98	2%	0,95		0,98	3%
Debt/EBITDA	-15,46		21,34	-238%	-15,46		30,69	-299%

WIZAIR EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	Impact	After		Before	impact	After	
EBITDA	393	167	560		393	365	758	
EBIT	300	-77	223		300	63	363	
Interest expense	4	89	93		4	106	110	
Other provisions	154		154					
Debt	28	1.815	1.843		28	1.852	1.880	
Equity	1.528	-396	1.132		1.528	-42	1.486	
Total assets	1.556	1.418	2.974		1.556	1.809	3.366	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	95,78		6,01	-94%	95,78		6,91	-93%
EBIT/Assets	0,19		0,07	-61%	0,19		0,11	-44%
Debt/Total assets	0,02		0,62	3320%	0,02		0,56	2982%
Debt/EBITDA	0,07		3,29	4486%	0,07		2,48	3356%

AEGEAN EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	impact	After		Before	impact	After	
EBITDA	111	130	241		111	83	194	
EBIT	93	10	103		93	9	102	
Interest expense	17	18	35		17	15	32	
Other provisions	42		42					
Debt	49	400	449		49	226	275	
Equity	278		278		278	-5	273	
Total assets	327	400	727		327	221	548	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	6,48		6,86	6%	6,48		6,09	-6%
EBIT/Assets	0,28		0,14	-50%	0,28		0,19	-34%
Debt/Total assets	0,15		0,62	313%	0,15		0,50	235%
Debt/EBITDA	0,44		1,86	323%	0,44		1,41	222%

PEGASUS EUR MLN	Actual impact				Constructive method estimate			
Year 2019	Before	Impact	After		Before	impact	After	
EBITDA	668	-38	630		668	104	773	
EBIT	314	52	366		314	14	328	
Interest expense	90	44	134		90	23	113	
Other provisions	413		413					
Debt	1.784	315	2.100		1.784	346	2.130	
Equity	886	-55	832		886	-8	878	
Total assets	2.670	260	2.931		2.670	338	3.009	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	7,40		4,70	-37%	7,40		6,85	-8%
EBIT/Assets	0,12		0,12	6%	0,12		0,11	-7%
Debt/Total assets	0,67		0,72	7%	0,67		0,71	6%
Debt/EBITDA	2,67		3,33	25%	2,67		2,76	3%

Appendix 4: Data of selected utility companies

EVN EUR MLN	Actual impact				Constructive method estimate			
Year 2018	Before	impact	After		Before	impact	After	
	2019	2019	2019		2019	2019	2019	
EBITDA	626	6	632		626	1	627	
EBIT	402	2	404		402	-1	401	
Interest expense	-50	-2	-52		-50	0	-50	
Other provisions	1.153	-	1.153			-		
Debt	1.884	70	1.954		1.884	4	1.888	
Equity	4.552	-	4.552		4.552	-0	4.552	
Total assets	6.436	70	6.506		6.436	4	6.440	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	12,60		12,27	-3%	12,60		12,63	0,23%
EBIT/Assets	0,06		0,06	-1%	0,06		0,06	-0,22%
Debt/Total assets	0,29		0,30	3%	0,29		0,29	0,15%
Debt/EBITDA	3,01		3,09	3%	3,01		3,01	0,11%

RWE EUR MLN	Actual impact				constructive method estimate			
Year 2019	Before	impact	After		Before	impact	After	
P&L	2019	2019	2019		2019	2019	2019	
EBITDA	3.277	75	3.352		3.277	56	3.333	
EBIT	169	17	186		169	4	173	
Interest expense	-1.609	-17	-1.626		-1.609	-8	-1.617	
Other provisions	24.883	-	24.883			-		
Debt	6.230	353	6.583		6.230	468	6.698	
Equity	17.448	-	17.448		17.448	-3	17.445	
Total assets	23.678	353	24.031		23.678	464	24.142	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	2,04		2,06	1%	2,04		2,06	1%
EBIT/Assets	0,01		0,01	8%	0,01		0,01	1%
Debt/Total assets	0,26		0,27	4%	0,26		0,28	5%
Debt/EBITDA	1,90		1,96	3%	1,90		2,01	6%

IBERDROLA EUR MLN	Actual impact				constructive method estimate			
Year 2018	Before	impact	After		before	impact	After	
EBITDA	9.349	406	9.755		9.349	117	9.466	
EBIT	5.504	142	5.646		5.504	11	5.516	
Interest expense	-1.996	-142	-2.138		-1.996	-21	-2.017	
Other provisions	6.734	-	6.734			-		
Debt	53.365	1.204	54.569		53.365	1.276	54.641	
Equity	43.977	-	43.977		43.977	-9	43.967	
Total assets	97.342	1.204	98.546		97.342	1.266	98.608	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	4,68		4,56	-3%	4,68		4,69	0,22%
EBIT/Assets	0,06		0,06	1%	0,06		0,06	-1,08%
Debt/Total assets	0,55		0,55	1%	0,55		0,55	1,08%
Debt/EBITDA	5,71		5,59	-2%	5,71		5,77	1,13%

EDF EUR MLN	Actual impact				constructive method estimate			
Year 2018	Before	impact	After		before	impact	After	
EBITDA	14.288	-139	14.149		14.288	697	14.985	
EBIT	5.282	-799	4.483		5.282	35	5.317	
Interest expense	-1.716	-85	-1.801		-1.716	-60	-1.776	
Other provisions	120.683	-	120.683			-		
Debt	74.192	4.492	78.684		74.192	3.333	77.525	
Equity	52.646	-	52.646		52.646	-24	52.622	
Total assets	126.838	4.492	131.330		126.838	3.309	130.147	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	8,33		7,86	-6%	8,33		8,44	1,4%
EBIT/Assets	0,04		0,03	-18%	0,04		0,04	-1,9%
Debt/Total assets	0,58		0,60	2%	0,58		0,60	1,8%
Debt/EBITDA	5,19		5,56	7%	5,19		5,17	-0,4%

DRAX EUR MLN	Actual impact				constructive method estimate			
Year 2018	Before	impact	After		before	impact	After	
EBITDA	280	8	289		280	6	286	
EBIT	85	0	86		85	0	85	
Interest expense	-40	-1	-42		-40	-0	-41	
Other provisions	227	-	227			-		
Debt	928	42	969		928	-	928	
Equity	1.968	-	1.968		1.968	-	1.968	
Total assets	2.895	41	2.937		2.895	-	2.895	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	6,93		6,95	0,2%	6,93		7,06	1,8%
EBIT/Assets	0.03		0,029	-0,9%	0,029		0,029	0,1%
Debt/Total assets	0,32		0,33	3,0%	0,32		0,32	0,0%
Debt/EBITDA	3,31		3,36	1,5%	3,31		3,24	-1,9%

ENDESA EUR MLN	Actual impact				constructive method estimate			
Year 2019	Before	impact	After		before	impact	After	
EBITDA	1.757	38	1.795		1.757	28	1.785	
EBIT	1.759	4	1.763		1.759	2	1.761	
Interest expense	-189	-4	-193		-189	-3	-192	
Other provisions	253	-	253			-		
Debt	10.790	186	10.976		10.790	186	10.976	
Equity	8.209	-	8.209		8.209	-1	8.208	
Total assets	18.999	186	19.185		18.999	185	19.184	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	9,30		9,30	0,0%	9,30		9,29	-0,1%
EBIT/Assets	0,09		0,09	-0,7%	0,09		0,09	-0,9%
Debt/Total assets	0,57		0,57	0,7%	0,57		0,57	0,7%
Debt/EBITDA	6,14		6,11	-0,4%	6,14		6,15	0,1%

ELIA EUR MLN	Actual impact				constructive method estimate			
	Before	impact	After		before	Estimated	After	
EBITDA	937	8	944		937	13	950	
EBIT	569	1	570		569	0	569	
Interest expense	-143	-2	-145		-143	-1	-144	
Other provisions	419	-	419			-		
Debt	6.530	96	6.625		6.530	38	6.568	
Equity	4.332	-	4.332		4.332	-0	4.332	
Total assets	10.862	96	10.957		10.862	38	10.899	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	6,54		6,50	-1%	6,54		6,60	0,9%
EBIT/Assets	0,05		0,05	-1%	0,05		0,05	-0,3%
Debt/Total assets	0,60		0,60	1%	0,60		0,60	0,2%

ENEL EUR MLN	Actual impact				constructive method estimate			
Year 2018	Before	impact	After		before	Estimated	After	
EBITDA	16.560	224	16.784		16.560	218	16.778	
EBIT	6.878	21	6.899		6.878	18	6.896	
Interest expense	-4.518	-54	-4.572		-4.518	-33	-4.551	
Other provisions	22.223	-	22.223			-		
Debt	69.100	1.372	70.472		69.100	2.011	71.111	
Equity	46.938	-	46.938		46.938	-15	46.923	
Total assets	116.038	1.372	117.410		116.038	1.996	118.034	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	3,67		3,67	0%	3,67		3,69	1%
EBIT/Assets	0,06		0,06	-1%	0,06		0,06	-1%
Debt/Total assets	0,60		0,60	1%	0,60		0,60	1%
Debt/EBITDA	4,17		4,20	1%	4,17		4,24	2%

E.ON EUR MLN	Actual impact				constructive method estimate			
Year 2019	Before	impact	After		before	Impact	After	
EBITDA	3.712	141	3.853		3.712	97	3.809	
EBIT	761	36	797		761	174	935	
Interest expense	-1.666	-11	-1.677		-1.666	-8	-1.674	
Other provisions	24.688	-	24.688			-		
Debt	39.063	824	39.887		39.063	463	39.526	
Equity	13.083	2	13.085		13.083	-	13.083	
Total assets	52.146	826	52.972		52.146	463	52.609	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	2,23		2,30	3%	2,23		2,27	2%
EBIT/Assets	0,01		0,02	3%	0,01		0,02	22%
Debt/Total assets	0,75		0,75	1%	0,75		0,75	0%
Debt/EBITDA	10,52		10,35	-2%	10,52		10,38	-1%

TERNA Euro mln	Actual impact				constructive method estimate			
Year 2018	Before	impact	After	Comparability Index	before	Estimated	After	Comparability Index
EBITDA	1.741	6	1.747		1.741	2	1.743	
EBIT	1.077	2	1.079		1.077	0	1.078	
Interest expense	-78	-0	-78		-78	-0	-78	
Other provisions	-	-	-			-		
Debt	8.259	21	8.280		8.259	21	8.280	
Equity	4.190	7	4.197		4.190	-0	4.190	
Total assets	12.449	29	12.478		12.449	20	12.469	
Ratios	Before		After	Comparability Index	Before		After	Comparability Index
EBITDA/Interest expense	22,41		22,43	0,09%	22,41		22,34	-0,30%
EBIT/Assets	0,09		0,09	-0,04%	0,09		0,09	-0,15%
Debt/Total assets	0,66		0,66	0,03%	0,66		0,66	0,08%
Debt/EBITDA	4,74		4,74	-0,09%	4,74		4,75	0,11%