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The Impact of the Transition from IAS 17 to IFRS 16: Measuring the Effect of Operating Lease Capitalization on Financial Ratios of Euronext 500 companies

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## **Abstract**

On January 1<sup>st</sup> 2019, IFRS 16 replaced IAS 17. IAS 17 only allowed capitalization of assets and liabilities, arising from operating leases, on the balance sheet. IFRS 16 requires all leases to be capitalized to enhance inter-company comparisons. The transition impacts financial statements and financial ratios, which are used by market participants to assess a company's performance. The thesis aims to measure the impact of IFRS 16 on financial ratios. Earlier research measured the impact of capitalizing off-balance sheet leases by estimating the off-balance sheet lease assets and liabilities. We analyzed the 2019 financial statements of Euronext 500 companies on the pre- and post-IFRS 16 (current) assets, (current) liabilities, equity and net income. We observe the effect on five financial ratios: Debt-to-Assets ratio, Debt-to-Equity ratio, Return on Assets, Return on Equity and the current ratio. Results show that IFRS 16 significantly increases D/A and D/E, while ROA and the current ratio significantly decrease. ROE was not significantly affected. We also found that IFRS 16 had a significantly larger impact on the D/A and D/E ratio in the retail than in the utilities sector. Most financial ratios are significantly affected by the change in accounting standard. However, we found that the financial ratios were less impacted than previous research showed. Market participants should be aware of this significant impact when comparing pre- and post-IFRS 16 financial figures and ratios. Most ratios change because of a change in accounting standard, not because of an internal change at a company.

Keywords: IFRS 16, Off-balance sheet leases, Debt-to-Assets Ratio, Debt-to-Equity Ratio, Return on Assets, Return on Equity, current ratio, operating leases

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## **1. Introduction**

### **1.1 Background**

Leasing has become an increasingly popular form of capital investment for many companies (Kieso, Weygandt & Warfield, 2018). This should not be a surprise, because leasing offers multiple advantages such as protection against obsolescence and more flexibility as compared to other forms of financing. The IASB issued the final version of the new standard in 2016, which supersedes the old IAS 17 standard (IASB, 2016). IAS 17 only allowed lessees to capitalize finance leases on the financial statements. The new IFRS 16 standard, effective on 1<sup>st</sup> January 2019, states that all leases, whether they are operating or finance leases, should be capitalized. IFRS 16 makes an exception for low-value and short-term leases<sup>1</sup>. The new standard does not include significant changes for lessors. The motive of the new IFRS 16 standard was a need for change. With the former IAS 17 standard, the absence of operating lease capitalization on the financial statement meant that investors and other financial statement users were not able to compare financial statements between companies, because the amount of operating lease contracts significantly varied between companies and across sectors (IASB, 2016).

IFRS 16 requires that companies recognize a right-of-use asset for the lease asset and a lease liability that is equal to the present value of future lease payments (Kieso et al., 2018). IFRS 16 impacts the balance sheet by an increase in both assets and liabilities, because it requires that all leases should be capitalized. The change to IFRS 16 also impacts the income statement. Under IAS 17, companies only recognized a single line of lease expense (IASB, 2016). IFRS 16 distinguishes between interest expenses and depreciation expenses, which do not belong to the operating expenses. The impact of IFRS 16 on the cash flow statement is out of the scope of this study. The new standard impacts the financial statements and therefore the way at which several financial ratios are calculated. Regarding the impact on financial ratios, the impact of IFRS 16 seems to be most prominent in sectors like retail (PwC, 2016a). We attempt to evaluate whether these financial ratios significantly change following the adoption of IFRS 16.

### **1.2 Research problem, motivation and research objectives**

Financial ratios are important because they offer the basis for financial analysis, which is used by different financial statement users to assess whether or not a company is liquid, stable and profitable. This makes them important for stakeholders' decision-making. Beaver (1966) justifies financial ratio analysis by stating that it can predict potential business failure. Suppliers are mainly

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<sup>1</sup> Low-value leases are lease contracts in which the leased asset has a value of less than 5.000 USD. Short-term leases apply to leases with a lease term of less than 12 months.

interested in a company's ability to comply with short-term financial obligations, also referred as liquidity. Investors have to decide whether or not they want to invest in a company. They often invest for the long-term, which is why they are interested in a company's ability to comply with long-term financial obligations, also referred as leverage. Creditors are also interested in a company's capital structure. The higher the leverage, the more risk of default a company bears, which makes a creditor reluctant to grant capital.

It is important to determine whether or not IFRS 16 has a significant effect on financial ratios. The problem is that the impact of IFRS 16 could be overlooked, which leads financial statement users to wrongly interpret changes in ratios. This leads stakeholders to relate changes in ratios to what is happening at the company level, whereas these changes are actually caused by an external factor: a change in accounting standard. This study therefore aims to identify how these ratios are affected by IFRS 16 and whether these changes are significant or not. It also aims to warn financial statements users to not blindly compare ratios before and after the adoption of IFRS 16, but to take IFRS 16 into account when comparing ratios between different periods.

This study contributes to earlier research by introducing a complete new methodology to study the impact of off-balance sheet lease capitalization on financial ratios, caused by IFRS 16. Note that the impact of IFRS 16 is the same as the impact of operating lease capitalization, because IFRS 16 prescribes that operating leases should also be capitalized. These terms can therefore be used interchangeably. Imhoff et al. (1991) were the first to describe a method which aims to capitalize off-balance sheet operating leases and show the effects of this capitalization on financial ratios. This method, the constructive capitalization method, has been the most popular method for operating lease capitalization in other studies. The other method, the factor method, is less used in research.

Almost all studies on lease capitalization were published before the release of the full IFRS 16 standard in 2016. Morales-Diaz & Zamora-Ramírez (2018) were the first to study the impact of operating lease capitalization after the release of the full IFRS 16 standard. They brought in significant changes to the Imhoff et al. (1991) model as how to account for operating lease capitalization and its effects on financial ratios. They also used a relatively large sample relative to previous studies, analyzing a total of 646 European quoted companies across 24 sectors. Previous studies lacked such a large sample and mainly focused the analysis on one sector. The problem with these methods is that they are built on assumptions and estimates which are subject to error.

We completely depart from these methods. IFRS 16 prescribes two methods to restate prior year financial figures to enhance comparability between pre-IFRS 16 financial information and post-IFRS 16 financial information. The first method is the full retrospective approach, the second method is the modified retrospective approach (KPMG, 2018). Companies adopt one of these methods for restatement and to capitalize off-balance sheet operating leases. This opens up the way for research based on a new methodological approach: the impact of IFRS 16 can directly be observed with the use of these two transition methods. These transition methods not only change the financial figures on the financial statement, they also change the related financial ratios. The transition methods may be more accurate in measuring IFRS 16 impact than the earlier mentioned methods, because they are accurately adopted by teams of financial accounting experts and not built on assumptions. The 2019 annual reports are the first reports where the methods are adopted. Because of the fact that these annual reports are released in early 2020, research on IFRS 16 impact based on these methods can only be conducted as of early 2020. This study therefore contributes to earlier research by assessing the impact of IFRS 16 based on the latest methodological approach available. It is interesting to see if a change in methodology will change the impact of operating lease capitalization on financial ratios. This is important, because financial ratios play a major role in stakeholders' decision-making.

The results can be used to inform stakeholders that financial ratios may improve or worsen between the pre-IFRS 16 period before 2019 and the post-IFRS 16 period from 2019 onwards. These financial ratios may only improve or worsen because of the adoption of the new standard and not because of company-specific internal changes. If IFRS 16 does significantly impact financial ratios, the need to inform stakeholders will be even greater. The introduction mentions that the general aim of this research is to evaluate whether the new IFRS 16 standard, which introduces capitalization of off-balance sheet leases, will significantly impact financial ratios.

Therefore, the following research question was formulated:

*What is the impact of IFRS 16 on financial ratios?*

The financial ratios will be classified based on what they measure. The research will look at liquidity, leverage and profitability ratios. The research question also poses underlying issues. Therefore, a set of sub-questions has been formulated:

1. *Will there be a difference in IFRS 16 impact if we calculate leverage and profitability ratios in multiple ways?*

## 2. *Does IFRS 16 impact on financial ratios significantly differ per industry?*

### **1.3 Research Methodology**

This research consists of a theoretical framework and literature review, followed up by quantitative and statistical analysis of the data. For understanding the transitional impact from IAS 17 to IFRS 16, it is important to understand the two transition methods prescribed by IFRS 16: the full retrospective and the modified retrospective approach. Every company adopts on these methods. These methods will be discussed in the theoretical framework.

The literature review aims to analyze and summarize previous research in the field of operating lease capitalization and IFRS 16 impact. We use financial information from financial statements with and without the adoption of IFRS 16 to measure IFRS 16 impact on financial ratios. The financial ratios under consideration relate to a company's liquidity, leverage and profitability. The research investigates a total of five financial ratios. To retrieve the financial information, 2019 annual reports from companies belonging to the Euronext Europe 500 stock index are used. Not all Euronext quoted companies can be taken in the final sample for statistical analysis. These include companies who (1) chose for early IFRS 16 adoption, (2) do not include enough information about IFRS 16 impact, (3) have not published their 2019 annual report and (4) reported according to a 'different' reporting period. The dataset will give an overview of reported assets, liabilities, equity and net income and the resulting financial ratios with and without the impact of IFRS 16. Depending on the distribution of the data, we use parametric and non-parametric tests to assess whether or not IFRS 16 has a significant impact on financial ratios.

### **1.4 Thesis Outline**

The remainder of the research is structured as follows. The theoretical framework explains the two transitional approaches on which we base our research methodology: the full retrospective and the modified retrospective approach. The literature review presents, based on the existing literature, seven hypotheses that aim to support the research question. Subsequently, the data section presents a description of the data that is used to answer the research question and accompanying hypotheses. After the data section comes the methodology section, in which techniques used to analyze the data are described. The subsequent section represents the results and gives answers to the formulated hypotheses. The research ends with a conclusion, which answers the research question, and a discussion, which describes limitations as well as suggestions for future research.



## 2. Theoretical framework

### 2.1 Overview of the theoretical framework

The goal of the theoretical framework is to explain the two transitional methods that are used to restate financial information under IAS 17 to financial information under IFRS 16. We also give some benefits and drawbacks of these methods. Explaining these methods is important because they form the basis of our research methodology.

IFRS 16 prescribes two methods to restate prior-year financial information (KMPG, 2018):

- The full retrospective approach
- The modified retrospective approach

### 2.2 Full retrospective approach

The full retrospective approach restates financial figures as if IFRS 16 has always been applied. Because IFRS 16 is effective 1<sup>st</sup> January 2019, restatement of the financial figures usually means that the 2018 financial statements are restated. Sometimes the 2017 financial statements are also restated. Figure 1 shows the timeline that corresponds with changes that have to be made when applying the full retrospective approach. This approach also states that companies should adjust their equity balance at the beginning of the earliest period presented in the 2019 annual report. When 2018 and 2019 financial information are presented in the 2019 annual report, equity will be adjusted at 1<sup>st</sup> January 2018. The capitalization of operating leases under IFRS 16 mostly causes an increase in liabilities that is greater than the increase in assets. Therefore, equity decreases.<sup>2</sup>

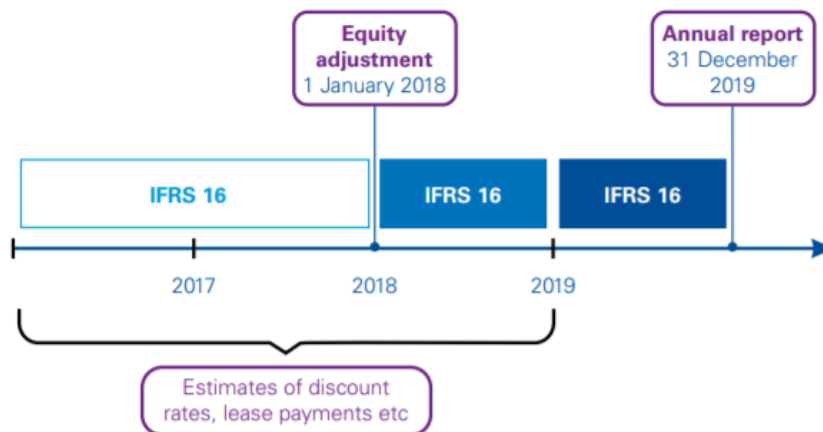


Figure 1: Timeline related to financial figure restatement under the full retrospective approach.

Source: KMPG, 2018 (p. 12)

<sup>2</sup> See the literature review (p. 10 and 11) for a detailed explanation.

Figure 2 shows how Ahold Delhaize reports IFRS 16 impact under the full retrospective approach. It shows the 2018 financial figures reported under IAS 17, the impact of IFRS 16 and the 2018 restated financial figures under IFRS 16. Ahold Delhaize chose to only restate 2018 financial information.

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**Consolidated balance sheet**

€ million	December 30, 2018, as reported	Effect of IFRS 16 adoption	December 30, 2018, restated
<b>Assets</b>			
Property, plant and equipment	11,147	(1,101)	10,046
Right-of-use asset	–	7,027	7,027
Investment property	629	334	963
Intangible assets	12,013	(200)	11,813
Investments in joint ventures and associates	236	(23)	213
Other non-current financial assets	238	398	636
Deferred tax assets	149	17	166
Other non-current assets	77	(29)	48
<b>Total non-current assets</b>	<b>24,489</b>	<b>6,423</b>	<b>30,912</b>

Figure 2: Ahold Delhaize reporting its non-current assets under the full retrospective approach.

Source: Ahold Delhaize, 2019 (p. 189).

## 2.2 Modified retrospective approach

The modified retrospective approach does not restate financial information in prior-years. This means that the 2019 annual report consist of 2019 financial figures presented under IFRS 16 and 2018 (and 2017) financial figures presented under IAS 17. See figure 3 for the timeline that corresponds with changes that have to be made when applying the modified retrospective approach.

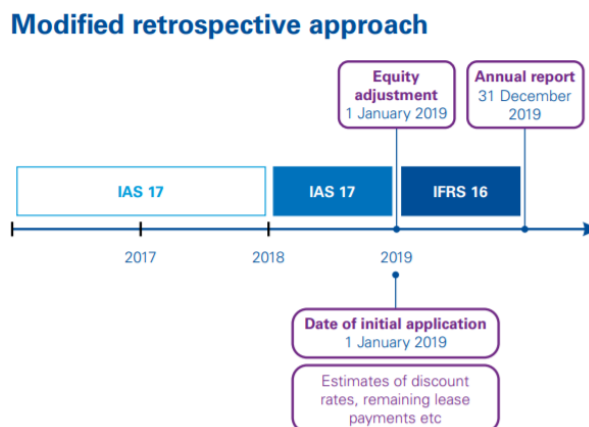


Figure 3: Timeline related to financial figure restatement under the modified retrospective approach.

Source: KMPG, 2018 (p. 14).

At 1<sup>st</sup> January 2019 an estimate of the remaining lease liability is made. The lease liability is determined by adjusting remaining lease payments at December 31<sup>st</sup>, 2018, which is presented under IAS 17, to the adjusted lease liability at December 31<sup>st</sup>, 2018 under IFRS 16. The adjusted lease liability at December 31<sup>st</sup>, 2018 is the same as the lease liability at January 1<sup>st</sup>, 2019. Figure 4 shows how Royal Dutch Shell makes these adjustments. For example, short-term leases (lease term less than 12 months) are excluded from the adjusted lease liability because they are exempted from IFRS 16 (as compared to IAS 17).

<b>Lease liabilities reconciliation</b>		\$ million
<b>Undiscounted future minimum lease payments under operating leases at December 31, 2018</b>		<b>24,219</b>
Impact of discounting		(5,167)
Leases not yet commenced at January 1, 2019		(2,586)
Short-term leases		(277)
Long-term leases expiring before December 31, 2019		(192)
Other reconciling items (net)		40
<b>Additional lease liability at January 1, 2019</b>		<b>16,037</b>
Finance lease liability at December 31, 2018		14,026
<b>Total lease liability at January 1, 2019</b>		<b>30,063</b>

Figure 4: Lease liability reconciliation from IAS 17 to IFRS 16 under the modified retrospective approach.

Source: Royal Dutch Shell, 2018 (p. 204).

IFRS 16 is not the only standard that prescribes these transition methods. IFRS 15 (– *Revenue from Contracts with Customers*) also uses these methods. A survey by PwC (2016b) on revenue recognition mentions some benefits and drawbacks of these methods. Because both IFRS 15 and IFRS 16 use the same methods, these benefits and drawbacks also apply for the transition methods under IFRS 16. Benefits of the full retrospective method include comparability of financial information between several years and therefore better relations with stakeholders (customers, creditors and investors). Drawbacks include a relatively high volume of data that needs to be restated. The full retrospective approach is therefore relatively time-intensive and costly. Companies need to determine if the benefits of increased comparability outweigh these drawbacks. Benefits of the modified retrospective approach include a relatively low volume of data that has to be restated. This method can be suitable when IFRS 16 does not bring significant changes to the financial statements. A major drawback is that comparable information has not been restated in the case when IFRS 16 does bring significant changes to the financial statements.

### **3. Literature review**

#### **3.1 Previous research**

The literature review has three goals. Firstly, it aims to establish what is already known about the impact of operating lease capitalization and IFRS 16 impact in particular. Secondly, it tries to identify research gaps and helps to identify the contribution that can be made by conducting further research. Thirdly, it assists in the hypothesis development of this research in conjunction with the concepts described in the theoretical framework. The first goal assists in reaching the second goal. By identifying what is already known, we can identify which research areas are still uncovered. Research papers used for the literature review mainly consist from a list of accounting journals provided by Locke & Lowe (2006). Because a lot of research papers were published before 2010, we decided to add some recent research papers (after 2015).

The first study on the impact of operating lease capitalization was conducted by Nelson (1963), who used a simplified version of the later developed constructive capitalization method by Imhoff, Lipe & Wright (1991) (hereafter ILW method). Nelson (1963) focused on the impact of lease capitalization on financial ratios in a sample of US companies. 15 ratios were investigated, including the current ratio, measured as the ratio of current assets to current liabilities, and the Debt-to-Equity (D/E) ratio. Ashton (1985) did the same, but used a sample of UK companies. Nelson (1963) concludes that comparisons between companies can actually not be made without lease capitalization, because they are inaccurate and misleading. Ashton's (1985) conclusion is the exact opposite. He states that lease capitalization does not significantly affect inter-firm comparisons.

So how does the ILW method work? The ILW method incorporates off-balance sheet assets and liabilities arising from operating leases to show the full impact of a company's leasing activities on the balance sheet and income statement (Imhoff et al., 1991). It requires an estimation of the magnitude of the assets and liabilities that would have been reported when operating leases had been treated as capital leases, which are always capitalized. IAS 17 requires a company to disclose financial information regarding future lease payments in the financial statement footnotes (Beattie, Edwards & Goodacre, 1998). This is where the method starts. The first step is to discount these future lease payments by using an appropriate interest rate and an estimate of the asset's remaining lease life.

The future lease payments, relating to operating leases, are disclosed in the financial statement footnotes. Companies have to disclose their operating lease commitments for three periods (figure 5). Figure 5 shows how Ahold Delhaize reports its future lease commitments. A clear distinction is made between the different time periods. Imhoff et al. (1991) discount the lump sum after the fifth year by assuming that the lease payment will be same for every year after the fifth year of the lease until the end of the lease term.

€ million	December 30, 2018	December 31, 2017
Within one year	1,210	1,153
Between one and five years	3,936	3,693
After five years	4,962	4,785
<b>Total</b>	<b>10,108</b>	<b>9,631</b>

Figure 5: Operating lease commitments as at december 31, 2018 and december 31, 2017.

Source: Ahold Delhaize, 2018 (p. 181)

Imhoff et al. (1991) explain the ILW method by introducing a case study of McDonald's Corporation, which includes key financial information from the financial statements as well as leasing information from the footnote. The result is that McDonald's liabilities increase by more than one-third of the total reported liabilities. The assets increase by about one tenth of total reported assets. The next section shows why the increase in total liabilities is essentially always greater than the increase in total assets.

The next step is to estimate the unrecorded asset. Imhoff et al. (1991) present the following three assumptions to do this:

1. Leased assets are depreciated with the straight-line depreciation method.
2. When the lease term starts, the unrecorded asset and unrecorded liability are the same. They are equal to the present value (PV) of the future lease payments.
3. When the lease term ends, the unrecorded asset and unrecorded liability are the same.

The PV of the (operating) lease asset is generally less than the PV of the unrecorded lease liability. Imhoff et al. (1991) state that in the early years of the lease term, the lease payments are mainly interest payments and that principal payments are relatively small. The decrease of the lease liability by principal payments is smaller than the amount at which the asset is depreciated. In later years, the lease payments are mainly principal payments and the interest payments are relatively small. However, until the lease term comes to an end, the unrecorded lease liability is greater than the unrecorded lease asset. As a result of lease capitalization, total liabilities increase more than

total assets, which should lead to a reduction in (shareholders') equity (Beattie et al., 1998; Giner, Merello & Pardo, 2019). However, this reduction in equity is, under IFRS 16, not expected to be significant (IASB, 2016). The last step of the ILW method is to calculate the unrecorded lease asset by multiplying the lease liability with an asset adjustment factor (Imhoff et al, 1991, 1993). The asset adjustment factor depends on:

- The average remaining life of the operating leases;
- the total estimated life of the operating leases and
- the interest rate.

The ILW method evaluates whether financial ratios, which are mainly derived from the balance sheet, significantly change as a result of lease capitalization. Liquidity and leverage ratios are examples of balance sheet ratios. Imhoff et al. (1991) do, however, wrongly assume that lease capitalization does not affect net income. Calculations of profitability ratios, such as Return on Equity (ROE) and Return on Assets (ROA) are calculated based on this assumption. In a later research paper, they found that net income does increase as a result of lease capitalization (Imhoff, Lipe and Wright, 1993). In a later research, ROE and ROA are calculated again based on these new findings (Imhoff, Lipe and Wright, 1997). Imhoff et al. (1991) select seven pairs of US companies in different sectors to measure the impact of operating lease capitalization. Each pair of companies were similar in size, measured by total assets, but only differed in the amount of operating lease contracts. Several assumptions were used;

- The interest rate is ten percent;
- the operating leases have a remaining life of 15 years
- and the lease asset is 70 percent of the lease liability.

These assumptions were then used for different sectors, with different interest rates, different remaining lives of operating leases and different adjustment factors. The assumptions are based on uniform values of all these variables for all companies and sectors. In reality, companies take on leasing contracts with varied lease terms (Beattie et al., 1998). Imhoff et al.'s (1991) study can be seen as the pioneering study of operating lease capitalization, since many studies thereafter used a research methodology that, albeit some adjustments, resembles the ILW method. Beattie et al. (1998) adapted the ILW method for the UK accounting and tax environment and added company-specific assumptions for a sample of 232 listed UK companies. The original ILW method failed in giving consistent and reasonable results. This means that every company or industry is

given their own average remaining life of operating leases, total estimated life of operating leases and interest rate.

Bennet & Bradbury (2003) adjust the ILW method using a sample of 38 New Zealand Stock Exchange companies. The original model is not suited for non-US firms due to differences in economic and institutional factors and differences in the variation of the interest rate. They also use another method, which uses a “rule of thumb” heuristic that calculates the unrecorded liability by multiplying the lease expense in the next period by eight. This method is also used by Imhoff et al. (1993) and is referred to as the “factor method”, which is widely used by credit analysts (Morales-Diaz & Zamora-Ramírez, 2018). Cheong, Davidson & Xu (2017) were the first to measure the impact of lease capitalization on Australian firms in the context of IFRS 16. They contribute to the refinement of the ILW method by improving the estimation of the lease liability after the fifth year. Imhoff et al. (1991) calculated the lease liability after the fifth year by assuming that the lump sum lease payments are evenly allocated over these years. Other authors assume a periodic reduction of these lease payments (Beattie et al., 1998; Bennett & Bradbury, 2003). Cheong et al. (2017) assume that the lease payments progressively decrease over the remaining years of the lease term after the fifth year.

Morales-Diaz & Zamora-Ramírez (2018) were the first to study the capitalization impact on financial ratios in the context of the full IFRS 16 standard. They make significant changes to the ILW method by using the average contract life disclosed in companies’ annual reports. Some studies used the 10% interest rate set by Imhoff et al. (1991) (Beattie et al., 1998; Bennet & Bradbury, 2003). However, Morales-Diaz & Zamora-Ramírez (2018) used interest rates that depend on a company’s credit ranking and the sector it operates in. Out of all studies, Morales-Diaz & Zamora-Ramírez (2018) used the largest sample, comprising of 646 European quoted companies across 24 sectors. They assumed that the lease asset is approximately 90% of the value of the lease liability, in contrast to the 70% used by Imhoff et al. (1991), 75% used by Imhoff et al. (1997) and the 81% used by Bennett and Bradbury (2003). Cheong et al. (2017), however, state that it is better to determine the asset adjustment factor per company as long as the remaining lease life, total lease life and interest rate are known for the particular company. Giner et al. (2019) use a methodology that completely departs from the ILW method by using the dynamic approach of Monte Carlo simulation. Monte Carlo simulation is used to predict values of relevant variables used to determine IFRS 16 impact on financial ratios. The result of this simulation are several likely scenarios of future values of the relevant variables. Until 2019, IFRS 16 impact, based on historical data, could only be researched by the use of the ILW method.

Because the 2019 annual reports of companies are released in 2020, the only alternative to measure IFRS 16 impact is to generate predictions about the future values of relevant variables. From this we can formulate a research gap; determining the impact of IFRS 16 on financial ratios using historical data and the two transition methods mentioned in the theoretical framework. Because 2019 annual reports of (nearly) all companies are available as of early 2020, we are able to fill this research gap. The change in methodology provides a contribution to the existing literature.

## **3.2 Hypothesis development**

### **3.2.1 Hypothesis 1**

Previous studies indicate that leverage ratios increase as a result of operating lease capitalization. An increase in the leverage ratio is not what a company wants, because it suggests that a company increasingly finances its growth and operations with debt. Bennet & Bradbury (2003) find an increase of 13.4% in the Debt-to-Assets (D/A) ratio across the whole sample. Lease capitalization caused the median D/A ratio to rise from 0.463 to 0.525. Morales-Diaz & Zamora-Ramírez (2018) and Giner et al. (2019) find increases in the median D/A ratio of respectively 10.8% and 4.1%. Morales-Diaz & Zamora-Ramírez (2018) were the only to find that this increase is statistically significant across the whole sample. If we measure leverage by dividing total liabilities by total assets, an increase in the ratio should not come as a surprise. As earlier mentioned, Imhoff et al. (1991) state that the decrease of the outstanding lease liability is smaller than the amount at which the asset is depreciated. This means that when off-balance sheet operating leases are capitalized, the recognized liabilities (the numerator) are greater than the recognized assets (the denominator), which leads to an increase in the D/A ratio. The question remains whether this increase is significant or not. The first hypothesis is therefore:

*Hypothesis 1: The adoption of IFRS 16 causes a significant increase in the D/A ratio.*

### **3.2.2 Hypothesis 2**

Previous research shows that the D/E ratio rises after including off-balance sheet assets and liabilities onto the balance sheet. Nelson (1963) shows that all eleven companies see a substantial increase in their D/E ratio. The McDonald's case study by Imhoff et al. (1991) shows a 30% increase in this ratio. The sample of seven matched pairs of companies shows that companies having a lot of operating lease contracts ("high lessees") see a larger increase in the D/E ratio than companies that do not have a lot of operating lease contracts ("low lessees"). The D/E ratio of "high lessees" increases 191%; the D/E ratio of "low lessees" increases (only) 47%. Cheong et al. (2017) report a statistically significant increase in the D/E ratio of 41.9%. Morales-Diaz &



Zamora-Ramirez (2018) also find a significant increase. The median D/E ratio before capitalization is 1.61; the median D/E ratio after capitalization is 2.18 (35.4% increase). If we calculate the leverage ratio by dividing total liabilities by total equity, we would expect the D/E ratio to increase. Total liabilities (the numerator) is the most affected financial figure by lease capitalization and increases the most. Total equity (the denominator) decreases slightly as a result of lease capitalization, because total liabilities increase more than total assets (Imhoff et al., 1991). We formulate the second hypothesis as follows:

*Hypothesis 2: The adoption of IFRS 16 causes a significant increase in the D/E ratio.*

### **3.2.3 Hypothesis 3**

The effect of lease capitalization on the ROA ratio is not clear-cut. Imhoff et al. (1991) show that “high lessees” experiences a 34% decline in ROA; “low lessees” experience a 10% decline. However, this study holds the assumption that net income is unaffected by lease capitalization. In another study, Imhoff et al. (1997) relax this assumption by stating that the effect on ROA is ambiguous, because the effect on net income is unclear. Beattie et al. (1998) find that ROA significantly decreases from 4.44% to 3.96% (10.8% decrease). Bennett & Bradbury (2003), Cheong et al. (2017) and Giner et al. (2019) find decreases of respectively 6.8%, 8.4% and 6.2%. However, they do not deliver evidence as to whether this decrease is significant. Only Morales-Diaz & Zamora-Ramirez (2018) find an increase in ROA as a result of lease capitalization: 4.4%. This increase is, however, not statistically significant. The transition from IAS 17 to IFRS 16 gives more clarity about the effect of operating lease capitalization on net income. Under IAS 17, all expenses relating to operating leases were included in the operating expenses (IASB, 2016). Under IFRS 16, these expenses are split into depreciation and interest expenses (see figure 6). Because interest expenses are excluded in the calculation of operating profit, operating profit increases. The transition to IFRS 16 and the capitalization of operating leases only causes a reallocation of expenses on the income statement. Total expenses under IFRS 16 and IAS 17 are the same, meaning that net income will not change. For the remainder of this research, we assume, unless otherwise stated, that net income will not change as a result of lease capitalization. If we assume that net income (the numerator) does not change as a result of IFRS 16, the ROA ratio will go down a result of lease capitalization. This is because total assets (the denominator) always increase when operating leases are capitalized. This leads us to the third hypothesis:

*Hypothesis 3: The adoption of IFRS 16 causes a significant decrease in the ROA ratio.*

	IAS 17 / Topic 840 / FASB model		IFRS 16
	Finance leases	Operating leases	All leases
Revenue	x	x	x
Operating costs (excluding depreciation and amortisation)	---	Single expense	---
EBITDA			↑↑
Depreciation and amortisation	Depreciation	---	Depreciation
Operating profit			↑
Finance costs	Interest	---	Interest
Profit before tax			↔

Figure 6: The treatment of operating lease expenses under IAS 17 and IFRS 16.

Source: IASB, 2016 (p. 4)

### 3.2.4 Hypothesis 4

Previous studies have shown that operating lease capitalization causes the ROE ratio to increase. Beattie et al. (1998) report a ROE of 7.94% before capitalization and a ROE of 8.32% after capitalization (4.8% increase). Cheong et al. (2017) find a much smaller increase: from 6.28% to 6.32% (0.6% increase). Giner et al. (2019) find a 4.1% increase in ROE. If net income (the numerator) does not change and equity (the denominator) decreases, we would expect the ROE ratio to increase. We therefore formulate the fourth hypothesis as follows:

*Hypothesis 4: The adoption of IFRS 16 causes a significant increase in the ROE ratio.*

### 3.2.5 Hypothesis 5

Several studies indicate that lease capitalization causes the current ratio to decrease. Nelson (1965) sees a decrease in the current ratio for each of the eleven investigated companies. Bennet & Bradbury (2003) report a 3.4% decline in the current ratio. The median current ratio decreases from 1.75 to 1.70. Giner et al. (2019), who investigate the impact in the context of IFRS 16, see the current ratio decrease with 12.3%. However, none of these studies tested whether this decrease is significant or not. A decrease in the current ratio makes sense, because the current assets (the numerator) are often not affected by lease capitalization (IASB, 2016; Nelson, 1965). This is because IFRS 16 does not allow short-term leases to be capitalized. Almost all newly recognized assets belong to the non-current assets. Because current liabilities (the denominator) do increase, the ratio falls. All formulas used to calculate the relevant financial ratios are included in the methodology section. We formulate the fifth hypothesis as follows:

*Hypothesis 5: The adoption of IFRS 16 causes a significant decrease in the current ratio.*

### **3.2.6 Hypotheses 6 & 7**

The impact of lease capitalization on financial ratios is not only studied on full samples of companies, but also on subsamples in which companies are classified according to the sector in which they operate. Beattie et al. (1998) focused on five different sectors. They found no significant impact on financial ratios in the mineral extraction and utility sectors. ROA and D/E were significantly affected in the other three sectors. ROA decreased from 3.96% to 3.60% in the consumer goods industry, decreased from 4.34% to 4.12% in the general industrial sector and decreased from 4.47% to 3.54% in the services sector. D/E increased from 1.23 to 1.48 in the consumer goods industry, increased from 1.10 to 1.29 in the general industrial sector and increased the most in the service sector. ROA and D/E are most affected in the service sector. ROE is only significantly affected in the services sector, increasing from 8.69% to 9.53%. Cheong et al. (2017) also find significant differences of financial ratio impact between various sector, the consumer goods sector being the most affected sector. In this sector, ROA increased from 8.75% to 9.98% and D/E increased from 54.34% to 85.40%. The mining sector was not significantly affected by lease capitalization. In both sectors, ROE was not significantly affected.

Morales-Diaz & Zamora-Ramírez (2018) find that the most impacted sectors are those who have the highest lease intensity. Lease intensity is measured by dividing lease expenses by total liabilities. The most lease intensive sectors are retail, hotels and transportation. D/A and D/E are significantly affected across all sectors. D/A is the most affected ratio In the retail sector; D/E is the most affected ratio in the hotel branch. Other sectors, for example utilities, experience far less impact from operating lease capitalization regarding the D/A and D/E ratio. Imhoff et al. (1991) provide a reason for the retail sector being so affected by lease capitalization. In the retail industry, rental payments are an important part of operating lease contracts. Rental payments are often based on sales. Because sales are volatile, rental payments also become volatile. Therefore, the retail sector is so affected when off-balance sheet leases are capitalized. The utility industry will not experience this effect because this industry does not have volatile sales and volatile rental payments. We therefore formulate the following hypotheses:

*Hypotheses 6: The impact of IFRS 16 on the D/A ratio is higher for the retail sector than for the utility sector.*

*Hypotheses 7: The impact of IFRS 16 on the D/E ratio is higher for the retail sector than for the utility sector.*

## 4. Data

### 4.1 Data source and data transformations

To study the impact of IFRS 16 on financial ratios, we use annual reports from the year 2019 of companies that are part of the Euronext 500 stock index. The Euronext 500 stock index tracks the performance of 500 European stocks. The ranking in the index is based on market capitalization. Market capitalization is calculated by multiplying a company's stock price by the number of stocks outstanding. Therefore, the company ranked first in the index has the highest market capitalization. The full sample consists of companies that are part of the index in March 2020<sup>3</sup>. The companies are grouped into nineteen sectors (figure 7) and are headquartered in fifteen countries.

Industries			
Automobiles & Parts	Financial Services	Media	Technology
Banks	Food & Beverage	Oil & Gas	Telecommunications
Basic Resources	Healthcare	Personal & Household Goods	Travel & Leisure
Chemicals	Industrial Goods & Services	Real Estate	Utilities
Construction & Materials	Insurance	Retail	

Figure 7: Industries to which the Euronext 500 constituents belong to.

We mainly use annual reports from 2019, because they provide information about the impact of IFRS 16 on balance sheet items and net income. Sometimes we also use 2018 annual reports if the 2019 annual reports do not report balance sheet items and net income prior to IFRS 16. From these annual reports, we extract the following independent variables: *Current Assets*, *Current Liabilities*, *Total Assets*, *Total Liabilities*, *Total Equity* and *Net Income*. Every independent variable is measured twice; one with IFRS 16 adoption on 31<sup>st</sup> December 2018 and one without IFRS 16 adoption on 31<sup>st</sup> December 2018. *Current Assets*, *Current Liabilities*, *Total Assets*, *Total Liabilities* and *Total Equity* are all measured on December 31<sup>st</sup> 2018. *Net Income* is measured for the year 2018, which begins on January 1<sup>st</sup> and ends on December 31<sup>st</sup>. The independent variables form the input for the dependent variables, which are the financial ratios. The following financial ratios are measured: *Debt-to-Assets Ratio*, *Debt-to-Equity Ratio*, *Return on Assets*, *Return on Equity* and *Current Ratio*.

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<sup>3</sup> The factsheet of the Euronext 500 stock index in March 2020 can be found at:  
[https://live.euronext.com/sites/default/files/documentation/index-factsheets/EU500\\_20200331.pdf](https://live.euronext.com/sites/default/files/documentation/index-factsheets/EU500_20200331.pdf)

To answer the research question and related hypotheses, we had to remove some companies from the sample for the following reasons:

- 225 companies were removed because they did not provide enough information about IFRS 16 impact on balance sheet items and net income to be included in the analysis. For example, Swiss companies are permitted, but not required to report under IFRS in their financial statements<sup>4</sup>. For some of these companies, no information about IFRS can be found, because they report under a different standard, in this case Swiss GAAP.
- 75 companies were removed because they did not report according to the reporting period used by the majority of companies in the sample. Most companies present their financial information for the year starting at January 1<sup>st</sup> and ending at December 31<sup>st</sup> of any given year. Companies adopting another reporting period were removed because they did not present IFRS 16 impact at December 31<sup>st</sup> 2018. Companies using a different reporting period report often for the year starting at July 1<sup>st</sup> and ending at June 30<sup>th</sup> or for the year starting at April 1<sup>st</sup> and ending at March 31<sup>st</sup>. These were mainly companies from the UK.
- 18 companies were removed because they chose to apply IFRS 16 early as of January 1<sup>st</sup> 2018. Because these companies restated only financial information before 2018, we cannot determine IFRS 16 impact on December 31<sup>st</sup> 2018.
- 4 companies were removed because the 2019 annual report of 2019 were not available.

This leads to a total of 178 companies whose annual reports can be used to assess whether IFRS 16 has a significant impact on financial ratios (figure 8). From these 178 companies, only 21 companies used the full retrospective approach.

<b>Sample selection</b>		Total
<b>Full sample</b>		500
	Less: companies whose annual report did not provide enough information to be included in the analysis	-225
	Less: companies presenting their financial information according to a 'different' reporting period	-75
	Less: companies that chose for early adoption of IFRS 16	-18
	Less: companies whose annual report 2019 is not available	-4
<b>Initial sample</b>		178

Figure 8: Sample selection of the companies that belong to the Euronext 500 stock index.

<sup>4</sup> More information on the use of IFRS standard per jurisdiction can be found at: <https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/>

To provide a better overview of the different sectors in our sample, we decided to merge certain sectors together that provide similar goods and services into one sector. We decided to merge the following sectors:

- *Banks, Financial Services* and *Insurance* are merged into one sector: *Financial Services*. All these sectors are related to each other, because they all offer financial products and services.
- *Chemicals, Construction & Materials, Industrial Goods & Services, Basic Resources* and *Oil & Gas* are merged into one sector: *Industrial Goods & Services*. All these sectors are related to each other, because their main operation is the conversion of raw materials in end products.
- *Personal & Household Goods* and *Retail* are merged into one sector: *Retail*. Many firms in the former sector also belong to the latter sector.
- *Technology* and *Telecommunications* are merged into one sector: *Technology & Telecommunications*. This is because telecommunications are also a form of technology.

This means that we now have 11 different sectors in our sample

#### **4.2 Data sample for hypotheses 1-4**

To arrive at the data sample for the first four hypotheses, 20 negative values for net income and equity were removed as well as 29 outliers. The final sample for these hypotheses amounts to 129 observations.

#### **4.3 Data sample for hypothesis 5**

To arrive at the data sample for the fifth hypothesis, we had to exclude 61 companies from the initial sample of 178 companies that did not provide information about IFRS 16 impact on current assets and current liabilities. These companies could therefore not be used to measure IFRS 16 impact on the current ratio at December 31<sup>st</sup> 2018. In addition, 9 outliers were removed. The final sample for the fifth hypothesis amounts to 108 observations.

#### **4.4 Data sample for hypotheses 6 & 7**

To arrive at the data sample for the sixth and seventh hypotheses, we created a subsample of companies that belong to the retail and utilities sector. The subsample initially amounted to 29 companies. We removed 1 outlier to arrive at a final sample of 28 observations. The amount of companies belonging to the retail sector is 15; the amount of companies belonging to the utilities sector is 13.

## 5. Methodology

To test the hypotheses and answer the research question, we use the following formulas to establish the relationship between the independent variables (financial figures) and dependent variables (financial ratios):

$$\text{Debt to Assets Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

$$\text{Debt to Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

$$\text{Return on Assets} = \left( \frac{\text{Net Income}}{\text{Total Assets}} \right) \times 100\%$$

$$\text{Return on Equity} = \left( \frac{\text{Net Income}}{\text{Total Equity}} \right) \times 100\%$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

For every company, we calculate each ratio twice; one without IFRS 16 adoption and one with IFRS 16 adoption. For companies using the full retrospective method, we extract the reported and restated financial figures at December 31<sup>st</sup> 2018. For example, Ahold Delhaize uses the full retrospective method because it reports balance sheet items before and after IFRS 16 on December 31<sup>st</sup> 2018 (figure 2), which is prior to the date at which IFRS 16 becomes mandatory (1<sup>st</sup> January 2019). Companies using the modified retrospective approach do not restate prior-year (2018 and earlier) financial information. They present the restated amount on the date at which IFRS 16 becomes mandatory. GN Store, a Danish manufacturer of hearing instruments, uses the modified retrospective approach when transitioning to IFRS 16. GN Store's financials at December 31<sup>st</sup> 2018 and for the year 2018 amount to the following numbers:

- *Current Assets:* 4,281
- *Current Liabilities:* 3,058
- *Total Assets:* 13,017
- *Total Liabilities:* 7,921<sup>5</sup> (= 4,863 + 3,058)
- *Total Equity:* 5,096
- *Net Income:* 1,247

All amounts are denoted in millions of Danish kroner.

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<sup>5</sup> Some companies do not explicitly report total liabilities, so we calculated them by using the following formula: total liabilities = current liabilities + non-current liabilities.

We chose not to convert the currency amounts of the financial figures to one common currency, because we do not compare financial figures between companies. Instead, we analyze financial ratios, which are not defined in currency amounts. Because GN Store Nord adopts the modified retrospective approach, the impact as of January 1 (2019) is shown (figure 9). The assumption we apply here is that all balance sheet amounts at the end of a financial year are equal to the balance sheet amounts at the beginning of the next financial year. For example, this means that *Current Assets* has the same balance at December 31<sup>st</sup> 2018 (the ending balance) as at January 1<sup>st</sup> 2019 (the beginning balance). We therefore assume that an impact as of January 1<sup>st</sup> (2019) is equal to an impact as of December 31<sup>st</sup> (2018). This means that the adjusted values for IFRS 16 can be calculated.

DKK million	Previous accounting policy	Effect of policy changes (IFRS 16)	New accounting policy
<b>Assets</b>			
Property, plant and equipment	514	527	1,041
<b>Total assets</b>	<b>13,017</b>	<b>527</b>	<b>13,544</b>
<b>Equity and Liabilities</b>			
<b>Equity</b>	<b>5,096</b>	<b>-</b>	<b>5,096</b>
Lease liabilities, non-current	-	389	389
Lease liabilities, current	-	138	138
<b>Total equity and liabilities</b>	<b>13,017</b>	<b>527</b>	<b>13,544</b>

Figure 9: The impact of IFRS 16 on GN Store's balance sheet items presented with the modified retrospective approach.

As mentioned in the hypothesis development, we assume net income to be unaffected by IFRS 16. This only holds for companies using the modified retrospective approach (like GN Store Nord). For companies using the full retrospective approach, we use net income for the year 2018 after IFRS 16. Holding net income constant for companies using the modified retrospective approach is a reasonable assumption. Most companies using the full retrospective approach see their net income increase or decrease with less than only one percent. For GN Store Nord, we calculate the adjusted balance sheet items (including IFRS 16) by adding the amounts stated in figure to the reported amounts at December 31<sup>st</sup> 2018 and for the year 2018. The restated financials at December 31<sup>st</sup> 2018 and for the year 2018 are as follows:

- *Current Assets*: 4,281 (remains the same)<sup>6</sup>

<sup>6</sup> Current assets often do not change, because the only adjustment to assets is caused by Property, plant and equipment, which is an item that belongs to the non-current assets.



- *Current Liabilities:* 3,196 (= 3,058 + 138)
- *Total Assets:* 13,544 (= 13,017 + 527)
- *Total Liabilities:* 8,448 (= 7,921 + 389 + 138)
- *Total Equity:* 5,096 (remains the same)<sup>7</sup>
- *Net Income:* 1,247 (remains the same)

We use this method for all companies using the modified retrospective approach. The next step is to calculate all financial ratios before and after IFRS 16. Then we determine if the financial ratios significantly increase or decrease a result of IFRS 16. With all hypotheses, we will be comparing two samples. These samples are not independent, because for every company or observation, we have paired data: a financial ratio before IFRS 16 and a financial ratio after IFRS 16. To answer the first five hypotheses, we either use a paired sample-test or Wilcoxon signed-rank test. Each of these two tests analyzes differences between the paired data. The choice for either test depends on the distribution of these differences. If the differences follow a Normal distribution, we use the paired sample t-test. If the differences significantly depart from a Normal distribution, we use the Wilcoxon signed-rank test. Because both tests define observations as differences between two sets of values, we create new variables. These define differences between the financial ratios before and after IFRS 16. For example, the variable *Difference Current Ratio* is calculated by subtracting the current ratio before IFRS 16 from the current ratio after IFRS 16. We created the following variables: *Difference D/A Ratio*, *Difference D/E Ratio*, *Difference ROA*, *Difference ROE* and *Difference Current Ratio*.

For the sixth and seventh hypothesis, we created a subsample that only consists of companies that belong to the retail and utilities sector. With these hypotheses, we test if IFRS 16 has a larger impact on the retail than on the utilities sector, when it comes to the D/A and D/E ratio. Hypothesis 6 uses the variable *Difference D/A ratio*; hypothesis 7 uses the variable *Difference D/E ratio*. The hypotheses test if the differences are significantly larger for the retail than for the utilities sector. Depending on the distribution of these differences, we either use the parametric two sample t-test or the non-parametric Wilcoxon rank-sum test (or: Mann-Whitney U Test). All hypotheses relate to significant decreases or increases in a financial ratio as a result of IFRS 16 adoption, which leads to the fact that all statistical tests are one-sided. Testing significance is done by using a significance level of 0.05.

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<sup>7</sup> Equity remains the same, because the increase in total assets due to IFRS 16 is the same as the increase in total liabilities.

## 6. Results

### 6.1 Assumption testing

Before heading to the results, we verify whether the data for each hypothesis fulfills the assumptions of the statistical test that is used to answer the hypotheses. Assumption testing allows us to draw correct conclusions from the chosen research method. In this section, we go over the most important assumption of the paired-sample t-test and two sample t-test. The most important assumption is that the differences between the paired data (here the financial ratios before and after IFRS 16) follow a Normal distribution. To test for normality, we use the Shapiro-Wilk test to assess if these differences follow a Normal distribution. The null hypothesis states that the differences between the financial ratios before and after IFRS 16 follow a Normal distribution. The alternative hypothesis states that these differences significantly depart from a Normal distribution. To check for normality using the Shapiro-Wilk test, we created new variables to highlight the differences between financial ratios before and after IFRS 16 (see methodology section). Results of the Shapiro-Wilk test are given in table A1. The differences of the financial ratios relating to the first five hypotheses all significantly depart from a Normal distribution. This means that we will use the Wilcoxon signed-rank test for these hypotheses. For the sixth and seventh hypothesis, we test whether the differences in D/A and D/E ratio for both the retail and utilities sector follow a Normal distribution. Table A1 shows that all differences significantly depart from a Normal distribution; all p-values are lower than our significance level (0.05). This means that these hypotheses will be tested with the Wilcoxon rank-sum test.

### 6.2 Hypothesis testing

#### 6.2.1 Hypothesis 1

The first hypothesis was formulated as follows:

*Hypothesis 1: The adoption of IFRS 16 causes a significant increase in the D/A ratio.*

In order to test the hypothesis, two D/A ratios were calculated for each company: the D/A ratio before IFRS 16 and the D/A ratio after IFRS 16. The Shapiro-Wilk test showed that the differences in the D/A ratio before and after IFRS 16 significantly departure from a Normal distribution. A Wilcoxon signed-rank test indicated that the D/A ratio after IFRS 16 ( $Mdn = 0.61$ ) was significantly higher than the D/A ratio before IFRS 16 ( $Mdn = 0.60$ ),  $Z = 8.17$ ,  $p = < .001$ . Table A2 shows an increase in the median D/A ratio of 1.67%. The relative small increase in median D/A ratio may come as a surprise, because table 1 shows that the increase in total liabilities is almost twice as large as the increase in total assets. Based on these results we find enough evidence to reject the

null hypothesis. IFRS 16 significantly affects the D/A ratio in our sample. An overview of the results of the first five hypotheses is given in table A2.

*Table 1: Mean percentual change ( $\Delta\%$ ) total assets, total liabilities, total equity and net income as a result of IFRS 16 adoption ( $n = 129$ ).*

<b>Financial figure</b>	<b><math>\Delta\%</math></b>
<b>Total assets</b>	2.94
<b>Total liabilities</b>	5.53
<b>Total equity</b>	-0.13
<b>Net income</b>	-0.14

### **6.2.2 Hypothesis 2**

The second hypothesis was formulated as follows:

*Hypothesis 2: The adoption of IFRS 16 causes a significant increase in the D/E ratio.*

In order to test the hypothesis, two D/E ratios were calculated for each company: the D/E ratio before IFRS 16 and the D/E ratio after IFRS 16. We used the Wilcoxon-signed rank test, based on the non-Normal distribution of the data. The Wilcoxon signed-rank test showed that the D/E ratio after IFRS 16 ( $Mdn = 1.60$ ) was significantly higher than the D/E ratio before IFRS 16 ( $Mdn = 1.49$ ),  $Z = 9.55$ ,  $p < .001$ . The median D/E ratio is more affected by IFRS 16 than the median D/A ratio. The difference between the recognized lease asset and lease liability is most often not very large, so equity slightly decreases (see also table 1). Because equity slightly decreases and liabilities increase, the D/E ratio will be more affected by IFRS 16 than the D/A ratio. Table A2 shows that the median D/E increases with 7.38%. The results suggest that we have enough evidence to reject the null hypothesis. IFRS 16 significantly affects the D/E ratio.

### **6.2.3 Hypothesis 3**

The third hypothesis is:

*Hypothesis 3: The adoption of IFRS 16 causes a significant decrease in the ROA ratio.*

We calculated two ROA ratios for each company: one before IFRS 16 and one after IFRS 16. The Wilcoxon signed-rank test indicated that ROA is significantly lower after IFRS 16 ( $Mdn = 0.05$ ) than before IFRS 16 ( $Mdn = 0.05$ ),  $Z = -4.94$ ,  $p < .001$ . The median before and after IFRS 16 remains the same, which suggests that IFRS 16 would not have a significant effect on ROA. However, the Wilcoxon signed-rank test is a rank test, not a median test.

Here, the results of the Wilcoxon signed-rank test show that IFRS 16 causes a significant decrease in ROA, even though the medians of the paired samples are the same. Table A2 shows that the median ROA does decrease as a result of IFRS 16. Again, we have enough evidence to reject the null hypothesis. The introduction of IFRS 16 has a significant impact on ROA.

#### **6.2.4 Hypothesis 4**

The fourth hypothesis was formulated as follows:

*Hypothesis 4: The adoption of IFRS 16 causes a significant increase in the ROE ratio.*

The impact of IFRS 16 on the ROE ratio is harder to predict. Table 1 shows that net income and equity both decrease, but only slightly. Earlier studies indicate that the effect on net income is unclear (Imhoff et al., 1997). We use the Wilcoxon signed-rank test to assess if ROE significantly increases as a result of IFRS 16. The test showed that ROE after IFRS 16 ( $Mdn = 0.14$ ) is not significantly higher than ROE before IFRS 16 ( $Mdn = 0.14$ ),  $Z = 0.91$ ,  $p = .183$ . Again, the medians are the same. We do not find a statistical significant increase in ROE as a result of IFRS 16. There is not enough evidence to reject the null hypothesis. The introduction of IFRS 16 has no significant impact on ROE.

#### **6.2.5 Hypothesis 5**

Hypothesis 5 was tested with another sample (108 observations) than the first four hypotheses (129 observations). This hypothesis was formulated as follows:

*Hypothesis 5: The adoption of IFRS 16 causes a significant decrease in the current ratio.*

We calculated two current ratios for each company: one before IFRS 16 and one after IFRS 16. Table 2 gives the mean percentual changes of current assets and current liabilities as a result of IFRS 16. The current assets almost do not change; the current liabilities increase on average with 2.60%. Current assets do often not change, because short-term leases of less than 12 months are exempted from capitalization under IFRS 16. On average, current assets even slightly decrease, because IFRS 16 sometimes causes reclassifications of assets from current assets to non-current assets. The Wilcoxon signed-rank test shows that the current ratio after IFRS 16 ( $Mdn = 1.23$ ) is significantly lower than the current ratio before IFRS 16 ( $Mdn = 1.20$ ),  $Z = -7.98$ ,  $p = < .001$ . The results of the Wilcoxon signed-rank test give enough evidence to reject the null hypothesis. IFRS 16 has a significant impact on the current ratio. Table A2 shows a decrease of the median current ratio of -2.44%.

Table 2: Mean percentual change ( $\Delta\%$ ) current assets and current liabilities as a result of IFRS 16 adoption ( $n = 108$ )

Financial figure	$\Delta\%$
Current assets	-0.08
Current liabilities	2.60

### 6.2.6 Hypothesis 6

Hypothesis 6 uses a subsample of the sample used for the first four hypothesis. This hypothesis only focuses on the retail and utilities sector. The subsample consisted of 15 companies belonging to the retail sector and 13 companies belonging to the utilities sector. The sixth hypothesis was:

*Hypotheses 6: The impact of IFRS 16 on the D/A ratio is higher for the retail sector than for the utility sector.*

The Wilcoxon rank-sum test indicated that the difference in D/A ratio as a result of IFRS 16 is significantly greater for the retail sector ( $Mdn = 0.06$ ) than for the utilities sector ( $Mdn = 0.01$ ),  $U = 29.0$ ,  $p < .001$ . Table 3 shows the mean percentual increases in total assets, total liabilities, total equity and the D/A and D/E ratios for both sectors. We see that the mean percentual increase in total assets, total liabilities and the D/A ratio was greater in the retail sector than in the utilities sector. We have enough evidence to reject the null hypothesis. The impact of IFRS 16 on the D/A ratio is higher for the retail sector than for the utilities sector. A possible reason for the higher impact of IFRS 16 on the D/A ratio in the retail sector than in the utilities sector can be found when looking at the assets. Looking at the increase in total assets between both sectors, we see that it is much higher for the retail sector than for utilities sector. This could be due to the fact that that the utilities already had a higher asset base than the retail sector. Lower asset bases (retail sector) may give higher percentual increases than higher asset bases (utilities). In fact, the mean percentual increase in the utilities sector is slightly negative. The results also suggests that the retail sector had a higher amount of operating lease contracts leading to off-balance sheet assets and liabilities than the utilities sector. An overview of the results of the sixth and seventh hypothesis is given in table 4.

Table 3: Mean percentual increases ( $\Delta\%$ ) in total assets, total liabilities, total equity and the D/A and D/E ratios for the retail and utilities sector

Sector	N	$\Delta\%$ Total Assets	$\Delta\%$ Total Liabilities	$\Delta\%$ Total Equity	$\Delta\%$ D/A	$\Delta\%$ D/E
Retail	15	14.07	29.30	-1.10	12.71	30.90
Utilities	13	-0.63	2.52	-0.21	4.13	2.76

### 6.2.7 Hypothesis 7

Hypothesis 7 was formulated as follows:

*Hypothesis 7: The impact of IFRS 16 on the D/E ratio is higher for the retail sector than for the utility sector.*

The Wilcoxon rank sum test indicated that the difference in D/E ratio as a result of IFRS 16 is (again) significantly greater for the retail sector ( $Mdn = 0.33$ ) than for the utilities sector ( $Mdn = 0.03$ ),  $U = 27.5$ ,  $p < .001$ . Table 3 provides extra information. For both sectors, total equity slightly decreases. However, total liabilities increase a lot more in the retail sector than in the utilities sector. We have enough evidence to reject the null hypothesis. The impact of IFRS 16 on the D/E ratio is higher for the retail sector than for the utilities sector. Why this result? Rental payments, which lead to lease liabilities under IFRS 16, are an important part of operating lease contracts in the retail sector (Imhoff et al., 1991). These payments are often based on sales. Rental payments are volatile, because sales are volatile. The retail sector is therefore more affected when balance sheet items are capitalized than other sectors. Other sectors, like utilities, do not experience this effect.

Table 4: Results of the Wilcoxon rank sum test for hypothesis 6 and 7.

Ratio	Variable	N	Median retail sector	Median utilities sector	Statistic (U)	P-value
D/A	Difference D/A ratio	129	0.06	0.01	29.0	.0005*
D/E	Difference D/E ratio	129	0.33	0.03	27.5	.0005*

\*Significant at the 0.05 level.

## 7. Conclusion

### 7.1 Summary of the results

We examined the impact of IFRS 16 on financial ratios by comparing the pre- and post-IFRS 16 financial ratios using the 2019 annual reports of Euronext 500 companies. Previous research focused on estimating the impact of IFRS 16. We do not use estimations. We use financial statements, which report IFRS 16 impact with either the full retrospective or modified retrospective approach. In order to answer the research question, we formulated seven hypotheses. For three ratios (D/A, D/E and the current ratio), we measured the pre- and post-IFRS 16 ratio levels at December 31<sup>st</sup> 2018. For the other two ratios, we measured the pre- and post-IFRS 16 ratio levels for the year 2018, because they are calculated using net income.

We found a significant increase in the D/A ratio. Table A2 shows an increase in the median D/A ratio of 1.67%. This is because total liabilities increase almost twice as much as total assets (table 1), which is in line with Imhoff et al.'s (1991) theory that the capitalized lease assets are generally always smaller than the lease liability. Bennett & Bradbury (2003) find a 13.4% increase while Giner et al. (2018) found an increase of only 4.1%. Morales-Diaz, J. & Zamora-Ramírez (2018) showed a significant increase in this ratio: 10.8%. We also found a significant increase in the D/E ratio. The median increase in the D/E ratio is 7.38%. Cheong et al. (2017) and Morales-Diaz & Zamora-Ramirez (2018) found significant increases of respectively 41.9% and 35.4%.

We found that IFRS 16 significantly worsens ROA. However, we found no change in the median ROA. Our significant finding may be the consequence of the fact that we held net income constant for most companies. The consequence is that the effect on ROA is determined by the effect on total assets. Because total assets increase, ROA decreases. ROA significantly decreases, but only slightly, so the effect is not seen in the median ROA. Other studies found higher decreases of 6.8%, 8.4% and 6.2% (Bennett & Bradbury (2003); Cheong et al. (2017); Giner et al. (2019)). Morales-Diaz & Zamora-Ramirez (2018) found a 4.4% increase, which was, however, not significant. The discrepancy in results may be caused by the fact that the effect on net income is unclear, as Imhoff et al. (1997) suggest.

We found no significant effect on ROE. This is not surprising, as net income was (most of the time) held constant, whereas equity only slightly decreased (table 1). Previous studies found increases. However, none of them was proved to be significant. IFRS 16 caused a significant worsening of the current ratio. We found a decrease in the median current ratio of 2.44% (table 2). Bennet & Bradbury (2003) report a 3.4% decline and Giner et al. (2019) even see a 12.3% decrease.

Current liabilities increase and current assets stay the same, because short-term lease contracts are exempted from capitalization under IFRS 16.

The results of the first five hypotheses can be used to answer the first sub-question. The first sub-question was formulated as follows: *Will there be a difference in IFRS 16 impact if we calculate leverage and profitability ratios in multiple ways?* We see that leverage worsens more when measured with the D/A ratio than measured with the D/E ratio. This is also what Morales-Diaz & Zamora-Ramirez (2018) found. We also see that ROA significantly decreases, whereas ROE is not significantly affected. This means that the performance of a company depends on the ratio it decides to report. For companies it is best to use the D/A ratio for leverage and ROE for profitability. These ratios tend to be less different between the pre- and post-IFRS 16 period than is the case with the D/E ratio and ROA. In the context of IFRS 16, the ratio choice determines the reported performance.

We use the results of the sixth and seventh hypothesis to answer the second sub-question. The second question was formulated as follows: *Does IFRS 16 impact on financial ratios significantly differ per industry?* Results suggest that the retail sector is more affected by IFRS 16 than the utilities sector, when it comes to the D/A and D/E ratio. The median difference in D/A for the retail sector was 0.06 (table 4). We found a median difference in D/A in the utilities sector of 0.01. For the D/E ratio, these differences amount to 0.33 and 0.03 respectively. Possible reasons for this difference in impact is that (1) the utilities sector has a higher asset base, (2) the retail sector is more characterized by operating lease contracts and (3) the retail sector is characterized by high volatility sales. Because rental payments (and therefore lease liabilities) depend on sales, we see that the D/E ratio is more affected in the retail sector than in the utilities sector. Morales-Diaz & Zamora-Ramirez (2018) performed the only study that extensively focused on impact differences of IFRS 16 between sectors. They found, by looking at ratios of lease expenses to lease liabilities, that retail was the most affected sector and that retail was significantly more affected than utilities.

We can conclude that IFRS 16 has a significant impact on most financial ratios. However, previous studies found higher impacts than we did. These differences are probably due to a difference in research methodology. Previous research made use of estimations of discount rates and remaining lease lives, which could have led to overestimations of the impact of lease capitalization on financial figures and financial ratios.



## **7.2 Practical implications**

The results suggests that, with the exception of ROE, IFRS 16 does have a significant effect on financial ratios. This would make the problem of overlooking the impact of IFRS 16 even greater. For example, investors who blindly compare financial ratios between the pre-IFRS 16 period and the post-IFRS 16 period may make investment decisions based on this 'unfair' comparison between pre- and post-IFRS 16 period. With its (mostly) significant results, this study aims to warns financial statement users not to blindly compare these periods. Changes in financial ratios between these periods are often not caused by what is happening at the company internally, but caused by an external factor: a change in accounting standard.

## **7.3 Research limitations**

The research has several limitations. The first limitation lies in the formulas that we used to calculate ROA an ROE. ROA is calculated by using the ratio of net income to total assets; ROE is calculated by using the ratio of net income to total equity. However, ROA is more accurately calculated by dividing net income by *average* total assets. ROE is more accurately calculated by dividing net income by *average* total equity. These formulas are more accurate, because they take into account that assets and equity can change over the year. Average total assets and equity can be calculated by measuring the total assets and total equity at January 1<sup>st</sup> and December 31<sup>st</sup> of any given year and divide them by two. Instead, for total assets and total equity, we used the reported and restated figures at 31<sup>st</sup> December 2018. The reason for using the first set of formulas is that the restated total assets and total equity on January 1<sup>st</sup> 2018 were not available for most companies in our sample. Only companies using the full retrospective approach report their total assets and total equity before and after IFRS 16 on these dates. The question is whether the results significantly change if we would have used different formulas for ROA and ROE. The second limitation is that for most companies in our sample, we had to restate the financial figures at 31<sup>st</sup> December 2018. We calculated the restated amounts by adding the impacts to the reported amounts at 31<sup>st</sup> December 2018. These calculations are subject to human error. The third limitation has to do with the sample size of hypothesis 6 and 7. The subsample amounts to 28 observations. Because we are comparing two samples, the retail sector (n=15) and utilities sector (n=13), the amount of observations in each sample is even lower. The low amount of observations causes a decrease in statistical power, which could lead to drawing incorrect conclusions. It also means that the conclusion may be based on findings we found by coincidence.

#### **7.4 Suggestions for further research**

Future research can focus on samples of companies that only use the full retrospective approach. This evades the second limitation, because we can then literally use the reported and restated amounts from the financial statements. Future research can include more years from the pre- and post-IFRS 16 period to see if the financial ratios are different between these periods. This research would make use of regression models with time series data, where we use the Chow break test to determine, for each financial ratio, if it is significantly different between both periods. We would make use of dummy variables to denote if a certain observation belongs to a certain period. If the ratios are significantly different between both periods, we have more evidence that we cannot compare pre- and post-IFRS 16 financial ratios without taking IFRS 16 into account.

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## Appendix

Table A1: Results of the Shapiro-Wilk normality test

Variable	Statistic (W)	df	Sig. (P)
Difference D/A Ratio	0.910	129	.000*
Difference D/E Ratio	0.901	129	.000*
Difference ROA	0.462	129	.000*
Difference ROE	0.298	129	.000*
Difference Current Ratio	0.941	108	.000*
Difference D/A Ratio Retail sector	0.863	15	.027*
Difference D/A Ratio Utilities sector	0.371	13	.000*
Difference D/E Ratio Retail sector	0.863	15	.027*
Difference D/E Ratio Utilities sector	0.746	13	.002*

\*Significant at the 0.05 level (one-tailed)

Table A2: Results of the Wilcoxon signed-rank test for hypothesis 1-5.

Ratio	Tested pair	N	Median before IFRS 16	Median after IFRS 16	$\Delta\%$ Median ratio	Statistic (W)	P-value
D/A	D/A after IFRS 16 – D/A before IFRS 16	129	0.60	0.61	1.67	8.17	.000*
D/E	D/E after IFRS 16 – D/E before IFRS 16	129	1.49	1.60	7.38	9.55	.000*
ROA	ROA after IFRS 16 – ROA before IFRS 16	129	0.05	0.05	0.00	-4.94	.000*
ROE	ROE after IFRS 16 – ROA before IFRS 16	129	0.14	0.14	0.00	0.905	.183
Current ratio	Current ratio after IFRS 16 – Current ratio before IFRS 16	108	1.23	1.20	-2.44	-7.976	.000*

\* Significant at the 0.05 level.