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The Effect of Capitalizing Operating Leases on Company Propensity to Lease

A quantitative study on the effects of IFRS 16 on Swedish firms

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Abstract

This study investigates whether firm propensity to lease has decreased after the implementation of IFRS 16. To answer this question, we use three cross-sectional regression models on data gathered from 90 Swedish firms in two-year intervals during 2015-2021. The firms were all listed on OMX Stockholm with their headquarters located in Sweden. Not in line with previous literature, our results cannot establish a link between higher degrees of to-be capitalized operating leases and a greater decrease in leasing after IFRS 16 implementation. Our lack of significant results could be due to differences between IFRS 16 and comparable regulation implementations which literature has previously analysed. There is however an indication of firms with higher degrees of operating leases pre-implementation, shifting to shorter leases that continue to be kept off-balance. Our study contributes by filling an established need for standard setters to evaluate the effects of IFRS 16, as well as helping practitioners who wish to understand more about the effects of the new leasing standard.

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Tutor: Katerina Hellström

Keywords: Leases, IFRS 16, Economic Consequences, Capitalization

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1. Introduction

1.1 Background

In 2005, the European Union required listed companies to report in accordance with IAS regulations (European Union, 2002). Ever since, European public firms have established their consolidated accounts following the IFRS standard. As of 2005, the effective standard for leasing was Internal Accounting Standard 17 (IAS 17), which prescribed the appropriate accounting policies for both lessees and lessors. IAS 17 divided leases into two categories, operating leases and finance leases based on the substance of the transaction. For lessees, operating leases were recognized as expenses on a straight-line bases, while finance leases recorded an asset and a liability on the balance sheet at commencement (IAS 17).

IAS 17 had previously been criticized because of the significant difference in accounting for finance leases and operating leases. This meant that two leases which were similar from an economic perspective could be accounted for "very differently" (IASB, 2016). The standard did not lead to sufficient comparability between companies which leased and those who did not, as well as between those who mainly had operating leases and those who had finance leases. IAS 17 also provided opportunities to arrange transactions to achieve a particular accounting outcome (IASB, 2016). Problems with the distinction between finance and operating leases generally concern companies using operating leases to maximize debt financing without recognizing it on the balance sheet (Ma & Thomas, 2021).

IFRS 16, which superseded IAS 17 in 2019, removed the distinction between finance and operating leases. All leases were now capitalized on the balance sheet and were accounted for in a similar way as finance leases had been. Exceptions were made for leases of low value and those with a lease term of less than 12 months. This was supposed to make companies more comparable, and users of financial statements could now have an easier time understanding the statements of companies with sizable lease commitments (IASB, 2016).

As one advantage of operating leases was their off-balance nature, IFRS 16 may have consequences for the use of operating leases as well as leasing overall (Ma & Thomas, 2021). Accounting changes that do not affect the underlying economic reality may therefore motivate lessee companies to alter their economic decisions (Boatsman, 1982). This is, in part, due to perceptions of operating lease capitalisation affecting covenants, measures of financial risk and

user perception of a company's financial position (Beattie, Goodacre, & Thomson, 2006; Ma & Thomas, 2021; El-Gazzar et al. 1986)

In reviewing previous literature, we conclude that it is likely that IFRS 16 leads to economic consequences. We believe it results in a decrease in the leasing sector as the advantages of operating leases are now gone, making leasing a less attractive form of financing overall. We further believe that this is greater for those companies which relied more on operating leases earlier, as they likely believed more in the benefits of operating leases.

1.2 Purpose

This study intends to study what implications IFRS 16 has had for leasing in Sweden. We intend to study if companies have less leases after IFRS 16 and if this decline is greater for firms with more operating lease commitments prior to IFRS 16. This will be done by analysing leasing data before and after IFRS 16 came into effect. Our ambition is to evaluate the effects of a newly introduced standard, which the standard setters at the IFRS foundation have called for (IFRS Foundation, 2020). The subject may also be of interest to practitioners who may wish to understand leasing and the effects of IFRS 16 on the leasing market.

Few other papers have investigated operating lease capitalization under IFRS, and those papers are generally ex ante and focus on the effect on key ratios and reported figures. Most literature on the economic consequences of lease capitalization come from other standards when finance leases were required to be capitalized, which was generally a long time ago. Few papers have studied operating lease capitalization ex post due to it happening recently. Therefore, we believe that our research serves an established need and can contribute to the developing discussion and understanding of the economic effects of lease capitalization.

Our study aims to answer the following questions:

Do companies have less leases after the implementation of IFRS 16?

Is the decline in leasing greater for firms with more operating lease commitments prior to IFRS 16?

1.3 Scope

We limit the scope of the research to public companies listed on the Nasdaq Stockholm stock exchange with headquarters in Sweden. The research is limited to Sweden as little has previously been done on the topic in Sweden and we wanted to gain an overview on the effect on companies which are relevant for the Swedish market. Sweden is furthermore a country where IFRS is applied for listed companies. We initially investigate the 100 largest companies by revenue on the stock exchange, whereof only 52 companies had all necessary information for the purpose of our study. The choice of companies by size is mainly due to data availability as smaller companies often lack the detailed leasing information in the notes that is necessary for our purpose. Thereafter, a second data selection is made to ensure that a selection of different industries is present in the sample, due to potential differences in leasing between industries.

1.4 Disposition

This study is divided into 6 sections. Section 2 provides an overview of previous literature on the topic and leads to the development of our hypothesis. Section 3 describes the sample selection and methodology used for the regressions in our study. In section 4 we present our descriptive statistics and the results of our regressions. We also perform various robustness tests on our result. In section 5 we discuss our results and the reasons behind them. In section 6 we draw conclusions from our study and provide suggestions for future research.

2. Literature review and theory

In this section, an overview is provided of relevant theory and literature concerning leasing. Our review of literature leads to our hypotheses.

2.1 IFRS 16 and Leasing

A leasing contract is defined as one where the customer has the right to use an asset for a time in exchange for consideration. A distinction is made between leasing contracts and service contracts. A lease exists when the customer "controls the use of an item", which is defined as where the customer has "exclusive use" of the item for a time and can control how it is used, otherwise it is defined as a service contract (IFRS Foundation, 2015).

Previously IAS 17 Leases was the standard used, which made a distinction between finance leases and operating leases. A lease was accounted for as a finance lease if it "substantially transferred all the risks and rewards incidental to ownership" and an operating lease if it did not. For finance leases, lessees recognized finance leases at commencement as the underlying asset and a lease liability equal to the lower of fair value and the present value of the lease payments, which gave rise to a depreciation expense for the asset and a finance expense for the liability in every accounting period. Operating leases were instead expensed on a straight-line basis, and a company's non-discounted leasing commitments were disclosed in the notes to the financial statements (IAS 17).

The IASB along with the financial accounting standards board in the United States were concerned about the lack of transparency concerning lease obligations under IAS 17. For many companies the effects of leasing transactions not reported on a lessee's balance sheet had substantial effects on reported figures if capitalized. Investors could not accurately compare companies which leased assets with those who borrowed to buy them without making adjustments, and techniques used for adjustments could vary significantly and be inaccurate (IASB, 2016). The disclosure-only accounting could be acceptable to expert users of financial statements, but it was not helpful to most investors who required clear information from financial statements. Moreover, most leases were operating leases: over 85% of lease commitments were off-balance before IFRS 16 came into effect (IASB, 2016). Therefore, a lessee's financial statements often neither provided a clear picture of the assets under its control or its unavoidable future minimum lease payments.

This lack of transparency was especially problematic as a small difference in lease-terms could lead to it being classified as a finance or operating lease. This provided opportunities to "structure transactions to achieve a particular accounting outcome", without regard to their economic reality (IASB, 2016).

For these reasons stated above, IFRS 16 was issued in January 2016, superseding IAS 17 Leases on the first of January 2019 (IASB, 2016). The new standard abolished the previous distinction between finance leases and operating leases. All leases with a term of more than 12 months without a buy option, or where the underlying asset is not of low value, are now accounted for in a similar way as finance leases had been, that is an asset and liability are recorded on the balance sheet at commencement.

Overall leasing increased 745% as a proportion of total debt from 1980 to 2007 in a US study, meaning that it now represents an important form of financing (Cornaggia, Franzen, & Simin, 2013). Furthermore, the use of off-balance sheet financing is very concentrated in certain industries and companies. In fact, according to a study done by the IFRS, 3,8% of companies accounted for over 80% of the present value of off-balance sheet leases worldwide. IFRS 16 makes for a significant change in lease accounting with a significant impact; in Europe 47% of listed firms disclosed off balance sheet leases before IFRS 16 (IASB, 2016). A change in lease regulation such as IFRS is therefore likely to have a material impact on many companies' accounts, especially for those few who heavily rely on operating lease commitments. This may be why the discussion paper discussing IFRS 16 received more than 1700 comment letters, a "good deal" more than is normal (Giner & Pardo, 2018).

The economic consequences of lease capitalization are contested. While IFRS 16 only represents a change in accounting, there have been concerns that the capitalization of off-balance sheet leases may lead to adverse economic consequences. Some concerns have been raised over an adverse effect on companies' cost of borrowing, the effect on debt covenants, and the effect on the leasing market as a whole (IASB, 2016).

2.2 The impact of lease capitalization on leasing attractiveness

While the accounting change to IFRS 16 does not change economic reality, preparers of financial statements may yet be motivated by this change to alter their economic decisions. Abdel-khalik, cited by Boatsman (1982), described this effect in 1981 for a similar proposition

in FASB standards which required finance lease capitalisation. In Abdel-khalik's study, management indicated non-favourable views to capitalizing leased assets. One reason for preparers attitudes may be that users can interpret the economic reality differently depending on how it is accounted for. When Abdel-khalik asked analysts and bankers to evaluate the profitability of two otherwise identical companies where one had capitalized a long-term lease, over 40% of analysts considered the company that did not capitalize the lease as more profitable. Imhoff & Thomas (1988) also found that lease capitalization increased the cost and decreased the attractiveness of leasing.

El-Gazzar, Lilien & Pastena (1986) polled 175 companies opposed to capitalizing capital leases (similar in essence to finance leases) in the United States and found that 75% of them cited covenant violations or changes to their debt-to-equity as reasons for opposing it. A sample of companies which were heavily affected by a change in lease regulation that required the capitalization of capital leases, found that out of 11 debt covenants, only one adjusted for the present value of lease obligations when calculating debt. Furthermore, this covenant used an unmodified equity which meant that companies could improve their perceived financial position through opting not to capitalize leases if this resulted in higher net income. As El Gazzar et al. (1986) find that managers can lessen the impact of covenant restrictions by using the operating method, lessees with a high D/E ratio should be the most inclined to keep leases off balance.

Beattie, Edwards, & Goodacre (1998) conduct an analysis of the effects of operating lease capitalization on key accounting ratios ex ante. They select a random sample of 232 UK industrial and commercial companies. Capitalization had a significant impact on key ratios such as profit margin, ROA, asset turnover and three measures for financial gearing, mostly painting a worse picture of company performance. They claim that the economic consequences of a change in lease regulation may be wide ranging, as individual decisions, market valuation and manager behaviour could be affected by the change in regulation. Durocher (2008) and Branswijck, Longueville, & Everaert (2011) expand on the effects of operating lease capitalization on accounting ratios in a Canadian and Dutch/Belgium setting respectively. Branswijck et al. found significant changes in accounting key ratios and furthermore, by looking at both Belgium and the Netherlands, found that they vary both by industry and by country. Durocher found large significant changes in key ratios though importantly sample "companies' comparative standings were not affected". While companies' comparative

standings are not affected, there will still likely be differences in comparative evaluations of companies due to analyst inaccuracies pre capitalization. Furthermore, financial information and databases used for analysis routinely did not adjust for operating lease effects, meaning that analysts' pictures of companies may change following capitalization. Capitalization of leases could therefore have a material impact on key ratios and perceptions of a company's financial standing and performance (Durocher, 2008).

Beattie, Goodacre, & Thomson (2006) polled UK users and preparers of financial information about a proposal to capitalize all leases. The proposal had garnered serious negative response, particularly from lessors and lessees with large operating lease commitments, who believed it could have serious economic consequences. Beattie et al. concluded that it was the economic consequences related to risk and users- and preparers' perception of it that was pivotal to the debate. Increases in accounted gearing would affect covenants, credit ratings, financing choices and user of financial information's view on company risk. Deloitte (2014) also surveyed 138 company executives in 2014 and suggested that a new standard that required lease capitalization for US firms could have noteworthy impact on corporate behaviour. They found that approximately 40% of executives thought firms would shorten lease terms and most also believed that firms would be more likely to purchase than lease compared to before the standard, that is they thought managers would be affected by the reporting incentives. Managers were disgruntled by the new American standard citing increases in risk, cost of external financing, and violating covenants (Ma & Thomas, 2021).

Beattie, Goodacre, & Thomson (2000) mention the possibility that capitalization of all leases can affect a firm's cost of capital, which is used by external analysts and in firms' capital budgeting, which can affect how firms finance their operations in the future. The IASB observes that IFRS 16 represents a change only to the accounting and will not change actual lease commitments. They do not believe that IFRS 16 will affect companies' cost of capital as they believe sophisticated users of financial statements (like credit agencies and lenders) already estimate the effect of off-balance financing. However, it may increase or decrease for individual companies as estimates can be off, especially for common imprecise estimation techniques (IASB, 2016). The IASB's findings are supported by Altamuro, Johnston, Pandit, & Zhang (2014). They study a sample of 5812 corporate bank loans and find evidence that lenders adjust for the risk effect of operating leases properly by using credit ratings, which correctly adjust for operating lease effects. While Altamuro et al. cite studies which found that operating leases had

little effect on credit risk, they mention that these were not recent and were done in a time with less operating lease activity.

Similarly, the IASB also does not believe in a large effect on debt covenants as credit agreements typically protect companies from changes in accounting, and there is also evidence that covenants consider off balance leases for companies where they are significant (IASB, 2016). The IASB also does not expect significant behavioural changes after IFRS 16 such as borrowing to buy rather than leasing. It also believes that modifying the terms of a lease, such as lease shortening, will not happen for many leases as changes typically arise for the underlying economic- and not for accounting reasons, nonetheless they believe some companies will change the lease length or the payment pattern (IASB, 2016).

Cornaggia et al. (2013) use common measures of risk and performance and find that, for the firms relying most on operating lease commitments, performance is overstated, and risk understated. Furthermore, they find that conventional debt ratios are negatively related to operating leases suggesting that the perceived benefits of off-balance sheet financing have "historically been a significant factor in firms' capital structures". Caskey & Ozel (2019) instead find in a US setting that it is not reporting incentives, that is avoiding recognition of assets and liabilities on the balance sheet, but rather non reporting incentives that play a more important role in US leasing. These benefits include operating leases accommodating volatile capacity needs, operating leases increasing financing capacity as they have more bankruptcy protection, and they can maximize the present value of cash flows from tax deductions. This means that leasing attractiveness may not be significantly impacted once reporting incentives disappear, as they are deemed to play a secondary roll. Beatty, Liao, & Weber (2010) also finds that, for a sample of 3033 manufacturing firms, liquidity and financially constrained firms who have trouble accessing other financing sources are those who prioritize leasing.

While studies from the United States and United Kingdom deal with comparable standards there is reason to believe that certain conclusions will differ. As Giner & Pardo (2018) note, lessors in continental law systems generally "maintain the ability to repossess the asset" whether it is finance or operating leasing, which is not the case in the United States. Therefore, the findings of Caskey & Ozel (2019) regarding non-reporting incentives for operating leasing may not be as applicable. IAS 17 also lacked the specific tests for determining whether a lease was a finance lease which US SFAS 13,1 had, which makes it harder to structure leasing agreement to

"narrowly" get out of capitalisation (Giner & Pardo, 2018). ASU 2016-02 in the US, which requires capitalization of operating leases also keeps the distinction between finance and operating leases while IFRS 16 removes it. These differences may lead to different incentives, for example operating leases under US GAAP show a lower EBITDA than finance leases.

Concerning leasing attractiveness overall, there is no clear consensus in the literature. On the one hand many studies suggest that managers relied on operating leases due to their reporting considerations. By eliminating the off-balance sheet nature of leasing, firms who leased based on this should be discouraged. On the other hand, Caskey & Ozel (2019) and others argue that reporting considerations play a secondary role in the increase in firms' use of operating leases in the US, which would suggest that the new standard does not have a large effect on company decisions.

2.3 Economic responses to previous standards that required capitalization of leases

Economic consequences are defined as when "changes in the information reported affect companies' cash flows or their distribution". This can occur either by changes in the behaviour of users or of managers, or by changes in standards contracts (Beattie, Goodacre, & Thomson, 2006). In Beattie et al.'s poll of UK users and prepares of financial information, both groups thought companies would lessen the impact of capitalization by shortening lease terms, but only preparers thought lease finance would be less attractive overall.

Imhoff & Thomas (1988) examined the economic consequences of the implementation of SFAS 13 which required all capital leases to be capitalized in US GAAP. Imhoff & Thomas find that the cost of capital leases increased and as a result companies reduced their proportion of capital leases, instead substituting it with operating leases or non-lease financing. If managers perceive costs of having to recognize capital leases, they will then likely be more willing to shift their leasing decisions. As much of the capital lease reductions were offset by operating lease increases, Imhoff & Thomas suggest that many existing capital leases were reconstructed as operating leases during the transition period (Imhoff & Thomas, 1988). Abdel-khalik found similar results 6 years earlier and saw that companies restructured leasing agreements in order to avoid capitalizing them (Boatsman, 1982). Durocher (2008) also puts forth the idea that companies prefer leaving leases off balance and that lease capitalization would incentivize companies to shorten lease terms.

While Imhoff & Thomas (1988) find significant support for the substitution between finance leases and operating leases**,** Godfrey & Warren (1995) did not see a trend of "discretional reclassification" from finance leases to operating leases in an Australian setting. They instead find an increased reliance on conventional debt, though they note that this was set in a period of debt financed growth in the Australian economy, which demonstrates the importance of macroeconomic circumstances.

Ma & Thomas (2021) find a significant decline in new operating lease commitments after the issuance of a US standard that requires capitalization, which supports the view that managers perceived benefits of operating leases were significantly reduced by eliminating their off-balance sheet characteristics. For ASU 2016-02 commitments less than one year are not required to be recognized on the balance sheet, similar to IFRS 16. Ma & Thomas find support of firms shortening lease commitments and switching from long term to short term commitments, as the reporting benefits remain for these leases. This decline in operating lease commitments was "especially pronounced" for firms with greater financial constraints in the pre-period, and a greater decline was observed for firms that overused operating leases in the pre period. However, as Giner & Pardo (2018) mention there are a number of differences between ASU 2016-02 and IFRS 16.

This leads us to our hypotheses.

2.4 Theoretical framework and hypothesis

Based on prior literature, we find it reasonable to assume that reporting incentives play an important role in the leasing decision. While there are studies like Caskey & Ozel (2019) who primarily argue for non-reporting incentives on the one hand, our findings seem to indicate that managers express belief in the reporting incentives of operating leases. In line with Ma & Thomas findings who did a similar study in 2021, we assume the following hypotheses.

H1: IFRS 16 leads to a decrease in leasing

In line with previous literature, as the reporting incentives of leases are eliminated, managers and companies which perceived the off-balance benefits to be larger would lease less.

Consequently, they should reduce their leasing commitments more after the introduction of the new standard (Imhoff & Thomas, 1988).

H2: The degree of leasing decreased more for companies with more operating leases before the IFRS 16 implementation

3. Methodology

In this section we explain our data collection process and our regression models.

3.1 Methodology for measuring abnormal decreases in leasing

Our methodology has been based on the framework established by Imhoff & Thomas (1988). Imhoff & Thomas primarily tested for abnormal decreases in capital leases due to the SFAS 13 implementation where capital leases were to be capitalized and included on the balance sheet. We have modified the model to test for abnormal decreases in leasing overall. The original cross-sectional model was formulated as follows:

$$Y_t = \left(\frac{PVCAP}{A}\right)_t - \left(\frac{PVCAP}{A}\right)_{t-2}$$

$$= \alpha + \beta\left(\frac{PVCAP}{A}\right)_{t-2} + D\{\gamma + \delta(PVCAP_f/LTC)_{1976}\} + \varepsilon_t,$$

$$H_0: \delta = 0, \qquad H_a: \delta < 0$$

Y = two-year change in PVCAP/A, from year t-2 to t,

PVCAP = present value of all future lease payments on all capital leases,

A = book value of all non-lease assets,

$PVCAP_f$ = present value of all future lease payments for capital leases reported in footnotes,

LTC = long-term capitalization = $PVCAP_f$ plus book value of long-term debt and equity,

D = 1 if t = 1978

= 0 if t = 1976 or t = 1980

Equation 1: Model and hypothesis used by Imhoff & Thomas (1988)

The dependent variable Y_t, is the two-year decrease in capital leases scaled by assets. Due to SFAS 13 being implemented over a two-year period, the change is also measured in those increments – one period before implementation, one transition period and one post-implementation period. Imhoff & Thomas' hypothesis is that firms with a greater share of footnoted capital leases will have a greater decrease in capital leases overall during the transition period due to not wanting to introduce these leases on the balance sheet. As such the model tests for abnormal decreases during the transition period by means of dummy variable *D*, with the hypothesis being that δ is less than zero – i.e. the greater the share of footnoted capital leases the greater the decrease in capital leases overall. Imhoff & Thomas do get significant results with this model; however, they also create a subsample in order to control for company size (book value of assets + $PVCAP_f$), leverage (sum of long-term conventional

debt and PVCAP, divided by long-term capitalization) and industry (SIC-code) by means of matching pairs of firms similar in all three aspects but with different levels of leasing.

In our case we measure the change of lease usage overall, as opposed to Imhoff & Thomas who measured the change in capitalized leases only. The principle stays the same however, measuring for abnormal decreases in leasing level based on leases previously not on the balance sheet. We assume that the model still holds despite this change, though it is important to note some differences. Imhoff & Thomas investigated leases of one type, where the only difference pre- and post-implementation was firms no longer being allowed to report the capitalized leases in footnotes. The equivalent would be to investigate operating leases only, however this is not possible due to a lack of information post IFRS 16 (due to operating and financial lease payments no longer being reported separately) and also non-relevant due to there not being an option to report operating leases on the balance sheet prior. Another aspect important to note is that firms in the data sample used by Imhoff & Thomas already had all relevant leases capitalized, both on- and off-balance sheet. We, on the other hand, have to capitalize operating leases on our own. In order to stay consistent across firms, we capitalize all leases, including those already capitalized on the balance sheet (for further explanation, see section 3.2).

The changes we do to the model are as follows: we exchange the term PVCAP with PVLEAS; extending the dependent variable to measuring the change in the present value of all future lease payments (calculated as the book value of capitalized leases + the present value of all future lease payments for operating leases). The term is scaled by the book value of non-lease assets in order to account for changes in firm size and inflation during the analysed period. We keep the length of the period two years long. IFRS 16 was stricter with the implementation period than SFAS13, being obligatory for all firms in 2019, however we assume that firms need some time to change their capital structure. One could argue that an increment of three years would fit better, to accommodate for the whole period between official standard announcement and obligatory implementation, however there is not yet enough data to use periods of such length. We also assume that a period of two years is enough time for firms to change their capital structure.

$PVCAP_f$ is in turn replaced by $PVOP_f$, the present value of all future lease payments for operating leases. The term is deflated by long term capitalization in order to ensure

comparability between different firms. Our preadoption, transition and postadoption periods are 2015-2017, 2017-2019 and 2019-2021 respectively. Our model is thus formulated as follows:

$$Y_t = \left(\frac{PVLEAS}{A}\right)_t - \left(\frac{PVLEAS}{A}\right)_{t-2}$$

$$= \alpha + \beta\left(\frac{PVLEAS}{A}\right)_{t-2} + D\{\gamma + \delta(PVOP_f/LTC)_{2017}\} + \varepsilon_t,$$

Y = two-year change in PVLEAS/A, from year t-2 to t,

PVLEAS = present value of all future lease payments on all leases,

A = book value of all non-lease assets,

$PVOP_f$ = present value of all future lease payments for operating leases,

LTC = long-term capitalization = PVLEAS plus book value of non-lease long-term debt and equity,

D = 1 if t = 2019

= 0 if t = 2017 or t = 2021

Equation 2: Thesis model

A more detailed description of the modified model variables is provided in section 3.1.1. Our first hypothesis, leases decreasing abnormally in 2019, is that $\gamma < 0$. Our second hypothesis, leases decreasing abnormally in 2019 for firms with greater operating leases, is that $\delta < 0$. Due to limitations in our data sample, we do not have the same possibility to control for size, leverage and industry be means of matched pairs. As such we introduce these as control variables in a second model. The three variables are calculated as follows:

Size: The natural logarithm of the book value of non-lease assets and PVLEAS. Due to us recapitalizing all leases we do not use the sum of all assets (capital leases included) and PVOP.

Leverage: the sum of long-term debt and PVLEAS, divided by long term capitalization.

Industry: industry division based on SIC-code. Due to firms in our sample being active in too wide a range of industries, we cannot use specific SIC-codes like Imhoff & Thomas. Instead, we use the divisions based on the first digit of the four figure SIC-code.

3.1.1 Variables in thesis model

Y_t: two-year change in PVLEAS scaled by non-book assets. Calculated as the difference between the ratio in year *t* and *t-2*, *t* assuming the values of 2017, 2019 or 2021.

PVLEAS: present value of all future lease payments for all leases. All leases are capitalized manually based on information available in footnotes (for further explanation, see section 3.2).

A: book value of all non-lease assets.

$PVOP_f$: present value of all futures lease payments for operating leases.

LTC: long-term capitalization, calculated as the sum of PVLEAS, non-lease long-term debt and equity

D: dummy variable capturing abnormal decreases during the transition period 2019. Equal to 1 for 2019 and 0 for 2017 and 2021.

3.2 Methodology for Capitalization of leases

We calculate the present value of future lease payments using the constructive model for lease capitalization developed by Imhoff et al. (1991). Imhoff et al. (1991, 1997) use minimum lease payment disclosures in the footnotes to estimate the leased asset and importantly for our paper, the lease liability, as if they had been treated as finance leases since their inception. To compute the present value of operating lease obligations, which is the lease liability, two key assumptions are required: the interest rate, and the pattern and durations of cash flows beyond the 5^{th} year which is normally disclosed as a lump sum in the notes. The theoretically correct interest rate is the weighted average of the marginal interest rates which are in effect when the leases were signed, which is often hard to accurately assess. Therefore, the interest rate can be approximated using the rates which are implicit in the firm's capital leases or by dividing the debt expense by interest bearing debt.

In companies which use IFRS, minimum lease payments for years 2-5 are also generally stated as a lump sum. Therefore, an assumption concerning the pattern and duration of cash flows in year 2-5 and 5+ are needed. Branswijck et al. (2011) divide the cash flows for year 2-5 equally among the years. Imhoff et al. (1991) also assume that cash flows occur equally over the 5+ period, and divide the lease payment for obligations beyond 5 years with that of year 5 to get an idea of the remaining life of leased assets. For simplicity it is also assumed that cash flows occur at the end of the year. Imhoff- and Branswijck et al.'s assumptions are simplifying but are not deemed to cause material errors on an aggregate level and will be used in this study. In our study, an average remaining life of leased assets will be calculated by taking the average of year 5+ lease payments divided by the lease payment in year 5 for all companies included in

the sample, rounded up to the next year, which is consistent with the assumption that cash flows occur at the end of the year. If notes are found to report year five cash flows together with years 5+, we assume year 5 to be equal to year 4 with 5+ consisting of the resulting residual.

Imhoff et al. (1991) capitalize all firms in the sample using assumptions that they believe are reasonable for one firm in the sample. This is to ensure that changes and differences in capitalization can be attributed strictly to differences in operating leases and not their assumptions. While we believe firm specific assumptions are not necessary or feasible for our whole sample, we believe that using one firm is not a reasonable assumption. Therefore, we instead make use of Goodacre's (2003) methodology when estimating the correct interest rate. Goodacre uses the interest rates on 10-year government bonds, representing the risk-free interest rate for companies. He argues that this is a reasonable simplification as the focus of the study is to report average aggregate effects, which is also the case for our study.

The average interest rate on government bonds is measured based on the average lease life. If the average lease life remaining is 16 years and leases are capitalized dec 31 first 1999, the average yield on 10-year government bonds from 1985-1999 is calculated. In our study we estimate the remaining life of leased assets, and therefore the average interest rates in effect when the leases were signed. We calculate one interest rate for 2015, 2017, 2019 and 2021, using the average remaining useful life of assets for each to period to calculate that period's average interest rate.

For 2015 and 2017, the average remaining life of leased assets is assumed to be 8 years. The average yield on Swedish 10-year state bonds between 2008-2015 and 2010-2017 are 2.35% and 1.6% respectively. For 2019 and 2021 an average remaining life of leased assets of 10 years is used, and the average yield between 2010-2019 and 2012-2021 are 1.36% and 0.83% respectively.

3.3 Methodology for measuring abnormal increases in leases shorter than 12 months

Due to limitations in the data available, our capitalization method includes leases shorter than 12 months, these being included in non-cancellable lease payments due within one year. In order to investigate whether firms changed their operating leases into shorter ones to avoid

inclusion on the balance sheet, we need a separate model. We assume that our modified variant of Imhoff & Thomas' model (1988) is still applicable in this case, with some changes in dependent variable and one independent variable. The dependent variable is the change in the ratio between lease payments due within one year and all future lease payments. Similarly, the independent variable $\left(\frac{PVLEAS}{A}\right)_{t-2}$ is exchanged for $\left(\frac{P_{one}}{P_{all}}\right)_{t-2}$. The model is formulated as follows:

$$Y_t = \left(\frac{P_{one}}{P_{all}}\right)_t - \left(\frac{P_{one}}{P_{all}}\right)_{t-2}$$

$$= \alpha + \beta \left(\frac{P_{one}}{P_{all}}\right)_{t-2} + D\{\gamma + \delta(PVOP_f/LTC)_{2017}\} + \varepsilon_t,$$

Y = two-year change in P_{one}/P_{all}, from year t-2 to t,

P_{one} = nominal lease payments due within one year

P_{all} = all non-cancellable nominal lease payments

$PVOP_f$ = present value of all future lease payments for operating leases,

LTC = long-term capitalization = PVLEAS plus book value of non-lease long-term debt and equity,

D = 1 if t = 2019

= 0 if t = 2017 or t = 2021

Equation 3: Thesis model for changes in lease payment ratio

Our hypothesis is that firms with a greater share of operating leases have greater incentives to exchange these for shorter leases to avoid introduction on the balance sheet, thus having an increase in lease payments due in one year accordingly. In model terms this is expressed as $\delta > 0$.

This method has similar inaccuracies as our previous model, including lease payments due within one year that are not related to leases shorter than 12 months. However, we assume that such a method can still give relevant hints as to how financing using leases has developed due to IFRS 16. An increase in the ratio would either be due to an increase in leases shorter than 12 months or due to firms renewing leases to a lesser degree, favouring other forms of financing in the future. As such, any increase or decrease can still be used to deduce a change in firm preferences to a certain degree.

3.4 Data selection

The sample was constructed by examining the annual reports of firms listed on OMX Stockholm with headquarters in Sweden. Due to a lack of databases with reliable data pertaining to lease payment and capitalization, we collected the data sample manually by going through individual annual reports, recording non-cancellable future lease payments typically found in the notes. Firms were examined in order of revenue size year 2021 and were excluded if they were found to not have sufficient information or not having available information throughout the timeframe of this study. Companies with split financial years were excluded as they had not yet released annual reports two years after the adoption of IFRS 16.

After analysing 100 firms, of which 48 lacked the information required for our regressions, we focused on gathering firm data based on industry. The shift in data gathering order was done due to smaller firms, in our experience, having a higher probability of providing insufficient information for our purposes and us wanting industry samples of a reliable size. We decided which industries to further expand based on the number of firms left unincluded in our sample, with our goal being to have 20 firms per industry. As such, industries that already had 20 or more members in the sample as well as industries that could not reach 20 firms were ignored during further data gathering. Adding the remaining firms with sufficient information available resulted in a sample size of 90, with three industries of a sufficient size to warrant membership dummy variables, namely "Manufacturing", "Services" and "Finance, Insurance and Real Estate". A table of our sample distribution by industry is provided below:

Table 1: Industry spread in our data sample

Construction	6
Manufacturing	26
Transportation, Communications, Electric, Gas and Sanitary service	5
Wholesale Trade	8
Retail Trade	5
Finance, Insurance and Real Estate	17
Services	21
Nonclassifiable	2
Total	90

In order to avoid problems with extreme outliers, the calculated dependent variables went through a 99% winsorizing.

3.5 Variables

3.5.1 Dependent variable

Two-year change in company leasing ("dLeas"): The dependent variable in our first two models is the change in company leasing, calculated as the difference in present value of all future lease payments, scaled by non-lease assets, between period *t* and *t-2* (calculation in equation form provided in dependent variable in Equation 2)

Two-year change in ratio of lease payments due in one year to total lease payments ("dPay"): The dependent variable in the third model is the change in ratio of non-cancellable lease payments due in one year to total non-cancellable lease payments, between period *t* and *t-2*.

3.5.2 Independent variables

Level of leasing in beginning of period ("lpvL"): The level of leasing at the beginning of each given period

Level of operating leases in 2017 ("pvop17"): Present value of all non-cancellable operating lease payments scaled by long term capitalization in the year of 2017. Due to limitations in dummy variable creation, the variable assumes it's correct value for *t=2019* and the value of 0 for *t=2017* and *t=2021*.

Dummy variable for 2019 ("dum19"): Due to limitations in dummy variable creation, the constant effect for the 2019 dummy variable is present as a separate dummy variable in the regression model. Assumes value 1 for *t=2019* and value 0 for *t=2017* and *t=2021*.

Size ("size"): The natural logarithm of the book value of all non-lease assets and present value of all future lease payments (*PVLEAS*) at the beginning of the period.

Leverage ("leverage"): Sum of total calculated leasing liabilities and the book value of long-term non-lease debt, divided by long-term capitalization (sum of equity, long-term debt less leasing liabilities, and present value of all future lease payments *PVLEAS*) at the beginning of the period.

Industry membership manufacturing ("ind_m"): a dummy variable assuming the value of 1 if a firm is active in the manufacturing industry.

Industry membership finance, insurance and real estate ("ind_f"): a dummy variable assuming the value of 1 if a firm is active in the finance, insurance or real estate industry.

Industry membership services ("ind_s"): a dummy variable assuming the value of 1 if a firm is active in the services industry.

Ratio of lease payments due in one year to total lease payments in beginning of period ("lPay"): ratio of non-cancellable lease payments due in one year to total non-cancellable lease payments in the beginning of each given period.

3.6 Regression model, simple variant

The regression equation below is our direct translation of Imhoff & Thomas' (1988) model. Present values scaled by assets are aggregated into separate variables, *dLeas* and *lpvL* respectively whereas the dummy variable components are split into *dum19*, the constant, and *pvop17*, the operating lease ratio 2017. How the variables are calculated using notations from section 3.1, is provided below the equation.

$$dLeas = \beta_0 + \beta_1 lpvL + \beta_2 dum19 + \beta_3 pvop17$$

Where:

dLeas = $\left(\frac{PVLEAS}{A}\right)_t - \left(\frac{PVLEAS}{A}\right)_{t-2}$

lpvL = $\left(\frac{PVLEAS}{A}\right)_{t-2}$

dum19 = D

pvop17 = $D(PVOP_f/LTC)_{2017}$

Equation 4: Regression equation for simple variant

3.7 Regression model with additional control variables

Our second model includes the control variables for size, leverage and industry that could not be dealt with by means of matching pairs due to data base limitations. The equation is similar to the simple variant in section 3.6 with the addition of *size*, *leverage*, and three dummy variables for industry membership.

$$dLeas = \beta_0 + \beta_1 lpvL + \beta_2 dum19 + \beta_3 pvop17 + \beta_4 size + \beta_5 leverage + \beta_6 ind\_m + \beta_7 ind\_f + \beta_8 ind\_s$$

Equation 5: Regression equation with additional control variables

3.8 Regression model for lease payment ratios

The third model follows the methodology described in section 3.3. The equation is similar to the simple model in 3.6 with the dependent variable being exchanged for *dPay* and *lpvL* being

exchanged for *lPay*. How the new variables are calculated using notations from section 3.3, is provided below the equation.

$$dPay = \beta_0 + \beta_1 lPay + \beta_2 dum19 + \beta_3 pvop17$$

Where:

dPay = $\left(\frac{P_{one}}{P_{all}}\right)_t - \left(\frac{P_{one}}{P_{all}}\right)_{t-2}$

lPay = $\left(\frac{P_{one}}{P_{all}}\right)_{t-2}$

Equation 6: Regression equation for lease payment ratios

4. Results and analysis

In this section we present our regression results and do additional non-parametric tests. All standard errors reported have been calculated as Huber-White sandwich estimators due to issues of heteroskedasticity, further described in section 4.5.1.

4.1 Descriptive statistics

The descriptive statistics for the variables used in our regressions are displayed in Table 2. The mean value for change in lease-to-assets ratio is -0.12 percentage points, whereas the median is -0.28 percentage points. Considering the mean not being weighted, total leasing commitments in our sample as a whole cannot be determined. Taking into consideration both mean and median being close to zero and the standard deviation being below 1 percentage point, the changes do not seem to be overly large over the time period analysed. One firm is responsible for both min and max values in the non-winsorized variable, a change in 11.82 percentage points in year 2017 and -12.28 percentage points in year 2019, both values being over 11 standard deviations away from the mean. The increase and decrease changed the firm's lease to asset ratio from non-outlier value to extreme outlier and back over the two time periods.

The total median of lease commitments to non-lease assets at the beginning of each analysed period is 7.34%. As seen in both max value of 1264% and higher mean sample of 27.17%, there are however extreme outlier firms. The firm in question (Christian Berner Tech Trade AB, see appendix 1) is the same one that was responsible for non-winsorized max and min values of change in total lease ratio. The decrease was 11.6 standard deviations away from the mean, showing signs of our data sample containing problematic entries.

Operating lease commitments to long term capitalization stay around one. The min and max values are worthy of note; there are companies barely having any operating lease commitments for the year of 2017, and there is also an extreme outlier that has over 13 times the lease commitments seem to long term capitalization – 13.3 standard deviations away from the mean. The company in question (Ework Group AB, see appendix 1) does not have any corresponding extreme values in the independent variable. The second largest value of *pvop17* is 2.4, only 2.0 standard deviations from the mean, further highlighting the presence of problematic entries.

The leverage spread in our sample is fairly distributed. Using the same definition as Imhoff & Thomas' (1988), described in section 3.1 and 3.5.2, the values can range from 0 to 1 - with our sample having a median of 0.44, min value close to 0 and max value close to 1. As seen with the median and mean, sample firms tend to have more equity than long-term debt and capitalized leases.

The change in lease payments ratio due within one year to all lease payments, stay close to zero, with both 1st and 3rd quartiles as well as max and min values being fairly equally distributed. At the beginning of the period, lease payments due in one year made up 26.8% of total on average, with the median being 24.8%. There are both firms with no lease payments due in one year and all lease payments due in one year as seen from the min and max values being 0 and 1 respectively.

Table 2: Descriptive statistics

Variable	N	Mean	Std. dev.	1st quart.	Median	3rd quart.	Min	Max
dLeas_nw*	270	-0.0012	1.0618	-0.0373	-0.0028	0.0141	-12.2770	11.8172
dLeas**	270	0.0042	0.2666	-0.0373	-0.0028	0.0141	-1.1837	2.1922
lpvL	270	0.2717	0.8846	0.0277	0.0734	0.2536	0.0005	12.6440
pvop17***	90	1.1611	1.4604	0.9918	1.1350	1.2691	0.0020	13.7717
size	270	8.546	2.0790	7.0828	8.4993	9.9958	4.2151	13.1703
leverage	270	0.4135	0.1883	0.2768	0.4412	0.5465	0.0008	0.9991
dPay	270	-0.0017	0.1290	-0.0394	0.0024	0.0418	-0.5708	0.5734
lPay	270	0.2678	0.1499	0.1797	0.2477	0.3333	0.0000	1.0000

* non-winsorized values, regression uses 99% winsorized values

** 99% winsorized

***only 2019 pvop17 values are included

4.2 Regression results, simple model

Table 3 below presents the results for the regression of the simple model:

Table 3: Regression results simple model

Independent variable	Coeff	Std. error	t-value	p-value	Lower 95% conf. int.	Upper 95% conf. int.
lpvL	-0.0686	0.0329	-2.09	0.038	-0.1333	-0.0039

dum19	0.0292	0.0374	0.78	0.436	-0.0502	0.1029
pvop17	-0.0052	0.0069	-0.75	0.452	-0.0427	0.0084
const	0.0151	0.0164	0.92	0.356	-0.0242	0.0474

$R^2 = 0.0488$
Adj. $R^2 = 0.0380$

The simple model has a low adjusted R^2 at 3.8%, and only one variable significant at the 5% level. The coefficient for present value of all lease payments at the beginning of the period, *lpvL*, being negative, indicates that firms with bigger lease commitments, financial leases included, have generally been decreasing the lease to asset ratio in accordance with its size over the analysed period of 2015 to 2019 (*lpvL* being lagged values, 2021 is not included). The results are not in accordance with our expectations that *pvop17* would influence a greater decrease, and there is also no other significant proof of an abnormally large decrease in the period of 2017-2019, seeing as *dum19* is not statistically significant. Our hypothesis that the coefficient for *pvop17* and *dum19* would be less than zero thus cannot be proven.

4.3 Regression results with additional control variables

Table 4 below presents the results of the regression with additional control variables:

Table 4: Regression results with additional control variables

Independent variable	Coeff	Std. error	t-value	p-value	Lower 95% conf. int.	Upper 95% conf. int.
lpvL	-0.0943	0.0233	-4.05	0.000	-0.1401	-0.0485
dum19	0.0298	0.0384	0.78	0.438	-0.0458	0.1055
pvop17	-0.0049	0.0080	-0.61	0.543	-0.0207	0.0109
size	-0.0035	0.0129	-0.27	0.787	-0.0289	0.0219
leverage	0.2621	0.1585	1.65	0.100	-0.0501	0.5743
ind_m	0.0067	0.0239	0.28	0.780	-0.0404	0.0537
ind_f	-0.0057	0.0358	-0.16	0.873	-0.0762	0.0647
ind_s	0.0815	0.0681	1.20	0.232	-0.0525	0.2155
const	-0.0766	0.1036	-0.74	0.460	-0.2806	0.1273

$R^2 = 0.0937$
Adj. $R^2 = 0.0659$

The introduction of control variables does increase the adjusted R^2 to 6.6%, however only one more variable is significant, leverage at 10% significance level. The coefficient for *lpvL* does get smaller with the model, as well as improving the significance level to 1%. Introduction of industry classification for industries with at least 15 members in the data sample does not add any conclusive evidence as to industry membership having an impact on the change in lease to asset ratio over the period analysed.

4.4 Regression results for lease payment ratios

Table 5 presents the results of the regression modelling the ratio of first-year lease payments:

Table 5: Regression results for lease payment ratios

Independent variable	Coeff	Std. error	t-value	p-value	Lower 95% conf. int.	Upper 95% conf. int.
lPay	-0.2919	0.0805	-3.63	0.000	-0.4504	-0.1334
dum19	-0.0206	0.0162	-1.27	0.205	-0.0526	0.0113
pvop17	0.0136	0.0044	3.10	0.002	-0.0050	0.0223
const	0.0781	0.0187	4.18	0.000	0.0413	0.1148

$R^2 = 0.1217$
Adj. $R^2 = 0.1118$

The regression modelling the first-year payment ratio for leases has the highest R^2 out of our three models. With *lPay* having a negative coefficient, the larger the ratio at the beginning of the period, the more prone companies are to decrease it. This could be a consequence of companies not renewing their leases after the beginning of the period, having the last payments for the leases due in year one but no more in the future, resulting in a more even distribution of payments at the end of the period when these leases have ceased to exist. The intercept for the model is positive, meaning that there was a base tendency to increase year 1 payments relative total. At a 1% significance level, *pvop17* is statistically greater than zero - confirming our hypothesis that firms with greater operating leases pre-IFRS 16 shifted to leases shorter than 12 months or are in the process of decreasing their level of leasing. In relation to the size of operating leases to long-term capitalization, there was thus a greater increase in year 1 lease payments in the transition period 2017-2019 relative pre- and post-implementation periods.

4.5 Robustness test and statistical considerations

Due to the problematic nature of our data set, we do additional tests for the validity of the OLS assumptions and additional non-parametric tests.

4.5.1 Heteroskedasticity and multicollinearity

In order to test for heteroskedasticity, we performed Breusch-Pagan tests for all regressions, the results of which are presented in Table 6. Since tests are significant at the 1% level for all regressions, we decided to use Huber-White sandwich estimators to solve for this problem, as mentioned at the beginning of section 4.

Table 6: Breusch-Pagan test results

H_0: constant variance	**Simple reg.**	**Reg. with control variables**	**Pay ratio reg.**
chi2(1)	139.71	8.66	111.38
Prob > chi2	0.0000	0.0033	0.0000

We also calculated the variance inflation factor (VIF) in order to check for multicollinearity, the results of which are presented in Table 7. No values were greater than 2, well below the standard cut-off point of 10, therefore we deemed multicollinearity not being anything of concern.

Table 7: Variance inflation factors for all regressions

Variable	**VIF simple reg.**	**VIF reg. with control variables**	**VIF pay ratio reg.**
lPay			1.00
dum19	1.43	1.46	1.43
pvop17	1.44	1.53	1.43
lpvL	1.01	1.24	
ind_m		1.66	
ind_s		1.47	
ind_f		1.38	
size		1.50	
leverage		1.18	

4.5.2 Non-parametric tests

Due to the presence of extreme outliers in our dataset, our regressions run a risk of non-normal error distribution (see appendix Appendix 2 – tests for normality of error distribution for tests). Although Knief and Forstmeier (2021) come to the conclusion that non-normality of residuals does not have an overly large impact on p-values, we choose to also perform four non-parametric Mann-Whitney U-tests. Two tests are done comparing firms above and below *pvop17* median in 2019, regarding the size of *dLeas* and *lPay*. The other two tests are comparing *dLeas* and *lPay* between firms in 2019 and other years. The results are presented below.

Table 8:Mann-Whitney U-test results showing whether firms with small pvop17 have the same dLeas in year 2019 as firms with big pvop17

pvop17	**Obs**	**Rank sum**	**Expected**
large	45	2010	2047.5
small	45	2085	2047.5

H0: dLeas (pvop17=large) = dLeas (pvop17=small)

z =-0.303

Prob > |z| = 0.7622

The first test examines whether firms with a large ratio of operating leases at the beginning of the transition period have a bigger decrease in total lease ratio. The classification of large and small is based on firms being above or below the median value for *pvop17*. If our original hypothesis would hold, firms with a larger operating lease ratio would have a greater decrease (lower rank sum). However, the difference between the groups is not statistically significant, implying that operating lease ratio does not have any impact on firms decreasing their levels of leasing.

Table 9: Mann-Whitney U-test results showing whether firms with small pvop17 have the same dPay in year 2019 as firms with big pvop17

pvop17	**Obs**	**Rank sum**	**Expected**
large	45	2274	2047.5
small	45	1821	2047.5

H0: dPay (pvop17=large) = dPay (pvop17=small)

z =-1.828

Prob > |z| = 0.0676

The second test examines whether firms with a large ratio of operating leasing at the beginning of the transition period have a greater increase in first year lease payments to total payments, *dPay*. If our original hypothesis would hold, firms with a larger operating lease ratio would have a greater increase (higher rank sum) than firms with a lower operating lease ratio, implying a shift from longer to shorter leases. The difference between groups holds at a 10% significance level, with firms with a higher degree of operating leases also having a higher increase (or lower decrease) in first year lease payment ratio.

Table 10: Mann-Whitney U-test results showing whether firms had a bigger decrease in dLeas in 2019 compared to 2017 and 2021

transition period	Obs	Rank sum	Expected
no	180	23547	24390
yes	90	13038	12195

H0: dLeas (is2019=no) = dLeas (is2019=yes)

z =-1.394

Prob > |z| = 0.1634

The third test examines whether the overall decrease in leasing ratio was greater during the transition period of 2017-2019 if compared to the pre-adoption and post-adoption period. If our original hypothesis would hold, the transition period would indeed have a greater decrease (lower than expected rank sum) compared to non-transition periods, however results show that there is no statistically significant difference between the groups.

Table 11: Mann-Whitney U-test results showing whether firms had a bigger increase in dPay in 2019 compared to 2017 and 2021

transition period	Obs	Rank sum	Expected
no	180	24431.5	24390
yes	90	12153.5	12195

H0: dLeas (is2019=no) = dLeas (is2019=yes)

z =0.069

Prob > |z| = 0.9453

The last test examines whether the increase in first year lease payment ratio, *dPay*, is greater during the transition period compared to pre- and post-adoption periods. If our original hypothesis would hold, the increase (decrease) would be greater (smaller) during the transition period, however test results show that there is no statistically significant difference between the groups.

5. Discussion

In this section we analyse and discuss our findings and how it relates to previous findings in the field. We provide an analysis of the results of our regression and hypotheses.

5.1 Analysis of regression results

We cannot see any clear evidence for sudden decreases in leasing during the transition period of 2017-2019. Both *pvop17* and *dum19* which would capture any such decreases stayed statistically insignificant across most regression even at a 10% significance level. This could be explained in three ways. The first explanation would be that companies simply did not change their leasing structure due to IFRS 16. In comparison with Imhoff & Thomas' study of SFAS 13 (1988), where companies had the option of substituting to-be capitalized leases with off-balance operating leases, IFRS 16 leaves no such similar alternatives. Hence companies not changing their leasing structure as drastically as during SFAS 13 does have justification. The other two explanations are related to the validity of our study.

The first validity issue is whether changes in leasing structure were implemented over a longer period of time, thus not showing any sudden shifts during the transition period. This would imply that we should have extended the length of the time periods analysed; there is rational behind having the transition period begin in 2015, the year before IFRS 16 was officially announced. However, at this point in time we do not have the data necessary to analyse time periods of such length since that would require annual reports for year 2023. In addition, keeping the time periods longer runs the risk of diluting an IFRS 16 effect with a more general time trend or other events. There is also an argument to keep the time periods shorter and only analyse annual reports for years 2018-2020 to better isolate the introduction of IFRS 16. We believe however that there were no events during 2018 that would systematically nullify a sudden shift in leasing during 2019, thus the analysed periods being too short should not be of concern.

The second validity issue is whether companies shifted to leases shorter than 12 months that could still be kept off-balance. Due to us not having the data to distinguish lease payments attributable to such leases, all were included in our calculations and effectively put on the balance sheet. What we measured was thus decreases in leasing overall, as opposed to decreases in the sum of capitalized finance leases and to-be capitalized operating leases. Hence a shift

from to-be-capitalized leases to shorter off-balance sheet leases would not be detectable in our data sample. Our attempt to get around this problem with our third regression, shows some signs of this being the case with the *pvop17* variable being significant at a 1% level. The coefficient being positive implies that companies with a higher degree of operating leasing did in fact shift to shorter leases or were in the process of decreasing their leases by not renewing them after the one-year period. The non-parametric tests have some weak evidence of the same phenomenon, with firms having higher *pvop17* ratios also having a greater increase in first year lease payment to total lease payments *dPay*, however only at a 10% significance level.

The results of the non-parametric test were overall in line with our regressions, implying no greater problems due to the non-normal distribution of error terms. The significance of *pvop17* dropped in determining the size of *dPay*, however this comparison was done without any other variables taken into account which could explain the difference.

Our findings were not in line with our predictions based on previous theory. A key change from studies studying standards which required finance lease capitalization is that it is likely easier to restructure financial contracts to operating ones rather than shifting away from leasing all together. Furthermore, as Giner & Pardo (2018) state, SFAS 13,1 provided a number of specific criteria for finance leases, which made it comparatively easy to avoid with a leasing contract. These explanations could be why we get different results on leasing attractiveness for operating lease capitalization in IFRS rather than finance lease capitalization in the United States.

Ma & Thomas (2021) also conduct a similar study to ours in a similar time frame with a different result. Differences include the maintained distinction between finance and operating lease commitments in the US. In the US the operating lease expense affects EBITDA while the depreciation and interest expense of a finance lease do not, meaning that operating leases have a reporting disadvantage, which could affect the result.

Our result could mean that reporting incentives are not as significant as envisaged, like Caskey & Ozel (2019) claim. As the reporting incentives disappear with IFRS 16 but we cannot prove a large decrease in leasing, our study does not provide support for large report incentives. However, this could also be due to our choice of time frame.

5.2 Validity and reliability

In addition to the validity issues already described, there are more aspects to take into account regarding our third regression. Firstly, an increase in year one payment to total could not only signify an increase in short-term leases, but also non-renewal of longer leases (the higher year one ratio symbolizing the last payment of the long-term leases which are going to be financed through different means year two onwards). Such non-renewal is a sign of leasing decreasing in a year, giving our regression a double purpose of both measuring increases in short-term leases and decreases in long-term leases in the future, both effects which would be in line with our hypothesis (although the decrease in long-term leases would belong to the next period, it shows signs of the intention to decrease leases nonetheless). However, the decrease effect is not scaled by assets – hence the decrease could be due to companies keeping a constant lease to asset ratio with the company size decreasing.

So far, we have not taken the Corona pandemic, which loosely coincided with the implementation of IFRS 16, into account when doing the study. We assume that any pandemic effects are mostly dealt with through the inclusion of size and leverage control variables as well as scaling the dependent variable by non-lease assets (dealing with company size changes during the time period), since reporting incentives themselves should not be impacted much. As seen with our second regression not having much additional significance, the pandemic should not have much of an effect, however it is worth to note that our third regression does not have any control variables or scaling that could deal with any potential effects.

The main problem with reliability is our data being collected by hand. Transcribing information from annual reviews gives room for errors due to the human factor, especially when different annual reviews use different ways of structuring the notes. Which company is excluded due to a lack of sufficient information could also change, however we have included a table with all companies in our data sample in order to clarify what is included (see appendix 1).

6. Conclusion

Due to IFRS 16 which came into effect in January 2019, Swedish public firms are required to recognize what was before classified as operating lease liabilities on the balance sheet. Before this operating lease commitments were instead disclosed in notes to the financial statements and expensed on a straight-line basis. With IFRS 16 one of the advantages of operating leases, being accounted for off-balance, was removed. We examine the results of the new standard and company responses. We aimed to answer if companies had less leases after IFRS 16 was introduced, and if this decline was greater for firms with larger operating lease commitments beforehand.

To answer our research questions, we used cross sectional regression analysis. We could not determine whether evidence supported our first hypothesis, that IFRS resulted in a decrease in leasing. Furthermore, we could not find evidence to confirm our second hypothesis but there is an indication that firms with larger operating lease commitments pre IFRS 16 shifted to shorter lease terms.

Comparing our results to previous literature we see that our results are not in line with studies which study similar phenomena such as Ma & Thomas (2021) or Imhoff & Thomas (1988). However, we note that these studies focus on different standards that are not exactly the same as IFRS 16; thus these differences could be a result of this. Our study could support what standard setters were expecting, that is that were was no clear difference in leasing due to the removal of reporting incentives.

6.1 Future Research

Future research in the field may explore the effect of the new leasing standard in other countries, as previous studies have pointed to the importance conditions between countries (Branswijck et al, 2011). Furthermore, it may include more variables like industry and size as well as other more precise control variables to get a better idea about leasing in different subsets of companies. Above all, concerning the economic responses to leasing and company propensity to lease, it would be interesting to get a longer-term perspective on leasing. A study with data for more than three years after the application of IFRS 16 could get a better idea of the long-term trend and implication for the leasing market.

Our review of relevant literature led us to identify that there are many opportunities for better studies on leasing under IFRS overall. Most studies we found study similar standards in the anglosphere. While these standards are similar, they are often not exact copies of IASB rulings, and these studies are therefore not always directly applicable to IFRS. As the IFRS foundation identifies (IFRS Foundation, 2020) studies on "the quality of disclosures", "how it has affected user behaviour and ability", if implementation led to identify additional leases, are needed to evaluate the standard and its overall effect on stakeholders.

Lastly, a qualitative study of managers perception's after IFRS 16 has been implemented could tell us something about their response and a likely long-term response to the change in leasing regulation. As some studies point to the economic disadvantages of lease capitalization being perceived to be larger than they are (Ma & Thomas, 2021), it would be interesting to see if managers perception of leasing changed, and how this predicts future propensity to lease assets.

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Appendix

Appendix 1 – Companies making up the data sample

Company name	SIC Industry
AB Volvo	Manufacturing
Investor AB	Finance, Insurance and Real Estate
Telefonaktiebolaget LM Ericsson	Manufacturing
Skanska AB	Construction
AB Electrolux	Manufacturing
Atlas Copco AB	Manufacturing
Securitas AB	Services
Sandvik AB	Manufacturing
SSAB AB	Manufacturing
Telia Company AB	Transportation, Communications, Electric, Gas and Sanitary service
AB SKF	Manufacturing
Boliden AB	Manufacturing
Peab AB	Construction
Axfood AB	Retail Trade
NCC AB	Construction
Husqvarna AB	Manufacturing
Hexagon AB	Manufacturing
Alfa Laval AB	Manufacturing
Saab AB	Manufacturing
Bilia AB	Retail Trade
NIBE Industrier AB	Manufacturing
Getinge AB	Manufacturing
Tele2 AB	Transportation, Communications, Electric, Gas and Sanitary service
Ratos AB	Finance, Insurance and Real Estate
Bravida Holding AB	Construction
Sweco AB	Construction
Indutrade AB	Manufacturing
Dometic Group AB	Manufacturing
Svenska Cellulosa Aktiebolaget SCA	Manufacturing
Holmen AB	Manufacturing
Investment AB Latour	Nonclassifiable
Gränges AB	Manufacturing
Intrum AB	Services
Lifco AB	Wholesale Trade
Beijer Ref AB	Wholesale Trade
HEXPOL AB	Manufacturing
Ework Group AB	Services
Attendo AB	Services
Mekonomen AB	Retail Trade
Elanders AB	Manufacturing

Ambea AB	Services
Evolution AB	Services
Thule Group AB	Manufacturing
Scandi Standard AB	Manufacturing
Coor Service Management Holding AB	Services
Lindab International AB	Manufacturing
Serneke Group AB	Nonclassifiable
Eltel AB	Services
Humana AB	Services
Inwido AB	Manufacturing
Byggmax Group AB	Retail Trade
AB Fagerhult	Manufacturing
Bure Equity AB	Finance, Insurance and Real Estate
Volati AB	Finance, Insurance and Real Estate
Ferronordic AB	Wholesale Trade
Stillfront Group AB	Services
Bufab AB	Wholesale Trade
BE Group AB	Wholesale Trade
Modern Times Group MTG AB	Transportation, Communications, Electric, Gas and Sanitary service
Knowit AB	Services
OEM International AB	Wholesale Trade
Pandox AB	Finance, Insurance and Real Estate
AB Sagax	Finance, Insurance and Real Estate
Wihlborgs Fastigheter AB	Finance, Insurance and Real Estate
DistIT AB	Wholesale Trade
Hufvudstaden AB	Finance, Insurance and Real Estate
Akelius Residential Property AB	Finance, Insurance and Real Estate
BTS Group AB	Services
FastPartner AB	Finance, Insurance and Real Estate
Semcon AB	Services
GHP Specialty Care AB	Services
Paradox Interactive AB	Services
Catena AB	Finance, Insurance and Real Estate
Zinzino AB	Retail Trade
Investment AB Öresund	Finance, Insurance and Real Estate
Dedicare AB	Services
Prevas AB	Services
Enea AB	Services
Byggmästare Anders J Ahlström Holding AB	Finance, Insurance and Real Estate
Studsvik AB	Transportation, Communications, Electric, Gas and Sanitary service
Softronic AB	Services
Wise Group AB	Services
Christian Berner Tech Trade AB	Wholesale Trade

Actic Group AB	Services
Besqab AB	Construction
Heba Fastighets AB	Finance, Insurance and Real Estate
Genova Property Group AB	Finance, Insurance and Real Estate
Arise AB	Transportation, Communications, Electric, Gas and Sanitary service
Logistea AB	Finance, Insurance and Real Estate
Havsfrun Investment AB	Finance, Insurance and Real Estate

Appendix 2 – tests for normality of error distribution

Appendix 1.1: Shapiro-Wilk test for normal distribution of regression residuals

Regression	Obs	W-value	p-value
Simple	270	0.47735	0.00000
Additional controls	270	0.56629	0.00000
Payment ratio	270	0.85292	0.00000

H_0: residuals are normally distributed

Appendix 2.2: Test for skewness and kurtosis of regression residuals

Regression	Obs	Skewness	Kurtosis	Adj. chi2(2)	Prob > chi2
Simple	270	0.0000	0.0000	225.11	0.0000
Additional controls	270	0.0000	0.0000	209.51	0.0000
Payment ratio	270	0.0000	0.0000	71.08	0.0000

H_0: residuals are normally distributed