ERASMUS UNIVERISTY ROTTERDAM

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The Market reaction to the Adoption of IFRS 16: Lease Accounting

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Abstract

This paper examines the market reaction to the adoption of IFRS 16. This is a new leasing standard that recognizes the operating leases on the balance sheet of the lessee. I use the Stoxx 600 Europe index to carry out an event study to measure the abnormal return using different event periods. In addition, I focus on the price impact, the bid-ask spread and the Tobin's Q to determine the economic consequences after the adoption. My results show negative returns for the issue date and positive returns for the effective date. Besides, I find stronger impacts of the IFRS 16 introduction on the stock prices for the longer-term event windows. The other outcomes show a significant positive effect of the price impact, a negative impact of the bid-ask spread and an insignificant influence of the Tobin's q. This indicates that the price impact increases and the information asymmetry decreases after the IFRS 16 application. Finally, my research also has some limitations. For instance, I use a limited data sample and sample period due to limited data excess. Other drawbacks are that my results could be biased from seasonal effects, such as the January-effect, or transitional effects.

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1. Introduction

The purpose of this thesis is to examine the market reaction to the adoption of International Financial Reporting Standards (IFRS) 16. IFRS 16 is a substitution of the International Accounting Standards (IAS) 17 accounting standards and entails the concept of lease accounting[1]. Leasing is an alternative form of investment in property, plant or equipment. It is a contractual agreement between a lessor and a lessee. A lessor is the party who purchases an item of property, plant and equipment to rent it to another party, the lessee. The lessee is the person to whom property, plant and equipment is rented or loaned. Both parties are tied to contractual conditions. It guarantees the lessee to use assets and guarantees the lessor of the item to get regular periodic payments in exchange, usually money or other assets. The contract conditions provide consequences when one of the parties fail to satisfy the terms of the contract.

On January 13, 2016, the International Accounting Standards Board (IASB) issued a new accounting standard (IFRS 16) which has been mandated for listed companies located in Euro-zone countries after January 1, 2019. These standards introduce a new lease accounting model which recognize almost all operating leases on the balance sheet of the lessee. The impact of the new model has several expectations on the financial statements and balance sheet items. Numerous studies, these papers will be explained in the theoretical background, have examined the market reaction to lease capitalization or differences in financial ratios due to accounting standard changes. For instance, the leverage ratio will increase due to

[1] Lease accounting consists of two parts, namely operating lease and financial lease. The main difference between these leases is that operating leases are not accounted on the balance sheet (off-balance sheet method) while financial leases are recorded on the balance sheet (on-balance sheet method). This difference is caused by the fact that the ownership of operating leases remains with the lessor the entire lease period while the ownership of financial leases transfer to the lessee. Thus, under operating leases all risk and rewards are for the lessor and the assets have to be returned to the lessor by the lessee at the end of the lease period while under financial leases all risk and rewards are for the lessee and after the period the lessee is the judicial owner of the asset. These differences will give problems with the balancing of the assets because operating leases are considered like rents while financial leases like loans. Therefore, the accounting effect is that operating leases are not on the balance sheet (off-balance sheet) while financial leases are (on-balance sheet).

recognition in new liabilities, return on assets will decrease due to recognition in new assets and EBITDA will increase due to changes in depreciation expenses and interest expenses instead of operational expenses. This can cause a market reaction and therefore my research question will be:

RQ: Does the adoption of IFRS 16 affect the market reaction of listed companies in Europe?

It is important to have an answer to this question because evidence about the effect of lease capitalization on the market reaction is mixed. For example, Sakai (2010) found that there was no market reaction to lease capitalization while Lindsey (2006) did find a reaction. However, there are three prior studies that investigated the market reaction to different changes in IFRS standards. Armstrong, Barth, Jagolinzer and Riedl (2010) concluded that there was a positive market reaction after the adoption of IFRS in 2005. The same results are found by Hamberg, Paananen, Novak (2011) to the adoption of IFRS 3 and Onali and Ginesti (2014) to the introduction of IFRS 9. So, there seems to be a relation to the market reaction and IFRS accounting changes and it is plausible to say that there could be a market reaction to the adoption of IFRS 16.

This thesis also contributes to the interest of shareholders, investors and regulators. IAS 17 used an off-balance sheet method which do not recognize all lease obligations and assets. IFRS 16 is an adjustment to this limitation and gives more comparability and transparency to the interested parties. The new requirements will have an impact on some financial metrics such as solvency and leverage which may affect the lessees' behaviour (PWC, 2016) which can lead to market changes. According to Daske et al. (2008 & 2013) I will measure the economic consequences to see how the market behaves.

For the first hypothesis I perform an event study to analyse the change in returns for two events: the issue date and the effective date of IFRS 16. I measure the abnormal returns of the Stoxx 600 Europe companies. I use different event windows to see whether the longer-term event periods differ from the shorter terms. For the second hypothesis I employ three proxies to evaluate the economic consequence of the adoption of IFRS 16. I use the Amihud price impact to measure market liquidity, the bid-ask spread to determine the information asymmetry and the Tobin's Q ratio to quantify the equity valuation. Moreover, I do robustness checks to test whether my results show valid outcomes. I analyse two difference-in-difference

tests. In the first test the retail industries, which feel more impact of the change to IFRS 16 than other industries, has been categorized as treatment group and the other industries as control group. For the second robustness check Switzerland, where the IFRS 16 adoption is not mandated, is the control group and the other Euro-zone countries the treatment group.

The main findings of the first hypothesis are that the results show negative outcomes for the issue date and positive outcomes for the effective date. In addition, the 3-day CAR and 11-day CAR reflect stronger impact of the IFRS adoption on the market, which entails that the market need time to react to this accounting change. The results of the second hypothesis show an increase of the price impact after the adoption of 16 which mean that the market illiquidity increases, a decrease in bid-ask spread which represents a decrease in information asymmetry and insignificant results of the Tobin's Q ratio. The outcomes of the first robustness check confirm my findings of the basic models, which holds that retail industries show higher market illiquidity and lower information asymmetry than non-retail industries. The Tobin's Q is still insignificant. The findings of the second robustness checks show insignificant results for the price impact and the Tobin's q, but significant results for the bid-ask spread. So, Euro-zone countries which are mandated to the IFRS 16 introduction show a lower gap of information asymmetry than Switzerland in which IFRS 16 is not mandated.

In contrast to Sakai (2010) and in addition to Lindsey (2006), there is indeed a market reaction to the application of IFRS 16. So, my results give additional insights to the mixed evidence to the market reaction of lease capitalization. This is more in the interest of shareholders because a higher stock price will implicate a higher receive in compensation which make shareholder happy. The results of the second hypothesis, which is in the interest of the investors and regulators, are mixed. The Amihud illiquidity measure suggest that market liquidity decreases while the bid-ask spread represent the opposite. Nevertheless, Amihud et al. (2002) argue that the bid-ask spread is a finer and better measure than the Amihud illiquidity measure. So, based on the results of the bid-ask spread, information asymmetry declines due to the increase of comparability and transparency which was the purpose of the IFRS 16 introduction by the regulators. Besides, due to this decrease in information asymmetry, investors are more able to trade and stimulate market liquidity.

My research has numerous limitations. For instance, my results could deviate from the reality due to limited data excess and a short sample period. Another drawback is that it is possible that the price changes are not attributable to the event but to other information

contents. Next, I do not consider some effects, such as the January-effect, which could bias my results. In addition, normal returns could also be measured by taking the constant mean model, which could be used in future research. Finally, the results of the Tobin's Q could be biased from transitional effects, but it has never been proven that this is not the case for liquidity proxies. So, this can be investigated in future research.

The thesis will be organized as follows. I will start with the theoretical and institutional background in which I discuss the research problem and dispute the most relevant issues of the market reaction to lease capitalization or other IFRS adoptions. Next, I will describe my hypotheses and the methodology on how to test them. Hereafter, I will analyze my empirical results and describe which statistical tests I will use. Finally, I come up with a conclusion on the research question and some limitations of my research.

2. Institutional background

In 1976 the Financial Accounting Standards Board (FASB) introduced the Statement of Financial Accounting Standard (SFAS) 13, now called Accounting Standard Codification (ASC) 840, to account for leases. It is the previous lease accounting standard controlling companies that fall under the U.S. Generally Accepted Accounting Principles (GAAP). This standard is similar to the European model of IAS 17 issued by the IASB which had been used since 1994.

SFAS 13 and IAS 17 are standards that distinguish between operating leases and capital leases. Capital leases were recorded on the balance sheet and presented in the income statement as interest and depreciation expenses, while operating leases were described in the footnotes of the financial statements. That is why capital leases are called “on-balance sheet leases” and operating leases “off-balance sheet leases”. For example, when one party (lessor) buy certain properties or goods, it will be recognized as a financed purchase so as an asset. When another party (lessee) want to lease this good, it will be seen as operating and will be recognized as expense. It looks like similar transactions, but the latter can be recognized as expense instead using the on-balance sheet method. This is known as the off-balance sheet method and can reflect a false impression about the capital structure and performance of that company. This method does not reflect the proper financial situation, making it difficult to estimate the enterprise value. This lack of transparency gives problems with the comparability among the financial statements and financial ratios of firms. The next researches will convince these statements.

The study of Cornaggia, Franzen and Simin (2011) examined the use of off-balance sheet lease financing for U.S. companies from 1980 to 2007. They calculated the average off-balance sheet lease financing as a percentage of total debt and find that usage of this method increased with 745% over the 27 years which affects relative risk levels and capital structure. Duke, Hsieh and Su (2009) suggest that companies can benefit from classifying leases as operating leases to hide billions of liabilities and assets from investors and report more favorable net income and retained earnings compared with reported capital leases. Moreover, their results show an improve in financial ratios by reporting leases as operating. Therefore, it seems reasonable to say that companies try to shift leases as operating instead of capital leases so that their financial position and net income looks better than it really is.

After several accounting scandals, the security boards in the U.S. and in Europe concluded that this standard was not sufficiently transparent. Finally, the FASB and the IASB decided to work together to mitigate the above-mentioned problems. The boards want the lessee to record the lease on the balance sheet. Many processes have preceded this, but after many considerations, the boards have decided to announce a new standard: the ASC 842 issued by the FASB and IFRS 16 issued by IASB.

The most important change of the IFRS 16 standard is that the distinction between operating and capital leases is eliminated for lessees which means that there is one single model that capitalize all leases. Under IFRS 16 the lessee will recognize a right-use asset and a lease liability on the balance sheet based on the discounted payments required under the lease agreement. There are exceptions for leases less than one year (short-term leases) and leases with a value equal or below 5,000 dollars. The lessor accounting does not change and still distinguish between operating and capital leases (PwC, 2016).

An important aspect under IFRS 16 is determining the lease term. Under IAS 17 this was not necessary because operating leases were seen as expense. The lease term under IFRS 16 is defined as "the noncancelable period for which the lessee has the right to use an underlying asset including optional periods when an entity is reasonably certain to exercise an option to extend (or not to terminate) a lease". When crucial events or changes in circumstance occur, the lessee has to re-estimate its lease term with new cash flows using updated discount rates.

The change to IFRS 16 will gross up the balance sheet and will affect the income statement and cash flow presentation. In addition, some financial key ratios will be influenced by the new standard. For example, PwC (2016) expects a median increase in EBITDA in some sectors. Due to the elimination of off-balance sheet accounting the comparability among firms will increase which makes it easier for small investors to create forecasts and to compare firms.

Finally, there are some differences between the U.S. ASC 842 and IRFS 16. First, under IFRS 16 there is one model that capitalize all leases, while under ASC 842 there are two accounting models depending on whether the lease is an operating or a finance lease. Second, under IFRS 16 there is an exception to recognize assets or liabilities when it falls under the low value standard of 5,000 dollar while the U.S. standard does not apply for this low value assets exception.

3. Literature Review

3.1 Lease capitalization

Imhoff, Lipe and Wright (1991) are one of the first authors that have concerns about operating leases. In their study they find that numerous firms recognize operating leases as an expense instead of an asset or a liability which result in lower reported assets or liabilities on their balance sheet and higher generated revenues. They also argue that these companies were more levered than their reported debt-to-equity represent. Therefore, they create a constructive capitalization method to show the effect on the firms' risk and return measures. This method shows that the relevance and comparability of firm specific measures of risk and performance increases.

Another study (Fülbier, Silva & Pferdehirt, 2008) has researched the potential impact of accounting treatment of operating leases on the balance sheet and its consequences on the financial statements and financial ratios of listed German firms. They use the modified constructive capitalization model of Imhoff et al. by estimating the off-balance sheet lease liability and calculating the present value of the future minimum lease payments. The modified part is that they use firm-specific discount and tax rates in contrast to other studies. Their main findings are that there are notable changes in a variety of financial ratios such as liabilities and assets and minor effects for profitability ratios and market multiples. These findings can suggest more operating and financial risks which may have management incentives to mitigate these effects.

Fitó, Moya and Orgaz (2011) do a similar study about the effects of operating capitalization on financial ratios to make regulators and users aware that accounting standards do matter companies' performance. They use a sample of Spanish companies and concluded that the relation between operating lease capitalization and changes in financial ratios is significant. They also find that the effect may differ among sectors associated with size, ratio variation and retail sector membership of a company.

A lot of studies focus on the market reaction to lease capitalization. So do Arata, also called Sakai, in 2010 on a Japanese sample. Until March 31st, 2009 Japanese companies did not recognize finance lease information on the balance sheets. Instead, they disclosed the information in footnotes. After the change in accounting standards, many firms recognized the lease information on the balance sheet. Sakai examine the market reaction related to the

movement of the finance lease disclosures from footnotes to the recognition of leases in the financial statements. Conclusively, his results show that there is no market reaction to this kind of lease capitalization.

Lindsey (2006) also investigate the market reaction to lease capitalization. He applies an American sample to examine whether operating and capital lease liabilities are differently valued. Operating leases in this study are estimated by discounting firms' future operating lease rental commitment amounts with firm-specific discount rate to create a "as-if capitalized operating lease liability". For both, as-if capitalized operating liability and capital lease liability, he argues a negative significant relation with the market value of equity. However, these leases are priced differently because the magnitude for the capital lease liability is greater than the magnitude for the as-if capitalized operating lease liability. His final conclusion is that all leases have to be capitalized.

3.2 IFRS

IFRS are established by the IASB. IFRS are a setting of rules, a global framework, for how public companies should prepare and disclose their financial statements. Many studies have investigated the market reaction to the adoption of IFRS.

Hamberg, Paananen and Novak (2011) have researched on the market reaction to the adoption of IFRS 3. IFRS 3 indicates the business combinations when an acquirer obtains control over another business, the so-called acquisitions or merger transactions. Assets acquired and liabilities assumed have to be measured at fair value at the acquisition date. They use a Swedish sample to document the accounting consequences and the market reaction to the adoption of IFRS 3. Their findings show that reported earnings increase as a result of abolished goodwill amortizations. The long-term effect of increasing earnings is a consequence of capitalized goodwill. Besides, when IFRS 3 was adopted, companies with a generous amount of goodwill show an increase in earnings because the stock market revalue firms with a high volume of goodwill upwards.

The study by Onali and Genesti in 2014 examines the market reaction of 13 announcement date to the adoption of IFRS 9. IFRS 9 involves requirements for recognition and measurement, impairment of financial assets, derecognition and general hedge accounting. It helps how an entity should be classified. The authors use an event study to test

the market reaction of listed European firms. Their results suggest that the stock market react positively to the accounting standard change from IAS 39 to IFRS 9, especially for companies located in countries where the divergence between local accounting and international accounting is small.

Another study (Armstrong, Barth, Jagolinzer & Riedl, 2010) investigate the stock market reaction in Europe based on 16 events that are associated with the adoption of IFRS in 2005 by using an event study. The adoption of IFRS in 2005 ensure that the convergence of financial reporting will increase across countries with the expected result of less information asymmetry and higher accounting quality. Armstrong et al. find evidence about the latter and argue that there is a positive market reaction to the adoption of IFRS in Europe with increases in information quality, decreases in information asymmetry, stricter enforcement of standards, and more convergence.

In 2018 Morales-Diaz and Zamora-Ramirez inspect the impact of IFRS 16 on the key financial ratios. As mentioned above, IFRS 16 will lead to the capitalization of operating leases. Thus, operating leases will not be recognized as expenses but as asset or liability which will have an impact on the balance sheet and profit and loss account. They examine the effect of the accounting standard change from IAS 17 to IFRS 16 on several financial ratios and find that this change has a significant impact on the balance sheet, leverage and solvency ratio but does not show significant evidence for profitability. In other words, their results show an increase in leverage and a decrease in solvency. Solvency is computed by the coverage ratio, which measures the firm's ability to service its debt and control its financial obligations such as interest payments. The decrease in solvency is caused by the relatively higher increase in interest expense compared to EBITDA. They also suggest that the magnitude of the effect differs across sectors. Sectors with a higher ratio of operating lease expense divided by total liabilities, show a higher magnitude. This includes the following sectors: retail, transport, hotels, and software and services.

4. Hypothesis development

The aforementioned literature shows the results of the market reaction to lease capitalization is mixed and inconclusive. Sakai (2010) find no market reaction to lease capitalization while Lindsey (2006) finds a negative relation. Nevertheless, lease capitalization has an effect on the capital structure of a company. Imhoff et al. (1991) argue that constructive lease capitalization of long-term operating lease engagements improves the relevance and comparability of firm specific measurements of risk and performance. Some other studies also show that lease capitalization influences some financial key ratios (Fülbier et al, 2008; Fitó et al, 2011). Morales-Diaz et al. (2018) investigate the impact of IFRS 16 on the financial ratios and find that leverage increases and that solvency decreases. So, the introduction of IFRS 16 leads to a change in capital structure for those IFRS adopters and it therefore seems plausible that IFRS 16 will lead to a market reaction. Prior literature (Hamberg et al, 2011; Onali & Genesti, 2014; Armstrong et al, 2010) show a positive market reaction to the adoption of IFRS 3, IFRS 9 and the general adoption of IFRS in 2005. I will therefore expect a positive market reaction to the adoption of IFRS 16. This generates the following hypothesis:

H1: The adoption of IFRS 16 lead to a positive market reaction for listed companies in Europe.

The introduction of new accounting standards can have consequences on economic, social or political level. These changes in accounting standards should only be made when benefits outpace the costs. However, giving a weight to benefits and costs is challenging for regulators because both are very different to identify and very difficult to measure. An important consideration is that new accounting standards should improve financial information of financial reports so that investors and other users can make rational investments. Although the weight to benefits and costs is difficult to determine, it is clear that these consequences cannot be ignored and that regulatory bodies have to be aware of these consequences when introducing a new accounting standard (Brown, 1990).

Zeff (1978) define economic consequences as “the impact of accounting reports on the decision-making behaviour of business, government, unions, investors and creditors”. He represents the awareness of economic consequences to increased accounting information by

identifying the way in which individuals and groups used economic consequences to make certain accounting decisions. Zeff argues that economic consequences are the most challenging accounting issue of the 1970s and that these consequences may no longer be ignored. Regulators must anticipate to the changing tenor of times and at the same time continue fulfil its essential role in areas in which it has expertise.

As read before, introducing a new accounting standard can change economic outcomes. Numerous studies use market liquidity, information asymmetry or cost of capital as variables for economic consequences. This is why. Information asymmetry can trigger adverse selection into security markets, which creates a situation where one party has more information than the other party, i.e. the better-informed party versus the less-informed party. As a consequence, less-informed investors want to buy (sell) a security at a lower (higher) price to protect themselves against the losses from trading with better-informed investors. Likewise, information asymmetry and adverse selection diminish the willingness of less-informed to trade, which means reducing market liquidity of security markets. An increase in financial reporting and disclosure quality can mitigate the adverse selection problem and increase market liquidity by harmonizing the flow of information for all investors (Verrecchia, 2001; Welker, 1995). Fu, Kraft and Zhang (2012) examine the financial reporting frequency on information asymmetry and suggest that information asymmetry reduces when reporting frequency increases. Leuz and Verrecchia (2000) mention a similar argument and suggest that higher disclosure quality reduce information asymmetry and increase market liquidity.

Another consequence of adopting a new accounting standard is that it can affect the cost of capital and Tobin's Q ratio. The cost of capital represents the minimum rate of return on a project or investment required by an investor to proceed with a project or investment. It is an indication of the risk of a firm's equity. According to Lambert, Leuz and Verrecchia (2007) better accounting quality improve investors' estimation risk about firms' future cash flows which results in a decline in cost of capital. This statement has been already released by Levitt (1998), the former chairman of the U.S. securities and exchange commission. However, there is a lot of discussion about the validity of the cost of capital and that is why Daske, Hail, Leuz and Verdi (2008) also use the Tobin's Q ratio. They find estimations problems for the cost of capital around changes in company's accounting standards which give challenges for clean-surplus and terminal-growth assumptions, and difficulties with forecasting future

earnings. This does not hold for the Tobin's Q ratio. For example, if transparency increases future cash flow estimations will improve. The Tobin's Q ratio has the ability to reflect resulting changes in future expected cash flows, even when the cost of capital remains constant. The Tobin's Q ratio is therefore a more complete measure than the cost of capital. The results of Daske et al (2008) argue that the Tobin's Q ratio increases around the IFRS adoption date. This will lead to my second hypothesis:

H2: The adoption of IFRS 16 lead to economic consequences associated with a decrease in information asymmetry, an increase in market liquidity, and increase in the Tobin's Q ratio.

5. Research design

In this section I will explain the methodology of the both hypotheses. For the first hypothesis I will use an event study and for the second one I will run a regression model. I will also clarify the sample selection.

5.1 Sample Selection

For the first hypothesis I need the stock prices of all companies that are included in the Stoxx 600 Europe index[2]. This index selects the wealthiest 600 companies in Europe based on free-float market capitalization. I collect this data from *Datastream*, which is a database that provide historical financial information of listed companies across 175 countries. I use daily stock prices to ensure there is sufficient data available to analyse.

For the second hypothesis I use *Datastream* and *Worldscope* to gather all information I need for the European listed companies. Worldscope is a database from Thomson Financial that provide detailed financial statement data on public companies. I only look at Euro-zone listed companies, because all these companies are mandated to use IFRS.

I use a 120-days estimation period and a 11-day event window for both events. So, I need data from September 2015 – January 2016 for the issue date of the IFRS 16 adoption and September 2018 – January 2019 for the effective date of the adoption of IFRS 16. The sample selection for the second hypothesis starts on January 1, 2018 and ends on January 1, 2020 due to limited data availability. The introduction of IFRS 16 is relatively recent, which is why I choose a time period of one year before and one year after the effective date.

5.2 Methodology first hypothesis

I use an event study to examine whether the market reacts to the adoption of IFRS 16. An event study measures a price change after a specific announcement. I select two events: 13 January 2016 which is the issue date of the adoption of IFRS 16 and 1 January 2019 which is the effective date of the adoption of IFRS 16 (IASPlus, 2019). The control period which is used for the estimation window for normal returns will be 120 days before the announcement date to have a large enough information content and a 11-day event window around the

[2] Due to limited data access I focus on the Stoxx 600 Europe companies instead of all European listed companies.

announcement date to give the market sufficient time to react to the adoption. With the help of the market model, which explicate the linear relation between the companies' return and market return conditional on the absence of the event, I run the next regression for the normal returns:

$$PR_{jt} = \alpha + \beta_j MR_t + \varepsilon_{jt}$$

PR_{jt} is the daily stock return for company *j*, MR_t stands for the market return and ε_{jt} indicate the stock return residual for firm *j* on day *t*. Using this formula, I can predict the expected returns for the same time period. Then, I subtract the expected returns from the normal returns to get the abnormal returns for company *j* on day *t.* I do this for all companies and at the end I calculate the cumulative abnormal return (CAR), which is the total of all abnormal returns. The whole process with all calculations of an event study is presented in appendix A.

5.3 Methodology second hypothesis

5.3.1 Dependent variables

For the second hypothesis I want to know the economic consequences (EC) around the adoption of IFRS 16. Many studies analyze economic and political factors to highlight financial reporting and disclosure quality associated with the adoption of IFRS. These studies show how financial reporting and disclosure quality are associated with economic outcomes, in which market liquidity, information asymmetry and the cost of capital should represent the quality of financial disclosures and reporting.

The first dependent variable is *Price Impact* to measure the market liquidity. Dask et al. use Amihud (2002) method to calculate the price impact, which I will also employ. When stocks generate higher returns, these stocks tend to be more illiquid and therefore investors who buy such stocks could deal with higher transaction costs and market impact when they want to sell the security. In this case, the investor is thus more exposed to illiquidity risk. The Amihud illiquidity ratio is a rough measure and can be interpreted as the daily price response associated with one Euro (depends on the currency the country use) of trading volume. It is calculated by the daily stock prices in absolute values to its country's currency volume,

averaged over some period. Higher values of the Amihud illiquidity measure indicate more illiquid stocks. According to Dask et al. (2008 & 2013) I will use the natural logarithm of the price impact. The stock prices and monetary volume are gathered from Datastream. The price impact is measured as follows:

$$ILLIQ_{iy} = 1/D_{iy} \sum_{t=1}^{Diy} |R_{iyd}|/VOLD_{ivyd},$$

Where:

ILLIQiy = The median daily price impact (illiquidity) over the year

Riyd = The return on stock *i* on day *d* of year *y*

VOLDiyd = The respective daily volume in monetary volume

The second dependent variable is *bid-ask spread* which measures the information asymmetry. The definition of bid-ask spread is the difference between the highest price that a buyer is willing to pay for an asset and the lowest price that a seller is willing to accept. IFRS 16 will increase the comparability among firms, which holds that investors are more able to differentiate between lower and higher quality firms, which reduces information asymmetry and lower estimation risk. This also means that when information asymmetry is reducing, the gap of material knowledge between buyers and sellers will decline which entails that the bid-ask spread will converge. Therefore, the bid-ask spread can be used as proxy for information asymmetry. This variable is often used by previous literature (Welker, 1995; Leuz & Verrechia, 2000; Diaske et al., 2008). It is calculated as the difference between the closing bid and ask prices divided by the mid-point. I obtain the bid and the ask prices from Datastream. According to Dask et al. (2008 & 2013) I will use the natural logarithm of the bid-ask spread.

The last dependent variable is the *Tobin's Q ratio* as proxy for equity valuation. There will be expected that the capital structure will change after the IFRS 16 introduction. The Tobin's Q ratio reflects whether a given company is over- or undervalued. So, if a certain business is over- or undervalued, it will change to a more realistic value after the adoption of IFRS 16. Besides, this ratio captures not only changes in firms' cost of capital but also the resulting changes in future expected cash flows and costs associated with the implementation of IFRS 16 while the cost of capital has difficulties with this. This is why the Tobin's Q ratio is

a more constant measure than the cost of capital. Thus, I will not use the cost of capital as proxy for economic consequences but instead the Tobin's q. I repeat the calculation method of Dask et al. (2008) by taking the total assets minus book value of equity plus market value of equity and divide this result by total assets. I obtain the financial data from Worldscope and the number of outstanding shares from Datastream.

5.3.2 Independent variable

I will create one independent variable related to the adoption of IFRS 16. I generate a dummy variable *IFRS* that contain the value of 0 if the period is before the effective date (January 1, 2018 – January 1, 2019) and the value of 1 if the period is after the mandatory adoption of IFRS 16 (January 1, 2019 – January 1, 2020). Thus, the period before the effective date involve companies that use another standard than IFRS 16 (for example, IAS 17) or is a voluntary adopter of IFRS 16.

5.3.2 Control Variables

Based on prior literature and especially the studies of Morales-Diaz et al. (2018) and Diaske et al. (2008 & 2013) I choose the next control variables: *Firm size, Financial Leverage, Solvency Ratio, Share Turnover, Industry Fixed effect, and Country Fixed Effects.* After including all variables, the regression model is structured as follows:

$$EC_{jt} = \alpha + \beta_1(IFRS) + \sum \beta_2 (CV)_{jt} + \varepsilon_{jt}$$

Firm size

Firm size will be included as control variable because I expect that larger firms with greater growth opportunities and more complex operations will experience more economic consequences due to the adoption of IFRS 16 compared to smaller firms. Several studies also control for firm size for both the liquidity (Chordia, Roll & Subrahmanyam, 2000; Leuz & Verrechia, 2000) as the Tobin's Q ratio (Daske et al., 2008; Lang, Lins & Miller, 2004). According to these studies, I measure the firm size by taking the natural logarithm of the market value which is calculated as the current stock price times the number of outstanding shares. I gather this data from Datastream.

Financial leverage

Financial leverage can affect market liquidity. Companies with a low level of financial leverage increases market liquidity and reduces risk (Sidhu, 2018). Also, a change of financial leverage can have an impact on the Tobin's Q ratio (Daske et al, 2008). It is therefore included as control variable for all proxies of economic consequences. The financial leverage ratio is measured as total liabilities divided by total assets. I collect the data of total assets and total liabilities from Datastream.

Solvency ratio

I will use the coverage ratio used by Morales-Diaz et al. (2018) to measure the solvency ratio. They find a decrease in coverage ratio after the adoption of IFRS 16. This ratio is measured as EBITDA/Interest expense. The higher the ratio, the less risk a company has due to sufficient generated cash flow to pay their interest expenses. Due to the results of this research, I will expect a negative effect between the adoption of IFRS 16 and the coverage ratio. I obtain this data from Worldscope.

Share turnover

Following Daske et al. (2008) I will use share turnover as control variable for the price impact, the bid-ask spread and the Tobin's Q ratio. It is a simple measure of how liquid a stock is. Although share turnover, price impact and bid-ask spread are all liquidity measures, I will look at the correlation table to determine if the share turnover should be included or not. If there is no correlation, the share turnover will be covered in the regression model as control variable. Besides, Tobin's Q and share turnover, contain both the component "market value of equity" in their calculation so I expect there is a relation between these two variables. Consequently, excluding the share turnover could lead to omitted variable bias which is why I should include this variable to all my regression models. The share turnover is measured as the annual trading volume divided by the market value of outstanding equity. Stock prices, common shares outstanding and monetary volume are gathered from Datastream.

Fixed effects

According to Dask et al. (2013) I will include country- and industry-fixed effects. Fixed effects are a special form of control variables and useful when you have panel data. With fixed

effects people can consider all factors that are not directly observable but that are constant for certain groups of observations. I will include country-fixed effects, because a country's legal institutions and level of enforcement can differ across countries. It is important to recognize these cross-country differences (Ball, Robin & Wu, 2003). In addition, I will include industry-fixed effects. According to Morales-Diaz et al. (2018) the magnitude of the IFRS 16 adoption is higher for sectors with higher operating lease expenses. There may therefore be cross-sectional differences between industries, resulting in some industries experiencing harder consequences of the IFRS 16 adoption than others. The companies are grouped by using ICB-codes, which is a code for classifying industries and the ISO-country code which is a code for categorizing countries. The ICB-industry code and the ISO-country codes are obtained from Datastream.

6. Empirical Results and Analysis

This chapter contains the statistical tests and analyses of the research designs. First, I will explain the descriptive statistics. Based on these statistics, I will explain why I do some transformations for my variables. Then, I will discuss the outcomes of the regression models and link the results to my hypotheses.

6.1 First Hypothesis

6.1.1 Data Sample

Table 1 shows the data sample for the first hypothesis. I obtain all daily data with available stock prices and market returns for the Stoxx 600 Europe companies from Datastream. After that, I transform the stock prices and market prices into the stock returns and market returns. The Stoxx 600 Europe index represents their index in euros which is why I delete all companies that do not use the euro as currency. This gives me a sample of 294 firms. To get the final sample, I remove all companies with missing values for stock returns. For the issue date sample 271 companies are still left and for the effective date sample 289 companies. These companies have data for the estimation period (120 days) and the 1-day, 3-day and 11-day event windows.

Table 1 Data sample

	Issue Date	**Effective Date**
	Companies	Companies
All daily data with available stock prices and market returns	600	600
After removing non-Euro zone companies	294	294
After dropping all companies with missing values	271	289
Final Sample AR	271	289
Final Sample 11-day CAR	271	289
Final Sample 3-day CAR	271	289

6.1.2 Descriptive Statistics

Table 2 shows the results of the descriptive statistics. Before I measure these statistics, I winsorize the top 1% and the bottom 1% of the stock and market returns. The descriptive statistics show the number of observations, the mean, the median, the standard deviation, the minimum value and the maximum value of the abnormal returns in the 11-day event

window for the issue date and effective date. Remarkable is that the mean and median of the issue date sample is negative compared to these variables of the effective date sample. The difference in standard deviation is very limited and both values are very small, which entails that most numbers are close to the mean. The lowest value is included in the issue date sample and the maximum amount belongs to the effective date sample.

Table 2 Descriptive statistics of the 11-day event window

	Obs	Mean	Median	Std. Dev.	Min	Max	Skewness
Issue Date	2981	-0.082%	-0.064%	0.016	-0.059	0.087	0.101
Effective Date	3179	0.109%	0.017%	0.014	-0.066	0.083	0.322

Furthermore, I look at the skewness to see if the variables are normally distributed. If skewness is 0, the variables have a perfectly normal distribution. If skewness is greater than 1 or less than -1, the distribution of the variables is skewed. The skewness values are all between 0 and 1, so it is plausible to say that the data is normally distributed. To test the normality of the variables, I use the Jarque-Bera test. If the p-value of the skewness test is significant, the null hypothesis will be rejected which means that the variable is not normally distributed. The results of this test are shown in table 3 of Appendix B. All p-values are below the significance level of 5%, so the null hypothesis is rejected which means that none of the variables is normally distributed. However, based on the central limit theorem, which says that data is normally distributed as long as the sample size is large enough, I assume that the data is normally distributed. For this reason, no further adjustments have been made.

6.1.3 Regression results

In this part I will analyze the results of the following event windows: the AR at the event date, 3-day CAR and 11-day CAR. AR shows the results of the abnormal returns when the announcement day is zero, which is the event date. The 3-day CAR displays the three-day event window of the cumulative abnormal returns. The abnormal returns one day before the event day and one day thereafter are summed up to measure the cumulative returns. The 11-day CAR is measured by taking the total of the abnormal return five days before and five day

after the event date. By getting these CARs, I want to show whether there are post-effects after the event date. Table 4 displays the univariate regression output for all event periods.

First, I will explain the results of the issue date at January 13, 2016. The abnormal return shows a significant negative effect after the issue date. The same holds for the 3-day and 11-day CAR. These returns show a respectively value of -0.485%, -0.389% and -0.898% and are all significant at a significance level of 5%. These results are not in line with my expectations of the first hypothesis. The negative effect may be because there was no mandatory application of IFRS 16 before the effective date. Companies could voluntarily choose whether or not to apply this standard after the issue date. So, companies could still use the old accounting standard which gives unrealistic image of a company. As a result of the relatively large amount of information asymmetry between investors and companies, many investors probably wait to trade until the standard is actually implemented. This does not stimulate market liquidity and could result in stock return decline. After the mandatory adoption of IFRS 16 it is likely that the gap of information asymmetry between companies and investors declines which stimulate investors to trade. This will increase market liquidity and should result in positive returns.

Second, I will analyze the results of the effective date at January 1, 2019. On this date all companies in Europe are mandated to adopt IFRS 16. The effect at the event date displays an insignificant positive value of 0.004%. Due to the insignificance number, I cannot draw conclusion for the AR at the effective date. If I look at the 3-day CAR, I see that the positive value is greater and increases to a significant value of 0.425%. The 11-day CAR even rises to a value above the 1%, which is the highest value measured for the events. The 3-day CAR and 11-day CAR values for the effective date sample are significant at a significance level of 5%. These results are in line with my expectations of the first hypothesis.

In my opinion the results of the effective date attach more value and reflect the real effect of the adoption of IFRS 16 more than the results of the issue date. First, in the sample of the issue date, companies can voluntary choose to change their accounting standard. The implementation of IFRS 16 can be cumbersome and costly. The company have to extract, gather and validate the lease data which cost them a lot of effort. I think that at that time the costs are higher than the benefits for companies to change their accounting standard to IFRS 16. Therefore, they do not change their reporting standards and still use the old ones. So, the information asymmetry between investors and companies remains high and the ability of

investors to trade in the market at low transactions costs and little price impact have not yet realized. This could result in a reduction of investor trading which reduce market liquidity and as a consequence a decrease in stock prices. After the mandatory application, companies do not have a choice anymore, so they have to change their reporting standards to IFRS 16. This will result in a higher comparability among firms, which holds that investors are more able to differentiate between lower and higher quality firms, which reduce information asymmetry and lower estimation risk. This means that information asymmetry reduces and investors want to trade again. This increases market liquidity which could lead to higher stock prices. In addition, it is usual that the market needs some time to implement the effects of the accounting standard change. That is why the long-term CARs shows higher coefficients. I therefore think that the results of the effective date sample are more reliable to measure the market reaction to adoption of IFRS 16 and thus I will accept my hypothesis.

Table 4 Regression output event study

	AR				3-day CAR				11-day CAR			
	Obs	Coefficient	t-value	p-value	Obs	Coefficient	t-value	p-value	Obs	Coefficient	t-value	p-value
Issue Date	271	-0.485%	-5.510	0.000	271	-0.389%	-2.380	0.018	271	-0.898%	-2.730	0.007
Effective Date	289	0.004%	0.580	0.562	289	0.425%	4.830	0.000	289	1.194%	5.380	0.000

6.2 Second hypothesis

6.2.1 Data sample

Table 5 represent the data sample for the second hypothesis. I first collect all quarterly available data needed to compute my variables for the Stoxx 600 Europe companies from one year before and one year after the mandatory IFRS 16 adoption. After gathering all raw variables, I transform them in the right formula explained in the research design. Next, I delete all non-Euro companies because I only want to know the economic consequences for the companies that use the Euro as their main currency. This still gives 2,376 quarterly

	Companies	***Observations***
All quarterly data available Stoxx 600 Europe companies	600	4,992
After dropping all companies with missing values	284	2,272
Final Sample	**284**	**2,272**

Table 5 Data sample

observations. The last modification is removing all companies with missing values. The final sample I use to test the second hypothesis contains 284 companies with 2,272 observations.

6.2.2 Descriptive statistics

I start my analysis with the descriptive statistics to see whether there are any special remarks in the data. Before winsorizing the mean and median for the price impact and the bid-ask spread were very low. The minimum and maximum values of the price impact represented the value 0 which means that the values are very close to each other. What was even more remarkable is that firm size had by far the highest values compared to the other variables. This was because firm size is not a ratio while the other independent variables are. In addition, the interest coverage ratio had relatively high values compared to the other ratios. This may be so due to the fact that the Stoxx 600 Europe Index selects the wealthiest 600 companies in Europe based on free-float market capitalization, which makes the companies in this sample more profitable than other companies, resulting in more investments with equity than with debt. This is associated with lower interest costs and therefore a higher interest coverage ratio.

Furthermore, I look at the skewness to see if the variables are normally distributed. As mentioned in the research design, Dask et al. (2008 & 2013) used the natural logarithm of the price impact, bid-ask spread and firm size. Before the variable transformations, price impact and bid-ask spread had very high skewness relative to the other variables. So, it confirms the transformations by Dask et al. to take the natural logarithm of price impact and bid-ask spread to reduce the impact of high skewness. I also take the natural logarithm of the firm size. To reduce the impact of outliers, I winsorize all data variables. Winsorized variables generate a regression model that fits data well and gives a low level of prediction error (Kennedy, Lakonishok & Shaw, 1992).

After taking the natural logarithm and winsorizing, the variables looks better (see Table 6). In contrast to the untransformed price impact, Log (Price Impact) contains a higher difference in the minimum and the maximum value. Moreover, the values of the Log (Firm Size) have converged now. Finally, if I look at the skewness value almost all variables are between or close to -1 and 1 which seems plausible that these variables are normally distributed. Only the Interest Coverage Ratio and the Log (Tobin's q) contain a value higher than 2. The variable of interest, IFRS, and the fixed effects are not included in the table

because these variables are dummy or instrument variables, so the values are very straightforward.

Table 6 Descriptive statistics after winsorizing and taking the natural logarithm

Variable	N	Mean	Median	Std. Dev	Min	Max	Skewness
Log (Price Impact)	2,272	-15.616	16.298	2.967	-21.079	-8.246	0.705
Log (Bid-Ask spread)	2,272	-6.262	-6.287	1.372	-8.892	-3.464	0.114
Tobin's q	2,272	1.001	1.000	0.001	1.000	1.006	2.519
Log (Firm Size)	2,272	16.227	16.130	1.017	14.271	18.768	0.364
Financial Leverage	2,272	0.634	0.628	0.191	0.094	1.013	-0.238
Interest Coverage Ratio	2,272	16.747	8.622	20.648	0.515	80.769	2.017
Share Turnover	2,272	0.121	0.113	0.108	0.000	0.495	1.008

To test the normality of the variables, I use the Jarque-Bera test. If the p-value of the skewness test is significant, the null hypothesis will be rejected which means that the variable is not normally distributed. The results of the Jarque-Bera test are shown in table 7 of Appendix B. All the variables show a significant p-value which means that none of the variables are normally distributed. However, based on the central limit theorem, which says that data is normally distributed as long as the sample size is large enough, I assume that the data is normally distributed.

I also look at the multicollinearity among the variable by doing a Pearson Correlation test. Multicollinearity arise when the independent variables are correlated with each other. It is important to exclude correlated variables because it declines the explanatory power of these variables due to large standard errors. This can lead to insignificant coefficients. The results of this test are found in table 8. Assuming a benchmark of -70% or 70%, there is no correlation among the independent variables. So, there is no multicollinearity detected which means that all variables are included in the regression models.

Table 8 Pearson correlation table

	Log (Price Impact)	*Log (Bid-Ask Spread)*	*Tobin's q*	*IFRS*	*Log (Firm Size)*	*Financial Leverage*	*Interest Coverage Ratio*	*Share Turnover*	*Industry FE*	*Country FE*
Log (Price Impact)	1.000									
Log (Bid-Ask Spread)	0.421	1.000								
Tobin's q	0.166	0.140	1.000							
IFRS	0.086	-0.322	-0.051	1.000						
Log (Firm Size)	-0.306	-0.218	-0.080	-0.012	1.000					
Financial Leverage	-0.197	-0.179	-0.410	0.039	0.157	1.000				
Interest Coverage Ratio	0.099	0.073	0.485	-0.083	-0.032	-0.425	1.000			
Share Turnover	-0.600	-0.351	-0.150	0.018	-0.088	0.166	-0.132	1.000		
Industry FE	0.034	0.005	-0.057	0.000	-0.189	0.081	-0.103	-0.026	1.000	
Country FE	-0.361	-0.114	0.060	0.000	0.009	0.034	-0.045	0.447	-0.005	1.000

Lastly, I look at the heteroscedasticity. Heteroskedasticity happens when the variances of the residuals are non-constant. Not correcting for these non-constant variances will lead to overestimated t-statistics. To test whether the variances are homoscedastic or heteroskedastic, I will use the White test. The results are shown in table 9 of the appendix C. The p-values are all zero in this test, which mean that the null hypothesis is rejected. So, for the regression outputs the variances of the residuals are not homoscedastic but heteroskedastic. That is why I use robust regressions. A robust regression computes a robust variance estimator for clustered data, so that violations, such as the impact of heteroskedasticity, are mitigated.

6.2.3 Regression Analysis

This part will analyze the regression outputs and test whether there is a relation between IFRS 16 and price impact, bid-ask spread and Tobin's Q. These variables are used as proxies for respectively market liquidity, information asymmetry and equity valuation. I run the panel regressions that control for firm size, financial leverage, interest coverage ratio, share turnover, industry-fixed effects and country-fixed effects. The multivariate regression models are shown in table 10.

The first regression tests the relation of IFRS 16 and Log (Price Impact). The results of this regression show that the Log (Price Impact) significantly increases with 55.7% after the adoption of IFRS 16. In this regression, only the Coverage Ratio is insignificant. The second regression test the relation between IFRS and Log (Bid-Ask Spread). The results show that the Log (Bid-Ask Spread) significantly decrease with 87.6% after the adoption of IFRS 16. All other variables are significant against the 1% significance level. The third model test the relation between IFRS and the Tobin's Q. The results of this regression show an insignificant effect between the two variables. So, there is no evidence that the Tobin's Q will change after the IFRS 16 introduction. Model 1 has the highest r-squared which mean that this model explains the variance of the independent variables best compared to model 2 and model 3.

Given that the interest coverage ratio is not significant in model 1, I run the regressions again without this ratio to see what happens with the values. These results are shown in model 4, model 5 and model 6. As can be seen, the values of the independent variable and control variables barely change and the r-squared remain practically the same in model 4. I

will therefore prefer model 4 above model 1 for drawing my conclusions of the Log (Price Impact). The r-squared of model 5 slightly decreases, so is has no added value to remove the interest coverage ratio to test the relation between IFRS and Log (Bid-Ask Spread). The last regression model shows a significant result for IFRS at the significance level of 10%. However, the r-squared decrease from 0.299 to 0.194 compared to model 3 which is a relatively large amount. So, I am not allowed to delete this ratio from the last regression. Based on those last observations, I will use model 2, model 3 and model 4 to draw my conclusions.

My expectations for the second hypothesis were that the adoption of IFRS 16 lead to economic consequences associated with an increase in market liquidity, a decrease in information asymmetry, and an increase in the equity valuation. Derived from the regression of model 4 the Log (Price Impact) has a significant positive effect of 56.2% after the adoption of IFRS 16. Using Log (Price Impact) as proxy for market liquidity, I conclude that the market liquidity decreases after the introduction of IFRS 16 because the higher the Amihud illiquidity measure, the more illiquid the market is. Derived from the regression of model 2, the Log (Bid-Ask Spread) decreases with a significant value of 87.6% after the adoption of IFRS 16. Using Log (Bid-Ask Spread) as proxy for information asymmetry, I find that the information asymmetry decreases after the IFRS 16 application. It seems plausible that market liquidity increases when information asymmetry reduces**.** So, the findings of the price impact and the bid-ask spread about market liquidity are mixed. This can be caused by the different way in which both liquidity units are measured. The Amihud illiquidity measure is a simple measure that only requires a limited amount of data. Although Amihud et al. (2002) suggest that the bid-ask spread desire a lot of microstructure data which could not be available in all markets, it is a finer and better measure than the Amihud illiquidity measure when you do have this data. I therefore attach more value to the results of the bid-ask spread than to the findings of the Amihud price impact. Nonetheless, both findings can be explained.

As mentioned in the results of the first hypothesis, stock prices increase over a longer time period after the mandatory adoption of IFRS 16. From the perspective of price impact, these increases are caused by illiquidity risk. Investors who buy stock in an illiquid market, can be expected to incur higher transactions costs and price impact when they want to sell their security. The investors are exposed to illiquidity risk and should be compensated for this risk which will increase stock prices. In summary, if investors expect higher illiquidity from the market, they want to be compensated and therefore they will price the stocks in such a way

that they generate a higher expected return (Amihud, 2002). From the perspective of the bid-ask spread, a reduction in bid-ask spread will decline the information gap between investors and firms which stimulate investors to trade. This will result in stock price increases.

Model 3 is the best model to explain what happens with the equity valuation after the adoption of IFRS 16. Using Log (Tobin's q) as proxy for the equity valuation the results show an insignificant effect of IFRS 16. There is no evidence that the equity valuation will change after the IFRS 16 introduction. A potential explanation is that equity valuations are more susceptible to transition effects. Hung and Subramanyam (2007) did research in the effects of the book value and total assets around the switch to IFRS for a German sample. They found that, on average, the book value of equity and total assets increases after the adoption of IFRS which would lead to a downward bias in Tobin's Q effects. However, Capkun, Jeny, Jeanjean and Weiss (2008) found evidence that these effects can differ across firms and countries and could go in other directions. It is thus possible that there are temporary difficulties to forecast earnings under new accounting standards which can effect changes in the measurement of total assets. This can have an impact on the Tobin's q.

Table 10 Regression output

	Dependent Variable					
	Model (1)	*Model (2)*	*Model (3)*	*Model (4)*	*Model (5)*	*Model (6)*
Independent Variable	*Log (Price Impact)*	*Log (Bid-Ask spread)*	*Tobin's q*	*Log (Price Impact)*	*Log (Bid-Ask spread)*	*Tobin's q*
IFRS	0.557 ***	-0.876 ***	0.000	0.562 ***	-0.867 ***	0.000 *
	(6.350)	(-18.010)	(-0.540)	(6.410)	(-17.860)	(-1.810)
Control Variables						
Log (Firm Size)	-1.046 ***	-0.345 ***	0.000 ***	-1.046 ***	-0.345 ***	0.000 **
	(-23.260)	(-13.660)	(-2.690)	(-23.260)	(-13.670)	(-2.170)
Financial Leverage	-0.663 **	-0.578 ***	-0.001 ***	-0.592 **	-0.431 ***	-0.002 ***
	(-2.530)	(-4.040)	(-8.080)	(-2.510)	(-3.170)	(-15.350)
Coverage Ratio	-0.002	-0.003 ***	0.000 ***			
	(-0.670)	(-2.620)	(10.600)			
Share Turnover	-16.057 ***	-4.974 ***	-0.001 ***	-16.038 ***	-4.935 ***	-0.002 ***
	(-26.610)	(-17.210)	(-5.890)	(-26.740)	(-17.060)	(-6.650)
Fixed Effects	Industry	Industry	Industry	Industry	Industry	Industry
	Country	Country	Country	Country	Country	Country
Constant	4.316 ***	0.771 *	1.002 ***	4.243 ***	0.617	1.003 ***
	(5.780)	(1.880)	(2740.870)	(5.760)	(1.510)	(2851.610)
Number of Observations	2,272	2,272	2,272	2,272	2,272	2,272
R-Squared	0.508	0.299	0.307	0.507	0.297	0.194

** indicate statistical significance at 10%*
*** indicate statistical significance at 5%*
**** indicate statistical significance at 1%*

7. Robustness checks

To check my results of the basic regression models, I will run two additional tests. I start the analysis with comparisons for the liquidity variables and the equity valuation variable around the adoption of IFRS 16 with a difference-in-difference analysis. This design is a counterfactual analysis which reflects a "what-if" analysis that identifies outcomes of groups with different treatments. I create a dummy variable to identify the group exposed to the treatment. The IFRS variable shows the time when the treatment is started. The variable of interest is the interaction effect between IFRS and the treatment dummy variable, the so-called differences-in-differences estimator. It is still useful to include control variables because the group characteristics of control variables can change over time and leaving them could bias the estimate of the treatment effect. However, I exclude the fixed effects because the differencing gets rid of the individual fixed effects. In addition, assuming the parallel trend assumption, the control group is subject to the same influences and trends as the treatment group and therefore goes in the same direction.

7.1 Difference-in-Difference test between retail and non-retail industries

Prior studies suggest that the magnitude of the adoption of IFRS 16 can differ across industries. That is why is do a difference-in-difference test that takes this effect into account. Almost every industry includes lease activities. Therefore, I make a distinction between the most affected sectors. According to Moralez-Diaz and Zamora-Ramirez (2018) and PwC (2019) are retailers the most influenced industry. I use the ICB-code to categorize the industries. I will form a group of industries that consist of the word "retail" in their definition related to the ICB-code. Table 11 shows me all sectors that are included in my sample. The bold ones are the sectors that have retail activities in their business operations. Next, I create a dummy variable *Retail Industry* that contains the value of 1 if the industry is one of the bold sectors mentioned above and 0 otherwise. The dummy *IFRS* is the same as in the prior regression models. The variable of interest is the interaction effect between *IFRS* and *Retail Industry*. Finally, the control group contains 1,520 number of observations and the treatment group 752 observations.

Table 11 List of industries: the bold ones are the retail industries

Sector	*Frequency*	*Retail*	*Non-Retail*
Aerospace and Defense	48		48
Alternative Energy	8		8
Automobiles and Parts	96	96	
Banks	160	160	
Beverages	48		48
Chemicals	104		104
Construction and Materials	96		96
Consumer Services	8	8	
Electricity	88		88
Electronic and Electrical Equipment	40		40
Finance and Credit Services	16		16
Food Producers	40		40
Gas, Water and Multi-utilities	80		80
General Industrials	40		40
Health Care Providers	24		24
Household Goods and Home Constructions	16	16	
Industrial Engineering	64		64
Industrial Materials	16		16
Industrial Metals and Mining	32		32
Industrial Support Services	48		48
Industrial Transportation	88		88
Investment Banking and Brokerage Services	80		80
Leisure Goods	16	16	
Life Insurance	40		40
Media	40	40	
Medical Equipment and Services	80		80
Nonlife Insurance	64		64
Oil, Gas and Coal	80		80
Personal Care, Drug and Grocery Stores	64	64	
Personal Goods	48	48	
Pharmaceuticals and Biotechnology	96		96
Real Estate Investment Trusts	88	88	
Real Estate Investment and Services	64		64
Retailers	16	16	
Software and Computer Services	112	112	
Technology Hardware and Equipment	64	64	
Telecommunications Equipment	16		16
Telecommunications Service Providers	120		120
Travel and Leisure	24	24	
Total	*2,272*	*752*	*1,520*

Table 12 shows the results of this difference-in-difference test. As can be seen, IFRS is still significant at a 1% significance level. So, after the adoption of IFRS 16 the Log (Price Impact) will increase. As predicted by PwC and Morales-Diaz et al. the effect will be different across sectors. When a company have retail activities, the effect of the Log (Price Impact) will

increase with 33.2%. The variable of interest is the interaction affect. Thus, compared to non-retail companies, companies with retail activities experience increases of 31.3% in Log (Price Impact) after the adoption of IFRS 16 at a significance level of 10%. Compared to my basic model, my findings are confirmed at a lower degree of significance level. In my basic model the results are significant at 1% and in this model at 10%.

For the second model, the interaction effect shows a significant value. So, I find evidence that the Log (Bid-Ask Spread) will decrease with 22.8% after the adoption of IFRS 16 if companies contains a higher amount of retail activities. Compared to my basic model, this result is still significant but at lower level. A potential explanation for the lower significance in model 1 and model 2 could be that although the retail industry is the biggest industry that is hurt by the IFRS 16 introduction, it does not mean that other industries are not feeling the impact of this accounting change. Both groups consist of lease activities, although the retail have a relatively higher amount. So, the non-retail group also reflects the effects of the IFRS 16 application partly. As a consequence, these findings are less significant relative to the basic models.

The interaction effect for the Tobin's Q ratio is still insignificant and I can therefore not draw conclusions on these results. Similar to the findings of my basic model, a potential explanation is that equity valuations are more susceptible to transition effects. This means that it is possible that there are temporary difficulties to forecast earnings under new accounting standards which can effect changes in the measurement of total assets, which can have an impact on the Tobin's Q.

Table 12 Difference-in-Difference test with non-retail as control and retail industries as treatment group

	Dependent Variable		
	Model (1)	*Model (2)*	*Model (3)*
Independent Variable	*Log (Price Impact)*	*Log (Bid-Ask spread*	*Tobin's q*
IFRS	0.459 ***	-0.804 ***	0.000
	(4.380)	(-13.680)	(-0.330)
Retail Industry	0.332 **	0.337 ***	0.000
	(1.730)	(3.850)	(1.190)
*IFRS*Retail Industry*	0.313 *	-0.228 **	0.000
	(1.660)	(-2.220)	(-0.270)
Control Variables			
Log (Firm Size)	-1.044 ***	-0.347 ***	0.000 **
	(-23.610)	(-13.900)	(-2.720)
Financial Leverage	-0.604 **	-0.613 ***	-0.001 ***
	(-2.560)	(-4.270)	(-8.060)
Coverage Ratio		-0.005 ***	0.000 ***
		(-3.610)	(10.210)
Share Turnover	-16.379 ***	-5.141 ***	-0.001 ***
	(-27.620)	(-17.520)	(-5.890)
Constant	4.042 ***	0.706 *	1.002 ***
	(5.580)	(1.730)	(2790.670)
Number of Observations	2,272	2,272	2,272
R-Squared	0.513	0.306	0.308

** indicate statistical significance at 10%*

*** indicate statistical significance at 5%*

**** indicate statistical significance at 1%*

7.2 Difference-in-Difference test between Switzerland and Euro-zone countries

For second difference-in-difference test, I use Switzerland as control group and the Euro-zone countries, which I have used for my basic model, as treatment group. I choose Switzerland as control group because listed companies in Switzerland are not mandated to use IFRS as their main accounting standard. Those companies are required to prepare their financial statements using either IFRS or US GAAP (IFRS, 2019). All listed Euro-zone companies are mandated to report their financial statements under the IFRS accounting standard and will therefore be the treatment group. The dummy variable *Euro Country* contains the value of 1 if the country uses the Euro as currency and is 0 if the country is Switzerland and use the Swiss Franc. The control group contains 400 observations and the treatment group 2,272 observations. The dummy variable IFRS is the same as used in the basic models. The results of this tests are found in table 13.

Model 1 shows the results of the difference-in-difference test for the Log (Price Impact). Despite both the IFRS and Euro Country variable show positive significant value, the interaction effect does not reflect a significant effect. There is thus no evidence that there is a difference in the Log (Price Impact) after the adoption of IFRS 16 between mandatory adopters (Euro-zone countries) and non-mandatory countries (Switzerland). One potential explanation could be that most listed companies in Switzerland choose the IFRS 16 reporting standard instead of the US GAAP. If this is the case, there is barely a difference in accounting standards between Euro-zone countries and Switzerland and it seems reasonble that there is no evidence.

If I look at the outcomes of model 2, the variable of interest for the Log (Bid-Ask Spread) is significant. Compared to non-mandated IFRS adopters (Switzerland), companies in IFRS countries experience a decrease of 84.1% of the log (Bid-Ask Spread) after the mandatory IFRS 16 adoption. So, there seems to be less information asymmetry in mandated-IFRS countries after the IFRS 16 introduction compared to non-mandated IFRS countries. This can be so due to a lack in commitment to global financial reporting standards. If listed companies in Switzerland do not choose the IFRS 16 standard, then these companies are less comparable with those that do use this standard. It is difficult for investors to differentiate between lower and higher quality firms across Switzerland and Euro-zone countries while it is easier to do so across Euro-zone countries. Because of this lack in commitment for Swiss companies, investors will probably invest more in Euro-zone countries due to relatively less information asymmetry and thus market liquidity will be higher in Euro-zone countries.

The results of the last dependent variable represent an insignificant interaction effect. Thus, model 3 do not produce evidence whether there is a difference in equity valuation for IFRS 16 adopters between mandated-IFRS adopters and non-mandated IFRS adopters. A potential explanation could be that equity valuation is more vulnerable to transition effects, which gives temporary difficulties to forecast earnings under new accounting standards and can effect changes in the measurement of total assets. This will influence the Tobin's q.

Table 13 Difference-in-Difference test with Switzerland (non-mandated IFRS adopter) as control and Euro-zone countries (IFRS adopters) as treatment group

	Dependent Variable		
	Model (1)	*Model (2)*	*Model (3)*
Independent Variable	*Log (Price Impact)*	*Log (Bid-Ask spread*	*Tobin's q*
IFRS	0.498 ***	-0.038	0.000
	(3.190)	(-0.650)	(0.010)
Euro Country	0.805 ***	1.359 ***	-0.001 ***
	(6.440)	(21.810)	(-5.740)
*IFRS*Euro Country*	0.054	-0.838 ***	0.000
	(0.300)	(-11.150)	(-0.100)
Control Variables			
Log (Firm Size)	-1.043 ***	-0.326 ***	0.000
	(-27.580)	(-15.660)	(-0.930)
Financial Leverage	-0.460 **	-0.509 ***	-0.001 ***
	(-2.240)	(-4.180)	(-8.030)
Coverage Ratio		-0.002 **	0.000 ***
		(-2.340)	(13.400)
Share Turnover	-15.523 ***	-4.165 ***	-0.001 ***
	(-31.060)	(-19.520)	(-4.970)
Constant	2.416 ***	-1.022 ***	1.002 ***
	(3.930)	(-2.990)	(2953.940)
Number of Observations	2,672	2,672	2,672
R-Squared	0.500	0.359	0.317

** indicate statistical significance at 10%*

*** indicate statistical significance at 5%*

**** indicate statistical significance at 1%*

8. Conclusion and implications

8.1 conclusion

In this thesis I examine the market reaction to the mandatory adoption of IFRS 16 of European listed companies. The first part of this research consists of an event study to measure the abnormal returns for the Stoxx 600 Europe companies. The second part measures the economic consequences in the form of price impact, information asymmetry and the Tobin's Q ratio.

The main findings of the first hypothesis are that the results show negative outcomes for the issue date and positive outcomes for the effective date. I give more value to the results of the effective date because it reflects the IFRS 16 effects more due to the mandatory application of the new standard. In the issue date sample, companies are not mandated but are allowed to use IFRS 16 whereby the stock prices do not fully represent the IFRS adoption. My outcomes also show stronger impacts on the longer-term event periods. This means that the market needs time to react to this accounting change. These outcomes give new insights compared to prior literature. Previous evidence about the market reaction to lease capitalization were mixed while my research indicates a positive market reaction. This is in the best interest of shareholders, because higher returns indicate higher compensation for shareholders.

The results of the second hypothesis show an increase of the Log (Price Impact) after the adoption of 16 which mean that the market illiquidity increases, a decrease in Log (bid-ask spread) which represents a decrease in information asymmetry and insignificant results of the Tobin's Q ratio. The regression output of the Log (Price Impact) and Log (bid-ask spread) show opposite outcomes about market liquidity. Amihud et al. (2002) suggest that the bid-ask spread is a finer and better measure than the Amihud illiquidity measure, so that is why I value the findings of the bid ask-spread relatively more. So, after the IFRS 16 introduction the information asymmetry declines. This means that the gap in information flow between companies and investors decreases, which give more investors the ability to trade. This stimulate market liquidity which may be a causation of the stock price increases in the first hypothesis. These outcomes are in the best interest of investors, because a lower bid-ask spread indicate more information about the company to the outside. Investors' ability to trade increases because they get more knowledge about these companies which make them

able to invest in more quality firms. Moreover, regulators are also satisfied with this result because the investors' ability to differentiate between lower and higher quality firms appear to be caused by more comparability and transparency among companies, which was one of the purposes of the new accounting standard introduction.

The findings of the robustness tests largely correspond to my basic models. The Log (bid-ask spread) is in both difference-in-difference tests significant. However, the results of the Log (Price Impact) is in the first difference-in-difference test significant at a lower degree and insignificant in the second robustness test. The Tobin's Q is in both tests still not significant.

In conclusion, although some findings are inconsistent with my research question, the results of the effective date sample and the outcomes of the regression output of the bid-ask spread indicate that my research question can be accepted. So, there is some evidence that the adoption of IFRS 16 will create a positive market reaction, which may be caused by a decrease in information asymmetry between investors and companies.

8.2 Implications and recommendations for future research

First of all, due to limited data access I have used the Stoxx 600 Europe index, which are the 600 wealthiest companies in Europe. Future research can expand the data sample to more European companies and more companies that are less wealthy. Besides, IFRS 16 is a pretty new accounting standard which gave me a mitigated sample period. In the future, researchers can take a longer time period to see if the results are different from mine.

Second, a limitation of an events study is that the methodology is not valid in some situations. It is possible that the abnormal return may not fully anticipate the IFRS 16 effects, but also other information contents that can have an impact on the stock price. In this case, it could be that the abnormal returns are not entirely the results of the market reaction to the specific event of interest. So, the movement of the price can also be caused by other impacts.

Third, there are different methods to measure the normal returns. I have used the market model, but the returns can also be measured by the *constant mean model*. This model assumes that the mean return is constant over time while the market return assumes a linear

relation between the companies' stock return and the market return. Future research can focus on the constant mean model to see if there are any differences in results.

Fourth, Van der Sar (2018) mentions in his book a number of effects (January effect, End-of-December effect, Turn-of-the-month effect and Weekend effect) that cause persistent deviations in stock returns that are regular in a certain way and have no empirical or theoretical explanation. Moreover, Lou and Shu (2016) mentioned that liquidity measures can be biased from the January effect. These effects are not included in this study and therefore future studies could take them into account.

Finally, I have mentioned that my results of the Tobin's Q could be biased from transitional effects. For instance, it is possible that there are temporary difficulties to forecast earnings under new accounting standards which can effect changes in the measurement of total assets. This can have an impact on the Tobin's Q. Although, it seems plausible that the liquidity proxies are less sensitive to these effects, it has never been proven. So, future investigation could issue this effect to the liquidity proxies.

9. References

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Appendix A

To do an event study I need the stock returns (realised returns) of all companies which will be measured by the following formula:

$$PR_{jt} = \frac{P_{jt} - P_{jt-1}}{P_{jt-1}}$$

P_{jt} is the closing stock price of a listed company *j* at the end of period t and P_{jt-1} is the opening stock return of a listed company *j* at the end of period *t-1*. To measure the normal return, I need the market model:

$$R^*_{jt} = \alpha_j + \beta_j * R_{mjt}$$

α_J is the average return and β_j the risk of the stock in relation to the market. R_{mjt} represent the market return. I will use an OLS regression to calculate the normal returns. The difference between the realised and normal return, will give the abnormal return which is the unexpected part of the return attributable to the event. It will be calculated by the next formula:

$$AR_j = R_{jt} - R^*_{jt}$$

To measure the average effect of the adoption of IFRS 16 (AAR) I will sum up the abnormal returns of all companies and will divide it to the number of observations (N) which can be calculated as follows:

$$AAR_0 = \frac{1}{N}\sum_{J=0}^{N} AR_J$$

I will use the cumulative abnormal returns approach to analyse the effect over a certain time interval. This will be measured with the following formula:

$$CAR_{jKL} = \sum_{t=K}^{L} AR_{jt}$$

CAR_{jKL} is the cumulative abnormal return for company *j* starting at K and ending at L. For example, when K=-11 and L=6 then the time interval is [-11,6]. $\sum_{t=K}^{L} AR_{jt}$ is the sum of the abnormal returns of company *j* at time *t.* I will use a significance level of 5%.

Appendix B

Table 3 Jarque-Bera test hypothesis 1

	Obs	Pr (Skewness)
Issue Date	2981	0.025
Effective Date	3179	0.000

Table 7 Jarque-Bera test hypothesis 2

Variable	N	Pr(Skewness)
Price Impact	2,272	0.000
Log(Price Impact)	2,272	0.000
Bid-Ask Spread	2,272	0.000
Log(Bid-Ask spread)	2,272	0.027
Tobin's q	2,272	0.000
Log(Tobin's q)	2,272	0.000
Firm Size	2,272	0.000
Log(Firm Size)	2,272	0.000
Financial Leverage	2,272	0.000
Interest Coverage Ratio	2,272	0.000
Share Turnover	2,272	0.000

Appendix C

Table 9 White test to test heteroscedasticity for hypothesis 2

	Log (Price Impact)			*Log (Bid-Ask Spread)*			*Tobin's q*		
	chi2	**df**	**p-value**	**chi2**	**df**	**p-value**	**chi2**	**df**	**p-value**
Heteroskedasticity	573.250	34.000	0.000	575.020	34.000	0.000	715.440	34.000	0.000
Skewness	70.810	7.000	0.000	194.180	7.000	0.000	146.660	7.000	0.000
Kurtosis	7.880	1.000	0.005	50.310	1.000	0.000	52.470	1.000	0.000
Total	651.950	42.000	0.000	819.520	42.000	0.000	914.580	42.000	0.000