

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis Economie en Bedrijfseconomie

**The effect of the implementation of IFRS 16 on companies in airline, retail and telecommunication industries**

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Date final version: July 12<sup>th</sup>, 2020

Keywords: lease accounting, IFRS 16, financing and investment decisions, financial metrics

**Abstract:** Before the new International Financial Reporting Standard (IFRS) 16 was introduced, leased assets were categorised as operating or financial lease. The introduction of IFRS 16 requires companies to capitalise all financial leases. This leads to a change in financial metrics such as solvency ratios and profitability ratios. Financiers and investors often use financial metrics to support their financing or investment decisions. Concern arose when the new lease standard was released, as it might have a negative effect for lease intensive companies, such as airline, retail and telecommunication firms, regarding financing and investment decisions. In this paper, the effect of the introduction of IFRS 16 on financial metrics, net cash flows from financing and investing activities and debt positions of airline, retail and telecommunication companies is analysed. Results show that the adoption of IFRS 16 has a significant effect on the Return on Assets (ROA), earnings before interest, taxes, depreciation and amortisation expenses (EBITDA) and the long-term debt.

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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## 1. Introduction

To get both access and use of property and equipment without having a large cash outflow at once, organisations commonly choose to lease assets. However, the way leased assets are categorised by companies can affect their financial metrics such as solvency ratios. As a result, these metrics can affect the possibility to attract credit for lease intensive companies (Sacarin, 2017). Previously, under International Accounting Standard (IAS) 17, companies had to categorise their leases as financial lease or operating lease. Under financial lease, the lessee needs to present the lease at the balance sheet and the depreciation and interest expenses in the income statement. Operating leases do not have to be recognised at the balance sheet and the costs of the lease should be presented in the income statement directly (Deloitte, 2016).

The new standard for lease accounting was issued by the International Accounting Standards Board (IASB) in January 2016. International Financial Reporting Standard (IFRS) 16 leads to the capitalisation of many operating leases by lessees and replaces the old IAS 17. The major change is that all leases for longer than 12 months, apart from low value asset leases, need to be presented at the balance sheet (Sacarin, 2017). This leads to a buy-or-lease decision for companies who previously used operating lease.

The capitalisation of most operating leases eliminates nearly all off balance sheet accounting for lessees. A right-of-use asset and lease liability need to be recognised when a lease needs to be recognised at the balance sheet because of IFRS 16. This leads to a rise in liabilities, as well as a rise in assets, while equity remains unchanged. Also, operational expenses are replaced with depreciation and interest expenses (Morales-Díaz & Zamora-Ramírez, 2018). Through these changes, some financial metrics are redefined, like the gearing ratio or earnings before interest, taxes, depreciation and amortisation expenses (EBITDA) (PwC, 2016). However, the comparability of companies increases through the implementation of IFRS 16 as the off-balance sheet accounting decreases. On the other hand, it can also affect credit ratings, the costs of borrowing and the stakeholders view (PwC, 2016). According to Jeroen Piersma (2018), the debts of some listed companies, especially retail and airline companies like KLM and Ahold Delhaize, will rise in 2019 through the application of the new lease standard. When the total debt of organisations rises, it might be harder for these organisations to obtain loans from banks and other investors. This leads to the following research question: *How does the implementation of IFRS 16 affect the financiers' and investors' decisions for airline, retail and telecommunication companies worldwide?*

The subject discussed is socially relevant as the new accounting standard impacts all companies involved in some sort of lease (PwC, 2016). When the implementation of IFRS 16 has a large impact on the financial position of some large companies such as KLM or Ahold Delhaize, this might in turn affect the employees, suppliers, customers or other stakeholders

of these companies. For example, KLM needs to decide whether they are going to buy or lease airplanes which were previously presented under operating lease. When the financial positions of large companies change as a result of the new lease standard, this might lead to more or less demand for employees or suppliers. Additionally, this might cause product prices to rise which affects customers or other stakeholders. Therefore, it is socially relevant to explore the effect of the new lease standard on lease intensive companies and their financial position. Also, the implementation of a new accounting standard influences the annual report of companies and the auditors' activities. By evaluating the effect of the implementation of a new accounting standard, it can be assessed whether the new standard benefits the comparability of the annual report.

First, a summary of the previous research on the effect of IFRS 16 will be presented in the theoretical framework. Also, the major changes from IAS 17 to IFRS 16 will be highlighted. Secondly, the construction of the data sample and the variables used is explained. Thirdly, the methodology section shows how the variables and the effect of IFRS 16 on the financial position of lease intensive companies are analysed. Finally, the results will be displayed and discussed and a conclusion will be formulated, answering the research question.

## **2. Theoretical framework**

To explore the effect of IFRS 16 on airline, retail and telecommunication companies, the most important features of the old and new lease standards are explained. In addition, previous research on the changing lease accounting standard is used to analyse the possible effect on financial metrics such as solvency ratios and profitability ratios. Next, the off-balance sheet accounting is examined to show the scope of the previous off-balance sheet accounting through operating leases. In this study, the effect is analysed if operating leases would be capitalised. These results are used to formulate probable effects of the introduction of IFRS 16. In the theoretical framework, lessee accounting is the primary subject of study, as it is most relevant in answering the research question.

### *2.1. IAS 17 – Leases*

Before IFRS 16 was published by the IASB, IAS 17 prescribed the accounting and disclosure rules for both lessors and lessees (IAS Plus, 2015). Under IAS 17, when a company chose to lease an asset, the lease needed to be categorised as financial or operating lease. The categorisation depends on the substance of the transaction. The five basic examples when a lease needs to be classified as financial lease are:

1. By the end of the lease term, the ownership of the lease is transferred to the lessee;

2. The option to purchase the asset at a price which is expected to be sufficiently lower than the fair value of the asset at the date the option can be exercised is available for the lessee. It is reasonably certain the lessee will choose this option;
3. Even if ownership is not transferred, the major part of the economic life of the asset equals the lease term;
4. The present value of the minimum lease payments amounts to at least the fair value of the leased asset, at the inception of the lease;
5. The leased assets are designed or produced in such way the lease can only be used by the lessee, without major modifications (IAS Plus, 2015).

When one of the examples above is met, an organisation needs to classify the lease as financial lease, with some exemptions. Otherwise the lease needs to be classified as operating lease. It is also possible a lease needs to be categorised as both financial and operating lease. This can be the case when property is leased, land and building elements need to be classified separately (IASB, 2008).

When leases are classified as financial lease, the risks and rewards of ownership are transferred to the lessee. In that case, the lease needs to be recognised at the balance sheet causing assets to rise and a lease liability to be recognised by the lessee. On the other side, the lessor needs to recognise a receivable. The amount recognised at the lessee's balance sheet equals the lower of the present value of the minimum lease payments and the fair value of the asset. The present value of the minimum lease payments is calculated using the interest rate implicit in the lease if this is possible. Otherwise the company's incremental borrowing rate is used, which is more common in practise (IAS Plus, 2015).

Over the lease period, the lease is depreciated against policy consistent with depreciation for owned assets. If it is not probably the ownership of the asset will be transferred to the lessee at the end of the lease period, the depreciation period of the asset should be the shorter of the life of the asset or the lease term (IASB, 2008). The depreciation expenses can be found in the income statement. Besides depreciation expenses, interest expenses for the lease can be found in the income statement. The interest expenses equal the difference between the periodic payment and depreciation expense for the same period.

When leases are classified as operating lease, the ownership of the risks and rewards of the leased object is not transferred to the lessee (IASB, 2008). No assets or liabilities are recognised at the balance sheet of the lessee. Only operating expenses for the lease can be found in the income statement. These operating expenses should be recognised on a straight-line basis over the lease term, unless another method is more representative for the lease (IAS Plus, 2015).

Regarding the disclosure for leases in the annual report of the lessee, some similarities can be found under IAS 17. For example, for both financial and operating lease, the disclosure

needs to include the amounts of minimum lease payments at balance sheet date for the next year, years two to five combined and beyond five years (IASB, 2008). Also, for significant leasing arrangements a general description needs to be presented, including contingent rent provisions, renewal or purchase options, borrowings or further leasing. For financial lease, the carrying amount of the assets and the reconciliation between the total minimum lease payments and their present value need to be presented as well (IAS Plus, 2015). So, the disclosure requirements for leases under IAS 17 are more extensive for financial lease than for operating lease.

### *2.2. Drawbacks of operating lease*

Despite the efforts made by accounting policymakers to develop rules which oblige companies to recognise most leases at the balance sheet, companies still find ways to recognise their leases as operating leases instead of capitalising their leases. Imhoff, Lipe and Wright (1991) did extensive research on the categorisation of financial and operating leases. They found numerous companies in all industries reporting large noncancelable operating lease commitments for many years in the future. In this way, these companies are using many more assets than presented on the balance sheet to generate revenue. Also, they are more levered than their reported solvency ratio suggests (Imhoff et al., 1991). Even though the effects of off-balance sheet financing or investing activities on financial metrics can be corrected, most public databases do not do this. This does not benefit the comparability of companies or industries, as the magnitude of operating lease, thus the influence of operating lease on financial measures, differs per industry (Imhoff et al., 1991).

Imhoff, Lipe and Wright (1991) however performed their research on companies using US GAAP. These companies had to follow Accounting Standards Codification (ASC) 840, which prescribes the accounting and disclosure rules regarding leases (FASB, 1976). Following, Branswijck and Longueville (2011) researched if the effect of off-balance accounting through the use of operating lease under IAS 17 was similar to off-balance sheet accounting through operating lease under ASC 840. As expected, they found a similar effect on the financial metrics as Imhoff et al. (1991) did, as IAS 17 and ASC 840 are quite similar.

### *2.3. Capitalisation of operating leases*

Imhoff, Lipe and Wright (1991) developed a model to assess the effect of constructively capitalising the noncancelable commitments embodied in a company's operating leases under ASC 840. They present a way to estimate the amount of assets and debt that would be reported on the balance sheet in case the operating leases were to be capitalised.

Both under ASC 840 and IAS 17, the disclosure should include the minimum future lease payments for operating lease with remaining noncancelable lease terms for the next

year, over one year till five years and over five years (FASB, 1976). This information is used by Imhoff et al. (1991) to estimate the debt present when all noncancelable commitments embodied in operating leases would be capitalised. The debt is calculated by discounting the minimum future lease payments against the company's incremental borrowing rate and estimate of the remaining life of the assets. This results in an estimate of the present off-balance sheet debt. Following, Imhoff et al. (1991) estimate the related unamortised off-balance sheet leased assets by analysing the relation between the debt and assets. They find evidence that the unrecorded liability will exceed the unrecorded asset. Also, they find a significant rise in solvency ratios and a significant decrease in the Return on Assets (ROA) when material operating lease commitments would be capitalised. Branswijck and Longueville (2011) found a similar effect on the solvency ratios and the ROA, when they performed similar research on the capitalisation of operating leases under IAS 17.

#### *2.4. IFRS 16 – Leases*

To eliminate the possibility for lessees for off-balance sheet accounting for leases and to improve the comparability between companies and industries, the IASB released a new lease standard in 2016 (Deloitte, 2016). IFRS 16 obligates companies to capitalise all leases, with the exemption of low-value assets, with a lease period over 12 months. The key change of the new accounting standard is the elimination of the choice between financial or operating lease for lessees (PwC, 2016). All leases need to be recognised on the balance sheet by the lessee as leased assets, for example right-of-use assets. On the other hand, a corresponding lease liability needs to be recognised at the balance sheet which presents the company's obligation to make future lease payments. Only low-value assets that are leased can still be treated the same way as operating leases by recognising their expenses in the income statement. According to Deloitte (2016), mainly retail, travel and telecommunication sectors or other companies with significant off-balance sheet obligations for operating leases are affected when all leases need to be recognised on the balance sheet.

The obligation to capitalise all leases, with some exceptions, leads to a new definition of lease as well. Under IFRS 16, only when the customer has the right to control the use of an identified asset for a period of time, a lease can exist (Deloitte, 2016). The economic benefits from the use of the asset should also be mainly for the lessee. When the decision-making on the asset and economic benefits remain in control of the supplier, there is no lease, but this might be a service contract (Deloitte, 2016).

In addition, leasing and non-leasing services need to be separated when IFRS 16 is adopted. This was already the case under IAS 17, however when the lease was classified as operating lease, this was not a difficult exercise from an accounting perspective. The lease and service components would both be classified as expenses. However, under IFRS 16 the

lease component needs to be capitalised and the service component mostly remains expensed over the term of the contract. But as a practical expedient, the lease and non-lease components may be elected by the lessee as a lease together (PwC, 2016).

Because of the new lease standard, most lease contracts need to be reviewed. When a lease needs to be capitalised, the lease term needs to be assessed. Under IFRS 16, the lease term is the non-cancellable period of the lease, plus any reasonably optional renewal periods and any period after an optional termination (PwC, 2016). Consequentially, the total lease liability needs to be re-evaluated by the lessee.

### *2.5. The probable effect of IFRS 16*

Not much research has been done on the impact of the implementation of IFRS 16, as it was not released until January 2016 and the implementation needs to be effective from 1 January 2019 onwards. However, Morales-Díaz & Zamora-Ramírez (2018) and Sacarin (2017) already did research on the effect of the implementation of IFRS 16 on financial metrics, but not on the decisions of financiers or investors. Under IAS 17, off-balance accounting was more common as operating leases did not have to be capitalised. According to Morales-Díaz & Zamora-Ramírez (2018), the change in leasing standard would lead to an improvement in ratios like debt to equity and Return on Assets (ROA). As operating leases need to be capitalised under IFRS 16, it would make sense that the debt to equity ratio rises and the ROA decreases. In addition, the capitalisation of operating leases leads to a higher EBITDA, ceteris paribus, as the operating costs disappear from the income statement and are replaced by interest and depreciation costs (PwC, 2016). This leads to the first sub-question:

1. *Does the implementation of IFRS 16 lead to a significant change in solvability ratios, profitability ratios and the EBITDA for airline, retail and telecommunication companies?*

A higher debt to equity ratio or a lower ROA might lead financiers to withhold themselves from granting a loan (Piersma, 2018). So, if the implementation of IFRS 16 causes financial metrics to appear less positive as before the implementation, the adoption of IFRS 16 might lower the ability for a company to attract credit. This could lead to a decrease in loans for the company. This leads to the second sub-question:

2. *Does the implementation of IFRS 16 have a significant effect on the financing activities and the debt position of airline, retail and telecommunication companies?*

However, a higher EBITDA can give the impression a company is doing well, which might lead to a better credit rating. When the credit rating improves, even when the profitability ratios and solvency ratios worsen, this can give the indication that banks or other financiers are focussing more on EBITDA than profitability or solvency ratios when deciding on granting loans. This leads to the third sub-question:



3. *In what way do profitability ratios, solvency ratios and the EBITDA influence the financing activities and debt position for companies who have implemented IFRS 16?*

Also, the new lease standard leads to a lease-or-buy decision for companies with a high lease intensity (PwC, 2016). They can choose to buy the assets that were previously classified as operating leases and capitalise the assets at the balance sheet without being obliged to present a corresponding lease liability at the balance sheet. On the other hand, they can choose to present the asset at the balance sheet as a leased asset. In this case, most companies choose to present right-to-use assets at the balance sheet, with corresponding lease liabilities (Deloitte, 2016). Thirdly, companies can choose to not use the assets that were previously classified as operating leases at all anymore, as the possibility for off-balance sheet accounting is eliminated. This leads to the last sub-question:

4. *In what way does the implementation of IFRS 16 influence the investment decisions made by airline, retail and telecommunication companies?*

The four sub-questions will be answered through the analysis of data from multiple annual reports from airline, retail and telecommunication companies before and after the implementation of IFRS 16, described in the next paragraph.

### **3. Data and methodology**

The data used to answer the sub-questions and eventually the research question is retrieved from the Wharton Research Data Services from the Wharton University of Pennsylvania. Through this data service, Compustat can be accessed, including financial, statistic and market information on active and inactive companies worldwide.

Panel data is used because this type of data allows variables that cannot be measured or observed. The panel data combines cross-sectional data and time series. In this case, balanced panel data from multiple companies and time periods is used. For all companies, data from the same time periods is used, namely fiscal years 2018 and 2019.

#### *3.1. Industry and company selection*

According to reports from PwC (2018) and Deloitte (2016), the impact of the adoption of IFRS 16 will be most noticeable in the airline, retail and telecommunication sectors. Therefore, only data from airline, retail and telecommunication sectors will be used to analyse the effect of IFRS 16. To limit all companies listed in the database to those only active in previously mentioned industries, the Standard Industrial Classification (SIC) codes are used. The SIC codes used are: 4512 (Air Transportation, Scheduled), 4812 (Radiotelephone Communication), 4813 (Telephone Communications, No Radiotelephone) and 5200 until 5999 (Retail Trade).

Besides the SIC codes, other filters are used to construct the data sample. The variable Accounting Standard (ACCTSTD) is used to only include companies using IFRS or using a domestic accounting standard which is in line with IFRS. Also, Compustat includes the option to only select active companies. This option is used for the construction of this data sample as well.

### *3.2. Fiscal year-end*

IFRS 16 needs to be effective from periods beginning on or after 1 January 2019 (PwC, 2016). Only an insignificant number of firms choose for an early adoption of the new standard and already applied IFRS 16 to their annual report of 2018, like KLM (2019).

To measure the effect of IFRS 16, it is required to have data included in the data sample from before and after the adoption of IFRS 16. Therefore, the variable Fiscal Year-End is used in Compustat. When the fiscal year-end for a company is not December, but for example July or October, no data might be available yet after the adoption of IFRS 16. For example, the European airline company SAS AB has a fiscal year-end in October (SAS AB, 2020). SAS AB (2020) implements IFRS 16 from 1 November 2019 onwards, however the annual report of 2020 of SAS AB is not available yet. Companies without data available after the implementation of IFRS 16 need to be removed from the data sample as well to analyse the effect on the selected industries.

However, there is no variable available in Compustat indicating whether IFRS 16 is adopted already by companies. In the annual reports, all organisations using IFRS report when they start to use the new lease standard. As it is extremely time-consuming to investigate this for all airline, retail and telecommunication firms worldwide, a random check will be performed for numerous companies that are left in the data sample. This shows that all companies in the data sample with a fiscal year not parallel to a calendar year choose to implement IFRS 16 in fiscal year 2020, which equals calendar year 2019/2020, with an insignificant number of exceptions. As most annual reports for fiscal year 2020 are not available yet, only companies with available data for fiscal years 2018 and 2019, with a fiscal year parallel to a calendar year, will be included in the data sample.

There are 565 companies left in the data sample that will be used to analyse the impact of the adoption of IFRS 16. The list of companies can be found in Appendix A, Table 1. The variables used are presented in Appendix A, Table 2. In the next paragraph, the variables are discussed in in further detail.

### 3.3. Hypotheses

#### 3.3.1. Financial metrics

The capitalisation of operating leases which is required when IFRS 16 is implemented, will affect financial metrics according to Morales-Díaz & Zamora-Ramírez (2018). Even some companies present the effect of the capitalisation of their operating leases in their annual report. For example, Eva Airways suspects a significant decrease in their Return on Assets (ROA) and solvency ratios (Eva Airways, 2020).

Firstly, it is investigated whether this effect on financial metrics is significant. Two common financial metrics, also displayed in the analysis of Eva Airways (2020), are the gearing ratio and ROA. The gearing ratio is calculated as total debt divided by stockholders' equity. ROA is calculated as net income divided by average total assets (Morales-Díaz & Zamora-Ramírez, 2018). Also, PwC (2016) suggests the EBITDA will increase when IFRS 16 is implemented, thus there will be focus on this key figure as well. This leads to the first three hypotheses:

*H1: The gearing ratio is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

*H2: ROA is significantly lower after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

*H3: EBITDA is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

The variables used for the first three hypotheses are Stockholders' Equity, Net Income, Average Total Assets, EBITDA and Total Debt (Table 2, Appendix A). Total Debt is the sum of variables Total Long-Term Debt and Total Debt in Current Liabilities. The Total Debt does mainly include short- and long-term agreements, like a contract for a loan. Accruals are not included in Total Debt, these are included in the Liabilities. The gearing ratio is calculated as Total Debt divided by Stockholders' Equity. The ROA is calculated as Net Income divided by Total Assets. It is also possible to calculate the ROA using EBITDA instead of the net income, however the choice is made to use net income instead, as EBITDA is already used for the third hypothesis. Besides, evidence is found that the EBITDA will change because of the implementation of IFRS 16 (Morales-Díaz & Zamora-Ramírez, 2018). The formulas used to calculate the financial metrics are displayed in the variable description as well (Table 2, Appendix A).

#### 3.3.2. Net cash flows from financing and investing activities

Secondly, as banks or other financiers often use financial metrics as important benchmarks to make financing decisions, changes in cash flow from financing activities through the

implementation of IFRS 16 are analysed to research if the implementation has a significant effect on the financing decisions. This will lead to the fourth hypothesis:

*H4: The net cash flow from financing activities is significantly lower after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

As a consequence of the new lease standard, companies need to decide for themselves whether they want to capitalise their former operating leases, buy the leased assets or not use the previously assets categorised as operating leases at all anymore (PwC, 2016). In this way, the implementation of IFRS 16 might have an impact on the investing decisions of the companies using the new standard. To analyse these decisions, the fifth hypothesis is presented:

*H5: The net cash flow from investing activities is significantly different before and after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

The variable used for the fourth hypothesis is Net Cash Flow from Financing Activities. The variable used for the fifth hypothesis is Net Cash Flow from Investing Activities (Table 2, Appendix A).

### *3.3.3. Debt position*

The capitalisation of operating leases leads to a rise in both assets and liabilities, which would lead to a higher debt for companies, ceteris paribus (Imhoff et al., 1991). On the other hand, the introduction of the new lease standard would make it harder for companies to attract loans (Piersma, 2018). To analyse which of these assumptions is more likely, the sixth hypothesis is presented:

*H6: The total debt is significantly different before and after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

In the data sample, the total debt is the sum of the total debt in current liabilities and the total long-term debt, which are two individual variables in the data sample as well. To support the sixth hypothesis, two additional hypotheses are set up to investigate whether the change in total debt is caused by the changes in short-term or long-term debt:

*H6a: The total debt in current liabilities is significantly different after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

*H6b: The total long-term debt is significantly different after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

For the hypotheses mentioned so far, paired t-tests are conducted to compare the numbers before and after the implementation of IFRS 16. The paired t-test compares two means that are from the same individual, object, or related units. For example, the mean of the EBITDA in 2018 and 2019 is compared, so before and after the adoption of IFRS 16. One-

sided paired t-tests are conducted for H1 until H4, two-sided paired t-tests will be conducted for H5 and H6. When it appears from the two-sided paired t-test for H6 that the total debt is significantly higher after the implementation of IFRS 16, H6a and H6b will be analysed using one-sided paired t-tests instead of two-sided, to analyse whether the short-term or long-term debt is significantly higher after implementation as well. When the total debt appears to be significantly lower in 2019 compared to 2018, the paired t-tests for H6a and H6b will be conducted as one-sided tests as well, but the other way around. When no significant result is found for H6, the paired t-tests for H6a and H6b will be conducted as two-sided paired t-tests. A significance level of 0.05 is used for the paired t-tests.

#### 3.3.4. Regression analysis

The data sample consists of balanced panel data, as data is present within the same time frame for each company. To investigate whether the financial metrics, the financing and investment decisions and the debt position are truly influenced by the adoption of IFRS 16 for the companies in the data sample, panel data analysis is performed. This leads to the six hypotheses:

*H7: The implementation of IFRS 16 has a significant effect on the gearing ratio for companies operating in the airline, retail or telecommunication industry.*

*H8: The implementation of IFRS 16 has a significant effect on the ROA for companies operating in the airline, retail or telecommunication industry.*

*H9: The implementation of IFRS 16 has a significant effect on the EBITDA for companies operating in the airline, retail or telecommunication industry.*

*H10: The implementation of IFRS 16 has a significant effect on the net cash flow from financing activities for companies operating in the airline, retail or telecommunication industry.*

*H11: The implementation of IFRS 16 has a significant effect on the net cash flow from operating activities for companies operating in the airline, retail or telecommunication industry.*

*H12: The implementation of IFRS 16 has a significant effect on the debt position of companies operating in the airline, retail or telecommunication industry.*

The regression model is based on the model used by Li (2019), where the real earnings are compared for the pre-SOX and post-SOX period, using panel data analysis. The model used by Li (2019) is applicable to this data sample too, as the effect before and after a specific implementation are compared as well and panel data is used. Therefore, random and fixed effect regressions will be performed.

When it can be assumed that the individual-specific effects are uncorrelated with the independent variables, the random effects (RE) regression should be used. When the individual-specific effects are correlated with the independent variables, the fixed effect (FE) regression is more applicable. The choice between the random effect or fixed effect regression

can be supported by the Hausman test. The null hypothesis of this test is that the random effect regression is appropriate, the alternative hypothesis of this test is that the fixed effect regression is appropriate. The significance level used for the Hausman test is 0.05. The Hausman test is performed for all dependent variables that are analysed in H7 until H12. The results of the test are shown in Table 3 below, indicating that both the RE and FE regressions should be performed.

**Table 3**

*Results of the Hausman test on all dependent variables used in H7 until H12*

Dependent variables	P-value	Appropriate test
<b>Gearing Ratio</b>	0.750	Random effect
<b>ROA</b>	0.966	Random effect
<b>EBITDA</b>	0.000*	Fixed effect
<b>Financing Cash Flow</b>	0.395	Random effect
<b>Investing Cash Flow</b>	0.734	Random effect
<b>Total Debt</b>	0.000*	Fixed effect
<b>Total Debt in Current Liabilities</b>	0.945	Random effect
<b>Total Long-term Debt</b>	0.000*	Fixed effect

\* p<0.05

The random and fixed effect regressions will be formulated in the form:

$$y_{it} = a + b_1x_{it} + b_2z_{it} + \dots + b_kq_{it} + \varepsilon_{it} \quad (1)$$

The  $y$  presents the dependent variable, so for H7, H8 and H9 it presents the financial metrics, for H10 and H11 it presents the net cash flows and for H12 it presents the debt position before and after implementation of IFRS 16. The  $x$  presents the independent variable, which is a dummy variable which equals 0 before adoption of IFRS 16 and 1 after adoption of IFRS 16. So, in fiscal year 2018 and 2019,  $x$  equals 0 and 1 respectively. The  $b_1$  shows the effect of the implementation of IFRS 16 on the financial metrics, the net cash flows and the debt position. The  $b_2$  until  $b_k$  are the coefficients of the control variables used in the regression analysis, indicating the effect of the control variables on the dependent variable  $y$ . The letters used in formula 1,  $z_{it}$  and  $q_{it}$ , are chosen randomly. For each hypothesis, these letters will be replaced with the control variables from the data sample. When the values found for  $b$  are significant,  $b$  shows how the implementation and the control variables affect the financial metrics, the net cash flows and the debt position. The  $i$  and  $t$  are indices for individual firms and time, for example Telecom Argentina in 2018 respectively (Table 1, Appendix A). Finally,  $\varepsilon$  represents the error term. Assumptions about the error term determine whether a fixed or random effect is present. These assumptions will be supported by the Hausman test, indicating whether a

random effect or fixed effect regression is more appropriate. A significance level of 0.05 will be used for the panel data analysis.

## 4. Results

### 4.1. Descriptive statistics

The descriptive statistics of all variables used for the hypotheses are displayed in Table 4 below. For the 25 numeric variables, the number of observations, mean, standard deviation, minimum and maximum are presented. The number of observations for all variables equals 565, which is equal to the number of companies used in the data sample. This means there are no missing values present.

**Table 4**  
*Descriptive statistics*

Variables	(1) N	(2) mean	(3) sd	(4) min	(5) max
Assets_2018	565	649,256.90	4116496.66	0.00	65108101.00
Assets_2019	565	648,243.82	3555659.11	6.00	44611620.00
CurrentDebt_2018	565	50,247.04	289,045.11	0.00	4321178.29
CurrentDebt_2019	565	56,834.64	340,994.75	0.00	5269433.71
LongDebt_2018	565	121,467.03	799,881.64	0.00	11418021.85
LongDebt_2019	565	166,184.23	1000856.45	0.00	12738825.68
Debt_2018	565	171,714.07	1068293.02	0.00	15739200.14
Debt_2019	565	223,018.87	1315046.60	0.00	17023735.53
AbsoluteDebtChange_2019	565	51,304.81	583,413.18	-8284123.00	8417903.60
FinancingCashFlow_2018	565	-6,065.67	100,087.62	-1407516.14	1034046.64
FinancingCashFlow_2019	565	-5,950.01	205,565.66	-1447170.26	3977780.00
InvestingCashFlow_2018	565	-36,173.52	265,917.93	-4047725.00	223,055.93
InvestingCashFlow_2019	565	-47,443.55	398,675.34	-6734779.00	570,685.13
Liabilities_2018	565	392,545.38	2638490.47	0.00	46150403.00
Liabilities_2019	565	403,618.03	2206048.61	0.63	24233326.24
StockholdersEquity_2018	565	221,572.70	1385127.16	-269,882.46	22470822.00
StockholdersEquity_2019	565	224,048.40	1401619.93	-332,900.08	22956829.00
NetIncome_2018	565	13,125.87	143,380.50	-557,455.58	3112084.00
NetIncome_2019	565	4,243.59	89,498.61	-909,561.60	875,141.00
GearingRatio_2018	565	0.96	6.18	-55.22	81.46
GearingRatio_2019	565	0.41	16.02	-338.60	28.20
ROA_2018	565	0.02	0.14	-1.40	1.48
ROA_2019	565	0.01	0.13	-1.25	0.35
EBITDA_2018	565	56,726.49	356,184.51	-51,807.36	4626461.00
EBITDA_2019	565	64,196.85	373,149.75	-10,139.83	5045821.00

The minimum and maximum are not informative for variables with absolute values, like the assets, liabilities or net income in 2018 and 2019, as the data in the data sample is presented in the domestic currency of the companies (Table 2, Appendix A). The currencies used by a

company in their annual reports is displayed by the variable ISO Currency Code in Table 1 (Appendix A). The mean for these variables is also not very informative, however it can be used to compare the mean of 2018 with the mean of 2019.

#### *4.1.1. Financial metrics*

The mean of the EBITDA in Table 4 is higher in 2019 compared to 2018, which is in line with H3. The means of the gearing ratio and ROA however are informative even without comparing both years, as these are ratios and no absolute values, so the differences in currencies are not causing problems. The mean of the gearing ratio in 2019 is lower than the mean in 2018, which is not in line with H1. The mean of the ROA in 2019 is also lower than the mean in 2018, which is in line with H2.

#### *4.1.2. Net cash flows and debt position*

When looking at the descriptive statistics, a global image can be formed over the changing debt position of the airline, retail and telecommunication companies in the data sample. Firstly, the mean of the net cash flow from financing activities in Table 4 is higher in 2019 than in 2018, while the mean of the net cash flow from investing activities is lower in 2019 than in 2018. The average increase in the net cash flow in financing activities is not in line with H4, the average decrease in the net cash flow from investing activities is in line with H5. Secondly, the means of the current, long-term and total debt rose stronger in 2019 than the mean of the total assets. This is in line with H6. In fact, the mean of the assets decreased during 2019. Without considering external factors, this can mean that it did not become harder for airline, retail and telecommunication companies to attract more credit even though this was previously suggested. One of the reasons the total debt and assets would rise is the capitalisation of the operating leases in 2019, which requires companies to recognise the leased asset on the balance sheet and to take on a matching lease liability. But as there is a rise in total debt and a decrease in assets, in absolute terms when looking at the means, this can suggest companies are still able to attract loans or issue bonds. However, it cannot be proved the implementation of IFRS 16 is the cause of the changes in the means of the variables in Table 4. With the regression analysis, this is explored in more detail.

#### *4.2. Correlations*

To investigate linear relationship between the variables, correlation analysis is performed. The results of the correlation between all numeric variables from the data sample are shown in Table 5 (Appendix A). The correlation coefficients of all variables in 2018 and 2019 that can be found on the balance sheet are larger than 0.750. This means that the values for the same variable of 2018 and 2019 have a strong positive linear relationship. For example, the



correlation coefficient of Assets\_2018 and Assets\_2019 is 0.854, indicating a strong positive linear relationship between both variables (Table 5, Appendix A). This makes sense as the balance sheet of fiscal year 2019 starts with the ending balance of fiscal year 2018.

The correlation analysis does not show a strong linear relationship between the gearing ratio or the ROA and the other variables. This does not lead to the assumption that these financial metrics influence the other variables, which was earlier stated. The EBITDA however shows a strong linear relationship with the assets, debt (especially long-term), liabilities, stockholders' equity and the net cash flow from investing activities (Table 5, Appendix A). This can imply that companies themselves use the EBITDA as an important financial metric in their decision-making process. Even though the EBITDA seems to influence the investing activities from a company, it does not seem to have a connection with the financing activities, as no strong linear relationship is found between the EBITDA and the net cash flow from financing activities (Table 5, Appendix A).

The correlation analysis is in line with the observations made when analysing the descriptive statistics. Both the descriptive statistics and the correlation analysis are in line with H2, H3 and H5. However, less support is found for H1 and H4.

4.3. Univariate tests

4.3.1. Financial metrics

The first three hypotheses will be tested using paired t-tests, with a significance level of 0.05. Firstly, according to PwC (2016), the gearing ratio decreases when companies need to capitalise their operating leases, so when IFRS 16 is adopted. This led to the first hypothesis: *The gearing ratio is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H1)*. The results of the paired t-test of the gearing ratio in 2018 and 2019 is shown in Table 6 below.

**Table 6**  
*Paired t-test results of the gearing ratio in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
GearingRatio_2018	565	0.958	0.260	6.181	0.447	1.469
GearingRatio_2019	565	0.406	0.673	16.016	-0.917	1.730
diff	565	0.552	0.748	17.783	-0.918	2.021
mean(diff) = mean(GearingRatio_2018 – GearingRatio_2019)					t = 0.737	
H0: mean(diff) = 0				degrees of freedom = 564		
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.769		Pr(T > t) = 0.461		Pr(T > t) = 0.231		

The average gearing ratio decreased from 0.958 in 2018 to 0.406 in 2019, as shown in Table 6. The one-sided paired t-test shows  $t(564) = 0.737$  with  $p = 0.231$ , so  $p > 0.025$ , indicating the gearing ratio of airline, retail and telecommunication companies is not significantly higher in 2019 compared to the previous year. The first hypothesis is rejected.

Secondly, the ROA should be lower after the implementation of IFRS 16 (Morales-Díaz & Zamora-Ramírez, 2018). This led to the second hypothesis: *ROA is significantly lower after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H2)*. Table 7 below shows the paired t-tests results for the ROA before and after the implementation of IFRS 16.

**Table 7**

*Paired t-test results of the Return on Assets (ROA) in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
ROA_2018	565	0.020	0.006	0.144	0.008	0.031
ROA_2019	565	0.006	0.006	0.131	-0.005	0.016
diff	565	0.014	0.006	0.139	0.002	0.025
mean(diff) = mean(ROA_2018 – ROA_2019)					t = 2.389	
H0: mean(diff) = 0				degrees of freedom = 564		
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.991		Pr(T > t) = 0.017		Pr(T > t) = 0.009		

As shown above, the average ROA decreased from 0.020 in 2018 to 0.006 in 2019. The one-sided paired t-test shows  $t(564) = 2.389$  with  $p = 0.009$ , so  $p < 0.025$ , indicating the ROA of airline, retail and telecommunication companies is significantly lower in 2019 compared to the previous year. The second hypothesis is not rejected.

Thirdly, the EBITDA should be higher when operating leases are capitalised, as operating expenses are replaced by depreciation and interest expenses, ceteris paribus (Imhoff et al., 1991). This led to the third hypothesis: *EBITDA is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H3)*. Again, a one-sided paired t-test is conducted to compare the EBITDA in 2018 and 2019 and the results are shown below in Table 8. The average EBITDA rose from 56726.491 in 2018 to 64196.852 in 2019. However, these numbers are not informative as the mean of the EBITDA is calculated using different currencies. The one-sided paired t-test shows  $t(564) = -2.314$  with  $p = 0.011$ , so  $p < 0.025$ , meaning the EBITDA of airline, retail and telecommunication companies is significantly higher in 2019 than in 2018. The third hypothesis is not rejected.

**Table 8**

*Paired t-test results of the earnings before interest, taxes, amortisation and depreciation expenses (EBITDA) in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EBITDA_2018	565	56726.491	14984.798	356184.501	27293.667	86159.310
EBITDA_2019	565	64196.852	15698.533	373149.847	33362.130	95031.572
diff	565	-7470.356	3228.461	76738.925	-13811.571	-1129.139
mean(diff) = mean(EBITDA_2018 – EBITDA_2019)					t = -2.314	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.011		Pr(T > t) = 0.021		Pr(T > t) = 0.990		

#### 4.3.2. Net cash flows from financing and investing activities

After analysing the financing metrics, the net cash flows from financing and investing activities are compared for the years 2018 and 2019. When the new lease standard was released, concern rose regarding the possibility to attract credit for companies operating in lease intensive branches (Piersma, 2018). This could lower the net cash flow from financing activities, leading to the fourth hypothesis: *The net cash flow from financing activities is significantly lower after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H4)*. Table 9 shows the paired t-test results for the net cash flow from financing activities in 2018 and 2019.

**Table 9**

*Paired t-test results of the net cash flow from financing activities in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
FinancingCashFlow_2018	565	-6065.672	4210.718	100087.621	-14336.281	2204.931
FinancingCashFlow_2019	565	-5950.013	8648.212	205565.744	-22936.652	11036.620
diff	565	-115.659	8547.999	203183.611	-16905.456	16674.144
mean(diff) = mean(FinancingCashFlow_2018 – FinancingCashFlow_2019)					t = -0.014	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.495		Pr(T > t) = 0.989		Pr(T > t) = 0.505		

The average net cash flow from financing activities rose from -6065.672 in 2018 to -5950.013 in 2019, as shown in Table 9. Again, these numbers on themselves are not informative as different currencies are used in the data sample. The one-sided paired t-test shows  $t(564) = -$

0.014 with  $p = 0.505$ , so  $p > 0.025$ , indicating the net cash flow from financing activities of airline, retail and telecommunication companies is not significantly lower in 2019 than in 2018. The fourth hypothesis is rejected.

In addition, the introduction of IFRS 16 leads companies to a lease-or-buy decision (PwC, 2016). This means companies need to choose whether to buy the asset, which was previously classified as operating lease, to change it to financial lease or not use the asset at all anymore. This leads to the fifth hypothesis: *The net cash flow from investing activities is significantly different before and after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H5)*. The results of the paired t-test of the net cash flow from investing activities in 2018 and 2019 is shown in Table 10 below.

**Table 10**  
*Paired t-test results of the net cash flow from investing activities in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
InvestingCashFlow_2018	565	-36173.521	11187.254	265917.912	-58147.288	-14199.761
InvestingCashFlow_2019	565	-47443.550	16772.398	398675.333	-80387.542	-14499.560
diff	565	11270.029	8432.808	200445.632	-5293.513	27833.578
mean(diff) = mean(InvestingCashFlow_2018 – InvestingCashFlow_2019)					t = 1.337	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.909		Pr(T > t) = 0.182		Pr(T > t) = 0.091		

The average net cash flow from investing activities decreased from -36173.52 in 2018 to -47443.55 in 2019, as shown in Table 10. The two-sided paired t-test displays  $t(564) = 1.337$  with  $p = 0.182$ , so  $p > 0.025$ , meaning the net cash flow from investing activities of airline, retail and telecommunication companies is not significantly different in 2018 compared to 2019. The fifth hypothesis is rejected.

*4.3.3. Debt position*

From the analyses of the net cash flows from financing and investing activities, it did not become clear yet whether the introduction of IFRS 16 made it harder for airline, retail and telecommunication companies to attract credit. Therefore, the debt position is analysed as well before and after the adoption of IFRS 16. This leads to the sixth hypothesis: *The total debt is significantly different before and after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry (H6)*. The two-sided paired t-test is used again with a significance level of 0.05. The results are shown in Table 11 below.

**Table 11***Paired t-test results of the total debt in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Debt_2018	565	171714.112	44943.431	1068293.045	83437.131	259991.033
Debt_2019	565	223018.936	55324.432	1315047.398	114651.808	331685.899
diff	565	-51304.810	24544.378	583413.221	-9514.360	-3095.255
mean(diff) = mean(Debt_2018 – Debt_2019)					t = -2.090	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.019		Pr(T > t) = 0.037		Pr(T > t) = 0.982		

As shown in Table 11, the average total debt in 2018 of 171714.112 rose to 223018.936 in 2019. These numbers are again averages of different currencies, so the numbers on itself are not informative. The results of the two-sided paired t-test are  $t(564) = -2.090$  with  $p = 0.019$ , so  $p < 0.025$  indicating the total debt of airline, retail and telecommunication companies is significantly higher in 2019 compared to 2018. The sixth hypothesis is not rejected.

The sixth hypothesis shows a significant result, thus two additional one-sided paired t-tests are conducted. As two one-sided paired t-tests will be conducted instead of two-sided, the two hypotheses mentioned before will change to:

*H6a: The total debt in current liabilities is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

*H6b: The total long-term debt is significantly higher after the implementation of IFRS 16 for companies operating in the airline, retail or telecommunication industry.*

For both the total debt in current liabilities and the total long-term debt, one-sided paired t-tests are performed and the results are shown in Table 12 and Table 13 below.

**Table 12***Paired t-test results of the total debt in current liabilities in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
CurrentDebt_2018	565	50247.042	12160.223	289045.109	26362.193	74131.880
CurrentDebt_2019	565	56834.644	14345.760	340994.735	28656.977	85012.271
diff	565	-6587.603	5955.224	141554.146	-18284.728	5109.523
mean(diff) = mean(CurrentDebt_2018 – CurrentDebt_2019)					t = -1.106	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.135		Pr(T > t) = 0.269		Pr(T > t) = 0.865		

**Table 13***Paired t-test results of the total long-term debt in 2018 and in 2019*

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
LongDebt_2018	565	121467.013	33651.270	799881.612	55369.938	187564.215
LongDebt_2019	565	166184.241	42106.351	1000856.011	83479.832	248888.598
diff	565	-44717.238	19436.152	461992.142	-82893.293	-6541.150
mean(diff) = mean(LongDebt_2018 – LongDebt_2019)					t = -2.301	
H0: mean(diff) = 0					degrees of freedom = 564	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.011		Pr(T > t) = 0.022		Pr(T > t) = 0.989		

The paired t-test in Table 12 shows  $t(564) = -1.1062$  with  $p = 0.1346$ , so  $p > 0.025$ . This means the total debt in current liabilities is not significantly higher after the implementation of IFRS 16, so hypothesis 6a is rejected. The one-sided paired t-test for total long-term debt in Table 13 leads to  $t(564) = -2.301$  with  $p = 0.011$ , so  $p < 0.025$ , indicating the total long-term debt is significantly higher after the implementation of IFRS 16. Hypothesis 6b is not rejected. Conclusively, the change in total debt seems to be mainly caused by the change in total long-term debt of airline, retail and telecommunication companies.

#### 4.4. Regression analysis

In order to perform the regression analysis, the data sample is modified. Instead of using two different variables for all numeric variables, like EBITDA\_2018 and EBITDA\_2019, these same variables for different years are displayed in the same column and combined as one variable (Table 2, Appendix A). Thus, in the new data sample, only the variable EBITDA is present. Dummy variables are added to the data sample to show if the variable applies to 2018 or 2019, so before or after the implementation of IFRS 16. Now every company can be found in the data sample twice, with fiscal year 2018 and 2019, because of the modification.

As the data sample is two-dimensional, panel data analysis is performed. Linear regressions are performed on the panel data in the form:

$$y_{it} = a + b_1x_{it} + b_2z_{it} + \dots + b_kq_{it} + \varepsilon_{it} \quad (1)$$

The group variable  $i$  is the global company key, so each individual company. The time variable  $t$  is in years. The number of groups equals the number of firms in the data sample, which are 565 firms. Only two observations per group are present, as the analysis is only performed for 2018 and 2019, so the year before and after the implementation of IFRS 16.

#### 4.4.1. Financial metrics

Firstly, regression analysis is performed to investigate the effect of the adoption of IFRS 16 on the solvency ratio, profitability ratio and the EBITDA. The first regression is performed on the seventh hypothesis: *The implementation of IFRS 16 has a significant effect on the gearing ratio for companies operating in the airline, retail or telecommunication industry (H7)*. For the gearing ratio, a random effect regression model is used, which is shown in the Hausman test in Table 3. The variables that are supposed to influence the gearing ratio are the adoption of IFRS 16, the current financial position, net cash flows and the net income of each company, which leads to the formula:

$$\text{GearingRatio}_{it} = a + b_1\text{IFRS16}_{it} + b_2\text{Assets}_{it} + b_3\text{Liabilities}_{it} + b_4\text{FinancingCashFlow}_{it} + b_5\text{InvestingCashFlow}_{it} + b_6\text{NetIncome}_{it} + \varepsilon_{it} \quad (2)$$

The results of the random and fixed effect regression on the gearing ratio are shown in Table 13 below.

**Table 13**

*Results of the random and fixed effect regressions for the relationship between the gearing ratio and the implementation of IFRS 16*

<b>Gearing Ratio</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	-0.548 (0.450)	-0.486 (0.522)
<b>Assets</b>	0.000 (0.835)	0.000 (0.455)
<b>Liabilities</b>	-0.000 (0.965)	-0.000 (0.456)
<b>Financing Cash Flow</b>	0.000 (0.619)	0.000 (0.686)
<b>Investing Cash Flow</b>	0.000 (0.685)	0.000 (0.906)
<b>Net Income</b>	-0.000 (0.809)	-0.000 (0.714)
<b>_cons</b>	0.948 (0.066)	0.135 (0.932)
Observations (N)	1,130	1,130
R-squared	0.001	0.000
(Assumed) correlation	0	-0.562

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The random effect regression shows only 0.01% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.001 shown in Table 13. Also, none of the variables is statistically significant, meaning no hard assumptions can be made on the coefficients found in the random effect regression. For the fixed effect regression with the gearing ratio as dependent variable, again no significant variables are found. The seventh hypothesis needs to be rejected.

The second financial metric that is analysed is the ROA, belonging to the eighth hypothesis: *The implementation of IFRS 16 has a significant effect on the ROA for companies*

operating in the airline, retail or telecommunication industry (H8). For the effect on the ROA, a random effect regression model is used (Table 3). Just as for the gearing ratio, the current assets and liabilities and net cash flows are supposed to influence the ROA, besides the implementation of IFRS 16. The variable net income is not included in the formula, as the net income is already part of the ROA itself and the net income is calculated again for a new fiscal year. Assets however are part of the ROA as well, but the assets of the current year are based on the assets at the year-end of the previous fiscal year, corrected for changes in assets during the current fiscal year (Table 2, Appendix A). Therefore, the variable assets is included, leading to the formula:

$$ROA_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4FinancingCashFlow_{it} + b_5InvestingCashFlow_{it} + \varepsilon_{it} \quad (3)$$

Table 14 shows the regression analysis on the ROA.

**Table 14**

*Results of the random and fixed effect regressions for the relationship between the Return on Investment (ROA) and the implementation of IFRS 16*

ROA	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	-0.139* (0.018)	-0.139* (0.019)
<b>Assets</b>	0.000 (0.604)	-0.000 (0.901)
<b>Liabilities</b>	-0.001 (0.555)	0.000 (0.898)
<b>Financing Cash Flow</b>	-0.000 (0.758)	0.000 (0.948)
<b>Investing Cash Flow</b>	0.000 (0.944)	0.000 (0.811)
<b>_cons</b>	0.019** (0.001)	0.021 (0.084)
Observations (N)	1,130	1,130
R-squared	0.003	0.000
(Assumed) correlation	0	-0.101

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The random effect regression shows only 0.03% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.003. However, one significant variable is found in the random effect regression. The coefficient of the variable IFRS 16 equals -0.139, with a p-value which equals 0.013, so which is smaller than 0.05. As the variable is a dummy variable, this means the ROA decreases with 0.139 when IFRS 16 is applied, compared to the year before the implementation, ceteris paribus. This would indicate the implementation of IFRS 16 affects the ROA for companies in the airline, retail or telecommunication industries, meaning the eighth hypothesis cannot be rejected. Shown in Table 14, the constant is statistically significant as well, as the p-value equals 0.001 which is smaller than 0.05, meaning the ROA would equal 0.019 when all other variables equal zero.



This is however unlikely, as the variable assets would equal zero as well in that case. The ROA is calculated by dividing the net income by the sum of the assets, therefore the ROA cannot equal 0.019 when the assets equal zero.

The third financial metric that is analysed is the EBITDA, belonging to the ninth hypothesis: *The implementation of IFRS 16 has a significant effect on the EBITDA for companies operating in the airline, retail or telecommunication industry (H9)*. For the effect on the EBITDA, a fixed effect regression model is used (Table 3). The variables that are assumed to affect the EBITDA are the same as for the ROA. Again, the variable net income is not included in the formula as the net income is already incorporated in the EBITDA, leading to the next formula:

$$EBITDA_{it} = a + b_1 IFRS16_{it} + b_2 Assets_{it} + b_3 Liabilities_{it} + b_4 FinancingCashFlow_{it} + b_5 InvestingCashFlow_{it} + \varepsilon_{it} \quad (4)$$

Below, Table 15 displays the results of the results of the regressions on the EBITDA.

**Table 15**

*Results of the random and fixed effect regressions for the relationship between the EBITDA and the implementation of IFRS 16*

<b>EBITDA</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	1707.88 (0.439)	4617.32** (0.006)
<b>Assets</b>	0.094** (0.000)	-0.035** (0.024)
<b>Liabilities</b>	-0.084** (0.000)	0.073** (0.000)
<b>Financing Cash Flow</b>	-0.590** (0.000)	-0.236** (0.000)
<b>Investing Cash Flow</b>	-0.608** (0.000)	-0.180** (0.000)
<b>_cons</b>	3241.97 (0.285)	42860.78** (0.000)
Observations (N)	1,130	1,130
R-squared	0.963	0.737
(Assumed) correlation	0	0.749

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The fixed effect regression shows 73.7% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.737. In Table 15 it can be found the R-squared of the random effect regression is higher than for the fixed effect regression, equalling 0.963. However, a strong correlation is found between the individual-specific effects and the independent variables in Table 15, with a correlation coefficient which equals 0.749. Because of this, the fixed effect regression model is more appropriate, besides the results from Hausman test is Table 3.

All standard errors of the coefficients and the constant in formula 4 are smaller than 0.05, meaning all coefficients and the constant in the fixed effect regression are statistically

significant. Thus, the EBITDA would be equal to 42,860.78, when all variables would be zero. In addition, the dummy variable representing the adoption of IFRS 16 shows the EBITDA is 4,617.32 units higher after the adoption of IFRS 16, ceteris paribus. This implies the introduction of the new lease standard indeed causes a rise in the EBITDA for companies operating in the airline, retail or telecommunication sectors. The ninth hypothesis cannot be rejected.

Regarding the other variables in formula 4, significant coefficients are found as well. When the assets rise with one unit, the EBITDA decreases with 0.035 units, ceteris paribus. The same interpretation goes up for the variables liabilities, net cash flow from financing activities and net cash flow from investing activities.

There is however a limitation to the interpretation of the coefficients found in this fixed effect regression. As explained before, the data sample consists of numbers in different currencies. It is therefore not possible to say, for example, that the EBITDA rises with 4,617.32 Euros or US Dollars when IFRS 16 is applied. The only assumptions that can be made concerns the sign of the coefficients. Therefore, the assumption can be made the EBITDA will rise when IFRS 16 is applied, ceteris paribus.

#### 4.4.2. Net cash flows from financing and investing activities

After the financial metrics, the effect of the adoption of IFRS 16 on the net cash flows from financing and investing activities are analysed. Firstly, the financing activities of airline, retail and telecommunication companies will be brought to light, leading to the tenth hypothesis: *The implementation of IFRS 16 has a significant effect on the net cash flow from financing activities for companies operating in the airline, retail or telecommunication industry (H10)*. For the effect on the net cash flow from financing activities, a random effect regression model is used (Table 3). The current financial position is expected to be considered when financiers makes decisions, therefore the assets and liabilities are used as variables in the regression. In addition, Piersma (2018) was worried whether it became harder for firms to attract credit once IFRS 16 was applied, as the solvency ratio would worsen. According to Morales-Díaz and Zamora-Ramírez (2018), the other financial ratios like profitability ratios and the EBITDA are affected as well. Therefore, the gearing ratio, ROA and EBITDA are added to the regression as well. This leads to the formula:

$$FinancingCashFlow_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4GearingRatio_{it} + b_5ROA_{it} + b_6EBITDA_{it} + \varepsilon_{it} \quad (5)$$

Table 16 shows the results from the regression model written in formula 5.

**Table 16**

*Results of the random and fixed effect regressions for the relationship between the net cash flow from financing activities and the implementation of IFRS 16*

<b>Financing Cash Flow</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	270.315 (0.967)	1949.911 (0.723)
<b>Assets</b>	0.040** (0.000)	-0.429** (0.000)
<b>Liabilities</b>	-0.100** (0.000)	0.490** (0.000)
<b>Gearing Ratio</b>	135.940 (0.679)	-14.527 (0.962)
<b>ROA</b>	-21061.860 (0.545)	-1810.311 (0.963)
<b>EBITDA</b>	0.103* (0.015)	-1.035** (0.000)
<b>_cons</b>	1674.627 (.813)	138984.600** (0.000)
Observations (N)	1,130	1,130
R-squared	0.062	0.006
(Assumed) correlation	0	-0.987

Standard errors in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ .

The random effect regression in Table 16 shows only 6.2% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.062. In the random effect regression, the correlation between the individual-specific effects and the independent variable is assumed to be zero. However, the correlation found in the fixed effect regression is almost equal to -1, namely -0.987. However, the variance for the dependent variables in the fixed effect regression is only for 0.6% explained by the independent variables, making the random effect regression a better model to use in this case.

The coefficients of the variables representing the current position of a company, so the assets and liabilities, are statistically significant. Shown in Table 16, the p-value of the coefficient of the assets equals 0.000, which is smaller than 0.05, and the coefficient equals 0.040. This means the net cash flow from financing activities will rise with 0.040 units when the assets rise with one unit, ceteris paribus. The p-value of the coefficient of the liabilities equals 0.000 as well, which is smaller than 0.05, and the coefficient equals -0.100. This implies the net cash flow from financing activities will decrease with 0.100 units when the liabilities rise with one unit, ceteris paribus.

From the financial metrics in Table 16, only the EBITDA shows a statistically significant coefficient. The p-value of the coefficient of the EBITDA equals 0.015, which is smaller than 0.05, and the coefficient equals 0.103. This means the net cash flow from financing activities will rise 0.103 units when the EBITDA rises with one unit, ceteris paribus. As from the financial metrics only the EBITDA shows a statistically significant effect on the net cash flow from financing activities, this implies the EBITDA can be seen as a more important measure than the gearing ratio or the ROA, when financiers have to make decisions on financing activities.

The coefficient of the dummy variable representing the adoption of IFRS 16 is not statistically significant, so no significant effect from the implementation on the net cash flow from financing activities can be found here. The tenth hypothesis is rejected.

Following, the effect of the implementation of IFRS 16 on the net cash flow from investing activities is analysed, according to the eleventh hypothesis: *The implementation of IFRS 16 has a significant effect on the net cash flow from operating activities for companies operating in the airline, retail or telecommunication industry (H11)*. As the same factors are expected to influence the net cash flow from investing activities compared to the financing activities, the same independent variables are used as in formula 5:

$$InvestingCashFlow_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4GearingRatio_{it} + b_5ROA_{it} + b_6EBITDA_{it} + \varepsilon_{it} \quad (6)$$

Table 17 below displays the random and fixed effect regression on the net cash flow from investing activities.

**Table 17**

*Results of the random and fixed effect regressions for the relationship between the net cash flow from investing activities and the implementation of IFRS 16*

<b>Investing Cash Flow</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	-2975.235 (0.672)	-2872.615 (0.581)
<b>Assets</b>	0.001 (0.944)	0.697** (0.000)
<b>Liabilities</b>	0.071** (0.000)	-0.804** (0.000)
<b>Gearing Ratio</b>	-179.682 (0.619)	-65.382 (0.821)
<b>ROA</b>	33861.310 (0.389)	10127.590 (0.783)
<b>EBITDA</b>	-1.165** (0.000)	0.176 (0.124)
<b>_cons</b>	1019.319 (0.903)	-183138.700** (0.000)
Observations (N)	1,130	1,130
R-squared	0.695	0.620
(Assumed) correlation	0	-0.986

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The random effect regression in Table 17 shows 69.5% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.695. This is larger than for the fixed effect regression, where R-squared equals 0.620. However, the correlation found in the fixed effect regression is almost equal to -1, namely -0.986. This makes it not straightforward whether the random or fixed effect regression is more appropriate. But just as for the net cash flow from financing activities, the Hausman test supports the random effect regression for the net cash flow from investing activities (Table 3).

From the coefficients of the variables in Table 17 representing the current position of a company, so the assets and liabilities, only the coefficient of the liabilities is statistically significant. The p-value of the coefficient of the liabilities equals 0.000, which is smaller than 0.05, and the coefficient equals 0.071. This implies the net cash flow from investing activities will rise with 0.071 units when the liabilities rise with one unit, ceteris paribus. The coefficient of the assets in the fixed effect regression however is statistically significant. The p-value of the coefficient of the assets equals 0.000, which is smaller than 0.05, and the coefficient equals 0.697. This means the net cash flow from investing activities will rise with 0.697 units when the assets rise with one unit, ceteris paribus. What stands out from the fixed effect regression as well is that the sign of the coefficient of the liabilities has changed compared to the random effect regression. In the fixed effect regression, the coefficient equals -0.804, meaning the net cash flow from investing activities will decrease with 0.804 units when the liabilities rise with one unit, ceteris paribus.

The only financial metric used in the random effect regression for the net cash flow from investing activities in Table 17 showing a statistically significant coefficient is again the EBITDA. The p-value of the coefficient equals 0.000, which is smaller than 0.05, and the coefficient equals -1.165. The net cash flow from investing activities will decrease with 1.165 units for every one unit the EBTIDA rises, ceteris paribus. As from the financial metrics only the EBITDA shows a significant coefficient, this implies the EBITDA might be a more important criterion for investors or the company itself in the decision-making process regarding investments. On the other hand, the coefficient of the EBITDA in the fixed effect regression is not significant, with a p-value which is equal to 0.124, so which is higher than 0.05. This means no significant effect of the EBITDA on the net cash flow from investing activities is found in the fixed effect regression. The p-value of the coefficient of the dummy variable representing the implementation of IFRS 16 equals 0.672 for the random effect regression and 0.581 for the fixed effect regression, which are both larger than 0.05. This concludes the adoption of IFRS 16 shows no significant effect on the net cash flow from investing activities, so the eleventh hypothesis is rejected.

With regards to the interpretation of the coefficients in the regressions on the net cash flows, the same limitation holds as for the regression on the EBITDA. The data on the net cash flows is in different currencies as well for the different companies in the data sample. Therefore, only assumptions can be made concerning the signs of the coefficients again.

#### 4.3.3. Debt position

Finally, regression analysis is performed to measure the effect of the implementation of IFRS 16 on the debt position of airline, retail and telecommunication companies. This analysis supports the twelfth hypothesis: *The implementation of IFRS 16 has a significant effect on the*

debt position of companies operating in the airline, retail or telecommunication industry (H12).

To measure the effect on the total debt, the fixed effect regression model will be used (Table 3). The variables expected to affect the total debt are again the assets and liabilities of the companies, but also the financing and investing activities of the companies and their financiers and investors. Therefore, the variables net cash flow from financing activities and net cash flow from investing activities are added to the regression. Lastly, the financing and investing activities, so also the total debt, are expected to be influenced by the financial metrics. As a result, the variables gearing ratio, ROA and EBITDA are added to the regression, leading to the formula:

$$TotalDebt_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4FinancingCashFlow_{it} + b_5InvestingCashFlow_{it} + b_6GearingRatio_{it} + b_7ROA_{it} + b_8EBITDA_{it} + \varepsilon_{it} \quad (7)$$

Table 18 below shows the random and fixed effect regression coefficients.

**Table 18**

*Results of the random and fixed effect regressions for the relationship between total debt and the implementation of IFRS 16*

<b>Total Debt</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	22771.820 (0.065)	6021.728 (0.334)
<b>Assets</b>	-0.375** (0.000)	-1.673** (0.000)
<b>Liabilities</b>	0.746** (0.000)	2.307** (0.000)
<b>Financing Cash Flow</b>	-0.595** (0.000)	0.563** (0.000)
<b>Investing Cash Flow</b>	-0.951** (0.000)	0.128 (0.130)
<b>Gearing Ratio</b>	256.935 (0.696)	618.814 (0.074)
<b>ROA</b>	-12460.270 (0.870)	-4752.324 (0.914)
<b>EBITDA</b>	1.233** (0.000)	2.636** (0.000)
<b>_cons</b>	14198.45 (0.464)	209832.700** (0.000)
Observations (N)	1,130	1,130
R-squared	0.819	0.019
(Assumed) correlation	0	-0.608

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The Hausman test shows the fixed effect regression is most appropriate (Table 3). However, the fixed effect regression in Table 18 shows only 1.9% of the variance for the dependent variable is explained by the independent variables, as R-squared equals 0.019, compared to 81.9% in the random effect regression. This again makes it not straightforward to prefer the random or fixed effect regression. However, a correlation coefficient of -0.608 can be found for the fixed effect regression, showing it cannot be assumed the individual-specific effect is

uncorrelated with the independent variables. This finding combined with the Hausman test in Table 3 makes the fixed effect regression more appropriate to use here.

The coefficients of the variables representing the current position of a company, so the assets and liabilities, show again statistically significant values. The coefficient of the assets equals -1.673, with a p-value of 0.000 which is lower than 0.05, shown in Table 18. The total debt will decrease with 1.673 units when the assets rise with one unit, *ceteris paribus*. The coefficient of the liabilities equals 2.307, with a p-value of 0.000 which is lower than 0.05. The total debt will rise with 2.307 when the liabilities rise with one unit, *ceteris paribus*. It makes sense that the total debt will rise when the liabilities increase, as the total debt is a part of the total liabilities. The coefficients of the assets and liabilities are statistically significant as well for the random effect regression, and their signs are the same in both regressions.

The coefficients of the net cash flows from financing and investing activities are statistically significant as well for the random effect regression in Table 18. The fixed effect regression only shows a statistically significant coefficient for the net cash flow from financing activities. There, the coefficient of the net cash flow from financing activities equals 0.563 with a p-value of 0.000, which is lower than 0.05. The total debt rises with 0.563 units when the net cash flow from financing activities increases with one unit, *ceteris paribus*. Remarkably, the signs of the coefficients of the net cash flows in the random effect regression are different from the fixed effect regression. The coefficient of the net cash flow from financing activities in the random effect regression equals -0.595, with a p-value of 0.000 which is lower than 0.05. This shows a reverse effect from the result found in the fixed effect regression on the net cash flow from financing activities. The coefficient of the net cash flow from investing activities in the random effect regression equals -0.951, with a p-value of 0.000 which is lower than 0.05. In contrast to the fixed effect regression, this coefficient is statistically significant, meaning the total debt decreases with 0.951 units when the net cash flow from investing activities increases with one unit, *ceteris paribus*. No hard assumptions can be made on the effect of the net cash flows from financing and investing activities on the total debt, as different results are found in the random effect and fixed effect regressions, with the side note that no straightforward choice could be made between the two regression models.

Following, the coefficients of the financial metrics are analysed. Again, only the EBITDA shows a significant coefficient, for both random and fixed effect regressions in Table 18. In the fixed effect regression, the coefficient equals 2.636, with a p-value of 0.000 which is lower than 0.05. This implies the total debt will rise with 2.636 units when the EBITDA increases with one unit, *ceteris paribus*. The coefficient of the EBITDA in the random effect regression has the same sign as in the fixed effect regression, equalling 1.233, with a p-value of 0.000 which is lower than 0.05. According to the random effect regression, total debt will rise with 1.233 units when the EBITDA increases with one unit, *ceteris paribus*. The signs for the gearing ratio and

the ROA are the same in both regressions, but not statistically significant. Thus, the EBITDA shows a positive effect on the total debt. The constant of 209,832.700 is only significant for the fixed effect regression, as its p-value equals 0.000 which is lower than 0.05. This means the total debt will equal 209,832.700 when all other variables in formula 7 equal zero.

The dummy variable representing the effect of the implementation of IFRS 16 shows no significant results in both regressions. Based on this result, the twelfth hypothesis should be rejected. However, the p-value of the dummy variable equals 0.065 in the random effect regression in Table 18. As a significance level of 0.05 is used, this coefficient is not statistically significant. However, as the p-value is so close to the significance level, the coefficient cannot be ignored. There might be some effect of the implementation of IFRS 16 on the debt position, which will be explored further for the long-term debt and debt in current liabilities.

For the analyses of the debt in current liabilities and the long-term debt, the same formula is used as for total debt. First, regression analysis is performed to explore the effect of the implementation of IFRS 16 on the total debt in current liabilities, using the formula:

$$CurrentDebt_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4FinancingCashFlow_{it} + b_5InvestingCashFlow_{it} + b_6GearingRatio_{it} + b_7ROA_{it} + b_8EBITDA_{it} + \varepsilon_{it} \quad (8)$$

The results of the regressions on the total debt in current liabilities is shown below in Table 19.

**Table 19**

*Results of the random and fixed effect regressions for the relationship between total debt in current liabilities and the implementation of IFRS 16*

<b>Total Debt in Current Liabilities</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	-411.510 (0.901)	-322.947 (0.881)
<b>Assets</b>	-0.111** (0.000)	-0.410** (0.000)
<b>Liabilities</b>	0.220** (0.000)	0.578** (0.000)
<b>Financing Cash Flow</b>	-0.231** (0.000)	-0.096** (0.001)
<b>Investing Cash Flow</b>	-0.323** (0.000)	-0.048 (0.103)
<b>Gearing Ratio</b>	135.377 (0.448)	110.250 (0.358)
<b>ROA</b>	-6255.479 (0.768)	-2297.941 (0.881)
<b>EBITDA</b>	0.110* (0.031)	-0.054 (0.314)
<b>_cons</b>	16618.360** (0.005)	90030.700** (0.000)
Observations (N)	1,130	1,130
R-squared	0.760	0.018
(Assumed) correlation	0	-0.794

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

The Hausman test in Table 3 indicates the random effect regression is most appropriate to use. This is in line with the R-squared of the random effect regression in Table 19, which equals



0.760, meaning 76.0% of the variance for the dependent variables is explained by the independent variables. The correlation coefficient found in the fixed effect regression is equal to -0.794, however only 1.8% of the variance for the dependent variables is explained by the independent variables, as R-squared equals 0.018. Combined with the Hausman test in Table 3, the random effect regression model seems to be the best fit.

The coefficients of the assets, liabilities, net cash flows from financing and investing activities and the EBITDA in Table 19 are statistically significant, as their p-values in the random effect regression are all lower than 0.05. The signs of these coefficients are the same in both the random and fixed effect regressions, except for the EBITDA. From this it can be concluded that the assets and net cash flows from financing and investing activities have a negative effect and the liabilities have a positive effect on the debt in current liabilities, ceteris paribus. No significant coefficient of the dummy variable representing the introduction of IFRS 16 can be found, as both p-values are higher than 0.05. When only the total debt in current liabilities would be considered, the twelfth hypothesis would be rejected.

However, the long-term debt is taken into account as well when analysing the debt position. The formula used to analyse the adoption of IFRS 16 on the long-term debt is:

$$LongDebt_{it} = a + b_1IFRS16_{it} + b_2Assets_{it} + b_3Liabilities_{it} + b_4FinancingCashFlow_{it} + b_5InvestingCashFlow_{it} + b_6GearingRatio_{it} + b_7ROA_{it} + b_8EBITDA_{it} + \varepsilon_{it} \quad (9)$$

The results of the regressions on the total long-term debt is shown in Table 20 below.

**Table 20**

*Results of the random and fixed effect regressions for the relationship between total long-term debt and the implementation of IFRS 16*

<b>Total Long-term Debt</b>	Coefficient Random Effect	Coefficient Fixed Effect
<b>IFRS 16</b>	24978.410* (0.029)	6344.375 (0.318)
<b>Assets</b>	-0.205** (0.000)	-1.263** (0.000)
<b>Liabilities</b>	0.454** (0.000)	1.729** (0.000)
<b>Financing Cash Flow</b>	-0.607** (0.000)	0.659** (0.000)
<b>Investing Cash Flow</b>	-0.712** (0.000)	0.176* (0.041)
<b>Gearing Ratio</b>	102.255 (0.864)	508.564 (0.149)
<b>ROA</b>	-9440.516 (0.887)	-2454.383 (0.956)
<b>EBITDA</b>	0.867** (0.000)	2.690** (0.000)
<b>_cons</b>	-2193.169 (0.884)	119802.000** (0.000)
Observations (N)	1,130	1,130
R-squared	0.827	0.078
(Assumed) correlation	0	-0.526

Standard errors in parentheses; \* p<0.05, \*\* p<0.01.

According to the Hausman test in Table 3, the fixed effect regression is most appropriate to use. However, the choice between the random or fixed effect regressions faces the same drawbacks as for the regression on the total debt. Just as was the case for the total debt, only a small percentage of the variance for the dependent variables is explained by the independent variables, namely 7.8%, as R-squared equals 0.078. On the other hand, a correlation coefficient of -0.526 is found in Table 20, whereby it cannot be assumed the individual-specific effects and the independent variables are uncorrelated. This correlation coefficient is not extremely high, therefore both the random and fixed regression models will be used for the long-term debt regression analysis.

The coefficients in Table 20 having a significant effect on the long-term debt are similar to the results found in the regressions on the total debt and the total debt in current liabilities. The coefficients of the assets, liabilities, cash flows from financing and investing activities and the EBITDA are statistically significant, as their p-values are all lower than 0.05 for both the random as fixed effect regression. However, the signs of the coefficients of the net cash flows from financing and investing activities are different in both regression models, making it uncertain to interpret these coefficients. In the random effect regression, the coefficient of the dummy variable representing the adoption of IFRS 16 equals 24,978.410, with a p-value of 0.028 which is lower than 0.05. This implies the long-term debt will be 24,978.410 units higher when IFRS 16 is adopted, *ceteris paribus*, meaning the implementation of IFRS 16 indeed influences the debt position of airline, retail and telecommunication. Based on this result, the twelfth hypothesis cannot be rejected.

## **5. Discussion and conclusions**

In 2016, the new lease standard was introduced which eliminates the classification choice between financial and operating lease. Companies with a high lease intensity, like companies operating in the airline, retail and telecommunication sector, are mostly affected by the new standard. All leases with a lease period of at least 12 months, except for low-value leases, need to be capitalised. Imhoff et al (1991) determined this would lead to a change in financial metrics like the EBITDA, solvency ratios and profitability ratios. As many financiers and investors use financial metrics to support their financing or investment decisions, these decisions might change as well (Piersma, 2018). For example, when operating leases are capitalised, the assets rise. On the other hand, a lease liability needs to be presented at the balance sheet, matching the capitalised asset. As this causes a rise in the total debt, keeping the stockholders' equity constant, the gearing ratio will increase. The solvability of a company gets worse, which might withhold financiers from granting a loan (Piersma, 2018). This leads to the research question:

*How does the implementation of IFRS 16 affect the financiers' and investors' decisions for airline, retail and telecommunication companies worldwide?*

To answer this research question, four sub-questions are added to analyse the effect of the financial metrics, net cash flows from financing and investing activities and the debt position of airline, retail and telecommunication companies. For the first sub-question, research is carried out on the financial metrics before and after the implementation of IFRS 16: *Does the implementation of IFRS 16 lead to a significant change in solvability ratios, profitability ratios and the EBITDA for airline, retail and telecommunication companies?* The results of the paired t-test in Table 6 showed the gearing ratio is not significantly different before and after the implementation of IFRS 16, causing to reject the first hypothesis. However, Table 7 and Table 8 show the ROA is significantly lower and the EBITDA is significantly higher after the adoption of IFRS 16. The second and third hypothesis are not rejected. Thus, the profitability ratio ROA and the EBITDA change significantly after IFRS 16 is applied for airline, retail and telecommunication companies.

As Piersma (2018) suggested, it might become harder for companies to attract credit when the new lease standard is introduced. Therefore, the net cash flow from financing activities and the debt position before and after the implementation of IFRS 16 are analysed in the second sub-question: *Does the implementation of IFRS 16 have a significant effect on the financing activities and the debt position of airline, retail and telecommunication companies?* The results of the paired t-test in Table 9 do not show a significant change in the net cash flow from financing activities in the year before and after IFRS 16 is applied. The fourth hypothesis is rejected. The debt position however is significantly different in the year before and after adoption of IFRS 16. Table 11 shows the total debt is significantly higher after the new lease standard is applied. This is mainly caused by the total long-term debt, which is significantly higher in 2019 as well. The sixth hypothesis cannot be rejected.

Following, regression analysis is performed on the panel data to research the effect of the adoption of IFRS 16 on the financial metrics, net cash flows from financing and the debt position. Also, the effect of the financial metrics on the net cash flows from financing and investing activities and the debt position is explored. This supports the third sub-question: *In what way do profitability ratios, solvency ratios and the EBITDA influence the financing activities and debt position for companies who have implemented IFRS 16?* Random effect and fixed effect regression models are used. The results of the regression analyses presented in Table 16 until Table 20 show the EBITDA has a significant effect on both net cash flows, the total debt, long-term debt and debt in current liabilities. The effect of the EBITDA on the total debt, long-term debt and debt in current liabilities is positive. The effect on the net cash flows from financing and investing activities however is ambiguous, as the signs of the coefficients differ for the random and fixed effect regressions.

Finally, companies are faced with the lease-or-buy decision through the new lease standard (PwC, 2016). Companies need to choose to buy the asset that was previously classified as operating lease, to capitalise the lease and take on a matching lease liability, or not use the asset at all anymore that was previously classified as operating lease. Therefore, the investing activities are explored. The lease-or-buy decision of companies with a high lease intensity is analysed through the fourth sub-question: *In what way does the implementation of IFRS 16 influence the investment decisions made by airline, retail and telecommunication companies?* The regression analysis on the net cash flow from investing activities does not show a significant result for the effect of the implementation of IFRS 16 on the net cash flow (Table 17). Also, the net cash flow from investing activities is not significantly different before and after IFRS 16 is applied (Table 10). No conclusions can be drawn on the changes in investing behaviour of companies operating in the airline, retail or telecommunication industry, as a result of the new lease standard.

To answer the research question, the regression analyses on the financial metrics, net cash flows from financing and investing activities and the debt position need to be evaluated. A dummy variable is used to represent the implementation of IFRS 16. The coefficient of the dummy variable appears to be statistically significant for the ROA, the EBITDA and the total long-term debt, shown in Table 14, Table 15 and Table 19. Table 14 shows the ROA will decrease, Table 15 shows the EBITDA will increase and Table 19 shows the total long-term debt will increase when IFRS 16 is applied, *ceteris paribus*. The decrease in ROA is in line with the expectations, as the new lease standard leads to a rise in assets when all operating leases need to be capitalised. When the net income remains constant, the ROA will decrease. An increase in EBITDA was previously already suggested by Morales-Díaz and Zamora-Ramírez (2018) and Sacarin (2017). When assets previously classified as operating leases are capitalised, operating expenses will decrease and at the same time the interest and depreciation expenses will rise. When everything else remains constant, this causes the EBITDA to increase. Finally, a rise in long-term debt is less straightforward than the other two results found. The capitalisation of the leases leads to a rise in assets, but also to a rise lease liabilities. The lease liabilities are part of the total debt, so in this case a rise in long-term debt seems credible. However, the prospect was it would get harder for companies to attract credit when the new lease standard became effective. From the increase in long-term and total debt, but a decrease in the mean of the assets in Table 4, it does not show more difficulty in attracting credit for airline, retail and telecommunication companies. However, as the variables total debt and long-term debt are not more detailed, it cannot be made clear what exactly causes the rise in total debt and long-term debt. Conclusively, only assumptions can be made on the decisions of financiers and investors for airline, retail and telecommunication firms regarding the implementation of the new lease standard.

To be able to make more assumptions on the changes in financiers' and investors' behaviour through the implementation of IFRS 16, some limitations of the research and suggestions for further research are presented. Firstly, the data sample used for the analysis can be expanded. In this data sample, only 565 companies are presented with data of only two years. As the effective date of the new lease standard is 1 January 2019, no more data was available at the time the research was performed regarding the after-implementation period. Nearly all companies with a fiscal year not parallel to a calendar year started with the implementation of IFRS 16 in fiscal year 2020, thus calendar year 2019/2020. The data of these annual reports was not available yet at the time of research. For future research, data from fiscal year 2020 and multiple years before and after implementation can be considered. Also, the number of companies and industries used in the data sample can be expanded. Secondly, the regression analyses performed do not take into account all variables effecting the dependent variables. For example, the EBITDA is not only influenced by variables found on the balance sheet, income statement and cash flow statement, but also by external factors like the economic circumstances in a specific country or continent, exchange rates or political factors. Thirdly, the dependent variables used in the regression analyses do not perfectly represent the decisions of financiers and investors. When it is analysed whether it truly becomes harder for companies to attract credit, the credit rating would be a better variable to use. Finally, the data retrieved for the sample is displayed in different currencies. Because of this, it becomes difficult to interpret the coefficients found in the regression analyses. Therefore, only assumptions can be made on the signs of the significant coefficients.

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## Appendix A

**Table 1**

*Company list data sample*

Global Company Key	Company Name	Country	ISO Currency Code	Accounting Standard	SIC	Industry
8544	PLDT INC	PHL	PHP	DI	4812	Telecommunication
13683	TELEFONICA SA	ESP	EUR	DI	4812	Telecommunication
19151	TELECOM ITALIA SPA	ITA	EUR	DI	4813	Telecommunication
23667	KONINKLIJKE AHOLD DELHAIZE	NLD	EUR	DI	5411	Retail
29194	TELECOM ARGENTINA	ARG	ARS	DI	4812	Telecommunication
30024	MILlicom INTL CELLULAR SA	LUX	USD	DI	4812	Telecommunication
31882	PHAROL SGPS SA	PRT	EUR	DI	4813	Telecommunication
61440	KONINKLIJKE KPN NV	NLD	EUR	DI	4813	Telecommunication
61761	GRUPO ELEKTRA SA DE CV	MEX	MXN	DI	5331	Retail
63205	TELEFONICA DEL PERU SA	PER	PEN	DI	4813	Telecommunication
63904	COMPANHIA BRASILEIRA DE DIST	BRA	BRL	DI	5411	Retail
63987	VEON LTD	BMU	USD	DI	4812	Telecommunication
64601	VIA VAREJO SA	BRA	BRL	DI	5700	Retail
64746	HIPERMARC SA	CHL	CLP	DI	5411	Retail
65662	CHINA MOBILE LTD	HKG	CNY	DI	4812	Telecommunication
100060	TRAVIS PERKINS PLC	GBR	GBP	DI	5211	Retail
100103	DEUTSCHE LUFTHANSA AG	DEU	EUR	DI	4512	Airline
100267	CYCLE & CARRIAGE BINTANG BHD	MYS	MYR	DI	5500	Retail
100346	CARREFOUR SA	FRA	EUR	DI	5399	Retail
101008	GREGGS PLC	GBR	GBP	DI	5400	Retail
101074	SKYLARK CO LTD	JPN	JPY	DI	5812	Retail
101095	RESTAURANT GROUP PLC	GBR	GBP	DI	5812	Retail

101173	CASINO GUICHARD-PERRACHON SA	FRA	EUR	DI	5411	Retail
101180	DAIRY FARM INTL HOLDINGS LTD	BMU	USD	DI	5411	Retail
101264	VIVENDI SA	FRA	EUR	DI	4812	Telecommunication
101475	AIR FRANCE - KLM	FRA	EUR	DI	4512	Airline
101585	BILIA AB	SWE	SEK	DI	5500	Retail
101732	FNAC DARTY SA	FRA	EUR	DI	5734	Retail
101736	STOCKMANN AB	FIN	EUR	DI	5311	Retail
101783	SA D'IETEREN NV	BEL	EUR	DI	5500	Retail
101811	SAINT-GOBAIN (CIE DE)	FRA	EUR	DI	5200	Retail
101843	ANDERSEN & MARTINI HLDG AS	DNK	DKK	DI	5500	Retail
102477	FINNAIR OYJ	FIN	EUR	DI	4512	Airline
102493	VALORA HOLDING AG	CHE	CHF	DI	5411	Retail
102556	HENDERSON INVESTMENT LTD	HKG	HKD	DI	5311	Retail
102941	STERN GROEP NV	NLD	EUR	DI	5500	Retail
102977	BIJOU BRIGITTE MOD ACCESS AG	DEU	EUR	DI	5944	Retail
103310	SAMSE	FRA	EUR	DI	5200	Retail
103423	DOYEN INTERNATIONAL HOLDINGS	HKG	HKD	DI	5812	Retail
103725	ISSETAN (SINGAPORE) LTD	SGP	SGD	DI	5311	Retail
103960	CHOW SANG SANG HOLDINGS LTD	BMU	HKD	DI	5944	Retail
104129	TELEKOM MALAYSIA BHD	MYS	MYR	DI	4812	Telecommunication
104175	WING ON CO INTL LTD	BMU	HKD	DI	5311	Retail
104611	SK NETWORKS CO LTD	KOR	KRW	DI	5500	Retail
104623	KOREAN AIR LINES CO LTD	KOR	KRW	DI	4512	Airline
104796	PENDRAGON PLC	GBR	GBP	DI	5500	Retail
104898	HOWDEN JOINERY GROUP PLC	GBR	GBP	DI	5700	Retail
104970	GIORDANO INTERNATIONAL LTD	BMU	HKD	DI	5600	Retail



105104	WAL MART DE MEXICO SA	MEX	MXN	DI	5331	Retail
106815	OTE - HELLENIC TELECOM ORG	GRC	EUR	DI	4813	Telecommunication
114927	SWISSCOM AG	CHE	CHF	DI	4813	Telecommunication
118958	PRESS CORPORATION PLC	MWI	MWK	DI	5399	Retail
122337	NETIA S.A	POL	PLN	DI	4813	Telecommunication
122874	INTERNET GOLD-GOLDEN LINES	ISR	ILS	DI	4813	Telecommunication
125378	PARTNER COMMUNICATIONS CO	ISR	ILS	DI	4812	Telecommunication
133104	KT CORP	KOR	KRW	DI	4813	Telecommunication
134267	QSC AG	DEU	EUR	DI	4813	Telecommunication
137066	CHINA UNICOM (HONG KONG) LTD	HKG	CNY	DI	4812	Telecommunication
137433	MOBILE TELESYSTEMS PJSC	RUS	RUB	DI	4812	Telecommunication
137612	TURKCELL ILETISIM HIZMET	TUR	TRY	DI	4812	Telecommunication
140756	CHINA PETROLEUM & CHEM CORP	CHN	CNY	DI	5500	Retail
142248	AMERICA MOVIL SA DE CV	MEX	MXN	DI	4812	Telecommunication
154942	LIANHUA SUPERMARKET HOLDINGS	CHN	CNY	DI	5411	Retail
160381	CENCOSUD SA	CHL	CLP	DI	5411	Retail
160628	GOL LINHAS AEREAS INTELIGENT	BRA	BRL	DI	4512	Airline
162094	AXTEL SA DE CV	MEX	MXN	DI	4813	Telecommunication
163677	B2W COMPANHIA DIGITAL	BRA	BRL	DI	5961	Retail
163896	X5 RETAIL GROUP NV	NLD	RUB	DI	5411	Retail
164690	PHARMACY CHAIN 36.6	RUS	RUB	DI	5912	Retail
165678	COPA HOLDINGS SA	PAN	USD	DI	4512	Airline
176652	CELLCOM ISRAEL LTD	ISR	ILS	DI	4812	Telecommunication
178741	B COMMUNICATIONS LTD	ISR	ILS	DI	4813	Telecommunication
182898	HUTCHISON TELECOMM HONG KONG	CYM	HKD	DI	4812	Telecommunication

200328	AURORA CORP	TWN	TWD	DI	5734	Retail
200384	PROXIMUS SA	BEL	EUR	DI	4813	Telecommunication
200397	LOJAS AMERICANAS	BRA	BRL	DI	5399	Retail
200511	PAL HOLDINGS INC	PHL	PHP	DI	4512	Airline
201025	CAPE RANGE LTD	AUS	AUD	DI	4812	Telecommunication
201028	GOME RETAIL HOLDINGS LTD	BMU	CNY	DI	5700	Retail
201118	CENTRAL PLAZA HOTEL CO LTD	THA	THB	DI	5812	Retail
201211	CHINA AIRLINES	TWN	TWD	DI	4512	Airline
201367	PAKISTAN TELECOMMUN CORP	PAK	PKR	DI	4813	Telecommunication
201535	AUTOGRILL SPA	ITA	EUR	DI	5812	Retail
202067	ENM HOLDINGS LTD	HKG	HKD	DI	5600	Retail
202135	FAR EAST DEPARTMENT STORES	TWN	TWD	DI	5311	Retail
202544	AEON CO. (M) BHD	MYS	MYR	DI	5399	Retail
202562	GRUPO GIGANTE SAB	MEX	MXN	DI	5411	Retail
202578	GLOBE TELECOM INC	PHL	PHP	DI	4812	Telecommunication
202793	JOLLIBEE FOODS CORP	PHL	PHP	DI	5812	Retail
202811	AEON STORES (HONG KONG) CO	HKG	HKD	DI	5331	Retail
202979	SHIN SHIN SUPERMKT	TWN	TWD	DI	5411	Retail
202995	SHINSEGAE CO LTD	KOR	KRW	DI	5311	Retail
203480	SK TELECOM CO LTD	KOR	KRW	DI	4812	Telecommunication
203709	SUB SRI THAI PCL	THA	THB	DI	5812	Retail
203734	BIG CAMERA CORPORATION PCL	THA	THB	DI	5940	Retail
203804	CHINA NUCLEAR ENERGY TECH	BMU	HKD	DI	5812	Retail
203930	TRUE CORP PUB CO LTD	THA	THB	DI	4812	Telecommunication
203931	ENTEL-EMPRESA NACION TELECOM	CHL	CLP	DI	4813	Telecommunication
203944	OI SA	BRA	BRL	DI	4813	Telecommunication
203973	THAI AIRWAYS INTERNATIONAL	THA	THB	DI	4512	Airline
204409	DELEK GROUP LTD	ISR	ILS	DI	5500	Retail
204459	SHUFERSAL LTD	ISR	ILS	DI	5411	Retail

204588	SIAM MAKRO PCL	THA	THB	DI	5399	Retail
205162	MIGROS TICARET AS	TUR	TRY	DI	5399	Retail
205333	OCC PUBLIC CO LTD	THA	THB	DI	5990	Retail
205679	LOJAS RENNER SA	BRA	BRL	DI	5311	Retail
205713	HOTAI MOTOR CO	TWN	TWD	DI	5500	Retail
205876	ALMACENES EXITO SA	COL	COP	DI	5399	Retail
205900	FALABELLA SA	CHL	CLP	DI	5311	Retail
205934	FREENET AG	DEU	EUR	DI	4812	Telecommunication
206468	ROSTELECOM PJSC	RUS	RUB	DI	4813	Telecommunication
206759	O2 CZECH REPUBLIC AS	CZE	CZK	DI	4813	Telecommunication
206956	PCCW LTD	HKG	HKD	DI	4813	Telecommunication
207173	RUENTEX DEVELOPMENT CO LTD	TWN	TWD	DI	5311	Retail
207938	AEROFLOT-RUSSIAN AIRLINES	RUS	RUB	DI	4512	Airline
208164	SONAE SGPS SA	PRT	EUR	DI	5411	Retail
208176	ORGANIZACION SORIANA SA DE C	MEX	MXN	DI	5331	Retail
208777	GRUPO SANBORN SA DE CV	MEX	MXN	DI	5311	Retail
208964	DAEGU DEPARTMENT STORE	KOR	KRW	DI	5311	Retail
209265	TURK HAVA YOLLARI AO	TUR	TRY	DI	4512	Airline
209531	AUTO ITALIA HOLDINGS LTD	BMU	HKD	DI	5500	Retail
209910	BOUTIQUE NEW CITY CO	THA	THB	DI	5621	Retail
210533	FOURLIS HOLDING SA	GRC	EUR	DI	5700	Retail
210828	RALLYE	FRA	EUR	DI	5411	Retail
210995	SMARTPHOTO GROUP	BEL	EUR	DI	5961	Retail
211655	MTN GROUP LTD	ZAF	ZAR	DI	4812	Telecommunication
211809	EASTERN MEDIA INT	TWN	TWD	DI	5960	Retail
212386	TOTAL ACCESS COMMUNICATIONS	THA	THB	DI	4812	Telecommunication
212723	GRUPO PALACIO DE HIERRO	MEX	MXN	DI	5311	Retail
213024	BETTER BED HOLDING NV	NLD	EUR	DI	5700	Retail

213085	GLORIOUS SUN ENTERPRISES LTD	BMU	HKD	DI	5600	Retail
213118	TALLINNA KAUBAMAJA GRUPP AS	EST	EUR	DI	5411	Retail
213215	TON LIN DEPARTMENT STORES	TWN	TWD	DI	5311	Retail
213364	COSTA VERDE AERONAUTICA SA	CHL	CLP	DI	4512	Airline
213466	KENYA AIRWAYS PLC	KEN	KES	DI	4512	Airline
213939	AMWAY (MALAYSIA) HLDGS BHD	MYS	MYR	DI	5961	Retail
214526	MAGYAR TELEKOM	HUN	HUF	DI	4812	Telecommunication
215406	AXFOOD AB	SWE	SEK	DI	5411	Retail
217200	HONG KONG TELE NETWORK LTD	HKG	HKD	DI	5961	Retail
218468	PETROL LJUBLJANA D.D.	SVN	EUR	DI	5500	Retail
218601	GO PLC	MLT	EUR	DI	4813	Telecommunication
219602	BOURRELIER GROUP SA	FRA	EUR	DI	5211	Retail
220157	S&P SYNDICATE CO LTD	THA	THB	DI	5810	Retail
220403	AVIC JOY HLDGS (HK) LTD	HKG	HKD	DI	5900	Retail
220487	LATAM AIRLINES GROUP SA	CHL	USD	DI	4512	Airline
220496	EL PUERTO DE LIVERPOOL SA	MEX	MXN	DI	5311	Retail
220579	TELIA COMPANY AB	SWE	SEK	DI	4813	Telecommunication
220711	LUDWIG BECK AG	DEU	EUR	DI	5311	Retail
220940	ORANGE	FRA	EUR	DI	4813	Telecommunication
221102	JERONIMO MARTINS SGPS SA	PRT	EUR	DI	5411	Retail
221371	CORPORATIVO FRAGUA SA DE CV	MEX	MXN	DI	5912	Retail
221612	TELENOR ASA	NOR	NOK	DI	4812	Telecommunication
221616	DEUTSCHE TELEKOM	DEU	EUR	DI	4813	Telecommunication
221648	IBERSOL SGPS SA	PRT	EUR	DI	5812	Retail
221877	AP EAGERS LTD	AUS	AUD	DI	5500	Retail
222044	PAKISTAN INTL AIRLINES CORP	PAK	PKR	DI	4512	Airline

222070	BEZEQ ISRAEL TELECOMMUNICATN	ISR	ILS	DI	4813	Telecommunication
222089	POLARIS LTD	SGP	SGD	DI	5731	Retail
222286	TELE2 AB	SWE	SEK	DI	4813	Telecommunication
222638	TIM PARTICIPACOES SA	BRA	BRL	DI	4812	Telecommunication
222648	TELEFONICA BRASIL SA	BRA	BRL	DI	4813	Telecommunication
223129	PETRON CORP	PHL	PHP	DI	5500	Retail
224603	DELEK AUTOMOTIVE SYSTEMS LTD	ISR	ILS	DI	5531	Retail
224977	ORANGE POLSKA SA	POL	PLN	DI	4813	Telecommunication
225091	ORANGE BELGIUM S.A.	BEL	EUR	DI	4812	Telecommunication
225160	GROUPE FLO SA	FRA	EUR	DI	5812	Retail
226811	HAWESKO HOLDING AG	DEU	EUR	DI	5900	Retail
226998	COUNTRY GROUP DEV PCL	THA	THB	DI	5311	Retail
227283	STOCKWIK FORVALTNING AB	SWE	SEK	DI	5731	Retail
228976	CELESTIAL ASIA SECURITIES	BMU	HKD	DI	5700	Retail
231038	HUTCHISON TELECOM AUSTRALIA	AUS	AUD	DI	4812	Telecommunication
231256	PRESIDENT CHAIN STORE CORP	TWN	TWD	DI	5412	Retail
232085	DIGI.COM BHD	MYS	MYR	DI	4812	Telecommunication
232956	3U HOLDING AG	DEU	EUR	DI	4813	Telecommunication
233253	ORIENTAL WEAVERS GROUP	EGY	EGP	DI	5700	Retail
233341	MEGAFON PJSC	RUS	RUB	DI	4812	Telecommunication
234079	DOMINO'S PIZZA GROUP PLC	GBR	GBP	DI	5812	Retail
234087	ELISA CORP	FIN	EUR	DI	4812	Telecommunication
236259	RAKUTEN INC	JPN	JPY	DI	5961	Retail
237802	SHAN-LOONG TRANSPORTATION	TWN	TWD	DI	5400	Retail
237957	SONAE.COM SGPS SA	PRT	EUR	DI	5411	Retail
238523	GLOBAL TELECOM HOLDING SAE	EGY	USD	DI	4812	Telecommunication
238705	CATERING INTL SERVICES	FRA	EUR	DI	5812	Retail

238761	PASSAT SA	FRA	EUR	DI	5961	Retail
239419	CRAYON GROUP HOLDING ASA	NOR	NOK	DI	5734	Retail
239576	TELIA LIETUVA AB	LTU	EUR	DI	4813	Telecommunication
240319	MASSMART HOLDINGS LTD	ZAF	ZAR	DI	5399	Retail
240656	TAIWAN MOBILE CO LTD	TWN	TWD	DI	4812	Telecommunication
241084	AUTO-HALL ANCIEN ETBLSMT VEY	MAR	MAD	DI	5500	Retail
241159	CHUNGHWA TELECOM LTD	TWN	TWD	DI	4813	Telecommunication
241495	GS HOME SHOPPING INC	KOR	KRW	DI	5961	Retail
242570	SEJONG TELECOM INC	KOR	KRW	DI	4813	Telecommunication
242577	ASIANA AIRLINES INC	KOR	KRW	DI	4512	Airline
242653	CMR S.A.B. DE C.V.	MEX	MXN	DI	5812	Retail
242709	EYESVISION CORP	KOR	KRW	DI	5961	Retail
242878	CONVENIENCE RETAIL ASIA LTD	CYM	HKD	DI	5412	Retail
243087	CJ ENM CO LTD	KOR	KRW	DI	5961	Retail
243169	INTERPARK HOLDINGS CORP	KOR	KRW	DI	5961	Retail
243241	LG UPLUS CORP	KOR	KRW	DI	4812	Telecommunication
243364	PHARMANIAGA BHD	MYS	MYR	DI	5912	Retail
243543	NATIONAL PETROLEUM CO LTD	TWN	TWD	DI	5500	Retail
243652	EVA AIRWAYS CORP	TWN	TWD	DI	4512	Airline
243660	VENUEG CO LTD	KOR	KRW	DI	5311	Retail
244281	SARAIVA SA LIVREIROS	BRA	BRL	DI	5961	Retail
244393	MOBILE TELEPHONE SYSTEMS	KWT	KWD	DI	4812	Telecommunication
244398	TAKKT AG	DEU	EUR	DI	5961	Retail
244664	CASTRO MODEL LTD	ISR	ILS	DI	5600	Retail
245222	MEKONOMEN AB	SWE	SEK	DI	5531	Retail
245272	SAGA FALABELLA SA	PER	PEN	DI	5311	Retail
245588	GRAZZIOTIN SA	BRA	BRL	DI	5311	Retail
245680	YULON FINANCE CORP	TWN	TWD	DI	5500	Retail

246258	EDGARS STORES LTD	ZWE	USD	DI	5600	Retail
247278	NATIONAL MOBILE TELECOMMUNIC	KWT	KWD	DI	4812	Telecommunication
247878	IGB ELETRONICA SA	BRA	BRL	DI	5731	Retail
248182	WASGAU PRODUKTIONS & HANDELS	DEU	EUR	DI	5411	Retail
248306	VIKING OFFSHORE AND MARINE	SGP	SGD	DI	5990	Retail
248321	PAVILLON HOLDINGS LTD	SGP	SGD	DI	5812	Retail
249258	JORDAN DUTY FREE SHOPS	JOR	JOD	DI	5990	Retail
249263	NATIONAL GAS CO	OMN	OMR	DI	5900	Retail
249274	SULTAN CENTRE FOOD PRODUCTS	KWT	KWD	DI	5411	Retail
250060	HOME PRODUCT CENTER PCL	THA	THB	DI	5211	Retail
251190	BAHRAIN DUTY FREE COMPLEX	BHR	BHD	DI	5990	Retail
251195	BMMI BSC	BHR	BHD	DI	5411	Retail
251201	BAHRAIN TELECOMMUNICATION	BHR	BHD	DI	4812	Telecommunication
252295	FAR EASTONE TELECOMMUNICTN	TWN	TWD	DI	4812	Telecommunication
252423	CHINA FORTUNE INVEST (HLDG)	CYM	HKD	DI	5944	Retail
252433	RENTIAN TECHNOLOGY HOLDINGS	CYM	HKD	DI	5500	Retail
252524	ALSEA SA DE CV	MEX	MXN	DI	5812	Retail
252606	PHILIPPINE SEVEN	PHL	PHP	DI	5411	Retail
252621	CHINA ENERGY DEV HLDGS LTD	CYM	HKD	DI	5812	Retail
254190	FUTURE BRIGHT HOLDINGS LTD	BMU	HKD	DI	5812	Retail
254338	CHINA TELECOM CORP LTD	CHN	CNY	DI	4813	Telecommunication
254458	HYUNDAI DEPT STORE CO LTD	KOR	KRW	DI	5311	Retail
256754	TAIWAN FAMILYMART CO	TWN	TWD	DI	5411	Retail

257245	NEW PALACE INTL CO LTD	TWN	TWD	DI	5812	Retail
257700	JEREISSATI PARTICIPACOES SA	BRA	BRL	DI	4813	Telecommunication
257743	BONJOUR HOLDINGS LTD	CYM	HKD	DI	5990	Retail
257744	CHINESE FOOD AND BEVERAGE GR	CYM	HKD	DI	5812	Retail
257752	IT CITY PCL	THA	THB	DI	5734	Retail
257756	MIDA ASSETS PCL	THA	THB	DI	5700	Retail
257892	SHINSEGAE FOOD SYSTEM	KOR	KRW	DI	5812	Retail
257961	SAVEZONE I&C CORP	KOR	KRW	DI	5311	Retail
258195	SCANDIC INTERNATIONAL CORP	TWN	TWD	DI	5712	Retail
258201	SUNFAC COMPUTER CO	TWN	TWD	DI	5734	Retail
258648	CP ALL PCL	THA	THB	DI	5412	Retail
258660	EMPRESAS LA POLAR SA	CHL	CLP	DI	5311	Retail
258702	SRI LANKA TELECOM	LKA	LKR	DI	4813	Telecommunication
258718	SIMINN HF	ISL	ISK	DI	4813	Telecommunication
259013	SAUDI TELECOM CO	SAU	SAR	DI	4813	Telecommunication
260324	MAXCOM TELECOMUNICACIONES SA	MEX	MXN	DI	4813	Telecommunication
260399	NORWEGIAN AIR SHUTTLE ASA	NOR	NOK	DI	4512	Airline
270109	BREADTALK GROUP LTD	SGP	SGD	DI	5400	Retail
270124	CHALLENGER TECHNOLOGIES LTD	SGP	SGD	DI	5734	Retail
270285	LIFESTYLE INTL HLDGS LTD	CYM	HKD	DI	5311	Retail
270958	MAX'S GROUP INC	PHL	PHP	DI	5812	Retail
271022	AQUA CORPORATION PUBLIC CO	THA	THB	DI	5731	Retail
271138	DOGUS OTOMOTIV SERIS VE TIC	TUR	TRY	DI	5500	Retail
271244	AIRASIA GROUP BERHAD	MYS	MYR	DI	4512	Airline
271783	EUROCASH SA	POL	PLN	DI	5411	Retail



271838	RAIA DROGASIL SA	BRA	BRL	DI	5912	Retail
272820	AMREST HOLDINGS SE	NLD	EUR	DI	5812	Retail
273498	BIM BIRLESIK MAGAZALAR	TUR	TRY	DI	5399	Retail
273720	RIPLEY CORP SA	CHL	CLP	DI	5700	Retail
273823	MOUNTAIN ALLIANCE AG	DEU	EUR	DI	5961	Retail
273892	APRANGA	LTU	EUR	DI	5600	Retail
273979	DOR ALON ENERGY IN ISRAEL	ISR	ILS	DI	5500	Retail
274107	DIALOG AXIATA PLC	LKA	LKR	DI	4812	Telecommunication
274153	ESANG NETWORKS CO LTD	KOR	KRW	DI	5961	Retail
274202	TIV TAAM HOLDINGS 1 LTD	ISR	ILS	DI	5411	Retail
274218	ETIHAD ETISALAT CO	SAU	SAR	DI	4812	Telecommunication
274476	HENGDELI HOLDINGS LTD	CYM	CNY	DI	5944	Retail
274626	PARKSON RETAIL GROUP LTD	CYM	CNY	DI	5311	Retail
274689	DUFY AG	CHE	CHF	DI	5900	Retail
274867	E-LIFE MALL CORP	TWN	TWD	DI	5700	Retail
274909	TELECOM EGYPT	EGY	EGP	DI	4813	Telecommunication
275037	FITAIHI GROUP HOLDING CO	SAU	SAR	DI	5900	Retail
275222	DEUTSCH MOTORS INC	KOR	KRW	DI	5500	Retail
275421	LO'ITE SHOPPING CO	KOR	KRW	DI	5311	Retail
275448	FOCUS DYNAMICS GROUP BHD	MYS	MYR	DI	5400	Retail
275616	FOX-WIZEL LTD	ISR	ILS	DI	5600	Retail
275794	GOLF & CO GROUP LTD	ISR	ILS	DI	5600	Retail
275880	GOLDEN EAGLE RETAIL GROUP	CYM	CNY	DI	5311	Retail
275929	ECOTEL COMMUNICATION AG	DEU	EUR	DI	4812	Telecommunication
276704	CARS MOTORCYCLES AND MARINE	GRC	EUR	DI	5500	Retail
277011	PRIVASIA TECHNOLOGY BHD	MYS	MYR	DI	4812	Telecommunication

277015	MAGNIT PJSC	RUS	RUB	DI	5399	Retail
277358	H & T GROUP PLC	GBR	GBP	DI	5900	Retail
277819	ELECTRA GRUPPEN AB	SWE	SEK	DI	5700	Retail
278132	SWEDOL AB	SWE	SEK	DI	5211	Retail
278248	TASTY PLC	GBR	GBP	DI	5812	Retail
278340	TOMEI CONSOLIDATED BERHAD	MYS	MYR	DI	5944	Retail
278358	GRUPO FAMSA SAB DE CV	MEX	MXN	DI	5311	Retail
278455	DIMERCO EXPRESS CORP	TWN	TWD	DI	4512	Airline
278721	CARREFOURSA AS	TUR	TRY	DI	5399	Retail
278952	NORTH STAR INTL CO LTD	TWN	TWD	DI	5500	Retail
278971	POYA INTERNATIONAL CO LTD	TWN	TWD	DI	5399	Retail
279045	FORMOSA OPTICAL TECH CO LTD	TWN	TWD	DI	5990	Retail
279467	DELTICOM AG	DEU	EUR	DI	5961	Retail
281819	ICELANDAIR GROUP HLDGS	ISL	USD	DI	4512	Airline
282124	OULA FUEL MARKETING CO K.S.C	KWT	KWD	DI	5500	Retail
282462	EUROTEL SA	POL	PLN	DI	5990	Retail
282632	ALDREES PETRO & TRANS SVC CO	SAU	SAR	DI	5500	Retail
282705	R.T.BRISCOE (NIGERIA) PLC	NGA	NGN	DI	5500	Retail
284137	AJISEN (CHINA) HOLDINGS LTD	CYM	CNY	DI	5812	Retail
284681	JIAHUA STORES HOLDINGS LTD	CYM	CNY	DI	5399	Retail
284741	SOUP RESTAURANT GRP LTD	SGP	SGD	DI	5812	Retail
285325	AEGEAN AIRLINES	GRC	EUR	DI	4512	Airline
285473	TAO HEUNG HOLDINGS LTD	CYM	HKD	DI	5812	Retail
285481	AEFFE SPA	ITA	EUR	DI	5600	Retail
285482	AIR ARABIA PJSC	ARE	AED	DI	4512	Airline
286365	CROATIA AIRLINES	HRV	HRK	DI	4512	Airline

286707	TAEYANG CORP	KOR	KRW	DI	5900	Retail
286916	MARISA LOJAS SA	BRA	BRL	DI	5311	Retail
287079	MAGMA D.D.	HRV	HRK	DI	5600	Retail
287183	M VIDEO PJSC	RUS	RUB	DI	5731	Retail
287608	BGT CORP PUBLIC CO LTD	THA	THB	DI	5600	Retail
287852	ROYAL JORDANIAN AIRLINES	JOR	JOD	DI	4512	Airline
287957	JAZEERA AIRWAYS	KWT	KWD	DI	4512	Airline
288546	MOBILE TELECOMMUNICATIONS CO	SAU	SAR	DI	4812	Telecommunication
288667	AXIATA GROUP BHD	MYS	MYR	DI	4812	Telecommunication
288761	MAOYE INTL HOLDINGS LTD	CYM	CNY	DI	5311	Retail
288793	YES24 CO LTD	KOR	KRW	DI	5961	Retail
288810	ZOOPLUS AG	DEU	EUR	DI	5900	Retail
288862	TURK TELEKOMUNIKASYON AS	TUR	TRY	DI	4813	Telecommunication
288990	POU SHENG INTL (HLDGS) LTD	BMU	CNY	DI	5600	Retail
289159	SEOUL AUCTION CO LTD	KOR	KRW	DI	5990	Retail
289178	SOOR FUEL MARKETING CO	KWT	KWD	DI	5500	Retail
289316	EMPEROR WATCH AND JEWELLERY	HKG	HKD	DI	5944	Retail
289488	RAMI LEVI	ISR	ILS	DI	5411	Retail
289506	HAMASHBIR 365 LTD	ISR	ILS	DI	5311	Retail
289611	ABDULLAH AL OTHAIM MARKETS	SAU	SAR	DI	5399	Retail
291923	CBA ASSET MANAGEMENT AD	BGR	BGN	DI	5411	Retail
292438	VODAFONE QATAR P.Q.S.C.	QAT	QAR	DI	4812	Telecommunication
292534	SIAM GLOBAL HOUSE CO LTD	THA	THB	DI	5200	Retail
293086	AL MEERA CONSUMER GOODS CO	QAT	QAR	DI	5399	Retail
293132	TRINITY LTD	BMU	HKD	DI	5600	Retail

293173	JUBILEE ENTERPRISE PCL	THA	THB	DI	5944	Retail
293284	MAXIS BHD	MYS	MYR	DI	4812	Telecommunication
293399	GRAMEENPHONE LTD	BGD	BDT	DI	4812	Telecommunication
293442	EMPRESAS HITES SA	CHL	CLP	DI	5311	Retail
293481	HAFARY HLDG LTD	SGP	SGD	DI	5700	Retail
293875	HERFY FOOD SERVICES CO LTD	SAU	SAR	DI	5812	Retail
294257	QIDIAN INTERNATIONAL CO LTD	CYM	CNY	DI	5700	Retail
294266	ZHONGSHENG GROUP HLDGS LTD	CYM	CNY	DI	5500	Retail
294564	GRUPO COMMERCIAL CHEDRAUI SA	MEX	MXN	DI	5399	Retail
294721	BYGGMAX GROUP AB	SWE	SEK	DI	5200	Retail
295088	ENNAKL SA	TUN	TND	DI	5500	Retail
295159	DP POLAND PLC	GBR	GBP	DI	5812	Retail
295163	COL PUBLIC CO LTD	THA	THB	DI	5961	Retail
295277	FOCUS POINT HOLDINGS BHD	MYS	MYR	DI	5990	Retail
295376	HYUNDAI HOME SHOPPING NET	KOR	KRW	DI	5961	Retail
295411	KTCS CORP	KOR	KRW	DI	4813	Telecommunication
295709	CEBU AIR INC	PHL	PHP	DI	4512	Airline
295761	O'KEY GROUP SA	LUX	RUB	DI	5399	Retail
295887	SHIRBLE DEPT STORE HLDGS	CYM	CNY	DI	5311	Retail
295905	GOURMET MASTER CO LTD	CYM	TWD	DI	5812	Retail
296006	LVMC HOLDINGS	CYM	KRW	DI	5500	Retail
296248	CHINA ZHENG TONG AUTO SVCS	CYM	CNY	DI	5500	Retail
296270	QLIRO GROUP AB	SWE	SEK	DI	5961	Retail
296576	ZHONGMIN BAIHUI RETAIL GROUP	SGP	CNY	DI	5311	Retail
296649	AN-SHIN FOOD SERVICES CO LTD	TWN	TWD	DI	5812	Retail
296697	CONTROLADORA VUELA COMPANIA	MEX	MXN	DI	4512	Airline

296762	BIZIM TOPTAN SATIS MAGAZALA	TUR	TRY	DI	5399	Retail
296860	ROPHARMA SA BRASOV	ROU	RON	DI	5912	Retail
296900	IVS GROUP	LUX	EUR	DI	5960	Retail
297003	INTL MEAL CO ALIMENTACAO SA	BRA	BRL	DI	5812	Retail
297289	GRUPO AEROMEXICO SAB DE CV	MEX	MXN	DI	4512	Airline
297296	TANG PALACE (CHINA) HLDGS	CYM	CNY	DI	5812	Retail
297346	WOWPRIME CORP	TWN	TWD	DI	5812	Retail
297353	MAGAZINE LUIZA SA	BRA	BRL	DI	5311	Retail
297402	TADIRAN HOLDINGS LTD	ISR	ILS	DI	5700	Retail
297988	VICTORY SUPERMARKET CHAIN	ISR	ILS	DI	5411	Retail
298073	E-MART CO LTD	KOR	KRW	DI	5399	Retail
298181	DISTRIBUIDORA INTERNACIONAL	ESP	EUR	DI	5399	Retail
298185	CARASSO MOTORS LTD	ISR	ILS	DI	5500	Retail
298280	FOOD IDEA HOLDINGS LTD	CYM	HKD	DI	5812	Retail
298338	SHINSEGAE INTL CO LTD	KOR	KRW	DI	5600	Retail
298439	SUN ART RETAIL GROUP LTD	HKG	CNY	DI	5399	Retail
298636	AVIANCA HOLDINGS SA	PAN	USD	DI	4512	Airline
298660	SHENG SIONG GROUP LTD	SGP	SGD	DI	5411	Retail
300098	FALABELLA PERU SAA	PER	PEN	DI	5311	Retail
300387	CAYMAN TUNG LING CO LTD	CYM	TWD	DI	5940	Retail
300697	TTFB CO LTD	TWN	TWD	DI	5812	Retail
305487	SINO ENERGY INTL HOLDINGS	CYM	CNY	DI	5500	Retail
306295	IEV HOLDINGS LTD	SGP	MYR	DI	5600	Retail
306490	ADESE ALISVERIS MERKEZLERI	TUR	TRY	DI	5411	Retail
311314	GRAND BAOXIN AUTO GROUP LTD	CYM	CNY	DI	5500	Retail

311378	GS RETAIL CO LTD	KOR	KRW	DI	5412	Retail
311447	UNITED ELECTRONICS CO	SAU	SAR	DI	5731	Retail
311528	ZHONGHUA GAS HOLDINGS LTD	CYM	CNY	DI	5812	Retail
311719	CHRISTINE INTL HOLDINGS LTD	CYM	CNY	DI	5400	Retail
312341	THE ESLITE SPECTRUM CORP	TWN	TWD	DI	5311	Retail
312468	MEPET METRO PETROL VE TESIS	TUR	TRY	DI	5500	Retail
312483	SOLAR COMPANY SA	POL	PLN	DI	5600	Retail
312659	SIF HOTELURI SA	ROU	RON	DI	5812	Retail
312666	TEKNOSA IC VE DIS TIC AS	TUR	TRY	DI	5734	Retail
312789	ASIA AVIATION PUBLIC CO LTD	THA	THB	DI	4512	Airline
312868	GRAND OCEAN RETAIL GROUP	CYM	TWD	DI	5311	Retail
313006	MAXI-CASH FINANCIAL SERV	SGP	SGD	DI	5944	Retail
313207	SAUDI AIRLINES CATERING CO	SAU	SAR	DI	5812	Retail
313251	CHINA YONGDA AUTOMOBILES	CYM	CNY	DI	5500	Retail
313298	TANSH GLOBAL FOOD GROUP CO	CYM	CNY	DI	5812	Retail
313495	BUILDERSMART PCL	THA	THB	DI	5211	Retail
313518	TV DIRECT CO LTD	THA	THB	DI	5961	Retail
313612	JCK HOSPITALITY PCL	THA	THB	DI	5812	Retail
313685	INRETAIL PERU CORP	PAN	PEN	DI	5399	Retail
313972	TELEFONICA DEUTSCHLAND	DEU	EUR	DI	4812	Telecommunication
314301	BEAUTY COMMUNITY PCL	THA	THB	DI	5990	Retail
314492	KCELL JSC	KAZ	KZT	DI	4812	Telecommunication
314896	LENTA PLC	VGB	RUB	DI	5399	Retail
315226	PEGASUS HAVA TASIMACILIGI	TUR	TRY	DI	4512	Airline
315257	BEIJING TONG REN TANG CHINE	HKG	HKD	DI	5912	Retail

315459	PTG ENERGY PUBLIC CO LTD	THA	THB	DI	5500	Retail
315505	CHINA HARMONY NEW ENERGY	CYM	CNY	DI	5500	Retail
315553	NOK AIRLINES PUBLIC CO LTD	THA	THB	DI	4512	Airline
315680	AIRASIA X BERHAD	MYS	MYR	DI	4512	Airline
315683	S CULTURE INTL HOLDINGS LTD	CYM	HKD	DI	5661	Retail
315703	HANJIN KAL CORP	KOR	KRW	DI	4512	Airline
315881	MONEYMAX FINANCIAL SERVICES	SGP	SGD	DI	5900	Retail
315943	MK RESTAURANT GROUP PCL	THA	THB	DI	5812	Retail
316084	MEDFIRST HEALTHCARE SERV	TWN	TWD	DI	5912	Retail
316429	VALUEMAX GROUP LTD	SGP	SGD	DI	5900	Retail
316561	ROBINSONS RETAIL HLDGS INC	PHL	PHP	DI	5399	Retail
316748	NOHO PARTNERS OYJ	FIN	EUR	DI	5810	Retail
316888	CHINA MEIDONG AUTO HOLDINGS	CYM	CNY	DI	5500	Retail
316932	SPVI PUBLIC CO LTD	THA	THB	DI	5961	Retail
316933	FESTI HF	ISL	ISK	DI	5500	Retail
316968	CHLITINA HOLDING LTD	CYM	TWD	DI	5900	Retail
317020	U BANQUET GROUP HLDG LTD	CYM	HKD	DI	5812	Retail
317174	SAUDI MARKETING CO LTD	SAU	SAR	DI	5411	Retail
317225	YI HUA HOLDINGS LTD	CYM	CNY	DI	5411	Retail
317230	AJ ADVANCE TECHNOLOGY PUB CO	THA	THB	DI	5700	Retail
317231	MOMO.COM INC	TWN	TWD	DI	5961	Retail
317329	PLAY COMMUNICATIONS SA	LUX	PLN	DI	4812	Telecommunication
317348	INTERPARK CORP	KOR	KRW	DI	5961	Retail
317407	VERKKOKAUPPA.COM OYJ	FIN	EUR	DI	5961	Retail
317572	SUNFONDA GRP HLDGS LTD	CYM	CNY	DI	5500	Retail

317585	BGF CO LTD	KOR	KRW	DI	5412	Retail
317721	7-ELEVEN MALAYSIA HOLDINGS	MYS	MYR	DI	5412	Retail
317863	UNIMOT SA	POL	PLN	DI	5900	Retail
317951	HUNG FOOK TONG GROUP HLDGS	CYM	HKD	DI	5411	Retail
317958	BEIJING DIGITAL TELECOM CO	CHN	CNY	DI	5731	Retail
318050	COGOBUY GROUP	CYM	CNY	DI	5961	Retail
318181	CHINA RUNDONG AUTO GROUP LTD	CYM	CNY	DI	5500	Retail
318221	ORGANIZACION TERPEL SA	COL	COP	DI	5500	Retail
318222	TAKUNI GROUP PCL	THA	THB	DI	5900	Retail
318434	ZALANDO SE	DEU	EUR	DI	5961	Retail
318466	XXL SPORT & VILLMARK AS	NOR	NOK	DI	5940	Retail
318580	BANGKOK AIRWAYS PCL	THA	THB	DI	4512	Airline
318585	RENJIE OLDSICHUAN CATERING	TWN	TWD	DI	5812	Retail
318782	HOMECHOICE INTERNATIONAL PLC	MLT	ZAR	DI	5961	Retail
318818	ZAIN BAHRAIN BSC	BHR	BHD	DI	4813	Telecommunication
318835	XIABUXIABU CATERING MGMT	CYM	CNY	DI	5812	Retail
318896	KUWAIT TELECOM CO	KWT	KWD	DI	4813	Telecommunication
318963	MR ONION CORP	TWN	TWD	DI	5812	Retail
318968	YUMMY TOWN	CYM	TWD	DI	5812	Retail
319024	GOMAJI CORP LTD	TWN	TWD	DI	5961	Retail
319179	GRANDVISION NV	NLD	EUR	DI	5990	Retail
319195	SUNRISE COMM GROUP AG	CHE	CHF	DI	4812	Telecommunication
319360	ZEGONA COMMUNICATIONS	GBR	EUR	DI	4813	Telecommunication
319411	ETILER GIDA VE TICARI YAT	TUR	TRY	DI	5812	Retail
319455	NS HOMESHOPPING	KOR	KRW	DI	5961	Retail
319505	MARSHALL MOTOR HOLDINGS	GBR	GBP	DI	5500	Retail



319606	NATURHOUSE HEALTH SA	ESP	EUR	DI	5399	Retail
319654	WINDELN.DE SE	DEU	EUR	DI	5961	Retail
319736	SAUDI COMPANY FOR HARDWARE	SAU	SAR	DI	5200	Retail
319789	TOTAL MAROC SA	MAR	MAD	DI	5500	Retail
319894	APPLEGREEN PLC	IRL	EUR	DI	5500	Retail
319912	INFRASTRUCTURE WIRELESS	ITA	EUR	DI	4812	Telecommunication
319915	EUROPRI ASA	NOR	NOK	DI	5331	Retail
320175	COM7 PUBLIC CO LTD	THA	THB	DI	5734	Retail
320246	SK JEWELLERY GROUP LTD	SGP	SGD	DI	5944	Retail
320322	CHINA SHUN KE LONG HOLDINGS	CYM	CNY	DI	5411	Retail
320324	HAIMARROW FOOD SERVICE CO	KOR	KRW	DI	5812	Retail
320588	GREAT TREE PHARMACY CO LTD	TWN	TWD	DI	5912	Retail
320636	SRP GROUPE SA	FRA	EUR	DI	5961	Retail
320662	KID ASA	NOR	NOK	DI	5700	Retail
320687	JEJU AIR CO LTD	KOR	KRW	DI	4512	Airline
320700	GEORGIA HEALTHCARE GROUP	GBR	GEL	DI	5912	Retail
320705	WITTCHEM SA	POL	PLN	DI	5940	Retail
320746	METRO RETAIL STORES GROUP	PHL	PHP	DI	5311	Retail
320755	THANAPIRIYA PCL	THA	THB	DI	5411	Retail
321103	LA COMER SAB DE CV	MEX	MXN	DI	5411	Retail
321132	KUOBROTHERS CORP	TWN	TWD	DI	5961	Retail
321591	TOKMANNI GROUP OYJ	FIN	EUR	DI	5311	Retail
321703	MAISONS DU MONDE SAS	FRA	EUR	DI	5712	Retail
321745	LAURITZ.COM GROUP AS	DNK	DKK	DI	5961	Retail
321815	COMPTOIR GROUP PLC	GBR	GBP	DI	5812	Retail
321819	HAVANNA HOLDING SA	ARG	ARS	DI	5812	Retail
321866	LI BAO GE GROUP	CYM	HKD	DI	5812	Retail

321959	LIFESTYLE CHINA GROUP LTD	CYM	CNY	DI	5311	Retail
321973	HI-LAI FOODS CO LTD	TWN	TWD	DI	5812	Retail
322030	KATRINA GROUP LTD	SGP	SGD	DI	5812	Retail
322179	KANPAI CO LTD	TWN	TWD	DI	5812	Retail
322617	SHOP APOTHEKE EUROPE NV	NLD	EUR	DI	5912	Retail
322674	GROUPE PAROT SA	FRA	EUR	DI	5500	Retail
322805	LUK HING ENTERTAINMENT GROUP	CYM	HKD	DI	5810	Retail
322832	FN FACTORY OUTLET PCL	THA	THB	DI	5311	Retail
322920	EMPRESAS LIPIGAS SA	CHL	CLP	DI	5900	Retail
322951	DNA LTD	FIN	EUR	DI	4813	Telecommunication
322964	CLASSIFIED GROUP LTD	HKG	HKD	DI	5812	Retail
323066	ALLTERCO AD	BGR	BGN	DI	4812	Telecommunication
323073	SHAKEYS PIZZA ASIA	PHL	PHP	DI	5812	Retail
323138	AFTER YOU PCL	THA	THB	DI	5812	Retail
323263	WP ENERGY PCL	THA	THB	DI	5900	Retail
323355	SMU SA	CHL	CLP	DI	5411	Retail
323578	DETSKY MIR PJSC	RUS	RUB	DI	5900	Retail
323626	RAYDAN FOOD CO	SAU	SAR	DI	5812	Retail
323629	DEVELOPMENT WORKS FOOD	SAU	SAR	DI	5812	Retail
323841	WILCON DEPOT INC	PHL	PHP	DI	5211	Retail
323959	MUDMAN PCL	THA	THB	DI	5812	Retail
323984	DINO POLSKA SA	POL	PLN	DI	5411	Retail
324229	KAMUX OYJ	FIN	EUR	DI	5500	Retail
324648	BOOZT AB	SWE	SEK	DI	5961	Retail
324685	FOOTWAY GROUP AB	SWE	SEK	DI	5961	Retail
324734	SILMAASEMA OYJ	FIN	EUR	DI	5990	Retail
324859	DELIVERY HERO AG	DEU	EUR	DI	5961	Retail
324893	ZUR ROSE GP	CHE	CHF	DI	5961	Retail
324900	DP EURASIA NV	NLD	TRY	DI	5812	Retail
324973	Y VENTURES GROUP LTD	SGP	USD	DI	5960	Retail

325228	TRICOT S.A.	CHL	CLP	DI	5600	Retail
325642	UNITED STRENGTH POWER	CHN	CNY	DI	5500	Retail
325693	SMCP S.A.S.	FRA	EUR	DI	5600	Retail
325735	HELLOFRESH SE	DEU	EUR	DI	5960	Retail
325807	PAN GERMAN UNIVERSAL MOTORS	TWN	TWD	DI	5500	Retail
325839	SPHERA FRANCHISE G	ROU	RON	DI	5812	Retail
326007	SAKOL ENERGY PCL	THA	THB	DI	5900	Retail
326057	1957 & CO. (HOSPIT	HKG	HKD	DI	5812	Retail
326170	BGF RETAIL CO LTD	KOR	KRW	DI	5412	Retail
326193	BK BRASIL OPERACAO	BRA	BRL	DI	5812	Retail
326195	LYKO GROUP AB (PUB	SWE	SEK	DI	5990	Retail
326374	CUCKOO HOMESYS CO LTD	KOR	KRW	DI	5700	Retail
326388	DRAGON KING GP	CYM	HKD	DI	5812	Retail
326410	1&1 DRILLISCH AG	DEU	EUR	DI	4813	Telecommunication
326743	CSMALL GROUP LIMIT	CHN	CNY	DI	5960	Retail
326854	ADIKA STYLE LTD.	ISR	ILS	DI	5960	Retail
326910	BYGGHEMMA GROUP FI	SWE	SEK	DI	5960	Retail
326953	JING-JAN RETAIL BU	TWN	TWD	DI	5311	Retail
327134	VIVO ENERGY PLC	GBR	USD	DI	5500	Retail
327146	JLOGO HOLDINGS LTD	CYM	SGD	DI	5812	Retail
327208	SOK MARKETLER TICA	TUR	TRY	DI	5411	Retail
327224	TL NATURAL GAS HLD	CYM	CNY	DI	5500	Retail
327307	LH GROUP LIMITED	CYM	HKD	DI	5812	Retail
327420	HOME24 SE	DEU	EUR	DI	5960	Retail
327697	PACIFIC LEGEND GROUP	CYM	HKD	DI	5712	Retail
327724	KOUFU GROUP LTD	SGP	SGD	DI	5812	Retail
327970	TOFU RESTAURANT CO LTD	TWN	TWD	DI	5812	Retail
327998	SCANCOM PLC	GHA	GHS	DI	4812	Telecommunication
328083	MEITUAN DIANPING	CYM	CNY	DI	5960	Retail
328163	HAIDILAO INTL HOLDING LTD	HKG	CNY	DI	5812	Retail

328586	LONGHUI INTERNATIONAL HOLDIN	CYM	CNY	DI	5812	Retail
328656	WESTWING GROUP AG	DEU	EUR	DI	5960	Retail
330175	SINO GAS HOLDINGS GROUP LTD	HKG	CNY	DI	5500	Retail
331056	ZEN CORPORATION GROUP PCL	THA	THB	DI	5812	Retail
331072	GUAN CHAO HOLDINGS LTD	CYM	SGD	DI	5500	Retail
331619	KURA SUSHI ASIA CO LTD	TWN	TWD	DI	5812	Retail
331907	GRUPO SBF SA	BRA	BRL	DI	5940	Retail
332150	FRESHMARKET LTD	ISR	ILS	DI	5411	Retail
332215	MTN NIGERIA COMMUNICATIONS	NGA	NGN	DI	4812	Telecommunication
332255	MULSANNE GROUP HOLDING LTD	HKG	CNY	DI	5600	Retail
332457	TAI HING GROUP HOLDINGS LTD	HKG	HKD	DI	5812	Retail
332786	GLOBAL FASHION GROUP SA	LUX	EUR	DI	5960	Retail
334203	VIVARA PARTICIPATES S A	BRA	BRL	DI	5944	Retail
334341	C&A MODAS S A	BRA	BRL	DI	5600	Retail
336806	JIUMAOJIU INTERNATIONAL	CYM	CNY	DI	5812	Retail

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**Table 2***Variable description overview*

Variable type	Variable name	Variable symbol*	Variable description
<b>Company identifying information</b>	Global Company Key	GlobalCompanyKey	Each company has a unique code to identify the company. The Global Company Key is used as the panel ID in the regression analysis.
	Company Name	CompanyName	This identifies the company or index for which data is presented.
	Country	Country	This item identifies the country in which the company is incorporated or legally registered.
	ISO Currency Code	ISOCurrencyCode	Currency that the company is collected in, in
	Accounting Standard	AccountingStandard	This item contains the code that identifies the accounting standard a company uses in presenting its financial statements. A domestic standard is assumed if a company omits reference to a specific standard. It consists of a two-character alpha code. The accounting standard DI is selected, meaning domestic standards generally in accordance with or fully compliant with International Financial Reporting Standards (IFRS).
<b>Balance sheet items**</b>	Standard Industrial Classification (SIC) codes	SIC	Standard Industry Classification Code, connecting a unique code to each industry.
	Assets	Assets_2018 and Assets_2019	This item represents the total assets of a company at a point in time. If the company does not report a useable amount, this data item will be left blank.
	Liabilities	Liabilities_2018 and Liabilities_2019	This item represents current liabilities plus long-term debt plus other noncurrent liabilities, including deferred taxes and investment tax credit.
	Total debt	Debt_2018 and Debt_2019	Total debt is the sum of the total debt in current liabilities and total long-term debt. Both variables are described below.
	Total debt in current liabilities	CurrentDebt_2018 and CurrentDebt_2019	This item represents the total amount of short-term notes and the current portion of long-term debt (debt due in one year).
	Total long-term debt	LongDebt_2018 and LongDebt_2019	The item represents debt obligations due more than one year from the company's balance sheet date. Excluded items are: Accounts payable/creditors due after one year, accrued interest on long-term debt (when a breakout is available), customers' deposits on bottles, cases, and kegs and deferred compensation.
	Absolute change in total debt in 2019	AbsoluteDebtChange_2019	The change in absolute debt is calculated as the total debt on 31-12-2019 minus total debt on 31-12-2019. This equals Debt_2019 minus Debt_2018.
Stockholders' equity	StockholdersEquity_2018 and StockholdersEquity_2019	This item represents common/ordinary and preferred/preference shareholders' interest in the company and any reserves reported in the Stockholders' Equity section.	

<b>Income statement items**</b>	Net income	NetIncome_2018 and NetIncome_2019	This item represents income used to calculate earnings per share as reported by the company. This is an issue-level item and is based on a company's consolidated statements.
	Earnings before interest, taxes, depreciation and amortisation expenses (EBITDA)	EBITDA_2018 and EBITDA_2019	This item is the sum of Net Sales minus Cost of Goods Sold minus Selling, General and Administrative Expense.
<b>Cash flow statement items**</b>	Net cash flow from financing activities	FinancingCashFlow_2018 and FinancingCashFlow_2019	This item represents cash paid or received for all transactions classified as Financing Activities on a Statement of Cash Flows. Increases in cash from financing activities are presented as positive numbers. Decreases are presented as negative numbers.
	Net cash flow from investing activities	InvestingCashFlow_2018 and InvestingCashFlow_2019	This item represents net cash received or paid for all transactions classified as investing activities on a Statement of Cash Flows. Increases in cash are presented as positive numbers. Decreases in cash are reported as negative numbers.
<b>Financial ratios</b>	Gearing ratio	GearingRatio_2018 and GearingRatio_2019	The gearing ratio represents the solvency of a company. The ratio is calculated as the total debt divided by the stockholders' equity of a company: $\text{GearingRatio}_{2018} = \frac{\text{TotalDebt}_{2018}}{\text{StockholdersEquity}_{2018}}$ $\text{GearingRatio}_{2019} = \frac{\text{TotalDebt}_{2019}}{\text{StockholdersEquity}_{2019}}$
	Return on assets (ROA)	ROA_2018 and ROA_2019	The return on assets represents the profitability of a company. The ratio is calculated as the net income divided by the total assets: $\text{ROA}_{2018} = \frac{\text{NetIncome}_{2018}}{\text{Assets}_{2018}}$ $\text{ROA}_{2019} = \frac{\text{NetIncome}_{2019}}{\text{Assets}_{2019}}$

\*: the variables used in the data sample, except for the company identifying information data items, are split up for the two different years. However, these items are not separated per year for the regression analysis. For example, the assets in 2018 and 2019 are two separate variables: Assets\_2018 and Assets\_2019. For the regression analysis section, the variables are combined into one variable with a dummy variable. For example, the variables Assets\_2018 and Assets\_2019 are combined into one variable, Assets, and the dummy variable 0 is added to the data concerning 2018, the dummy variable 1 is added to the data concerning 2019. This applies to all annual report variables.

\*\* : the balance sheet, income statement and cash flow statement data items are presented in millions. The currency in which the data is presented depends on each company's ISO currency code. The data is not formatted into one currency for all companies.

Source: Compustat Daily Updates - Fundamentals Annual. (2020, June 1). Retrieved from <https://wrds-web.wharton.upenn.edu/wrds/>.

**Table 5***Correlation analysis*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Assets_2018	1.000							
(2) Assets_2019	0.854	1.000						
(3) CurrentDebt_2018	0.829	0.823	1.000					
(4) CurrentDebt_2019	0.621	0.803	0.912	1.000				
(5) LongDebt_2018	0.887	0.892	0.904	0.812	1.000			
(6) LongDebt_2019	0.722	0.931	0.829	0.896	0.892	1.000		
(7) Debt_2018	0.889	0.891	0.947	0.855	0.993	0.892	1.000	
(8) Debt_2019	0.710	0.917	0.867	0.941	0.889	0.993	0.901	1.000
(9) AbsoluteDebtChange_2019	-0.026	0.436	0.221	0.556	0.186	0.606	0.199	0.605
(10) FinancingCashFlow_2018	-0.275	-0.456	-0.453	-0.548	-0.506	-0.588	-0.502	-0.589
(11) FinancingCashFlow_2019	0.330	-0.110	0.034	-0.259	-0.029	-0.278	-0.012	-0.279
(12) InvestingCashFlow_2018	-0.883	-0.792	-0.608	-0.405	-0.764	-0.599	-0.737	-0.561
(13) InvestingCashFlow_2019	-0.922	-0.716	-0.686	-0.441	-0.746	-0.549	-0.745	-0.532
(14) Liabilities_2018	0.980	0.781	0.862	0.635	0.885	0.679	0.896	0.681
(15) Liabilities_2019	0.803	0.973	0.883	0.903	0.908	0.966	0.919	0.969
(16) StockholdersEquity_2018	0.842	0.940	0.646	0.582	0.788	0.795	0.765	0.756
(17) StockholdersEquity_2019	0.831	0.934	0.633	0.566	0.776	0.782	0.753	0.742
(18) NetIncome_2018	0.551	0.612	0.282	0.195	0.484	0.393	0.439	0.350
(19) NetIncome_2019	-0.054	0.114	-0.241	-0.263	-0.102	-0.089	-0.142	-0.136
(20) GearingRatio_2018	0.006	0.007	0.020	0.025	0.020	0.017	0.020	0.020
(21) GearingRatio_2019	0.007	0.005	0.018	0.015	0.013	0.002	0.015	0.005
(22) ROA_2018	0.001	0.002	-0.010	-0.011	-0.004	-0.005	-0.006	-0.007
(23) ROA_2019	-0.007	0.001	-0.013	-0.011	-0.007	-0.004	-0.009	-0.006
(24) EBITDA_2018	0.913	0.899	0.746	0.594	0.870	0.757	0.853	0.730
(25) EBITDA_2019	0.842	0.933	0.726	0.641	0.849	0.814	0.832	0.786

Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Assets_2018								
(2) Assets_2019								
(3) CurrentDebt_2018								
(4) CurrentDebt_2019								
(5) LongDebt_2018								
(6) LongDebt_2019								
(7) Debt_2018								
(8) Debt_2019								
(9) AbsoluteDebtChange_2019	1.000							
(10) FinancingCashFlow_2018	-0.410	1.000						
(11) FinancingCashFlow_2019	-0.606	0.267	1.000					
(12) InvestingCashFlow_2018	0.085	0.113	-0.275	1.000				
(13) InvestingCashFlow_2019	0.165	0.250	-0.532	0.894	1.000			
(14) Liabilities_2018	-0.105	-0.286	0.383	-0.815	-0.907	1.000		
(15) Liabilities_2019	0.502	-0.542	-0.176	-0.686	-0.650	0.764	1.000	

(16) StockholdersEquity_2018	0.304	-0.303	-0.008	-0.873	-0.743	0.725	0.839	1.000
(17) StockholdersEquity_2019	0.295	-0.289	-0.015	-0.877	-0.735	0.711	0.830	0.999
(18) NetIncome_2018	-0.014	-0.043	-0.005	-0.789	-0.535	0.429	0.472	0.774
(19) NetIncome_2019	-0.047	0.269	-0.222	-0.320	-0.001	-0.180	-0.022	0.279
(20) GearingRatio_2018	0.007	-0.019	-0.005	0.000	-0.004	0.012	0.015	-0.005
(21) GearingRatio_2019	-0.015	0.001	0.014	-0.006	-0.003	0.009	0.004	0.005
(22) ROA_2018	-0.006	-0.004	-0.005	-0.010	-0.004	-0.004	-0.003	0.011
(23) ROA_2019	0.004	0.002	-0.018	-0.006	0.008	-0.012	-0.004	0.007
(24) EBITDA_2018	0.85	-0.385	0.138	-0.940	-0.900	0.857	0.837	0.902
(25) EBITDA_2019	0.247	-0.396	-0.015	-0.904	-0.818	0.774	0.874	0.929

Variables	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
(1) Assets_2018									
(2) Assets_2019									
(3) CurrentDebt_2018									
(4) CurrentDebt_2019									
(5) LongDebt_2018									
(6) LongDebt_2019									
(7) Debt_2018									
(8) Debt_2019									
(9) AbsoluteDebtChange_2019									
(10) FinancingCashFlow_2018									
(11) FinancingCashFlow_2019									
(12) InvestingCashFlow_2018									
(13) InvestingCashFlow_2019									
(14) Liabilities_2018									
(15) Liabilities_2019									
(16) StockholdersEquity_2018									
(17) StockholdersEquity_2019	1.000								
(18) NetIncome_2018	0.792	1.000							
(19) NetIncome_2019	0.319	0.617	1.000						
(20) GearingRatio_2018	-0.005	-0.008	-0.020	1.000					
(21) GearingRatio_2019	0.006	-0.002	-0.014	-0.109	1.000				
(22) ROA_2018	0.012	0.042	0.038	-0.002	-0.007	1.000			
(23) ROA_2019	0.009	0.022	0.065	-0.007	0.018	0.494	1.000		
(24) EBITDA_2018	0.901	0.683	0.210	0.005	0.008	0.010	0.007	1.000	
(25) EBITDA_2019	0.930	0.702	0.279	0.004	-0.004	0.011	0.012	0.979	1.000