

Széchenyi István University, Győr

Doctoral Program in Management (SZEEDS^M), Doctoral School of Regional Sciences and Business Administration

DOCTORAL THESIS SUMMARY

IFRS 16 leases impact review in Hungary and a comparison to DAX 30 German listed entities

Árpád Tóth January 2020 Győr

1. Primary objectives and hypotheses

1.1. Primary objectives and contribution

This Ph.D. thesis is a developing theory and primarily quantitative research on lease transactions. The starting point was the conceptual global change of lease accounting, where the objective was to highlight and measure key impacts and potential issues. Accounting legislation is going through an exciting time when new rules are replacing several decades-old practices. This changing regulation revealed some additional aspects in lease transactions, as well as some completely new solutions and operations where users can completely separate services from lease transactions. Modern age lease transactions have always supported new solutions since the 19th century, and they have played a significant role in our daily life.

It should be noted that since most lease transactions were not recorded in the balance sheet, the related assets and liabilities were not sufficiently visible in their respective financial statements. We can only make precise decisions or predictions if market information, statistics, and financial reports can adequately measure and present these transactions. One example is, how is it possible to predict the role of leases in the future of mobility without precise market information on the volume of those transactions?

Two key milestones were significant inspirations for this research. The first one happened in June 2015 when the Hungarian Government adopted the International Financial Reporting Standards (hereinafter: IFRS). This began a new era in our accounting system when for the first time in modern Hungarian accounting history it became possible to publish a standalone annual report purely according to IFRS Standards and replace the Hungarian Accounting Law required for yearly reporting. The crucial second milestone was the publication of the new IFRS 16 Leases Standard, where the International Accounting Standard Board (hereinafter: IASB) introduced a completely new lease accounting model with a three years preparation period due to the complexity and the nature of the changes.

The current situation is analysed from the IFRS 16 Lease Standard perspective. The paper performs and discusses a quantitative impact analysis for Hungary, which has a continental European legislation system, and compares it to the relevant DAX 30 listed German companies. It also highlights the particular case of financial institutions, which are critical lease provider companies

that had an obligation to apply IFRS by 2019. Observations are related to different areas, such as the lease impact measurement methods, statistical data collection, business model taxation, financing advantages, and finally, on the necessity and importance of these transactions from a lease market perspective.

IASB issued a detailed impact analysis (IASB 2016) together with the IFRS 16 Leases Standard in January 2016. It is a significant work, which used a sample of 1 022 listed companies globally to assess the potential impacts of the new standard. Despite the large sample size, it is mainly qualitative study and does not include any sample from Hungary.

	IAS Topi	IFRS 16 / FASB model		
	Finance leases	Operating leases	All leases	
Assets	Դ <u>m</u>		テナ 🗃 畠 ^前 "凱	
Liabilities	\$\$		\$\$\$\$\$\$	
Off balance sheet rights / obligations		;≘ ₽ →<u>m_m</u> \$\$\$\$		

Table 1. Expected impact on the statement of financial position

Source: IFRS 16 – Effect Analysis <u>www.ifrs.org</u>

Table 1 presents the most significant effect of the IFRS 16 new regulation, which requires the capitalisation of all off-balance sheet rights and obligations. According to the previous regulation, IAS 17 only financial leases were capitalised and off-balance sheet items for operational leases were kept outside the balance sheet. This new capitalisation requirement represents an increase in lease assets and financial liabilities. According to this methodology, in regard to companies with significant off-balance sheet leases there is a change in key financial ratios (for example leverage).

	IAS / Topic 840	IFRS 16		
	Finance leases	All leases		
Revenue	х	х	х	
Operating costs (excluding		Single expense		
depreciation and amortisation)				
EBITDA			<u> </u>	
Depreciation and amortisation	Depreciation		Depreciation	
Operating profit			Û	
Finance costs	Interest		Interest	
Profit before tax			⇔	

Table 2. Expected impact on the comprehensive income statement

Source: IFRS 16 – Effect Analysis

www.ifrs.org

Table 2 shows the impact on the comprehensive income statement. IFRS 16 changes the nature of expenses, replaces the straight-line operating lease expenses, which was previously applied under IAS 17. From the previous single expense, the new requirement separates a depreciation charge for the leased asset (reported in the operating costs) and an interest expense (reported in the finance costs). With this change all leases are reported consistently from the perspective of comprehensive income statements, additionally the overall impact on the profit before tax is not considered to be material. The below impact analysis is categorised per industry sector with a descending impact ratio compared to the total balance sheet value.

Industry sector	Number of companies	Total assets (in millions of USD)	Future payments for off balance sheet leases (undiscounted) (in millions of USD)	Future payments for off balance sheet leases / total assets	Present value of future payments for off balance sheet leases (estimate) (in millions of USD)	Present value of future payments for off balance sheet leases / total assets
Airlines	50	526 763	151 549	28,8%	119 384	22,7%
Retailers	204	2 019 958	571 812	28,3%	431 473	21,4%
Travel and leisure	69	403 524	115 300	28,6%	83 491	20,7%
Transport	51	585 964	90 598	15,5%	68 175	11,6%
Telecommunications	56	2 847 063	219 178	7,7%	172 644	6,1%
Energy	99	5 192 938	400 198	7,7%	287 858	5,5%
Media	48	1 020 317	71 743	7,0%	55 764	5,5%
Distributors	26	581 503	31 410	5,4%	25 092	4,3%
Information technology	58	1 911 316	69 870	3,7%	56 806	3,0%
Healthcare	55	1 894 933	72 149	3,8%	54 365	2,9%
Others	306	13 959 223	401 703	2,9%	306 735	2,2%
Total	1 022	30 943 502	2 195 510	7,1%	1 661 787	5,4%

Table 3. Expected impact on the statement of financial position

Source: IFRS 16 – Effect Analysis <u>www.ifrs.org</u>

Out of the IASB (2016) sample, there were 348 European based companies with a total impact of undiscounted value USD 710 billion.



Figure 1. Expected impact on the statement of financial position by region *Source: IFRS 16 – Effect Analysis www.ifrs.org*

Main objectives and contribution

- 1. Measurement of the IFRS 16 impact in Hungary.
- 2. Compare companies listed on the stock exchange in Hungary and Germany and review the impact difference.
- 3. Apply a systematic data collection method.
- 4. Highlight any significant segment with high or considerable impact.
- 5. Review the sustainability element not currently recorded related to leases.

Structure

The study includes six chapters in which the first chapter contains a literature review and a general overview of lease accounting. The second chapter raises the research questions and describes the initial hypotheses and methodology. In the third chapter, mainly accounting regulations and standards are described in relation to IFRS 16, and Hungarian and German legislation. The fourth section contains the impact measurement on all reviewed Hungarian and DAX 30 related companies. In addition, it includes IASB initial impact assessment values as benchmark data. In the fifth section, Hungarian lease market data was analysed, and it is also the section where statistical validation is performed. The last chapter includes the results, conclusions, and summary of the research together with potential areas for future research.

1.2. Hypotheses

In this study, the focus was on the understanding of the relation between IFRS and Hungarian national lease regulations, and to answer the defined research questions. The following hypotheses were raised:

H1₁: The new IFRS 16 Lease Standard **impacts can be measured for listed entities**, and those can be compared to other EU listed entities.

H1₀: The new IFRS 16 Lease Standard impacts cannot be measured for listed entities, and those cannot be compared to other EU listed entities.

H2₁: Specific lease market segments have a dominant frequency for a specific lease type, out of which operational leases exceed 50% frequency.

H2₀: Specific lease market segments do not have a dominant frequency for a specific lease type, out of which operational leases do not exceed 50% frequency.

H3₁: There are **quantifiable business advantages** related to specific lease transactions. H3₀: There are no quantifiable business advantages related to specific lease transactions.

H4₁: There are indications and evidence from the lease market that the new IFRS 16 Standard causes economic changes in business transactions.

H4₀: There are no indications or evidence from the lease market that the new IFRS 16 Standard causes economic changes in the business transactions.

H5₁: It is **necessary to implement specific software-based monitoring** for the lease accounting calculation.

H5₀: It is not necessary to implement specific software-based monitoring for lease accounting calculations.

H61: There are already available conceptually new sharing mobility models in Hungary.H60: There are no available conceptually new sharing mobility models in Hungary.

H7₁: The quantifiable off-balance-sheet impacts for the Hungarian listed entities are relatively lower (in %) compared to the reviewed German entities.

H7₀: The quantifiable off-balance-sheet impacts for the Hungarian listed entities are relatively not lower (in %) compared to the reviewed German entities.

For the last two hypotheses based on the IASB effect analysis study, one specific homogeneous population market segment from vehicles was selected for assessment, the fleet cars. The research objective was to analyse this particular market and to review and evaluate the last two hypotheses. It also has to be noted that there are no foreseen changes in the lease regulations in Hungary.

2. Methodology and data sources

2.1. Methodology

Primary data source: The utilized primary data served both quantitative and qualitative research purposes and therefore were categorized accordingly.

Quantitative research related to primary data

- Companies listed on the Budapest Stock Exchange (hereinafter: BÉT) financial statements were downloaded and analysed together with the related appendixes. Based on 2015-2017 official turnover provided by the BÉT, 95% of total turnover of stock exchange transactions were covered with the analysis of 42 companies out of the entire 60 listed companies.
- German companies listed on the DAX 30 financial statements were analysed together with the related appendixes.
- MNB reports on financial institutions, and financial service providers were reviewed, if they are considered lease providers in Hungary.
- Hungarian companies court register database was utilized to identify the total population of freefloating car-sharing companies in Hungary based on operational activities.
- Sustainability reports related to the analysed financial statements.
- Fleet cars operational leases reviewed three contracts reporting key terms and conditions.
- Lease service providers quarterly reports.
- Hungarian Lease Association monthly statistical database.

Qualitative research related to primary data

Thirteen lease companies' General Terms and Conditions were reviewed in detail to identify any existing new products on the market.

Secondary data source: The following secondary data sources were used: International Accounting Standards Board (IASB); issued International Financial Reporting Standards (IFRS); European Financial Reporting Advisory Group (EFRAG) issued statements and related analyses; Hungarian Accounting Law (HAL) reports; Hungarian Statistical Office (KSH) reports; Hungarian Lease Association (HLA) published studies and analyses; and Hungarian National Bank (MNB) announced reports. Additionally, Statistisches Bundesamt (SB); the Bundesverband Deutscher Leasing-Unternehmen (BDL); Lease Europe (LE); and the World Bank (WB) reports were utilized as well.

Applied software platforms: The following software platforms were used for the data analyses as follows: R version x64 3.4.3; ACL – Audit Command Language version 13.1.0.112 and Notepad++ version 7.7 for data analytics and statistical review.

Databases: The following databases were utilized for the research: Scopus, ScienceDirect, EBSCO, and ResearchGate.

2.2. The impact review model

Even before the new IFRS 16 approval, several different models and aspects were assessed to identify operating lease accounting effects on debt ratios, risk, effects of taxation (Damodaran, 2009; Jesswein, 2008 and 2009) and even ethical aspects of operating lease finance Frecka (2008). The most accepted and popular model was developed and introduced by Imhoff, Lipe, and Wright (1991); Imhoff et al. (1991); and Beattie – Edwards – Goodacre (1998). It calculates the present value of both assets and liabilities. Off-balance sheet assets calculations require such information which is not available directly from the financial statement. In this situation, this model gives an estimate of the leased assets depreciation is calculated in a linear depreciation after inception. The difference between assets and liabilities is most significant in around half of the lease terms, which on the Imhoff graph can be found after the t2 time period. Imhoff estimated that in most situations unrecorded assets values differ between 60-80% of the estimated off-balance sheet liability. As a rule of thumb, they used 70% of the unrecorded lease liability value as unrecorded assets. The Imhoff 1991 model can be presented in the following formula:

$$\frac{PVA}{PVL} = \frac{RL}{TL} X \frac{PVAFTL}{PVAFRL}$$

PVA = present value of the unrecorded asset

PVL = present value of unrecorded debt (liability)

RL = Remaining lease life

TL = Total lease life

 $PVAF_{TL}$ = present value annuity factor for 1 EUR at r%, for n years for the total lease life $PVAF_{RL}$ = present value annuity factor for 1 EUR at r%, for n years for the remaining lease life



Figure 2. Imhoff's constructive capitalization model

Source: (Imhoff 1991)

This model, later in 1997, was extended to include effects of income statement (Imhoff, 1997). In both models the authors found evidence that operational leases can have a material impact on the entities performance and certainly on the financial risks if they extensively use operating leases.

2.3. Database statistical review

The 2015-2017 three-year period detailed lease market database was downloaded from the Hungarian Lease Association, who was so kind to provide this primary data collection for research purposes. The analysis of this data is based on quarterly statistical information reported by lease providers in Hungary.

Normal distribution test:

Two statistical tests were performed on the lease market database:

- a) Shapiro-Wilk test on normal distribution and variation
- b) Benford analysis to identify whether any modification in the database was performed

Shapiro-Wilk test:

The Shapiro-Wilk test reviews normal distribution of the population; therefore, it is a necessary test to conduct. The formula is as follows:

$$W = \frac{\left(\sum_{i=1}^{n} a_{i} x_{(i)}\right)^{2}}{\sum_{i=1}^{n} (x_{i} - \bar{x})^{2}}$$

where

x(i): is the *i*th order statistic,

$$x = (x_1, \dots, x_n)$$

The coefficient a_i is given by:

$$(a_1,\ldots,a_n)=\frac{m^T V^{-1}}{C}$$

where C is a vector norm:

$$C = \|V^{-1}m\| = (m^T V^{-1} V^{-1}m)^{1/2}$$

and the vector m:

$$m = (m_1, ..., m_n)^T$$

is made of the expected values "of the order statistics of independent and identically distributed random variables sampled from the standard normal distribution"; finally, V is the covariance matrix of those normal order statistics. The interpretation of the null hypothesis of this test is that the population is normally distributed. Thus, on the one hand, if the p-value is less than the chosen alpha level then the null hypothesis is rejected and there is evidence that the data tested is not normally distributed. On the other hand, if the p-value is higher than the chosen alpha level, then the null hypothesis that the data came from a normally distributed population cannot be rejected (e.g., for an alpha level of .05, a data set with a p-value of less than .05 rejects the null hypothesis that the data is from a normally distributed population). So overall attention should be paid to the p-value in that if it is higher than 0.05 it means the population follows a normal distribution.

Benford analysis

Benford's law also called the Newcomb–Benford law, the act of anomalous numbers, or the firstdigit law, is an observation of the frequency distribution of leading digits in many real-life sets of numerical data. The law states that in many naturally occurring collections of numbers the significant leading figure is likely to be small.

A set of numbers is said to satisfy Benford's law if the leading digit $d (d \in \{1, ..., 9\})$ occurs with probability.

$$\log_{10}(d+1) - \log_{10}(d) = \left(\frac{d+1}{d}\right) = \log_{10}\left(1 + \frac{1}{d}\right)$$

the leading digits in such a set thus have the following expected distribution:

d	P(d)	Relative size of $P(d)$
1	30.1%	
2	17.6%	
3	12.5%	
4	9.7%	
5	7.9%	
6	6.7%	
7	5.8%	
8	5.1%	
9	4.6%	

		name	Year	Asset_type	loan_value	financial_value	operating_value	total_value
Fleet	1	ALD_Automotive	2017	Fleet	0	0.0	50644843200.0	50644843
LHA_analysis_v1	2	ARVAL	2017	Fleet	0	0.0	17884000000.0	17884000
NewLeases1	3	Budapest_Bank	2017	Fleet	0	0.0	10899444524.0	10899444
T NewLeases2	4	Business_Lease_Hungary	2017	Fleet	0	0.0	12006875291.0	12006875
Totallease1	5	CIB_Lease	2017	Fleet	0	711292881.0	35512758.0	746805
	6	De_Lage_Landen	2017	Fleet	0	8944931492.0	1078713984.0	10023645
- I lotalleasez	7	Erste_Leasing	2017	Fleet	0	-1.0	2545596845.0	2545596
	8	KH	2017	Fleet	0	11613605476.0	968629614.0	12582235
	9	Leaseplan_Hungaria	2017	Fleet	0	0.0	44267092046.0	44267092
	10	Lombard	2017	Fleet	0	0.0	24648039.0	24648
	11	Merkantil	2017	Fleet	7024184	12418031112.0	9280271066.0	21705326
	12	Ober	2017	Fleet	0	0.0	10378071452.0	10378071
	13	Otokoc	2017	Fleet	0	0.0	2195228463.0	2195228

Population may exhibit unacceptable variability. If so, reduce the number of leading digits

06/07/2019 11:22:38 Command: BENFORD ON total value LEADING 1 TO SCREEN

Fleet

As of:

Table:

Leading Digits	Actual Count	Expected Count	Zstat Ratio
1	13	12	0.265
2	7	7	0.056
3	4	5	0.180
4	3	4	0.151
5	4	3	0.244
<u>6</u>	3	3	0.249
<u>Z</u>	2	2	0.179
8	3	2	0.367
2	0	2	0.984

COMMAND LINE
BENFORD ON total_value LEADING 1 TO "Fleet_total_Benford.FIL" OPEN
\blacksquare ACL_fleet_clean_table $\mathbb{Z} \times \blacksquare$ Fleet_total_Benford $\mathbb{Z} \times $ Benford $\mathbb{Z} \times$
Command: <u>BENFORD ON total value LEADING 1 TO "Fleet total Benford, FIL" OPEN</u>
00:05:12 - 06/17/2019 Population may exhibit unacceptable variability. If so, reduce the leading digits Output to C:\ACL\Fleet_total_Benford.FIL is done Opening file "Fleet_total_Benford"

Tool

+ 💼 ACL_fleet_clean_table 🚛 🛪 🖽 Fleet 🗯

Figure 3. Screenshots from ACL Benford analysis

Source: self-prepared tables based on the performed statistical database review

Based on the ACL¹ Benford analysis on the fleet population, the following result is received:

A LHA_analysis_v1.acl - Analytics File Edit Import Data Analyz



Figure 4. Benford's analysis results

Source: self-prepared table based on the performed statistical database review

The review did not detect any deterioration or any modified number in the population. In other words, based on the Benford analysis, the lease database was not modified artificially. Based on

¹ ACL Analytics version 13.1.0.112 Unicode @1986-2018 ACL Services Ltd.

both the Shapiro-Wilk and Benford analysis, the reviewed population has a normal distribution, and it is not artificially modified.

2.4. Chi-square testing on fleet car market segment

The operational leases are presented in fleet-car specific lease market segments. In this way, a particular chi-square test is performed to identify whether or not specific lease types are dominating this increasing market segment.

Chi-square testing is performed for the fleet car market segment concerning the 2017 calendar year. The expected lease types are identified based on the Hungarian Lease Association (HLA) reported lease types for 2017 on the Hungarian lease market. The actual value is defined based on the HLA database, where the lessor companies are reporting on the market.

The proportion of the fleet car market segment is expected and observed to be as follows:

Fleet cars	Open-ended Finance lease	Closed Finance lease	Loan	Operating lease	Other
Expected %	19,79%	53,51%	9,36%	14,74%	2,60%
Observed %	5,77%	11,56%	0,01%	82,22%	0,44%

Table 4. Expected and observed lease market segmentation

Source: self-prepared table based on the performed statistical database review

Based on the total number of the fleet car contracts, the expected and actual (observed) contract values are reported as follows:

Fleet cars	Open-ended Finance lease	Closed Finance lease	Loan	Operating lease	Other	Total	
Expected value	11 020,06	29 797,04	5 212,12	8 207,97	1 447,81		
Observed value	3 213,02	6 437,19	5,57	45 784,21	245,01		
Chi-square value calculation							
E-o	7 807,04	23 359,86	5 206,55	-37 576,24	1 202,80		
(E-O) ²	60 949 826,72	54 5682 942,42	27 108 136,87	1 411 973 662,23	1 446 718,22		
Chi Square	1 094,55	9 799,46	486,81	25 356,45	25,98	36 763,24	
df = 4		alpha (significan	ce level) = $0,05$				
	critical value	9,49					

Table 5. Chi-Square test on expected and observed lease values

Source: self-prepared table based on the performed statistical database review

The chi-square calculated total value equals the squares of the differences between the expected and observed values. In this test it equals = 1.094,55 + 9.799,46 + 486,81 + 25.356,45 + 25,98 =

36 763,24. If this value exceeds the critical value, which is determined based on the degree of freedom and significance level. The current test number of degrees of freedom are: (number of rows – 1) x (number of columns – 1) = $(5 – 1) \times (2 – 1) = 4$. The confidence level is set for 95% and therefore the significance level (alpha) is equal to 0,05.

The chi-square test has generated a much more significant value compared to the critical importance; therefore, the value and concentration of operational leases should be significantly different from the proportion of the total lease market. In other words, it means that based on the performed review with 95% confidence level the observed difference within the fleet cars lease categories is not caused by chance.

3. Results, conclusions and summary

3.1. Recommendations for the statistical IFRS impact measurement on listed companies

The definition and key objective of accounting and statistical information is to provide relevant and meaningful support for economic decisions. Lacking relevant and significant information, on the other hand, also conflicts with the IFRS framework. The statistical data is very important in order to get accurate measurements of micro-and macro-level economic transactions.

The implementation of off-balance item measurements enables the building of a database that can measure not only a one-time impact, but it can also visualize a significant statistical data collection process. To highlight the importance of this please refer to section four where the number of companies who quantified the operational lease off-balance-sheet impact was measured.

Having an implemented database and the measurement of these transactions from a statistical point of view can also bring up several additional important questions, which were not even considered before by decision-makers. For instance, some of these questions are: What could be behind the significantly decreasing estimated impact of off-balance sheet lease items? What could be the motivation from a financial statement preparer's perspective? Does it mean that when it is close to the new lease accounting implementation, the companies have a better and more precise estimation?

The accounting standard for leases is changing, and they are expected to cause a significant impact on the lease market. It should be taken into consideration a request for information in the form of statistical questionnaires regarding operational leases in order to identify the potential effects occurring from the beginning of 2019. Such information is available, as it was already required by the current IAS 17 Lease Accounting Standard as well.

When examining methodology of statistical data collection, the implementation of operational lease requirements in statistical questioners should be considered, as it can provide timely

information to regulators and decision-makers, which could also be significant to the lease market itself.

Information-gathering for IFRS reporting entities would not cost a considerable amount because the data is already required to be disclosed by IFRS Standards. On the other hand, with the incorporation of the lease impact measurement in the statistical questioners, it would reveal an accurate picture on off-balance-sheet impacts, which can bring valuable information, as it was mentioned in the previous section.

3.2. Hypotheses conclusions

H1₁: The new IFRS 16 Lease Standard **impacts can be measured for listed entities**, and those can be compared to other EU listed entities. – The null hypothesis has been disproved.

Based on the research, companies listed on the stock exchange and all lessor (financial service provider) companies are required to apply IFRS Standards. For BÉT listed entities, the expected impact from operational lease capitalization, based on the reviewed sample, was lower than the IASB effect analysis, but considering the total estimated HUF 303.5 billion effects compared to the total HUF 1.465 trillion lease market value it is statistically significant. Additionally, reviewed financial institutions and unlisted entities increased the full off-balance sheet impact to a very substantial HUF 1.146 trillion in 2018, where a significant value of cross border lease transactions were identified. The results can be identified and listed in Table 6 below.

It has to be noted that lessor accounting for IFRS 16 brings changes, but considering that Hungarian regulations were not harmonized to the previous IAS 17 Standard, from the definition of a leasing perspective and the classification of financial and operational lease transactions, it brings further impacts to the lease market.

IASB – DAX30 – Hungarian companies impact comparison (Undiscounted)												
	IA	SB]	DAX 30				Hunga	i <mark>rian compan</mark> i	ies	
Industry	Number	Evaluation	Number	2016	2017	2018		Number	2016	2017	2018	
Airlines	50	28,80%	1	6,72%	7,12%	8,08%	*	1	155,01%	146,60%	115,07%	***
Retailers	204	28,30%	1	17,12%	18,90%	19,11%	*	0	-	-	-	*
Travel and leisure	69	28,60%	0	-	-	-	*	0	-	-	-	*
Transport	51	15,50%	4	3,22%	3,14%	3,22%	*	1	0,80%	0,75%	0,54%	*
Telecommunications	56	7,70%	2	5,62%	1,18%	0,98%	*	1	3,75%	3,69%	12,63%	*
Energy	99	7,70%	3	1,94%	2,24%	0,86%	*	5	4,44%	0,69%	1,84%	*
Media	48	7,00%	0	-	-	-	*	1	0,00%	0,32%	12,78%	*
Distributors	26	5,40%	5	2,16%	1,84%	1,75%	*	0	-	-	-	*
Information technology	58	3,70%	2	2,55%	3,27%	2,80%	*	0	-	-	-	*
Healthcare	55	3,80%	4	3,41%	6,05%	6,00%	*	1	2,19%	2,04%	1,40%	*
Others	306	2,90%	8	0,31%	0,38%	0,45%	*	20	10,20%	0,58%	0,56%	**
Total	1022	7,10%	30	1,51%	1,43%	1,55%		30	3,84%	0,80%	2,02%	
IASB – DAX30 – Hungarian c	companies imp	pact comparison	(Discounted)									
Airlines	50	22,70%	1	5,82%	6,19%	6,64%	*	1	127,80%	119,99%	95,09%	***
Retailers	204	21,40%	1	14,78%	16,27%	16,28%	*	0	-	-	-	*
Travel and leisure	69	20,70%	0	-	-	-	*	0	-	-	-	*
Transport	51	11,60%	4	2,94%	2,87%	2,94%	*	1	0,74%	0,70%	0,50%	*
Telecommunications	56	6,10%	2	4,77%	1,02%	0,85%	*	1	3,26%	3,25%	10,02%	*
Energy	99	5,50%	3	1,54%	1,78%	0,69%	*	5	1,78%	0,62%	1,49%	*
Media	48	5,50%	0	-	-	-	*	1	0,00%	0,31%	10,96%	*
Distributors	26	4,30%	5	1,84%	1,57%	1,50%	*	0	-	-	-	*
Information technology	58	3,00%	2	2,87%	2,78%	2,36%	*	0	-	-	-	*
Healthcare	55	2,90%	4	4,37%	4,97%	4,87%	*	1	1,86%	1,75%	1,17%	*
Others	306	2,20%	8	0,27%	0,32%	0,37%	*	20		0,45%	0,46%	**
Total	1022	5,40%	30	1,31%	1,25%	1,34%		30	3.21%	0,66%	1,68%	

Table 6. Future payments for off-balance sheet leases / total assets ratio comparison

Source: Self-prepared table based on the reviewed financial statements and IASB effect analysis

Notes: The number of asterisks indicate company profile: *Listed / **Listed, incl. financial institutions /

***Unlisted/private

H2₁: Specific lease market segments have a dominant frequency for a specific lease type out of which operational leases exceed 50% frequency. – The null hypothesis has been disproved.

One market segment for fleet cars was identified, where the operational lease frequency not only reached 50%, but in the reviewed period of 2015-2017 the value of the operating lease contacts even reached above 80% of the total leased value. Chi-square testing also confirmed that the occurrence of operational leases in that specific market segment is significantly different from the whole lease market. Please refer back to section 5.5.

H3₁: There are **quantifiable business advantages** related to specific lease transactions. – The null hypothesis has been disproved.

In section 4 among the car-share service providers, it was identified that for GreenGo Kft. significantly less capital investment was used to build up a similar fleet to that of MOL Limo. Additionally, in section 5 there was a specific example to compare operational and finance leases for a particular car leasing contract. Based on the results, it was possible through quantifiable business advantages to identify specific operational lease agreements.

H4₁: There are indications and evidence from the lease market because the new IFRS 16 Standard *causes economic changes in business transactions*. – The null hypothesis has been disproved.

From the beginning of 2016, new – long-term rental business transaction types were identified on the lease market of which some kinds of transactions only appeared after the release of the IFRS 16 Lease Standard. This type of service transaction allows for keeping transactions out of balance sheets with limited potential application.

H5₁: It is **necessary to implement specific software-based monitoring** for the lease accounting calculation. – The test failed to disprove the null hypothesis.

In this study, it was identified that despite IFRS based companies chose an automated software application for the new IFRS 16 Lease accounting and based it on a cost-benefit review, it is not beneficial to not implement a system-based application. However, though it is technically possible to manually record and maintain the lease accounting journal entries, there is an extreme compliance risk in using this method.

H6₁: There are already available **conceptually new sharing mobility models** in Hungary. – The null hypothesis has been disproved.

Based on the reviewed market new car-sharing models were identified in Hungary. These entities present themselves as sustainable companies. The sustainability reports from Car2go and DriveNow were compared using the following four areas: a) new business model; b) geographic expansion; c) public transport; d) electric vehicles. The basic idea of sustainable mobility is simple: "we need to shape our city mobility in such a way that the ease and safety of our everyday movements now and in the future will not diminish but grow and the quality of life will not suffer, but improve for us and for the generations to come" (Tkatchenko 2015). From sustainability dimensions, we can conclude that three key areas can be the targeted goals for the reviewed entities: a) Efficiency of resource utilization; b) Low carbon footprint; c) build social capital. The sustainability reports in the examined sample cannot be traced back to the financial statements where the harmonization would be essential, and it should be a subject of future studies. This conclusion echoes the IASB statement (Hoogervorst 2019), which was mentioned earlier in this study.

H7₁: The quantifiable off-balance-sheet impacts for the Hungarian listed entities are relatively lower (in %) compared to the reviewed German entities. – The null hypothesis has been accepted for 2016; 2018 and only disproved for 2017.

According to Table 35 the results confirmed that Hungarian listed entities IFRS off-balance sheet impacts are relatively not lower compared to the reviewed DAX 30 companies. From an absolute value perspective, the German companies have much more significant off-balance sheet items compared to the Hungarian ones.

On the other hand, this hypothesis was developed to compare the relative impacts on DAX30 entities and Hungarian reviewed companies. Table 35 shows that in 2016 a 3,84% relative impact for Hungary compared to a 1,51% impact for Germany. In 2017 these relative impacts changed and, in that year, the relative off-balance sheet values for the reviewed entities were higher in Germany. In 2018 a 2,02% relative impact for Hungary was higher compared to 1,55% for Germany.

3.3. Future research

Based on this study, future investigations in the following areas can be relevant in the following categories: a) Measurement of the lease market demand and supply, precisely monitoring lessee transactions and identifying any additional cross-border agreements. b) Research on mobility and

mobility-related finance solutions. c) XBRL implementation and software automation. d) A review of the connection of sustainability and financial statements.

3.4. Summary

The impact of the new IFRS 16 implementation based on the initial estimation is expected to be significant for the Hungarian lease market due to the obligatory application of it for listed companies and financial institutions. For unlisted companies, this can have various impacts on them. The listed companies are at least aware of the expected changes. Economic transformation can also be expected as new lease products have appeared on the market. It seems necessary to provide more education for the general public on the new IFRS 16 requirements. It would also be important to publish detailed impact analyses for specific sectors. It has to be mentioned here, that in the past 27 years there were several lease-related regulation issues and specifically one of them was the operational and finance lease definition clarification, which is still not resolved as of today, and a one-sided simplified approach is followed. There was also an attempt to create and publish a national accounting standard on leases, which started back in 2000 (Pankucsi, 2001) but a Hungarian lease standard was never issued.

The new IFRS 16 Standard can impact financial decision-makers, investors, and regulators. It can even result in economic changes or other additional consequences. All lease market participants would need to apply different measurements and definitions. A lack of guidance can lead to tax issues and improper accounting practices. As an example, the unlisted national regulation-based lessee companies' need to lease from the IFRS based accounting lessor companies, where the IFRS application is mandatory and the standard will only be applied to them. Besides, all the listed and unlisted voluntary companies that need to use IFRS are facing significant financial impacts compared to the size of the Hungarian lease market. More detailed market analysis and broader communication in the media should be performed before the 2019 implementation as a first step.

Three main areas can even be differentiated in the case of the summary of this study.

 Impact measurement of the lease transactions: From the impact measurement view, a) Hungarian Statistical Office (KSH) statistical data collection and analysis method should be improved. The recommended solution is presented in the paper. The Hungarian statistical data collection questionnaire should be updated. Measurement is already possible and is available at the statistical office. b) Hungarian statistical data collection from 2020 can measure disclosure items in addition to current issues if XBRL is applied. c) IFRS 16 also drives the accounting automation process but it is not obligatory.

- 2. *Hungarian lease market-related observations: a)* The fleet car lease market segment represents a high-frequency operational lease segment. Based on the performed chi-square test, the results highlighted that the difference between the expected operational lease contracts versus the observed lease contracts is significant. b) On the fleet car lease market segment, tax incentives were identified for operational leases in the area of VAT. c) For the airline industry a very significant approximately HUF 700 billion cross border operational lease transactions were identified. d) Unlisted entities (HUF 700 billion) can have even higher impact on the market than listed entities (HUF 303 billion).
- 3. Specific lease market segments related observations: a) Lease versus service contracts new lease-related products are identified on the lease markets. (Long-term rental contracts, free-floating car-sharing companies.) b) Sustainability versus the financial reporting link should be established. c) Lease regulation plays an economic role in the future of mobility. d) Car share companies should be accurately measured statistic TEAOR 08 and a new sub-category should be created.

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