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

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Author's Declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other university or any other institution of learning.

Furthermore, this dissertation contains no material previously written and/or published by another person, except where an appropriate acknowledgment is made in the form of bibliographical references, etc.

Abstract

Abstract of the dissertation submitted by:

Árpád Tóth

For the degree of Doctor of Philosophy, entitled: IFRS 16 Leases impact review in Hungary and a comparison to DAX 30 German listed entities

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This thesis is developing a theory and a quantitative study related to lease transactions and the implementation of the IFRS 16 Leases Standard. The accounting legislation is going through an exciting time, as new rules are replacing several decades-old practices. This changing regulation revealed some additional aspects of the expected changes in lease transactions, as well as some new solutions and operations where services from lease transactions can be separated. Lease transactions in the modern age have always supported new solutions since the 19th century, and they have played a significant role in our daily life. Before this change, the majority of lease transactions were not recorded in the balance sheet, causing significant worldwide unreported off-balance-sheet liabilities and assets.

The paper contains six chapters, in the first chapter a literature review and a general overview of lease accounting is given. The second chapter raises research questions and describes the initial hypotheses and methodology. In the third chapter, the accounting regulations and standards are detailed 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 of future research.

The impact of the new IFRS 16 implementation based on the initial estimation is significant for the Hungarian lease market due to the mandatory application of it by 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. With these new requirements, new lease products are also be expected to appear on the market. It has to be mentioned that in the past 27 years there were several lease-related regulations, including the clarification of the operating and finance lease definition.

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. Lack-of guidance can lead to tax issues and improper accounting practices. Three main areas can even be differentiated to summarize this study.

1. *Impact measurement of lease transactions:* From an impact measurement view, a) the Hungarian Statistical Office (KSH) statistical data collection and analysis method should be improved. The recommended solution is presented in this paper. The Hungarian statistical data collection questionnaire should be updated. Measurement is already possible and can be available for the statistical office to use. 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 not in an obligatory manner.

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 result highlighted that the difference between the expected operational lease contracts versus the observed lease contracts is significant. b) In 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, value of cross border operational lease transactions was identified. d) Unlisted entities (HUF 700 billion) can have an 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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Key to Abbreviations

ACL	Audit Command Language
BDL	Bundesrverband Deutscher Leasing-Unternehmen
BÉT	Budapest Stock Exchange (Budapesti Értéktőzsde)
CSR	Corporate Social Responsibility
DAX 30	Deutscher Aktienindex (German Stock Index)
EBIT	Earnings Before Interest, Taxes
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EFRAG	European Financial Reporting Advisory Group
EY	Ernst and Young
FASB	Financial Accounting Standards Board
FP	Financial Performance
FTSE 250	Financial Times Stock Exchange 250 Index
GRI	Global Reporting Initiative
HAL	Hungarian Accounting Law
HLA	Hungarian Lease Association
HQ	Corporate Headquarter
IASB	International Accounting Standard Board
IBEX 35	Indice Bursátil Espanol (Spanish Exchange Index)
IFRS	International Financial Reporting Standards
IR	Integrated Reporting
ITC	International Trade Center
KPMG	Peat Marwick International and Klynveld Main Goerdeler
KSH	Hungarian Statistical Office
LCC	Low-Cost Carrier (Airline)
LCV	Light-Commercial Vehicle
LE	Lease Europe
LSE	London Stock Exchange
MNB	Hungarian National Bank
MOU	Memorandum of Understanding
NPV	Net Present Value
PWC	Pricewaterhouse Coopers
ROU	Right-of-use (assets)

SME	Small and medium-sized enterprises
SB	Statistisches Bundesamt
SP	Sustainability Performance
STOXX	Swiss globally integrated index provider
US GAAP	United States Generally Accepted Accounting Principles
VAT	Value Added Tax
VLP	Variable Lease Payments
WB	World Bank

Introduction

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 of the expected changes 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 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?

Background and motivation

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 have 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.

Main objectives and contribution

1. Measurement of the 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.
6. Demonstrate that lease accounting change is also driving digitalization in accounting.

Structure

This 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. Literature review and an overview of lease accounting

Even though there are many publications available prior to 2016 concerning the new IFRS 16 implementation at international level, Hungary has only a limited number of academic papers on this topic. However, after the standard issuance in 2016 only professional level comments, mainly from the Big4 companies (Deloitte, EY, KPMG, PWC) and a minimal amount of comments from the Hungarian Lease Association (hereinafter: HLA) were published. For the literature review, the first results were generated from three primary databases (Scopus, EBSCO, and Science Direct) with a focus on publications on IFRS 16.

1.1. Literature review

The relevant articles and studies can be classified into the following seven categories based on their findings or conclusions:

a) Perceptions regarding the use of leases
b) Regulation related impact studies
c) Academic impact studies
d) Expected changes in business practices
e) Sustainability reporting and the connection to financial reporting
f) Literature or comment summaries on lease standards
g) Hungarian publications on IFRS 16

The search is targeted to review academic publications and the answers from these studies structured according to the use of leases and the impact of new lease model implementation. In the last section of the literature review, the Hungarian publications also are presented separately to have a clear disclosure of the specific country related literature.

There are several available academic impact studies, and there is an available literature review, which consolidates the views and summarizes them in a simple structure. All these papers are ex-ante impact analyses, and the majority of them have a rather qualitative than quantitative approach, which is logical because the available quantitative data is still limited in 2017 more than one year before implementation.

1.1.1. Perceptions regarding the use of leases

Wheeler & Webb 2015; Beatty, Liao and Webber 2010; and Zechman 2010 harmonized conclusions as leasing decisions are not solely due to the desire for off-balance-sheet financing; however, operating leases are used opportunistically. In other words, (Wheeler & Webb 2015) "these structures also provide substantial benefits to others, particularly those with financial constraints." Cars in companies' assets (Vuk, 2016) brought up interesting examples to prove that leasing decisions are firmly dependent on taxation and other economic benefits; this is in relation to their utilization in Croatia. Later in this same study, regarding Hungary, another aspect can be added as not only the utilization, but also the lease type itself can cause a difference in the benefits. Empirical evidence from the airline industry (Bourjade, Huc, Muller-Vibes, 2017) also provided the same conclusion on leasing and profitability. This article concluded that the economic advantage of leases arises from the nature of the actual contracts, based on whether contracts are reported on or off the balance sheet. In summary of the reviewed papers, it can be concluded that the primary motivation is considered to be economical and secondary motivation would be reporting incentives. In a later section of the lease history this statement is confirmed as the primary economic need for this type of contract is the starting point, and the accurate and transparent recording of these transactions is the task of the accounting regulation.

In the next two sub-categories, I summarized the available international impact studies. I have created two categories because it is essential to distinguish and understand the motivation of those papers. The first category belongs to obligatory impact studies, which are required before standard-setting or for EU standard endorsement. In the second category I have listed all academic research-based impact assessment papers.

1.1.2. Regulation related impact studies

There are two available impact studies related to regulation and standard approvals. The first one is the IASB effect analysis (IASB 2016), which was prepared before the IFRS 16 official approval as a standard-setting process. The second impact analysis was completed before the IFRS 16 EU endorsement, which is a Europe Economics (2017) study.

As a result of a lengthy standard-setting procedure, the 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 instead of a quantitative study. In addition, the likely effects of the new lease accounting requirements are analysed. In this research the highlighted potential impact on the lease market focuses on the possible behavioural changes that would affect the leasing market. In other words, transactions might be structured to achieve the desired accounting outcome, as reducing the length of lease terms and making lease payments variable could be done in an attempt to recognise smaller lease liabilities. Overall for the sample base of reviewed companies, the expected impact was estimated to be almost USD 3 trillion of off-balance sheet lease commitments, and the overall effect on profit before tax in the comprehensive income statement was not expected to be significant; however, the reclassified elements will also impact several financial ratios. The following two tables from the analysis show the impacts of where the most visible effect is in regard to capitalization of the operating leases as assets and liabilities.

	IAS 17 / Topic 840		IFRS 16 / FASB model
	Finance leases	Operating leases	All leases
Assets	✈🏛	---	✈✈🚗🚌 🏛🏛🏛
Liabilities	$$	---	$$$$$$$
Off balance sheet rights / obligations	---	🚗🚌 ✈🏛🏛🏛 $$$$	---

Table 1. Expected impact on the statement of financial position

Source: IFRS 16 – Effect Analysis www.ifrs.org

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

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. Table 1 and Table 2 impact assessments are demonstrated with several examples and these are also accepted and utilised in my research.

For the EU regulation endorsement an individual and separate impact study was prepared alongside the IASB effect analysis and it is made by the Europe Economics Chancery House (2017) at the request of the European Financial Reporting Advisory Group (hereinafter: EFRAG) prior to standard endorsement in order to provide input to the advisory body and be able to advise to the European Commission on whether implementation of IFRS 16 would be conducive to the European public good. The key conclusion from this study was the same as the IASB effect analysis in that

the critical impact is to record the assets held under operating leases and lease liabilities in the balance sheet. They also stated that they have a profitability and leverage ratio impact as well.

The study covered various areas with the principal intention of quantifying all aspects of the EU lease market. These conclusions were based on 2 294 listed companies' financial statements from EU registered stock exchanges from 2015 and based on 30 interviews for unlisted companies by 276 respondents (lessees or lessors) from across the following EU countries: Belgium, Netherland, Luxembourg, France, Italy, Sweden, Germany, Poland.

The advantage of this study was that it provided quantifiable impacts on the overall market. For the listed companies, it was based on the reported financial statements; however, for the unlisted companies, the sample size, considering the number of SME companies in the EU, might be questionable from many aspects. The study stated that they included all Bloomberg based listed companies; however, the downloaded World Bank data reported in 2015 the number of listed companies in the Eurozone amounted to 5 470 entities.

Country	Number of companies	Aggregate lease obligations (€m)	Average lease obligations (€m)
United Kingdom	496	287,616	580
France	234	127,889	547
Germany	367	122,763	335
Sweden	238	40,391	170
Norway	120	34,246	285
Netherlands	88	29,417	334
Spain	71	27,960	394
Italy	42	17,742	422
Denmark	90	17,467	194
Finland	113	10,929	97
Poland	122	5,878	48
Belgium	61	5,806	95
Portugal	19	5,626	296
Greece	84	5,336	64
Ireland	17	4,691	276
Austria	46	4,230	92
Others	86	3,839	45
Total	**2,294**	**751,827**	**328**

Table 3. Operating lease obligations by country of headquarters (2015)

Source: Europe Economics' calculations EFRAG

www.efrag.org

The study stated an off-balance sheet aggregated lease obligation for the EU with a value of EUR 751 billion with the most impacted sectors being airline (44%), retail (43%), and travel & leisure

(41%). From a country perspective, the country origin of most companies was based in the United Kingdom, France, and Germany. The total aggregated lease obligations for Germany in 2015 was EUR 122.8 billion; Hungary was not on the list. The lack of Hungarian company examples was a motivation to investigate further and analyse the impact on Hungary.

1.1.3. Academic impact studies

From the academic impact studies, I would like to highlight short summaries and their connection to this paper. Wheeler & Webb (2015) and Barone, Birt, and Moya's (2014) documents provide an overview of the expected impact of operating lease capitalization and its effect on profitability and leverage ratios, a review on the systematic issues, and also a review from an auditors' point of view. Regarding the impact of leverage ratios, they believe that there is a stronger impact compared to profitability ratios. The reviewed studies supported the proposed and later accepted change in lease accounting due to the provision of high-quality information, which would ultimately lead to better decision-making. On the other hand, the preparers of financial information offered only moderate support because they claimed that the costs of the change might outweigh the benefits, and they also raised issues with the treatment of renewal options and contingent rentals.

In the quantitative study of the economic consequences of changes in the lease accounting standard, evidence provided by Kusano, Sakuma, Tsunogaya (2016) concluded that firms in Japan with debt contracting incentives were more likely to choose operational leases, and in turn Japan granted and exception on the international standard application for a limited time.

Briggs, Beams, Baril, and Betancourt's (2017) US study was related to variable lease payments, which focused on both the final standards of lease accounting issued by the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB), and their impact on variable lease payments. In summary, no forecasting of future unknown lease payments will take place, and in the United States contingent rents tied to either revenue/usage or rates/indexes will generally not lead to liabilities on the balance sheet. In the shorter-term, debt covenants may need to be renegotiated to account for the balance sheet impact of operating leases. In the longer term, some companies may gradually shift toward variable payments in contracts to reduce liabilities on the balance sheet.

Gross, Huston (2014) described the path of lease resistance; how changes to lease accounting treatment impact businesses. Changes in accounting standards may have a significant indirect economic effect on companies as they can trigger debt covenant violations, restrict access to capital, and distort critical financial information used by investors and lenders. New accounting standards may also directly affect the calculation of employee bonuses and incentives that utilize EBITDA or operating income as benchmarks. The study, as provisions related to operating leases, could lead firms to discontinue leasing activities and even make recommendations to companies' management on how to change or re-negotiate prior lease agreements.

From the IASB effect analysis the most impacted industry is the airline business, which was supported by the fact that there is the highest number of academic studies available for this specific industry. Öztürk-Sercemeli (2016), Prado-Giner (2018) focus on IFRS 16 Leases by examining accounting policies related to recognition, presentation, and disclosure of lease transactions from the perspective of lessees and lessors and compares it with the former standard IAS 17 and determines the differences between IFRS 16 and IAS 17. The research pointed out that IFRS 16 leads to the reporting of all lease transactions from lessee's standpoint like a finance lease. This is regardless if it is either a finance lease or an operating lease, as well as if it improves financial disclosures in such way that it will reflect the financial position, financial performance and cash flows of the lessees and lessors. It evaluated the effect of reporting all lease transactions like a finance lease over the Alabood-Abuaddous-Bataineh (2019) airline industry in terms of liquidity and financial structure. Akbulut (2017) reviews the changes of operating leases for the lessees, which are required by International Financial Reporting Standards 16 (IFRS 16) – that set out a new approach to the financial reporting and accounting of leases. The scope of the research uses the consolidated financial statements, and footnotes of the 110 companies listed on the Istanbul Stock Exchange. Both previous studies confirmed the statistically significant impacts on financial statements, which were the same as described in the IASB effect analysis.

In addition to these studies, Karwowski (2016) analysed the risk of using current financial reports in a study of airline business models. The study pointed out that this is an essential factor in studying the carriers' accounting policies. In the case of airlines, accounting analysis can show material differences in accounting policies concerning their critical assets and liabilities. These differences may significantly impact profitability, which provides an additional element to the impact on new lease accounting implementation.

Morales - Zamora-Ramírez's (2018) impact assessment applied the same methodology as the IASB or the EFRAG study. In this study they also addressed the constructive capitalization method. In my thesis, I applied this same methodology, which is discussed in section four: impact measurement. The study reviewed the impact after the IFRS 16 approval on STOXX companies with a total sample of 646 entities from across 17 countries; however no companies were selected from Hungary. Based on their analysis, I agree with their conclusions as the adoption of IFRS 16 does have a significant impact on the balance sheet, leverage, and solvency ratios. It also has to be added that the magnitude of the effect significantly depends on the sector in which the company operates.

Prado – Pla – Giménez (2018) reviewed the Stoxx All Europe 100 index, where the results showed an average increase of the assets and liabilities of 4.48% and 11.98%, respectively. Furthermore, the adjustment impacts the most significant European companies by showing more substantial leverage, lower liquidity, and a decrease in their economic profitability ratio. Additionally, this paper does not include any Hungarian examples as part of the index. It is also important to note that the impact could be heavily dependent on the respective industry.

Giner-Merello – Pardo (2018) used a Monte-Carlo method to simulate the IFRS 16 impact on Stoxx companies, which incorporates uncertainty of the future value of variables. The objective was to provide a future estimate on IFRS 16 impacts. Based on the Stoxx index, the results indicated that the most significant effect occurred in the 2019 financial reports after its implementation in which I agree with the conclusion.

Nurkasheva – Dosmanbetova – Zharylkasinova (2018) reviewed an impressive non-European country impact. They examined listed companies in Kazakhstan. Their results indicated that the most noticeable change of the financial indicators, such as debt load, capital leverage, and EBITDA is taking place in retail enterprises and airline companies.

Pavic – Decman – Sacer (2017), from Croatia, analysed a handful of airline companies, including the national airliner and others from France, Germany, and the United Kingdom; however no examples were from Hungary. The conclusion confirmed the IASB expected effect analysis on the

significant impact related to the financial position. The results indicated that the presentation changes are contributing to a better assessment of lessee's financial liabilities and its financial position. Houqe – Monem – Tareq – van Zilj (2016) also confirmed the positive effects of IFRS implementation by analysing a significant sample of European entities. The authors also concluded if a high level of undisclosed information ("secrecy") in a country exists, the lower level of earnings of firms are reported.

1.1.4. Expected changes in business practices

In addition to the IASB impact assessment, in this section, I highlight accounting impact estimation studies and compare this to my applied methodology.

The study of Hunt, Kristin, Gunderson (2017) includes the standard's use in growing the managers' and tenants' relationship, reducing off-balance-sheet accounting, and generally accepted accounting principles (GAAP) practice issues. Also included are details on the standard's effect on leasing behaviours of tenants and leasing's economic benefits on the real estate market.

Nasip – Sudarmaji (2018) reviewed specifically the Indonesian market with a focus on contracts for retrofits for energy efficiency products. They highlighted that the operating lease is a significant source and is essential for off-balance-sheet financing in Indonesia. Their results indicated that the benefits of retrofit financing implementation are beating the costs, based on the current tax system, and providing a favourable impact overall. The tax implication of specific lease types in withholding taxation for Hungary is also going to be presented later in section three.

Kints – Spoor's (2018) research indicated a substantial effect on the presentation of the financial position. They also expect that this will affect decision making by stakeholders. The authors also concluded that the smaller chance of relevant information being overlooked, the better the decision-making process. The results suggested that the accounting treatment under IFRS 16 contributes to the quality but not necessarily to the ease of making investment financing decisions.

Pardo – Giner (2018) reviewed listed non-financial companies on the Spanish stock exchange (IBEX 35). They applied the constructive capitalization method in their estimations. From a

practical point of view they concluded, in some instances, to avoid non-compliance with restrictions particularly in debt contracts, contract renegotiations should be initiated. The social implication for investors, shareholders, and lenders, or even other users is the more transparent decision. These impacted parties will have more transparent information, which should improve their decision-making ability.

Nurunnabi (2017) reviewed entities in Saudi-Arabia, where significant differences between IFRS and Saudi GAAP regulations were identified. The findings suggested that necessary training is required for the effective implementation of IFRS in Saudi Arabia.

Chatfield – Poon (2017) reviewed the hospitality market segment in the United States. The examined hospitality companies indicated that they extensively use operational leases, which amounted to 51% of their assets in 2015. The unfavourable impact on lessee's debt ratios and interest coverage could also affect a hospitality company's borrowing rates and debt covenants. Their results indicated that the implementation of new standards is most likely to be time-consuming, not just costly; however, the earlier hospitality companies prepare for the new standards, the better off they will be.

Edeigba – Amenkhienan (2017) studied the influence of IFRS adoption on corporate transparency and accountability perspectives in New Zealand. This general review of standards included an analysis of IFRS 16 based on disclosure requirements. The authors identified the presence of information asymmetry for tier 2 (specific New Zealand companies under Reduced Disclosure Regime) companies and for tier 1 entities where the disclosure requirements were equal to IFRS. They, Edeigba – Amenkhienan (2017), "identified a decline in incidences of corporate fraud after IFRS was adopted." This conclusion confirms the IASB's view and also the transparency and quality of IFRS reporting standards, which results in better reporting.

André – Filip – Paugam (2015) reviewed the application of IFRS consequences from the view of conditional conservatism, which means the book value is recorded lower under sufficiently adverse circumstances but not higher under favourable conditions. Based on a significant sample size of 13

711 companies across 16 European countries they argued that IFRS could be viewed as conceptually conservative, but after IFRS adoption the authors actually recorded a declining degree of conditional conservatism. This impact represents better quality financial reporting with the application of IFRS.

Lantto (2014) studied the adoption of IFRS standards and the work of accountants. "The study shows why and how especially IFRS' requirement of 'business involvement' in accounting revolutionises accountants' work and how it has an implication on their roles, practices".

Giner – Pardo (2018) and Wong-Joshi (2015) made an impact review on Spanish listed entities where the initial research was based on the assumption that preparers have been actively lobbying against the IFRS 16 disclosure changes. Their analysis suggested that investors in civil-law countries, like Hungary, do not behave any differently to those in common-law countries. In their view, these results should give some comfort to preparers of the new regulation, which I also accept.

1.1.5. Sustainability reporting and the connection to financial reporting

Lease regulation, in many ways, is related to high-value transportation systems and types of equipment, such as airplanes, ships, trains, or other vehicles. It is, therefore, taking an essential part in the future of mobility. On top of the mobility question, even for other tangible assets in 2019, it is an increasingly important question of how to connect financial and sustainability reporting. No one other than the IASB chairman, Hoogervorst (2019), has addressed this topic, and actually, IASB is working on generating an exposure draft in 2020 in this area, called the Management Commentary Project. Mr. Hoogervorst has also expressed that, in an ideal world, we would not need sustainability reporting because the negative environmental impacts, such as pollution, would be adequately taxed and presented in the financial statements so the price of the product would reflect the cost it imposes on the environment. As he expressed, "Should these costs make an economic activity unfeasible, the financial statements would show the impairment of its related assets. Financial reporting and sustainability reporting would be the same." Unfortunately, we do not live in a perfect world. Based on the International Trade Center (hereinafter: ITC) interactive

sustainability reporting standards map, more than 230 sustainability reporting standards initiatives applicable to more than 80 sectors and 180 countries have been detailed. Hoogervorst (2019) has also expressed the following, “The first strand of sustainability reporting is embedded in Corporate Social Responsibility (CSR) reporting. It seeks to promote behavioural change by requiring companies to demonstrate how they contribute to a better world by engaging in environmentally sustainable activities.” It was also clearly stated that sustainability and financial reporting are not the same activities, but in terms of the public good, these two types of reporting should have a connection, or at least a way of reconciliation to one another.

Since 2018 there has been increasing attention and a growing number of publications on the topic of sustainability reporting. Kannenberg – Schreck (2018) published in the Journal of Business Economics a review of empirical research, where they analysed 32 studies on Integrated Reporting (IR), which is the most connected sustainability reporting standard that is issued by the Global Reporting Initiative (GRI) organisation. They reported that integrated reporting has some positive implications, such as improved data quantity and quality on sustainability issues. They also communicated that in contrast the reviewed studies provided inconclusive results on whether IR advances sustainability performance. Based on their summary this could be a goal of future investigations.

Hussain – Rigoni – Cavezzali (2018) went even further in the review when they tried to explore the link between companies’ sustainability performance (SP), sustainability disclosure, and financial performance (FP). They applied a manual content analysis technique and reviewed the sustainability reports of the 100 best-performing US companies. They noted that interlinkages between different SP dimensions and sub-dimensions are weak and somewhat contradictory. This confirms the view of Hoogervorst et al. in that this is an excellent subject for future research.

In addition, I would like to note that in my study the linkage between sustainability and financial reporting is also analysed for a specific segment of the Hungarian lease market.

1.1.6. Literature on comment summaries on leases

Barone, Birt, and Moya's (2014) literature summary on lease publications were prepared during the IFRS and US GAAP joint standard-setting and commenting period. They highlighted proposed changes, initial responses, and potential economic implications for both preparers and users of accounting reports, which were presented earlier in the impact literature section. The authors highlighted in a consistent conclusion, based on the bulk of research, that the proposed changes to lease standards have significant implications for preparers and users of financial reports.

Wheeler, Spencer, Webb (2015), Morais's (2011) review of contemporary academic literature relating to leases started with the statement that corporate leasing activities have been examined and debated for more than 30 years. In their summary, the authors concluded that uniform capitalisation of operating leases should enhance the usefulness of the financial statements in most cases, which is in-line with the later approved IFRS and US-GAAP standards. They also noted that key obstacles in those reviews were the reliability of available disclosures in certain circumstances.

Kovalev (2016) reviewed lease accounting history from the 1930s up to the acceptance of the IFRS 16. The IFRS legislation history was compared to US regulations. The conclusion was that the need for changes was dictated by the project of convergence of accounting systems. It is a bit unique view because usually literature reviews approach changes from a transparency perspective in which harmonization in general is considered a result and not a root cause of the changes.

1.1.7. Hungarian literature on leases and IFRS

There are several advisory companies, mainly international auditing companies, such as KPMG, PWC, EY, Deloitte, and other advisory companies who have published newsletters and additional supporting information regarding the new IFRS 16 Lease Standards. These documents provide practical details; however, the impact analysis on implementation is limited, mainly qualitative, and not related to the overall lease market. The Hungarian Auditing Chamber published a summary, Lakatos (2018), Madarasiné-Bartha (2018), where the general terms of IFRS 16 are explained. Additionally, the Magyar Lízingszövetség (Hungarian Lease Association hereinafter: HLA) also published a summary in the last quarter of 2017. That document mainly describes the new lease

standard regulations, which are similar to the advisory companies and, from an impact perspective, it only mentions a general statement that there can be changes in the operational lease agreements. It is a very broad statement and the real impacts are not specified.

There are two doctoral theses in Hungary on the topic of leases. Both are interesting papers, but they are not relevant to this topic. Gulyas (2014) covers the finance lease regulations and harmonization. This thesis highlighted the necessity of the harmonization and recommended a unique national based solution. Instead of the alignment being implemented as it was explained in detail in 2015, the Hungarian Government accepted the extended voluntary IFRS application, which created a situation when the national and international lease regulations were regulated in entirely different ways. Veres (2013) researched the connection between depreciation and lease finance from the lessor's point of view. This second thesis is more focused on the lessor's internal calculations and the profitability modification aspects of depreciation in the case of finance leases.

The absence of relevant Hungarian academic literature on the implementation of IFRS 16 and the recent change in 2016, when the Hungarian regulations allowed for the voluntary application of IFRS for unlisted companies, inspired the development of my hypotheses, which is to examine potential future impacts and differences.

To summarize the literature review, potential vital impacts are related to change in the lease model and future capitalization of operating leases as assets and liabilities. An essential element that needs to be highlighted is that the IFRS Standard in Europe is mainly related to the companies which are listed on stock exchanges., while unlisted companies' impact is primarily defined by local laws.

In 2016 the estimated total impacts valued at USD 3 trillion are mainly expected to be related to specific industries, such as airlines, transportations, travel and leisure, retailers, and telecommunications. It has to be mentioned that vehicles, such as airplanes, ships, trains, or cars, are naturally used as leased objects in those industries; therefore, the most significant impact is expected among those at an international level.

1.1.8. Literature review summary

This section is intended to draw a summary on the reviewed literature in accordance with the previous classifications. I do agree and accept the reviewed literature on perceptions regarding the use of leases, which concludes that the primary motivation for lease contracts is economic and the reporting off-balance sheet incentives can only be mentioned as a secondary one. From the regulation and academic impact studies I fully accepted and applied the constructive capitalisation methodology in order to keep the comparability of my research to the main international studies.

Three additional general conclusions can be highlighted from the reviewed studies, which are important and worth mentioning here. Firstly, the new lease accounting model provides better transparency and it follows a substance over form approach. Secondly, the IFRS 16 new standard implementation provides a positive impact on information quality. Thirdly, the importance of the connection between financial and sustainability reporting.

There are four areas, where I would like to contribute with my current research. Firstly, my approach focuses on a whole country impact with listed and non-listed lessee companies as well as lease providers. Secondly, it is my intention to search for a direct reconciliation between sustainability and financial reporting for a specific market segment. Thirdly, I review the new lease accounting potential impact on digitalisation. Fourthly, I intentionally search for new products and services, which might be the results of a new lease regulation.

Before the detailed review in the next section I would like to go through the background and evolution of lease regulation.

1.2. Background and the overview of lease transactions

The history of lease transactions can be even traced back to the ancient Roman Empire or also older civilizations regarding land, water sources, animals, or even slaves; however, as we use it nowadays in modern terms, it can be dated to the 20th century. In 1877 the Bell telephone company invented a new economic transaction in the US when they started to lease the phones in a contractual

agreement for an agreed period transferring the right to use those phones. Several other companies followed and have applied such a method since that time.

Regarding lease regulations, it is interesting to note some ancient rules. First, I would mention the Code of Hammurabi from about 1754 BC, which included 282 laws (Yale, 2008), wherein section 266 - 267 a lease transaction for an animal (cattle or sheep) was documented with specific conditions. It recorded that the lessor should pay attention and take proper care of the leased item. In the case that the "animal be killed in the stable by God (accident), or if a lion kills it" typically the owner bears the cost of the accident. In spite of this if it happens as a result of an oversight then the owner must be compensated. Aristotle, in 4 BC in the book Politics, made comments on contracts and substantial contributions to contracts, economic thoughts, addressed property, and trade (Robins 2000). In addition, in the ancient Roman Empire, even gladiators could be commonly leased, and the lessor should only pay compensation to the owner if the gladiators lost. Many further examples can be brought up, but as mentioned in the beginning of this section modern age leases, as we use them today, appeared only in the late 19th century.

In Hungary, even the translation of the original word "lease" has caused a lot of problems. Nowadays, we use "lízing" as a word in Hungarian, which is a phonetic transcription; however, we can mention two significant legal professors János Székely and László Réczei who tried to accurately translate this expression. In Hungary starting from the 19th century several regulations were derived from Germany, including accounting and legal systems. It is one of the reasons why Mr. Székely started with the German legal expression "Mietkauf," which can be directly translated to "bérletvásárlás"; however, according to Mr. Székely, it is not be satisfactory because this expression is more related to rental rather than the expression of direct purchase. He suggested using the expression "vásárlási bérlet" or "vásárbérlet" (Székely, 1991). Réczei (1988) mentioned other phrases that could be used in some cases: "kölcsönbérlet" or "vételbérlet." Despite these efforts, the lízing expression was implemented, which is only meaningful if the reader has English knowledge.

At least four milestones should be highlighted in the history of modern lease regulation and they are as follows:

1. 1877

In 1877 the Bell Telephone Company invented the leasing of the phones. This transaction made it possible to almost immediately use machines or property for those persons who were not able to pay the total purchase price but could instead pay a partial price together with smaller later monthly payments. The seller kept ownership until the purchasing partner paid the full sales price. In the case that the buyer did not settle the fees as defined in the contract, the lessor could withdraw from the contract without penalties or problems and keep the asset for themselves.

The lease transactions became so favoured by the 20th century that until the great economic depression, from 1929-1933, many sales agents tried more intensively to sell leased products; however, if customers were not adequately informed, they could face serious consequences, as only one missing payment could generate an obligation to pay the whole remaining part of the leased asset. On the other hand, the seller could also face unfavourable customers who were not able to pay for their obligations.

2. 1940s to 1960s

In World War 2 (hereinafter: WW2) the United States (hereinafter: US) entered several "lend and lease" agreements with its allied nations. This program was signed into law on 11 March 1941. According to regulations, the US supplied the allied nation with material with conditions that those items are going to be settled after the war. "The terms and conditions upon which any such foreign government receives any aid authorized under section a) shall be those which the President deems satisfactory, and the benefit to the United States may be payment or repayment in kind or property, or any other direct or indirect benefit which the President deems satisfactory." (Pub.L. 77-11, 55 Stat. 32) Without going into too many unnecessary details the value of this program was USD 50.1 billion (equivalent to USD 565 billion in 2018), which was a very significant value even considering total war expenditures. After WW2, there was a constant need for equipment and property leases. Advances in technology, parallel with the specific limitations of entities' financial sources, generated a significant need for lease transactions through capital assets renovation. Leasing enabled these companies to acquire assets with better conditions compared to traditional

purchases. It also created the need for specialized leasing companies. In 1951 the foundation of the first US leasing corporation took place, which was then followed by European lease entities. Deutsche Leasing AG can be mentioned as an example, founded in 1962 and still operates in 2019 as one of the largest manufacturer-independent leasing companies in Germany.

Before getting to the next milestone, in November 1967 an interesting article was published in the Journal of Accountancy by William D. Hall (Hall, 1967) who presented the problems in lease accounting. As a significant problem Hall mentioned the concern over "off-balance-sheet" financing, where he argued about inconsistency, as not all finance lease transactions needed to be capitalized in the balance sheets. He also brought up other topics, such as leases for less than useful life of an asset, related parties, and capitalization value – Finnerty – Fitzsimmons – Oliver (1980).

3. 1976/1982 – Effective dates of FAS13 and the IAS 17:

The third milestone, which takes place in 1976 (US) (Dieter 1979) and 1982 (IFRS), is related to the issuance of specific regulations for lease transactions. There are slightly different steps related to US and IFRS Standards, but after specific changes both rules applied the same regulation principles. Please find below in appendix 1 both the GAAP FAS 13 and IAS 17 issuance timelines.

Even after the specific lease regulation, there was still a part of the leases (operational leases) which remained out of the balance sheet. Until the ENRON scandal, it was not in the pipeline to change the off-balance-sheet finance area.

Even after the ENRON case, according to Duke – Hsieh – Su (2009), in 2001 operational leases were used for off-balance sheet finance. As an example, a Wall Street Journal article from 2004 can demonstrate this scheme. "The article focuses on the accounting practices of US companies concerning how they report their lease obligations. Examples of companies who keep lease obligations off their balance sheets, notably US Airways Group Inc. and Walgreen Co., have several millions of dollars in lease obligations despite showing minimal amounts of debt… (and) the importance of debt in determining a company's financial health… (which have led to) regulations enacted by the Financial Accounting Standards Board prompted by the Enron Corp. scandal in 2001, which left lease obligations untouched" Weil (2004); Fornaro – Buttermilch

(2006). It was also confirmed and commented on by Donald Nicolaisen, chief accountant for the Securities and Exchange Commission, "regarding the reporting of leasing guidance is related to leasing accounting details of the 90% test," which referred to the minimum lease payment compared to the net present value of the assets in lease accounting (Ball – Bushman – Vasvari, 2008; Barker, 2010; Bennet – Bradbury, 2003). Below this threshold there was no need to capitalize leases, so in other words this was one of the critical limits to keeping the contracts off-balance sheet (Collins – Pasewark – Riley, 2012; Cornaggia – Franzen – Simin, 2013).

4. 2016 issuance of the new IFRS 16 Leases Standard:

The last milestone can be highlighted as the IFRS 16, ASC 842 joint project and standard regulation, which will be explained later.

It is also going to be demonstrated how those two standards cover most of the global economy and that is the reason why it is causing a significant change to worldwide lease settlement. It also reaches the point where all leases, both operational and financial, are going to be capitalized and presented in the balance sheet, which will close out the off-balance-sheet financing. It was one of the essential criticisms of lease regulations even back to the 1960s. It also must be highlighted and mentioned that the leases are specific non-typical transactions; therefore, it is not a "job done" status, because they require constant measurement and monitoring.

From a legal standpoint, two major types of economic transactions can be distinguished:

a) typical transactions: legal standards or regulations create such transactions
b) non-typical transactions: they are generated by the economic relations or specific interactions between various business entities

From a regulation perspective, non-typical transactions need to be always reviewed and measured monitored because they are changing over time naturally and if the legal regulations do not adequately define and regulate these transactions it is possible to misuse or misinterpret the rules or the intended objectives of regulations. In such a situation, monitoring of the transactions is a crucial activity; therefore, regulators should have feedback and market data to react to the significant market changes.

1.3. The root cause of the new lease regulation project

As it was mentioned before the leases are "non-typical contractual" forms; therefore, they need to be actively monitored and, if necessary, the regulation needs to be changed or corrected. Besides, it was presented that IAS 17 (IFRS), the previous lease regulation, together with FAS13 (US-GAAP) classified leases into two different categories as finance leases and operating leases. During the historical review a comment was mentioned from 1967 (Hall, 1967) where it was criticised from a regulation perspective that not all finance lease transactions needed to be capitalized, which was corrected by both IAS 17 and FAS 13.

Nevertheless, by the 2000s off-balance-sheet financing was still an increasing problem and that was always one of the critical issues which needed to be addressed (Alissa-Bonsall-Kohari-Penn, 2013; Altman, 1977). Based on the form of the lease, the accounting treatment can be very different. In 2005, the US Securities and Exchange Commission (SEC) expressed concerns about the lack of transparency. As it was presented earlier, based on a global IASB research for the major listed companies, using IFRS or US GAAP identified approximately USD 2.2 trillion of balance sheet lease commitments in 2014. This absence of information on the balance sheet meant that investors or any other interested party did not have relevant information or a complete picture of the financial position of an impacted company.

For every IFRS Standard there is a basis for conclusions section available, where the IASB highlights the root cause of the specific rule. This is one of the best summaries to understand the reason of the change and also the intentions of the IASB. This document included three particular reasons:

a) Information asymmetry caused by off-balance-sheet finance: "information reported on operating leases lacked transparency and did not meet the needs of the users of financial statements."
b) Existence of two different accounting models: "assets and liabilities associated with leases were not recognised as operating leases but were recognised as finance leases, this meant that they were economically similar, but they could be accounted for very differently."
c) Lessors did not provide adequate information on the exposure to credit risk: "particularly for leases of equipment and vehicles that were classified as operating leases."

The change is a logical continuity on the recognition of off-balance sheet items in the balance sheet. This has been significantly changing, since the first issuance of lease standards. Please find a presentation of this in the table below:

Description of lease accounting from the lessor perspectives	Before IAS 17, FAS13	IAS 17 and FAS13	IFRS 16 and ASC 842
Off-balance sheet items	All operational leases and partially finance leases as well.	Operational leases	xceptions (short term or small value) or service agreements, which do not qualify for a lease.
Balance sheet recorded transactions	Only a part of the finance lease contract	Finance leases	Operational and finance leases

Table 4. Lease accounting comparison from lessor perspectives

Source: own table based on IFRS and US GAAP regulations

1.4. IFRS and US-GAAP joint project key aspects

In November 2009, within a joint statement, the IASB and the FASB made an additional commitment to improve IFRS and US GAAP and achieve their convergence. Initially, for major project plans a Memorandum of Understanding (MOU) was issued in 2006, which was later updated. The lease regulation was one of the key standard improvements.

The primary project objective was to improve financial reporting in order to recognize all assets and liabilities arising from lease contracts in the statement of financial position. The concept was a completely new approach; therefore, it took almost ten years to agree and issue new IFRS and ASC standards. In the next section, the fundamental changes are going to be compared to both new IFRS – old IAS and IFRS versus US-GAAP relations.

1.5. Harmonization and the remaining differences

IASB and FASB issued separate standards, IFRS 16 and ASC 842 respectively, at the end of a joint project. They are similar standards, as both require lessees to record almost all leases on their balance sheets; however, there are several differences between those standards as shown in appendix 2; which is an actual accounting guide for practitioners made by EY (2018).

After 1 January 2019, almost all leases are reported in the balance sheet for IFRS and US-GAAP listed companies as assets and liabilities. For initial recognition, the first step is that both regulations applied similar rules; however throughout the duration of the lease it can cause problems for companies, which use both IFRS and US-GAAP, for instance in circumstances that involve listing on European (DAX) and US (NYSE) stock exchanges.

The following five key areas can be mentioned:

1. **Effective date and scope**

IFRS 16 has been effective since 1 January 2019, for all companies who started their business year with this calendar year; it is like ASC 842. For US regulations there is a significant additional difference compared to IFRS, as this lease accounting requirement is also going to be a requirement for private companies for annual periods beginning after 15 December 2021. If this plan is going to be implemented, then the impact for the US companies to capitalize off-balance sheet items will be much more significant.

2. **Low-value asset exemption**

IFRS 16 provides an exception to lessees, who may apply for an exception on low-value assets with the lease capitalization. When the value of the underlying asset per unit is below USD 5 000 it is not required to capitalize such an asset. There is no similar exception in ASC 842.

3. **Recognition and classification**

IFRS applies a single lease accounting model for lessees, as operational and finance leases' classification is no longer necessary. It is based on a concept of financing arrangement, in other words, it treats all contracts in the same way. ASC continues to separate the definition of operational and finance leases, where all leases should be capitalized as well; however, the financing concept has not treated all cases as the primary reason.

4. **Remeasurement assessment for leases tied to an index or rate**

It should also be noted that a difference is that accounting for lease payments depends on an index or rate. To demonstrate the difference, a simple example can be used as follows: the sample is a real estate lease where lease payments depend on the change in the consumers' price index (CPI). It is updated on an annual basis where the liability is remeasured as the CPI changed. In the case of IFRS, this is performed on a yearly basis; however, ASC 842 does require remeasuring for changes in CPI unless it should be remeasured for other reasons. Additional payments in regard to

CPI changes are recognized as incurred. As a result, IFRS liability could increase significantly compared to US regulations.

5. **Subleases**

According to IFRS 16 a sublease classification, as the sublessor classifies the sublease, is based on the right-of-use asset recognition compared to the US GAAP, where the classification is based on the underlying asset. The two values, especially after the first recognition, can be different, which also causes a difference in the sublease values.

As a summary of the lease differences between IFRS and US GAAP, we can conclude that these different methods apply to the same concept; however, after the first recognition, it can result in differences between reporting standards. This could be challenging for companies who have to report under both IFRS and ASC standards because they need to keep different processes, controls, and accounting systems separate.

1.6. Comparison between the old and new lease standards, IAS 17 versus IFRS 16 – changes and new methodology and its application as of 2019

The detailed comparison between the former IAS 17 and the current IFRS 16 Standard is attached in appendix 3, this is an actual accounting guide for practitioners made by EY (2018).

The most significant changes are the following:

1) Definition of a lease
2) New implemented recognition exceptions
    a. Short-term contracts within 12 months
    b. Low-value assets below USD 5 000
3) Classification from lessees' side are now applied as a single recognition
4) Transactions measurement
    a. The initial measurement of the minimum lease payments
    b. reassessment of the lease liability
    c. measurement basis for right-of-use assets
5) Lease modifications
    a. Lease modifications on an operating lease – lessors

   b. Lease modifications, which do not result in new separate contracts – both lessees and lessors

6) Presentation and disclosure
   a. Presentation lessees
   b. Disclosure for both lessees and lessors
7) Sales and leaseback transactions
   a. Determining whether a sale has occurred?
   b. Accounting by seller-lessees
   c. Accounting by seller-lessees for transactions not at fair value
8) Business combinations

2. Research questions and methodology

2.1. Research questions

This study examines lease accounting regulations in Hungary and compares it to IFRS. The available academic research has given an excellent example on the approach of how to measure the potential impact for a specific market. These hypotheses are only applied to the Hungarian market; however, due to the nature of the regulations, it can have a similar impact on the other continental European regulations as well.

The research can be categorized into eight different questions as follows:

1. Are there any impacts of IFRS 16 on the Hungarian lease market?
2. Can these impacts be measured on Hungarian listed companies, and can it be compared to their German counterparts?
3. Can these impacts be quantified and estimated based on the currently available public information?
4. Are there specific types of transactions where lease types are used?
5. In the context of Hungarian regulations, is there any business advantage related to any kinds of lease accounting?
6. Based on international scientific research regarding the role of leases in the future of mobility, is there any new concept based on a specific service already available in Hungary? (Free-floating car sharing)
7. In the case of an identified new service, how can it be identified and measured from profitability and sustainability perspectives?
8. From a digitalisation and automation perspective, is it necessary to implement a system for lease accounting?

2.2. 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:

$H1_1$: The new IFRS 16 Lease Standard ***impacts can be measured for listed entities,*** *and those can be compared to other EU listed entities.*
$H1_0$: The new IFRS 16 Lease Standard impacts cannot be measured for listed entities, and those cannot be compared to other EU listed entities.

$H2_1$: Specific lease market segments have ***a dominant frequency*** *for a specific lease type, out of which operational leases exceed* ***50% frequency****.*
$H2_0$: 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.

$H3_1$: There are ***quantifiable business advantages*** *related to specific lease transactions.*
$H3_0$: There are no quantifiable business advantages related to specific lease transactions.

$H4_1$: There are indications and evidence from the lease market that the new IFRS 16 Standard ***causes economic changes in business transactions****.*
$H4_0$: There are no indications or evidence from the lease market that the new IFRS 16 Standard causes economic changes in the business transactions.

$H5_1$: It is ***necessary to implement specific software-based monitoring*** *for the lease accounting calculation.*
$H5_0$: It is not necessary to implement specific software-based monitoring for lease accounting calculations.

$H6_1$: There are already available ***conceptually new sharing mobility models*** *in Hungary.*
$H6_0$: There are no available conceptually new sharing mobility models in Hungary.

*$H7_1$: The quantifiable **off-balance-sheet impacts** for the Hungarian listed entities **are relatively lower (in %)** compared to the reviewed German entities.*
$H7_0$: 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, as if the current regulations would still be in place ceteris paribus after the new IFRS 16 Leases Standard implementation in 2019. It also has to be noted that there are no foreseen changes in the lease regulations in Hungary.

2.3. Methodology

In the course of research both primary and secondary data were used, as is described in this section.

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 free-floating 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.

3. IFRS 16 Standard as applied in Hungary and Germany

3.1. IFRS Standard around the world

Financial information can be translated as the "lifeline of the capital market"; therefore, it is a primary requirement that this information should be relevant and reliable. Every day more and more transactions are cross-border investments and, consequently, international investors need financial information, which they can trust. As a resolution, IFRS provides the "global language" of financial reporting standards.

Based on IASB data currently, 166 jurisdictions require publishing of financial statements (IASB, 2018). The United Nations (UN) member list of sovereign states is **193** (UN, 2019); however, it does not equal the number of jurisdictions because several countries have implemented the same authorities, for instance, the United Kingdom's overseas territories and self-governing Crown dependencies.

Out of a total of 166 different jurisdictions there are **144**, which equals 87%, that require all or listed entities to follow IFRS Standards (IASB, 2018). Out of the required countries it should be noted that in Bhutan IFRS will be in effect starting from 2021.

If we reconcile the difference of 22 jurisdictions between the globally applied and total number of domains, the following can be described:

- **12** jurisdictions permit IFRS Standards rather than require them: *Bermuda, Cayman Islands, Guatemala, Honduras, **Japan**, Madagascar, Nicaragua, Panama, Paraguay, Suriname, **Switzerland**, and Timor-Leste*.
- **1** jurisdiction requires IFRS Standards for financial institutions but not for unlisted companies: Uzbekistan.
- **1** jurisdiction is in the process of adopting IFRS Standards in full: Thailand.
- **1** jurisdiction is in the process of converting its national standards substantially (but not entirely) to IFRS Standards: **Indonesia**.
- **7** jurisdictions use national or regional standards: Bolivia, **China**, Egypt, **India**, Macao SAR, **United States**, and Vietnam.
- In total there are **22** legislations, where IFRS is not required.

The following needs to be noted about the global coverage of IFRS:

Out of the 22 legislations where IFRS is not required, in 12 there is a voluntary allowance; in other words, companies can choose IFRS as their reporting standard. From this group 2 countries, Japan and Switzerland, can be highlighted as developed countries.

From the seven jurisdictions, where IFRS is not allowed, two countries should be mentioned, China and the United States. The national standards in China have gone through a substantial convergence to IFRS since 2007; China has committed to adopting IFRS Standards for reporting for at least some domestic companies, although there is no timetable for the completion of the process. In September 2002 the IASB and United States regulatory body the Financial Accounting Standard Board (FASB) agreed to work towards removing the differences between IFRS and US GAAP. There was a Memorandum of Understanding signed, which is known as the Norwalk Agreement. From 2006 to 2008 several harmonization related events occurred that allowed for the creation of the roadmap, update on the signed memorandum, and publishing of progress reports.

For lease regulations it is essential to note that during this period several FASB and IASB joint projects started in which lease accounting was one of the three key topics, and they are as follows: a) revenue recognition, b) leases, c) financial instruments.

From the perspective of this study, it is essential to note that the Joint Lease Project started in February 2007 and was completed in January 2016, and with this collective effort the US GAAP and IFRS Standard concepts became harmonized.

For a better understanding in Figure 1 below the current 2019 implementations are presented.

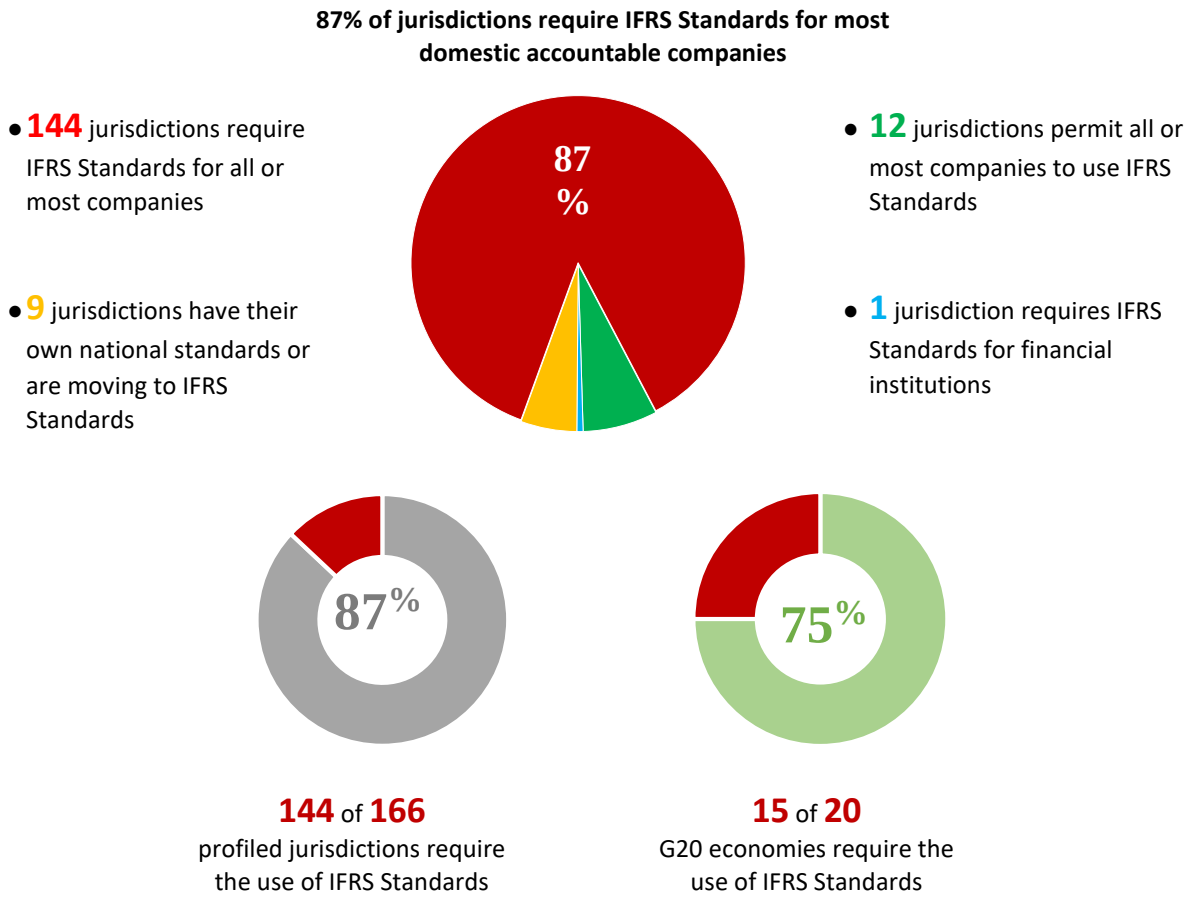


Figure 1. IFRS Standards global applications by jurisdiction

Source: IFRS Standard around the world

www.ifrs.org

Concentrating on the leading economies, we also can draw a good picture of coverage with the presentation of the application of IFRS among the G20 (Group of Twenty). As it is shown on the coverage graph, 15 out of 20 countries adopted IFRS Standards. The following five remaining countries are also quite close to adopting the IFRS Standard:

- **Japan** allows voluntary IFRS application.
- three out of five countries (**China**, **India,** and **Indonesia**) have national laws, which are substantially harmonized or in line with IFRS.
- **the United States** uses a national regulation; however, as it was explained earlier from a lease regulation perspective, the lease accounting was a joint project with IFRS.

From the application of IFRS coverage review, we can conclude the new joint lease accounting concept, from the point of view of IFRS, has been implemented in 144 jurisdictions and from the US GAAP perspective in 1 jurisdiction, in total 145 domains with a significant and very significant global coverage, which is 87%.

The key benefits of the global accounting standard can set standards in three different areas – Armstrong – Barth – Jagolinzer – Riedl (2010); Barker (2004):

a) **Transparency**: This allows for more informed decisions by investors.
b) **Accountability**: Improve accounting quality and reduce the information gap between inside and outside of the entity.
c) **Efficiency**: Markets can operate more effectively by having a single, trusted global standard.

Indeed, changing the accounting regulations and creating a global standard requires effort and costs as well. It also means the general improvement of the reporting entities systems, practices, or even controls. There was particular academic debate and research, as to whether it is a favourable or adverse process. This study follows the generally accepted results (Tarca, 2012), as the global standard adoption brings a net benefit to capital markets compared to their costs. Professor Nobes (2013), Nober – Stadler (2015) also published a specific paper on the surviving international differences under IFRS where he highlighted stock markets that have not adopted IFRS. This list of stock markets has been shrinking up to 2019; however, it has shown that there is still not complete coverage.

3.2. Financial reporting requirements for listed companies in the EU

Starting from 2005, listed entities in the EU need to apply IFRS as their reporting framework. This means those companies need to use all accepted IFRS Standards by the EU. There is a nominated body called EFRAG (European Financial Reporting Advisory Group) in which it is their primary duty to publish and report on the status of the formal acceptance procedure.

According to the latest available EFRAG report, the IFRS 16 Leases Standard was endorsed by the EFRAG body as of 31 October 2017 and it was officially presented to the public on 9 November

2017. Based on this source, IFRS 16 needs to be implemented in all EU listed companies before 1 January 2019.

The impact analysis and information collection from financial statements are possible even now before 1 January 2019. Currently effective standards already require publishing information, which can be utilized as an ex-ante impact assessment both for accounting and statistical purposes. It must also be highlighted that the available financial information gives a picture of the statement of the financial position at the end of the fiscal year and these conditions might change at a later point in time.

The disclosure requirement on the currently effective IAS 17 (International Accounting Standard) regulation requires the presentation of operational leases IAS 17.35 in separate sub-sections and they are as follows:

"Lessees shall make the following disclosures for operating leases: (a) the total of future minimum lease payments under non-cancellable operating leases for each of the following periods: (i) not later than one year; (ii) later than one year and not later than five years; (iii) later than five years. (b) the total of future minimum sublease payments expected to be received under non-cancellable subleases at the end of the reporting period. (c) lease and sublease payments recognized as an expense in the period, with separate amounts for minimum lease payments, contingent rents, and sublease payments. (d) a general description of the lessee's significant leasing arrangements including, but not limited to, the following: (i) the basis on which contingent rent payable is determined; (ii) the existence and terms of renewal or purchase options and escalation clauses; and (iii) restrictions imposed by lease arrangements, such as those concerning dividends, additional debt and further leasing."

With these requirements from financial statements, it is possible to get the necessary data to measure the off-balance-sheet operational leases capitalization impact.

3.3. IFRS application in Hungary and Germany

From the academic research performed, I would like to highlight a specific comparison between the German and Hungarian accounting regulations (Karai, 2005). The table below classifies the comparison between Hungary and Germany in three categories:

a) General accounting principles
b) IFRS application
c) National regulation related to vital differences.

From a lease regulation perspective, the IFRS application is key in both countries where both countries need to apply the same regulations as required by the European Union (EU).

Description	Hungary	Germany
IFRS application	From 2005 all listed domestic entities need to publish their financial statements according to IFRS regulations. From 2018 Financial institutions need to report according to IFRS, where the credit institutions ('Takarékszövetkezetek') received one-year prolongation for the application until 2019.	From 2005 all listed domestic entities need to publish their financial statements according to IFRS Standard.
Critical differences in national regulations accounting principles	Explicit definition of the accounting principles; however, no hierarchy is written in between those principles (Karai, 2005)	The implicit meaning of the accounting principles and no clear hierarchy. (Karai, 2005)
Significant differences in the national regulations lease accounting	Operational and finance lease specification. Operational leases are off-balance sheet items. Finance leases are primarily determined by the transfer of ownership per the lease agreement.	Operational and finance lease specification. Operational leases are off-balance sheet items. Lease item capitalization value might be different based on the applied asset item. (Karai, 2005). Financial and operational lease classification is governed by certain decrees of the Federal Ministry of Finance and depends on the beneficiary of ownership. (PWC, 2018)
Other key national differences	No deferred tax concept implemented in Hungary	Deferred tax concept (latent Steuer) is valid in Germany. General provision calculation on specific items related to future obligations.

Table 5. Hungarian and German accounting regulations comparison from lease transactions and IFRS perspectives.

Source: Europe Economics' calculations EFRAG www.efrag.org

From the table it is visible that the listed companies must apply IFRS reporting and in Hungary; additionally, from 2019 all financial institutions must also report according to IFRS.

Haller – Ernstberger – Froschhammer (2009); Fülbier – Silva – Pferdehirt (2008) analysed the detailed differences between German GAAP (HGB) and IFRS together with the first-time adoption impact on 103 German companies. This impact on average saw a significant increase in stockholders' equity and net income. This is in line with the general observation of the literature review that IFRS implementation does not have a conditional conservatism impact.

3.4. Accounting regulations history related to leases in Hungary

From an accounting regulation perspective Hungary has a very similar regulation to Germany due to specific historical reasons. In 1875 commercial law was based on the German commercial rule "Handelgesetzbuch" (HGB) and so Hungary just "imported" this law with Act XXXVII. of 1875 (Borbély, 2012).

The legal and accounting aspects of Hungarian leasing regulations show a rather diverse picture. Leasing, as a transaction, appeared in Hungary in the late sixties and seventies in connection with the "new economic mechanism," although the term leasing was not used during this period due to the inability to buy assets. These transactions were named as "task-leasing." The type of deal was of particular importance because, unlike in the US and Western European countries, it was used to rent unused machinery, not to exchange assets (with a new form of financing), within the socialist economy where investments and asset financing were subject to stringent rules.

According to the related accounting standards, the leased asset had to be recorded as an asset by the lessor, it had to be depreciated, and the rent had to be recognized as income. The lessee charged a fee as an expense and these costs were agreed upon by the parties in the contract.

Due to the peculiarities of the regulatory environment, this type of transaction spread very slowly, although, with the increase in the share of small business management, leasing of assets was becoming more common. In the eighties, companies were only able to borrow at ever-higher interest rates, while for leasing companies it was much easier, which also helped spread this type of deal. The relevant legislation that appeared during this period covered equipment leasing and allowed lessees to purchase the leased item, although the option had not yet been granted. The accounting was done in the same way as before. The possible scope of leasing items was

determined based on the List of Amortization Norms (except for buildings and structures). Lawyers were already using the term leasing during this period, which, in legal and accounting terms, was mostly a contingent operational leasing transaction.

After the proclamation of the Hungarian Republic in October 1989, a completely new accounting regulation was needed. This followed German accounting as a role model (Roberts, Weetman, Gordon 1998, Boross, Clarkson, Fraser, Weetman 1995), leading to Act XVIII. of 1991 when new accounting regulations were accepted.

At the time of the regime change, with the emergence of a market economy, the number of leasing transactions increased significantly. From a regulatory point of view, it is essential to mention a short period, 1991 to1992, in which there was an absence of legislation. The so-called prompt leasing transaction was undertaken in which the lessee paid a significant portion of the consideration at the time to signing a short-term contract and subsequently owned the asset by settling the residual value after paying some lease payments. According to the position of the tax authority, the contracts had to be classified based on their content during this period. The legal gap was finally regulated in Act LXXXVI of 1991. Laws abolished corporation tax on leases by defining a lease and recognizing a contract for at least 365 days as a lease, and then, one year later, adding the option to purchase. Recognition of lease payments as expenses were limited in order not to disproportionately reduce pre-tax profit (more than 36% of the total rent could only be accounted for by a tax base increase) (Varga, 2009). The 1996 LXXXI. Law on corporation tax and dividends not only deleted the time limitation, but also the possible recognition of it as an expense.

From 1997 accounting has changed compared to previously, this is partly due to the above-mentioned changes and partly to the XVIII. Accounting Act, which introduced the substance over form principle. Previously the tax authority applied this view. Besides favourable tax treatment, cancellation adversely affected the development of these lease transaction types. It also provided rules for the legal institution in Act CXII of 1996 on credit institutions and financial enterprises. However, until the amendment of the Civil Code in 2013, there was no precedent for leasing regulations in Hungarian civil law, so the judicial practice treated it as an atypical contract and applied the rules of sale, lease and loan agreement to it (Gárdos et al. 2013). This situation laid the groundwork for the current and sometimes contradictory set of rules (Borbély-Evans 2006).

3.5. What are the key differences between the Hungarian regulations and IFRS?

3.5.1. Definition of a lease in Hungary and comparison to IFRS

"In Hungary, it is not so simple even to accurately define the lease terms, because we have them in two separate effective legal regulations: Gardos – Tóth – Szabó – Parlagi – Darákné (2013): a) V. Act of 2013. Polgári Törvénykönyv (Ptk.), which can be translated by the Hungarian Civil Code (hereinafter: Ptk.) 6:409 §; and b) CCXXXVII Act of 2013. Hitelintézetekről és Pénzügyi Vállalkozásokról (hereinafter: Hpt.) 6 § Section 89." Tóth (2017/1).

Not only is the definition of lease ambiguous, but also the type of lease identification and proper classification. Both national regulations define the finance lease type conditions, and all other contracts are operational leases, but both Ptk. and Hpt. give a different term for finance leases, which is quite transparent if we compare them. Ptk. uses similar terms as IFRS, currently effective IAS 17 lease conditions. Two significant differences between Ptk. and IAS 17 are that Hungarian regulations do not define the specialized nature of the leased assets, and it does not specify the minimum lease payments, but the applied concept was intended to follow IFRS. Hpt. defines finance lease critical criteria as the formal transfer of ownership or a purchase option where both are legal conditions. IFRS and US-GAAP also use different terms, based on the economic substance of the transaction. In other words, it means there are several possibilities to transfer the risk and rewards from the leased assets without a formal legal transfer or option. In the case of self-interest or motivation, enterprises may misuse the concept and wrongly classify lease types, which allows them to keep significantly more items off the balance sheet compared to IFRS.

In addition to the classification issue in Hungary, there is no definition of lease, as it exists in IFRS 16, in terms that a contract conveys the right to control the use of an identified asset for a period in exchange for consideration. This lack of definition results in operating leases not being adequately segregated from the rental service agreements. Many lease companies even provide, in 2017, the same contract for both a long-term rental agreement and also an operational lease. Starting from 2019 there will be a significant difference in IFRS between the rental and the operational lease accounting.

3.5.2. Hungarian lease accounting

"The Hungarian Accounting Law (Act C of 2000) applied the Ptk. definition for a long time even before the current IFRS based version. There have been several updates in Ptk. since 1989; however, in 2014 there was the first complete revision and the issuance of a new regulation. The previous one was in force since 1959. Among other sections, the update in the lease definition was expected for a long time, but due to the complexity, it took several years to update this law. In March 2014 Ptk. applied the IFRS based definition for the first time and after there was a sudden change in accounting regulations." Tóth (2017/2) Since 2015 the finance lease definition for accounting is based on the Hpt. definition and as a result, the accounting records apply the same classification as it is defined by the legal terms of formal ownership change or purchase option. In the case of a company that would like to avoid capitalizations or would not want to present lease obligations (liabilities) and account lease payments as expenses with the operational lease terms it is possible to do so. It does not generate a positive impact on the total financial profit; however, it does have a decreasing effect on the corporate income tax, debt ratios, and it can have other tax benefits.

3.5.3. Finance lease sub-categories in Hungary

From a finance lease perspective, there is an additional `special` classification only applied in Hungary as `Open` or `Close-end` finance lease agreement. The `close-end` agreement is defined by the determined ownership transfer at the end of the lease term; therefore it is treated in VAT as a purchase contract, which means at the beginning of the lease agreement the whole VAT on the leased asset needs to be paid and it can only be deducted if the transaction is completed; this means the end of the lease period. This requires, in some cases, significant cash-flow financing from the lessee company. On the other hand, the open-end finance lease contract usually allows VAT deduction during periodic invoice issuance. There is also opportunity in some cases to reclaim VAT after a passenger car that is used as a company car, which is an additional tax advantage.

3.5.4. Regulation based impact

Compared to IFRS 16 the Hungarian regulation does not define lease as IFRS 16, which can result in all operational lease agreements being treated as rental contracts based on national standards. Neither the Ptk. nor Hpt. definition of a finance lease is harmonized to IAS 17. This lack of harmonization results in a different classification between finance and operating contracts. As a third and crucial last difference is that operational contracts are kept as off-balance sheet items.

3.5.5. Hungarian regulation differences with missing conditions from Hungarian Accounting Law

Compared to IAS 17 there are missing conditions from Hungarian Accounting Law. The key differences are listed below:

- The minimum lease payments value compared to the net present value of the leased asset.
- Lease contract duration compared to the economic useful life of the leased asset.
- Key conclusion on this area: according to the Hungarian accounting regulations, many finance lease contracts can be considered as operational leases.

These missing terms can have a significant impact, as the regulation does not reflect the economic reality; therefore, there are wide opportunities to inappropriately use the accounting regulation.

3.5.6. Taxation and leases

Withholding taxation is an absorbing layer on leases, especially in Hungary. It represents an example of interrelation between accounting and taxation regulations. Borbely – Evans (2006) already highlighted these conditions in Hungary, where this strong connection can be a driving force on the law itself. The specific area is related to passenger cars and not larger trucks or machines that are applied by lessor companies. Passenger cars are a growing part of Hungary's lease market, which is going to be analysed and presented later in section five. This section contains the exact legislation tax advantage on leased passenger cars (company cars) by companies, which was just adjusted in 2019. According to Act LXXXII of 2018., starting from 1 January 2019 the regulation of VAT in Hungary Act CXXVII. of 2007. (hereinafter: VAT Act) was modified for both rental and the operational leases and specific Hungarian open-ended finance lease contracts deductions and reclamation of VAT rules. This is included explicitly in the VAT Act in section 124, 125/A and in section 325.

Starting from 2019 a 50%-50% deduction is accepted as a rule, which generally does not even require specific documentation to prove the firm's related usage.

4. Impact Measurement

4.1. IASB impact assessment on IFRS 16

From the available international effect analyses in this study, the standard-setting effect analysis [IASB, 2016] is utilized, which uses a significant global sample and is based on published financial statements.

After a lengthy standard-setting procedure, the IASB (International Accounting Standard Board) issued a detailed impact analysis together with the IFRS 16 Leases Standard in January 2016. It is a significant work which used a sample of 1 022 listed companies across the globe to assess potential impact. It is both a qualitative and quantitative study of the likely effects of the new lease accounting requirements. For the sample, the expected result was estimated to be almost USD 2.2 trillion of off-balance sheet lease commitments that needed to be capitalized on the lessee side after the implementation of the new standard.

To gain a better understanding of the future impacted areas of the financial statements there are two tables below, which summarize the impacts. Examining it from the nature of the changes, the most significant impact is expected on the capitalization of operating leases as assets and liabilities. Please refer to chapter 1 table 1 and table 2. These tables clearly show that the current off-balance sheet items under the IAS 17 (International Accounting Standards) current regulations are going to be presented on both the asset side, as a right to use the asset, and liabilities side, as an obligation of the operating lease contract.

The IASB observed over 14 000 listed companies (of approx. 30 000 listed companies based on IFRS) and collected the disclosed information on leases from their latest available annual reports. The future payments for off balance sheet contracts for 14 000 listed companies totalled USD 2.86 trillion (on an undiscounted basis). The present value of those payments is estimated to be USD 2.18 trillion. Further analysis of off-balance sheet leases for listed companies revealed that 1 145 of these companies (i.e., 3.8 per cent or 1 145 of the approx. 30 000 companies) account for over 80 per cent of the present value of total off-balance sheet leases (i.e., USD 1.83 trillion out of a total of USD 2.18 trillion). These companies each have estimated off balance sheet leases of more than USD 300 million, calculated on a discounted basis.

The IASB has used a sample of 1 145 companies as a starting point for further analysis; however, they excluded banks and insurance companies (123 in total) from the sample because of the disproportionate size of their respective balance sheets compared to other companies, resulting in a sample of 1 022 companies. The present value of future payments for off balance sheet leases for those 1 022 companies amounts to USD 1.66 trillion. This represents 76 per cent of the total off balance sheet leases for listed companies (USD 2.18 trillion on a discounted basis). The proportion of the total off-balance sheet contracts by region included in the IASB sample is shown in the table below.

The off-balance sheet capitalisation impact in relation to the change within the lease regulation is compared to the value of the Statement of the Financial Position for the IASB sample size. 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 6. Expected impact on the statement of financial position

Source: IFRS 16 – Effect Analysis

www.ifrs.org

From table 6 it is visible that the most impacted industry sectors with an above 10% average impact at an international level are airlines with an expected average impact of 28.8% (discounted value: 22.7%) compared to total balance sheet value and respectively for retailers this is 28.3% (discounted value: 21.4%); for travel & leisure it is 28.6% (discounted value: 20.7%); and for transportation 15.5% (discounted: 11.6%).

In addition to the average impact, the dispersion is also an important factor, within the individual impact measurement. Table 7 shows for the IASB analysed sample size the respective dispersion within the industry sector. For instance, 28% of airliners in the sample size (14 out of 50 companies) the estimated present value of future payments for off balance sheet leases total assets is greater than 50% compared to a 22.7% average for all companies in that sector. Compared to this of the 27% of distribution companies in the sample (7 out of 26 companies) the estimated present value of future payments for off balance sheet leases to total assets is lower than 5 per cent compared to 4.3% for all companies in the sample in that sector.

Industry sector		Present value of future payments for off balance sheet leases / total assets ***by the number of companies***															
		<1%		1%–5%		5%–10%		10%–20%		20%–50%		50%–100%		>100%		Total	
Airlines	22,7%	**-**	**-**	**2**	*4%*	**4**	*8%*	**13**	*26%*	**17**	*34%*	**8**	*16%*	**6**	*12%*	**50**	*100%*
Retailers	21,4%	**-**	**-**	**6**	*3%*	**11**	*5%*	**37**	*18%*	**77**	*38%*	**60**	*30%*	**13**	*6%*	**204**	*100%*
Travel and leisure	20,7%	**-**	**-**	**5**	*7%*	**11**	*16%*	**11**	*16%*	**16**	*23%*	**15**	*22%*	**11**	*16%*	**69**	*100%*
Transport	11,6%	-	-	**10**	*20%*	**5**	*10%*	**17**	*33%*	**14**	*27%*	**3**	*6%*	**2**	*4%*	**51**	*100%*
Telecommunications	6,1%	**3**	*5%*	**21**	*38%*	**17**	*30%*	**10**	*18%*	**5**	*9%*	---		---		**56**	*100%*
Energy	5,5%	**7**	*7%*	**43**	*44%*	**22**	*22%*	**16**	*16%*	**8**	*8%*	**2**	*2%*	**1**	*1%*	**99**	*100%*
Media	5,5%	-	**-**	**14**	*29%*	**13**	*27%*	**8**	*17%*	**5**	*10%*	**8**	*17%*	---		**48**	*100%*
Distributors	4,3%	**1**	*4%*	**6**	*23%*	**9**	*35%*	**5**	*19%*	**5**	*19%*		---		---	**26**	*100%*
Information technology	3,0%	**3**	*5%*	**31**	*54%*	**10**	*17%*	**8**	*14%*	**6**	*10%*	---		---		**58**	*100%*
Healthcare	2,9%	**8**	*15%*	**20**	*36%*	**7**	*13%*	**4**	*7%*	**10**	*18%*	**2**	*4%*	**4**	*7%*	**55**	*100%*
Others	2,2%	**35**	*11%*	**159**	*52%*	**51**	*17%*	**26**	*9%*	**29**	*9%*	**4**	*1%*	**2**	*1%*	**306**	*100%*
Total	**5,4%**	**57**	***5%***	**317**	***31%***	**160**	***16%***	**155**	***15%***	**192**	***19%***	**102**	***10%***	**39**	***4%***	**1 022**	***100%***

Table 7. Expected impact dispersion on the statement of financial position for different industries.

Source: IFRS 16 – Effect Analysis

www.ifrs.org

It is not enough to review the companies on a global level, and we should take a closer view on the European companies' off-balance sheet lease exposure. Out of the sample, there were 348 European based companies with a total impact of undiscounted value USD 710 billion. It is also important to note that effects are mainly expected from specific businesses like airlines, transportation, travel and leisure, retailers, and telecommunications. It has to be noted that vehicles, such as airplanes, ships, trains and cars are commonly used as leased objects in those industries; therefore, the most significant impact is expected among those at an international level.

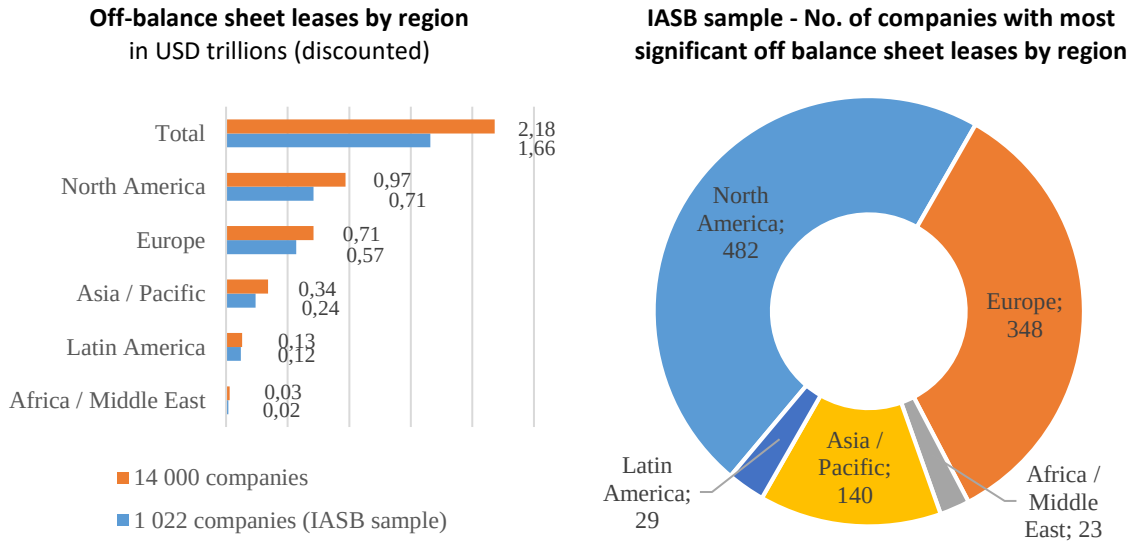


Figure 2. Expected impact on the statement of financial position by region

Source: IFRS 16 – Effect Analysis

www.ifrs.org

4.2. 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 previously reviewed global impact estimation collected the estimated unrecorded liabilities on nominal and discounted values. To get a full picture of operational lease items, we should also consider the unrecorded assets.

The most accepted and popular model was developed and introduced by Imhoff, Lipe, and Wright (1991, 2001); 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 and liabilities. Leased liability is calculated using the effective interest method, where 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 t_2 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

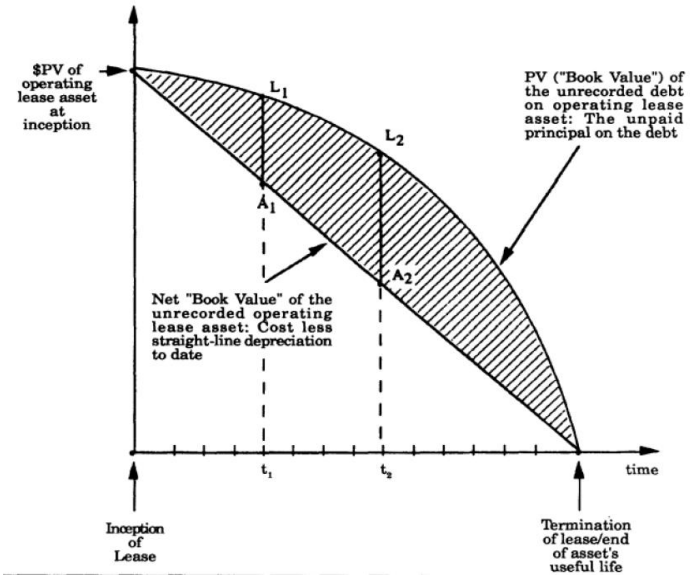


Figure 3. Imhoff's constructive capitalization model

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.

4.3. Impact overview of various Hungarian groups of companies

The impact measurement is performed by different groups based on the required or even voluntary application of IFRS. The different groups of companies in Hungary can have a different required level of compliance with IFRS 16. In the first round, these impacts are presented in nominal values using unrecorded liabilities and later in present values and together with the unrecorded lease assets value estimates.

The three different groups in the impact analysis are as follows:

1. **Listed** companies – application of IFRS is required
2. **Financial institutions** – for banks IFRS were already obligatory in 2018, other financial institutions were only required to apply IFRS in 2019.
3. **Unlisted companies'** voluntary application of IFRS

4.3.1. Listed companies

Hungarian companies registered on any European Union stock exchange have been obliged to apply IFRS Standards since 2005, and with this obligation these companies file IFRS statutory reports.

As of June 2019, there are in total 60 registered papers at the Budapest Stock Exchange (Budapesti Értéktőzsde) out of which three shares can be excluded as two are under registration and the compensation bond has no real turnover. Out of those listed companies, the table below represents a summary of each share category. In the review the premium shares, standard shares, and T shares plus the mortgage papers were selected. In total, these 42 companies within the period of 2016-2018 represent more than 95% total turnover each year, based on the disclosed Budapest Stock Exchange statistics.

Description	Number of companies	Turnover in millions of HUF		
		2018	2017	2016
Investment certificate	2	94 691	75 957	92 968
Investment fund	4	5 423	8 082	12 316
Xtend market	2	3 400	10 490	7 559
Vállalati kötvény (Corporate bond)	6	184	413	682
Államkötvény és kárpótlási jegy (Treasury bond and compensation bond)	2	81	52	669
Under classification or restricted	2	-	-	-
Részvények / Shares (Premium, Standard, T-shares)	38	2 791 322	2 690 062	2 297 901
Mortgage papers	4	59 888	69	127
		96,49%	96,59%	95,27%
Total	**60**	**2 954 989**	**2 785 125**	**2 412 222**

Table 8. Budapest Stock Exchange share turnover

Source: Budapesti Értéktőzsde

(www.bet.hu)

Premium shares include the most traded shares, which represent 19 entities; therefore, it is a primary objective to focus on them because from an investor or regulation perspective these companies' disclosures are the most important to provide quality information. In table 10 later in this section, please find enclosed reported off-balance sheet operational leases for the period of 2016 – 2018. These published items are capitalized in 2019 within a statement of financial position with the method mentioned earlier utilizing a lease liability and a right-of-use asset.

It should also be mentioned that out of the 19 listed premium share companies there is an increasing trend where six companies reported in 2016 that they have a quantifiable off-balance-sheet operational lease liability, this increased to nine companies in 2017 and continuously to eleven in 2018. The remaining eight companies did not disclose in the notes such details; these companies might not have any significant items to report. On the other hand, not all of these entities published notes explicitly stating that the off-balance sheet lease obligations are not significant. There is an increasing trend in the disclosure notes among the premium shares on a year-over-year basis, in 2016 it represents 31.57%, in 2017 it increased to 47.37%, and 2018 a further increase to 57.89% of the companies that reported off-balance-sheet lease obligations. If we compare all DAX 30

companies included in the disclosure in the notes, then 93.33% of them presented an off-balance sheet obligation larger than zero. This means that Hungarian listed entities reported 42.11% fewer disclosure notes compared to DAX 30 companies.

Out of the 19 premium share provider companies in 2018, eleven companies reported a nominal value HUF 303.4 billion off-balance sheet liabilities and in 2017 nine companies published a total off-balance sheet impact of HUF 93 billion and for 2016 six identified companies disclosed an overall off-balance-sheet result of HUF 168.1 billion operational lease transactions in off-balance sheet items. The lease capitalization impact is measured relatively lower compared to the IASB effect analysis in comparison to the entities, total assets, and equity value. In the summary section there is a detailed comparison between these results.

There is an exciting fluctuation in the reported impact items from 2016 to 2017, the total disclosed off-balance lease obligations value decreased by HUF 75.1 billion and from 2017 to 2018 it increased by HUF 210 billion. The critical changes were from 2016 to 2017 because MOL reported a HUF 59.610 billion decrease and Magyar Telekom stated a HUF 3.165 billion decrease in liabilities. From 2017 to 2018 the increase was mainly caused because MOL reported a HUF 60 775 million increase and Magyar Telekom also disclosed a HUF 105 095 million increase in off-balance liabilities. The increase was so significant that Magyar Telekom had to explain that the HUF 56 billion lease liability was related to their new Corporate Headquarters (HQ).

The off-balance-sheet liability was then reviewed for 12 standard and 7 T shares. Out of the total 19 companies only two reported a minimal value of HUF 55 million in 2018, HUF 40 million in 2017, and only HUF 27 million in 2016. The entities represent 10.53% of this second group, which is 47.36% lower compared to companies with premium shares.

The third reviewed group of entities are the mortgage shares. There are five companies in this group, out of which only one reported off-balance sheet lease liabilities over the last three years, almost consistently around HUF 4 billion, more precisely HUF 4.925 billion in 2016 and HUF 4.415 billion in 2017, and finally, HUF 3.961 billion in 2018. This reporting ratio is also far below that of premium shares.

The reviewed listed entities' off-balance-sheet liability value as of 2018 resulted in a total of HUF 303.509 billion, which consisted of HUF 303.454 billion premium and mortgage shares and HUF 55 million standard and T shares (refer to appendix 4). Compared to the IASB impact study, this actual 2018 data shows a lower impact, but I would like to add a new comparative view and compare these impact figures to the Hungarian lease market value. According to the Hungarian Lease Association (HLA), the total lease market value was HUF1.465 trillion in 2018. Based on this research, the listed companies off-balance-sheet operational lease liabilities represents 20.72 % of the Hungarian lease market value, which is only a part of the total off-balance sheet items in Hungary. In the next sub-section, the financial institutions from Hungary are evaluated.

4.3.2. Financial Institutions

There were in total 61 financial institutions in Hungary as of the end of 2018. According to specific requirements of the Hungarian Accounting Law (HAL) by 2019 all financial institutions need to implement IFRS based reporting.

Out of the 61 financial institutions, 29 banks already were required to implement IFRS and the other special-purpose institutions like savings cooperatives ("takarékszövetkezetek") need to apply IFRS by 2019 at the latest.

Due to obligatory transitions, 29 Hungarian Banks financial statements and notes were reviewed for 2018 compared to the period of 2017. OTP Bank was deducted from the list of banks because it is a listed entity; therefore, it was analysed among the premium shares group. In 2018 within their first obligatory IFRS reports 16 out of the 28 reviewed companies reported out-of-balance lease liabilities with a value of HUF 82 330 million, which represents 5.62% of the total Hungarian lease market in 2018. In addition to OTP Bank, the following companies reported the highest impact: ERSTE Bank, Raiffeisen Bank, and K&H Bank. These cases represented the lessee obligations, but it has to be noted that banks appear significantly on the lessor side as well, which will be analysed in the lease market section.

As a qualitative factor of the obligatory implementation of IFRS, the banks have to apply international and not the national lease definition and measurement methods.

4.3.3. Unlisted entities

After 2016 in Hungary, there was an opportunity for unlisted entities to voluntarily apply IFRS reporting. By the end of 2018, based on Deloitte reporting (Deloitte, 2018), 191 companies had already used this opportunity, based on reports from the tax authority.

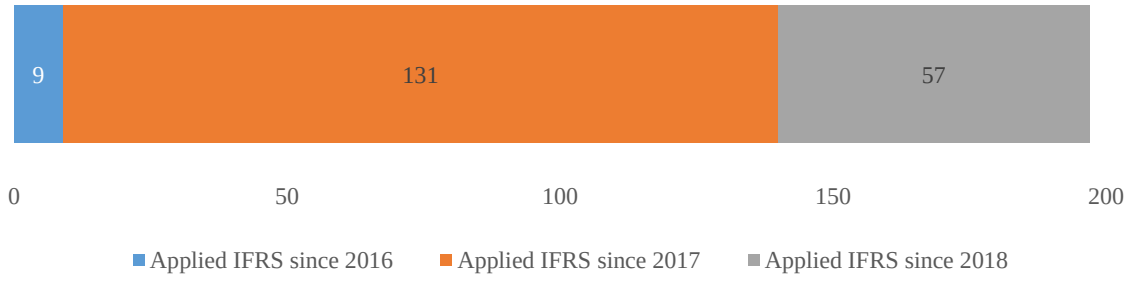


Figure 4. Voluntarily applied IFRS entities 2016-2018 in Hungary

Source: (Deloitte, 2018)

From the published Deloitte information in 2016, only nine entities had already used IFRS, which significantly increased to 131 in 2017 and 2018 when there was a moderate decrease to 57 companies. The majority of companies switched to the desired IFRS in 2017. There is no publicly available detailed list of the entities; therefore, it is not possible to generate a file with the company names, so an indirect search needs to be applied.

Indeed, it is not possible to review every single unlisted company, other than taking DAX 30 entities and searching for their Hungarian subsidiaries. Additionally, I reviewed the airline industry, which is the most impacted, but based on the Hungarian listed entities, it was not represented in the off-balance sheet review as of yet.

From the DAX 30 companies, 23 Hungarian subsidiaries have been identified, but unfortunately, none of those entities applied IFRS by 2018. In the German listed entities section and also in appendix 5 all the details are presented regarding these companies.

In the Hungarian Airline industry, after the bankruptcy of the national airline MALÉV in 2019, there was only one regional low-cost carrier airline (hereinafter: LCC) operating in Hungary. This is Wizz Air Hungary Légiközlekedési Kft. (hereinafter: Wizz Air Hungary Kft.) led by Mr. József Váradi, former MALÉV CEO, who founded this company in September 2003. This company represents an excellent example because it is listed on a European Stock Exchange where the parent company needs to apply IFRS. The parent company is called Wizz Air Holding PLC. (Wizz Air Holding) and it is listed on the London Stock Exchange (hereinafter: LSE).

Wizz Air Hungary Kft. would not need to necessarily disclose the operational leases as IFRS requires it; however, the company did so perhaps in consideration of the significance and the impact of these items, and it turned out to be an exciting operational lease item.

Wizz Air Holding is required to disclose according to IFRS the off-balance-sheet liabilities; however, based on the detailed analyses, almost 100% of these items were transferred to Wizz Air Hungary Kft. In other words, these were intercompany transactions where the parent company presents these items in the consolidated financial statement but, in reality, these transactions are related to one specific entity, which is the Wizz Air Hungarian subsidiary.

These transactions are special as they represent operational leases where the lessee is located in Hungary and the lessor in a different country. These are so-called cross-border transactions, which generate a non-visible supply for the lease market as they are not reported in Hungary. Please find the details in table 9 below.

Description	2018 EUR million	2017 EUR million	2016 EUR million
Wizz Air Hungary Kft. operational leases off-balance sheet liability items	2 385	2 410.3	1 758.3
Wizz Air Holding PLC. operational leases off-balance sheet liability items	2 385	2 410.3	1 758.3
Wizz Air Holding PLC. total assets value as a comparison	*2 142.1*	*1 696.3*	*1 331.8*
In % of the lease commitments to total assets value	*113,4%*	*142%*	*132%*

Table 9. Wizz Air Holding PLC. lease commitments as of 2016 and 2017

Source: Wizz Air Holdings PLC. consolidated annual statement and Wizz Air Hungary Kft. annual report

In the 2016-2018 reviewed period all operational leases were related to Wizz Air Hungary Kft. Overall these values were so high that they even represented more than 100% of the total Wizz Air group total assets value. The majority (99 per cent) of the commitments related to aircraft operating lease contracts. The above table also includes the lease costs of those aircraft that are not yet delivered but for which lease contracts have already been signed before the date of the statement of financial position. Only for this company the related operational lease impact is going to be higher than the whole Hungarian lease market; however, it has to be noted that these airplanes are leased through cross border agreements from outside of Hungary (please refer to cross border leases section).

The leases, which are contracted by Wizz Air Hungary, represent cross border operational leases. Based on their true nature, the service belongs to Hungary, but they are not reported on the Hungarian lease market, instead on the parent level. From a Hungarian market perspective, the value is reasonably significant and would represent a total of HUF 760.513 billion, which is 51.91% of the total lease market value.

The IFRS 16 Standard made such a significant impact on the Wizz Air Holding that they reported temporarily changing their airplane procurement process for three months between January – March 2019. Instead of leasing any new aircraft in this period they are purchasing airplanes.

In table 10 below, please find the details of the Hungarian companies' off-balance sheet liabilities. Additionally, more details are available in appendix 4 where the base tables can be found. Appendix 4 also includes the Net Present Value (hereinafter NPV) calculation, which is performed in alignment with the IASB impact analysis. Considering the very same discount factors and NPV calculation method the results can be compared, and they provide the same relative ranking between IASB analysed entities, DAX30 and Hungarian companies. Additionally, the undiscounted values can be easily referenced back to the respective financial statements. Overall the calculation is performed by both methods and results are presented accordingly.

Hungarian companies lease impact estimation (undiscounted)

Data in millions of HUF			2016					2017					2018				
n	Company name	Share type	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2016	Total Equity (in millions of HUF) 2016	Future payments for off balance sheet leases / total equity 2016	Total assets (in millions of HUF) 2016	Future payments for off balance sheet leases / total assets 2016	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2017	Total Equity (in millions of HUF) 2017	Future payments for off balance sheet leases / total equity 2017	Total assets (in millions of HUF) 2017	Future payments for off balance sheet leases / total assets 2017	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2018	Total Equity (in millions of HUF) 2018	Future payments for off balance sheet leases / total equity 2018	Total assets (in millions of HUF) 2018	Future payments for off balance sheet leases / total assets 2018
1.	Budapesti Elektromos Müvek Nyrt	Standard	19	161 828	0,01%	232 151	0,01%	20	168 514	0,01%	245 405	0,01%	36	20 646	0,17%	279 079	0,01%
2.	ÉMASZ Nyrt	Standard	8	77 285	0,01%	104 901	0,01%	20	81 136	0,02%	104 907	0,02%	19	91 859	0,02%	94 721	0,02%
3.	MOL Nyrt.	Premium	91 215	1 801 626	5,06%	4 103 786	2,22%	31 605	2 055 771	1,54%	4 231 700	0,75%	92 380	2 309 946	4,00%	4 611 581	2,00%
4.	Magyar Telekom Nyrt.	Premium	44 082	538 490	8,19%	1 175 529	3,75%	40 917	547 195	7,48%	1 109 661	3,69%	146 012	580 491	25,15%	1 155 996	12,63%
5.	Richter Nyrt.	Premium	17 811	678 002	2,63%	813 877	2,19%	15 555	659 327	2,36%	760 865	2,04%	11 188	680 185	1,64%	797 883	1,40%
6.	Állami Nyomda	Premium	0	7 374	0,00%	15 374	0,00%	57	7 215	0,79%	17 673	0,32%	2 468	7 142	34,56%	19 304	12,78%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	3 972	0,00%	77 394	0,00%	0	9 015	0,00%	105 629	0,00%	167	17 392	0,96%	110 776	0,15%
8.	Graphisoft Park SE*	Premium	9 747	7 318	133,20%	24 779	39,34%	17	1 708	1,00%	1 751	0,98%	19	2 368	0,80%	2 406	0,79%
9.	OTP Nyrt.**	Premium	0	1 420 649	0,00%	11 307 665	0,00%	0	1 640 055	0,00%	13 190 228	0,00%	46 677	1 826 657	2,56%	14 590 288	0,32%
10.	PannErgy Nyrt.	Premium	72	8 889	0,81%	25 255	0,29%	45	9 024	0,49%	25 023	0,18%	50	9 867	0,51%	25 811	0,20%
11.	Rába Nyrt.	Premium	268	18 679	1,43%	33 502	0,80%	274	19 978	1,37%	36 438	0,75%	226	20 865	1,08%	42 079	0,54%
12.	ALTEO Nyrt.	Premium	0	4 897	0,00%	16 148	0,00%	126	5 119	2,47%	16 652	0,76%	305	5 145	5,93%	22 859	1,33%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	4 925	53 116	9,27%	333 391	1,48%	4 415	50 332	8,77%	610 577	0,72%	3 961	55 236	7,17%	754 516	0,52%
14.	Bank of China	Bank	-	-	-	-	-	N/A	16 547	-	143 316	-	1 380	16 814	8,21%	263 710	0,52%
15.	BNP	Bank	-	-	-	-	-	277	606	45,71%	265 205	0,10%	328	1 693	19,37%	269 823	0,12%
16.	CIB Bank	Bank	-	-	-	-	-	N/A	232 087	-	1 683 230	-	9	219 207	0,00%	1 905 081	0,00%
17.	Citibank	Bank	-	-	-	-	-	27 518	2 432 276	1,13%	13 534 788	0,20%	24 375	2 508 740	0,97%	16 463 965	0,15%
18.	Cofidis	Bank	-	-	-	-	-	0	5 480	0,00%	67 791 237	0,00%	1 100	6 289	17,49%	82 246	1,34%
19.	Commerzbank	Bank	-	-	-	-	-	31	28 932	0,11%	294 528	0,01%	32	29 457	0,11%	289 776	0,01%
20.	Erste Bank	Bank	-	-	-	-	-	36 631	339 278	10,80%	2 219 069	1,65%	18 110	357 864	5,06%	2 563 507	0,71%
21.	ING Bank	Bank	-	-	-	-	-	138	44 965	0,31%	478 931	0,03%	154	46 733	0,33%	570 723	0,03%
22.	K&H Bank	Bank	-	-	-	-	-	8 234	266 024	3,10%	3 041 317	0,27%	8 657	302 795	2,86%	3 229 244	0,27%
23.	KDB Bank	Bank	-	-	-	-	-	N/A	19 941	-	212 030	-	1 341	20 240	6,63%	230 216	0,58%
24.	MKB Bank	Bank	-	-	-	-	-	5 533	140 380	3,94%	2 044 987	0,27%	3 577	158 166	2,26%	1 857 579	0,19%
25.	Porsche Bank	Bank	-	-	-	-	-	1 963	8 761	22,40%	53 526	3,67%	1 963	7 818	25,10%	62 375	3,15%
26.	Raiffeisen Bank	Bank	-	-	-	-	-	14 601	202 852	7,20%	2 172 339	0,67%	13 285	207 815	6,39%	2 409 761	0,55%
27.	Sberbank	Bank	-	-	-	-	-	2 902	41 588	6,98%	349 672	0,83%	5 076	44 534	11,40%	365 837	1,39%
28.	Sopron Bank	Bank	-	-	-	-	-	324	7 857	4,13%	64 621	0,50%	211	8 388	2,52%	73 819	0,29%
29.	Unicredit Bank	Bank	-	-	-	-	-	0	339 036	0,00%	2 746 775	0,00%	2 732	350 050	0,78%	3 054 948	0,09%
30.	Wizz Air Hungary Kft	unlisted	546 876	170 468	320,81%	352 806	155,01%	747 524	239 789	311,74%	509 923	146,60%	760 513	337 696	225,21%	660 900	115,07%
	Total		715 023	4 952 592	14,44%	18 616 556	3,84%	938 727	9 620 789	9,76%	118 062 004	0,80%	1 146 352	10 252 097	11,18%	56 860 810	2,02%

Table 10. Operational lease obligations in millions of HUF by contract maturities in the period of 2016-2018

Source: Self-prepared table based on reported financial statements

Hungarian companies lease impact estimation continued (discounted)

DISCOUNTED TABLE BELOW:

	Data in millions of HUF		2016					2017						2018			
n	Company name	Share type	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2016	Total Equity (in millions of HUF) 2016	Future payments for off balance sheet leases / total equity 2016	Total assets (in millions of HUF) 2016	Future payments for off balance sheet leases / total assets 2016	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2017	Total Equity (in millions of HUF) 2017	Future payments for off balance sheet leases / total equity 2017	Total assets (in millions of HUF) 2017	Future payments for off balance sheet leases / total assets 2017	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2018	Total Equity (in millions of HUF) 2018	Future payments for off balance sheet leases / total equity 2018	Total assets (in millions of HUF) 2018	Future payments for off balance sheet leases / total assets 2018
1.	Budapesti Elektromos Művek Nyrt	Standard	19	161 828	0,01%	232 151	0,01%	20	168 514	0,01%	245 405	0,01%	36	20 646	0,17%	279 079	0,01%
2.	ÉMASZ Nyrt	Standard	8	77 285	0,01%	104 901	0,01%	20	81 136	0,02%	104 907	0,02%	19	91 859	0,02%	94 721	0,02%
3.	MOL Nyrt.	Premium	79 698	1 801 626	4,42%	4 103 786	1,94%	28 420	2 055 771	1,38%	4 231 700	0,67%	74 585	2 309 946	3,23%	4 611 581	1,62%
4.	Magyar Telekom Nyrt.	Premium	38 280	538 490	7,11%	1 175 529	3,26%	36 064	547 195	6,59%	1 109 661	3,25%	115 880	580 491	19,96%	1 155 996	10,02%
5.	Richter Nyrt.	Premium	15 105	678 002	2,23%	813 877	1,86%	13 299	659 327	2,02%	760 865	1,75%	9 350	680 185	1,37%	797 883	1,17%
6.	Állami Nyomda	Premium	0	7 374	0,00%	15 374	0,00%	55	7 215	0,76%	17 673	0,31%	2 116	7 142	29,63%	19 304	10,96%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	3 972	0,00%	77 394	0,00%	0	9 015	0,00%	105 629	0,00%	154	17 392	0,89%	110 776	0,14%
8.	Graphisoft Park SE*	Premium	8 339	7 318	113,95%	24 779	33,65%	14	1 708	0,84%	1 751	0,82%	16	2 368	0,68%	2 406	0,67%
9.	OTP Nyrt.**	Premium	0	1 420 649	0,00%	11 307 665	0,00%	0	1 640 055	0,00%	13 190 228	0,00%	46 677	1 826 657	2,56%	14 590 288	0,32%
10.	PannErgy Nyrt.	Premium	65	8 889	0,73%	25 255	0,26%	42	9 024	0,46%	25 023	0,17%	46	9 867	0,47%	25 811	0,18%
11.	Rába Nyrt.	Premium	247	18 679	1,32%	33 502	0,74%	255	19 978	1,27%	36 438	0,70%	210	20 865	1,00%	42 079	0,50%
12.	ALTEO Nyrt.	Premium	0	4 897	0,00%	16 148	0,00%	105	5 119	2,04%	16 652	0,63%	225	5 145	4,38%	22 859	0,98%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	4 428	53 116	8,34%	333 391	1,33%	3 982	50 332	7,91%	610 577	0,65%	3 610	55 236	6,54%	754 516	0,48%
14.	Bank of China	Bank	-	-	-	-	-	0	16 547	0,00%	143 316	0,00%	1 380	16 814	8,21%	263 710	0,52%
15.	BNP	Bank	-	-	-	-	-	277	606	45,71%	265 205	0,10%	328	1 693	19,37%	269 823	0,12%
16.	CIB Bank	Bank	-	-	-	-	-	0	232 087	0,00%	1 683 230	0,00%	9	219 207	0,00%	1 905 081	0,00%
17.	Citibank	Bank	-	-	-	-	-	24 319	2 432 276	1,00%	13 534 788	0,18%	21 613	2 508 740	0,86%	16 463 965	0,13%
18.	Cofidis	Bank	-	-	-	-	-	0	5 480	0,00%	67 791 237	0,00%	1 100	6 289	17,49%	82 246	1,34%
19.	Commerzbank	Bank	-	-	-	-	-	31	28 932	0,11%	294 528	0,01%	32	29 457	0,11%	289 776	0,01%
20.	Erste Bank	Bank	-	-	-	-	-	28 771	339 278	8,48%	2 219 069	1,30%	15 369	357 864	4,29%	2 563 507	0,60%
21.	ING Bank	Bank	-	-	-	-	-	138	44 965	0,31%	478 931	0,03%	154	46 733	0,33%	570 723	0,03%
22.	K&H Bank	Bank	-	-	-	-	-	7 193	266 024	2,70%	3 041 317	0,24%	7 383	302 795	2,44%	3 229 244	0,23%
23.	KDB Bank	Bank	-	-	-	-	-	0	19 941	0,00%	212 030	0,00%	1 199	20 240	5,93%	230 216	0,52%
24.	MKB Bank	Bank	-	-	-	-	-	4 595	140 380	3,27%	2 044 987	0,22%	3 028	158 166	1,91%	1 857 579	0,16%
25.	Porsche Bank	Bank	-	-	-	-	-	1 406	8 761	16,05%	53 526	2,63%	1 408	7 818	18,01%	62 375	2,26%
26.	Raiffeisen Bank	Bank	-	-	-	-	-	12 982	202 852	6,40%	2 172 339	0,60%	11 213	207 815	5,40%	2 409 761	0,47%
27.	Sberbank	Bank	-	-	-	-	-	2 372	41 588	5,70%	349 672	0,68%	4 289	44 534	9,63%	365 837	1,17%
28.	Sopron Bank	Bank	-	-	-	-	-	296	7 857	3,77%	64 621	0,46%	198	8 388	2,36%	73 819	0,27%
29.	Unicredit Bank	Bank	-	-	-	-	-	0	339 036	0,00%	2 746 775	0,00%	2 732	350 050	0,78%	3 054 948	0,09%
30.	Wizz Air Hungary Kft	unlisted	450 898	170 468	264,51%	352 806	127,80%	611 845	239 789	255,16%	509 923	119,99%	628 429	337 696	186,09%	660 900	95,09%
	Total		597 088	4 952 592	12,06%	18 616 556	3,21%	776 501	9 620 789	8,07%	118 062 004	0,66%	952 789	10 252 097	9,29%	56 860 810	1,68%

Table 10. Discounted operational lease obligations in millions of HUF by contract maturities in the period of 2016-2018 - IASB effect analysis discount factors applied

Source: Self-prepared table based on reported financial statements

4.3.4. Summary of lease impact among Hungarian entities by industry

In appendix 4, all listed entities, banks, and unlisted companies are presented where the off-balance sheet lease liabilities are presented in detail. In Hungary, not all reviewed companies presented values regarding lease disclosure requirements, but it has been increasing over the years. It is still a process, which should be improved in the future, especially if we want to compare disclosures to DAX 30 registered companies.

In 2018 according to reported values, the total off-balance-sheet liability impact for premium shares and mortgage companies was HUF 303.509 billion, for standard companies it was HUF 55 million, for banks it amounted to HUF 82.330 billion and for the reviewed unlisted companies was HUF 760.513 billion, which is a total HUF 1.146532 trillion.

In table 11, table 12, and table 13 below, these companies are categorised according to IASB impact analysis and presented in relative comparison to their equity and total balance sheet values.

Industry sector	Number of companies	Future payments for off balance sheet leases (undiscounted) (in millions of EUR)	Total assets (in millions of EUR)	Future payments for off balance sheet leases / total assets	Total Equity (in millions of EUR)	Future payments for off balance sheet leases / total equity
Energy	5	291,0	15 787,2	1,84%	7 644,1	3,81%
Financial sector	19	417,5	154 132,4	0,27%	19 399,4	2,15%
Healthcare	1	35,1	2 502,2	1,40%	2 133,1	1,64%
Media	1	7,7	60,5	12,78%	22,4	34,56%
Real Estate	1	0,1	7,5	0,79%	7,4	0,80%
Telecommunication	1	457,9	3 625,3	12,63%	1 820,5	25,15%
Transport	1	0,7	132,0	0,54%	65,4	1,08%
Airline	1	2 385,0	2 072,6	115,07%	1 059,0	225,21%
Total	**30**	**3 595,0**	**178 319,7**	**2,02%**	**32 151,3**	**11,18%**

Table 11. Operational lease obligations in millions of HUF, categorised by IASB effect analysis industries and comparing companies' equity / total assets (2018)

Source: self-prepared table based on reported financial statements

Industry sector	Number of companies	Future payments for off balance sheet leases (undiscounted) (in millions of EUR)	Total assets (in millions of EUR)	Future payments for off balance sheet leases / total assets	Total Equity (in millions of EUR)	Future payments for off balance sheet leases / total equity
Energy	5	99,8	14 500,2	0,69%	7 274,3	1,37%
Financial sector	19	321,7	348 110,5	0,09%	18 270,8	1,76%
Healthcare	1	48,8	2 386,1	2,04%	2 067,7	2,36%
Media	1	0,2	55,4	0,32%	22,6	0,79%
Real Estate	1	0,1	5,5	0,98%	5,4	1,00%
Telecommunication	1	128,3	3 480,0	3,69%	1 716,0	7,48%
Transport	1	0,9	114,3	0,75%	62,7	1,37%
Airline	1	2 344,3	1 599,2	146,60%	752,0	311,74%
Total	**30**	**2 943,9**	**370 251,2**	**0,80%**	**30 171,5**	**9,76%**

Table 12. Operational lease obligations in millions of HUF, categorised by IASB effect analysis industries and comparing companies' equity / total assets (2017)

Source: self-prepared table based on reported financial statements

Industry sector	Number of companies	Future payments for off balance sheet leases (undiscounted) (in millions of EUR)	Total assets (in millions of EUR)	Future payments for off balance sheet leases / total assets	Total Equity (in millions of EUR)	Future payments for off balance sheet leases / total equity
Energy	5	286,4	6 443,1	4,44%	14 056,6	2,04%
Financial sector	19	15,4	4 634,3	0,33%	36 749,9	0,04%
Healthcare	1	55,9	2 126,3	2,63%	2 552,4	2,19%
Media	1	0,0	23,1	0,00%	48,2	0,00%
Real Estate	1	30,6	22,9	133,20%	77,7	39,34%
Telecommunication	1	138,2	1 688,7	8,19%	3 686,5	3,75%
Transport	1	0,8	58,6	1,43%	105,1	0,80%
Airline	1	1 715,0	534,6	320,81%	1 106,4	155,01%
Total	**30**	**2 242,4**	**15 531,7**	**14,44%**	**58 382,9**	**3,84%**

Table 13. Operational lease obligations in millions of HUF, categorised by IASB effect analysis industries and comparing companies' equity / total assets (2016)

Source: self-prepared table based on reported financial statements

As expected, the off-balance-sheet values are lower in almost every industry sector, except in two cases. The first industry is the airline industry; the impact is far above the expected IASB value of 22.7%, because the reviewed company is an LCC airline, where, based on the business model, almost all airplanes are leased via operational lease contracts. The second industry is the real estate industry, where the expected impact was higher only in the years 2016, and in 2017 and 2018 the estimated effects significantly decreased to an average level.

In addition, the industry categorization as seen in **Figure 5**, presents identified aging operational lease items.

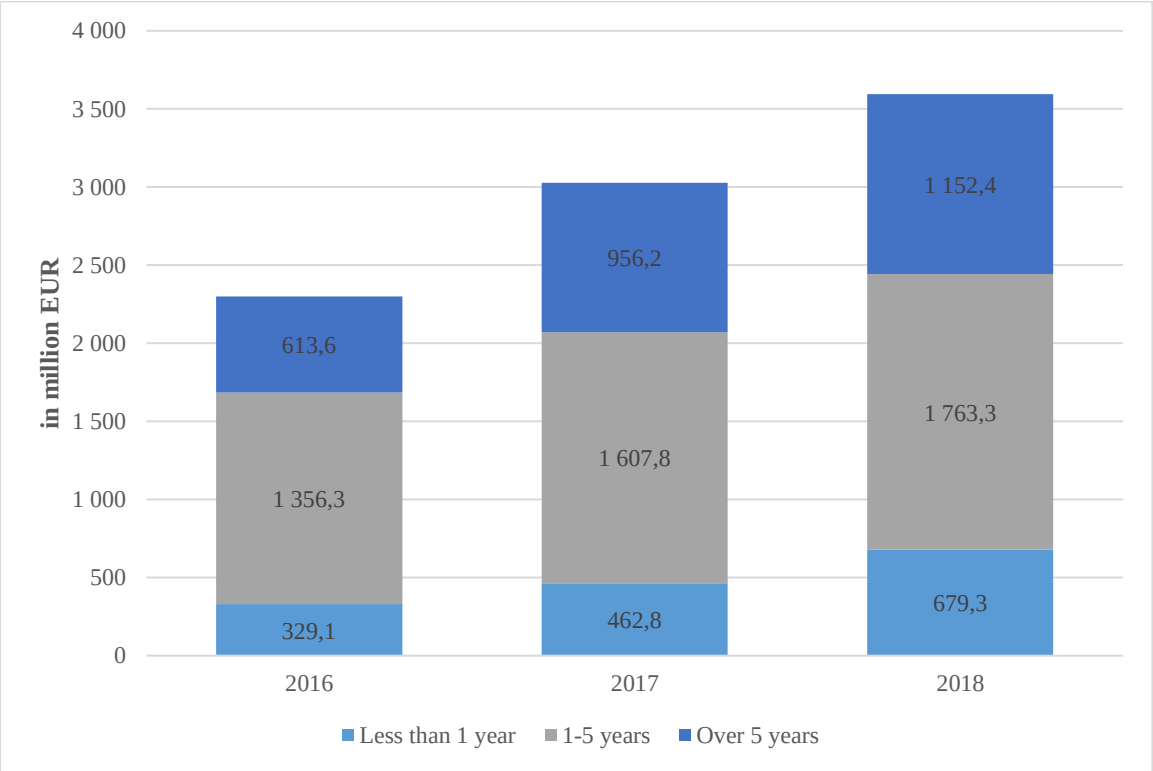


Figure 5. Aging report on the Hungarian companies' off-balance-sheet operational leases 2016-2018

Source: Self-prepared table based on reported financial statements

Figure 5 helps understand the aging of lease obligations. There are three age categories: within one year, 1-5 years, and above five years. This does not mean that in 2018 the EUR 679 million includes operational leases within 12 months, but rather these values are a part of a long-term contract that were due within a year.

According to the previously described Imhoff (1997) model, the off-balance-sheet right-of-use (ROU) asset value can be calculated based on the aging categories.

Aging category in 2018 / Million EUR	Off-balance sheet liability	Worst case Imhoff estimation	Right-of-use asset value worst case	Most likely estimated factor	Right-of-use asset value most likely case	Best-case Imhoff estimation	Right-of-use asset value worst case
Less than 1 year	679,3	0,75	509,48	0,8	543,44	0,85	577,41
Over 1 and less than 5 years	1 763,3	0,65	1 146,15	0,7	1 234,31	0,75	1 322,48
Over 5 years	1 152,4	0,55	633,82	0,6	691,44	0,65	749,06
Total	**3 595**		**2 289,44**		**2 469,19**		**2 648,94**

Table 14. Hungarian entities estimation of right-of-use assets value and off-balance sheet liabilities

Source: self-prepared table

According to the estimates, the right-of-use assets value would be between EUR 2.289 billion and EUR 2.648 billion for 2018, including all Hungarian impacted companies. The most-likely case estimated assets value would be EUR 2.469 billion.

In conclusion, on the Hungarian market we can state that, from an impact perspective, it is heavily dependent on the industry and in 2018 the estimated overall impact of HUF 1.146353 quadrillion (EUR 3.595 billion) is a reasonably significant value representing 78.25% of the total lease market value (the Hungarian lease market is analysed in section 5.2, the total lease market value in 2018 was HUF 1.4654 trillion). From this full impact, 66.34% is related to the airline industry where these contracts are all cross-border lease transactions.

4.4. Impact overview for German DAX 30 companies

In this section, the impact estimation is based on the DAX 30 listed entities 2016, 2017 and 2018 annual financial statements and notes. From the reviewed population of listed entities, all 100% of them reported the IAS 17.35 required disclosure notes. Out of these entities, 93.33% reported out-of-balance sheet liabilities above a zero value, which represents a very significant disclosure difference from the Hungarian companies.

From a value perspective, the estimated off-balance-sheet impact in 2016 was almost double of the estimated IASB impact, which in 2017 and 2018 significantly decreased to nearly 1.5% compared to the IASB total estimated result of 5.4%.

To represent interrelation and connection in Hungary to German DAX 30 registered companies, there are three out of the 30 companies which for operational reasons cannot operate in Hungary, namely the Deutsche Börse, Deutsche Post, Münchener Rückversicherungen (all three of which perform activities in Germany). After deducting these three companies from the 30 we are left with 27 companies from which 23 have a Hungarian subsidiary, which is 85% of the total population.

There is an interesting fact about German subsidiaries in Hungary and that is all their parent companies report according to the IFRS Standard; however, after a detailed analysis it turns out that all subsidiaries report according to the national Hungarian Accounting Law (HAL). More detailed information can be found in appendix 5. From a review of 23 parent companies, it was identified that these entities have 68 Hungarian registered subsidiaries.

In table 15 (2018), table 16 (2017), and table 17 (2016) below the companies are categorised according to IASB impact analysis and are compared to the Hungarian companies.

Industry sector	Number of companies	Future payments for off balance sheet leases (in millions of EUR)	Total assets (in millions of EUR)	Future payments for off balance sheet leases / total assets	Total Equity (in millions of EUR)	Future payments for off balance sheet leases / total equity
Airline	1	3 089	38 213	8,08%	9 573	32,27%
Chemical - other	2	2 017	116 179	1,74%	53 202	3,79%
Energy	3	1 157	134 432	0,86%	22 775	5,08%
Finance sector	3	7 134	1 780 204	0,40%	100 200	7,10%
Finance sector - other	1	2 404	897 567	0,27%	63 679	3,36%
Healthcare	4	14 765	246 118	6,00%	101 291	14,58%
Industrial engineering, steel - other	1	64	33 868	0,19%	3 274	1,95%
Industrial manufacturing – other	1	3 192	138 915	2,30%	48 046	6,64%
Information Technology	2	1 603	57 346	2,80%	30 800	5,20%
Manufacturing - other	3	301	30 834	0,98%	17 468	1,72%
Other	1	1 599	35 783	4,47%	16 822	9,51%
Real estate	1	82	49 388	0,17%	19 664	0,42%
Retail	1	2 984	15 612	19,11%	6 364	46,89%
Telecommunications	2	1 915	195 845	0,98%	57 310	3,34%
Transport / Automotive	4	31 877	989 200	3,22%	259 816	12,27%
Total	**30**	**74 183**	**4 759 505**	**1,56%**	**810 284**	**9,12%**

Table 15. Lease value impact on total assets and total equity by industry sector (2018)

Source: DAX 30 companies' consolidated annual financial statements

From an impact perspective DAX 30 companies' off-balance sheet liabilities represented EUR 74.183 billion compared to Hungarian entities total value of EUR 3.595 billion in 2018. This means that the DAX 30 impact is more than twenty times that of the Hungarian ones.

The industry-specific impacts are also below the IASB estimated effects in all categories. For instance, the airline industry impact of 8.08% is far below the IASB expected 22.7%. The retail industry-specific 19.11% impact is the closest to IASB estimated 21.4%.

Industry sector	Number of companies	Future payments for off balance sheet leases (in millions of EUR)	Total assets (in millions of EUR)	off balance sheet leases / total assets	Total Equity (in millions of EUR)	off balance sheet leases / total equity
Airline	1	2 547	35 778	7,12%	9 110	27,96%
Chemical - other	2	1 804	107 107	1,68%	50 403	3,58%
Energy	3	3 552	158 522	2,24%	33 758	10,52%
Finance sector	3	5 240	1 875 595	0,28%	101 256	5,17%
Finance sector - other	1	2 701	901 300	0,30%	68 602	3,94%
Healthcare	4	11 361	187 866	6,05%	83 475	13,61%
Industrial engineering, steel - other	1	51	35 048	0,15%	3 404	1,50%
Industrial manufacturing – other	1	3 341	136 111	2,45%	44 619	7,49%
Information Technology	2	1 536	47 017	3,27%	27 155	5,66%
Manufacturing - other	3	308	29 491	1,04%	16 126	1,91%
Other	1	1 333	34 558	3,86%	16 052	8,30%
Real estate	1	82	37 516	0,22%	16 691	0,49%
Retail	1	2 649	14 019	18,90%	6 017	44,03%
Telecommunications	2	2 116	180 006	1,18%	55 373	3,82%
Transport / Automotive	4	28 582	910 485	3,14%	244 633	11,68%
Total	**30**	**67 202**	**4 690 419**	**1,43%**	**776 675**	**8,65%**

Table 16. Lease value impact on total assets and total equity by industry sector (2017)

Source: DAX 30 companies' consolidated annual financial statements

Table 16 contains the DAX30 companies impact assessment for 2017 where the future off-balance sheet lease obligations value represented EUR 67.202 billion. It had a lower impact compared to 2018, when these companies reported EUR 73.899 billion off-balance sheet items, which represents an additional EUR 6.697 billion. The increased impact presented mainly in the Airline, Energy, Finance, Information Technology and in the Transport/Automotive sectors.

Industry sector	Number of companies	Future payments for off balance sheet leases (in millions of EUR)	Total assets (in millions of EUR)	off balance sheet leases / total assets	Total equity (in millions of EUR)	off balance sheet leases / total equity
Airline	1	2 301	34 222	6,72%	6 674	34,48%
Chemical - other	2	1 917	104 447	1,84%	47 753	4,01%
Energy	3	3 403	175 290	1,94%	24 757	13,75%
Finance sector	3	4 651	2 022 194	0,23%	101 227	4,59%
Finance sector - other	1	2 857	883 809	0,32%	70 135	4,07%
Healthcare	4	10 108	192 697	5,25%	77 847	12,98%
Industrial engineering, steel – other	1	54	35 072	0,15%	2 609	2,07%
Industrial manufacturing – other	1	3 459	127 924	2,70%	34 999	9,88%
Information Technology	2	1 630	47 759	3,41%	27 880	5,85%
Manufacturing - other	3	598	26 894	2,22%	13 916	4,30%
Other	1	0	37 120	0,00%	17 792	0,00%
Real estate	1	62	32 522	0,19%	13 888	0,45%
Retail	1	2 500	14 604	17,12%	5 980	41,81%
Telecommunications	2	10 488	186 780	5,62%	50 195	20,89%
Transport / Automotive	4	28 239	877 430	3,22%	214 141	13,19%
Total	**30**	**72 268**	**4 798 763**	**1,51%**	**709 794**	**10,18%**

Table 17. Lease value impact on total assets and total equity by industry sector (2016)

Source: DAX 30 companies' consolidated annual financial statements

Table 17 represents the DAX30 companies impact assessment for 2016. It is interesting to note that off-balance sheet lease liabilities impact in 2016 was higher for these companies in comparison to 2017 by EUR 5.066 billion and in 2018 prior to the 2019 effective date it reached almost the same level as in 2016.

The aging of the 2016-2018 years impact is presented in Figure 6 where the maturity of the reported lease obligations can be found.

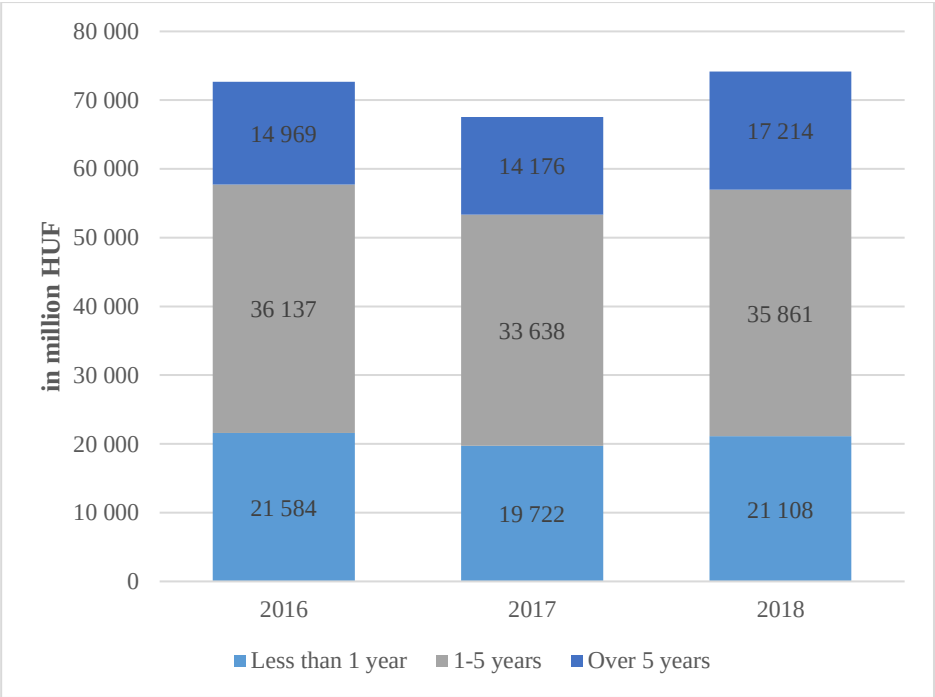


Figure 6. DAX 30 companies' off-balance sheet liabilities 2016-2018 in million EUR

Source: DAX 30 companies' consolidated annual financial statements

According to the previously described Imhoff (1997) model, the off-balance-sheet right-of-use (ROU) asset value can be calculated based on the aging categories.

Aging category in 2018 / Million EUR	**Off-balance sheet liability**	**Worst case estimation**	**Worst case Right-of-use asset value**	**Most likely estimation**	**Most likely right-of-use asset value**	**Best case estimation**	**Best case right-of-use asset value**
Less than 1 year	21 108	0,75	15 831,00	0,8	16 886,40	0,85	17 941,80
Over 1 and less than 5 years	35 861	0,65	23 309,65	0,7	25 102,70	0,75	26 895,75
Over 5 years	17 214	0,55	9 467,70	0,6	10 328,40	0,65	11 189,10
Total	**74 183**		**48 608,35**		**52 317,50**		**56 026,65**

Table 18. DAX 30 estimation of right-of-use assets value and off-balance sheet liabilities

Source: self-prepared table

According to the estimation, the right-of-use assets value would be between EUR 48.608 billion and EUR 56.026 billion. The most likely case would result EUR 52.317 billion for 2018, including all Hungarian impacted companies.

In conclusion, on the German market we can state that DAX 30 off-balance sheet items, from an impact perspective, are heavily dependent on the industry and in 2018 the estimated overall impact was EUR 73.899 billion. In a relative way it does not seem to be significant with a 1.5% impact compared to the companies total assets. On the other hand, these values are among the highest in the European market. It does show that in Germany in 2017 and 2018 those off-balance-sheet values were reasonably stable.

4.5. Statistical IFRS impact measurement on listed companies

In May 2018 a study was issued in the Hungarian Statistical Review, which describes the background of the current statistical questionnaire system in Hungary. It also compares IFRS and statistical reporting [Madarasiné, 2018]. This study is an excellent summary and a starting point for further research on statistical reporting for IFRS based accounting. It analyses IFRS based regulations in Hungary, specifically the individual financial statements application (Act CLXXVIII of 2015, hereinafter: IFRS Act), which goes even beyond listed companies reviewed in this study. In addition, one of the critical findings was that on macro-level statistical tasks there is no guidance in the regulation. Consequently, the modification of HCSO (Hungarian Central Statistical Office) questionnaires is considered to be an urgent necessary action. Furthermore, due to the lack of harmonization, the macro-statistical national and international ratios can present inaccurate results, and this could lead to incorrect conclusions, from a regulation perspective.

The article not only summarized the findings but also raised several questions, which can bring us closer to a resolution of the situation. This is the part where it raised several guiding questions. It is an important milestone because it defines the key questions and by answering those for this specific area of leases proper conclusions can be drawn from a statistical data collection point of view.

Five questions were raised as guiding questions on the statistical data source out of which two were general. One was related to the difference between IFRS and the Hungarian accounting regulations. However, it is not relevant for this matter because now the IFRS Standard is compared to statistical data collection. The second general question was related to the revision of statistical indicators, which is also not relevant because it is a specific area, where no statistical signs are available at the moment. The remaining three guiding questions are specific, and they can provide an answer to conclude this particular topic. The questions are the following:

- *Are there any significant potential fractures in the statistical timelines?*

According to the new lease regulations, certain potential fractures are expected in the financial ratios, or even in the statistical data as a result of the operational lease capitalization in the balance sheets.

- *Can it have a macro-level impact on the IFRS application?*

  According to the estimated HUF 1.146 trillion in 2018 and HUF 939 billion in 2017 impact on the approximately HUF 1.465 trillion Hungarian lease market this should be considered a material macro-level impact.

- *How can it be solved so that it does not require additional resources to generate the statistical data necessary?*

  As it has already been shown, the disclosure of the potential impact is already required by the current IAS 17 Lease Transactions Standard. In other words, the necessary data should be available with reasonable resources.

Concerning the last question, this point brings up the obligatory disclosure requirements related to both IAS 17 and IFRS 16. In the previous point, and within the impact measurement section, it has become visible that the IAS 17.35 required data disclosure already allows for the estimation of off-balance-sheet liability and right-of-use (ROU) assets as well. It is now time to highlight that IFRS 16 is taking disclosure requirements to the next level. Based on the current requirements, it would be already possible to implement a new statistical data collection method (Tóth – 2019) but with the new IFRS 16 requirements even more information is available for statistical data collection. Together with the disclosure requirements a new topic of digitalisation is going to be reviewed jointly.

4.6. Lease accounting and digitalization

In addition to the new and better-quality reporting in this section, the potential digitalization impact is going to be analysed. This section, based on a cost-benefit analysis of the current IFRS 16

accounting and disclosure requirements, is going to examine why it is necessary for companies to apply automated software-based solutions.

In addition to lease accounting software automation, disclosure and reporting requirements for listed companies in the EU starting from 2020 will also be analysed. A specific Hungarian software platform, which is used by MOL Nyrt. (Hungarian Oil- and Gas Company) among other prestigious stock-exchange listed entities, will also be examined.

To appropriately apply the new IFRS 16 requirements, five essential conditions need to be followed. The disclosure requirements are fifth on the list. However, in the first four conditions there are several potential compliance risks, which are going to be described below before the details of disclosure requirements.

1. **Identification and qualification** of the contracts with adequate documentation. There are several embedded contracts or lease agreements with different lease items, which makes it, in some cases, difficult to either identify or to properly qualify and distinguish these cases from leases or services.
2. **Determination of the lease term** with supporting documentation. There are several potential renewal options that can make it difficult to accurately determine the lease terms.
3. **Initial measurement and recognition** of the contract in cases of incentives can cause difficulties.
4. **Subsequent measurement** in the case of a change this can cause measurement issues.
5. **Disclosure** requirements.

The lease identification, classification, and supporting documentation are difficult to complete without a software platform. In the case of a non-system-based approach from a compliance perspective considering the error-prone problem, it is a high risk for the entities to undertake this. Disclosure requirements were increased by IFRS 16; below is a disclosure comparison between IAS 17 and IFRS 16 for lessee entities. Table 19 is prepared from KPMG (2018) IFRS 16 disclosure requirements.

	Disclosure requirements	IFRS 16
	Lessees	
IFRS 16.47, 53, 58	**Relating to the statement of financial position**	
	Additions to right-of-use assets	✔
	The year-end carrying amount of right-of-use assets by a class of underlying asset and if they are not presented separately the corresponding line items in the statement of financial position	✔
	Lease liabilities and the corresponding line items in the statement of financial position if lease liabilities are not presented separately	✔
	Maturity analysis for lease liabilities	–
IFRS 16.53–54	**Relating to the statement of profit or loss and other comprehensive income (including amounts capitalized as part of the cost of another asset)**	
	Depreciation expense of right-of-use assets by the class of underlying asset	✔
	Interest expense on lease liabilities	✔
	The expense relating to short-term leases for which the recognition exemption is applied (leases with a lease term of up to one month can be excluded)	✔
	The expense relating to leases of low-value items for which the recognition exemption is applied	✔
	The expense relating to variable lease payments not included in lease liabilities	–
	Income from sub-leasing right-of-use asset	✔
	Gains or losses arising from sale-and-leaseback transactions	–
IFRS 16.53(g)	**Relating to the statement of cash flows**	
	Total cash outflow for leases	✔
IFRS 16.55	**Other**	
	Amount of short-term lease commitments if the portfolio of short-term leases to which the entity is committed is dissimilar to the portfolio to which current short-term lease expense relates	✔
IFRS 16.58, 60, 7.39(c)	**Qualitative disclosures**	
	Description of how liquidity risk related to lease liabilities is managed	✔
	Use of exemption for short-term and/or low-value item leases	✔

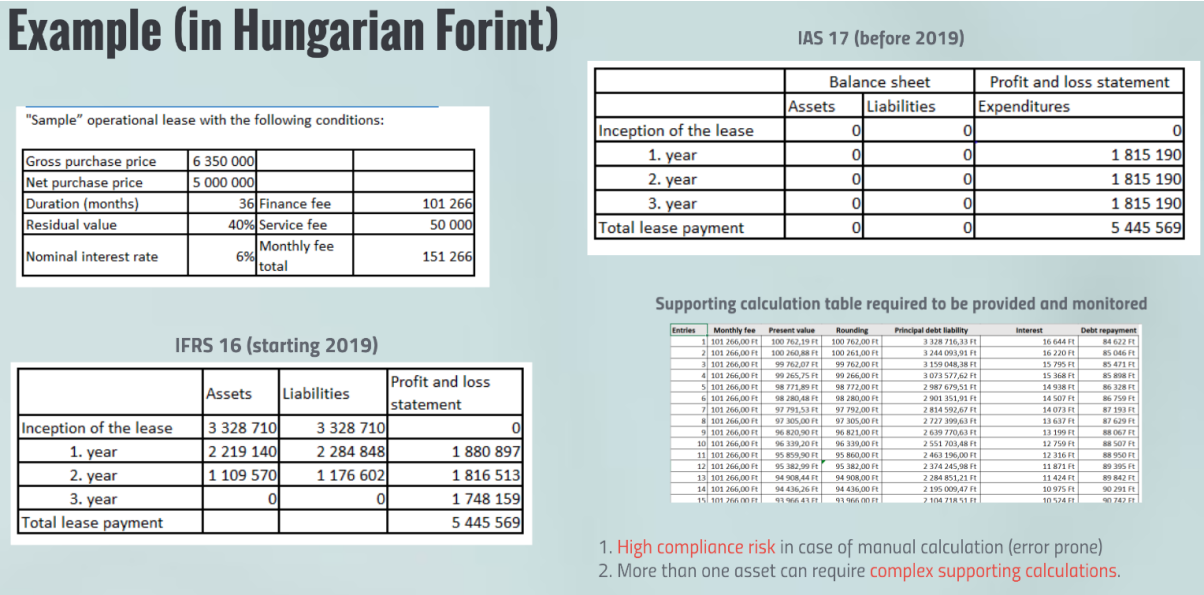
Table 19. IFRS 16 vs IAS 17 disclosure requirements

Source: www.kpmg.com

The additional disclosures as presented in the table above in IFRS 16 are related to both parties, the lessee and the lessor; however, from an off-balance-sheet presentation perspective before 2019, the lessee did not have to present the operational leases in the balance sheet. The new IFRS 16 disclosure requirements are marked with a ✔ sign, whereas the already required IAS 17 requirements are marked with a – symbol. In the table only the obligatory lessee requirements are presented, there might be some optional additional disclosure obligations, which are not disclosed there.

The previous IAS 17 Leases Standard required three essential disclosure requirements: maturity analysis for lease liabilities, expenses related to variable lease payments (VLP) and gains-losses arising from sale-and-leaseback transactions. IFRS 16 implemented twelve new and essential disclosure requirements for lessees, among others: detailed right-of-use (ROU) assets by the class of underlying assets; ROU related depreciation; expense relating to low-value items; interest expenses; and liquidity risks or use of exemptions for short-term or low-value items. It is important to note that new IFRS 16 Leases related to disclosure generated significantly more additional available information for statistical data collection methodology.

For a contract rationalisation, an example is presented with a HUF 5 billion net purchase price and a three-year useful life period with a calculated 40% residual value in Figure 7.



Example (in Hungarian Forint)

"Sample" operational lease with the following conditions:

Gross purchase price	6 350 000		
Net purchase price	5 000 000		
Duration (months)	36	Finance fee	101 266
Residual value	40%	Service fee	50 000
Nominal interest rate	6%	Monthly fee total	151 266

IFRS 16 (starting 2019)

	Assets	Liabilities	Profit and loss statement
Inception of the lease	3 328 710	3 328 710	0
1. year	2 219 140	2 284 848	1 880 897
2. year	1 109 570	1 176 602	1 816 513
3. year	0	0	1 748 159
Total lease payment			5 445 569

IAS 17 (before 2019)

	Balance sheet		Profit and loss statement
	Assets	Liabilities	Expenditures
Inception of the lease	0	0	0
1. year	0	0	1 815 190
2. year	0	0	1 815 190
3. year	0	0	1 815 190
Total lease payment	0	0	5 445 569

Supporting calculation table required to be provided and monitored

Entries	Monthly fee	Present value	Rounding	Principal debt liability	Interest	Debt repayment
1	101 266,00 Ft	100 762,19 Ft	100 762,00 Ft	3 328 716,33 Ft	16 644 Ft	84 622 Ft
2	101 266,00 Ft	100 260,88 Ft	100 261,00 Ft	3 244 093,91 Ft	16 220 Ft	85 046 Ft
3	101 266,00 Ft	99 762,07 Ft	99 762,00 Ft	3 159 048,38 Ft	15 795 Ft	85 471 Ft
4	101 266,00 Ft	99 265,75 Ft	99 266,00 Ft	3 073 577,62 Ft	15 368 Ft	85 898 Ft
5	101 266,00 Ft	98 771,89 Ft	98 772,00 Ft	2 987 679,51 Ft	14 938 Ft	86 328 Ft
6	101 266,00 Ft	98 280,48 Ft	98 280,00 Ft	2 901 351,91 Ft	14 507 Ft	86 759 Ft
7	101 266,00 Ft	97 791,53 Ft	97 792,00 Ft	2 814 592,67 Ft	14 073 Ft	87 193 Ft
8	101 266,00 Ft	97 305,00 Ft	97 305,00 Ft	2 727 399,63 Ft	13 637 Ft	87 629 Ft
9	101 266,00 Ft	96 820,90 Ft	96 821,00 Ft	2 639 770,63 Ft	13 199 Ft	88 067 Ft
10	101 266,00 Ft	96 339,20 Ft	96 339,00 Ft	2 551 703,48 Ft	12 759 Ft	88 507 Ft
11	101 266,00 Ft	95 859,90 Ft	95 860,00 Ft	2 463 196,00 Ft	12 316 Ft	88 950 Ft
12	101 266,00 Ft	95 382,99 Ft	95 382,00 Ft	2 374 245,98 Ft	11 871 Ft	89 395 Ft
13	101 266,00 Ft	94 908,44 Ft	94 908,00 Ft	2 284 851,21 Ft	11 424 Ft	89 842 Ft
14	101 266,00 Ft	94 436,26 Ft	94 436,00 Ft	2 195 009,47 Ft	10 975 Ft	90 291 Ft
15	101 266,00 Ft	93 966,43 Ft	93 966,00 Ft	2 104 718,51 Ft	10 524 Ft	90 742 Ft

1. High compliance risk in case of manual calculation (error prone)
2. More than one asset can require complex supporting calculations.

Figure 7. Asset posting according to IAS 17 and IFRS 16

Source: self-prepared table based on reported financial statements

The example from Figure 7 according to IAS 17 would be a pure profit and loss statement posting without impacting the balance sheet, but as it is presented as well in IFRS 16 then all assets, liabilities, and profit and loss statement posting are needed.

Based on the example, a cost-benefit analysis is prepared in Figure 8 below. Per IAS 17 requirements the postings would be 12 entries per year compared to IFRS 16 with an average of 73 journal entries.

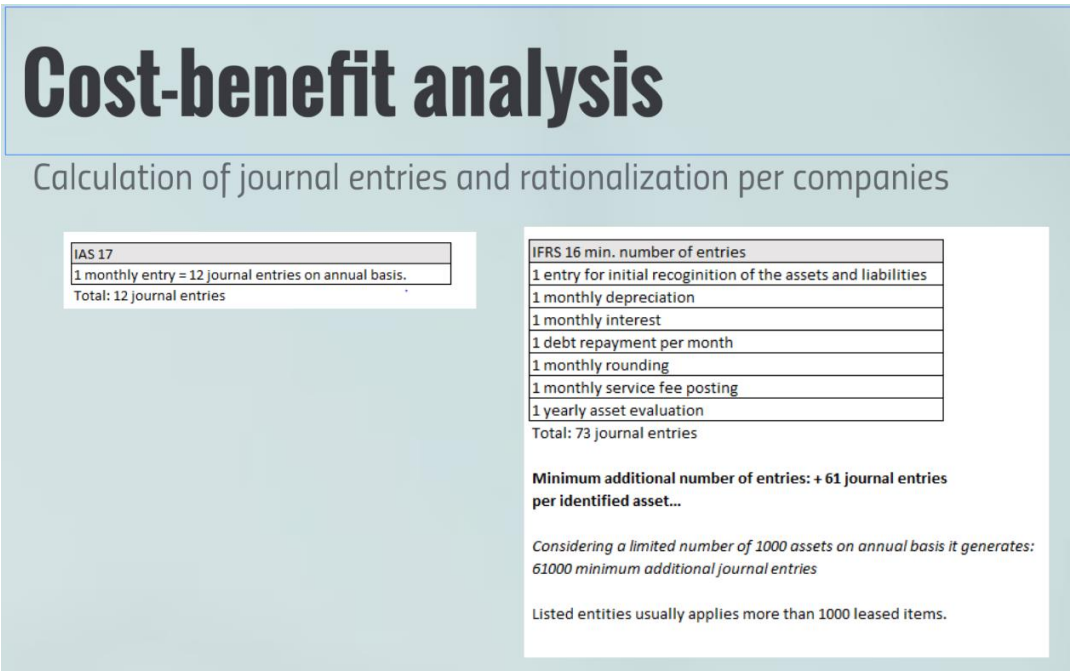


Figure 8 Cost-benefit analysis of IAS 17 and IFRS 16

Source: self-prepared table based on recorded financial statements

Figure 8, above, presented the example that IFRS 16 requires approximately six times more postings than IAS 17. Usually, the companies have more than one single lease item. In this case, the necessary entries are multiplied by the number of assets and the complexity of the lease contracts. It is the reason why, however, technically, there could be a possibility of manual posting, but the listed companies implemented an automated solution.

As an example for automation the SpiderPig platform can be mentioned, which has been implemented by several listed companies in Hungary, including, among others, the Hungarian Oil- and Gas Company (hereinafter: MOL), which is a premium share “blue chip” paper on the Budapest Stock Exchange (hereinafter: BÉT). To demonstrate the complexity of the postings 13 different types of classes of transactions were implemented and at least 95 individual types of transactions were built into the platform. Additionally, eleven logical process maps are also a part of the system. With such a complex system, it would be an extremely high compliance risk to post IFRS 16 transactions manually.

Considering automation, it should also be added that starting from 2020 a new obligatory reporting platform called eXtensible Business Reporting Language (hereinafter: XBRL) is going to be implemented for companies listed on an EU stock exchange. This is a great additional opportunity for automation and further research.

"XBRL is the open international standard for digital business reporting, managed by a global not for profit consortium, XBRL international." (XBRL, 2019) The iXBRL (inline XBRL), is an open standard document both human-readable and structured, machine-readable data. It takes the HTML standard and embeds extra "tags" into it that give meaning to figures and statements in a pre-defined computer format. It allows for the creation, publication and exchange of entire financial statements, including for instance the appendixes and statements in a comparable digital format, which can be easily automated.

XBRL is in use around the world:

- US listed companies can file iXBRL to SEC with 10-Q filing.
- UK companies submit each year to HMRC, the UK tax authority and to business register Companies House.
- In Japan listed companies submit their statements to the Japan Financial Services Agency (hereinafter: JFSA).
- ESMA, requires mandatory application for all public companies across Europe, for reporting periods on or after 1 January 2020.

4.7. Mobility and lease-related identified new services

Lease transactions and mobility are linked in many ways. Later in this study, in the fifth section, it is going to be highlighted that in the market analysis mobility-related services represent a majority of the Hungarian lease market, a high-level example of this is that from 2018 the new lease contracts for cars, trucks, and fleets represented approximately 74% of the total market. This section reviews any identified new services related to both lease transactions and mobility.

There is one key element the new IFRS 16 Lease Standard does and that is it separates the services and the lease contracts Moreover the accounting treaty of those transactions are entirely different.

As per the theory of services, the market demand is generating a new type of service.

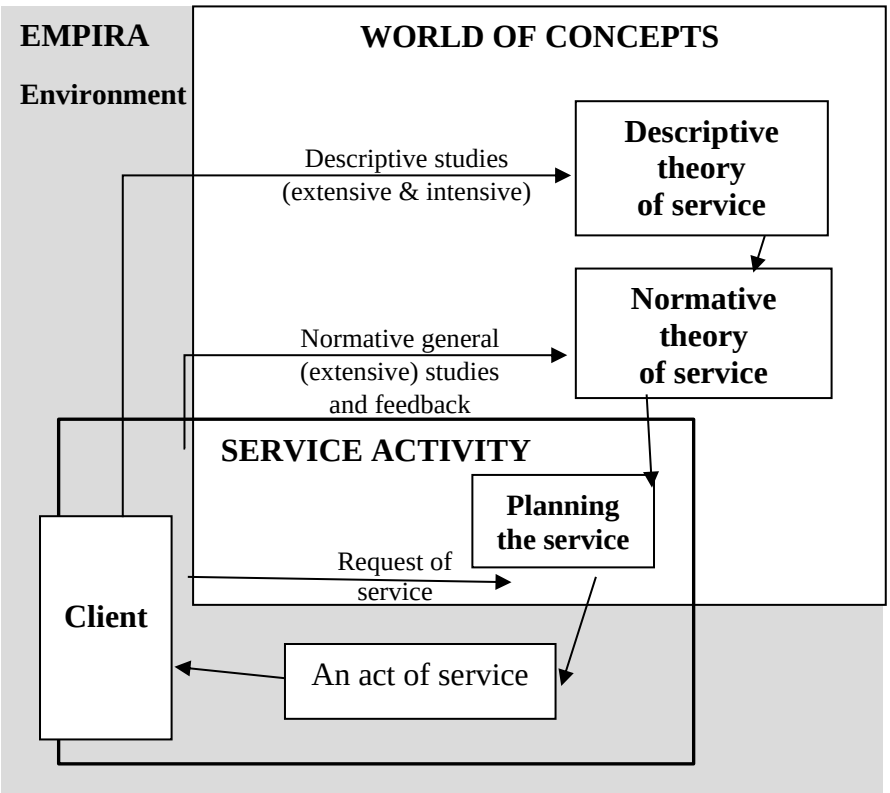


Figure 9. Theory of services

Source: http://www2.uiah.fi/projekti/metodi/127.htm

With the utilization of this theory, the following aspects of the identified services are examined:

1) Technology
2) Economy
3) Quality
4) Timing
5) Occupational health and safety
6) Motivation and psychology of the activity

IAS 17 regulation lease contracts have already separated ownership from the presentation of the asset. Additionally, the new separation of the services from the leases generated new types of arrangements in the form of long-term rental agreements. Not only the economy, but also the technology changes as well; this can been seen in the rise of new car-sharing services. In the next sections, these new services are going to be analysed in greater detail.

4.7.1. Long-term rental contracts

In 2016, shortly after the acceptance of the new lease regulations, a new service became available among top lease provider companies both globally and in Hungary, which have longer than one-year rental agreements. The so-called "long-term rental" is considered as a service, which is a new product among lease services. Based on the new IFRS 16 Leases definition criteria these transactions are not classified as lease agreements because they are not identifying an asset just a vehicle type for rental from a large fleet. Even if an asset was identified, the supplier would have the substantive right to substitute the asset throughout the period of use. In other words these services can replace lease contracts with similar terms and it would allow the lessee companies in certain cases to keep the service liabilities as off-balance sheet items.

These are new and emerging types of contracts, which are positioned from a cost perspective between short-term ‘classic’ car rentals and operational leases. In Hungary it was advertised that it is an `approximately 20% cheaper solution compared to a short-term car rental`. This new contract type serves as a fact to prove how the lease market agreements can change in specific cases from operational leases to long-term rental service. To correctly highlight this change, long-term rental

contracts in the past were also possible from rental companies but in this situation the lessor company entered into a new market with this product.

The advantages related to long-term contracts versus the lease agreements are flexibility and the simple, off-balance-sheet postings of these transactions, just as it was required for the operational leases under IAS 17. This service can be mentioned as an example when the economic and accounting conditions changed and generated a new service for entities, who would like to keep the transactions out of the balance sheet. It must be noted that based on the new IFRS 16 Standard, these are specific transactions with certain limitations. For instance, it can be applied to car rentals but for certain assets they cannot be applied, such as airplanes.

4.7.2. Car share services

The car-share services are basically short-term rentals on a timescale because they are usually shorter than one whole day. On the other hand, these services were developed independently from the accounting practices; instead, they represent a technical development. These services are a substitution for leases and can play an essential role in the future of mobility. There are already short-term car rental services available in Hungary, representing relatively new services on the market, where one of the most visible occurrences is the free-floating car-sharing companies.

Free-floating car-sharing companies business models in Hungary and Germany

The specific free-floating service providers are defined by the service of car sharing, where the vehicles can be rented and parked freely throughout the entire business area without having to determine the start and the end of the rental period in advance. The beginning and end of the rental for all vehicles is done via a specific smartphone application. Payment is based on usage and according to a fixed minute rate.

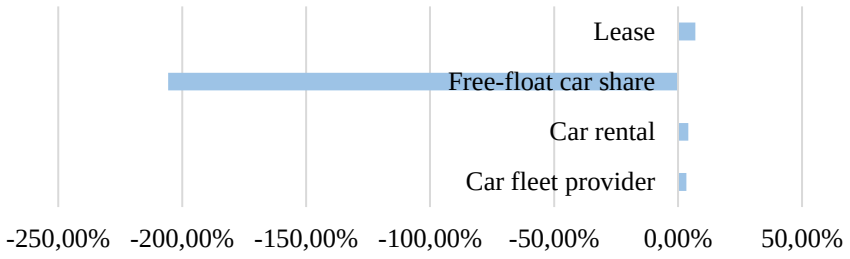
To accurately identify all key free-floating companies, the complete database of the registry of firms was reviewed in terms of principal operational activity of each company. This classification (TEÁOR'08) is "identical and fully harmonized with the European one, NACE Rev.2." – "Statistical Classification of Economic Activities in the European Community," 2008 (Nomenclature des activités économiques dans les Communautés européennes), (Eurostat, 2008).

“Based on Regulation 1893/2006 / EC, taking effect from 1 January 2008, TEÁOR’08 is used to determine the principal activities of enterprises, in the calculation of economic and social indicators, as well as the publication of statistical data.” (KSH, 2008). The car-sharing activities are classified under Section “N” as administrative and support service activities, in division 77, group 77.1 and class 77.11 – renting and leasing of cars and light motor vehicles. From the registered Hungarian companies’ database in total, 362 companies were identified. This analysis covers all Hungarian operational entities. In order not to include recently established entities, only companies with a staff headcount of 10 were reviewed, which is in accordance with the EU commission defined categories, (EU, 2003). Based on the detailed review, 28 companies were identified and they are presented in appendix 9.

According to the Hungarian Accounting Regulation Act of 2000. C., in Hungary companies need to file a financial statement by the end of the 5th month after the fiscal year. Consequently, the latest reports available were for 2017.

From appendix 9 out of the total 28 entities, based on their financial statements, only two companies, #11 GreenGo Car Europe Korlátolt Felelősségű Társaság (hereinafter: GreenGo) and #20 MOL Limitless Mobility Korlátolt Felelősségű Társaság (hereinafter: MOL LIMO), are real free-floating car-sharing companies, and both operate in Budapest. This list contained all free-floating service providers, but it did not represent the total lease market because finance lease activities are classified in a different statistical segment, in section K financial and insurance activities, divisions 64-66. It does, however, represent all non-micro level free-floating car-sharing companies. It is the consequence of an unclear current statistical data class, which does not identify the specific lease, rental, or free-floating service. In the case of a larger population, it would be challenging to sort out such companies manually. In 2017, in Hungary, there was a HUF 110.7 million (EUR 358.3 thousand) market, so a resolution-specific sub-section should be created in statistical classification to accurately measure lease and rental services.

In the analysed group from a profitability perspective, it is visible that the free-floating car-sharing service providers compared to the same activity category lease and rental service companies in 2017 delivered significantly worse results in Hungary, which is presented in Figure 10.



	Car fleet provider	Car rental	Free-float car share	Lease
Average Profit before tax / revenue	3,32%	4,10%	-205,65%	6,98%

Figure 10. Average PBT / average revenue in 2017 by key activities on the reviewed population

Source: www.ceginfo.hu

To get a better understanding of the situation, each of the Hungarian free-floating service Hungarian entities are separately examined and later compared to German service providers.

Financial Statement analysis and review of the financing model

GreenGo was established in 2014 as the first free-floating car-sharing service in the Hungarian market where until 2017 it was the only market participant. The first day of real operation, when the company started to provide services, was in November 2016 with 45 electric cars.

From a financial perspective, the assets and liabilities of the company are as follows:

Assets: Long-term assets value have continuously increased from HUF 69 million in 2016 to HUF 102 million in 2017, which consists of intangible assets of HUF 43 million, tangible assets of HUF 58 million, and other investments valued at HUF 1 million. This breakdown would give the reader important information if we paired it with published data from January 2018 when GreenGo reported 168 vehicles, which in the case of purchases should be recorded among property, plant, and equipment (hereinafter: PPE). It is easy to rationalize that HUF 58 million / 168 vehicles = HUF 340 thousand (approximately EUR 1 060) value per car is a very unreasonable figure. The only reasonable explanation for this is if the company applied operational leases and these assets are off-balance-sheet financed items. Later this business model is going to be compared to another Hungarian competitor. Below in Figure 11 is a summary related to asset items for the period of 2014-2017.

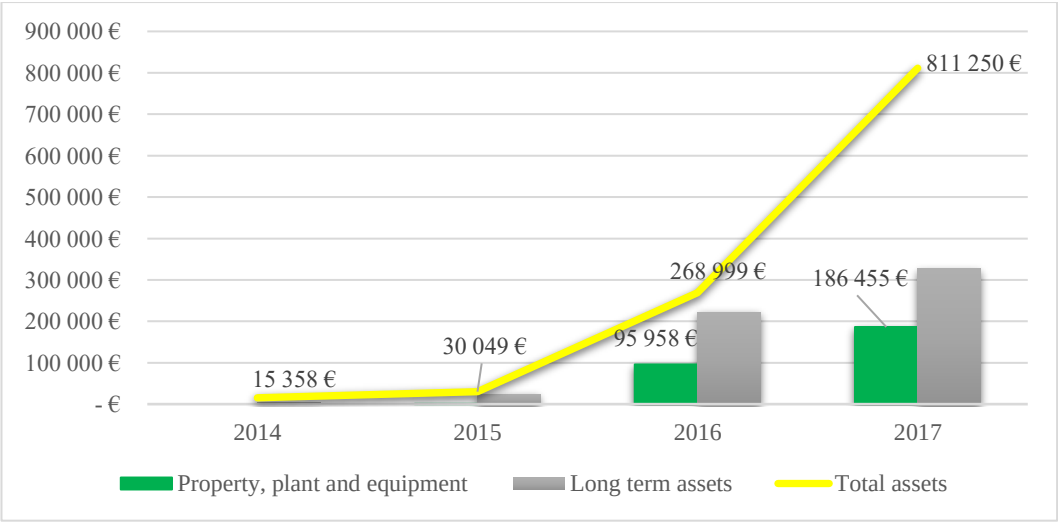


Figure 11. Changes in asset structure of GreenGo (2014-2017 in EUR)

Source: www.ebeszamolo.im.gov.hu

Liabilities, Equity: The equity value remained relatively the same over 2016-2017 HUF 43 million; however, the generated loss increased significantly from HUF -18 million (EUR -59 thousand) to HUF -158 million (EUR -512.6 thousand), which was compensated by equity contribution from owners. The debt/equity ratio also significantly increased in relation to the liabilities with an increase of HUF 129.3 million; this is mainly a result of short-term shareholders' loans of HUF 115 million and long-term related parties' credit of HUF 16 million.

Profit and loss statement: The realized revenue increased from 2016 with a value of HUF 8 million (EUR 26 thousand) to HUF 111 million (EUR 358 thousand) in 2017, compared to expenses, which increased from HUF 27 million to HUF 275 million. This was the principal reason for the generated loss, as the company did not earn enough revenue to compensate for the increased value of material expenditures. In Figure 12 a summary of the statement of profit and loss of GreenGo for the period of 2014-2017 can be found.

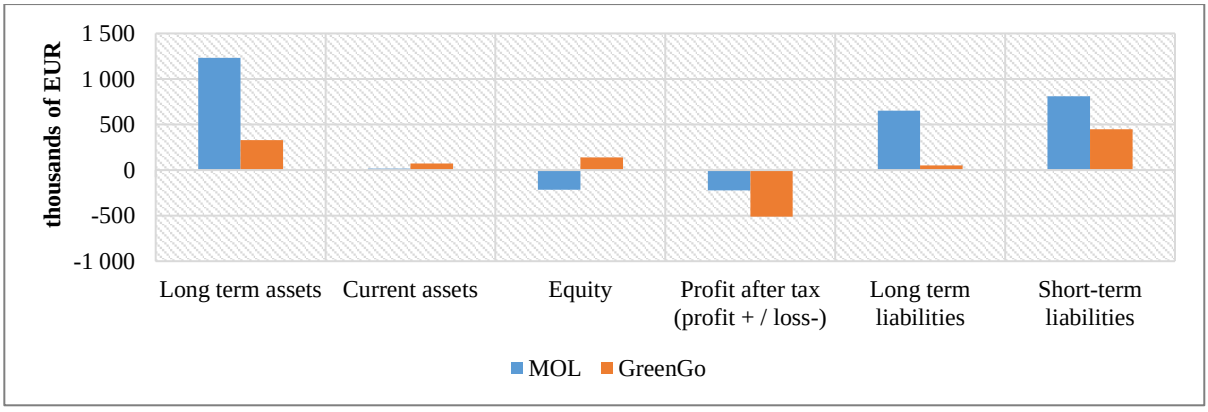


Figure 12. Comparison of assets and liabilities of MOL Limo and GreenGo (2017)

Source: www.ebeszamolo.im.gov.hu

In 2017 **MOL Limo** entered the market. It is owned by the listed Hungarian Oil- and Gas Company (hereinafter: MOL), in contrast to GreenGo whose owners are private investors. MOL Limo's market presence did not cause the increasing loss of GreenGo because, in 2017, it did not realize any revenue. Table 20 presents a comparison between the profit and loss statements of these two entities.

2017 Statement of profit or loss and other comprehensive income (Data translated to EUR)	**MOL Limo**	**GreenGo**
Revenue	0	374 391
Results from operation (profit + / loss -) (EBIT)	-215 512	-484 509
Results from financial activities (profit + / loss -)	-9 392	-27 408
Profit before tax (profit + / loss -)	-224 904	-511 918

Table 20. Comparison of the profit and loss statement for MOL Limo and GreenGo (2017)

Source: www.ebeszamolo.im.gov.hu

MOL Limo generated a significantly higher loss compared to GreenGo. However, there are several reasons for this, starting with that it is the year of its establishment and it earned no revenue. Moreover, it is the result of a larger scale of operation with more considerable fleet investment, as presented earlier in Figure 12 on assets and liabilities. The difference in assets value is related to a specific accounting regulation difference in lease accounting. MOL Limo is preparing an IFRS based financial statement and GreenGo is preparing a simplified national accounting-based financial report.

From an operation perspective, it is essential to mention that GreenGo only uses electric vehicles compared to MOL Limo. The total number of 400 electric vehicles operated by these two companies represents approximately 10% of the registered fully electric (excluding hybrids) cars in Hungary. It should also be highlighted that hybrid vehicles have increased more significantly in Hungary compared to fully electric ones from 2017 to 2018. This trend seems to continue; this could be part of a future investigation.

Description	2017	2018
The registered number of vehicles in Hungary	3 471 997	3 641 823
Budapest total number of registered vehicles	633 554	659 513
Registered "green plate" vehicles in Hungary	4 543	8 482
Registered hybrid vehicles in Hungary	2 414	4 709
The registered number of electric vehicles in Hungary (5E category)	**2 129**	**3 773**
GreenGo fleet	168	300
MOL Limo electric fleet	100	100
GreenGo and MOL fleet electric vehicles	**268**	**400**
Car share % of electric vehicles in Hungary	**12,59%**	**10,6%**

Table 21. Registered electric vehicles in Hungary and a comparison of MOL LIMO and GreenGo fleets

Source: www.ksh.hu

Advantages of lease accounting differences

The difference in lease accounting is significant between the C. Act of 2000. Hungarian Accounting Law (hereinafter: HAL) and IFRS. Not only the definition of lease is different, but also table 5 presents a fundamental accounting difference, as operating leases are not recorded under HAL in the balance sheet. Furthermore, in the HAL disclosure requirements, in certain cases operational leases only appear in the profit and loss statement.

A key objective of IFRS 16 was that they require the operational lease committed rights (rights of use, hereinafter: ROU) to be recorded as assets and committed liabilities in order to reduce the off-balance sheet items. For the entities reporting under HAL regulations, it is not a requirement, and

in the case of an independent financial analysis or credit strength testing, they can be invisible. The recorded off-balance sheet value can be significant from a creditor or financial analysis point of view. GreenGo is reporting under HAL regulations, where the operational leases as off-balance sheet items might create a business advantage from a presentation perspective because the leverage ratio does not show the total minimum liabilities from the lease obligations.

Comparison to German entities

Germany has the most significant car-sharing market in Europe with several service providers; the details can be found below in table 6 for German companies with above 30 000 registered users, along with a comparison to the Hungarian market.

Provider`s name	Registered users	Fleet size	Number of cities service is available in
Free-floating car share providers in Germany			
Share Now (car2go & DriveNow)	**3 000 000+**	**20 000+ out of 3 200+ electric**	**31**
Flinkster (DB)	315 000	4 000	300
Cambio	77 000	1 600	22
Stadtmobil	63 000	2 600	100
Book N Drive	43 000	1 015	14
teilAuto	35 000	1 000	19
Free-floating car share providers in Hungary			
GreenGo (HUN)	30-40 000	300 electric	1
MOL LIMO (HUN)	40 000	100 electric 350 petrol	1

Table 22. Comparison of registered users, fleet size, serviced cities of German and Hungarian entities

Source: www.greengo.hu www.mollimo.hu

From this table, it can be concluded that free-floating car-sharing companies operate significantly larger fleets and have significantly larger registered users in absolute terms. Hungarian companies operate only in one city, namely Budapest with a total of 750 vehicles with a 525km^2 area, where the population is approximately 1.75 million. In a contrast, only one company ShareNow operates approximately four thousand vehicles in Berlin with an 891km^2 area and a population of 3.6 million. The closest similar population capital city in the region is Vienna. This is also an important

comparison to make, where only ShareNow operates with 2 000+ vehicles for a 1.8 million population in a 415km^2 area.

The service fees can also be compared because in April 2019 ShareNow announced the expansion of its operations in Budapest with a total of approximately 240 vehicles (out of this fleet there are 40 electric BMW i3s). In table 6 I have included a fee and car type comparison.

Provider's name	Service fee	Car type	Additional conditions
ShareNow (BMW and Daimler)	from 99 HUF/min (0.32 cent/min)	Mini, BMW	38.7 EUR/hour
GreenGo	from 65 HUF/min (0.21 cent/min)	VW Up	
MOL Limo	from 66 HUF/min (0.21 cent/mind)	VW Up, Mercedes A-class	

Table 23. Comparison of free-floating service costs between ShareNow, MOL Limo and GreenGo (2019)

Source: www.greengo.hu www.mollimo.hu

It is an important factor as ShareNow (a joint venture of Car2Go and Drive Now) provides services across the EU and in 2019 they established the most significant European fleet. Additionally, they published a plan to invest together a further EUR 1 billion. With 20 000+ vehicles, the joint companies operate in 24 countries globally. It is only a matter of time before they utilize the economies of scale advantage and provide service in all European countries. Please find a coverage map in Figure 13.

Figure 13. Car2Go & DriveNow joint coverage

Source: www.your-now.com

From an operation and financial analysis perspective, a precise market concentration is happening now in Europe, which is a successful business model and no doubt supports sustainability; however, there is no core sustainability element of this business. The more effective utilization of the resources has an impact on sustainability, but it is based on a typical corporate profit model.

Sustainability and financial reporting

Free-floating car-share services are advertised that they are sustainable solutions for the environment. Therefore, as an essential element of their service, in this section I have tried to reconcile the sustainability information to either financial statements or any other global reporting initiative.

From a sustainability perspective, three aspects out of seven have appeared in the official communications of the reviewed companies; this is presented in table 24.

Sustainability Related Aspects of Sharing	**GreenGo**	**MOL Limo**	**BMW DriveNow**	**Daimler Car2go**
Resource efficiency through use rather than ownership	There is **less** of an emphasis on **parking infrastructure** and **road expansion**		Digital parking service Park Now	The smart ForTwo can fit in almost any parking spot and can manoeuver around even in the chaotic downtown rush hour traffic jams.
Low ecological footprint/low carbon	**300 electric cars**	The VW MOL Limo fleet is 450-strong **(100 electrical** and 350 gas-powered)	**900** electric vehicles in Europe, **1300** in the USA	
	Shared cars are **smaller** and **newer** than those in an average household.			
Own less, interact more, builds social capital			digital networking	Over 50% of car2go members don't own a car.

Table 24. Sustainability related aspects of sharing

Source: BMW Group [2017], Daimler[2016] Penz et. al [2018], https://www.mollimo.hu/en, https://www.GreenGo.hu/en

In appendix 2, from a reporting perspective, we have listed the key sustainability-related statements from car2go and DriveNow sustainability reports. In a recent presentation (Hoogervorst, 2019) the International Accounting Standard Board Chair identified 230 corporate sustainability standards, which can be categorized into two major orientations: a) CSR and b) sustainability issues impact. He also added that in an ideal world financial reporting would be “the same,” but the reviewed sustainability reports are all related to the CSR orientation and they cannot be referenced or connected back to the financial statements directly. We do agree with Mr. Hoogervorst statement that there are “reasons for hope” in the future, but a lot of obstacles, regulations, and standards need to be harmonized and changed to reach this goal.

IFRS work-plan – IFRS practice statement 1 – Management Commentary

The IASB has already generated a work plan to address the mentioned issue that the sustainability reports cannot be reconciled to the financial statements.

In 2019 it is still part of the work-plan that an exposure draft is to be issued by mid-2020. The scope of the IASB interest is highlighted in Figure 14.

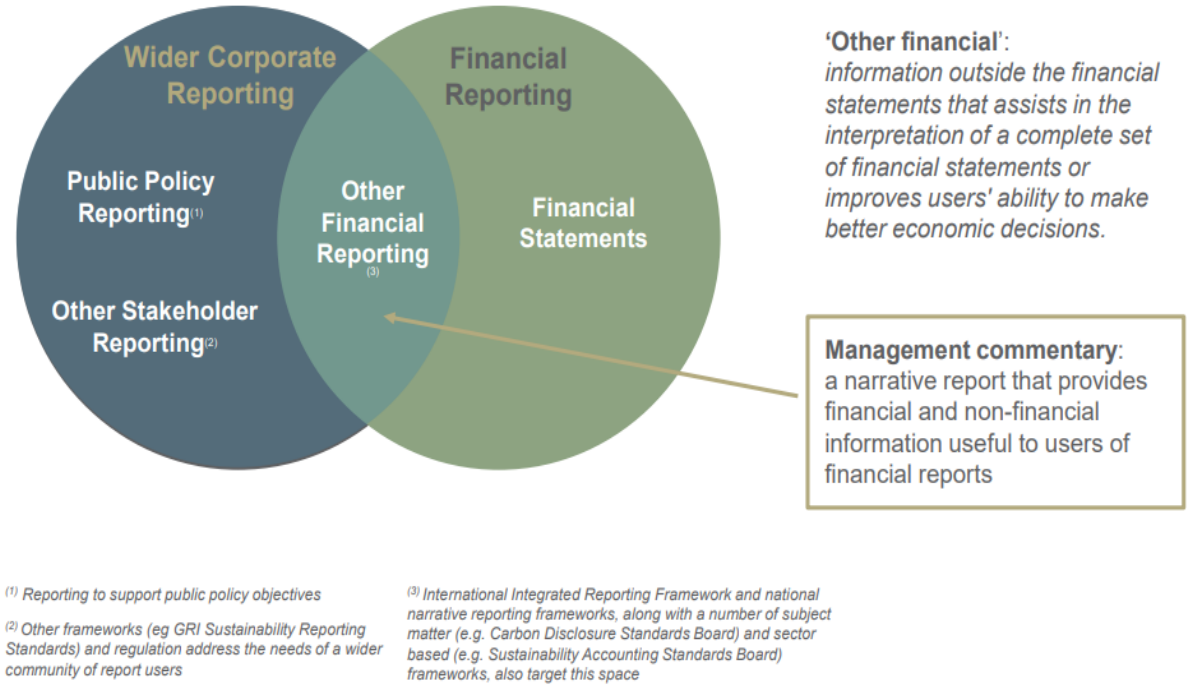


Figure 14. The objectives of the new management commentary and principles for standard-setting

Source: www.ifrs.org

The project for Management Commentary (Practice Statement) concept was first presented in 2010; however, it was only in November 2017 that it was added to the International Accounting Standards Board (IASB) agenda. Officially it is "a project to update IFRS Practice Statement 1 Management Commentary (Practice Statement)" (IASB, 2019). IASB organized a separate and specific Management Commentary Consultative Group where the group's aims are to provide the IASB with access to practical experience and expertise in developing, implementing and using management commentary regimes, and to advise the board as it develops proposals for updating the Practice Statement.

Please find below statements from IASB regarding the objectives:

"Management commentary should provide users of financial statements with integrated information providing a context for the related financial statements, including the entity's resources and the claims against the entity and its resources, and the transactions and other events that change them. It also provides management with an opportunity to explain its objectives and its strategies for achieving those objectives." (IASB, 2019)

"The Practice Statement makes clear that management commentary should be consistent with the following principles: Provide management's view of the entity's performance, position, and progress (including forward-looking information). Supplement and complement information presented in the financial statements (and possess the qualitative characteristics described in the Conceptual Framework for Financial Reporting). Although the particular focus of management commentary will depend on the facts and circumstances of an individual entity, the Practice Statement outlines the main elements of the information that should always be included in management commentary." (IASB, 2019)

Operating environment and risk

In 2019 there is no direct exposure draft available only the initial objectives are presented. From the already notified targeted topics, the operating environment and risk presentation cover the connection between the financial and the sustainability reporting.

There are four key areas mentioned in the objectives as presented in the graph below.

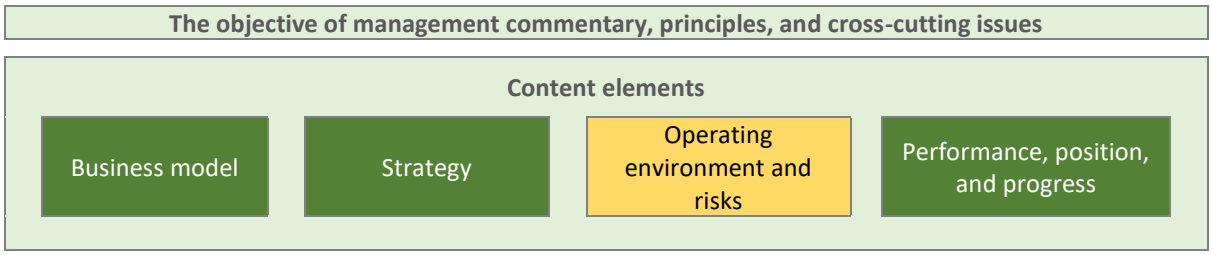


Figure 15. The objectives of the new management commentary and principles for standard-setting

Source: www.ifrs.org

5. Review of the Hungarian lease market data

5.1. Market data source

Market data was obtained from the HLA and the Hungarian Central Statistical Office. Both authorities are obliged by regulations to collect required information from all lessor companies in which they then publish the details regarding the provided services. HLA is publishing the data every quarter and additionally on an annual basis with more in-depth analyses and presentations. It should be noted that information and data breakdown for 2017 have not yet been completed. I will review in more detail the mobility-related segments based on the information from these organizations.

5.2. Overall market review

In Figure 16 the Hungarian lease market is presented in a waterfall diagram for the period 2015-2017. From an absolute value perspective at the end of 2015, the starting point of the review of cars and light commercial vehicles (hereinafter: LCV) had a value of HUF 433.4 billion; fleet cars, HUF 131.4 billion; trucks, HUF 220.7 billion; machines, HUF 202.9 billion; and all other contracts had a value of HUF 83.4 billion, which makes the total value of the market HUF **1.0718** trillion. This value increased to HUF **1.4654** trillion at the end of 2018, which is a 36.72% increase within three business years.

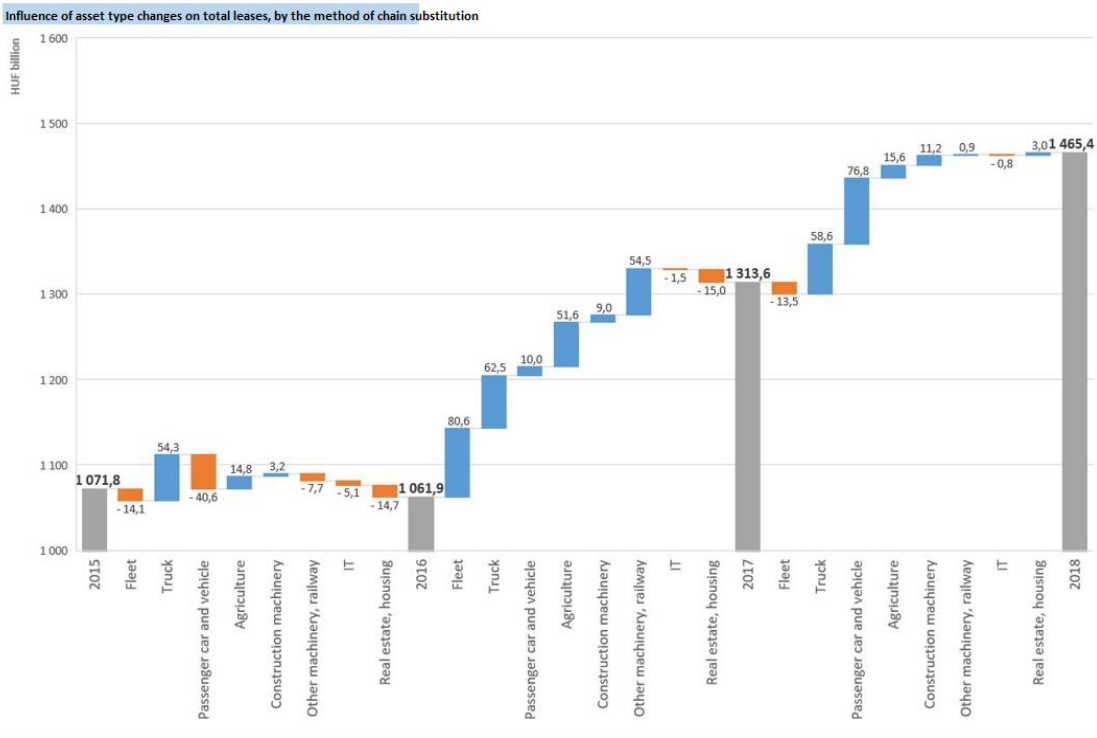


Figure 16. Overview of the Hungarian Lease Market 2015-2018

Source: Hungarian Lease Association www.lizingszovetseg.hu

2017 was a new record year for the Hungarian lease market. The total financed value in the 1st half of 2017 was HUF 279.4 billion (EUR 904.79 million), which represented a +19% increase compared to last year. It is the highest value within the previous five years. At the end of 2016, the total financed value reached HUF 518 billion (EUR 1.67756 billion) and the total capital receivables from lessors is HUF 1.138 trillion (EUR 3.685 billion).

The year of 2017 saw the Hungarian leasing market continue the development trend that it experienced in previous years (Tóth – 2018/1). Regarding the Hungarian Lease Association (HLA) data, the total value of new leasing contracts in 2017 exceeded HUF 613 billion, which is an 18% growth (with nearly HUF 100 million) compared to the previous year. The result was quite noteworthy because there has been no other example of such a significant amount since the 2008 crisis. The growth rate exceeded the average of many previous years. Nearly all segments of assets have contributed to this growth, and the volume of new businesses has reached higher levels than expected in several cases. Another decisive factor is that the entire portfolio amounted to HUF 1.3136 trillion by the end of 2017, so the growth seems to be persistent in this regard as well. Furthermore, despite the high base data, the market did not slow down in Q4 of 2017; the value of lease contracts still showed an 18 per cent increase in this period, too.

5.3. Specific mobility-related market segments

The lease market contains three direct mobility-related sub-categories. At the end of 2017 the value of cars and LCVs were valued at HUF 402.9 billion; fleet cars at HUF 197.9 billion; and trucks at HUF 336.2 billion, which in overall is a total value of HUF 937 billion. In 2018 the total value of these three categories increased by HUF 123.9 billion and at the end of 2018 it totalled HUF 1.0609 trillion, which was 72.4% of lease market value. From a lease market change perspective in 2018, the mobility-related segment continued to represent approximately 74% of total growth. These segments are represented by the car and light commercial vehicles, 35%; fleet cars, 12%; and trucks, 27%.

The car and LCV, and truck market segments represent exact vehicles; however, the fleet car market might not be that straight forward considering this is a particular area, so it should be further analysed.

The fleet car lease market is a success story. In the past five years starting from 2013 fleet cars financed value increased from HUF 42.7 billion (EUR 138.28 million) to HUF 70.6 billion (EUR 228.63 million), which is a 65.34% significant increase. As of June 2017 fleet cars financed value had a total of HUF 35.78 billion (EUR 115.87 million). For 2017 and the last two quarters of 2016 a detailed breakdown of fleet cars was not yet publicly available, so a more detailed analysis could only be concluded based on June 2016 detailed status information.

Fleet car population from a contractual perspective

According to Hungarian specifications, the agreed leased contracts can be divided into three different categories, which are open-, closed finance leases and operating leases. As a fourth category in the past lease companies provided loan finance as well; however, it is clear that they have finished these types of agreements from the start of 2016. Please find below a breakdown of lease categories for fleet cars on an annual basis:

Year	Loan finance	Closed Finance Lease	Open Finance Lease	Operational lease	Total	Operational lease %
2015	11	2 448	1 088	38 748	**42 295**	91.61%
2016	0	2 312	1 269	36 082	**39 602**	91.11%
2017	0	4 662	2 444	45 084	**52 195**	86.38%

Table 25. Fleet car market classification by year in Hungary as per number of contracts

Source: www.lizingszovetseg.hu

From the fleet contracts population, it is evident that the operational lease type of contracts represents the vast majority of agreements. There is a stable, approximately 85-90%, portion from the total lease agreements (Tóth – 2018/2). In other words, it means nine out of ten contracts were made with an operational lease, which is a compelling fact in the reviewed period of 2013-2016. Based on the earlier H1, there should be a definite economic advantage of such a portion.

Further breakdown is also available to identify the lease providers; the June 2016 status according to lessors for fleet contracts can be found below.

Lease provider	Closed Finance Lease	Open Finance Lease	Operational Lease	Total Fleet agreement
Leaseplan Hungária Zrt.*	**0**	**0**	**9 502**	9 502
MKB Euroleasing Csoport*	0	0	7 283	7 283
ALD Automotive Magyarország*	**0**	**0**	**6 037**	6 037
ARVAL Magyarország Járműparkkezelő Kft.*	0	0	4 900	4 900
Business Lease Hungary Kft.*	**0**	**0**	**2 824**	2 824
K&H Lízingcsoport	975	737	662	2 374
CIB Lízing Csoport	479	268	159	906
De Lage Laden Lízing Zrt.	390	188	142	720
Erste Leasing Cégcsoport	446	0	0	446
Lombard Lízing Csoport	22	0	183	205
Unicredit Leasing csoport	8	0	28	36
Total	**2 320**	1 193	**31 720**	35 233

Table 26. Fleet car market as of June 2016 in Hungary according to the number of lease contracts

(The yellow highlighted * lease providers only contracted operational lease agreements.)

Source: www.lizingszovetseg.hu

Altogether 11 lessor companies provided total fleet lease agreements in June 2016. Out of these, only the top 5 companies provided operational lease agreements. The other remaining six provided finance leases as well; however, we need to note that those are related to banking parent companies. It is evident of how operational contracts are essential for the fleet market in Hungary.

European Fleet-market specific analysis

In addition to the Hungarian fleet market, general comments should be made about the European fleet management activities. In the past, the fleet management companies required a robust financial background and traditionally they had a financial institutional group. Next to these companies, as of today, non-financial background companies appeared as well.

Provided services

Fleet management companies provide not only the financial service, but also other activities, as described in the figure below.

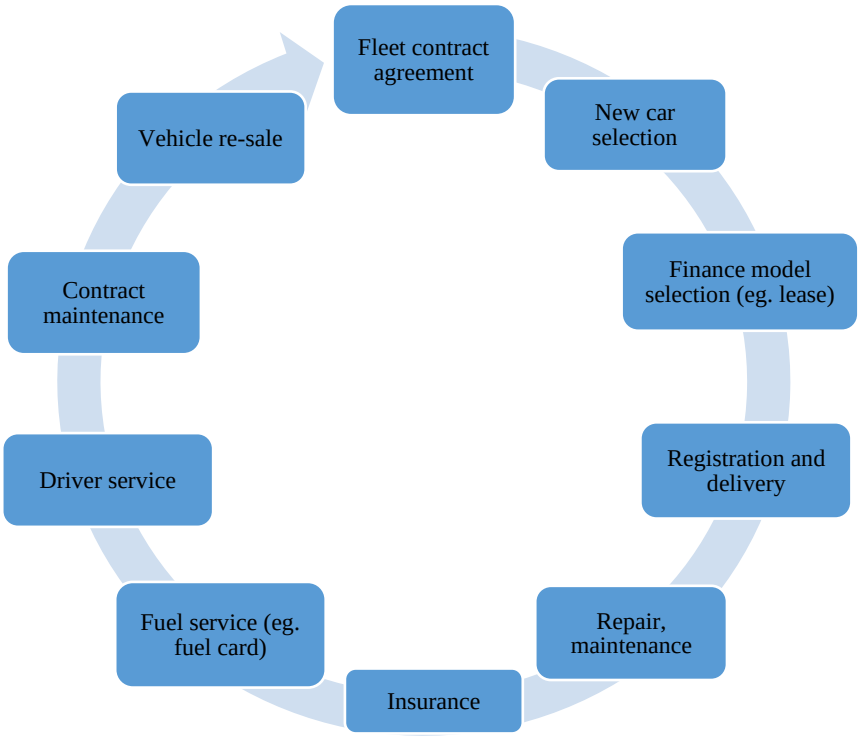


Figure 17. Fleet management services

Source: fleet management in Europe (Deloitte, 2016)

The table below shows the top company car (fleet car) companies in Europe.

Country	2012	2016	2020* (estimate)
United Kingdom	862 900	1 132 727	1 179 055
Germany	831 115	924 305	991 752
France	682 605	751 561	814 303
Italy	335 028	430 489	529 159
Spain	183 574	277 081	319 406

Table 27. The top registered company car countries in Europe

Source: fleet management in Europe (Deloitte, 2016)

The top five market share fleet service providers in Europe are as follows:

	Company	Fleet (item)	Headquarters	Ownership
1.	Leaseplan	>1 600 000 (70% in the EU)	Netherlands (Amsterdam)	*Financial Service Provider* (LP Group B.V. investment consortium)
2.	ALD Automotive	>1 400 000 (90% in the EU)	France (Clichy)	*Financial Service Provider* (100% subsidiary of Societe Generale Group)
3.	Arval	>1 000 000	France (Rueil-Malmaison)	*Financial Service Provider* (100% subsidiary of BNP Paribas Group)
4.	Alphabet	>650 000 (90% in EU)	Germany (Unterschleißheim)	*Car manufacturer* (100% subsidiary of BMW)
5.	Athlon	>340 000 (EU)	Belgium (Machelen)	*Car manufacturer* (100% subsidiary of Daimler Financial Service AG)

Table 28. The top five fleet services operators in Europe

Source: fleet management in Europe (Deloitte, 2016)

From fleet management, there are five essential expense categories that can be distinguished (Deloitte, 2016):

1. Purchase related expenses: 3-6%
2. Financing related expenses: 30-35%
3. Insurance-related services: 5-10%
4. Service-related: 40-55%
5. Re-sale related fees: 14-21%

The fleet market closed a very intensive and complex year in 2017, where the operational leases increased by HUF 87 billion. This resulted in an increase in production by 23%.

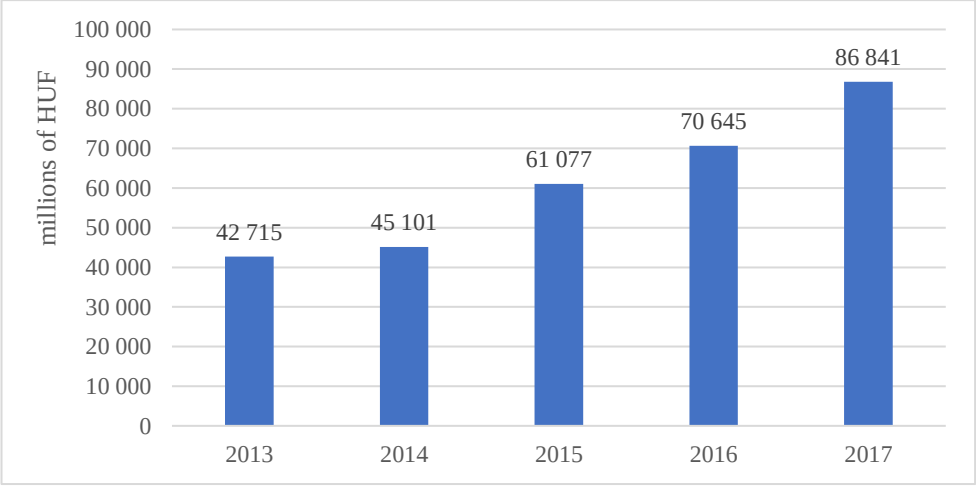


Figure 18. New fleet leases in Hungary

Source: Magyar Lízingszövetség – 2017. www.lizingszovetseg.hu

5.4. Trends and expectations in Hungary

2018 was a very successful year for the Hungarian lease market. The growth was above the European or even the regional average. The sales and outstanding financed debt value reached or even exceeded the highest recorded level in several subcategories (equipment, agriculture, fleet, and trucks). For 2019 the predicted annual growth is around a 10% increase, where the vehicle industry plays the leading role.

Hungarian lease provider companies by lease type:

#	name	Full_name	Loan	Finance lease	Operational lease
1	ALD_Automotive	ALD Automotive Magyarország Kft.			x
2	ARVAL	ARVAL Magyarország Jármûparkkezelõ Kft.			x
3	Budapest_Bank	Budapest Bank Zrt., Budapest Lizing Zrt.		x	x
4	Business_Lease_Hungary	Business Lease Hungary Kft.			x
5	CIB_Lease	CIB Lizing Csoport			x
6	City_Leasing	CITY-LEASING Zrt.		x	x
7	Cofidis	Cofidis	x	x	x
8	De_Lage_Landen	De Lage Landen Finance Zrt.	x	x	x
9	Deutsche_Leasing	Deutsche Leasing Hungaria Zrt., Deutsche Leasing Hungaria Kft.	x	x	x
10	Erste_Leasing	Erste Leasing Cégcsoport			x
11	FHB	FHB	x	x	x
12	FINALP	FINALP Zrt.	x	x	x
13	Fraikin	Fraikin			x
14	IKB	IKB-Pénzügyi Lizing Zrt.		x	x
15	Indotek	Indotek Lizing Zrt.		x	
16	KH	K&H Bank Zrt. Lizing üzletág		x	x
17	Leaseplan_Hungaria	Leaseplan Hungária Zrt.			x
18	Lombard	Lombard Lizing Csoport			x
19	Merkantil	Merkantil csoport	x	x	x
20	Merkantrade	Merkantrade Zrt			x
21	MKB	MKB-Euroleasing			x
22	Ober	Ober Pénzügyi Lizing Zrt.			x
23	Otokoc	Otokoc Hungary Kft.			x
24	OTP	OTP Ingatlanlizing Zrt.			x
25	Porsche	Porsche csoport	x	x	x
26	Raiffeisen	Raiffeisen Corporate Lizing Zrt.		x	x
27	Regio	Régió Holding Kft.		x	
28	Rent_a_server	Rent-a-server Kft.			x
29	Scania	Scania Finance Magyarország Zrt.			x
30	SG	SG Eszközlizing Magyarország Kft.	x	x	x
31	TFSH	TFSH			x
32	UniCredit	UniCredit Leasing csoport	x	x	x

Table 29. Hungarian lease providers by lease type

Source: Magyar Lízingszövetség – 2019. www.lizingszovetseg.hu

As it was analysed earlier, the mobility-related three market segments (car and LCV, trucks and fleet cars) represent the majority of the Hungarian market above 70%. Especially related to fleet cars where there is an essential occurrence of the operational leases. In a later section, this specific sub-market segment is going to be reviewed further.

5.5. 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:

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

where C is a vector norm:

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

and the vector m:

$$m = (m_1, \dots, m_n)^T$$

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.

Statistical test results

The demand side of the market was reviewed based on the annual (2015-2017) market analyses of the Hungarian Leasing Association that provides data on the number of lease contracts and total lease values. The sources also include the distribution of values by the provider financial institution (n=32, 2017), by the type of leased asset (n=11) and in some cases by the type of lease (n=3). Based on the source data, two samples were formed. The first sample includes the average lease contract value (HUF) differentiated by leased asset type, while the second sample consists of the average contract values (HUF) of fleet leases separated by lease type.

Asset types	*Lease types of fleet*
Agriculture	Loan
Construction	Finance lease
Fleet	Operating lease
IT	
Other machinery, railway	
Passenger car and vehicle	
Real estate, housing	
Truck	

For both samples, statistical testing was carried out to reveal whether there are associations between average contract value as (dependent) outcome variables and asset type/lease type as categorical predictor (independent) variables. In terms of statistical assumptions normal-distribution and homogeneity of variance were reviewed, both by visual methods (histogram, boxplot) and

statistical tests (Shapiro-Wilk test of normality, Bartlett's test of variance). Another assumption is that the independence of sample data is naturally met by the method of data collection, since the dependent variable is the average contract value of individual providers in the Hungarian lease market, with nearly full market coverage (no data was a subset). With the assumptions of parametric tests met, the chosen method was the one-way independent ANOVA to measure the association between average contract value and different predictor variables. All analyses were computed in the open-source statistical software R (r-project.org) and its programming environment RStudio (rstudio.com)[1], at the same time, the methodology was chosen based on the descriptions of Field-Miles-Field (2012).

Assumption, Method	Sample 1	Sample 2	Significance (1-α)=0,95
			Normal distribution
Visual test: Histogram	✔	✔	✔
Shapiro-Wilk test	2015: p = 0,7598 2016: p = 0,338 2017: p = 0,3775	2015: p = 0,4917 2016: p = 0,479 2017: p = 0,6914	✔
			Homogeneity of variance
Visual test: Boxplot	✔	✔	✔
Bartlett's test	2015:2017 aggregate: p = 0,01038	2015:2017 aggregate: p < 2,2e-16	✔
			Analysis of variance
One-way independent ANOVA	F = 11,6; p = 3,61e-13	F = 35,21; p = 7,11e-13	✔
Post-hoc Tukey multiple comparisons of means	Adjusted p-value < 0,05 in 8 out of 29 pairwise cases	Adjusted p-value < 0,05 in 3 out of 3 pairwise cases	S1: ☒ S2: ✔

Table 30. Summary of statistical analyses

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

Table 30 summarizes the results of the analysis with significance levels included. Assumptions were made with an alpha value of 0.05 (with a 5% probability of making a false assumption with the rejection of a true null hypothesis); therefore a 95% confidence interval was used.

[1] R version 3.5.3 (2019-03-11) -- Copyright (C) 2019 The R Foundation for Statistical Computing Platform: x86_64-w64-mingw32/x64 (64-bit)

1. Sample 1: Total average lease value by contract, by asset type

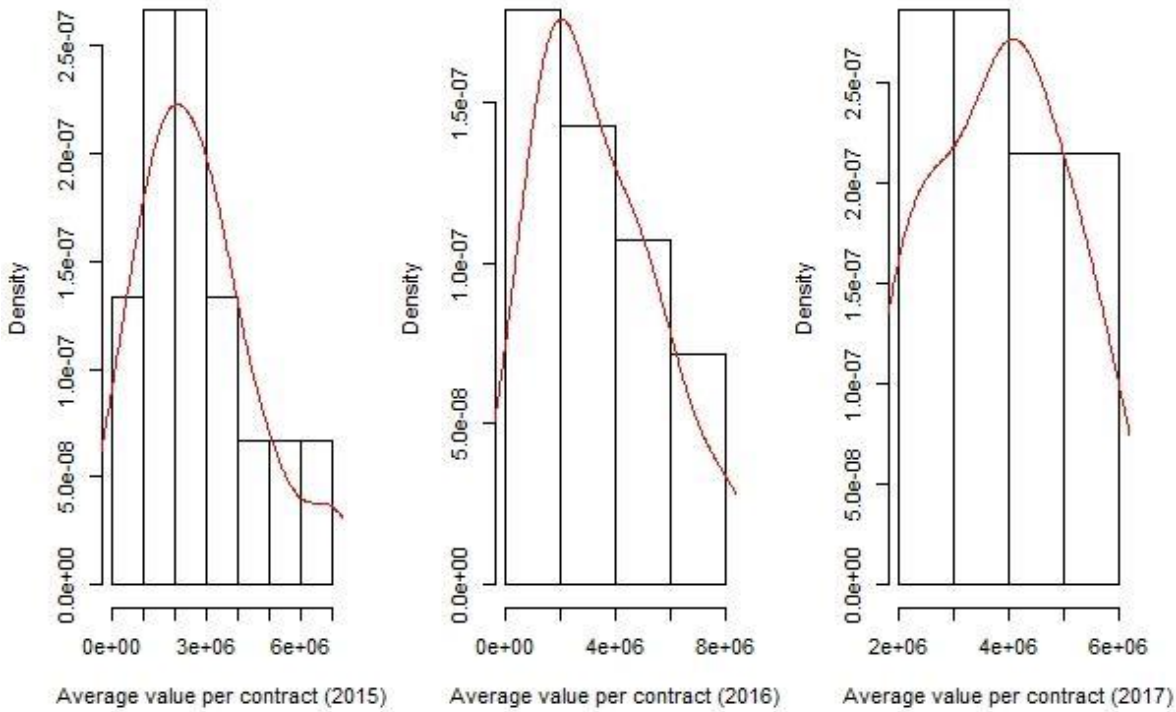


Figure 19. Normal distribution of sample 1

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

The histograms for the years 2015 and 2016 show relatively small positive skewness due to the slightly higher number of contracts with low values, which indicates that the median is lower than the mean. However, the simple fit line takes a shape similar to the bell of normal distribution, which is an assumption that is supported by the result of the Shapiro-Wilk test. In all three years the p-value is above the alpha (0.05) in which case the null hypothesis of the test is rejected in favour of the alternate hypothesis of the normal distribution assumption.

Year	Shapiro-Wilk test of normality	Bartlett's test of variance
2015	W = 0.95475 p-value = 0.7588	Bartlett's K-squared = 18.377 Degrees of freedom = 7 p-value = 0.01038
2016	W = 0.90767 p-value = 0.338	
2017	W = 0.91324 p-value = 0.3775	

Table 31. Test of normality and variance on sample 1

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

Over the three years the sample is normally distributed with a 95% confidence interval (p-value > 0.05). As a sample requirement of parametrical tests, the homogeneity of variance was also tested by the Bartlett's test and visually represented in a boxplot, that is ideally the same with several groups of data. The results show that the variances of the samples are homogenous with a 95% confidence interval (p-value < 0.05).

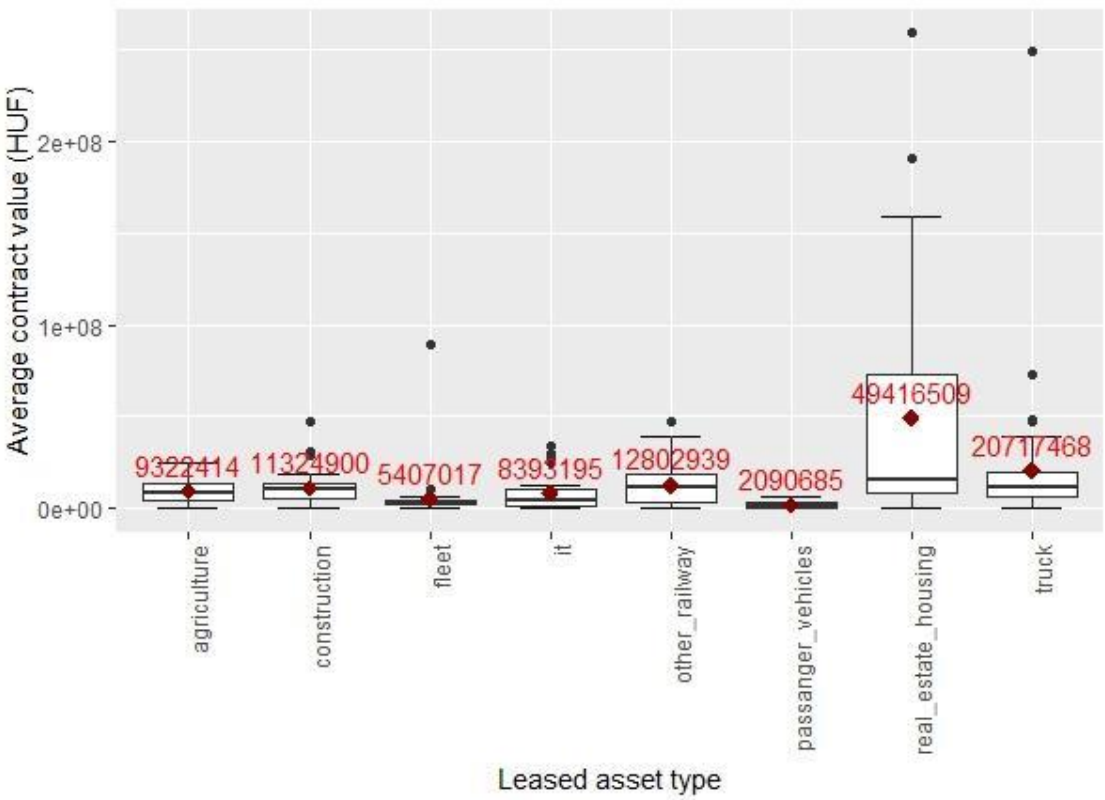


Figure 20. Visual check of variance by boxplot (year of occurrence is irrelevant)

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

Test of variance, post-hoc comparison of means

Based on the result of the ANOVA test, a post-hoc test of the Tukey, multiple comparisons of means, was used (Ghosh, 2017; Schlegel, 2016).

2. SAMPLE 2: Fleet

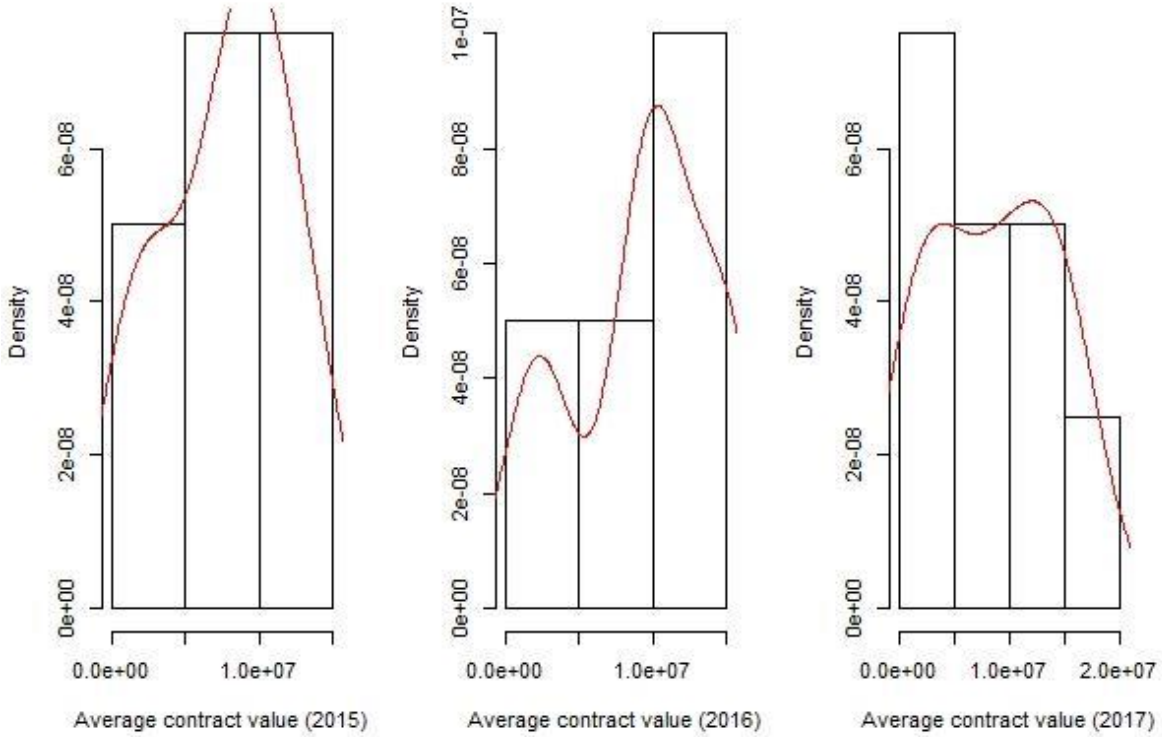


Figure 21. Normal distribution of sample 2

Unlike the first sample, histograms of the years 2015-2017 in the case of example 2, shows that values are lower than the median; therefore, a negative skewness is seen. However, according to the results of the Shapiro-Wilk test, the sample is normally distributed with a 95% confidence interval (p-value > 0.05).

Year	Shapiro-Wilk test of normality	Bartlett's test of variance
2015	W = 0.94788, p-value = 0.4917	Bartlett's K-squared = 111.05 Degrees of freedom = 2 p-value < 2.2e-16
2016	W = 0.9445 p-value = 0.479	
2017	W = 0.95808 p-value = 0.6914	

Table 32. Test of normality and variance on sample 1

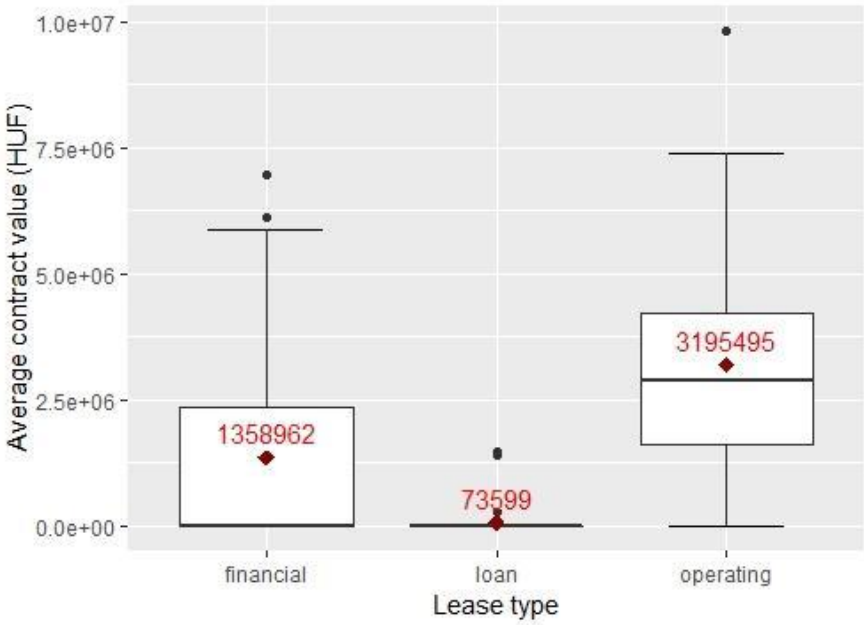


Figure 22. Bartlett's test of visual variance check of variance by boxplot

Note: year of occurrence is not relevant

Using the boxplot, the variance seems entirely consistent and in the case of average value by lease contract, financial and operating leases it showed a much bigger range. At the same time, loans were only represented by three providers, with relatively low contract values. Furthermore, Bartlett's test for homogeneity of variance was used (best fit for normally distributed samples). The results show the variances of the examples are homogenous with a 95% confidence interval (p-value < 0.05).

2.1. Test of variance, post-hoc comparison of means

Sample 2 independent one-way ANOVA

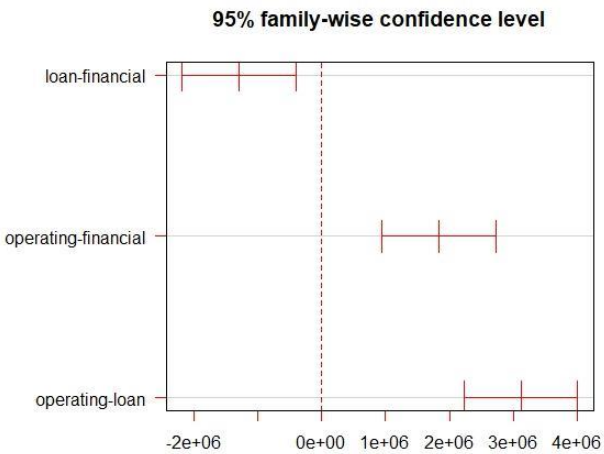


Figure 23. ANOVA sample 2 independent one-way

Benford analysis

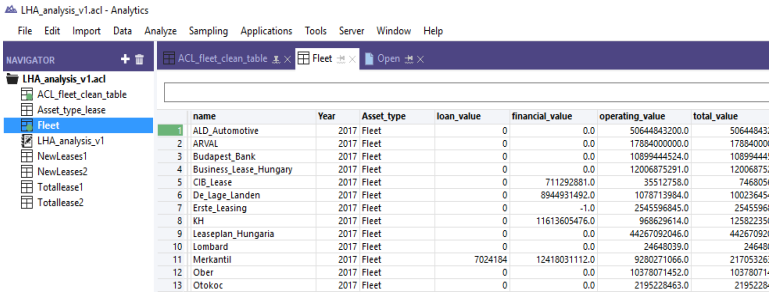
Benford's law also called the Newcomb–Benford law, the act of anomalous numbers, or the first-digit law, is an observation of the frequency distribution of leading digits in many real-life sets of numerical data. The law states that in many naturally occurring collections of numbers the significant leading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

A set of numbers is said to satisfy Benford's law if the leading digit d (d ∈ {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
ALD_Automotive	2017	Fleet	0	0.0	50644843200.0	50644843
ARVAL	2017	Fleet	0	0.0	17884000000.0	17884000
Budapest_Bank	2017	Fleet	0	0.0	10899444524.0	10899444
Business_Lease_Hungary	2017	Fleet	0	0.0	12006875291.0	12006875
CIB_Lease	2017	Fleet	0	711292881.0	35512758.0	746805
De_Lage_Landen	2017	Fleet	0	8944931492.0	1078713984.0	10023645
Erste_Leasing	2017	Fleet	0	-1.0	2545596845.0	2545596
KH	2017	Fleet	0	11613605476.0	968629614.0	12582235
Leaseplan_Hungaria	2017	Fleet	0	0.0	44267092046.0	44267092
Lombard	2017	Fleet	0	0.0	24648039.0	24648
Merkantil	2017	Fleet	7024184	12418031112.0	9280271066.0	21705326
Ober	2017	Fleet	0	0.0	10378071452.0	10378071
Otokoc	2017	Fleet	0	0.0	2195228463.0	2195228

As of: 06/07/2019 11:22:38
Command: BENFORD ON total_value LEADING 1 TO SCREEN
Table: Fleet

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

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
6	3	3	0.249
7	2	2	0.179
8	3	2	0.367
9	0	2	0.984

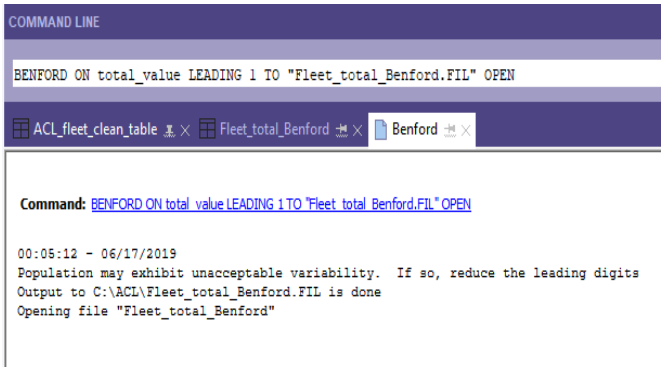


Figure 24. Screenshots from ACL Benford analysis

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

Based on the ACL[2] Benford analysis on the fleet population, the following result is received:

[2] ACL Analytics version 13.1.0.112 Unicode @1986-2018 ACL Services Ltd.

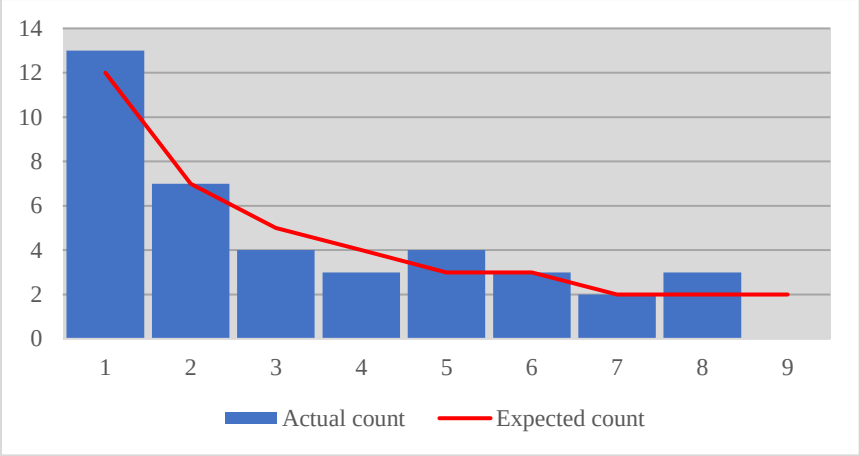


Figure 25. Benford's analysis results

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

5.5. 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 33. 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 (significance level) = 0,05				
	critical value	**9,49**				

Table 34. 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) x (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.

5.6. Cross border leases

As it was noted during the impact measurement in section four related to the Wizz Air Hungary analysis, it turned out that approximately seven hundred billion HUF cross-border leases were identified. In the European Union cross border services are allowed; therefore, an opportunity for cross-border contracts is also granted. There is no available national register for these transactions but from Hungarian market information the existence and the significance of such operations have been already demonstrated. Additionally, it should be noted that the identified impact is related to mobility services.

During the parent company and the subsidiary review, it was identified that these leases are cross-border items. This transnational transaction type is also confirmed by the HLA statistical database because HLA measures the lease types as well, where there zero value lease transactions were reported concerning airplane leases.

5.7. Lease contracts and Withholding taxation

The cross-border transactions can bring additional questions relating to Value Added Taxation (hereinafter: VAT) because they are received services by Hungarian entities. As a service, according to the general rule, VAT should be paid in the country, or in other words in Hungary.

With significant off-balance sheet cross-border leases of HUF 700 billion, this would represent HUF 189 billion VAT income for Hungary. The formal measurement of these impacts and contracts could support VAT planning or rationalization even on macro-level from a tax authority perspective.

5.8. Demonstrating the different advantages between the lease types on one specific lease agreement

To make an economic benefit analysis in this section, a specific fleet car example is going to be presented from Leaseplan and MKB Euroleasing, as they are the market leaders and provide similar price deals.

This example uses a Ford Focus TREND 4 doors, 1.6l Ti-VCT, with a purchase cost of HUF 5 030 000. Considering that the same car is used for both companies the registration tax and other obligatory expenses would be the same, so I will only calculate the lease-related costs and not the total cost of the specific car. The lease duration is 36 months for all lease options. For the Net Present Value calculation, I used the Hungarian National Bank (MNB) average rate over the last 3 years, which is 1.5%, so the annual interest rate conversion to monthly is: 12√ (1,0105)= 0.087% (monthly interest rate).

The same car was requested and the on-line offers from the available lease fee calculator were given as follows:

1. Operational Lease (Leaseplan) monthly fee: HUF **95 973** + VAT (27% - deductible according to the VAT regulation). Calculated operational lease cost on nominal value: 95 973 x 36 = HUF 3 455 028
   Calculated total NPV of the **operational lease cost:** $C/r \times (1 - (1/(1+r)^n)$ = 95 973/0,00087 x $(1-(1/(1{,}00087)^{36})$ = HUF **3 400 027**

2. Open Finance Lease (MKB) initial payment: HUF **791 016** + VAT (deductible); monthly fee: HUF **85 354** + VAT. Calculated open finance lease costs on nominal value: 791 016 + 85 354 x 36 = HUF 3 863 760
   Calculated total NPV of the **open finance lease cost:** $C_0 + C/r \times (1 - (1/(1+r)^n)$ = 791 016 + 85 354/0,00087 x $(1-(1/(1{,}00087)^{36})$ = HUF **3 814 845**

3. Closed Finance Lease (MKB) initial payment: HUF **1 000 000**; monthly fee: HUF **107 421** (VAT non-deductible). Calculated open finance lease costs on nominal value: 1 000 000 + 107 421 x 36 = HUF 4 867 156
   Calculated total NPV of the **closed finance lease cost:** $C_0 + C/r \times (1 - (1/(1+r)^n)$ = 1 000 000 + 107 421/0,00087 x $(1-(1/(1{,}00087)^{36})$ = HUF **4 805 594**

The deviation of costs between lease types is significant. The following can be concluded from the example:

- Cost advantage: Operational lease agreement was the cheapest option, and the second most affordable option was the open finance lease. The most expensive contract offer was the final finance lease agreement.

- Tax advantage: Operation leases and the open finance leases are functioning as a “service” agreement and for this specific situation from 2019, 50% of the VAT is deductible compared to the closed finance lease transactions where it is considered to be a passenger car sale with lease funding; therefore, VAT is not deductible. It has to be noted that for specific trucks and other industrial equipment VAT can be deductible, but it has to be paid at the beginning of the lease and only deducted after the end of the contract; this means that the company needs to finance 27% VAT for the whole 36 months or even longer depending on the lease term.

6. Results, conclusions, and limitations

6.1. 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.

6.2. Hypotheses conclusions

$H1_1$: 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 35 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)														
	IASB			DAX 30						Hungarian companies				
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 companies impact 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 35. 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

*$H2_1$: 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.

*$H3_1$: 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.

*$H4_1$: 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.

*$H5_1$: 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.

$H6_1$: 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" (Tkatcheko 2018). 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.

$H7_1$: 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 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.

6.3. 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.

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.

1. *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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Appendix 1

IAS 17 and US GAAP FAS 13 Lease Standards timeline and regulations

History of IAS 17

October 1980	Exposure Draft E19 Accounting for Leases
September 1982	IAS 17 Accounting for Leases
1 January 1984	The effective date of IAS 17 (1982)
1994	IAS 17 (1982) was reformatted
April 1997	Exposure Draft E56, Leases
December 1997	IAS 17 Leases
1 January 1999	The effective date of IAS 17 (1997) Leases
18 December 2003	The revised version of IAS 17 issued by the IASB
1 January 2005	The effective date of IAS 17 (Revised 2003)

Table 36. History of the IAS 17 regulation

Source: www.ifrs.org

US GAAP FAS 13 timeline and regulation

1949	The Accounting Principles Board issued ***Reporting of Leases in Financial Statements of Lessees*** which established that leases should be categorized as finance if the contract has a nominal purchase option.
1964	The Accounting Principles Board issued ***Reporting of Leases in Financial Statements of Lessees*** which established that leases should be categorized as finance if the contract has a nominal purchase option.
1966	The Accounting Principles Board issued ***Accounting for Leases in Financial Statements of Lessors*** which issued different criteria for finance lease identification than the 1964 opinion.
1976	The SEC asked the FASB to create comprehensive lease accounting rules. They issued FAS 13, ***Accounting for Leases***. This standard has been in place since 1976, though it has been amended multiple times since then.

Table 37. US GAAP FAS13 timeline and regulation

Source: www.fasb.org

Appendix 2

Key differences between IFRS 16 and ASC 842 lease regulations from ERNST and YOUNG (2018)

	IFRS 16	US GAAP ASC 842
Scope and measurement exceptions		
Low-value asset exemption	Lessees may elect, on a lease-by-lease basis, not to recognise leases when the value of the underlying asset is low (e.g., US$5,000 or less when new).	There is no recognition exemption for leases based on the value of the underlying asset.
Scope exemption for intangible assets4	Lessees may apply IFRS 16 to leases of intangible assets other than rights held by a lessee under licensing agreements within the scope of IAS 38 Intangible Assets, for items such as motion picture films, video recordings, plays, manuscripts, patents, and copyrights. Lessors are required to apply IFRS 16 to leases of intangible assets, except for licenses of intangible property that are in the scope of IFRS 15 *Revenue from Contracts with Customers*.	All leases of intangible assets are excluded from the scope of ASC 842.
Key concepts		
Lease liability – a reassessment of variable lease payments5	Changes in variable lease payments based on an index or rate result in a remeasurement of the lease liability whenever there is a change in the contractual cash flows (i.e., when the adjustment to the lease payment takes effect).	Changes in variable lease payments based on an index or rate result in a remeasurement of the lease liability when the lease liability is remeasured for another reason (e.g., a change in the lease term). Lessors would only remeasure upon modification.
Accounting for all entities other than PBEs – discount rate	IFRS 16 does not provide accounting alternatives for private companies.	Entities that are not public business entities (PBEs) may elect to use a risk-free rate for initial and subsequent measurements of the lease liability.
Determination of the discount rate	Lessees determine the discount rate at lease commencement, but lessors determine the rate implicit in the lease at the inception date.	Lessees and lessors determine the discount rate at the lease commencement date.
Determination of a lessee's incremental borrowing rate	IFRS 16 does not address whether a lessee may consider the effect of lease term options (e.g., purchase and renewal options) that are not included in the lease term.	A lessee may consider the effect of lease term options (e.g., purchase and renewal options) that are not included in the lease term.

Definitions of initial direct costs (IDCs)	IDCs are incremental costs of obtaining a lease that would not have been incurred if the lease had not been obtained. However, costs incurred by a manufacturer or dealer lessor in connection with a finance lease are excluded.	IDCs are incremental costs of obtaining a lease that would not have been incurred if the contract had not been obtained. Lessors expense IDCs for sales-type leases if the fair value of the underlying asset is different from the carrying amount of the underlying asset.
	IFRS 16	**US GAAP ASC 842**
Lease classification		
Lessee lease classification6	All leases are accounted for based on a right-of-use model (similar to finance leases under ASC 842) unless a recognition exemption is adopted.	Recognised leases are classified as either finance or operating. Lessees classify leases at the lease commencement date.
Lessor lease classification	Leases are classified as a finance or operating leases at the inception date of the contract.	Leases are classified as operating, direct financing or sales-type contracts at the commencement date of the lease.
Lessor – lease classification criteria	IFRS 16 does not include explicit guidance for considering collectability of lease payments.	Collectability of lease payments is considered when determining if a lease is classified as a direct financing or operating lease.
Collectability	IFRS 16 does not include explicit guidance for considering collectability of lease payments.	Collectability of lease payments is considered when determining if a lease is classified as a direct financing or operating lease.
Subleases	When classifying a sublease, a sublessor classifies the sublease based on the right-of-use asset recognised as part of the head lease.	When classifying a sublease, the sublessor classifies the sublease based on the underlying asset rather than the right-of-use asset on the head lease.

	IFRS 16	US GAAP ASC 842
Lessee accounting		
Short-term leases – the existence of a purchase option	A contract may not qualify as a short-term lease if it includes a purchase option, regardless of whether the lessee is reasonably certain to exercise the option.	A lease may not qualify as a short-term lease if it includes a purchase option that is reasonably certain to be exercised.
Short-term leases – change in the lease term	A change in terms of a short-term lease creates a new lease. If that new lease has a lease term greater than 12 months, it cannot qualify as a short-term lease.	A lease may no longer qualify as a short-term lease when there is a change in a lessee's assessment of either of the following: • The lease term so that, after the change, the remaining lease term extends more than 12 months from the end of the previously determined lease term ● • Whether the lessee is reasonably certain to exercise an option to purchase the underlying asset.
Allocating variable consideration not dependent on an index or rate between lease and non- lease components of a contract	Under IFRS 16 lessees may allocate variable consideration entirely to a non-lease component of a contract.	Lessees allocate variable consideration not depending on an index or rate to the lease and non-lease components of a contract.
Componentisation	A lessee applies the depreciation requirements in IAS 16 *Property, Plant and Equipment in depreciating* ROU *assets*, which requires that each item of property, plant, and equipment with a cost that is significant in relation to the total cost of the item be depreciated separately (i.e., a component approach).	Component depreciation is permitted but not common.

	IFRS 16	US GAAP ASC 842
Lessor accounting		
Practical expedient to not separate lease and non- lease components	IFRS 16 does not include a practical expedient for lessors.	A lessor can elect, by class of underlying asset, not to separate lease and related non- lease components if certain criteria are met. Additionally, if the non-lease component is the predominant component of the combined component, the combined component is accounted for in accordance with ASC 606.
Recognition of selling profit for direct financing leases7	Selling profit on finance leases is recognised at lease commencement. IFRS does not distinguish between sales-type and direct financing leases.	Selling profit on direct financing leases is deferred at lease commencement and amortised into income over the lease term.
Collectability	IFRS 16 does not include explicit guidance for considering collectability of lease payments.	Collectability of lease payments is assessed for purposes of initial recognition and measurement of sales-type leases. It is also evaluated to determine the income recognition pattern of operating leases. Collectability of lease payments is also considered when determining if a lease is classified as a direct financing lease or an operating lease.
Modification of a sales-type or direct financing lease8 under US GAAP that does not result in a separate contract and is not classified as an operating lease	Lessors apply IFRS 9 to account for modifications to finance leases that do not result in a separate lease and continue to be classified as finance leases. If the lease would have been classified as an operating lease, had the modification been in effect at inception, the modification is accounted for as a new lease from the effective date of the modification.	ASC 842 includes guidance for modifications of sales-type and direct financing leases that do not result in a separate contract.

	IFRS 16	US GAAP ASC 842
Allocating variable consideration not dependent on an index or rate between a lease and non-lease components of contract	IFRS 16 does not give guidance for variable consideration related to the lease component. Lessors would allocate the consideration in the contract based on the guidance in paragraphs 73-90 of IFRS 15.	If the terms of a variable payment that is not dependent on an index or rate relate, even partially, to the lease component, the lessor will not recognise those payments before the changes in facts and circumstances on which the variable payment is based occur (e.g., when the lessee's sales on which the amount of the variable payment is based occur). When the changes in facts and circumstances on which the variable payment is based occur, the lessor will allocate those payments to the lease and non-lease components of the contract. The allocation is based on the same basis as the initial allocation of the consideration in the contract or the most recent modification not accounted for as a separate contract unless the variable payment meets the criteria in 606-10-32-40 to be allocated only to the lease component(s).

	IFRS 16	US GAAP ASC 842
Sale and leaseback transactions		
Assessing if a transfer of an asset is a sale in a sale/purchase and leaseback transaction	To determine whether the transfer of an asset is accounted for as a sale, a seller-lessee and a buyer-lessor apply the requirements for determining whether and when a performance obligation is satisfied under IFRS 15.	To determine whether an asset transfer is a sale and purchase, a seller-lessee and a buyer-lessor consider the following: • Whether the transfer meets the sale criteria under ASC 606 (however, certain fair value repurchase options would not result in a failed sale) • A sale and purchase do not occur when the leaseback is classified as a sales-type lease by buyer-lessor or finance lease by seller-
Gain or loss recognition in sale and leaseback transactions9	The seller-lessee recognises only the amount of any gain or loss, adjusted for off-market terms, that relates to the rights transferred to the buyer- lessor.	The seller-lessee recognises any gain or loss, adjusted for off-market terms, immediately.
Failed sales – seller/lessee	Asset transfers that do not qualify as sales should be accounted for as financings in accordance with IFRS 9 Financial Instruments by the lessor and lessee. IFRS 16 does not provide additional guidance on interest rates.	Asset transfers that do not qualify as sales should be treated as financings by the lessor and lessee. ASC 842 provides additional guidance on adjusting the interest rate in certain circumstances (e.g., to ensure there is not a built-in loss).
Other considerations		
Related party transactions	IFRS 16 does not address related party lease transactions. IAS 24 Related Party Disclosures contains guidance on related party disclosures.	Entities classify and account for related party leases (including sale and leaseback transactions) based on the legally enforceable terms and conditions of the lease. Disclosure of related party transactions is required.

	IFRS 16	US GAAP ASC 842
Effective date and transition		
Effective date	For all entities, IFRS 16 is effective for annual reporting periods beginning on or after 1 January 2019.	For PBEs and certain other entities, ASC 842 is effective for fiscal years beginning after 15 December 2018. For other entities, ASC 842 is effective for fiscal years beginning on or after 15 December 2019.
Early adoption	Early adoption is permitted for entities that apply IFRS 15 at or before the date of initial application of IFRS 16.	Early adoption is permitted in all cases.
Modified retrospective transition – application to comparative periods	Comparative periods are not adjusted.	ASC 842 provides an option to apply the transition provisions as of the beginning of the earliest comparative period presented in the financial statements or as of the effective date. Comparative periods are adjusted when an entity elects to apply the transition provisions as of the earliest comparative period presented in the financial statements. Comparative periods are not adjusted when an entity elects to apply the transition provisions as of the effective date.
Modified retrospective transition – specific transition guidance	Transition guidance primarily addresses lessee's leases previously classified as operating leases under IAS 17.	Specific transition guidance is provided for all leases depending on the lease classification before and after application of ASC 842.
Full retrospective transition	This is permitted under IFRS.	This is prohibited under US GAAP.
Leveraged leases	Leveraged lease accounting is not permitted under IFRS 16.	Leveraged lease accounting is eliminated for leases that commence on or after the effective date of ASC 842. However, leveraged leases that commenced before the effective date are grandfathered. If an existing leveraged lease is modified on or after the effective date, the lease is accounted for under ASC 842 and no longer accounted for as a leveraged lease.

Appendix 3

Key differences between IFRS 16 and IAS 17 from ERNST and YOUNG (2018)

	IFRS 16	IAS 17
Definition of a lease	Under IFRS 16, a lease is a contract, or part of a contract, that conveys the right to control the use of an asset (the underlying asset) for a period of time in exchange for consideration. To determine if the right to control has been conveyed to the customer, an entity assesses whether, throughout the period of use, the customer has the right to obtain substantially all of the economic benefits from the use of the identified asset and the right to direct the use of the identified asset. Section 2.1 *Determining whether an arrangement contains a lease*	IAS 17 defines a lease as an agreement whereby the lessor conveys to the lessee, in return for a payment or series of payments, the right to use an asset for an agreed period of time. Under IFRIC Interpretation 4 *Determining whether an Arrangement contains a Lease*, it is not necessary for an arrangement to convey the right to control the use of an asset to be in the scope of IAS 17.
Recognition exemptions		
Short term leases - lessees	Lessees can elect, by the class of underlying asset to which the right of use relates, to apply a method similar to IAS 17 operating lease accounting, to leases with a lease term of 12 months or less and without a purchase option. Section 4.1.1 *Short-term leases*	Not applicable
Leases of low-value assets - lessees	Lessees can elect, on a lease-by- lease basis, to apply a method similar to IAS 17 operating lease accounting, to leases of low-value assets (e.g., tablets and personal computers, small items of office furniture and telephones). Section 4.1.2 *Leases of low-value assets*	Not applicable

	IFRS 16	IAS 17
Classification		
Lease classification – lessees	Lessees apply a single recognition and measurement approach for all leases, with options not to recognise right-of-use assets and lease liabilities for short-term leases and leases of low-value assets. Section 4.1 *Initial recognition*	Lessees apply a dual recognition and measurement approach for all leases. Lessees classify a lease as a finance lease if it transfers substantially all the risks and rewards incidental to ownership. Otherwise, a lease is classified as an operating lease.
Measurement		
Lease payments included in the initial measurement - lessees	At the commencement date, lessees (except short-term leases and leases of low-value assets) measure the lease liability at the present value of the lease payments to be made over the lease term. Lease payments include: (a) Fixed payments (including in-substance fixed payments), less any lease incentives receivable (b) Variable lease payments that depend on an index or a rate, initially measured using the index or rate at the commencement date (c) Amounts expected to be payable by the lessee under residual value guarantees (d) The exercise price of a purchase option if the lessee is reasonably certain to exercise that option (e) Payments of penalties for terminating the lease, if the lease term reflects the lessee exercising an option to terminate the lease Section 4.2.2 *Lease liability,* In addition, the cost of the right-of-use asset comprises: (a) The lease liability (b) Lease payments made at or before the commencement date, less any lease incentives received (c) Initial direct costs (d) Asset retirement obligations, unless those costs are incurred to produce inventories Section 4.2.1 *right-of-use assets*	At the commencement of the lease term, lessees recognise finance leases as assets and liabilities in their statements of financial position at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments, each determined at the inception of the lease. Minimum lease payments are the payments over the lease term that the lessee is or can be required to make, excluding contingent rent, costs for services and taxes to be paid by and reimbursed to the lessor, together with, for a lessee, any amounts guaranteed by the lessee or by a party related to the lessee. No assets and liabilities are recognised for the initial measurement of operating leases.

Reassessment of lease liability - lessees	After the commencement date, lessees are required to remeasure the lease liability when there is a lease modification (i.e., a change in the scope of a lease, or the consideration for a lease that was not part of the original terms and conditions of the lease) that is not accounted for as a separate contract. Section 4.5 *Lease modifications* Lessees are also required to remeasure lease payments upon a change in any of the following: • The lease term (section 3.4.1) • The assessment of whether the lessee is reasonably certain to exercise an option • to purchase the underlying asset (section 3.4.1.1) • The amounts expected to be payable under residual value guarantees (section 3.5.6) • Future lease payments resulting from a change in an index or rate (section 3.5.3) Section 3.5.9 *Reassessment of the lease liability*	Not dealt with by current IFRS
Measurement basis for right-of-use assets other than cost model – lessees	If a lessee applies the fair value model in IAS 40 to its investment property, under IFRS 16, the lessee also applies the fair value model to right-of-use assets that meet the definition of investment property. Section 4.3.1 *right-of-use assets*	Property interests held by lessees that are accounted for as investment property is measured under IAS 40 and thus outside the scope of IAS 17.

	IFRS 16	IAS 17
Lease modifications		
Lease modifications to an operating lease - lessors	Lessors account for a modification to an operating lease as a new lease from the effective date of the modification, considering any prepaid or accrued lease payments relating to the original lease as part of the lease payments for the new lease. Section 5.5.2 *Modification to an operating lease*	Not dealt with by current IFRS
Lease modifications which do not result in new separate leases - lessees and lessors	Lessees: (a) Allocate the consideration in the modified contract (b) Determine the lease term of the modified lease (c) Remeasure the lease liability by discounting the revised lease payments using a revised discount rate with a corresponding adjustment to a right-of-use asset; In addition, lessees recognise in profit or loss any gain or loss relating to the partial or full termination of the lease. Lessors: If a lease would have been an operating lease, had the modification been in effect at the inception date, lessors in a finance lease: (i) Account for the modification as a new lease (ii) Measure the carrying amount of the underlying asset as the net investment in the lease immediately before the effective date of the modification Otherwise, the modification is accounted for in accordance with IFRS 9 Financial Instruments. Sections 4.5.2 *Lessee accounting for a modification that does not result in a separate lease and* 5.5.1.2 *Lessor accounting for a modification that does not result in a separate lease for lessees and lessors, respectively.*	Not dealt with by current IFRS

	IFRS 16	IAS 17
Presentation and disclosure		
Presentation – lessees	Statement of financial position- present right-of-use assets (other than those that meet the definition of an investment property) separately from other assets. If a lessee does not present right-of-use assets separately in the statement of financial position, the lessee is required to include right-of-use assets within the same line item as that within which the corresponding underlying assets would be presented if they were owned and disclose which line items in the statement of financial position include those right-of-use assets. Lease liabilities are also presented separately from other liabilities. If the lessee does not present lease liabilities separately in the statement of financial position, the lessee is required to disclose which line items in the statement of financial position include those liabilities. Statement of profit or loss – present interest expense on the lease liability separately from the depreciation charge for the right-of-use asset. Interest expense on the lease liability is a component of finance costs, which paragraph 82(b) of IAS 1 *Presentation of Financial Statements* requires to be presented separately in the statement of profit or loss. Cash flow statement – classify cash payments for the principal portion of the lease liability within financing activities; cash payments for the interest portion of the lease liability applying the requirements in IAS 7 for interest paid; and short-term lease payments, payments for leases of low-value assets and variable lease payments not included in the measurement of the lease liability within operating activities. Section 4.7 *Presentation*	Presentation in the statement of financial position- not dealt with by current IFRS Statement of profit or loss – operating lease expense is presented as a single item Cash flow statement- for operating leases, cash payments are included within operating activities
Disclosure- lessees and lessors	Detailed disclosures including the format of disclosure, are required under IFRS 16. In addition, qualitative and quantitative information about leasing activities is	Quantitative and qualitative disclosures are required, but generally fewer disclosures are required than under IFRS 16.

	required in order to meet the disclosure objective. Sections 4.8 Disclosure and 5.8 Disclosure for lessees and lessors, respectively	

	IFRS 16	IAS 17
Sale and leaseback transactions		
Sale and leaseback transactions – determining whether a sale has occurred	Seller-lessees and buyer-lessors apply the requirements in IFRS 15 to determine whether a sale has occurred in a sale and leaseback transaction. Section 7.1 *Determining whether the transfer of an asset is a sale*	IAS 17 focuses on whether the leaseback is an operating or finance lease and does not explicitly require the transfer of the asset to meet the requirements for a sale in accordance with IAS 18 for seller-lessees and buyer- lessors.
Sale and leaseback transactions – accounting by seller-lessees	The seller-lessee measures the right-of-use asset arising from the leaseback at the proportion of the previous carrying amount of the asset that relates to the right-of-use retained by the seller-lessee and recognises only the amount of any gain or loss that relates to the rights transferred to the buyer- lessor. Section 7.2.1 *Accounting for the sale*	If a sale and leaseback transaction results in a finance lease, any excess of sales proceeds over the carrying amount is deferred and amortised over the lease term. If a sale and leaseback transaction results in an operating lease, and it is clear that the transaction is established at fair value, any profit or loss is recognised immediately.
Sale and leaseback transactions – accounting by seller-lessees for transactions not at fair value	If the fair value of the consideration for the sale of an asset does not equal the fair value of the asset, or if the payments for the lease are not at market rates, an entity is required to measure the sale proceeds at fair value with an adjustment either as a prepayment of lease payments (any below-market terms) or additional financing (any above-market terms) as appropriate. Section 7.2.3 *Adjustment for off-market terms*	If a sale and leaseback transaction results in an operating lease and the sale price is • Below fair value – any profit or loss is recognised immediately except that, if the loss is compensated for by future lease payments at below market price, it is deferred and amortised in proportion to the lease payments over the period for which the asset is expected to be used • Above fair value – the excess over fair value is deferred and amortised over the period for which the asset is expected to be used

	IFRS 16	IAS 17
Business combinations		
Business combinations – acquiree is a lessee – initial measurement	The acquirer is not required to recognise right-of-use assets and lease liabilities for leases with a remaining lease term less than 12 months from the acquisition date, or leases for which the underlying asset is of low value. The acquirer measures the right-of-use asset at the same amount as the lease liability, adjusted to reflect favourable or unfavourable terms of the lease, relative to market terms. Section 8.1.*1 Initial measurement of a lease*	There is no exemption for leases with a remaining lease term less than 12 months from the acquisition date or leases for which the underlying asset is of low value. An intangible asset is recognised if terms of the operating lease are favourable relative to market terms and a liability is recognised if terms are unfavourable relative to market terms. An intangible asset may be associated with an operating lease, which may be evidenced by market participants' willingness to pay a price for the lease even if it is at market terms.

Appendix 4
Tables supporting IFRS 16 impact measurements

The following supporting tables were used for the calculations:

	Company name PREMIUM SHARES	Estimated impact in 2016 as millions of HUF	Estimated impact in 2017 as millions of HUF	Estimated impact in 2018 as millions of HUF	Total equity value 2018 as millions of HUF	Total assets value in 2018 as millions of HUF
1.	MOL Nyrt.	91 215	31 605	92 380	2 309 946	4 611 581
2.	Magyar Telekom Nyrt.	44 082	40 917	146 012	580 491	1 155 996
3.	Richter Nyrt.	17 811	15 555	11 188	680 185	797 883
4.	Állami Nyomda	N/A	57	2 468	7 142	19 304
5.	Appenninn Nyrt.*	N/A	N/A	N/A	19 861	39 966
6.	CIG Pannónia Életbiztosító Nyrt.	N/A	N/A	167	17 392	110 776
7.	Duna House Holding Nyrt.	N/A	N/A	N/A	5 501	11 078
8.	Graphisoft Park SE*	9 747	17	19	2 368	2 406
9.	Konzum Nyrt.	N/A	N/A	N/A	73 841	144 939
10.	Masterplast Nyrt.*	N/A	N/A	N/A	9 469	24 385
11.	OPUS Global Nyrt.	N/A	N/A	N/A	280 354	576 723
12.	OTP Nyrt.**	N/A**	N/A**	46 677	1 826 657	14 590 288
13.	PannErgy Nyrt.	75	45	50	9 867	25 811
14.	Rába Nyrt.	268	274	226	20 865	42 079
15.	Waberer's Nyrt.*	N/A	N/A	N/A	46 259	231 214
16.	Zwack Unicum Nyrt.	N/A	N/A	N/A	6 827	10 677
17.	ALTEO Nyrt.	0	156	450	5 145	22 859
18.	Budapesti Ingatlan Nyrt.	0	0	N/A	41 452	53 409
19.	Takarék Jelzálogbank Nyrt.	0	4 415	3 961	55 236	754 516
	Total	**168 120**	**93 011**	**303 454**	**5 998 856**	**23 225 890**

Table 38. IAS 17.35 disclosure requirements for Budapest Stock Exchange-listed companies 2016-2018

Source: respected companies IFRS financial statements from 2016-2018

N/A – Not available in the notes is the reference to the operating lease transactions. These were not presented in the notes. (This should be considered as either finance lease types that are used or operational lease transactions that did not occur, or they did not represent any significant amount on the balance sheet.)
**Financial report issued in non HUF currency – for balance sheet items the year-end National Bank rates were used, which are as follows: 2015 - 2016 – 311.02 HUF/EUR / 2017 – 310.14 HUF/EUR / 2018 – 318.87 HUF/EUR*
*** Financial Institutions – consolidated reports are not comparable to non-financial entities. OTP Bank includes several lease entities with complex financial transactions.*

	Company name STANDARD and T RÉSZVÉNYEK	Estimated impact in 2016 as millions of HUF	Estimated impact in 2017 as millions of HUF	Estimated impact in 2018 as millions of HUF	Total equity value 2018 as millions of HUF	Total assets value in 2018 as millions of HUF
1.	4iG Nyrt	0	0	0	2 618	8 395
2.	AKKO INVEST Nyrt	0	0	0	30	66
3.	AUTO WALLIS Nyrt	0	0	0	3 172	20 494
4.	Budapesti Elektromos Művek Nyrt	19	20	36	20 646	279 079
5.	CSEPEL HOLDING Nyrt	0	0	0	-351 225	1 299 258
6.	ÉMÁSZ Nyrt	8	20	19	91 859	94 721
7.	ENEFI ENERGIAHATÉKONYSÁGI Nyrt	0	0	0	1 362	1 759
8.	EST MEDIA Vagyonkezelő Nyrt	0	0	0	34	90
9.	FINEX Nyrt*	0	0	0	38 253 047	63 534 095
10.	FORRÁS Nyrt	0	0	0	9 000	0
11.	FUTURAQUA Nyrt	0	0	0	151	182
12.	KARTONPACK Nyrt	0	0	0	1 548	0
13.	KULCS-SOFT Nyrt	0	0	0	469	1 568
14.	NORDTELEKOM Nyrt	0	0	0	431 416	525 833
15.	NUTEX Nyrt	0	0	0	1 125 448	1 150 840
16.	OTT-ONE Nyrt	0	0	0	2 285	2 447
17.	ŐRMESTER Nyrt	0	0	0	211	588
18.	SET GROUP Nyrt	0	0	0	443	805
19.	UBH HOLDING Nyrt	0	0	0	69	76
	Total	**27**	**40**	**55**	**39 592 584**	**66 920 296**

Table 39. IAS 17.35 disclosure requirements for Budapest Stock Exchange-listed companies 2016/2018

Source: respected companies IFRS financial statements from 2016/2018

N/A – Not available in the notes is the reference to the operating lease transactions. These were not presented in the notes. (This should be considered as either finance lease types that are used or operational lease transactions that did not occur, or they did not represent any significant amount on the balance sheet.)

**Financial report issued in non HUF currency – for balance sheet items the year-end National Bank rates were used, which are as follows: 2015 - 2016 – 311.02 HUF/EUR / 2017 – 310.14 HUF/EUR / 2018 – 318.87 HUF/EUR*

From the listed entities, the last section in the table below analysed the mortgage papers are as follows:

	Company name MORTGAGE papers	Estimated impact in 2016 as millions of HUF	Estimated impact in 2017 as millions of HUF	Estimated impact in 2018 as millions of HUF	Total equity value 2018 as millions of HUF	Total assets value in 2018 as millions of HUF
1.	ERSTE Jelzálogbank Zrt.	0	N/A	N/A	10 278	165 572
2.	K&H Jelzálogbank Zrt.	N/A	N/A	N/A	3 567	107 311
3.	OTP JB Zrt.	N/A	N/A	N/A	75 784	1 209 239
4.	Takarék Jelzálogbank Nyrt.	4 925	4 415	3 961	55 236	754 516
5.	Unicredit Jelzálogbank Zrt.	0	N/A	N/A	19 975	220 127
	Total	**4 925**	**4 415**	**3 961**	**164 840**	**2 456 765**

Table 40. IAS 17.35 disclosure requirements for Budapest Stock Exchange-listed companies 2016/2018

Source: Respected Companies IFRS Financial Statements from 2016/2018

N/A – Not available in the notes is the reference to the operating lease transactions. These were not presented in the notes. (This should be considered as either finance lease types that are used or operational lease transactions that did not occur, or they did not represent any significant amount on the balance sheet.)

	Company name BANKS	Estimated impact in 2017 as millions of EUR	Estimated impact in 2018 as millions of EUR	Total equity value 2018 as millions of EUR	Total assets value in 2018 as millions of EUR
1.	Bank of China	N/A	4,3	52,7	827,0
2.	BNP	0,9	1,0	5,3	846,2
3.	Budapest Bank	N/A	N/A	483,1	3 878,5
4.	Cetelem Bank	0	0	103,7	364,9
5.	CIB Bank	N/A	0	687,4	5 974,5
6.	Citibank	88,7	76,4	7 867,6	51 632,2
7.	Cofidis	0	3,4	19,7	257,9
8.	Commerzbank	0,1	0,1	92,4	908,8
9.	Deutsche Bank	N/A	N/A	9,1	360,6
10.	Duna Takarék	N/A	N/A	14,0	277,7
11.	Erste Bank	118,1	56,8	1 122,3	8 039,3
12.	Gránit Bank	0	0	41,7	1 108,5
13.	ING Bank	0,4	0,5	146,6	1 789,8
14.	K&H Bank	26,5	27,1	949,6	10 127,1
15.	KDB Bank	N/A	4,2	63,5	722,0
16.	Magnet Bank	0	0	40,1	474,2
17.	Merkantil Bank	0	0	118,9	1 271,6
18.	MKB Bank	17,8	11,2	496,0	5 825,5
19.	NHB Bank	N/A	N/A	10,6	164,5
20.	Oberbank	N/A	N/A	1 948,4	21 148,4
22.	Polgári Bank	0	0	7,7	121,1
23.	Porsche Bank	6,3	6,2	24,5	195,6
24.	Raiffeisen Bank	47,1	41,7	651,7	7 557,2
25.	Sberbank	9,4	15,9	139,7	1 147,3
26.	Sopron Bank	1,0	0,7	26,3	231,5
27.	Takarékbank Zrt.	N/A	N/A	11,2	199,5
28.	Takarék Kereskedelmi Bank	0	0	70,4	1 705,7
29.	Unicredit Bank	0	8,6	1 097,8	9 580,5
	Total	**316,5**	**258,2**	**16 302,0**	**136 737,8**

Table 41. IAS 17.35 disclosure requirements for Banks in Hungary 2017/2018

Source: Respected Companies IFRS Financial Statements from 2017/2018

	Company name DAX 30	Estimated impact in 2016 as millions of EUR	Estimated impact in 2017 as millions of EUR	Estimated impact in 2018 as millions of EUR	Total equity value 2018 as millions of EUR	Total assets value in 2018 as millions of EUR
1.	adidas Aktie	2 500	2 649	2 984	6 364	15 612
2.	Allianz Aktie	2 857	2 701	2 140	63 679	897 567
3.	BASF	1 513	1 410	1 482	36 109	86 556
4.	Bayer Aktie	1 101	801	1 271	46 148	126 285
5.	Beiersdorf Aktie	0	0	0	5 647	8 871
6.	BMW Aktie	2 444	2 474	2 694	58 088	208 980
7.	Continental Aktie	1 302	1 395	1 535	18 333	40 445
8.	Covestro Aktie	0	0	0	5 375	11 084
9.	Daimler Aktie	16 029	16 600	18 336	66 053	281 619
10.	Deutsche Bank Aktie	3 803	4 506	6 244	68 737	1 348 137
11.	Deutsche Börse Aktie	353	325	433	4 963	161 899
12.	Deutsche Post Aktie	8 188	0	0	13 873	50 470
13.	Deutsche Telekom Aktie	2 300	2 116	1 915	43 437	145 375
14.	EON Aktie	815	856	585	8 518	54 324
15.	Fresenius Aktie	4 471	5 525	7 389	25 008	56 703
16.	Fresenius Medical Care Aktie	4 174 044	4 505 026	5 527 638	12 902	26 242
17.	HeidelbergCement Aktie	0	1 333	1 599	16 822	35 783
18.	Henkel vz Aktie	404	394	535	17 093	29 623
19.	Infineon Aktie	598	308	301	6 446	10 879
20.	Linde Aktie*	538	485	0	N/A	N/A
22.	Lufthansa Aktie	2 301	2 547	3 089	9 573	38 213
23.	Merck Aktie	362	530	577	17 233	36 888
24.	Münchener Rückversicherungs-Gesellschaft Aktie	495	409	437	26 500	270 168
25.	RWE Aktie	2 050	2 211	572	14 257	80 108
26.	SAP Aktie	1 577	1 458	1 442	28 877	51 491
27.	Siemens Aktie	3 459	3 341	3 192	48 046	138 915
28.	thyssenkrupp Aktie	54	51	64	3 274	33 868
28.	Volkswagen (VW) vz Aktie	8 464	8 113	9 312	117 342	458 156
29.	Vonovia Aktie	62	82	82	19 664	49 388
30.	Wirecard Aktie	53	78	161	1 923	5 855
	Total	**4 242 138**	**4 567 723**	**5 596 009**	**810 284**	**4 759 505**

Table 42. IAS 17.35 disclosure requirements for DAX30 companies 2016/2018

Source: Respected Companies IFRS Financial Statements from 2016/2018
** Year 2018 not applicable due to M&A (Merger & Acquisition)*

Applied assumptions:

The calculations and the impact estimations required the following assumptions:

1) **Discount rate**: In all discounting calculation I have applied a 5% discount rate, which is consistent with the IASB and EFRAG impact analyses. IASB calculated this rate on a global sample, testing 10 000+ companies and EFRAG applied this rate consistently as well. (IASB, 2016)

   The discount rate calculation is due to the need to determine for each lease (older than short-term (within 1 year) leases) measuring lease assets and lease liabilities at the present value. In order to provide the disclosures required, companies need to have an inventory of leases, and information about the lease term and future lease payments for each lease. To mitigate costs, companies are permitted to use the incremental borrowing rate at the date of the initial application for each portfolio of similar assets.
2) **Linear distribution**: For those companies that reported operating lease commitments using the time bands I assumed a constant amount in years. It is a valid assumption for each category.
3) **Long-**term estimations: In time band year 5 and beyond the commitments in line with IFRS requirements calculated until year 10.
4) **Single set of assumptions**: The calculation applies a single set of assumptions to all leases without taking into account the specific individual terms.

Hungarian companies lease impact estimation

	Data in millions of HUF		2016							
n	Company name	Share type	Less than 1 year 2016	1-5 years 2016	Over 5 years 2016	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2016	Total Equity (in millions of HUF) 2016	Future payments for off balance sheet leases / total equity 2016	Total assets (in millions of HUF) 2016	Future payments for off balance sheet leases / total assets 2016
1.	Budapesti Elektromos Művek Nyrt	Standard	19	0	0	19	161 828	0,01%	232 151	0,01%
2.	ÉMÁSZ Nyrt	Standard	8	0	0	8	77 285	0,01%	104 901	0,01%
3.	MOL Nyrt.	Premium	6 384	84 079	752	91 215	1 801 626	5,06%	4 103 786	2,22%
4.	Magyar Telekom Nyrt.	Premium	10 723	26 274	7 085	44 082	538 490	8,19%	1 175 529	3,75%
5.	Richter Nyrt.	Premium	3 798	9 604	4 409	17 811	678 002	2,63%	813 877	2,19%
6.	Állami Nyomda	Premium	0	0	0	0	7 374	0,00%	15 374	0,00%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	0	0	0	3 972	0,00%	77 394	0,00%
8.	Graphisoft Park SE*	Premium	2 852	4 316	2 580	9 747	7 318	133,20%	24 779	39,34%
9.	OTP Nyrt.**	Premium	0	0	0	0	1 420 649	0,00%	11 307 665	0,00%
10.	PannErgy Nyrt.	Premium	19	53	0	72	8 889	0,81%	25 255	0,29%
11.	Rába Nyrt.	Premium	110	158	0	268	18 679	1,43%	33 502	0,80%
12.	ALTEO Nyrt.	Premium	0	0	0	0	4 897	0,00%	16 148	0,00%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 304	1 846	775	4 925	53 116	9,27%	333 391	1,48%
14.	Bank of China	Bank	-	-	-	-	-	-	-	-
15.	BNP	Bank	-	-	-	-	-	-	-	-
16.	CIB Bank	Bank	-	-	-	-	-	-	-	-
17.	Citibank	Bank	-	-	-	-	-	-	-	-
18.	Cofidis	Bank	-	-	-	-	-	-	-	-
19.	Commerzbank	Bank	-	-	-	-	-	-	-	-
20.	Erste Bank	Bank	-	-	-	-	-	-	-	-
21.	ING Bank	Bank	-	-	-	-	-	-	-	-
22.	K&H Bank	Bank	-	-	-	-	-	-	-	-
23.	KDB Bank	Bank	-	-	-	-	-	-	-	-
24.	MKB Bank	Bank	-	-	-	-	-	-	-	-
25.	Porsche Bank	Bank	-	-	-	-	-	-	-	-
26.	Raiffeisen Bank	Bank	-	-	-	-	-	-	-	-
27.	Sberbank	Bank	-	-	-	-	-	-	-	-
28.	Sopron Bank	Bank	-	-	-	-	-	-	-	-
29.	Unicredit Bank	Bank	-	-	-	-	-	-	-	-
30.	Wizz Air Hungary Kft	unlisted	76 136	295 492	175 249	546 876	170 468	320,81%	352 806	155,01%
	Total		102 352	421 822	190 849	715 023	4 952 592	14,44%	18 616 556	3,84%

Table 43. Hungarian companies operational lease obligations in millions of HUF by contract maturities in 2016

Source: Self-prepared table based on reported financial statements

	Data in millions of HUF		2017							
n	Company name	Share type	Less than 1 year 2017	1-5 years 2017	Over 5 years 2017	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2017	Total Equity (in millions of HUF) 2017	Future payments for off balance sheet leases / total equity 2017	Total assets (in millions of HUF) 2017	Future payments for off balance sheet leases / total assets 2017
1.	Budapesti Elektromos Művek Nyrt	Standard	20	0	0	20	168 514	0,01%	245 405	0,01%
2.	ÉMÁSZ Nyrt	Standard	20	0	0	20	81 136	0,02%	104 907	0,02%
3.	MOL Nyrt.	Premium	10 838	18 632	2 135	31 605	2 055 771	1,54%	4 231 700	0,75%
4.	Magyar Telekom Nyrt.	Premium	11 501	24 569	4 847	40 917	547 195	7,48%	1 109 661	3,69%
5.	Richter Nyrt.	Premium	3 768	8 186	3 601	15 555	659 327	2,36%	760 865	2,04%
6.	Állami Nyomda	Premium	43	14	0	57	7 215	0,79%	17 673	0,32%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	0	0	0	9 015	0,00%	105 629	0,00%
8.	Graphisoft Park SE*	Premium	3	9	5	17	1 708	1,00%	1 751	0,98%
9.	OTP Nyrt.**	Premium	0	0	0	0	1 640 055	0,00%	13 190 228	0,00%
10.	PannErgy Nyrt.	Premium	25	20	0	45	9 024	0,49%	25 023	0,18%
11.	Rába Nyrt.	Premium	132	142	0	274	19 978	1,37%	36 438	0,75%
12.	ALTEO Nyrt.	Premium	18	70	39	126	5 119	2,47%	16 652	0,76%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 243	1 414	758	4 415	50 332	8,77%	610 577	0,72%
14.	Bank of China	Bank				N/A	16 547	-	143 316	-
15.	BNP	Bank	277	0	0	277	606	45,71%	265 205	0,10%
16.	CIB Bank	Bank				N/A	232 087	-	1 683 230	-
17.	Citibank	Bank	8 515	15 533	3 470	27 518	2 432 276	1,13%	13 534 788	0,20%
18.	Cofidis	Bank				0	5 480	0,00%	67 791 237	0,00%
19.	Commerzbank	Bank	31			31	28 932	0,11%	294 528	0,01%
20.	Erste Bank	Bank	4 046	13 967	18 618	36 631	339 278	10,80%	2 219 069	1,65%
21.	ING Bank	Bank	138			138	44 965	0,31%	478 931	0,03%
22.	K&H Bank	Bank	1 066	6 742	426	8 234	266 024	3,10%	3 041 317	0,27%
23.	KDB Bank	Bank				N/A	19 941	-	212 030	-
24.	MKB Bank	Bank	975	2 815	1 743	5 533	140 380	3,94%	2 044 987	0,27%
25.	Porsche Bank	Bank	84	253	1 626	1 963	8 761	22,40%	53 526	3,67%
26.	Raiffeisen Bank	Bank	3 091	11 105	405	14 601	202 852	7,20%	2 172 339	0,67%
27.	Sberbank	Bank	540	1 225	1 137	2 902	41 588	6,98%	349 672	0,83%
28.	Sopron Bank	Bank	113	211	0	324	7 857	4,13%	64 621	0,50%
29.	Unicredit Bank	Bank				0	339 036	0,00%	2 746 775	0,00%
30.	Wizz Air Hungary Kft	unlisted	96 046	393 735	257 743	747 524	239 789	311,74%	509 923	146,60%
	Total		143 533	498 642	296 553	938 727	9 620 789	9,76%	118 062 004	0,80%

Table 44. Hungarian companies operational lease obligations in millions of HUF by contract maturities in 2017

Source: Self-prepared table based on reported financial statements

	Data in millions of HUF		2018							
n	Company name	Share type	Less than 1 year 2018	1-5 years 2018	Over 5 years 2018	Future payments for off balance sheet leases (undiscounted) (in millions of HUF) 2018	Total Equity (in millions of HUF) 2018	Future payments for off balance sheet leases / total equity 2018	Total assets (in millions of HUF) 2018	Future payments for off balance sheet leases / total assets 2018
1.	Budapesti Elektromos Művek Nyrt	Standard	36	0	0	36	20 646	0,17%	279 079	0,01%
2.	ÉMÁSZ Nyrt	Standard	19	0	0	19	91 859	0,02%	94 721	0,02%
3.	MOL Nyrt.	Premium	14 539	38 599	39 242	92 380	2 309 946	4,00%	4 611 581	2,00%
4.	Magyar Telekom Nyrt.	Premium	21 501	52 837	71 674	146 012	580 491	25,15%	1 155 996	12,63%
5.	Richter Nyrt.	Premium	2 957	4 312	3 919	11 188	680 185	1,64%	797 883	1,40%
6.	Állami Nyomda	Premium	352	1 751	365	2 468	7 142	34,56%	19 304	12,78%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	72	95		167	17 392	0,96%	110 776	0,15%
8.	Graphisoft Park SE*	Premium	4	11	4	19	2 368	0,80%	2 406	0,79%
9.	OTP Nyrt.**	Premium	46 677	0	0	46 677	1 826 657	2,56%	14 590 288	0,32%
10.	PannErgy Nyrt.	Premium	18	33	0	50	9 867	0,51%	25 811	0,20%
11.	Rába Nyrt.	Premium	102	124	0	226	20 865	1,08%	42 079	0,54%
12.	ALTEO Nyrt.	Premium	19	65	222	305	5 145	5,93%	22 859	1,33%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 403	800	758	3 961	55 236	7,17%	754 516	0,52%
14.	Bank of China	Bank	1 380	0	0	1 380	16 814	8,21%	263 710	0,52%
15.	BNP	Bank	328	0	0	328	1 693	19,37%	269 823	0,12%
16.	CIB Bank	Bank	9	0	0	9	219 207	0,00%	1 905 081	0,00%
17.	Citibank	Bank	5 285	18 010	1 080	24 375	2 508 740	0,97%	16 463 965	0,15%
18.	Cofidis	Bank	1 100	0	0	1 100	6 289	17,49%	82 246	1,34%
19.	Commerzbank	Bank	32	0	0	32	29 457	0,11%	289 776	0,01%
20.	Erste Bank	Bank	4 033	9 527	4 550	18 110	357 864	5,06%	2 563 507	0,71%
21.	ING Bank	Bank	154	0	0	154	46 733	0,33%	570 723	0,03%
22.	K&H Bank	Bank	897	6 515	1 245	8 657	302 795	2,86%	3 229 244	0,27%
23.	KDB Bank	Bank	285	1 056	0	1 341	20 240	6,63%	230 216	0,58%
24.	MKB Bank	Bank	694	2 016	867	3 577	158 166	2,26%	1 857 579	0,19%
25.	Porsche Bank	Bank	88	259	1 615	1 963	7 818	25,10%	62 375	3,15%
26.	Raiffeisen Bank	Bank	3 187	6 266	3 832	13 285	207 815	6,39%	2 409 761	0,55%
27.	Sberbank	Bank	822	3 101	1 153	5 076	44 534	11,40%	365 837	1,39%
28.	Sopron Bank	Bank	113	99	0	211	8 388	2,52%	73 819	0,29%
29.	Unicredit Bank	Bank	2 732	0	0	2 732	350 050	0,78%	3 054 948	0,09%
30.	Wizz Air Hungary Kft	unlisted	106 772	416 793	236 947	760 513	337 696	225,21%	660 900	115,07%
	Total		216 611	562 267	367 474	1 146 352	10 252 097	11,18%	56 860 810	2,02%

Table 45. Hungarian companies operational lease obligations in millions of HUF by contract maturities in 2018

Source: Self-prepared table based on reported financial statements

DISCOUNTED TABLE BELOW:

	Data in millions of HUF		2016							
n	Company name	Share type	Less than 1 year 2016	1-5 years 2016	Over 5 years 2016	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2016	Total Equity (in millions of HUF) 2016	Future payments for off balance sheet leases / total equity 2016	Total assets (in millions of HUF) 2016	Future payments for off balance sheet leases / total assets 2016
1.	Budapesti Elektromos Művek Ny	Standard	19	0	0	19	161 828	0,01%	232 151	0,01%
2.	ÉMÁSZ Nyrt	Standard	8	0	0	8	77 285	0,01%	104 901	0,01%
3.	MOL Nyrt.	Premium	6 384	72 804	510	79 698	1 801 626	4,42%	4 103 786	1,94%
4.	Magyar Telekom Nyrt.	Premium	10 723	22 751	4 807	38 280	538 490	7,11%	1 175 529	3,26%
5.	Richter Nyrt.	Premium	3 798	8 316	2 991	15 105	678 002	2,23%	813 877	1,86%
6.	Állami Nyomda	Premium	0	0	0	0	7 374	0,00%	15 374	0,00%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	0	0	0	3 972	0,00%	77 394	0,00%
8.	Graphisoft Park SE*	Premium	2 852	3 737	1 750	8 339	7 318	113,95%	24 779	33,65%
9.	OTP Nyrt.**	Premium	0	0	0	0	1 420 649	0,00%	11 307 665	0,00%
10.	PannErgy Nyrt.	Premium	19	46	0	65	8 889	0,73%	25 255	0,26%
11.	Rába Nyrt.	Premium	110	137	0	247	18 679	1,32%	33 502	0,74%
12.	ALTEO Nyrt.	Premium	0	0	0	0	4 897	0,00%	16 148	0,00%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 304	1 598	526	4 428	53 116	8,34%	333 391	1,33%
14.	Bank of China	Bank	-	-	-	-	-	-	-	-
15.	BNP	Bank	-	-	-	-	-	-	-	-
16.	CIB Bank	Bank	-	-	-	-	-	-	-	-
17.	Citibank	Bank	-	-	-	-	-	-	-	-
18.	Cofidis	Bank	-	-	-	-	-	-	-	-
19.	Commerzbank	Bank	-	-	-	-	-	-	-	-
20.	Erste Bank	Bank	-	-	-	-	-	-	-	-
21.	ING Bank	Bank	-	-	-	-	-	-	-	-
22.	K&H Bank	Bank	-	-	-	-	-	-	-	-
23.	KDB Bank	Bank	-	-	-	-	-	-	-	-
24.	MKB Bank	Bank	-	-	-	-	-	-	-	-
25.	Porsche Bank	Bank	-	-	-	-	-	-	-	-
26.	Raiffeisen Bank	Bank	-	-	-	-	-	-	-	-
27.	Sberbank	Bank	-	-	-	-	-	-	-	-
28.	Sopron Bank	Bank	-	-	-	-	-	-	-	-
29.	Unicredit Bank	Bank	-	-	-	-	-	-	-	-
30.	Wizz Air Hungary Kft	unlisted	76 136	255 865	118 898	450 898	170 468	264,51%	352 806	127,80%
	Total		102 352	365 254	129 482	597 088	4 952 592	12,06%	18 616 556	3,21%

Table 46. Hungarian companies discounted operational lease obligations in millions of HUF by contract maturities in 2016

Source: Self-prepared table based on reported financial statements

DISCOUNTED TABLE BELOW:

	Data in millions of HUF		2017							
n	Company name	Share type	Less than 1 year 2017	1-5 years 2017	Over 5 years 2017	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2017	Total Equity (in millions of HUF) 2017	Future payments for off balance sheet leases / total equity 2017	Total assets (in millions of HUF) 2017	Future payments for off balance sheet leases / total assets 2017
1.	Budapesti Elektromos Művek Ny	Standard	20	0	0	20	168 514	0,01%	245 405	0,01%
2.	ÉMÁSZ Nyrt	Standard	20	0	0	20	81 136	0,02%	104 907	0,02%
3.	MOL Nyrt.	Premium	10 838	16 133	1 448	28 420	2 055 771	1,38%	4 231 700	0,67%
4.	Magyar Telekom Nyrt.	Premium	11 501	21 274	3 288	36 064	547 195	6,59%	1 109 661	3,25%
5.	Richter Nyrt.	Premium	3 768	7 088	2 443	13 299	659 327	2,02%	760 865	1,75%
6.	Állami Nyomda	Premium	43	12	0	55	7 215	0,76%	17 673	0,31%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	0	0	0	0	9 015	0,00%	105 629	0,00%
8.	Graphisoft Park SE*	Premium	3	8	3	14	1 708	0,84%	1 751	0,82%
9.	OTP Nyrt.**	Premium	0	0	0	0	1 640 055	0,00%	13 190 228	0,00%
10.	PannErgy Nyrt.	Premium	25	17	0	42	9 024	0,46%	25 023	0,17%
11.	Rába Nyrt.	Premium	132	123	0	255	19 978	1,27%	36 438	0,70%
12.	ALTEO Nyrt.	Premium	18	61	26	105	5 119	2,04%	16 652	0,63%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 243	1 224	514	3 982	50 332	7,91%	610 577	0,65%
14.	Bank of China	Bank			0	0	16 547	0,00%	143 316	0,00%
15.	BNP	Bank	277	0	0	277	606	45,71%	265 205	0,10%
16.	CIB Bank	Bank			0	0	232 087	0,00%	1 683 230	0,00%
17.	Citibank	Bank	8 515	13 450	2 354	24 319	2 432 276	1,00%	13 534 788	0,18%
18.	Cofidis	Bank			0	0	5 480	0,00%	67 791 237	0,00%
19.	Commerzbank	Bank	31		0	31	28 932	0,11%	294 528	0,01%
20.	Erste Bank	Bank	4 046	12 094	12 631	28 771	339 278	8,48%	2 219 069	1,30%
21.	ING Bank	Bank	138		0	138	44 965	0,31%	478 931	0,03%
22.	K&H Bank	Bank	1 066	5 838	289	7 193	266 024	2,70%	3 041 317	0,24%
23.	KDB Bank	Bank			0	0	19 941	0,00%	212 030	0,00%
24.	MKB Bank	Bank	975	2 437	1 183	4 595	140 380	3,27%	2 044 987	0,22%
25.	Porsche Bank	Bank	84	219	1 103	1 406	8 761	16,05%	53 526	2,63%
26.	Raiffeisen Bank	Bank	3 091	9 616	275	12 982	202 852	6,40%	2 172 339	0,60%
27.	Sberbank	Bank	540	1 061	771	2 372	41 588	5,70%	349 672	0,68%
28.	Sopron Bank	Bank	113	183	0	296	7 857	3,77%	64 621	0,46%
29.	Unicredit Bank	Bank			0	0	339 036	0,00%	2 746 775	0,00%
30.	Wizz Air Hungary Kft	unlisted	96 046	340 933	174 866	611 845	239 789	255,16%	509 923	119,99%
	Total		143 533	431 771	201 197	776 501	9 620 789	8,07%	118 062 004	0,66%

Table 47. Hungarian companies discounted operational lease obligations in millions of HUF by contract maturities in 2017

Source: Self-prepared table based on reported financial statements

DISCOUNTED TABLE BELOW:

	Data in millions of HUF		2018							
n	Company name	Share type	Less than 1 year 2018	1-5 years 2018	Over 5 years 2018	Future payments for off balance sheet leases (discounted) (in millions of HUF) 2018	Total Equity (in millions of HUF) 2018	Future payments for off balance sheet leases / total equity 2018	Total assets (in millions of HUF) 2018	Future payments for off balance sheet leases / total assets 2018
1.	Budapesti Elektromos Művek Ny	Standard	36	0	0	36	20 646	0,17%	279 079	0,01%
2.	ÉMÁSZ Nyrt	Standard	19	0	0	19	91 859	0,02%	94 721	0,02%
3.	MOL Nyrt.	Premium	14 539	33 423	26 624	74 585	2 309 946	3,23%	4 611 581	1,62%
4.	Magyar Telekom Nyrt.	Premium	21 501	45 751	48 627	115 880	580 491	19,96%	1 155 996	10,02%
5.	Richter Nyrt.	Premium	2 957	3 734	2 659	9 350	680 185	1,37%	797 883	1,17%
6.	Állami Nyomda	Premium	352	1 516	248	2 116	7 142	29,63%	19 304	10,96%
7.	CIG Pannónia Életbiztosító Nyrt.	Premium	72	82	0	154	17 392	0,89%	110 776	0,14%
8.	Graphisoft Park SE*	Premium	4	9	3	16	2 368	0,68%	2 406	0,67%
9.	OTP Nyrt.**	Premium	46 677	0	0	46 677	1 826 657	2,56%	14 590 288	0,32%
10.	PannErgy Nyrt.	Premium	18	28	0	46	9 867	0,47%	25 811	0,18%
11.	Rába Nyrt.	Premium	102	107	0	210	20 865	1,00%	42 079	0,50%
12.	ALTEO Nyrt.	Premium	19	56	150	225	5 145	4,38%	22 859	0,98%
13.	Takarék Jelzálogbank (FHB) Nyrt.	Premium	2 403	693	514	3 610	55 236	6,54%	754 516	0,48%
14.	Bank of China	Bank	1 380	0	0	1 380	16 814	8,21%	263 710	0,52%
15.	BNP	Bank	328	0	0	328	1 693	19,37%	269 823	0,12%
16.	CIB Bank	Bank	9	0	0	9	219 207	0,00%	1 905 081	0,00%
17.	Citibank	Bank	5 285	15 595	733	21 613	2 508 740	0,86%	16 463 965	0,13%
18.	Cofidis	Bank	1 100	0	0	1 100	6 289	17,49%	82 246	1,34%
19.	Commerzbank	Bank	32	0	0	32	29 457	0,11%	289 776	0,01%
20.	Erste Bank	Bank	4 033	8 249	3 087	15 369	357 864	4,29%	2 563 507	0,60%
21.	ING Bank	Bank	154	0	0	154	46 733	0,33%	570 723	0,03%
22.	K&H Bank	Bank	897	5 641	845	7 383	302 795	2,44%	3 229 244	0,23%
23.	KDB Bank	Bank	285	914	0	1 199	20 240	5,93%	230 216	0,52%
24.	MKB Bank	Bank	694	1 746	588	3 028	158 166	1,91%	1 857 579	0,16%
25.	Porsche Bank	Bank	88	224	1 096	1 408	7 818	18,01%	62 375	2,26%
26.	Raiffeisen Bank	Bank	3 187	5 426	2 600	11 213	207 815	5,40%	2 409 761	0,47%
27.	Sberbank	Bank	822	2 685	782	4 289	44 534	9,63%	365 837	1,17%
28.	Sopron Bank	Bank	113	85	0	198	8 388	2,36%	73 819	0,27%
29.	Unicredit Bank	Bank	2 732	0	0	2 732	350 050	0,78%	3 054 948	0,09%
30.	Wizz Air Hungary Kft	unlisted	106 772	360 899	160 757	628 429	337 696	186,09%	660 900	95,09%
	Total		216 611	486 865	249 313	952 789	10 252 097	9,29%	56 860 810	1,68%

Table 48. Hungarian companies discounted operational lease obligations in millions of HUF by contract maturities in 2018

Source: Self-prepared table based on reported financial statements

Appendix 5 -German DAX 30 entities with Hungarian subsidiaries in 2019

	German DAX30 Companies	Hungarian subsidiary entity				
Nr	Name	Name	Registry Number	Tax Number	Listed entity	Sztv. /IFRS
1	adidas Aktie	Adidas Budapest Sportcikkelőállító és Kereskedelmi Kft.	01 09 060492	10192018-2-43	No	Sztv.
2	Allianz Aktie	Allianz Hungária Biztosító Zártkörűen Működő Részvénytársaság/1989	01 10 041356	10337587-4-44	No	Sztv.
		Allianz Alapkezelő Zrt./2008	01 10 045969	14267967-4-42	No	Sztv.
		Allianz Foglalkoztatói Nyugdíjszolgáltató Zártkörűen Működő Részvénytársaság/2010	01 10 046806	22985826-4-42	No	Sztv.
		Allianz Hungária Önkéntes Kölcsönös Egészség -és Önsegélyező Pénztár/2004	01 99 008483	18116870-1-42	No	Sztv.
		ALLIANZ HUNGÁRIA ÖNKÉNTES NYUGDÍJPÉNZTÁR/1996	01 99 005788	18080966-2-42	No	Sztv.
3	BASF	BASF Hungária Vegyiáru és Kiegészítő Termék, Berendezés- és Szolgáltatás Kereskedelmi Korlátolt Felelősségű Társaság/1991	01 09 077596	10579194-2-44	No	Sztv.
4	Bayer Aktie	Bayer Hungária Kft.	01 09 063142	10263002-2-44	No	Sztv.
5	Beiersdorf Aktie	BEIERSDORF Korlátolt Felelősségű Társaság/1991	01 09 160767	10679232-2-44	No	Sztv.
6	BMW Aktie	BMW Manufacturing Hungary Korlátolt Felelősségű Társaság/2018	13 09 195537	26531436-2-13	No	Sztv.
7	Continental Aktie	Continental Automotive Hungary Korlátolt Felelősségű Társaság/1990	19 09 503741	10518869-2-19	No	Sztv.
		CONTINENTAL Hungaria Gumiabroncs Kereskedelmi Korlátolt Felelősségű Társaság/1990	13 09 070676	10505506-2-44	No	Sztv.
		ContiTech Fluid Automotive Hungária Korlátolt Felelősségű Társaság/1995	06 09 003838	11351331-2-06	No	Sztv.
		ContiTech Rubber Industrial Korlátolt Felelősségű Társaság/1993	06 09 002502	11087209-2-06	No	Sztv.
		ContiTech Magyarország Korlátolt Felelősségű Társaság/1993	15 09 062148	11246017-2-15	No	Sztv.
8	Covestro Aktie		Not applicable	Not applicable	Not applicable	N/A
9	Daimler Aktie	Mercedes-Benz Manufacturing Hungary Korlátolt Felelősségű Társaság/2008	03 09 119767	14398649-2-03	No	Sztv.
10	Deutsche Bank Aktie	Deutsche Bank AG Magyarországi Fióktelepe/2011	01 17 000707	23514614-2-41	No	Sztv.
11	Deutsche Börse Aktie		Not applicable	Not applicable	Not applicable	N/A
12	Deutsche Post Aktie		Not applicable	Not applicable	Not applicable	N/A
13	Deutsche Telekom Aktie	Magyar Telekom Távközlési Nyilvánosan Működő Részvénytársaság/1991	01 10 041928	10773381-2-44	Yes	IFRS

	German DAX30 Companies	Hungarian subsidiary entity				
Nr	Name	Name	Registry Number	Tax Number	Listed entity	Sztv. /IFRS
14	EON Aktie	E.ON Hungária Energetikai Zártkörűen Működő Részvénytársaság/1997	01 10 043518	12282225-2-44	No	Sztv.
		E.ON Business Services Hungary Korlátolt Felelősségű Társaság			No	Sztv.
		E.ON Dél-dunántúli Áramhálózati Zártkörűen Működő Részvénytársaság	02 10 060025	10732614-2-02	No	Sztv.
		E.ON Dél-dunántúli Gázhálózati Zártkörűen Működő Részvénytársaság			No	Sztv.
		E.ON Energetikai Tanácsadó Kft.			No	Sztv.
		E.ON Energiakereskedelmi Korlátolt Felelősségű Társaság			No	Sztv.
		E.ON Energiatermelő Korlátolt Felelősségű Társaság			No	Sztv.
		E.ON Észak-dunántúli Áramhálózati Zártkörűen Működő Részvénytársaság			No	Sztv.
		E.ON Gazdasági Szolgáltató Korlátolt Felelősségű Társaság			No	Sztv.
		E.ON Közép-dunántúli Gázhálózati Zártkörűen Működő Részvénytársaság			No	Sztv.
		E.ON Tiszántúli Áramhálózati Zártkörűen Működő Részvénytársaság			No	Sztv.
		E.ON Ügyfélszolgálati Korlátolt Felelősségű Társaság			No	Sztv.
15	Fresenius Aktie	Fresenius Kabi Hungary Vegy-, Gyógyszeripari és Kereskedelmi Korlátolt Felelősségű Társaság/1991	01 09 164646	10736687-2-41	No	Sztv.
16	Fresenius Medical Care Aktie	FRESENIUS MEDICAL CARE Magyarország Egészségügyi Korlátolt Felelősségű Társaság/1993	01 09 469583	11071101-2-41	No	Sztv.
17	HeidelbergCement Aktie		Not applicable	Not applicable	Not applicable	N/A
18	Henkel vz Aktie	Henkel Magyarország Korlátolt Felelősségű Társaság	01 09 307515	26201720-2-43	No	Sztv.
		Henkel Magyarország Operations Korlátolt Felelősségű Társaság	01 09 168340	10783050-2-44	No	Sztv.
19	Infineon Aktie	Infineon Technologies Bipoláris Korlátolt Felelősségű Társaság/2007			No	Sztv.
		Infineon Technologies Cegléd Teljesítményfélvezetőket Gyártó Korlátolt Felelősségű Társaság/1996			No	Sztv.
20	Linde Aktie	LINDE GÁZ Magyarország Zártkörűen Működő Részvénytársaság			No	Sztv.
		Linde Magyarország Anyagmozgatási Kft.			No	Sztv.
21	Lufthansa Aktie	DEUTSCHE LUFTHANSA AG			No	Sztv.
		Lufthansa AirPlus Servicekarten GmbH Magyarországi Közvetlen Kereskedelmi Képviselete			No	Sztv.
		Lufthansa Cargo AG Magyarországi Fióktelepe			No	Sztv.
		Lufthansa Systems Hungária Információs Technikai Szolgáltató és Szervíz Korlátolt Felelősségű Társaság			No	Sztv.
		Lufthansa Technik AG Magyarországi Fióktelepe			No	Sztv.
		Lufthansa Technik Budapest Repülőgép Karbantartó és Nagyjavító Korlátolt Felelősségű Társaság			No	Sztv.
		Lufthansa Technik Miskolc Korlátolt Felelősségű Társaság			No	Sztv.
22	Merck Aktie	MERCK Vegyi és Gyógyszeripari Kereskedelmi Korlátolt Felelősségű Társaság/1991	01 09 077842	10587287-2-44	No	Sztv.
23	Münchener Rückversicherungs-Gesellschaft Aktie		Not applicable	Not applicable	Not applicable	N/A

	German DAX30 Companies	Hungarian subsidiary entity				
Nr	Name	Name	Registry Number	Tax Number	Listed entity	Sztv. /IFRS
24	RWE Aktie	innogy-EnBW Magyarország Energiaszolgáltató Korlátolt Felelősségű Társaság/1996	01 09 468035	12135398-2-41	No	Sztv.
		innogy Hungária Tanácsadó Korlátolt Felelősségű Társaság/1999	01 09 684855	11951278-2-41	No	Sztv.
25	SAP Aktie	SAP Hungary Rendszerek, Alkalmazások és Termékek az Adatfeldolgozásban Informatikai Korlátolt Felelősségű Társaság/1997			No	Sztv.
26	Siemens Aktie	Siemens Gamesa Megújuló Energia Hungary Korlátolt Felelősségű Társaság			No	Sztv.
		Siemens Gamesa Renewable Energy Korlátolt Felelősségű Társaság			No	Sztv.
		Siemens Healthcare Korlátolt Felelősségű Társaság			No	Sztv.
		Siemens Mobility Korlátolt Felelősségű Társaság			No	Sztv.
		Siemens termelő, szolgáltató és kereskedelmi zártkörüen működő részvénytársaság			No	Sztv.
27	thyssenkrupp Aktie	thyssenkrupp Components Technology Hungary Korlátolt Felelősségű Társaság			No	Sztv.
		thyssenkrupp Industrial Solutions AG Magyarországi Fióktelep				
		thyssenkrupp Lift Korlátolt Felelősségű Társaság				
		thyssenkrupp Materials Hungary Zártkörűen Működő Részvénytársaság				
		ThyssenKrupp System Engineering GmbH Magyarországi Fióktelep				
28	Volkswagen (VW) vz Aktie	AUDI HUNGARIA Zártkörűen Működő Részvénytársaság			No	Sztv.
		Volkswagen Group Services Korlátolt Felelősségű Társaság/2008			No	Sztv.
		Porsche Bank Hungaria Zártkörűen Működő Rt./1994			No	Sztv.
		Porsche Biztosításközvetítő Korlátolt Felelősségű Társaság/1996			No	Sztv.
		Porsche Hungaria Kereskedelmi Kft./1990			No	Sztv.
		Porsche Ingatlankezelő Kft/1991			No	Sztv.
		Porsche Inter Auto Hungaria Korlátolt Felelősségű Társaság/2008			No	Sztv.
		Porsche Lizing és Szolgáltató Kft./1993			No	Sztv.
		Porsche Versicherungs, AG. Magyarországi Fióktelepe/2006			No	Sztv.
29	Vonovia Aktie		Not applicable	Not applicable	Not applicable	N/A
30	Wirecard Aktie		Not applicable	Not applicable	Not applicable	N/A

Table 49. German DAX 30 entities with Hungarian subsidiaries in 2019

Source: Self-prepared table based on reported financial statements

Appendix 6

XBRL description from the official XBRL site:

What is XBRL?

XBRL is the open international standard for digital business reporting, managed by a global not for profit consortium, XBRL International. We are committed to improving reporting in the public interest. XBRL is used around the world, in more than 50 countries. Millions of XBRL documents are created every year, replacing older, paper-based reports with more useful, more effective and more accurate digital versions. In a nutshell, XBRL provides a language in which reporting terms can be authoritatively defined. Those terms can then be used to uniquely represent the contents of financial statements or other kinds of compliance, performance and business reports. XBRL lets reporting information move between organisations rapidly, accurately and digitally.

The change from paper, PDF and HTML based reports to XBRL ones is a little bit like the change from film photography to digital photography, or from paper maps to digital maps. The new format allows you to do all the things that used to be possible, but also opens up a range of new capabilities because the information is clearly defined, platform-independent, testable and digital. Just like digital maps, digital business reports, in XBRL format, simplify the way that people can use, share, analyse and add value to the data.

What does XBRL do?

Often termed "bar codes for reporting", XBRL makes reporting more accurate and more efficient. It allows unique tags to be associated with reported facts, allowing:

- people publishing reports to do so with confidence that the information contained in them can be consumed and analysed accurately
- people consuming reports to test them against a set of business and logical rules, in order to capture and avoid mistakes at their source
- people using the information to do so in the way that best suits their needs, including by using different languages, alternative currencies and in their preferred style
- people consuming the information to do so confident that the data provided to them conforms to a set of sophisticated pre-defined definitions

Comprehensive definitions and accurate data tags allow the:

- preparation
- validation
- publication
- exchange
- consumption; and
- analysis

of business information of all kinds. Information in reports prepared using the XBRL standard is interchangeable between different information systems in entirely different organisations. This

allows for the exchange of business information across a reporting chain. People that want to report information, share information, publish performance information and allow straight through information processing all rely on XBRL.

In addition to allowing the exchange of summary business reports, like financial statements, and risk and performance reports, XBRL has the capability to allow the tagging of transactions that can themselves be aggregated into XBRL reports. These transactional capabilities allow system-independent exchange and analysis of significant quantities of supporting data and can be the key to transforming reporting supply chains.

Who uses it?

The international XBRL consortium is supported by more than 600 member organisations, from both the private and public sectors. The standard has been developed and refined over more than a decade and supports almost every kind of conceivable reporting, while providing a wide range of features that enhance the quality and consistency of reports, as well as their usability. XBRL is used in many different ways, for many different purposes, including by:

Regulators

- Financial regulators that need significant amounts of complex performance and risk information about the institutions that they regulate.
- Securities regulators and stock exchanges that need to analyse the performance and compliance of listed companies and securities, and need to ensure that this information is available to markets to consume and analyse.
- Business registrars that need to receive and make publicly available a range of corporate data about private and public companies, including annual financial statements.
- Tax authorities that need financial statements and other compliance information from companies in order to process and review their corporate tax affairs.
- Statistical and monetary policy authorities that need financial performance information from many different organisations.

Companies

- Companies that need to provide information to one or more of the regulators mentioned above.
- Enterprises that need to accurately move information around within a complex group.
- Supply chains that need to exchange information to help manage risk and measure activity.

Governments

- Government agencies that are simplifying the process of businesses reporting to government and reducing red tape, by either harmonising data definitions or consolidating reporting obligations (or both).

- Government agencies that are improving government reporting by standardising the way that consolidated or transactional reports are prepared and used within government agencies and/or published into the public domain.

Data Providers

Specialist data providers that use performance and risk information published into the market place and create comparisons, ratings and other value-added information products for other market participants.

Analysts and Investors

- Analysts that need to understand relative risk and performance.
- Investors that need to compare potential investments and understand the underlying performance of existing investments.

Accountants

Accountants use XBRL in support of clients reporting requirements and are often involved in the preparation of XBRL reports.

What are some of the most important features of XBRL?

Clear Definitions

XBRL allows the creation of reusable, authoritative definitions, called taxonomies, that capture the meaning contained in all of the reporting terms used in a business report, as well as the relationships between all of the terms. Taxonomies are developed by regulators, accounting standards setters, government agencies and other groups that need to clearly define information that needs to be reported upon. XBRL doesn't limit what kind of information is defined: it's a language that can be used and extended as needed.

Testable Business Rules

XBRL allows the creation of business rules that constrain what can be reported. Business rules can be logical or mathematical, or both and can be used, for example:

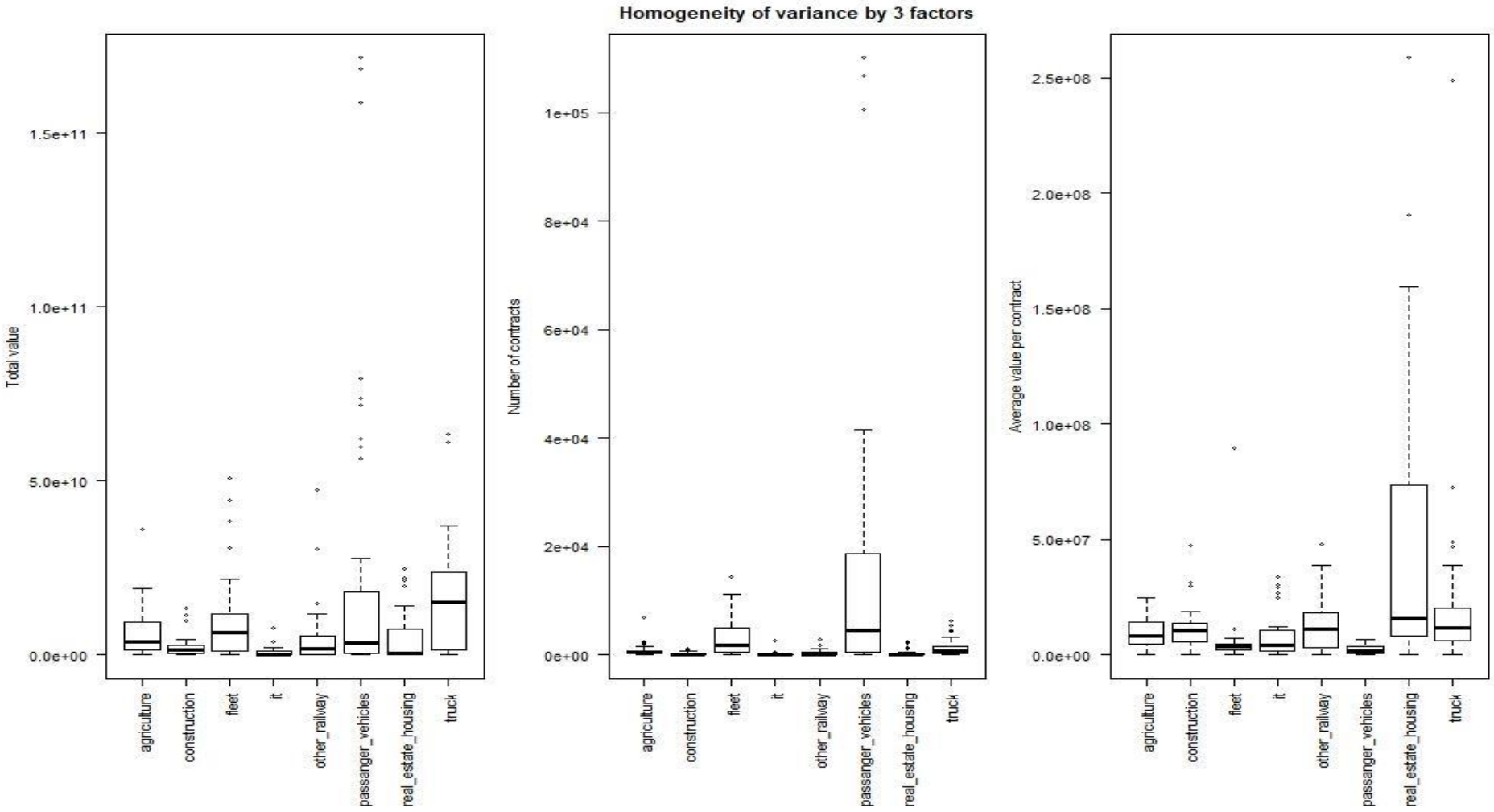
- stop poor quality information being sent to a regulator or third party, by being run by the preparer while the report is in draft.
- stop poor quality information being accepted by a regulator or third party, by being run at the point that the information is being received. Business reports that fail critical rules can be bounced back to the preparer for review and resubmission.
- flagging or highlighting questionable information, allowing prompt follow up, correction or explanation.
- create ratios, aggregations and other kinds of value-added information, based on the fundamental data provided.

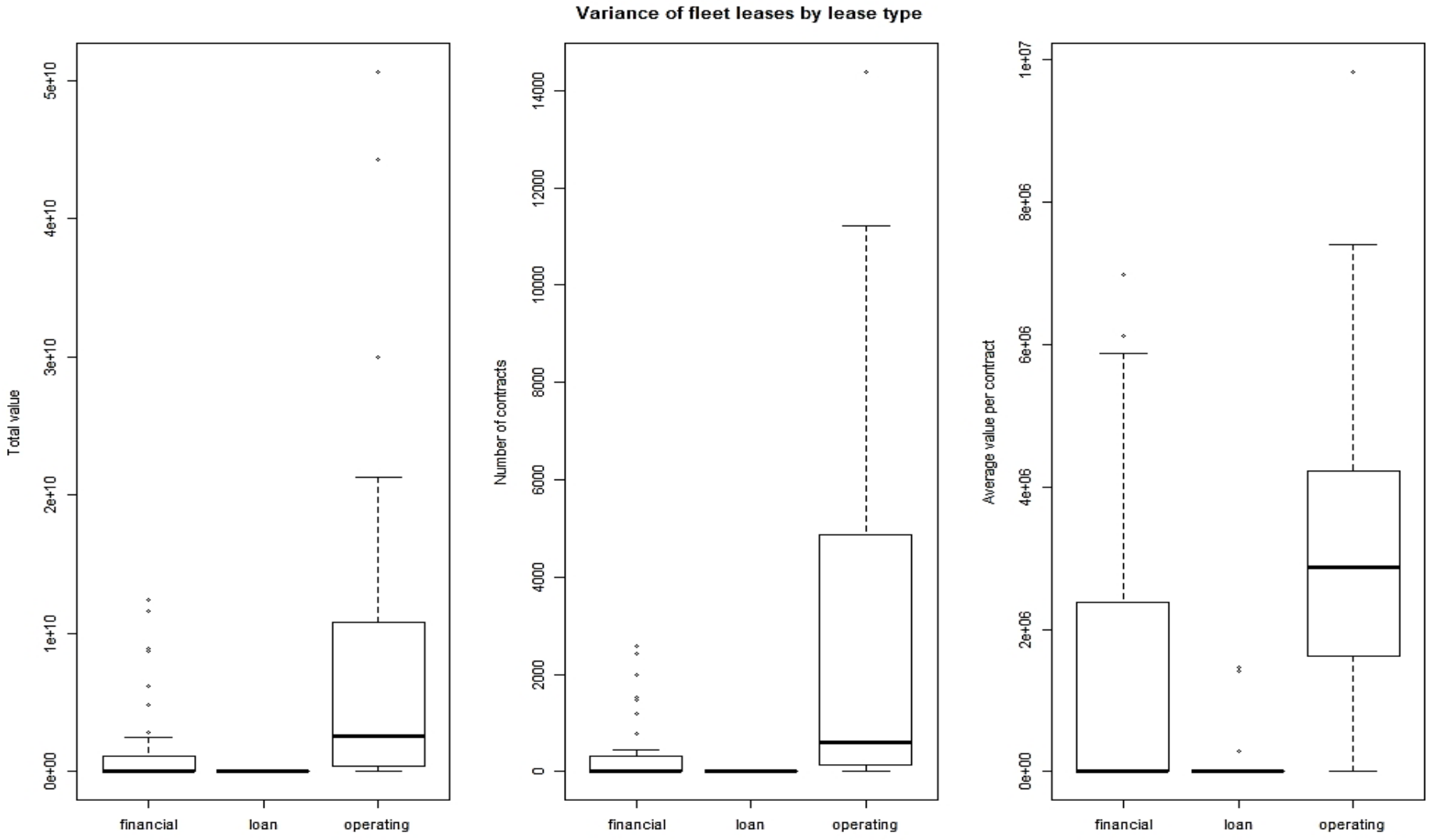
Strong Software Support

XBRL is supported by a very wide range of software from vendors large and small, allowing a very wide range of stakeholders to work with the standard.

Appendix 7

Homogeneity testing supporting documentation screenshots and scripts




Variance of fleet leases by lease type
Total value
0e+00
1e+10
2e+10
3e+10
4e+10
5e+10
financial
loan
operating
Number of contracts
0
2000
4000
6000
8000
10000
12000
14000
financial
loan
operating
Average value per contract
0e+00
2e+06
4e+06
6e+06
8e+06
1e+07
financial
loan
operating

```
shapiro.test(lease_list_2015$value_avg)

        Shapiro-Wilk normality test

data:  lease_list_2015$value_avg
W = 0.95475, p-value = 0.7588
```

```
> shapiro.test(lease_list_2016$value_avg)

        Shapiro-Wilk normality test

data:  lease_list_2016$value_avg
W = 0.90767, p-value = 0.338
```

```
> shapiro.test(lease_list_2017$value_avg)

        Shapiro-Wilk normality test

data:  lease_list_2017$value_avg
W = 0.91324, p-value = 0.3775
```

```
> bartlett.test(lease_list$value ~ asset_type)

        Bartlett test of homogeneity of variances

data:  lease_list$value by asset_type
Bartlett's K-squared = 18.735, df = 7, p-value = 0.009061
```

```
> bartlett.test(lease_list$number ~ asset_type)

        Bartlett test of homogeneity of variances

data:  lease_list$number by asset_type
Bartlett's K-squared = 32.817, df = 7, p-value = 2.864e-05
```

```
> bartlett.test(lease_list$value_avg ~ asset_type)

        Bartlett test of homogeneity of variances

data:  lease_list$value_avg by asset_type
Bartlett's K-squared = 18.377, df = 7, p-value = 0.01038
```

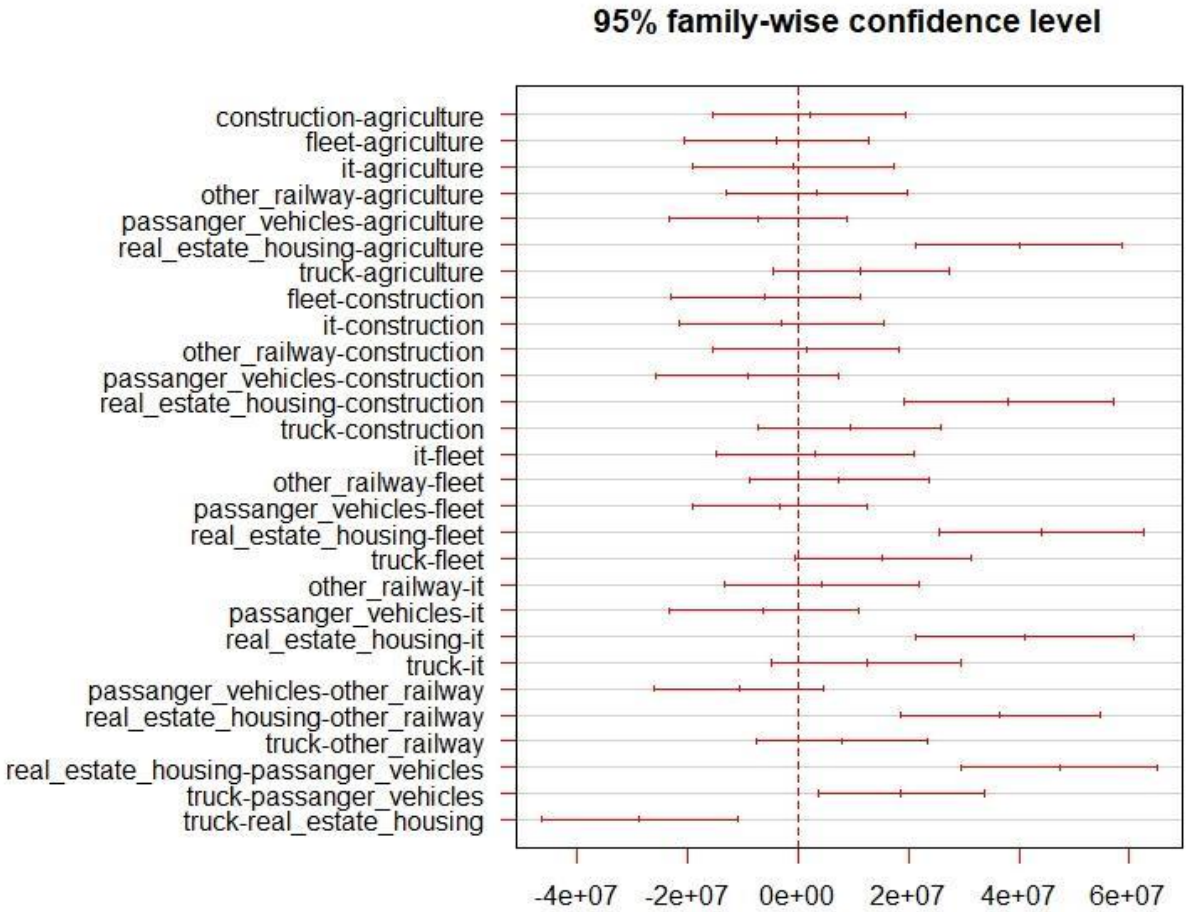
```
> sample1indep<-aov(value_avg ~ asset_type, data = lease_list)
> summary(sample1indep)
            Df    Sum Sq   Mean Sq F value   Pr(>F)
asset_type    7 5.158e+16 7.369e+15    11.6 3.61e-13 ***
Residuals   326 2.072e+17 6.355e+14
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
> TukeyHSD(sample1indep, conf.level = 0.95)
  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = value_avg ~ asset_type, data = lease_list)

$asset_type
                                diff        lwr       upr     p adj
construction-agriculture     2002485.7 -15435948.8  19440920 0.9999688
fleet-agriculture           -3915396.7 -20702140.8  12871347 0.9966288
```

it-agriculture	-929219.4	-19069645.9	17211207	0.9999999
other_railway-agriculture	3480525.3	-12953859.9	19914910	0.9981712
passanger_vehicles-agriculture	-7231729.0	-23226832.2	8763374	0.8661923
real_estate_housing-agriculture	40094094.7	21434118.9	58754070	**0.0000000**
truck-agriculture	11395053.6	-4666992.1	27457099	0.3762948
fleet-construction	-5917882.4	-23162870.0	11327105	0.9667541
it-construction	-2931705.1	-21496992.5	15633582	0.9997318
other_railway-construction	1478039.6	-15424144.8	18380224	0.9999952
passanger_vehicles-construction	-9234214.7	-25709594.7	7241165	0.6808509
real_estate_housing-construction	38091609.0	19018341.9	57164876	**0.0000001**
truck-construction	9392567.9	-7147811.0	25932947	0.6660292
it-fleet	2986177.4	-14968367.4	20940722	0.9996215
other_railway-fleet	7395922.0	-8833052.6	23624897	0.8613022
passanger_vehicles-fleet	-3316332.2	-19100309.1	12467645	0.9982619
real_estate_housing-fleet	44009491.4	25530170.6	62488812	**0.0000000**
truck-fleet	15310450.3	-541360.7	31162261	0.0669224
other_railway-it	4409744.6	-13215802.6	22035292	0.9947843
passanger_vehicles-it	-6302509.6	-23519194.1	10914175	0.9528705
real_estate_housing-it	41023314.1	21306174.4	60740454	**0.0000000**
truck-it	12324272.9	-4954622.1	29603168	0.3691020
passanger_vehicles-other_railway	-10712254.2	-26120958.5	4696450	0.4036520
real_estate_housing-other_railway	36613569.4	18453736.4	54773402	**0.0000001**
truck-other_railway	7914528.3	-7563654.8	23392711	0.7737570
real_estate_housing-passanger_vehicles	47325823.7	29562551.3	65089096	**0.0000000**
truck-passanger_vehicles	18626782.5	3615837.8	33637727	**0.0044763**
truck-real_estate_housing	-28699041.1	-46522616.3	-10875466	**0.0000389**



```
> shapiro.test(fleet_2015$total_average)
        Shapiro-Wilk normality test
data:  fleet_2015$total_average
W = 0.94788, p-value = 0.4917
```

```
> shapiro.test(fleet_2016$total_average)
        Shapiro-Wilk normality test
data:  fleet_2016$total_average
W = 0.9445, p-value = 0.479
```

```
> shapiro.test(fleet_2017$total_average)

        Shapiro-Wilk normality test

data:  fleet_2017$total_average
W = 0.95808, p-value = 0.6914
```

```
> bartlett.test(fleet_list$value ~ lease_type)

        Bartlett test of homogeneity of variances

data:  fleet_list$value by lease_type
Bartlett's K-squared = 687.06, df = 2, p-value < 2.2e-16
```

```
> bartlett.test(fleet_list$number ~ lease_type)

        Bartlett test of homogeneity of variances

data:  fleet_list$number by lease_type
Bartlett's K-squared = 651.09, df = 2, p-value < 2.2e-16
```

```
> bartlett.test(fleet_list$average ~ lease_type)

        Bartlett test of homogeneity of variances

data:  fleet_list$average by lease_type
Bartlett's K-squared = 111.05, df = 2, p-value < 2.2e-16
```

```
> sample2indep<-aov(average ~ lease_type, data = fleet_list)
> summary(sample2indep)
            Df    Sum Sq   Mean Sq F value   Pr(>F)
lease_type    2 2.117e+14 1.059e+14   35.21 7.11e-13 ***
Residuals   126 3.788e+14 3.006e+12
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

```
> TukeyHSD(sample2indep, conf.level = 0.95)
  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = average ~ lease_type, data = fleet_list)
$lease_type
                     diff       lwr       upr     p adj
loan-financial      -1285363 -2172250.8 -398475.6 0.0022833
operating-financial  1836533   949645.1 2723420.4 0.0000082
operating-loan       3121896  2235008.3 4008783.5 0.0000000
```

Appendix 8

Tables supporting Hungarian lease provider companies. Summary of all 32 registered Hungarian lease companies:

#	name	Equipment	Bus	Construction	Fleet	Ship	Truck	real estate	IT	vehicle	housing	Agriculture	Airplane	Passenger car	Railway
1	ALD_Automotive				5									10	
2	ARVAL				2									6	
3	Budapest_Bank	3	1	4			2		5			3		3	
4	Business_Lease_Hungary				6									15	
5	CIB_Lease		8	14	7		12		8	x		6		7	x
6	City_Leasing	16		13			18			x				20	
7	Cofidis									x				13	
8	De_Lage_Landen	6		1			3		1			8		8	
9	Deutsche_Leasing	1	6				15					4		17	
10	Erste_Leasing	13					9			x		12		14	
11	FHB	x						x			x				
12	FINALP				x		x			x					
13	Fraikin						13			x				x	
14	IKB	7		10			16		7			13		18	
15	Indotek							x							
16	KH		5	11	4		8		6	x		7		9	
17	Leaseplan_Hungaria				1									5	
18	Lombard						x			x				x	
19	Merkantil	2	3	2	3		4		2	x		1		1	
20	Merkantrade	17												16	
21	MKB		2	9			11			x		2		2	
22	Ober			7			1		x			9		12	x
23	Otokoc				x									x	
24	OTP							x			x				
25	Porsche		x		x		x			x				x	
26	Raiffeisen	10		6			10				x	10		11	x
27	Regio	14	10	12			17					14		21	
28	Rent_a_server	15							3						
29	Scania						9								
30	SG		4	5			14		10			11		19	
31	TFSH									x				x	
32	UniCredit		9	3			6		4			5			

Table 50. Hungarian lease providers ranking in 2017

Source: www.lizingszovetseg.hu

								Last business year 2017									
name	Létszám	Eladósodottság foka	Árbevétel arányos nyereség	Értékesítés nettó árbevétele	Üzemi eredmény	Adózás előtti eredmény	Adózott eredmény	Eszközök összesen	Befektetett eszközök	Forgó eszközök	Pénzeszközök	AIE	Saját tőke	Céltartalékok	Rövid lejáratú kötelezettségek	Hosszú lejáratú kötelezettségek	PIE
ALD_Automotive	115	0,84	6,12	16 471 974	2 020 928	1 108 227	1 007 609	52 875 732	47 954 647	4 264 903	189 724	656 182	6 110 703	0	12 811 909	31 854 277	2 098 843
ARVAL	45	0,86	10,18	9 589 635	1 380 860	976 847	976 847	22 411 995	17 920 861	4 078 649	879 153	412 485	2 176 847	0	6 888 956	12 475 689	870 503
Budapest_Bank				127 347 000	16 148 000	15 775 000	13 896 000	1 026 586 000	512 832 000	508 305 000	20 827 000	5 449 000	134 987 000	6 063 000	746 831 000	131 908 000	6 797 000
Business_Lease_Hungary	33	0,82	3,97	6 557 881	601 054	260 472	260 472	17 787 917	16 283 975	1 350 582	299 628	153 360	2 171 414	274 925	10 614 824	4 000 000	180 754
CIB_Lease																	
City_Leasing (2018)	4		0,06	935 813	62 754	62 754	57 175	2 399 496	1 499 303	886 987	141 578	13 206	318 616	-	1 316 136	674 794	89 950
Cofidis	369		0,05	20 959 024	1 033 801	1 033 801	993 585	65 517 205	46 226 157	18 776 301	4 756	514 747	4 203 983	161 250	38 268 832	22 510 610	372 530
De_Lage_Landen (2018)	40			33 785 918	332 700	332 700	303 214	61 930 884	37 446 882	24 128 577	140 637	355 425	717 414	5 705	25 121 252	35 742 773	343 740
Deutsche_Leasing	39			37 162 863	275 240	275 240	236 518	82 758 776	51 494 676	30 658 532	594 410	605 568	2 477 133	386 497	34 042 874	45 500 857	351 415
Erste_Leasing			0,26	317 355 000	83 617 000	83 617 000	80 974 000	2 179 025 000	1 756 442 000	402 408 000	20 292 000	20 175 000	360 592 000	5 648 000	1 499 205 000	294 295 000	19 285 000
FHB																	
FINALP (2018)	9			219 423	- 167 006	- 167 006	- 167 006	2 321 955	1 465 960	796 510	182 252	59 485	308 740	56 748	1 938 399	-	18 068
Fraikin	8	0,97	- 4,25	1 292 599	76 426	- 52 374	- 54 962	4 003 847	3 567 794	398 137	219 744	37 916	61 666	68	1 079 995	2 805 265	56 853
IKB (PEAC)	22		0,02	9 697 439	201 598	201 598	180 419	36 202 205	19 681 912	16 364 551	1 261 250	155 742	1 433 364	9 304	14 069 252	20 600 010	90 275
Indotek (SME, 2018)	9		0,13	26 682	3 521	3 521	3 361	1 109 054	1 094 421	14 030	3 791	603	1 059 032	-	45 507	3 457	1 058
KH																	
Leaseplan_Hungaria	82	0,88	9,18	22 451 936	2 728 147	2 082 167	2 060 149	50 361 399	46 323 269	3 353 186	26 459	684 944	5 051 253	409 627	19 755 444	24 549 665	595 410
Lombard	87		- 0,66	6 080 542	- 4 021 133	- 4 020 252	- 4 020 252	10 972 404	5 466 455	5 386 795	1 911 387	119 154	5 294 868	818 309	1 804 040	1 768 680	1 286 507
Merkantrade	3	-	64,61	49 832	- 9 846	32 195	32 195	1 641 520	209 428	1 428 780	5 799	3 312	1 625 349	-	5 586	-	10 585
Merkantil	279																
MKB			0,01	104 626 000	1 196 000	1 116 000	1 017 000	120 213 000	67 234 000	51 831 000	51 000	1 148 000	2 009 000	-	34 564 000	82 890 000	750 000
Ober	26		0,03	35 187 789	1 860 637	1 180 637	1 115 936	61 564 870	39 479 157	21 007 330	970 010	1 078 383	4 527 389	-	46 997 990	9 938 052	101 439
Otokoc	30	0,99	- 1,22	2 031 185	24 558	- 24 873	- 24 873	6 150 244	4 048 654	2 052 341	26 144	49 249	4 708	-	5 021 736	1 095 276	28 524
OTP	19																
Porsche (2018)	53	0,77	2,41	33 646 913	1 528 499	823 934	809 832	49 684 319	44 178 762	4 679 159	1 401 680	826 398	6 563 185	1 265 158	22 276 872	16 098 545	3 480 559
Raiffeisen			0,01	26 222 635	201 990	201 990	201 990	63 571 713	48 099 536	15 299 472	17 922	172 705	1 545 683	9 962	15 526 854	46 309 671	179 543
Regio (2018)		0,22	45,97	154 101	- 8 524	71 260	70 844	1 107 657	835 178	255 389	145 846	17 090	855 637	-	98 157	144 859	9 004
Rent_a_server (2018)	3	0,89	2,38	220 553	13 869	5 250	5 250	587 730	499 458	82 092	23 677	6 180	19 640	-	52 986	472 802	42 302
Scania (2018)	6		0,02	14 796 207	323 607	323 607	294 340	24 083 179	15 255 054	8 802 679	72	25 446	2 120 463	-	8 984 972	12 860 400	117 344
SG (2018)	38		0,02	15 595 732	315 647	315 647	301 447	27 925 663	15 910 355	11 605 709	2 224 355	409 599	1 772 364	12 401	9 812 295	16 187 303	141 300
TFSH																	
UniCredit	83																

Table 51. Hungarian lease provider companies' key financial data in 2017

Source: Self-prepared table based on reported financial statements

Appendix 9

Short introduction of the lease companies registered in Hungary

The 32 registered lease companies in the Hungarian Lease Association are listed below with brief descriptions on their activities.

ALD AUTOMOTIVE MAGYARORSZÁG KFT.

The ALD Automotive - as a subsidiary of the Société Générale Bank Group – operate and finance almost 800 000 vehicles worldwide in the field of operative leasing and fleet management has been present in 1977. The ALD Automotive Hungary - as a member of an international group - operates more than 5,000 cars. Except the experts working in Hungary, the expertise and experience of the international group of companies as well as the financing system of a reputable financial institution are at the disposal of our clients. The guarantee of quality of service provided to our customers in accordance with international expectations is the internationally recognized and accepted ISO 9001 certificate, which our company possesses on the one hand, and the nearly 60 years of know-how of ALD Automotive International, combining with the Hungarian specificities, provides unique expertise for existing companies and for the future companies, too. The key to our international and domestic success is our expertise, dynamism, creativity, and commitment to finding the best solutions for our customers.

Products provided by the company/group:

• Operational leasing

Services provided by the company/group of companies:

• fleet vehicle financing

ARVAL MAGYARORSZÁG JÁRMŰPARKKEZELŐ KFT.

ARVAL is today a European reference for long-term leasing and fleet management. The company - founded in 1989 -, is present in most European countries, and since 2003 in Hungary. The group manages more than 600,000 cars across Europe. The main activity of ARVAL Magyarország Járműparkkezelő Kft. Is financing new vehicles and managing existing fleets for companies. It provides tailor-made solutions, a fixed-rate rental plan for its customers, enabling more accessible cost financing, full-time lease, and time-saving, predictability, and flexibility. Besides, it provides a wide range of services, individual counseling, and optimized costs to meet the needs of its partners. The provided services include car repair, maintenance, tire change, emergency service, replacement car, fuel card, return service, insurance, damage management, and

reporting. Clients: In the composition of the portfolio, multinational companies engaged in the manufacturing, trade and financial services represent a significant part, and these companies take advantage of ARVAL's most favourable services. ARVAL's goal is to provide fast, flexible, and quality service in the future.

Products provided by the company/group:

• Operational leasing

Services provided by the company/group of companies:

• fleet vehicle financing

BUDAPEST BANK ZRT.

Budapest Lízing Zrt. was established in the autumn of 1992 with the aim of providing our customers with easy access, flexible and favourable financing, enabling them to achieve their business goals more effectively by strengthening their competitiveness. In the development of BL the acquisition of GE was the turning point. The organizational structure developed and the corporate culture of GE helped Budapest Leasing Zrt. to become one of Hungary's leading leasing companies.

Why Budapest Lízing Zrt.?

• Due to our many years of experience, we offer open, non-standard financing solutions open to our partners' New concept for our partners

• We will give you a tailor-made offer within 2 hours from the date of application

• Make a decision within 48 hours of obtaining the required documents

• Forint based on EUR - we offer both currency-based and EUR repayment forms

• We have available seasonal repayment options tailored to your income

• You can fund assets with a value of HUF 1 million, but we are also open to financing large investments worth hundreds of millions of HUF.

• Stable financial background is provided by General Electric

BUSINESS LEASE HUNGARY KFT.

Business Lease Hungary Kft. - with over 25 years of experiences and expertise - a subsidiary of Business Lease in the Netherlands and as a member of AutoBinck Holding N. Group V. The company group in several European countries (Netherlands, Poland, Czech Republic, Slovakia, Romania, Hungary) has more than 44 300 cars. Business Lease Hungary Kft. Offers a full operational leasing financing facility and a complete fleet management service for international and domestic companies based in Hungary. The independent, supplier, and service partner network of the company's brand provides its customers with a high level of service. The company has been present in Hungary since 2006 with a continuously expanding customer base and a fleet of cars.

Our colleagues, with their expertise and distinctive attention, manage every customer to find the most suitable and tailored services tailored to the needs of the company. In 2015, we expanded our service interface with a 7/24 online concept. Also, our customers are given complete insight into the savings and cost of maintaining their company's fleet on the online interface. Business Lease Hungary Kft also offers its customers a unique and unique service package in the field of electric cars.

CIB LÍZING ZRT.

The CIB Leasing Group was founded in 2000 by its 100% owner, CIB Bank Zrt. The new subsidiary has already achieved outstanding performance in the dynamically expanding leasing market in the first years of its operation. In the past decade, CIB Leasing has retained its dominant, stable role. Despite fierce market competition and unfavourable economic trends, the CIB Leasing Group achieved a market share of about 6% in 2014. Car finance continues to represent the largest share in the corporate asset portfolio.

Under the current market conditions, it is still essential for the company to ensure the sustainability of contractual relationships with existing customers in addition to new customer relationships, so the institution continued to focus on improving the processes and service model for managing existing contracts in 2014 it provides a guarantee for increasing the satisfaction of the internal and external customers and the efficient and fast delivery of related tasks.

The company will continue to be an active participant in leasing market financing in the future; The aim is to further increase placements. Also, it plans to increase the share of direct customer financing channels by involving the Internet and CIB Bank sales network and by strengthening cross-selling activities while maximizing the synergies between banking group businesses. Besides, the company continues to focus on

developing, maintaining, managing, and developing customer relationships, importer, and prominent merchant relationships to continuously increase the Company's market share.

The objective of the CIB Leasing Group is to understand market participants and to offer real long-term solutions to their needs. It intends to support this with flexible constructions, favorable financing conditions, fast and customer-friendly administration, and extensive nationwide network.

CITY-LEASING ZRT.

Since 2001, CITY-LEASING Zrt. Has been providing financial leasing services to its clients in Hungary. Our predecessor companies: PSK-LHS Leasing, BAWAG, and Andrew's Leasing Zrt.

Our company offers financial leasing services to SME partners for passenger cars, other vehicles, and production machines.

As an independent leasing company, we strive to be better than our competitors in terms of service quality, which means fast, flexible, and direct partner administration.

COFIDIS MAGYARORSZÁGI FIÓKTELEPE

Banif Plus Bank Zrt. Started its operations in Hungary in 1998 under the name Tecnicredito Hungary Financial Limited Company. The company was founded by Tecnicredito SGPS SA, the sole shareholder in Portugal, in the field of used vehicle financing. The parent company, which has since been transformed into a bank, has been integrated into the Portuguese BANIF Financial Group in 2009 as well. The Hungarian Financial Supervisory Authority authorized the Hungarian Company to become a bank in 2006, after which our Company continued its business as Bank Plus Zrt., And since 2010 it has been operating as Banif Plus Bank Zrt. The main activity of our company remains the financing of new and used vehicles in the form of financial leasing or loans. Banif Plus Bank Zrt. Is committed to continuously improving the quality of its services to its customers and partners, improving its products, and prudent risk management and risk-based pricing strategies.

DE LAGE LANDEN FINANCE ZRT.

De Lage Landen Finance Zrt. Provides asset-based financing products to manufacturers, distributors, and distributors to promote their significant products in Europe, America, Australia, Asia, and the Pacific. De Lage Landen is present in 35 countries worldwide and is a competitive advantage for its partners in every relationship. With 40 years of experience in the financing of office equipment, food industry, agriculture, healthcare, material handling, construction, trucks, and technology. In Hungary, we offer financing solutions from small and medium-sized private companies to multinational clients. In line with the practice of previous years, we keep our product line up to date, so we still offer all our solutions in the finance sector - closed and open-end financial leasing, lease, factoring, asset-based loan - with fixed and variable interest rates, the forint and various foreign exchange bases. Our growth goals are first and foremost achieved by adapting the experience, know-how, and relationships of our mother company and our international network. Our strategic goal is to offer and provide value-added financing solutions to our customers and our vendor partners, creating the basis for long-term mutually beneficial collaborations.

Company / Group Services:

• Truck Financing

• Machine Equipment Financing Products provided by the

Company / Group:

• Financial Leasing

• Operational Leasing

• Loan

• Insurance Brokerage

DEUTSCHE LEASING HUNGARIA ZRT.

Deutsche Leasing has been providing professional financial advice and support to its clients in the field of leasing finance for 50 years. Since the early 1990s, it has been engaged in the development of dynamic

international financing solutions and, through its subsidiary in 23 countries, provides a professional service background for manufacturers and investors in Europe, the US, South America, Canada, and China.

Germany is the market leader in mobile device financing. Deutsche Leasing Hungaria is one of the market-leading leasing companies, independent of manufacturers, in the funding of investment instruments, especially in the field of leasing of production machines and equipment, with comprehensive services and expertise at its disposal.

In addition to the large enterprise circle, it offers solutions for small and medium-sized enterprises in the field of mechanical engineering and monitors the investments of German investors in Hungary. Deutsche Leasing Hungaria's financing offers are tailor-made, tailored to the customers' economic situation and needs. In addition to operational, open-ended and closed-end financial leasing, it has been offering innovative and individually structured financing concepts, asset-based loans for several years, enabling production and production equipment to be matched to investments supported by the EU and the Hungarian state.

Deutsche Leasing Hungaria provides its customers with comprehensive insurance that protects you against possible damage to your funded asset during the funding period.

Services provided by the company/group:

- truck financing
- machine equipment financing
- ship, flying, railway financing

Products supplied by the company/group:

- Financial leasing
- Operative leasing
- Loan, loan
    - Insurance mediation

ERSTE BANK HUNGARY ZRT.

For more than ten years Erste Bank Hungary Zrt's leasing business has been offering a wide range of leasing products to its corporate customers. At all times, Erste Bank is committed to satisfying individual needs by developing tailor-made leasing structures. The main services of the leasing company are:

- large-scale motor vehicle and machine,
- as well as personal and small car financing.

FINALP ZRT.

The primary objective is to maintain and manage the car financing portfolio. Quality is the key, and our business is an integral part of every operating area.

Company / Group Services, Products:

- retail vehicle financing
- Financial leasing
- Loan, loan
- Insurance mediation

FRAIKIN MAGYARORSZÁG KFT.

As a European market leader in commercial vehicle leasing, Fraikin offers a professional solution for long-term, medium, and short-term rentals of almost any commercial vehicle with full service or service. Fleet management of commercial vehicles. The Fraikin Group was founded in France for 60 years, and has been present in 10 countries since then and operates around 60,000 commercial vehicles.

INDOTEK LÍZING ZRT.

Indotek Company Group is currently the market leader in the field of ownership and operation of industrial properties of category B and C in Hungary. Indotek Lízing Zrt., Registered on 1 December 2010, is a private limited company that is a risk-separate company from Indotek Group, which provides real estate financial leasing services only to foreign companies and other legal entities by accepting real estate as a leasing object as well as the (re-) financing bank. Qualifies its clients according to the long-term risk-taking aspects. The

purpose of establishing a leasing company is primarily to provide flexible financing for category B and C (industrial, commercial) properties. Future customers of the leasing company are small and medium-sized enterprises, for whom financial leasing can be a solution for their intent to buy real estate instead of traditional bank loans or companies with valuable real estate property, for whom the leaseback service may be an alternative to providing the financial resources necessary for their management.

K&H BANK ZRT.

K&H Bank Zrt's Leasing business offers a wide range of leasing finance for businesses and institutions, whether it is financing vehicles, equipment, machinery and equipment, fleet management or fleet financing. Our financial leasing and lease facilities are available on a forint and euro basis, offering a wide range of additional services. As a member of the K&H Group, the Leasing business cooperates closely with K&H Bank and K&H Insurance. Using the experience we have accumulated, we are at the disposal of our customers with innovative combined financial solutions that provide them with unique benefits.

Services provided by the company/group of companies

- vehicle financing
- asset financing
- fleet management
- sale of returned cars and other equipment

Products supplied by the company/group

- financial leasing
- operational leasing
- insurance brokerage

LeasePlan HUNGÁRIA ZRT.

LeasePlan, with its Dutch parent company, is the market leader in the domestic and international fleet and vehicle management markets. LeasePlan's affiliates are present in more than 30 countries on all five continents. Today, our company employs nearly 6,000 employees globally, manages a total of 1.3 million vehicles and a portfolio of EUR 13.6 billion. Our strength is that as a proactive fleet manager, we provide tailor-made solutions for our customers worldwide, while keeping the cost of cars in full time, keeping drivers at a high level. In 1994, LeasePlan started its operation in Hungary as a fleet manager. Today, nearly

400 customers are served by 9000 cars in Hungary. Our partners include major companies such as IBM, E.on, and Metro. Over the past 15 years, LeasePlan has maintained its market leadership in Hungary.

LOMBARD LÍZING ZRT.

The history of Lombard began at the end of 1991 when four private individuals founded the Company's predecessor. In recent years, the ownership structure has changed several times since the appearance of foreign investors. The Hungarian National Bank has also approved the transaction after the Hungarian Competition Authority, so DDM Holding AG (Baar, Switzerland) is the 100% new owner of the Lombard Leasing Group as of 1 May 2016. \ t DDM Holding AG is an international portfolio management company whose business operations are concentrated in Eastern Europe.

MERKANTIL BANK ZRT.

In 1988, Merkantil Bank started its operations as a subsidiary of the National Trade and Credit Bank as a specialized financial institution where it primarily dealt with billing, factoring, and leasing. In 1992, Merkantil Bank changed its scope of activity and was one of the first companies in Hungary to sell cars in detail. The privatization of the bank took place in 1996, as a result of which the most significant domestic financial institution, OTP Bank Plc., Was acquired by Merkantil Bank Zrt. In 2003, Merkantil Bank set up a joint financial services company with SUZUKI-ITOCHU and launched SUZUKI's stock financing. In connection with OTP Bank's foreign acquisition policy, leasing companies have been established in Bulgaria, Croatia, and Romania since 2005. As a significant player in the domestic car financing market, Merkantil Bank launched the Real Estate and Production Facility Financing Divisions after assessing market needs. The Production Facility Financing Division provides a complete solution for financing new and used machinery and equipment. Merkantil Bank has set a strategic goal to become a major player in production capital financing, along with vehicle financing while serving its customers with high professional and service standards. The strategy for financing the procurement of equipment for agriculture, health care, transportation, and transportation, public, as well as local and long-distance passenger transport, is a priority.

Services provided by the company/group of companies:

- vehicle financing
- fleet financing
- production facility financing
- investment

- forint flow account management

lending company/group products:

- financial leasing
- loan, loan
- operational leasing

MERKANTRADE ZRT

MERKANTRADE Zrt. Was founded by Merkantrade Ltd. on December 30, 1993. The Company was founded on March 29, 1990. The company was established to finance vehicles, production assets, real estate leases, and leases. Simultaneously with the transformation of the company into a joint-stock company, the owners made another share capital increase, as a result of which the share capital of ZRt. Currently, Emiker Zrt. And Merkantrade Zrt. Conduct leasing - operational leasing or long-term lease transactions. Emiker Zrt. Specializes mainly in the financing of passenger cars and vans, while Merkantrade ZRt. In November 1998, M&E Lízing Zrt. Was established by Merkantrade and Emiker Zrt. With a 50-50% ownership interest in finance leasing and, to a lesser extent, in credit transactions. In the past year, the volume of transactions increased compared to previous years, most notably the dynamic growth of factoring activity. Customer Assessment: The company group has been operating for a long time with a closed customer base. The partnership structure is diverse and diverse from an industry perspective. The group of companies is best known among SMEs. In the future, we do not want to change our business strategy and the composition of our clientele.

MKB-EUROLEASING AUTÓLÍZING ZRT.

MKB-Euroleasing Group is a subsidiary of MKB Bank Zrt. The automotive business has a 25-year history. 70 MKB branches, more than 200 trading partners, an online car showroom and a bidder interface help customers access and use their leasing services.

Online car showroom: www.autostart.hu;

Page of car finance calculator: www.autohitel.hu.

In 2016, our group expanded with decades of experience in new, internationally funded financiers, and expanded its scope to include finance, large commercial vehicle, and general machinery and equipment financing businesses.

www.eszkozlizing.hu

MKB-Euroleasing aimed at expanding its financing product range primarily by developing financing arrangements that meet market expectations and demands, thereby opening up a wide scope for effective investment.

OBER PÉNZÜGYI LÍZING ZRT.

Our company, a subsidiary of the Oberbank Group in Linz, Austria, is one of Hungary's leading asset financing companies. The development of the group is facilitated by its portfolio of non-interbank markets and thus a stable presence in 5 Central European countries. In Hungary, besides the three capital branches, Ober Lízing is represented in 8 county seats - in Debrecen, Győr, Kecskemét, Miskolc, Pécs, Szeged, Székesfehérvár, Szombathely, and one county town in Nagykanizsa. Main market areas are the financing of lorries, commercial vehicles, construction machinery, and machine equipment, but they also offer a solution for car and real estate financing. They have active domestic small and medium-sized enterprises as well as multinational companies in our clientele. Their parent philosophy is customer-oriented according to the traditions of the parent company, so besides our important vendor relations, due to our customer acquisition strategy, they pay close attention to the thorough understanding of their prospective partners and the most suitable financing solutions for them.

OTOKOC HUNGARY KFT.

Budget Rent a Car Corporation was founded in 1958 in Los Angeles, and as its name implies, it has opened up a new marketplace for cost-effective, cost-effective car rental. Budget car rental has been in Hungary since 1990.

Otokoc Hungary Kft. - the exclusive Hungarian representative of Budget - is a member of the Worldwide Network of 128 member countries, 3,400 leasing offices, 14,500 employees, and 225,000 cars, the second-largest car rental network in the world, the ABG Group. Our classic - short-term - car rental services: long-term lease, fleet management, complete administration of foreign car rentals from the home center, insurance administration, Budget credit card making.

OTP INGATLANLÍZING ZRT.

OTP Real Estate Leasing Ltd. is a key player in the housing leasing market. Leasing of new dwellings continues to play a significant role in its activities, but the leasing of used homes and leasing for free use are also successful products. OTP Real Estate Leasing Ltd.'s products are available in 400 OTP branches nationwide, and as a full member of OTP Group, it seeks to explore and exploit potential synergies in product development and sales. The company's long-term goal is to continue to meet consumer needs and serve the needs of micro and small businesses with growing real estate needs, innovative market behavior, the housing finance market, and leasing finance for commercial real estate, micro and small businesses, so make the most of your opportunities and thus further dynamic growth.

PEAC PÉNZÜGYI LÍZING ZRT.

As it is known, IKB Deutsche Industriebank AG sold its leasing group to financial investors in February this year and is managed by HPS Investment Partners LLC, based in New York. Simultaneously with the acquisition of IKB Leasing Group, other vendor financing companies were acquired by HPS in the UK. These companies are merged under the name PEAC (Pan European Asset Company) Finance Continental Europe and became a member of PEAC Finance Leasing Ltd. and PEAC Lease Ltd., former IKB Finance Leasing Co. and IKB Leasing Kft. FINANCE is currently active in nine European countries. Its strategic goal is to offer competitive financing solutions across a wide range of assets, in collaboration with manufacturers, distributors, and businesses.

PORSCHE LÍZING ÉS SZOLGÁLTATÓ KFT.

Porsche Leasing and Service Ltd. was founded in 1993. Founder and 100% owner of Porsche Bank AG, Austria. As a member of the Porsche Finance Group Hungary, the company operates in the operating leasing and fleet management business. The company car rental arrangement is based on the operational leasing product (with HUF and EURO-based financing), supplemented with a full-service fleet management service for the leased vehicles, which includes Porsche Leasing Assistance available from vehicle insurance to

nationwide maintenance and repair up to 0-24 hours. Until then, any service/service directly related to the use of the car becomes available to the tenant through a partner. The services are available for all new and used vehicle types sold in Hungary.

Products offered by Porsche Financial Group:

- Operational Leasing, Fleet Financing / Management - Porsche Lízing Kft.

- Credit and Finance Lease - Porsche Bank Zrt.

- Insurance intermediation / Brokerage of the largest insurance companies - Porsche Insurance Company Ltd.

- Porsche Casco / Unique Casco insurance primarily for Volkswagen brands - Porsche Versicherung AG Hungary Branch

- Car Rental / Hungary's largest car rental - Eurent Kft.

The Porsche Finance Group provides one-of-a-kind products and services related to car and car use.

RAIFFEISEN CORPORATE LÍZING ZRT.

Raiffeisen Leasing Zrt. (Name before 1 March 1997: UB Leasing Ltd.) is a joint-venture of the Raiffeisen Bank Zrt. And Raiffeisen Leasing International GmbH (Vienna). Since its establishment in 1993, its dynamic growth, customer-centered services, and nationwide sales network have become a significant player in the Hungarian finance market. Raiffeisen Leasing Zrt. Is a member of the Hungarian Leasing Association, one of the leading leasing companies.

In 2010, our company placed great emphasis on the development of portfolio management techniques and opportunities, which enabled customers to recover due to the crisis.

Services provided by the company/group of companies

· Finance

· Financing of agricultural machinery

· Lorry financing

· Machine equipment financing

· Real estate financing

Products provided by the company/group of companies

· Financial leasing (open and closed)

· Operative leasing

RÉGIÓ HOLDING

The Régió Holding Vagyonkezelő és Szolgáltató Kft., The parent company of the Region Group, was established in 1993 to carry on leasing activities. A further four members of the group, to be presented later, were established between 1994 and 1997, in line with the amendments to the Act on Credit Institutions and Financial Enterprises that regulate their field of activity. The holding of Régió Holding Kft. From its previous owner was acquired in 1995 by the seven domestic natural persons, six of whom are still the owners, and as a member of the management in the companies, they are active contributors to the successes so far. The company is not affiliated with any single multinational financial group or investor on its ownership, with its long-term, long-standing cooperation with some commercial banks. The company builds relationships and deals with offices in Eger, Miskolc, Szeged, and Csíkszereda (Romania), but it's business relationship extends throughout the country. Over the years, the Companies have tried to build their clients. Great emphasis has been placed on maintaining excellent solvency, stable market relationships with partners, broadening cooperation, and exploring each sector as fully as possible.

Our group has a market share in the financing of earthmoving, tooling, lifting, construction and plastic machinery, equipment, and some commercial vehicle brands. When creating their bids, the dealers always develop a financing arrangement that is tailored to the individual needs of the partner, so they can take into account the benefits of the legal environment, the ability of the companies to bear the burden, or the seasonality of the products they produce.

The main activity of Régió Holding Kft. Is under the direction of the Company Group the evaluation of the management of the future and returning partners, the verification of their legal status, the accounting of the subsidiaries and the provision of the IT background, and the provision of operational leasing services in recent years.

The Region Moneta Zrt. Continues the financial services activities under the control of the MNB as a supervisory authority, namely financial leasing, factoring, and the "bad" commodity purchase business started since 2009.

Region Leasing IFN S.A. is a leasing company established in 2002 in Romania, whose scope of activity is primarily limited to Szeklerland. His colleagues have good experience in the financial field.

RENT-A-SERVER KFT.

Rentasystem has been offering long-term rental solutions for the domestic micro, small, and medium-sized enterprise sector since 2013. Group leaders have decades of experience in services and investment projects, as well as in asset-based financing for SMEs, especially in the field of IT, car and equipment rental.

Standard desktops and laptops, mobile phones, tablets, servers and rescue units, network and storage devices, office technology, visual and security devices can be rented. Rentasystem also has a unique opportunity to permanently rent software.

The long-term lease of premium and executive cars through fleets to minibusses, commercial vehicles or motorbikes can be the subject of a long-term lease.

Typically, energy systems, solar panels, LED lighting, medical and dental instruments, metal, wood, plastic-processing machines, construction machines, agricultural machines are financing, but practically any kind of industrial equipment can be financed.

SCANIA FINANCE MAGYARORSZÁG ZRT.

Scania Finance, a worldwide financing company for Scania truck manufacturer, provides financial services in 16 countries with 51 regional centers, serving more than 25,000 customers and managing a portfolio of EUR 4,000 million. The company's Hungarian subsidiary, Scania Finance Hungary Zrt., Which belongs to the Central European (CER) region of the company, has been providing the full range of financial and insurance services closely related to the brand to Scania customers in Hungary since 2008.

SG ESZKÖZFINANSZÍROZÁS MAGYARORSZÁG ZRT.

Our Hungarian company group currently consists of three companies:

- SG Asset Leasing Hungary Ltd. has been operating leasing and leasing since February 1998;

• SG Asset Finance Hungary Zrt. Has been financial leasing since January 2000, and since autumn 2005 it has been offering lending and receivables purchase services; As of January 2008, it provides and provides financial solutions for commercial vehicle financing (including financial leasing and cash) to our clientele.

Our services cover the following areas:

• Commercial vehicles, buses, air, water and rail transport equipment, material handling equipment, agricultural machinery

• Industrial machinery and equipment (e.g., construction machinery, printing machines, machine tools, plastic processing, environmental protection), trade machines, tools) • High-tech devices (information technology, high-value medical equipment, software, hardware, telecommunication systems, devices that serve production and registration).

Products provided by the company/group of companies

• Financial leasing

• Operational leasing, lease

• Money loan, loan

• Insurance intermediation

• Other: purchase of long-term receivables (supplier cooperation only)

TAKARÉK LÍZING ZRT.

FHB Leasing Zrt. (Formerly known as FHB Real Estate Leasing Ltd.) started its activity in 2011 as a legal successor of a mortgage house. The property has been replaced by a mortgage-based product structure, now a closed and open-end property and production asset leasing for residents and businesses. Housing leasing options for individuals include financing new and second-hand properties, free use, and loan redemption. As a special area, private sources may also be required for non-residential properties. The Company offers leasing schemes to companies - tailored to their individual needs - for investment, resource creation, and loan redemption. Leasing items can be in a wide range, real estate, machinery, equipment, or special tools for any business. The product range is available in the branch network of FHB Bank Zrt., As well as in some

Savings Co-operatives. FHB Group firmly believes that financial leasing products are now a must-have for a professionally structured banking product range.

TOYOTA PÉNZÜGYI SZOLGÁLTATÓ MAGYARORSZÁG ZRT.

Toyota Finance Ltd. is a Hungarian affiliate of Toyota Financial Services (TFS), a Toyota brand sponsor. With the world's largest and most valuable car manufacturer, TFS is currently present in 35 countries and is the world's largest "captive" auto finance company, with over 30 years of financing experience, worldwide contact with 25 million customers, and nearly 8,000 employees working for the company. Partners to the highest standards.

In Hungary, Toyota Finance Ltd. has been providing financial solutions since 2002 to Toyota and Lexus customers and, in addition to serving private and corporate customers, provides stock financing services to Toyota and Lexus dealers.

UNICREDIT LEASING HUNGARY ZRT.

UniCredit Group has united all its divisions across Europe into a sub-holding, creating Europe's leading leasing company, which belongs to the banking group's corporate business. UniCredit Leasing Group has a membership of 3000 with 17 different countries, offering cross-continental transactions with a unique background team, outstanding expertise, and the best on-market leasing solutions. The diversity, quality, and substantial financial background of the products together guarantee that our company will be a reliable partner for our customers in the increasingly competitive market. As the primary value of our unique services, we emphasize reliability, professional foundation, and international relations resulting from the synergy of the group. In our daily work, we want to serve our customers with these values. When designing our product range, the most crucial aspect is the compilation of financing arrangements that are maximally responsive to expectations and needs. UniCredit Leasing Hungary offers all leasing structures in the finance sector. In addition to leasing, it has been providing asset-based loan for a number of years, tailored to the investments supported by the European Union and the Hungarian state, which helps investment promotion for small and medium-sized enterprises.

Services provided by the company/group of companies:

- retail vehicle financing
- fleet vehicle financing
- truck financing
- production machinery and equipment financing

Company/group products:

- Financial leasing
- Operational leasing
- Loan, loan
- Insurance brokerage

Appendix 10

TEÁOR 77.11 main renting and lease activities of companies in Hungary with a staff headcount of at least 10

#	Company name	Registered address	Establishment year	Employees	Data in THUF Revenue 2017	PBT 2017	Profit %	Key operation
1	ALD Automotive Magyarország Autópark-kezelő és Finanszirozó Korlátolt Felelősségű Társaság	1133 Budapest, Váci út 76.	2001	108	16 471 970	1 108 227	6,73%	Lease
2	ARVAL Magyarország Járműparkkezelő kft.	1113 Budapest, Bocskai út 134-146.	2002	46	9 598 635	976 847	10,18%	Lease
3	AUTO ReFAIRent Autókölcsönző és Szolgáltató Korlátolt Felelősségű Társaság	2220 Vecsés, Ecseri út 21.	2010	52	1 733 054	158 709	9,16%	Car rental
4	AVALON Car(e) Services Korlátolt Felelősségű Társaság	1142 Budapest, Tengerszem utca 106.	1989	24	371 938	29 593	7,96%	Car rental
5	BÉR-ELEK Flotta és Autópark Kezelő Korlátolt Felelősségű Társaság	1138 Budapest, Váci út 113.	2007	25	1 612 429	99 194	6,15%	Car rental
6	Business Lease Hungary Kereskedelmi és Szolgáltató Korlátolt Felelősségű Társaság	1124 Budapest, Csörsz utca 41. Gellért torony. ép. 3. em.	2003	29	5 351 868	376 017	7,03%	Lease
7	EuRent Autókölcsönző Kft.	1238 Budapest, Szentlőrinci u. 195853. hrsz.	1989	59	3 218 105	65 175	2,03%	Car rental
8	EuroFleet Gépjármű Flottakezelő Zártkörűen Működő Részvénytársaság	9111 Tényő, Kossuth L. u. 39.	2008	34	2 207 047	332 127	15,05%	Lease
9	Euroleasing Kereskedelmi Szolgáltató Korlátolt Felelősségű Társaság	1134 Budapest, Lőportár utca 24.	1995	56	561 959	3 304	0,59%	Lease
10	GAS-CAR Gépjárműkölcsönző, Autópark-kezelő és Szolgáltató Korlátolt Felelősségű Társaság	8600 Siófok, Fő utca 262.	1994	56	1 044 191	11 304	1,08%	Car rental
11	**GreenGo Car Europe Korlátolt Felelősségű Társaság**	**1075 Budapest, Rumbach Sebestyén utca 15.**	**2014**	**20**	**110 788**	**-158 291**	**-142,88%**	**Free-float car share**
12	HARUM INVESTMENT Gépjármű Üzemeltető Zártkörűen Működő Részvénytársaság	1118 Budapest, Rétköz utca 5.	1999	12	1 128 502	4 402	0,39%	Car fleet provider
13	IVANICS Autópark -kezelő Kereskedelmi és Szolgáltató Korlátolt Felelősségű Társaság	8097 Nadap, Haladás út 56.	2005	14	3 283 259	68 525	2,09%	Car fleet provider
14	KÉSZ&GO Flotta és Gépjárműkezelő Korlátolt Felelősségű Társaság	6000 Kecskemét, Izsáki út 6.	1993	13	1 195 742	39 497	3,30%	Car fleet provider
15	LAFUT Service Kereskedelmi és Szolgáltató Korlátolt Felelősségű Társaság	3527 Miskolc, Zsigmondy út 2.	2015	22	74 246	722	0,97%	Car rental
16	LeasePlan Hungária Gépjárműpark Kezelő és Finanszírozó Zártkörű Részvénytársaság	1113 Budapest, Bocskai út 134-146.	1994	95	22 451 936	2 082 167	9,27%	Lease
17	Mercarius Flottakezelő Korlátolt Felelősségű Társaság	1142 Budapest, Komáromi út 36-38.	1996	81	4 539 377	767 564	16,91%	Lease
18	Mercur Rent a Car Autókölcsönző és Szolgáltató Kft.	2220 Vecsés, Hertz u 2.	1995	80	5 498 329	291 926	5,31%	Car rental
19	Mobil Credit Kereskedelmi Korlátolt Felelősségű Társaság	4026 Debrecen, Bem tér 14. A. ép. 1. em. 3.	2000	14	1 272 146	116 266	9,14%	Car fleet provider
20	**MOL Limitless Mobility Korlátolt Felelősségű Társaság**	**1117 Budapest, Október huszonharmadika utca 18.**	**2017**	**32**	**0**	**-69 543**	**N/A**	**Free-float car share**
21	NELSON FLOTTALÍZING Eszközbérbeadó és Autóparkkezelő Korlátolt Felelősségű Társaság	8000 Székesfehérvár, Vörösmarty tér 1.	1992	38	2 917 894	139 365	4,78%	Lease
22	Otokoc Hungary Autókölcsönző és Szolgáltató Korlátolt Felelősségű Társaság	1134 Budapest, Kassák Lajos utca 19-25.	2015	29	2 031 185	-24 873	-1,22%	Car rental
23	Porsche Lizing és Szolgáltató Kft.	1139 Budapest, Fáy u. 27.	1993	54	29 728 668	1 047 108	3,52%	Lease
24	Rapid Rent Autó Kereskedelmi és Szolgáltató Korlátolt Felelősségű Társaság	1037 Budapest, Zay u. 24.	2011	25	529 054	1 067	0,20%	Lease
25	RELEASE Zártkörűen Működő Részvénytársaság	1054 Budapest, Zoltán utca 8. 2. em. 2.	2009	19	592 100	41 393	6,99%	Lease
26	UniCredit Leasing Kereskedelmi Korlátolt Felelősségű Társaság	1118 Budapest, Budaörsi út 64.	1995	24	1 206 524	-162 445	-13,46%	Lease
27	VR Transport and Rental Korlátolt Felelősségű Társaság	2141 Csömör, Bence utca 22 (3397. hrsz.).	2017	10	45 974	6 089	13,24%	Car rental
28	ZENIT-AUTO RENT Szolgáltató és Kereskedelmi Korlátolt Felelősségű Társaság	3519 Miskolc, Miskolctapolcai út 25-27.	2017	14	177 215	10 350	5,84%	Car rental

Figure 26. TEÁOR 77.11 main renting and lease activities of companies in Hungary with a staff headcount of at least 10

Source: www.ceginfo.hu