

Economic and Financial Impacts Arising from IFRS 16 Recognition and Measurement Criteria on Airlines

Impactos Econômicos e Financeiros Decorrentes dos Critérios de Reconhecimento e Mensuração da IFRS 16 em Companhias Aéreas

Impactos Económicos y Financieros Derivados de los Criterios de Reconocimiento y Medición de la IFRS 16 en Aerolíneas

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Abstract: The study aimed to comparatively analyze, before and after adoption, the impacts of IFRS 16 on the financial statements of airlines. For this, the methodology adopted in this research is descriptive with a qualitative and quantitative approach. In order to identify the impacts introduced by the standard, balance sheets, income statements and explanatory notes of 43 airlines for the period from 2017 to 2020 were analyzed, which allow comparing two years before and after the adoption of the standard, then calculated ten economic and financial indicators that could be impacted by the changes introduced by the new way of accounting for leases for lessee companies. With this study, it was concluded that the economic and financial indicators of the airlines were impacted by the standard, where there was a decrease in the indicators of current liquidity, general liquidity, asset turnover and return on assets, while there was an increase in the indebtedness, the immobilization of shareholders' equity, the EBITDA and the participation of long-term leasing obligations over total liabilities. With the calculation of right of use on total assets and right of use on property, plant, and equipment, the study demonstrated the representativeness of the right of use account that corresponds more than 22% of total assets and more than 33% of property, plant, and equipment.

Keywords: IFRS 16. Airlines. Economic and Financial Indicators.

Resumo: O estudo teve como objetivo analisar comparativamente, antes e após a adoção, os impactos da IFRS 16 nas demonstrações contábeis de companhias aéreas. Para isso, a metodologia adotada nessa pesquisa é descritiva com abordagem qualitativa e quantitativa. Com a finalidade de identificar os impactos introduzidos pela norma, foram analisados balanços patrimoniais, demonstrações de resultados e notas explicativas de 43 companhias aéreas pelo período de 2017 a 2020 que permitem comparar dois anos antes e após a adoção da norma, em seguida, foram calculados dez indicadores econômicos e financeiros que poderiam ser impactados pelas mudanças introduzidas pela nova forma de contabilização de arrendamentos para as empresas arrendatárias. Com o estudo, concluiu-se que os indicadores econômicos e financeiros das companhias aéreas foram impactados pela norma, causando a diminuição

dos indicadores de liquidez corrente, de liquidez geral, do giro do ativo e do retorno sobre ativo, enquanto causou o aumento do endividamento, da imobilização do patrimônio líquido, do EBITDA e da participação das obrigações de leasing a longo prazo sobre passivo total. Com o cálculo dos índices direito de uso sobre ativo e direito de uso sobre imobilizado, o estudo demonstrou a representatividade da conta de direito de uso que corresponde mais de 22% do ativo e mais de 33% do imobilizado.

Palavras-chave: IFRS 16. Companhias Aéreas. Indicadores Econômicos e Financeiros.

Resumen: El estudio tuvo como objetivo analizar comparativamente, antes y después de la adopción, los impactos de la NIIF 16 en los estados financieros de las compañías aéreas. Para ello, la metodología adoptada en esta investigación es descriptiva con un enfoque cualitativo y cuantitativo. Para identificar los impactos introducidos por la norma, se analizaron los balances, estados de resultados y notas explicativas de 43 aerolíneas para el período de 2017 a 2020, que permiten una comparación entre dos años antes y después de la adopción de la norma. e indicadores financieros que podrían verse afectados por los cambios introducidos por la nueva forma de contabilizar los arrendamientos para las empresas arrendatarias. Con el estudio se concluyó que los indicadores económicos y financieros de las aerolíneas se vieron impactados por la norma, provocando una disminución en los indicadores de liquidez corriente, liquidez general, rotación de activos y retorno sobre activos, a la vez que provocó un aumento del endeudamiento, inmovilización de los accionistas. ' patrimonio, EBITDA y la participación de las obligaciones de arrendamiento a largo plazo en el pasivo total. Mediante el cálculo de los índices de derecho de uso sobre activos y derecho de uso sobre activos fijos, el estudio demostró la representatividad de la cuenta de derecho de uso, que corresponde a más del 22% de los activos y más del 33% de los activos fijos.

Palabras Clave: IFRS 16. Aerolíneas. Indicadores Económicos y Financieros.

Introdução

Historically, leasing transactions and their accounting treatment have been widely discussed since the last century. The main issues guiding these discussions seek to determine whether the leased asset should be capitalized as an asset by the lessee, with substance taking precedence over form, as well as to address the question of who controls the asset, regardless of ownership.

Internationally, leasing standards were guided until 2018 by IAS 17, whose main feature is the distinction between operating and finance leases and, consequently, a specific accounting treatment for each type of transaction. Ozturk and Serçamelli (2016) explain that in an operating lease, the leased asset will not be reported on the company's balance sheet, and lease payments related to operating leases will be recognized as a liability when the respective expense is incurred and recorded in the income statement. With the omission of these amounts from the balance sheet, liabilities and profitability appear lower than they should be.

Thus, IAS 17 began to receive criticism from users, especially investors who considered that the "breadth" of the standard allowed lessee companies to carry out asset financing "disguised" as rent. Therefore, they present financial statements that do not reflect reality by omitting assets and liabilities that, due to their characteristics, should be recognized, thereby impairing the calculation and interpretation of economic and financial indicators, and consequently distorting potential resulting decisions (Niyama; Silva, 2021).

In this context, in January 2016, the International Accounting Standards Board (IASB), the international body responsible for issuing accounting standards, issued IFRS 16, which came into effect in 2019 and introduced changes such as the elimination of the distinction between operating and finance leases and the capitalization of most leases on the balance sheet. In Brazil, CPC 06, which addressed leasing, also aligned with international standards and issued Technical Pronouncement CPC 06 (R2).

Regarding the impacts, KPMG (2016) states that the larger the leased assets and the lease portfolio, the greater the impact of the new standard on the balance sheet and financial metrics.

Therefore, the standard will affect a variety of industries and activities, such as airlines that lease aircraft and retailers that lease stores.

In the same year the standard was published, the IASB released an analysis of the potential effects that IFRS 16 could have, particularly for lessees. This analysis found that airlines would be the most affected, as they had 22% of future payments that were not included as liabilities on the balance sheet (IFRS, 2016).

Based on this, the present study seeks to answer the following question: What are the main economic and financial impacts resulting from the recognition and measurement criteria for leases that IFRS 16 introduced into the financial statements of domestic and international airlines? This change directly affects the financial statements of airlines—the subject of this study—and the economic and financial indicators used in the decision-making process by external users. Therefore, the overall objective of the research is to conduct a comparative analysis of the impacts of IFRS 16 on the financial statements of airlines before and after its adoption.

The standard and this research aim to provide a valuable contribution to financial analysts, financial institutions, and development agencies by enabling a better analysis of these companies' economic and financial indicators, which no longer present misleading information due to the absence of assets and liabilities, thereby making financial statements more transparent and of higher quality for users.

The study is also relevant to Accounting Science, given that leasing operations have undergone significant changes with IFRS 16 and that information on the standard's impacts needs to be updated, as the recognition of right-of-use assets is unprecedented in accounting theory literature. It is important to note that, for the most part, previous studies addressed the impacts of the standard even before its first year of implementation, such as the study by Săcărin (2017), who conducted a comparative analysis between IAS 17 and IFRS 16 and examined the main consequences of applying IFRS 16 on financial statements and financial indicators, and the study by Öztürk and Serçemeli (2016), who sought to identify the potential impacts on the balance sheet and financial indicators of Pegasus Airlines Company. Both studies identified impacts on the balance sheet and financial indicators such as return on assets and EBITDA.

Finally, this study will help regulatory bodies such as the Brazilian Securities and Exchange Commission (CVM) and aviation regulatory agencies improve their monitoring of airlines' behavior in setting prices and fares for their services.

Theoretical Framework

IFRS 16 – Historical Evolution and Key Changes

According to Kovalenko and Kovalenko (2018), the emergence of “modern” *leasing* is often associated with the operations of the American company *Bell Telephone Company*, whose management in 1877 decided to lease its telephones rather than sell them. However, the use of *leasing* only became widespread in the 20th century due to companies' need to avoid costly expenses and the demands of the Allies during World War II.

At the same time that leasing operations were beginning to gain ground in various industries, discussions about standardization were already underway. The first standard addressing long-term leases was issued in 1949 by the *American Institute of Accountants* and designated as *Accounting Research Bulletin - ARB 38*.

ARB 38 provided guidance on how *leases* should be disclosed in lessees' financial statements. Moreira, Silva Filho, and Lemes (2011) state that the bulletin arose from the responsible

committee's concern that companies with lease agreements were not disclosing the related assets and liabilities on their balance sheets. However, the standard did not address the classification of leases as operating or finance leases.

During the second half of the 20th century, discussions regarding the standardization of *leases* intensified with the publication of *Discussion Memoranda* and *Exposure Drafts* issued by the FASB (*Financial Accounting Standards Board*), the body that replaced the APB (*Accounting Principles Board*). In 1976, the *Exposure Draft – Accounting for Leases* became SFAS (*Statement of Financial Accounting Standards*) No. 13, which established the distinction between operating and finance leases. (Moreira; Silva Filho; Lemes, 2011)

In 1982, the IASC (*International Accounting Standards Committee*) issued IAS 17, which underwent revisions over time and became the primary international standard on leasing in effect until 2018. The standard defines that lease transactions should be classified as finance leases or operating leases, whereby in a finance lease all risks and rewards are transferred to the lessee, while in an operating lease the risks and rewards are borne by the lessor.

To align with the convergence process, the IASB and the FASB entered into a partnership to issue a joint standard; to this end, a *Discussion Paper* was initially released in 2009 (DP/2009/01), and in 2010 an *exposure draft* (ED/2010/09) was released with input from accounting users regarding the potential new *leasing* standard. Subsequently, an *exposure draft* (ED/2013/06) was issued, incorporating adjustments and considerations from the first *exposure draft* (ED/2010/09). (Visoto, 2018)

Finally, the final version of the new *leasing* standard was issued in January 2016, when the IASB - *International Accounting Standards Board*-issued IFRS 16 - *Leases*, which stipulated that *lease* transactions must be recognized on the lessee's balance sheet.

The new standard arose from the need to make leases more transparent for users. Niyama and Silva (2021) highlight the fact that investors needed to adjust the financial statements to account for liabilities and assets omitted in the calculation of financial indicators and thus use them for decision-making.

In this context, to estimate the financial impact on financial statements, the IASB, in its document on the analysis of the effects of IFRS 16, conducted a survey of publicly listed companies that adopt the International Financial Reporting Standards (IFRS) or Generally Accepted Accounting Principles (GAAP), and identified nearly \$3 trillion in off- balance-sheet lease obligations (IFRS, 2016). IFRS 16 became effective on January 1, 2019, and defined that “a contract is, or contains, a lease if it conveys the right to control the use of an identified asset for a period of time in exchange for consideration” (IASB, 2016, p. 25). Therefore, to recognize that a contract contains a lease, it is necessary to have an identified asset, for there to be a transfer of economic benefits to the lessee, and for the asset to be managed by the lessee without interference from the lessor.

Consequently, accounting recognition for lessees must be made through an asset such as a right-of-use asset, and the corresponding entry will be a lease liability. During the term of the contract, depreciation expenses and interest expenses must be recognized periodically and separately (IASB, 2016).

For lessors, the standard requires an increase in the amount of information disclosed; however, there were no significant impacts, considering that the classification between operating and financial and the accounting recognition remained similar to what was established by IAS 17.

In Brazil, Technical Pronouncement CPC 06 - Finance Leases has been updated with the introduction of IFRS 16. CPC 06 R2 is similar in content to the international standard, under which *lease* contracts must be recognized as assets and liabilities, except in cases involving the term and amount of the lease. This pronouncement took effect on January 1, 2019.

Accounting in Airlines

Airlines use leased aircraft through *leasing* arrangements because it is less costly than purchasing aircraft. The study by Gomes, Fonseca, and Queiroz (2013) highlights the advantage that operating *leases* offer airlines by enabling the exchange and incorporation of more advanced and appropriate aircraft into the fleet, along with the benefit of a shorter term compared to purchase.

With IFRS 16, operating *leases*-which were consistently used by airlines - now receive accounting treatment similar to finance leases and have adopted a new accounting method. The impacts of this change are reflected in the balance sheet and financial indicators; for example, it is estimated that over time, a mismatch will occur between assets and liabilities, with assets decreasing at a straight-line depreciation rate and liabilities decreasing non-linearly through amortization.

The new *leasing* standard has affected the vast majority of industrial sectors that used operating *leases*. The IASB found that the four sectors with the most significant off-balance-sheet amounts are airlines, along with the following sectors: retail, travel, leisure, and transportation. Among these four sectors, airlines stand out as the most affected, with approximately 22.7% of future payments not previously recorded on the balance sheet. Furthermore, it was also found that if all leases were recognized on the balance sheet, airlines would see the largest increase in earnings before interest and taxes (EBIT) among the sectors analyzed, with an increase of approximately 1.36%. (IFRS, 2016)

Financial Ratios

Financial indicators represent quantitative measures used as tools for analyzing financial position and performance. Higgins (2014) highlights the importance of ratios for companies' operational activities, as they allow for the assessment of an entity's financial health, as well as its financial performance, weaknesses, strengths, and future prospects. Financial ratios allow for the analysis of a specific situation based on observed needs and can be calculated by considering a period that encompasses the past, the present, and future estimates.

Since the publication of IFRS 16, the potential impacts of the standard on financial ratios have been estimated. Veverková (2019) states that IFRS 16 will have significant effects on accounting metrics such as EBITDA, which is likely to increase with the deduction of operating costs. EBITDA allows one to see how much cash the company is generating without considering operating expenses; the indicator makes it possible to measure the profit generated by core business activities, and its growth represents productivity.

Current liquidity and general liquidity, which measure the entity's ability to meet its obligations, tend to decrease with the increase in *lease* liabilities. The higher the indicator's result, the better the entity's financial health.

As assets and liabilities increase, other indicators tend to be negatively affected. Matos and Murcia (2019) conclude that ROA tends to decrease due to the recognition of leases as assets, and debt indicators increase as a result of liabilities. A low ROA percentage indicates that the company's assets do not generate earnings for the entity and are not managed efficiently.

The fixed assets-to-equity ratio, which shows how much of the company's equity is tied up in long-term assets, tends to have a positive relationship with IFRS 16. On the other hand, the asset turnover ratio, which enables an analysis of the company's profitability, tends to have a negative relationship with IFRS 16.

The ROU (Right of Use) indicator determines the ratio of leases to total fixed assets and the ratio of leases to total assets. Finally, the study also uses the indicator of the proportion of long-term *lease* obligations to total liabilities; an increase in this indicator means that *lease* liabilities have increased, which is expected under IFRS 16.

Methodological Elements of the Study

The methodology of this study is inductive, as it infers a general or universal truth from specific data – thereby expanding the scope of a theory beyond what is presented. The study employs a qualitative approach regarding procedures; it is a theoretical and bibliographic study aimed at analyzing the main changes brought about by the new standard, as well as to assess the impacts resulting from the new recognition and measurement standards, through empirical research in international and national commercial aviation companies to evaluate possible changes in their *financial reporting*, drawing on *stakeholder* theories.

In addition to this, the research has a quantitative focus, as it involves “the collection, classification, summarization, organization, analysis, and interpretation of data. That is: methods and techniques for synthesizing and interpreting a set of numerical data” (Martins and Theóphilo, 2016, p. 107).

Sampieri, Collado, and Lucio (2013) state that the collection and analysis of quantitative and qualitative data, as well as their integration and joint discussion, represent a set of systematic and critical research processes for drawing inferences based on all the collected information and achieving a greater understanding of the phenomenon under study.

Population and Sample

Considering the universe of this research to be all industrial sectors that will be impacted by IFRS 16, this study will use the airline sector operating domestic and international commercial flights as its sample, as it represents the sector with the greatest potential for impact compared to the others.

To delimit the study, the 2021 list of the top 100 commercial aviation companies was used, compiled by the consulting firm *Skytrax*, which annually publishes the ranking based on its analyses. Among the top 100 companies, only 43 have accessible information with complete content; therefore, they were considered for this study.

The rationale for using the *Skytrax* ranking in this study is based on its establishment as the primary global benchmark for assessing quality and efficiency in the air transport sector. The relevance of this metric is justified by three fundamental methodological pillars:

Global Standardization and Comparability

1. The *Skytrax* rating system, structured on a scale of one to five stars, allows for technical comparability among organizations of different sizes and from different geographic regions. This standardization enables regional airlines and international conglomerates to be evaluated using uniform criteria, establishing a universal benchmark for quality performance (*Skytrax*, 2021).
2. Audit Methodology and Data Scope The platform’s credibility stems from the dual nature of its evaluation processes, which include:

Professional Audits: On-site inspections covering more than 800 service and product items, ensuring technical objectivity.

World Airline Awards: Conducting large- scale satisfaction surveys involving millions of

passengers of various nationalities, which mitigates regional biases and lends statistical validity to the results.

Granularity of Performance Indicators The platform segments the user experience into essential technical categories, enabling a detailed analysis of operations:

Ground Operations: Check-in efficiency, security flows, and VIP lounge infrastructure.

In-Flight Assets: Seat ergonomics and comfort, in-flight entertainment systems, and cabin sanitation.

Service Quality (Soft Skills): Crew performance, in-flight services, and assistance with connections.

Data Collection

The data for this study was collected from each company's website and from websites dedicated solely to compiling annual reports and financial statements from various companies. Information was collected for the years 2017, 2018, 2019, and 2020.

The information used included accounts for current and non-current assets, long-term receivables, current and non-current liabilities, and shareholders' equity, as well as income statement accounts representing net income, operating income, sales revenue, and EBITDA. Notes to the financial statements providing figures related to the *right-of-use* account were also utilized.

Data Analysis Techniques

First, a preliminary analysis of the companies' balance sheets and income statements was conducted to identify the accounts necessary for calculating the financial ratios. Subsequently, the notes to the financial statements for the fixed assets group were analyzed to find the values not listed on the balance sheet pertaining to the Right of Use account, which is necessary for calculating financial indicators related to ROU (Right of Use).

After locating the accounts, calculations were performed for the economic and financial ratios of indebtedness, general and current liquidity, asset turnover, equity immobilization, EBITDA, return on assets, right of use on assets, and right- -of-use on fixed assets, as well as the proportion of long-term lease obligations to total liabilities.

Next, the median of each financial indicator for the years 2017 through 2020 was calculated. The median was used to obtain a typical and representative value of the data obtained, which is presented in a heterogeneous manner and includes some extreme values that deviate from the norm.

For a better analysis, the variation between the analyzed years was calculated using the following expression:

$$x = \text{Year2/Year1 Variation} = x - 1.$$

Another piece of data analyzed was the performance of companies that were more or less impacted; the selected companies were those that showed the largest or smallest variations in 2019 and 2020.

It is worth noting that for the analysis of the right-of-use asset ratio and the right-of-use fixed asset ratio, only medians were used, since the right-of-use account did not exist prior to 2018 for 41 of the 43 companies analyzed. Table 1 presents the expected relationships of the indicators with IFRS; a positive relationship indicates an increase in the indicator, and a negative relationship indicates a decrease in the indicator.

Table 1

Expected relationship of financial indicators

Indicators	Expected relationship with IFRS 16
Debt	Positive
Current liquidity	Negative
Overall liquidity	Negative
ROA – Return on Assets	Negative
Asset Turnover	Negative
Fixed Assets to Equity	Positive
EBITDA	Positive
Ratio of Long-Term Lease Obligations to Total Liabilities	Positive
Right-of-use assets as a percentage of total assets	Positive
Right-of-use over total fixed assets	Positive

Source: Prepared by the authors (2022)

Results and Analysis

Indebtedness

Table 2 shows the median and the change in the debt ratio from 2017 to 2020. With the regulation in place, indebtedness is expected to increase; thus, based on the data analysis, it is observed that the median indebtedness increased in the first two years of the regulation's implementation, notably between 2019 and 2020, when it showed a positive variation of 11.69%. Between 2018 and 2019, the median debt level also increased, showing a variation of 7.18%.

Table 2

Median debt and variation in the median between years

	2017	2018	2019	2020
Median debt	0.96%	70.93%	76.02%	84.91%
		2017 and 2018	2018 and 2019	2019 and 2020
Variation of the median of the unit		-0,04%	7,18%	11,69%

Source: Prepared by the authors (2022)

Table 3 shows the results for the companies most and least impacted by the debt ratio. Azul Linhas Aéreas Brasileiras was the most impacted during the analyzed period, showing an increase in debt in 2019 and 2020 compared to 2018. Next, Air Asia stood out for its increase in debt in 2019 and 2020, showing an increase in 2019 compared to 2018. The least affected airline was Norwegian Air Shuttle, which, despite seeing an increase in the median in 2019, saw a decrease in debt to –70.35% in 2020. The same is true for Jet2.com, which saw an increase in 2019 but a decrease in 2020.

Table 3: Median of the Most and Least Impacted Companies for the Indebtedness Indicator

Most Impacted Companies	2017	2018	2019	2020
Azul Linhas Aéreas Brasileiras	72.53%	73.17%	118.33%	189.58%

Air Asia	69.04%	66.66%	88.63%	118.15%
Least Impacted Companies	2017	2018	2019	2020
Norwegian Air Shuttle	46.31%	41.43%	48.02%	-70.35%
Jet2.com	79.00%	79.76%	81.26%	66.44%

Source: Elaborated by the authors (2022)

Current Liquidity

Table 4 presents the median and the variation in the current liquidity ratio from 2017 to 2020. It can be observed that the variation between 2017 and 2018 indicates a 1.82% increase in the median current liquidity ratio, while the variation in the median between 2018 and 2019 stands out for indicating a 19.13% decrease. In 2020, a recovery among companies is noted, as they show a positive median variation of 5.56%, which is higher than the variation in the other years analyzed. It is expected that, with the new standard, current liquidity will show lower results, which is observed in the first year of the standard's implementation.

Table 4

Median current liquidity and variation in the median between years

Median current liquidity	2017	2018	2019	2020
	0.81	0.83	0.67	0.70

Source: Prepared by the authors (2022)

Table 5 presents the results for the companies most and least affected by the current liquidity ratio. *Indigo* was the most affected; the indicator has declined over the years, notably between 2018 and 2019, when current liquidity fell from 2.26 to 1.36, and in 2020, when the indicator dropped to 1.09. *Air Asia* was the second most affected, with the indicator falling to 0.74 in 2019 and 0.30 in 2020. The least impacted companies were *Ana Holdings* and *Southwest Airlines*, neither of which saw a decline in the ratio in 2019. However, in 2020, *Southwest Airlines* saw an increase in the ratio compared to 2019, and *Ana Holdings*, which was the least impacted company, saw increases in both 2019 and 2020.

Table 5

Median of the most and least impacted companies by the Current Liquidity indicator

Most impacted companies	2017	2018	2019	2020
Indigo	2.38	2.26	1.36	1.09
Air Asia	0.81	1.28	0.74	0.30
Companies least affected	2017	2018	2019	2020
Ana Holdings	1.15	1.02	1.07	2.43
Southwest Airlines	0.70	0.63	0.66	2.02

Source: Prepared by the authors (2022)

Current Ratio

Table 6 presents the median and the variation in the general liquidity ratio from 2017 to 2020. The results show that between 2017 and 2018 there was a negative change of 7.58%, and

between 2018 and 2019 there was a larger negative change of -12.97%. However, in 2020, the general liquidity ratio recovered, showing a positive median change of 6.00%. As with current liquidity, IFRS 16 is expected to reduce the general liquidity result, meaning that airlines have reduced their short-term and long-term payment capacity, and therefore the 2019 median is the one furthest from 1.00.

Table 6

Median of general liquidity and variation in the median between years

	2017	2018	2019	2020
Median overall liquidity	0.49	0.45	0.39	0.42
	2017 and 2018	2018 and 2019	2019 and 2020	
Change in the median of overall liquidity	-7.58%	-12.97%	6.00%	

Source: Prepared by the authors (2022)

Table 7 shows the results for the companies most and least impacted by the general liquidity indicator. *Wizz Air* and *Saudi Arabian* were the most impacted; for both, the 2019 and 2020 results showed no increase. The least impacted company was *Norwegian Air Shuttle*, which saw a decrease in the index in 2019 but recovered in 2020, posting a result of 0.71. *Air Astana* was the second least impacted due to an increase in the index that raised the result to 1.07 in 2019.

Table 7

Median of the most and least impacted companies by the General Liquidity indicator

Most impacted companies	2017	2018	2019	2020
Wizz Air	1.60	1.82	0.56	0.47
Saudi Arabian	2.14	1.86	1.13	0.89
Companies least affected	2017	2018	2019	2020
Norwegian Air Shuttle	0.27	0.29	0.23	0.71
Air Astana	0.64	0.65	1.07	0.97

Source: Prepared by the authors (2022)

Return on Assets

Table 8 presents the median and the variation in the return on assets index from 2017 to 2020. Data analysis reveals a trend of declining return on assets over the years, with the variation between 2019 and 2020 standing out at -384.02%. It should be noted that the 2020 fiscal year encompassed the first year of the COVID-19 pandemic and that this should be considered an extremely relevant variable when analyzing the 2020 ratio, which includes operating profit in its formula. IFRS 16 is expected to reduce return on assets results, a trend observed in the first two years of the standard's implementation.

Table 8

Median Return on Assets and variation in the median between years

	2017	2018	2019	2020
Median return on assets	8.02%	6.12%	4.13%	-11.73%
	2017 and 2018	2018 and 2019	2019 and 2020	

Change in median return on assets	-23.69%	-32.52%	-384.02%
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Source: Prepared by the authors (2022)

Table 9 shows the results for the companies most and least impacted by the return on assets indicator. According to the table, *Saudi Arabian* and *Aegean Airlines* were the most impacted companies, both reporting lower results in 2019 and 2020, with a notable decline in 2020: for *Saudi Arabian*, the indicator fell to -11.37%, and for *Aegean Airlines*, it fell to -20.60%. , the least impacted airlines were Qatar Airways and SpiceJet; neither saw a decline in results in 2019. However, SpiceJet, the second least impacted airline, saw a decline in 2020, while Qatar Airways, the least impacted airline, saw an increase in the indicator in 2020.

Table 9

Median of the most and least impacted companies for the Return on Assets indicator

Most-impacted companies	2017	2018	2019	2020
Saudi Arabian	28.43%	24.24%	21.54%	-11.73%
Aegean Airlines	12.59%	13.59%	8.01%	-20.60%
Least-impacted companies	2017	2018	2019	2020
Qatar Airways	-0.02%	-1.88%	-0.89%	-0.74%
SpiceJet	14.97%	-4.05%	-3.59%	-4.17%

Source: Prepared by the authors (2022)

Asset Turnover

Table 10 presents the median and the change in the asset turnover ratio from 2017 to 2020. The results indicate a negative trend over the years, with a decrease of 0.06% between 2017 and 2018, and a decrease of - 10.49% between 2018 and 2019. In 2020, a larger variation of -63.01% was observed compared to 2019; however, the COVID-19 pandemic that began in 2020 should be considered a significant contributor to this reduction, given that the sales revenue account was used to calculate the indicator. The standard is expected to reduce asset turnover results, which is observed in the first two years of the standard's implementation.

Table 10

Median Asset Turnover and Change in Median Between Years

	2017 and 2018	2018 and 2019	2019 and 2020	
Change in median asset turnover	-0.06%	-10.40%	-63.01%	
	2017	2018	2019	2020
Median asset turnover	0.766	0.765	0.686	0.253

Source: Prepared by the authors (2022)

Table 11 presents the results for the companies most and least impacted by the asset turnover indicator. *Aeroflot* was the most impacted company; in 2019, it experienced the largest decline, from 1.932 in 2018 to 0.297 in 2019. Meanwhile, *SpiceJet*, which was the second-most impacted company, saw the largest reduction in 2020, dropping from 0.904 in 2019 to 0.003 in 2020. The least affected airlines were *Korean Airlines* and *China Eastern Airlines*; for both, the indicator decreased in all years analyzed, although the decrease was smaller than that of the other airlines analyzed.

Table 11

Median of the most and least impacted companies for the Asset Turnover indicator

Most impacted companies	2017	2018	2019	2020
Aeroflot	1,648	1,932	0.726	0.297
SpiceJet	1,527	1,474	0.904	0.003
Least affected companies	2017	2018	2019	2020
Korean Airlines	0.491	0.509	0.458	0.302
China Eastern Airlines	0.446	0.482	0.424	0.206

Source: Prepared by the authors (2022)

Equity Capitalization

Table 12 presents the median and the variation between 2017 and 2020 of the equity immobilization index. With IFRS 16, it is expected that fixed assets financed by equity will increase and, consequently, the equity immobilization indicator will also rise; this increase is demonstrated in the medians shown below, which rose starting in 2019. Furthermore, the positive change between 2018 and 2019 shows that this increase in 2019 was 2.47% compared to 2018, which corresponds to the largest change among the other years.

Table 12

Median Equity Immobilization and Median Variation Between Years

	2017	2018	2019	2020
Median equity immobilization	181.78%	173.15%	177.43%	179.94%
	2017 and 2018	2018 and 2019	2019 and 2020	
Change in the median of net equity equity	-4.75%	2.47%	1.41%	

Source: Prepared by the authors (2022)

Table 13 presents the results for the companies most and least affected by the equity immobilization indicator. The company most affected was *American Airlines*, which reported a result of -29,656.78% in the first year the standard was in effect; in 2020, the indicator recovered, showing an immobilization rate of -461.61%. On the other hand, the second most impacted company, *Kenya Airways*, experienced the greatest impact in 2019, reporting a result of -499.31%. *Norwegian Air Shuttle* was the least impacted airline, as in 2019 and 2020 the decline in equity decreased, showing results of 1,609.57% and -144.22%, respectively. Next, *Latam* was the least impacted; although it showed an increase in the index in 2019, in 2020 the impact decreased from 412.88% to - 439.34%. Next, *Avianca* was the least impacted; although it showed the largest increase in 2019 among the other companies analyzed, in 2020 the impact was reduced to -369.61%.

Table 13: Median of the Most and Least Impacted Companies for the Immobilization of Net Equity Indicator

Most Impacted Companies	2017	2018	2019	2020
American Airlines	-4,378.97%	-20,176.33%	- 29,656.78%	-461.61%
Kenya Airways	2,262.24%	-4,011.05%	-499.31%	-130.28%
Least Impacted Companies	2017	2018	2019	2020
Norwegian Air Shuttle	1,498.81%	2,353.64%	1,609.57%	-144.22%
Avianca	364.34%	541.99%	95,864.47%	-369.61%

Source: Elaborated by the authors (2022)

EBITDA

IFRS 16 is expected to increase profitability indicators such as EBITDA. Based on the results shown in Table 14, there was an increase in the median between 2018 and 2019; the change in the median for this period is the only positive one among the others, at 14.38%. On the other hand, the change between 2019 and 2020 was -121.83%. When analyzing the decline in this indicator in 2020, one must take into account the COVID-19 pandemic, which reduced sales revenue and directly influenced the calculation of this indicator.

Table 14: Median EBITDA and Median Variation Between Years

	2017	2018	2019	2020
Median EBITDA in US\$	1,520,500,000	1,292,189,000	1,478,038,750	-322,667,460
	2017 and 2018	2018 and 2019	2019 and 2020	
Variation of EBITDA	-15.02%	14.38%	-121.83%	

Source: Elaborated by the authors (2022)

Table 15 presents the results of the most and least impacted companies regarding the EBITDA indicator. The most impacted company was SpiceJet, which obtained an increase in EBITDA in 2019 but a reduction in the indicator in 2020. The same occurred with Cathay Pacific, the second most impacted company. American Airlines and United Airlines were the least impacted among the other analyzed companies; both had increases in EBITDA in 2019 and the two largest EBITDA reductions in the year 2020.

Table 15

Median of the Most and Least Impacted Companies for the EBITDA Indicator in US\$

Most Impacted Companies	2017	2018	2019	2020
SpiceJet	131,074,043	6,940,847	178,469,047	151,664,254
Cathay Pacific	343,040	491,645	630,444	-125,130

Least Impacted Companies	2017	2018	2019	2020
American Airlines	5,933,000,000	4,495,000,000	5,047,000,000	-8,381,000,000
United Airlines	5,820,000,000	5,532,000,000	6,589,000,000	-3,871,000,000

Source: Prepared by the authors (2022)

Long-Term Lease Obligations as a Percentage of Total Liabilities

Table 16 presents the median and the change from 2017 to 2020 in the ratio of Long-Term Lease Obligations to Total Liabilities. It can be observed that in the years prior to the standard, the change was -4.25%. However, the variation between 2018 and 2019 showed a positive result of 10.48%, which is expected, as IFRS 16 causes an increase in *lease* liabilities and consequently an increase in the indicator. However, the variation between 2019 and 2020 is negative, indicating that companies reduced their *lease* liabilities.

Table 16
Median Share of Long-Term Lease Obligations over Total Liabilities

	2017	2018	2019	2020
Median Share of Long-Term Lease Obligations over Total Liabilities	73.46%	70.34%	77.71%	67.43%
	2017 and 2018	2018 and 2019	2019 and 2020	
Median Variation of the Share of Long-Term Lease Obligations over Total Liabilities	-4.25%	10.48%	-13.23%	

Source: Elaborated by the authors (2022)

Table 17 presents the results for the companies most and least impacted by the indicator “Long-Term Lease Obligations as a Percentage of Total Liabilities.” *Emirates* and *Indigo* were the most impacted and showed increases in the indicator in 2019 and 2020, particularly in 2019, when both achieved results of 94.04% and 88.39%, respectively. *British Airways* and *Finnair* were the least affected; in 2019 and 2020, both showed a decrease in both years, particularly in 2019 for *British Airways*, which fell to 78.35%.

Table 17
Median of the Most and Least Impacted Companies for the Share of Long-Term Lease Obligations over Total Liabilities

Most Impacted Companies	2017	2018	2019	2020
Emirates	55.95%	50.27%	94.04%	95.22%
Indigo	55.91%	53.16%	88.39%	91.30%
Least Impacted Companies	2017	2018	2019	2020
British Airways	101.36%	120.89%	78.35%	67.22%
Finnair	65.62%	65.72%	46.81%	26.59%

Source: Elaborated by the authors (2022)

Right of Use on Assets and Right of Use on Fixed Assets

Table 18 presents the median of the right-of-use-to-assets ratio and the right-of-use-to-fixed-assets ratio for the years 2019 and 2020, since in 2017 and 2018 there was no right-of-use account on the balance sheets of the analyzed companies. The median of the right-of-use-to-assets ratio shows that, starting in 2019, the right-of-use account represents 25.95% of total assets, while in 2019 the median was 33.60%. In 2020, the median did not show significant changes; the right-of-use ratio on total assets decreased to 22.09%, and the right-of-use ratio on fixed assets increased to 35.43%. Overall, IFRS 16 is expected to make the right-of-use account significant for companies that hold a substantial amount of leased assets.

Table 18

Median of Right-of-Use to Assets and Right-of-Use to Fixed Assets

	2019	2020
Median Right-of-Use to Assets	25.95%	22.09%
	2019	2020
Median Right-of-Use in Relation to Fixed Assets	33.60%	35.43%

Source: Elaborated by the authors (2022)

Table 19 shows the companies with the highest and lowest share of right-of-use in relation to total assets. *Aeroflot* and *Turkish Airlines* are the companies with the highest share; for both, the right-of-use account accounts for more than 55% of total assets. On the other hand, *Ryanair* and *EasyJet* have no significant share of the right-of-use account relative to total assets, with the highest figure being 1.61%.

Table 19

Companies with Highest and Lowest Representativity of Right-of-Use in Relation to Total Assets

Companies with Highest Representativity of Right-of-Use to Total Assets	2019	2020
Aeroflot	67.41%	62.53%
Turkish Airlines	55.08%	57.88%
Companies with Lowest Representativity of Right-of-Use to Total Assets	2019	2020
Ryanair	1.61%	1.53%
EasyJet	0.17%	0.22%

Source: Elaborated by the authors (2022)

Finally, Table 20 shows the companies with the highest and lowest proportions of right-of-use assets relative to fixed assets. *Aeroflot* and *Indigo* are the companies with the highest proportions; for both, the right-of-use account accounts for more than 85% of fixed assets. On the other hand, *Ryanair* and *EasyJet* have no significant share of the right-of-use account relative to fixed assets, with the highest figure being 2.45%.

Table 20

Companies with Highest and Lowest Representativity of Right-of-Use in Relation to Fixed Assets

Companies with Highest Representativity of Right-of-Use to Fixed Assets	2019	2020
Aeroflot	95.92%	96.97%
Indigo	85.08%	95.76%

Companies with Lowest Representativity of Right-of-Use to Fixed Assets	2019	2020
EasyJet	0.35%	0.28%
Ryanair	2.45%	2.20%

Source: Elaborated by the authors (2022)

Final Considerations

The objective of this study was to conduct a comparative analysis of the impacts of IFRS 16 on the financial statements of airlines before and after its adoption. To perform this analysis, economic and financial indicators were calculated for the period from 2017 to 2020, corresponding to two years before and after the standard's adoption.

Throughout the study, it was evident that the choice of airlines was due to the fact that the airline sector is the industry most impacted, according to a study prepared by the IASB. The final sample consisted of forty-three companies that make their financial statements available for public access with complete content.

The study also presented the main changes introduced by IFRS 16, such as changes in accounting that primarily affect lessee companies, which must recognize a right-of-use asset and a lease liability, in addition to reducing operating costs.

The survey results show that all expected impacts on economic and financial ratios were realized in at least one of the first two years of the standard's implementation, as the expected impacts were based on the accounting changes introduced by IFRS 16.

Analysis of the ratios reveals an increase in debt, equity tied up in fixed assets, EBITDA, and the share of long-term *lease* obligations in total liabilities. In all the ratios analyzed, these increases are justified by the rise in assets and liabilities and the reduction in operating costs. However, the increase in these accounts led to a decrease in current liquidity, general liquidity, asset turnover, and return on assets.

The other two ratios that showed a positive impact from the new standard were the right-of-use-to-assets ratio and the right-of-use-to-fixed-assets ratio, which demonstrated the significance of the right-of-use account on the balance sheets of most of the companies analyzed, accounting for more than 22% of total assets and more than 33% of fixed assets.

It was found that the airline most impacted was *Indigo*, which ranks among the two airlines most affected in terms of current liquidity, the ratio of long-term lease obligations to total liabilities, and right-of-use assets. The company least impacted was also identified: Norwegian Air Shuttle, which ranks among the two least-impacted airlines in terms of debt ratios, general liquidity, and equity tied up in fixed assets.

This study contributes to accounting theory by presenting evidence of the impacts of IFRS 16 on lessees' financial statements. For future research, it is suggested that a broader sample be used, including other sectors of the economy and a longer analysis period. Furthermore, new quantitative methods are recommended for data analysis to identify the impacts of IFRS 16 from new perspectives.

References

Accounting Pronouncements Committee (CPC) (2017). CPC 06 (R2) Operating Leases. Retrieved November 12, 2021, from <http://www.cpc.org.br/CPC/Documentos-Emitidos/Pronunciamentos/Pronunciamento?Id=37>.

Gomes, S. B. V., Fonseca, P. V. D. R., & Queiroz, V. D. S. (2013). Financing for aircraft lessors: business model and introduction to aircraft leasing risk analysis. In, BNDES Setorial (Vol. 37, pp. 129–172).

<https://web.bndes.gov.br/bib/jspui/handle/1408/1515>. Accessed May 18, 2022.

Higgins, R. C. (2014). Financial Management Analysis-10. 10th edition. AMGH Editora.

International Accounting Standards (2003). Accounting Standard (IAS) 17 Leases. Retrieved February 23, 2022, from <http://ifrs.skr.jp/ias17.pdf>.

International Accounting Standards Board (2016). Accounting Standard IFRS 16 Leases. Retrieved January 19, 2022, from <https://www.ifrs.org/content/dam/ifrs/publications/pdf-standards/english/2022/issued/part-a/ifrs-16-leases.pdf>.

International Financial Reporting Standards (2016). IFRS 16 Leases: Effects Analysis. Retrieved October 22, 2021, from <https://www.ifrs.org/content/dam/ifrs/project/leases/ifrs/published-documents/ifrs16-effects-analysis.pdf>.

Kovalenko, N. E., & Kovalenko, K. E. (2018). The history of leasing contracts [Special issue]. QUID: Investigación, Ciencia y Tecnología, (2), 159-165. <https://dialnet.unirioja.es/servlet/articulo?codigo=6724748>. Accessed Feb. 25, 2022.

KPMG. (2016). IFRS in Focus 02/2016: IFRS 16 Leases. Retrieved November 2, 2021, from <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/04/br-ifrs-em-destaque-02-2016.pdf>.

Martins, G. A. & Theóphilo, C. R. (2016) Research Methodology for Applied Social Sciences. 3rd ed. São Paulo: Atlas.

Matos, E. B. S. de, & Murcia, F. D. (2019). IFRS 16: A practical and critical accounting perspective on the new leasing standard from the lessee's viewpoint. Revista Brasileira de Contabilidade-RBC, no. 238, 50–65.

Moreira, A. T.; Silva Filho, O. A. D.; Lemes, S. (2011) IAS 17 – Analyses, Comparisons, and the Primacy of Substance over Form. IDEAU Journal of Administration and Accounting Sciences, Getúlio Vargas, 6(12).

Niyama, J. K.; Silva, C. A. T. (2021) Accounting Theory. 4th ed. São Paulo: Atlas.

Öztürk, M.; Serçemeli, M. (2016) Impact of New Standard “IFRS 16 Leases” on Statement of Financial Position and Key Ratios: A Case Study on an Airline Company in Turkey. Business and Economics Research Journal, 7 (4), 143-157.
<http://dx.doi.org/10.20409/berj.2016422344>

Sacarin, M. (2017) IFRS 16 “Leases” — Consequences on the Financial Statements and Financial Indicators. Audit financial, 15 (1), 114-122. <https://doi.org/10.20869/AUDITF/2017/145/114>.

Sampieri, R. H.; Collado, C. F.; Lucio, M. B. (2013) *Research Methodology*. 5th ed. Porto Alegre: Penso.

Skytrax World Airline Awards (2022). The World's Top 100 Airlines in 2021: Skytrax World Airline Awards. Retrieved April 19, 2022, from <https://www.worldairlineawards.com/worlds-top-100-airlines-2019/>.

Veverková, A. (2019). IFRS 16 and its impacts on the aviation industry. *Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis*, 67(5), 1369-1377.
[10.11118/actaun201967051369](https://doi.org/10.11118/actaun201967051369).

Visoto, M. C. R. (2018). Lease accounting (IFRS 16): the perception of users of accounting information according to the criteria proposed by ED/2013/6. [Master's thesis, University of Brasília]. Institutional Repository of the University of Brasília.
<https://repositorio.unb.br/handle/10482/34747>.