“Level of pandemic consequences for the indebtedness of the Slovak hospitality sector”

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LEVEL OF PANDEMIC CONSEQUENCES FOR THE INDEBTEDNESS OF THE SLOVAK HOSPITALITY SECTOR

Abstract

The financial impact of the COVID-19 pandemic on entire economies has been proven. The current necessity is to determine the level of consequences for distinct industries and sectors. The local lockdowns and travel restrictions shocked the hospitality industry and its performance. Thus, the purpose of this study is to explain the effect of the pandemic on a particular economic sector, specifically NACE I (Accommodation and food service activities), and changes in financial indicators in Slovak circumstances for the period 2016–2021. The study focuses on debt ratios that reflect the financial stability of businesses. Friedman's test was run to determine how the chosen indebtedness indicators developed over the chosen years. Based on a sample of 321 Slovak companies, statistically significant differences were found. But only the interest coverage ratio was significantly different between the pre-pandemic and pandemic eras, according to the post-hoc tests. In addition, there was a hint of a positive overall transformation in the sector of accommodation and food service activities. The decline of the number of enterprises by total indebtedness from the alarming threshold in 2021 declared this fact. The conclusions implicate that Slovak businesses are becoming more mindful of debt financing and are attempting to reduce the risks of going bankrupt.

Keywords comparison of periods, corporate finance, COVID-19, performance, ratios

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INTRODUCTION

Financial performance plays an important role in the corporate lifecycle if businesses want to attain market dominance and maintain a sustainable competitive advantage. To achieve these objectives, a strategic management system is required to ensure the controlled use of corporate resources, which will result in the realization of a company's vision (Dragos et al., 2014). Financial performance is understood as a representation of the corporate attained success, which can be expressed as the result of various activities that have already been carried out (Durana & Valaskova, 2022; Durana et al., 2022). The overall performance evaluation, which is also related to a company's financial health, is crucial, particularly for identifying the company's strengths and weaknesses. Because the strategy for financial management is selected based on these factors (Meirawati et al., 2023).

A financially stable system is one that can ensure efficient and problem-free operation in the absence of significant issues (Jarsulic, 2010; Dankiewicz et al., 2023). According to Vlahovic (2014), stability is the capacity of the financial system that enables the improvement of economic processes, the management of risks, and the elimination of fluctuations. Allen and Wood (2006) provide a similar definition, defining financial stability as a situation with a very low likelihood of

financial disruptions. In general, however, several authors assert that it is difficult to establish a precise definition of financial stability. Due to the large number of public and private entities, institutions, and markets that comprise the financial system, many definitions are therefore of a general nature (Eduardo et al., 2021; Shkolnyk et al., 2020).

Financial analysis is an important characteristic for assessing the performance and prosperity of a business, not only in prosperous times, but also when volatile market fluctuations impact business performance and financial stability (Zhang & Dilanchiev, 2022). During the last three years, which have seen the negative impact of the COVID-19 pandemic, several companies have come to believe in the importance of continuous analysis of their financial situation (Zhang et al., 2023). Identification of threats and business weaknesses, as well as preparation for unexpected and crisis situations, were the most important areas of interest for a company's management (Chapman Cook & Karau, 2023). The recent economic changes brought about by the COVID-19 pandemic have had a global impact on the activity and operation of businesses (Sultana et al., 2022). Lizinska et al. (2023) highlight the occurrence of differences in industries' vulnerability to these shock changes. It is necessary to detect the score of pandemics in every country via every sector and every company size (Islam & Fatema, 2023) and to measure the changes in the financial performance and stability of enterprises (Musa et al., 2022).

1. LITERATURE REVIEW

Financial analysis is a highly effective method for determining a company's financial health, as it is a set of methods that, based on the analysis of a company's economic situation, can determine and also influence its market position (Valaskova et al., 2021). Therefore, an examination of a company's financial state can assure a comprehensive evaluation that includes market success, management level, profitability, or efficiency, as well as management level and quality (Cerkovskis et al., 2022). And predict future development based on current and historical data. In addition, Blazek et al. (2023) provide a comprehensive overview of financial analysis. This publication focuses on the characteristics of financial analysis, individual indicators, as well as a description of the various categories of employed methods. They considered financial analysis and control as the final phase of financial management, the essence of which is the administration of a company's financial processes. According to Siebeneichler and Feil (2022), financial analysis is the representation of performance through the balance sheet and income statement. Hiadlovsky et al. (2016) emphasize that the purpose of a company's financial analysis is to determine: the level of liquidity in order to demonstrate that the company is able to meet its financial obligations; the level of solvency in order to demonstrate the company's ability to meet its financial obligations even in the event of liquidation; the level of profitability and demonstrate the business's ability to generate profit over a certain period of time; and the stability of the business amidst a changing economic environment.

Analyzing ratio indicators is a fundamental aspect of financial analysis. According to Purnama et al. (2020), financial ratios are numbers derived by comparing closely related financial items. Therefore, it can be concluded that the analysis of financial ratio indicators represents two or more financial variables. Financial ratio analysis is helpful for determining the current and prospective financial health of a business (Gajdosikova et al., 2022). These financial indicators disclose the situation and performance of a company during a specific period. The purpose of the analysis of various indicators is to determine the company's level of liquidity, solvency, operational efficiency, and profitability (Gajdosikova et al., 2023a). A business is healthy if it can endure in any economic environment by meeting its financial obligations, engaging in stable activities, and achieving sustainable business growth (Krasteva & Nagy, 2022). A company's performance is the consequence of distinct phases requiring the expenditure of diverse resources. Profit can be used to determine performance indicators, but to generate a profit, the company must carry out its activities, which are supported by the availability of adequate resources (Plater et al., 2022).

However, being in debt increases the likelihood of facing financial problems (Boyle, 2022), accruing

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debts (Baines & Hager, 2021), needing a bank loan (Sierpinska-Sawicz & Bak, 2021), and having a weak currency on the market (Sgambati, 2019), all of which can lead to mistrust from clients and suppliers. The risk of doing business increases as corporate debt increases (Uzea et al., 2014). Financial risk is a concept that describes the threat or potential that shareholders, investors, or other interested parties would lose money and applies to businesses, financial markets, and people (Dimitrova et al., 2021). Only a small percentage of businesses in the market are fully independent. On the other hand, a lot of businesses rely on outside funding for their operations. A negative equity scenario might develop if an organization experiences a long-term loss, according to Mauer et al. (2022). Debt indicators are used to assess a company's degree of debt, debt coverage, and overall debt (Rant et al., 2021; Singh, 2022; Issa & Gevorkyan, 2022). One of the most important debt indicators is the total indebtedness ratio, which shows how much debt a company has and calculates how much of its assets are covered by debt (Climent-Serrano, 2019). The greater the value of this indicator, the greater the financial risk that the organization faces (Johnson & Yushkov, 2022). One of the most important debt indicators is the indebtedness ratio, which shows how much debt a company has and calculates how much of its assets are covered by debt. The greater the value of this indicator, the greater the financial risk that the organization faces (Patel & Dahlin, 2021).

The primary objective of an organization is to maximize profits. In addition, the corporate profit positively impacts its financial performance. Consequently, businesses must evaluate the attained results and their development over time. Companies must be able to measure their performance and ensure its sustainability. Moreover, businesses must be able to optimize financial results to achieve and maintain a competitive advantage in the face of increasingly intense competition (Jencova et al., 2021) even in the difficult periods accompanied by various crises. It has been proven that the era of the COVID-19 crisis has significantly affected the economic situation of Slovak companies and influenced their indebtedness and financial ratios (Musa et al., 2022). The dependencies between corporate indebtedness and the coronavirus were disclosed in individual sectors and individual categories of company sizes. The pandemic has triggered many shock changes, including unprecedented turbulences in most business mechanisms (Kovacova et al., 2022). The hospitality industry has suffered from the COVID-19 pandemic crisis very hard. The majority of companies, hotels, and other hospitality facilities had to deal with a significant decline in demand as a result of travel restrictions, lockdown times, social isolation, and shortened opening hours (Vavrova, 2022). Thus, the purpose of this study is to explain the effects of the pandemic on a particular economic sector, specifically NACE I (Accommodation and food service activities), and changes in financial indicators in Slovak circumstances for the period 2016–2021. The implementation of the study in this sector can contribute to the recognition of the level of pandemic consequences in the context of its financial performance; it may also highlight the transformation of the accommodation and food service activities sector. The subsequent hypotheses were examined:

H_0: *The median values of the financial indicators of indebtedness do not change from one year to the next at all (time has no statistically significant impact on the development of financial indicators)*

H_1: *At least two financial indicators have different median values, and their level varies considerably within the analyzed period (time has a statistically significant impact on the development of financial indicators).*

2. METHODOLOGY

2.1. Creation and structure of a sample

According to the NACE statistical taxonomy of economic activities of the European Communities, the research was concentrated on section I – Accommodation and Food service activities, which was the most impacted by several government measures (Xiang et al., 2021; Alotaibi & Khan, 2022; Gerwe, 2021, and others). The primary data used to analyze the industry spans the years 2016 to 2021 and came from the

Table 1. Categorization according to the Orbis database

Size of the enterprise	Criterion		
	Operational revenue	Total assets	Number of employees
Medium	≥ 1 million euros	≥ 2 million euros	≥ 15
Large	≥ 10 million euros	≥ 20 million euros	≥ 150
Very large	≥ 100 million euros	≥ 200 million euros	≥ 1,000

ORBIS database provided by Bureau van Dijk. The data was sorted based on the parameters defining the main aim of the study (the focus on corporate indebtedness).

Financial data of 321 Slovak companies were available for the analysis (after the removal of non-available and incomplete data). Focusing specifically on SK NACE I was necessitated by the fact that, in most cases, this sector is reliant on direct consumption, which was affected and largely constrained by the pandemic of the COVID-19 virus, which was also reflected in the decline in employment. The dataset of analyzed enterprises consists of 211 private limited companies (65.7%) and 110 public limited companies (34.3%) when considering the legal form of enterprises. Summarizing the information about the firm size, the sample is formed of 187 (58.3%) small enterprises, 125 (38.9%) medium-sized enterprises and 9 (2.8%) large enterprises which copy the general division of enterprises in Slovak conditions. There was not a very large enterprise in the sample. Table 1 summarizes the categorization according to the ORBIS database. The enterprises must meet the criteria listed in the table to be labelled as medium, large, or very large enterprises. If not, the enterprise was identified as a small enterprise. (Blazek et al., 2023).

2.2. Choice of indebtedness ratios

The pandemic had the greatest impact on indebtedness, profitability, and liquidity, among other indicators. When conducting a financial analysis of the industry, the main focus was on debt indicators because they have a significant impact on the financial stability of a company and its future market operations (Table 2).

2.3. Disclosure of effects and structures over the period 2016–2021

The pandemic of the viral disease COVID-19 necessitated the adoption of measures that had a significant impact on the operation, existence, and functionality of business entities. In some instances, businesses were completely shut down, which led, for instance, to once-thriving businesses ceasing operations and coming to a standstill. The purpose of the analyses is to determine if the pandemic influenced the level of debt, the capacity of business entities to carry debt, and the structure of a company's financial resources. The objective is to identify groups of years that differ using Friedman's non-parametric test (the data normality was not confirmed). The significance level of 0.05 is considered during statistical verification. If is rejected and is accepted, this indicates that the development of indicators between the analyzed years differed significantly.

The subsequent detection of differences between groups of years can be monitored via post hoc analysis, where differences are to be found between the pair of years whose Adj. Sig. (calculated using the Dunn-Bonferroni correction) in the pairwise comparison table is less than the value of

Table 2. Selected indebtedness ratios

Indebtedness ratio	Algorithm
Total indebtedness ratio (TI)	Current and non-current liabilities to total assets
Self-financing ratio (SF)	Shareholders' funds to total assets
Credit indebtedness ratio (CI)	Bank loans and overdrafts to total assets
Debt-to-equity ratio (DE)	Current and non-current liabilities to shareholders funds
Interest coverage ratio (IC)	Earnings before interest and taxes to interests paid
Interest burden ratio (IB)	Interests paid to earnings before interest and taxes
Equity leverage ratio (EL)	Total assets to shareholders funds

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0.05. In this instance, it was essential to compare the period immediately preceding the coronavirus pandemic (2018 and 2019) to the period substantially impacted by the pandemic (2020 and 2021).

3. EMPIRICAL RESULTS AND DISCUSSION

To meet the main aim of the study, the financial indicators were calculated for each enterprise in the dataset and for each year. The results of the calculation of the most important indebtedness indicator, total indebtedness (TI), were divided into three categories based on the following facts. The golden rule of financing states that for the ratio of foreign and equity capital to be 1:1, the value of total indebtedness should be 50%, which was selected as one of the most significant values among the attained outcomes. The second, and in this case alarming, value for developed economies is debt between 70 and 80% (Kotulic et al., 2018). To establish the categories, a value greater than the alarming value is chosen. In the first category are companies with a total debt of up to 50%, i.e., those that are below the optimal value; in the second category are business entities with a value of total debt between 50% and 80%, i.e., from an optimal to an alarming value; and in the third category are those whose total indebtedness percentage expression is greater than 80%, i.e., those that are above the alarming value of total indebtedness (Table 3).

Table 3 presents the number of businesses that fall into each of the three categories of the distribution of total indebtedness ratio over the six analyzed years. From 2016 to 2018, the industry's total indebtedness fluctuated above the alarming threshold of 80%, but in 2019 the total indebtedness fell below this limit value. Even though in 2020 the pandemic had a significant impact on the function, operation, and existence of business entities, the industry's total indebtedness decreased by only 0.2 percentage points compared to the previous year, indicating that the pandemic had no significant impact on the growth of the industry's overall indebtedness. The decline occurred in 2021, when the growth of the industry's total debt again surpassed the alarming threshold of 80%.

Using Friedman's non-parametric test, the development and changes in the total indebtedness of Slovak enterprises in NACE I (Table 4) were examined, and it was found that the development of total indebtedness varied significantly between periods, rejecting the null hypothesis that the median values of the monitored indicator are equal. Multiple pairwise comparisons of all pairings revealed, however, that the pandemic of the COVID-19 virus did not have a significant effect on this indicator, as no significant differences were found between the pandemic and previous periods.

The self-financing ratio (SF) indicates the proportion of shareholders' funds to total assets. The minimum recommended value for this indicator ranges from 20 to 30 percent. Since the sum of the self-financing ratio and total indebtedness ratio equals 100 percent, 20 percent was chosen as

Table 3. Frequencies of categories of the total indebtedness ratio

Year	to 50 %	50 % to 80 %	over 80 %
2021	34.0%	26.5%	39.6%
2020	36.8%	24.3%	38.9%
2019	37.4%	23.4%	39.3%
2018	36.1%	22.1%	41.7%
2017	36.1%	22.4%	41.4%
2016	34.0%	20.9%	45.2%

Table 4. Summary of total indebtedness hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	Test	Sig.	Decision
1	The distribution of variables TI2021, TI2020, TI2019, TI2018, TI2017 and TI2016 is the same.	Friedman test of dependent samples.	0.000	Rejection of the null hypothesis.
Asymptotic values are shown. The significance level is 0.050.				

the threshold value for categorizing business entities. The resulting values of the self-financing ratio were divided into two categories. The first group consists of companies with an independence rate of up to 20% during the period of analysis, while the second group consists of companies with an independence rate greater than 20%.

Table 5. Frequencies of categories of the self-financing ratio

	to 20%	over 20%
2021	38.3%	61.7%
2020	37.7%	62.3%
2019	39.3%	60.7%
2018	43.0%	57.0%
2017	43.0%	57.0%
2016	45.8%	54.2%

The number of business entities that were either below or above the optimal level of self-financing is depicted in Table 5. Every year, the average value of the sector exceeds 20%, indicating that, based on the average value, the business sector can finance its operations. The average rate of independence has fluctuated between 60 and 70 percent over the years. The average value increased from 2016 to 2017, decreased in 2018, and increased by 3.7 percentage points in 2019. Already in 2020, a decline can be attributed to the COVID-19 pandemic, and the same can be said for 2021. Even though it was a decline, the average value did not fall below the optimal level. As a result, companies in the sector were able to meet their financial obligations to finance business activities, and the pandemic did not have a significant impact on them in the analyzed period.

Because of statistical analysis and multiple pairwise comparisons of all groups (Table 6), the trend of the level of self-financing varied significantly between periods. It means that time has a statistically significant impact on the development of the self-financing ratio. However, the pairwise comparison confirmed that the COVID-19 pandemic did not have a significant impact on the indicator – there are no significant differences between the critical pairs of year; significant distinctions between the pandemic period and the preceding period could not be confirmed.

The relationship between the current and non-current liabilities to shareholders funds is measured by the debt-to-equity (DE) ratio. The results of the specified indicators attained by companies in the investigated industry were divided into three categories. In the first category are entities whose final value of debt to equity is less than 1, in the second category are those with a final value between 1 and 2, and in the third category are those with a value greater than 2. According to Kotulic et al. (2018), the given dividing points were determined because the optimal achieved value is 1, but for Central European countries such as Slovakia, the value should not surpass 2. It was monitored to see how many of the total number of analyzed business entities in the industry fell below the optimal threshold, how many fell within the range of the total optimal value and the optimal value for Central European nations, and how many exceeded this value (Table 7).

Table 7 provides an overview of the number of business entities within the industry that belong to the categories determined based on their

Table 6. Summary of the hypothesis test of the self-financing ratio

	Summary of the hypothesis test			
	Null hypothesis	Test	Sig.	Decision
1	The distribution of variables SF2021, SF2020, SF2019, SF2018, SF2017 and SF2016 is the same.	Friedman test of dependent samples	0.000	Rejection of the null hypothesis.

Asymptotic values are shown. The significance level is 0.050.

Table 7. Frequencies of categories of the debt-to-equity ratio

	to 1	from 1 to 2	over 2
2021	47.4%	15.0%	37.7%
2020	47.7%	17.8%	34.6%
2019	47.0%	17.8%	35.2%
2018	47.7%	16.8%	35.5%
2017	47.4%	19.3%	33.3%
2016	47.4%	15.3%	37.4%

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debt-to-equity ratio values. In the first year of analysis, the average debt-to-equity ratio was significantly higher than the optimal value, which should be less than 2. This excess can be attributed to the fact that two companies in the analyzed industry have reached extraordinary levels of this indicator. In 2017, the debt-to-equity ratio rapidly decreased to 11.3, and in 2018, the average debt level decreased to 3.4, which was still above the optimal level. In 2019, the average value of the indicator was projected to rise to 16.8, representing an increase of up to 13.4 percentage points. In 2020, when the outbreak of the COVID-19 pandemic was felt most globally, the level of the indicator returned to the value it reached the year prior to the outbreak of the pandemic, and in the final year analyzed, the coefficient decreased even further, to a value of 2.2, which was the closest of all the years analyzed to the optimal value set for the Central European countries. Based on the following findings, it may be concluded that the pandemic had a minimal, but more or less positive impact on the values of this indicator for the industry, as they were trending towards optimal values. The greater the value of the debt-to-equity ratio, the greater the proportion of liabilities to shareholders funds possessed by business entities in the industry.

Another indicator statistically analyzed using Friedman's non-parametric paired test is the debt-to-equity ratio (Table 8). Based on the findings, it may be concluded that the debt-to-equity ratio varied significantly across time periods. P-value is less than the significance value, so the null hypothesis about the same distribution of the indicator in the analyzed period was rejected. However, no differences were found between the period affected by the COVID-19 pandemic and the preceding period, indicating that this global issue did not substantially impact the debt-to-equity ratio of the NACE I sector of the Slovak Republic.

As for the credit indebtedness (CI) indicator, it is utilized to provide data regarding the proportion of bank loans and financial aid to total capital. Since bank loans constitute a portion of foreign capital, the value of loan debt should not exceed 50 percent (Kotulic et al., 2018). Based on this fact, enterprises were divided into two categories. The first group consists of industry participants whose credit indebtedness did not exceed the 50% threshold, and the second group consists of those who exceeded this limit value. For the analyzed years 2016–2021, all business entities, and thus 100 percent of the analyzed industry, fall within the category of up to 50 percent, meaning they did not exceed the utmost permissible credit debt level. Even in the years preceding and during the COVID-19 pandemic, the credit debt indicator remained unchanged (Table 9).

In the case of the credit indebtedness indicator, the result of Friedman's non-parametric paired test is that the value of Sig. is 1.000, indicating that the null hypothesis is accepted and there are no significant differences between the pairings of years throughout the entire period analyzed.

The next analyzed indicator is interest coverage (IC) ratio, which aids in determining whether or not a business entity should obtain a loan. The results of the analysis of the interest coverage of business entities in the chosen industry have been

Table 8. Summary of the debt-to-equity hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	**Test**	**Sig.**	**Decision**
1	The distribution of the variables DE2021, DE2020, DE2019, DE2018, DEI2017 and DEI2016 is the same.	Friedman test of dependent samples	0.014	Rejection of the null hypothesis.
Asymptotic values are shown. The significance level is 0.050.				

Table 9. Summary of the credit indebtedness hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	**Test**	**Sig.**	**Decision**
1	The distribution of the variables CI2021, CI2020, CI2019, CI2018, CI2017 and CI2016 is the same.	Friedman test of dependent samples	1.000	Accepting the null hypothesis.
Asymptotic values are shown. The significance level is 0.050.				

categorized into four groups for a more comprehensible presentation and simpler interpretation. In the first category, there are entities whose interest coverage is below 1, as well as those whose profit is insufficient to cover interest. If the indicator attains a value of 1 or higher, it indicates that the profit will cover the interest. The optimal level of interest coverage is between 3 and 5 (Kotulic et al., 2018). Based on this, it was created a second category ranging from 1 to 3 for entities with minimum value and are approaching the lower limit of optimal results. Next is a group of companies whose interest coverage ratio reached the values between 3 and 5, placing them within the optimal range of values. In the final category, where the value of the indicator is greater than 5, there are the companies with earnings before interests and taxes that are at least five times higher than the cost of interest, and thus sufficient profit to cover them (Table 10).

Table 9 summarizes the business entities located in the individual categories of the distribution during the analyzed years, which serves as an overview of the number of businesses located in the four groups. In the years before the outbreak of the COVID-19 pandemic, 2016, 2017 and 2018, the largest category was the one in which the values of the interest coverage ratio did not exceed the value of 1, and the fewest enterprises of the analyzed industry were in the category of optimal values of the indicator from 3 to 5. At the end of 2019, the COVID-19 pandemic broke out, which, however, did not yet have an impact on the indicator of interest coverage of the industry that year, even the last, fourth, category became the most numerous category, where the result of earnings before interests and taxes (EBIT) were five times higher than the cost of interests and thus was sufficient to cover them (the reason is also the fact that in 2019 the pandemic was recorded in Slovakia). In the category of optimal values from 3 to 5, the occupation of business entities was still the lowest. It may be observed the impact of the pandemic in 2020. The number of companies whose EBIT is insufficient to pay interest costs increased rapidly, up to 53.3%. In the category where the indicator reached a value above 5, the number of entities from the industry decreased from 38.3% to 25.9%. The least occupied category remains the category of optimal values, even though its occupation increased compared to the previous year. The year 2021 brought a reduction in the number of entities that produced insufficient EBIT to cover interest costs to 45.5%, but it was still the largest category. The number of enterprises also increased in the group in which the indicator had a value higher than 5. The least numerous category was the group of enterprises achieving optimal results, even if the number of entities with an optimal value increased to 9.7%.

According to the results of the calculations, the COVID-19 pandemic already had a significant impact on the interest coverage ratio in 2020, its value decreased by 809.4 units and reached negative numbers, i.e., below 1. That year, the industry did not produce sufficient level of EBIT to cover interest costs. Although the average value of the interest coverage ratio increased in 2021 its value (–175.7) was not at the minimum sufficient level.

Table 10. Frequencies of categories of the interest coverage ratio

	to 1	from 1 to 3	from 3 to 5	from 5
2021	45.5%	18.1%	9.7%	26.8%
2020	53.3%	14.6%	6.2%	25.9%
2019	37.1%	19.3%	5.3%	38.3%
2018	36.8%	22.4%	9.0%	31.8%
2017	34.9%	20.6%	10.0%	34.6%
2016	39.3%	17.4%	8.4%	34.9%

Table 11. Summary of the interest coverage hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	Test	Sig.	Decision
1	The distribution of variables IC2021, IC2020, IC2019, IC2018, IC2017 and IC2016 is the same.	Friedman test of dependent samples	0.000	Rejection of the null hypothesis.
Asymptotic values are shown. The significance level is 0.050.				

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The Friedman´s non-parametric test was used to find the differences in the development of the interest coverage ratio (Table 11). The outputs demonstrated that there are substantial differences between the years analyzed. If the differences between individual pairs of years using the post-hoc tests were examined, it may be concluded that there is a very significant difference between the years 2019–2020 and 2018–2020, as well as 2020–2021 (and also 2016 and 2017 for the observed pandemic periods 2020 and 2021), indicating that the pandemic had a significant impact on this indicator.

The interest burden (IB) ratio measures the interests paid to earnings before interest and taxes. This indicator values were categorized as follows. The content of the first category consists of business entities in the sector whose interest burden value was negative. The formation of this group is used to assess the number of subjects who experienced a loss and with the higher risk of interest non-payment. The second group was for businesses with results ranging from 0% to 50% because payment of interest costs is assumed to be manageable. The third category consists of businesses in the analyzed industry with an interest burden value of at least 50 percent, because the higher the percentage of this indicator, the closer the value of interest expense to the value of the economic result, and the final category consists of businesses with an interest burden value exceeding 100 percent. The probability of non-payment of interest costs increases if the value of the interest burden is greater than 100%, as the value of interest costs would exceed the value of EBIT, and there would be insufficient funds to cover them (Table 12).

Table 11 displays the number of business entities in the industry during each of the years analyzed in each of the categories created. In 2016, the analyzed sector was in the loss, with an average interest burden value of -11.4%. In 2017, the value of the ratio increased to 14.7%, representing an increase of 26.1 percentage points. In 2018, the industry's interest burden deteriorated, falling to -28.8%, the lowest value in the monitored period. The value of the interest burden increased by 33.1% in 2019, and surprisingly, even though the number of loss-making business entities of the industry rose rapidly in the pandemic year 2020, its average value did not reach negative numbers, but instead it rose to the highest value of the analyzed industry, 49.9%. In 2021, however, the value of the indicator fell to 0.1%, representing a change of 49.8 percentage points. The average value of the interest burden ratio in the sample of enterprises is close to zero, but it did reach negative, loss-making levels, so the enterprises are still able to pay interest costs.

The interest burden ratio, analyzed by the Friedman test (Table 13) revealed, was not substantially impacted by the COVID-19 pandemic, nor did its trend between periods differ significantly following the p-value of the test.

The last analyzed indebtedness ratio is the equity leverage (EL) ratio. The optimal value of this ratio should be 3, so that the proportion of debt is not excessively high. The maximum average value

Table 12. Frequencies of categories of the interest burden ratio

	Negative value	From 0% to 50%	From 50% to 100%	Over 100%
2021	40.5%	41.4%	13.1%	5.0%
2020	46.4%	36.4%	10.3%	6.9%
2019	30.5%	50.8%	12.1%	6.5%
2018	30.8%	50.8%	12.5%	5.9%
2017	29.9%	53.3%	12.1%	4.7%
2016	33.6%	50.5%	10.3%	5.6%

Table 13. Summary of the interest burden hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	Test	Sig.	Decision
1	The distribution of the variables IB2021, IB2020, IB2019, IB2018, IB2017 and IB2016 is the same.	Friedman test of dependent samples	0.215	Accepting the null hypothesis.

Asymptotic values are shown. The significance level is 0.050.

of the indicator was recorded by the industry in 2016, when it reached the value of 159, indicating that business entities in the industry made an extensive use of debt. Positively, the value decreased annually for the next two years, and by 2018 it was almost at the recommended level (3.4). In 2019, there was an increase to the value of 18.8, which was followed by a decline in the indicator's year-over-year development. Looking to 2020, when the equity leverage ratio reached a value of 5.2, and 2021 (with a value of 4), it may be concluded that the decline in the equity leverage ratio is a positive sign for the industry, as it is approaching the optimal level.

Using the Friedman paired test (Table 14), the equity leverage ratio and its development in individual periods were also analyzed. It was proven that there are significant differences between some of the periods of development. However, a pairwise comparison revealed that the pandemic had no effect on this indicator, as there are no statistically significant differences between the pandemic and the previous period; these differences only occurred between 2016–2020 and 2016–2019.

The individual groups of years compared pairwise, for the selected investigated indicators, and the evaluation of the significant impact of the COVID-19 pandemic on these indicators are displayed in Table 15. The value of Adj. Sig. calculated in the post-hoc tests (using the Dunn-Bonferroni correction) compared to the significance level indicates whether the influence of the pandemic on the given indebtedness ratio was significant. Because the pandemic outbreak was most evident in 2020 and 2021 in Slovak conditions, it was concentrated primarily on those pairings of years that were compared to the pandemic years, and most obviously on the pairs 2019-2020 and 2019-2021. However, it is also examined for the years 2018–2020 and 2018–2021 to determine if there are any significant differences between these categories.

It is evident from the outputs that the pandemic did not have a substantial impact on all or the majority of the indicators, but only in two cases: the interest coverage indicator and its modification. This significant effect (marked in bold) was observed in a pairwise comparison of 2019 and 2020, 2018 and 2020. For other indicators such as total indebtedness, self-financing, debt to equity, credit indebtedness, interest burden, and equity leverage, it was merely a matter of confirming that there are no differences between 2019–2020 and 2019–2021. It is evident that there are no significant differences between the years 2018–2020 and 2018–2021 for the indicators: total debt, self-financing ratio, debt to equity, modified interest coverage, and equity leverage. Using the interest coverage indicator, however, it may be seen that there are signifi-

Table 14. Summary of the equity leverage hypothesis test

	Summary of the hypothesis test			
	Null hypothesis	**Test**	**Sig.**	**Decision**
1	The distribution of variables EL2021, EL2020, EL2019, EL2018, EL2017 and EL2016 is the same.	Friedman test of dependent samples	0.006	Rejection of the null hypothesis.
Asymptotic values are shown. The significance level is 0.050.				

Table 15. Results of the post-hoc tests to detect the impact of the COVID-19 pandemic

Year /indicator		Adj. Sig.				
TI		SF	DE	IC	FL	
2020	2016–2020	0.009	0.000	0.060	0.000	0.018
	2017–2020	1.000	0.765	1.000	0.000	1.000
	2018–2020	1.000	1.000	1.000	0.000	1.000
	2019–2020	1.000	1.000	1.000	0.000	1.000
2021	2016–2021	0.044	0.000	0.370	0.023	0.250
	2017–2021	1.000	1.000	1.000	0.011	1.000
	2018–2021	1.000	1.000	1.000	0.765	1.000
	2019–2021	0.380	1.000	1.000	0.181	1.000
COVID-19 impact		no	no	no	yes	no

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cant differences between 2018 and 2020 but not between 2018 and 2021. This may be because the average value of this indicator for the industry increased in 2021. Credit indebtedness and interest burden ratios do not present the results of the pairwise comparison, as the statistically significantly differences in the analyzed periods where not confirmed.

When analyzing the economic effects of past pandemics, Bonam and Smadu (2021) found that historically, pandemics were predominantly accompanied by a ten-year-plus increase in inflation. Given the current circumstances, this vital information hints at potential future developments that could occur even after the coronavirus pandemic has emerged. Currently, it is conceivable to say that the pandemic has created a problem that is manifesting itself primarily in rising inflation (Fetzer et al., 2021). However, the outputs presented and calculated in this study, bring very interesting findings. Despite the fact, that the hospitality sector was the most affected by the COVID-19 pandemic, due to combination of local lockdowns and travel restrictions (Kramarova et al., 2022), considering the enterprises operating in this sector in Slovak conditions, the impact was not that disastrous, confirming the outputs of the current research. It may be caused by the fact, that this is not the crucial economic sector of the country, and of course by several supporting measures adopted by the government to support the crucial sectors. Nonetheless, it is obvious that the interest coverage ratio was affected by the pandemic (see Table 15). The analysis of this indicator in the given period proved, that in both pandemic years, this ratio was negative. It is also the only indicator including the corporate earnings before interests and taxes with statistically significant changes in the indicator development declaring that enterprises were not able to produce earnings in a depressed environment (Gajdosikova et al., 2023b) and did not have the ability to generate revenues in sufficient amount. Alsamhi et al. (2022) proved that total income, net sales, net profit, and earnings per share were significantly different before and after the pandemic in tourism and hospitality (and it was confirmed also by Soni et al., 2023 or Clark et al., 2021). Parvin et al. (2022) revealed that the pandemic had a huge negative impact on the hospitality sector, considering the reduction in earnings, which confirmed the provided finding of the current study. The consequences of the pandemic on the risk faced by tourist enterprises are further mitigated by lower levels of historical debt and profitability as well as larger cash reserves. The enterprises with enough cash and cash equivalents were better equipped to deal with the negative consequences of the pandemic (Khana et al., 2022). The results of the international studies confirm the importance of the earnings when assessing the effects of the pandemic on this sector. However, even though the provided analysis was focused on the changes in the debt level as measured by various indebtedness ratios, the results confirmed the most significant changes were linked to the interest coverage ratio which includes the level of earnings achieved. As presented in the Results section, the pandemic has not had strictly negative consequence. It was proven that ratios changed significantly in the analyzed period, but the effect of the pandemic was not evident in each indicator. The total indebtedness decreased in 2020 which was supported by the increase in self-financing ratio. The debt-to-equity ratio decreased significantly in 2020 and slight decrease was observed also in 2021 which was a positive shift towards the optimal values of this indicator. The credit indebtedness ratios remained unchanged during the analyzed period proving not to be affected by the pandemic. Finally, the equity leverage ratio achieved almost the optimal values in 2020, first time in the analyzed period, which declares, that enterprises were more aware of careful debt financing decisions. Kazemikhasragh and Pineda (2022) confirmed that the pandemic reduced the total debts. The outputs of Song et al.'s (2022) study declared that the system of financing through debt capital should be re-developed to be more system-friendly and to reflect the structural changes caused by the crisis. Gomes et al. (2022) affirmed the negative effect of the pandemic on the profitability, efficiency, and indebtedness in the restaurant sector. Different results were proved by Lizarazo et al. (2022), who verified the effect of the COVID-19 pandemic in a tourism and food sector of Columbia claiming that the level of indebtedness increased (they also

showed negative relationship between the profitability and indebtedness levels) which is in contrast with our study.

Of all the industries affected by the pandemic, the hospitality industry suffered the greatest economic losses. Throughout the pandemic, hospitality businesses reported higher than average percentages of businesses with low profits, cash, and business confidence (Corvello et al., 2023). Beginning in early 2022, all coronavirus limitations were cancelled, and this industry has been still recovering. It is claimed that hotel and leisure industries will have the fastest economic growth over the next five years (Aharon et al., 2021). The findings suggest that the key to (relative) success was having a solid income statement and balance sheet. Particularly, businesses with lower levels of debt performed significantly better than those with higher levels of debt. At all times, prudent financial management entails making sure there is adequate money on to pay bills. Reduced debt exposure is one strategy for lowering the risk of non-payment, which seem to be the strategy of Slovak enterprises operating in the NACE I sector.

CONCLUSION

The purpose of this study was to explain the effect of the pandemic on a particular economic sector, specifically NACE I, in Slovak circumstances for the period 2016–2021, and identify changes in crucial financial indicators. The performed statistical tests confirmed statistically significant differences in the development of the total indebtedness ratio, self-financing ratio, debt-to-equity ratio, interest coverage ratio, and equity leverage ratio. Then, the post-hoc tests revealed that only the indebtedness indicator using EBIT, or interest coverage ratio, was significantly different in the pre-pandemic and pandemic periods, confirming that enterprises were not able to generate sufficient levels of revenues to cover their liabilities and interest costs. No differences over the analyzed period were identified for the interest burden ratio or credit indebtedness ratio.

The hospitality sector was radically affected by the COVID-19 pandemic. Despite this fact, it may be pointed out from the findings that enterprises became more aware of debt financing and tried to minimize the risks of being insolvent. One of the many skills and knowledge resources required for a solution to be successful is the ability of a financial manager to appropriately identify the factors that determine indebtedness in the context of corporate features and macroeconomic development, which have a significant impact on how much indebtedness is perceived generally. However, to accept the changes, the debt financing structure must be redesigned to be more system-friendly and to consider the structural challenges brought on by the pandemic. These are also the implications for policymakers and managers arising from the study.

The study has some limitations, which may also be perceived in the context of future study directions. Firstly, it is also necessary to include the profitability (liquidity) indicators into the analysis and, thus, extend the findings to other aspects of the corporate financial performance. The hospitality sector and its changes caused by the COVID-19 pandemic should also be compared in the context of other European countries.

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