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The effects of the COVID-19 pandemic on business activity indicators in the V4 region

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ABSTRACT

Research background: The COVID-19 pandemic introduced challenges that significantly impacted all business entities. The Nomenclature of Economic Activities (NACE) C is important for the Visegrad Four (V4) countries because it classifies the manufacturing sector, which constitutes a key part of their economies, contributing to economic growth, job creation, and exports both within the region and beyond. Manufacturing was one of the most affected sectors during the pandemic era and encountered new and demanding tasks.

Purpose of the article: Business activity, represented by ratios of financial analysis, is a key factor for the economic growth of enterprises in each sector. The aim of this article is to unveil the impact of the COVID-19 pandemic on indicators of business activity in the V4 region.

Methods: The data sample consists of 11,110 enterprises from NACE C, gained by Moody's Orbis database. The research focuses on analysing activity ratios based on individual size categories within Slovak, Czech, Polish, and Hungarian entities from 2018 to 2021. The Friedman test was used to assess the impact of the COVID-19 pandemic on chosen ratios.

Findings & Value added: The COVID-19 pandemic impacted all businesses in the V4 region, with significant effects confirmed across all enterprise size categories. For small businesses, the pandemic's impact was evident in turnover and turnover period indicators. For medium-sized businesses, the affected indicators included turnover, turnover period, and credit period ratios. For large businesses, the affected indicators were turnover, turnover period, collection period ratio, and credit period ratio. However, the pandemic's impact was not confirmed on the collection period ratio and credit period ratio indicators for small businesses; on the long-term asset turnover period and collection period ratio for medium-sized businesses; or on the long-term asset turnover and long-term asset turnover period for large businesses. The added value of this contribution lies in the regional comparisons of activity ratios and the proven impact of the COVID-19 pandemic on the manufacturing sector, based on a robust sample.

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INTRODUCTION

The financial status determines the competitiveness of the company and its ability to establish business relationships. This process evaluates to what extent the economic interests of the company itself and its partners in financial and other relationships are guaranteed. All operational and economic activities form the foundation of financial stability. The analysis of the financial status itself

controls the subsequent direction of the company (Faizuloyeva & Olechowska, 2022). Analysis of activity indicators is an important part of operating business units. Activity analysis serves to determine whether the company has enough assets and how efficiently it manages them. Many factors influence the state and development of activity indicators, including external ones. One of the external factors that can affect activity indicators is the outbreak of the COVID-19 pandemic.

The first case of infection with the COVID-19 virus was registered by the World Health Organization in the Chinese city of Wu-Chan on December 31, 2019, and on March 11, 2020, this disease was already declared a global pandemic. Realities, such as the outbreak of the COVID-19 pandemic, give many researchers an incentive to analyse the impact of the COVID-19 viral disease pandemic on business performance. The pandemic of the viral disease COVID-19 profoundly affected the entire world in 2020–2021, remaining unmanageable despite the implementation of rigorous and prompt interventions. The epidemic caused a substantial influence not only on the healthcare industry and the well-being of the populace but also on global economic operations (Vojtekova & Durana, 2024) and generated there extensive tension (Szczygielski et al., 2022).

Countries worldwide have implemented various forms of lockdowns. It has been globally implemented stringent restrictions to restrain the transmission of the virus, resulting in an abrupt cessation of significant economic operations (Nguyen et al., 2021). Restrictions imposed because of COVID-19 were significantly impacting both social and economic aspects (Muhammad et al., 2020). The closures of companies have caused economic crises across the world, highlighting the significance of entrepreneurship for economic recovery (Krasniqi et al., 2021).

Business enterprises were compelled to maximize cost efficiency and frequently had to downsize their workforce because of insufficient investment. With the aim of assisting enterprises, the governments implemented steps to mitigate the negative impact of the pandemic on the business sector. Following the implementation of steps to reduce the first wave of the epidemic, a second wave emerged, leading to various impacts on specific sectors of the corporate economy (Penakova, 2021). Ogunnusi et al. (2021) assert that the COVID-19 disease has significantly affected government revenue. Given the current global situation, analysing the utilization of assets is crucial for continued operations. The COVID-19 pandemic also significantly affected the Visegrad Four countries. This grouping consists of four states: Slovakia, the Czech Republic, Poland, and Hungary. The V4 is known in the EU for its high economic growth, employment, enormous investments, and rapid digital transformation. Its main goal is the effort to maintain a stable and safe Europe (Chetverikova, 2021).

Zakaria (2021) presents several lessons for this world after the COVID-19 pandemic. He primarily focuses on how this pandemic has impacted our lives, isolated the entire world, introduced the concept of the home office. At the same time, it emphasizes how not only the V4 countries but the whole world is spending huge financial resources to maintain a certain stable economic situation at a time when the world was not at all ready for it. This pandemic has caused the greatest economic, political, and social damage since World War II. It was undoubtedly a significant test for businesses, with the potential to either destroy them or strengthen them. It serves as a catalyst for contemplating stability and crisis management.

Kumar & Zbib (2022) focus on the company's performance during this pandemic. Management's objective during this period was to reassess the company's aims. The research findings indicated that a higher return on equity was positively correlated with high management ability. However, many entrepreneurs were unable to cope with this situation and went bankrupt before the governments could effectively respond or adjust the legislation to protect them (Krasna, 2021). During the first wave, some of these countries tried to be at the forefront (especially Slovakia), but after the arrival of the second wave of the pandemic COVID-19, the Czech Republic, Poland, Hungary, and Slovakia were among the countries most affected by the pandemic. According to published information, the pandemic disrupted supplier-customer relations, severely affecting the overall indebtedness and activity of companies in the Visegrad Four (Gyarfasova & Meseznikov, 2021).

Thus, the aim of this article is to unveil the impact of the COVID-19 pandemic on indicators of business activity in the V4 region. The study concentrates on business activity indicators, particularly those related to asset turnover, long-term asset turnover, inventory turnover, asset turnover period, short-term receivables collection period, and short-term liabilities maturity period.

The structure of the article begins with a theoretical background that evaluates the status of the research topic globally. Next, the methodology and data chapter present a comprehensive research methodology, provides data from the V4 countries, and explains the method used to calculate the used ratios. The results and discussion provide a clear explanation of the research findings. The conclusion chapter summarizes the primary research findings and establishes limitations that indicate potential avenues for future research.

THEORETICAL BACKGROUND

Tian & He (2016) state that the concept of financial-economic analysis originated in the early 19th century in the United States of America. Initially, it was to be applied only in the banking sector to analyse the ability to repay the debt of credit companies. Later, however, it expanded from the services provided by banks to those of investors, who make decisions mainly based on the solvency and profitability of the company. Even this initial development indicates the ability of financial-economic analy-

sis to adapt to any growing needs and requirements in the field of investment and business management. Financial indicators became a tool of financial and economic analysis in the last half of the nineteenth century. The first causes can be traced back to the last stages of the American drive toward industrial maturity, when the management of enterprises in various industrial sectors shifted from business capitalists to professional managers. At the same time, the financial sector has become a more dominant force in the economy, and the need for regular annual financial statements has increased accordingly (Anjum, 2010).

However, in the case of complex business activities, it was gradually discovered that one financial index cannot fully evaluate the financial situation and operating results of the entire company. Fama (2010) emphasizes the significance of highlighting the year 1910 in the historical development of financial-economic analysis, as it marked the creation of a complex model based on the quantitative relationship between basic financial indicators. In 1920, a system of ratio analysis emerged, offering a comprehensive financial analysis system for an external enterprise. Ball & Brown (2014) draw attention to the year 1945, when, with the rapid development of science and technology and increasingly intense competition on the market, various measurement methods and models for financial and economic analysis began to be used for better business development. These methods primarily include the net present value, the internal rate of return, and the profit index method. Simultaneously, the development of methods for operating leverage, financial leverage, and portfolio analysis took place. Economic value added (EVA) emerged as a new index in 1991 to measure business performance.

All Visegrad Four countries, including Slovakia, began using the term financial-economic analysis at the end of the 20th century, coinciding with the end of the communist regime and the start of the transition to a market economy. Foreign investors, bringing with them modern know-how or innovative business practices, supported this process (Tissen & Shneidere, 2016). Vighova et al. (2023) claim that the goal of the financial-economic analysis is to identify the weak and strong sides of the company, which can largely affect its future. This process provides the basis for sound strategic decisions. In addition, they emphasize that financial-economic analysis can be divided into internal and external. Analysts directly within the company process internal information, while external analysis relies on publicly available data. Financial analysis is an effective way to assess the financial well-being of a firm. It contains a range of techniques that, by examining the economic condition of a company, may both identify and impact its market position (Valaskova et al., 2021). Financial-economic analysis, according to Kovarova & Vitkova (2019), compares the company's performance with that of competitors in the same industry area and evaluates the evolution of the company's financial situation over time. Using this analysis, managers and investors can gain valuable information about the financial health of the business and its ability to achieve long-term success in the market. Audited financial statements serve as a rich source of information, facilitating a more detailed analysis.

Faizuloyeva & Olechowska (2022) emphasize that solvency, the structure of assets and liabilities, turnover, business activity, capital efficiency, and liquidity are an important part of a complex financial-economic analysis. The goal of this analysis is to quickly obtain reliable and extensive information about the company's financial situation. In business practice, therefore, financial-economic analysis can be defined as the ability of a business to generate money that guarantees payment of its financial obligations. Herman et al. (2022) consider it very important, in the case of financial-economic analysis, to properly and thoroughly process a wide database and the subsequent evaluation of all obtained results. Investigating the financial performance of the company in this case necessitates comparing different companies based on their size, through the processing and analysis of several annual reports. In this way, it is possible to recognize trends, compare the company's performance with its competition, or get an overall overview of the market.

Sulentic et al. (2018) define the objectives of financial-economic analysis in more detail. Therefore, they assert that the primary goal of this analysis is to confirm the solvency, liquidity, or profitability of the enterprise under examination. The main purpose is therefore to obtain a clear picture of the financial situation of the company, and the obtained results can subsequently be considered a beneficial basis for decision-making in a wider area of useful information. On the contrary, Velez & Montoya (2019) specify the goal of financial-economic analysis as the evaluation of the performance of given enterprises in terms of financial, commercial, and production indicators. Identifying the factors influencing the dynamics of the industry under analysis allows for a potential blueprint for its future growth. The authors often comment on specific users of financial-economic analysis. From the perspective of these users, financial-economic analysis is devoted to the study and evaluation of data in specific financial statements. The goal of their process is to draw accurate conclusions about the previous state of the company and predict how it will function in the future. Users who can perform this analysis include the company's management but also various external entities such as owners, trade creditors, trade unions, investors, analysts, and the like. In the case of the company's financial statements, the assessment itself depends on the user, as well as the scope of its use. It means that different interested parties can find value in the analysis of the enterprise (Osadchy et al., 2018).

The success of a financial-economic analysis is based on high-quality information sources. Stangova & Vighova (2020) claim that the analysis of the financial and economic aspects of a company is the most demanding precisely in terms of the amount of information that must be considered over time. This information originates from

various sources and varies in nature, encompassing both financial and non-financial data. he quality of this data is therefore clearly key for an accurate and reliable evaluation of the financial or economic situation of the company. Welc (2022) adds that the basic financial statements provide a rough overview of the company's financial situation, but it is necessary to use ratios. These indicators represent an excellent measure to evaluate the performance of the company. They help to understand the profitability of the company, efficient use of assets, liquidity, and important business trends. In addition, they provide valuable information to assess the effectiveness of the company's management and enable the identification of possible risks (Alexander, 2018).

According to Kliestik et al. (2020), evaluating a company using certain ratio indicators can bring a clear competitive advantage to a given company. Among the most used indicators of financial and economic analysis of this type are indicators of liquidity, profitability, indebtedness, or activity. Based on historical data, Venugopal et al. (2022) complement this statement by considering these ratios as key measures in evaluating a company's financial assets and production. These ratios enable users to monitor and scrutinize pertinent data, thereby providing valuable insights for their decision-making process. Given that these indicators are essential for expressing the company's productivity and competitiveness, it is crucial to give them particular attention during the analysis process. Assets are a decisive factor in the financial health or well-being of a company. The composition and effective use of these assets directly influence the results of the company's management. Adequate asset management can intensify the financial stability of the company and guarantee an increase in competitiveness. To achieve long-term financial sustainability and competitive advantage, it is necessary to constantly improve asset management. Financial analysis is an important tool for supporting and monitoring decisions regarding the use of assets. The specifics of the industry and business conditions strongly influence the turnover and return on assets, necessitating complete adaptation of financial analysis methods to specific situations or needs (Kovalcuk & Verhun, 2019).

According to Cernohorsky (2020), all activity ratio indicators show the efficiency of use, or the speed of change of assets and individual parts of assets, within the enterprise. The activity ratios fall into three groups. The first group consists of indicators that express the speed of turnover, and they indicate the number of turnovers of a specific type of asset over a certain period. The second group consists of indicators that express turnover time, period, and characterize the number of days during which the given assets are in the analysed form of property in the company. The third group consists of binding coefficients, which are based on almost the same principle as turnover time indicators. The binding coefficients do not use the time interval at all. The asset turnover ratio is a measure of the efficiency with which the company's assets generate their income. A low asset turnover ratio usually signals problems with excess production capacity, insufficient inventory management, or ineffective debt collection practices. A growing trend in the asset turnover indicator over time can, on the contrary, indicate dynamic growth as well as high profitability of the company or, at the same time, a high ability to use its assets effectively (Barbuta-Misu et al., 2019). The long-term asset turnover ratio reveals how efficiently the company uses its fixed assets within its production process. A decrease in the total number of turnovers during the monitored period indicates that the company has a high level of long-term assets. While this high level of long-term assets can point to successful investments in durable assets. The long-term asset turnover ratio itself can also serve as an indicator of the success of investments in permanent assets (Lian et al., 2021). The inventory turnover ratio refers to liquidity and how effectively a company holds and manages its inventory. The most widely used sub-indicator conveys the number of inventory turnovers during a specific monitored period, indicating the number of times the inventory changes into current assets prior to the final sale of the finished product. Low inventory turnover therefore indicates an excessive amount of unused inventory. Conversely, a high inventory turnover indicates faster inventory sales, improved inventory management, and increased profitability for the company (Alnaim & Kouaib, 2023). The assets turnover period ratio sheds light on the company's intensive use of assets to drive sales. Specifically, it focuses on the number of days required for one asset turnover. Lower values of this indicator benefit the company. The company can minimize this indicator, for example, by improving supply or innovations. When compared to the industry, this may mean that the business is better able to manage its assets compared to the general trend in the area. This implies an increase in asset turnover (Bartosova et al., 2020). The indicator long-term assets turnover period functions from the point of view of its application in the production process as an evaluation aid for the long-term assets of the company. As with the previous indicator, it is crucial to control the downward trend during the analysed period. The inventory turnover period indicator shows how much time passes from the purchase of inventory to its sale. Respectively, it talks about the time the company needs to unload its stock. A lower value of this indicator indicates better efficiency in inventory management, and conversely, a too high value is associated with an increase in company costs (Repkova Stofkova et al., 2020). The indicator collection period ratio provides information on the average number of days the company receives payment for its sales transactions, starting from the moment of sale. Ensuring quick payment acceptance is crucial for the business, which is why it is preferable for its value to be as low as possible (Yousaf et al., 2021). The indicator credit period ratio represents the time interval from the creation of the liability to its payment, thus giving an insight into the company's ability to pay. When the credit period of liabilities roughly matches the credit collection period, this indicator reaches its ideal state (Bartosova et al., 2020).

METHODOLOGY & DATA

Four states, united by close geopolitical conditions, a shared history, and similar economies, formed the informal alliance known as the Visegrad Four. V4 includes the Czech Republic (CZ), Hungary (HU), Poland (PL), and the Slovak Republic (SK). Moody's provided the ORBIS database, which contained the data of the enterprises from NACE C during 2018-2021. NACE C includes the chemical or physical transformation of materials, components, or substances into new products, as well as activities such as the processing of fresh fish outside the fishing boat, leather processing, wood storage, tire production, etc.

The creation of the sample was the first step. Table 1 shows the specific number of analysed enterprises within the V4 region. It was analysed for a total of 11,110 companies, with Polish companies constituting the largest representation in the sample. The total number of these Polish enterprises is 5,115, which represents up to 46.04% share in the sample. Slovak companies, numbering 2,932, hold the second largest representation in the sample, accounting for up to 26.39% of the total share. The sample also includes Czech and Hungarian companies in similar numbers. Specifically, there are 1,556 Czech enterprises and 1,507 Hungarian enterprises.

Table 1: The structure of the sample according to countries

Country	Nr.	% share
CZ	1556	14.01%
HU	1507	13.56%
PL	5115	46.04%
SK	2932	26.39%
∑	11,110	100 %

Source: own research

Within the provided data sample, we can also divide the analysed companies according to their sizes (Table 2). The categorization of the size of enterprises from the data provided by the ORBIS database differs from the EU recommendations. Blazek et al. (2023) state in their article that determining the size of these businesses depends on operating income, total assets, and number of employees. Large enterprises are defined as those whose operating income exceeds 10 million euros, their total assets equal or exceed 20 million euros, and their employee count exceeds 150. Among medium-sized enterprises, we can classify enterprises that have operating income of more than 1 million euros, total assets of more than 2 million euros, and the number of employees over 15. However, if enterprises fail to meet any of these criteria, we classify them as small enterprises. From the following table, we know that the largest number of medium-sized enterprises are in the sample, namely 5,691, which represents a 51.22% share. Out of the total 4,731, 42.58% are large enterprises, while the remaining 688 are small enterprises.

Table 2: The structure of the sample according to sizes

Size	Nr.	% share
small	688	6.19%
medium sized	5691	51.22%
large	4731	42.58%
∑	11,110	100 %

Source: own research

Cernohorsky (2020) notes that all activity ratios are considered indicators of the efficiency—or, more specifically, the speed at which assets and individual components of assets are transformed. In consideration of the fact that the NACE C - Manufacturing sector encompasses the physical or chemical transformation of materials, substances, or components into new products (Europa, 2024), we concentrated on the analysis of this type of indicator. The goal is to fully evaluate all parts of the activity ratio analysis, which explains the choice of indicators for analysis. The activity ratios were computed as follows:

$$assets\ turnover\ \ (AT) = \frac{sales}{average\ total\ assets}$$

The assets turnover ratio assesses the efficiency with which a manufacturing firm produces sales relative to its total assets. For NACE C enterprises, which frequently need substantial expenditures in machinery, equipment, and facilities, this ratio underscores the effectiveness of asset utilization in generating revenue. An elevated ratio signifies superior asset utilization and operational efficiency.

$$long\ term\ assets\ turnover\ (LTAT) = \frac{sales}{average\ long\ term\ assets}$$

The long term assets turnover ratio assesses the efficiency of a manufacturing company in utilising its fixed assets, including machinery and real estate, to produce sales. Given that manufacturing firms depend significantly on long-term assets, this ratio is essential for evaluating the adequacy of these assets in generating output. An inadequate ratio may indicate underutilised equipment or inefficiencies in manufacturing methodologies.

$$inventory\ turnover\ (IT) = \frac{sales}{average\ inventory}$$

The inventory turnover ratio indicates the frequency with which a manufacturing business sells and replenishes its inventory within a certain period of time. In the NACE C sector, sustaining an appropriate inventory turnover is crucial to prevent overstocking, which immobilizes capital, or stockouts, which hinder output. An elevated turnover ratio signifies effective inventory management and robust sales success.

$$assets\ turnover\ period\ \ (ATP) = \frac{average\ total\ assets}{sales} x365$$

The asset turnover period measures the amount of time it takes for a manufacturing business to produce sales that the equivalent its total assets. In capital-intensive industries such as manufacturing, reducing this amount

of time is essential to prevent asset idleness and to optimize revenue generation. A reduced period indicates enhanced asset utilization and superior financial performance.

$$long\ term\ assets\ turnover\ period\ (LTATP) = \frac{average\ long\ term\ assets}{sales} x365$$

The long term asset turnover period indicates the amount of time it takes for a manufacturing organization to produce sales that are equivalent to its fixed assets. This ratio is especially significant for NACE C enterprises, where substantial investments in machinery and equipment are prevalent. A reduced period signifies that the organization is efficiently utilizing its long-term assets to facilitate production and sales.

$$inventory\ turnover\ period\ (ITP) = \frac{average\ inventory}{sales} x365$$

The inventory turnover period quantifies the amount of time, in days, required for a manufacturing business to transform its inventory into sales. In the NACE C sector, effectively managing this period is essential to save holding costs and enhance cash flow. A reduced period implies effective inventory management, whereas a longer period may signify surplus inventory or sluggish-moving items.

$$collection\ period\ ratio\ (CoPR) = \frac{average\ current\ trade\ receivables}{sales} x365$$

The collection period ratio evaluates the duration required for a manufacturing company to receive payment from customers following a sale. In the NACE C sector, where credit sales are common, a reduced collection period enhances cash flow and mitigates the risk of bad debts. Effective credit management guarantees cash and facilitates continuous operations.

$$credit\ period\ ratio\ (CrPR) = \frac{average\ current\ trade\ liabilities}{sales} x365$$

The credit period ratio measures the amount of time a manufacturing business need to settle payments to its suppliers. For NACE C enterprises, securing advantageous credit terms with suppliers may improve cash flow and offer greater flexibility in managing working capital. Excessively prolonged payment intervals may jeopardize supplier relationships; hence, it is essential to balance this ratio to sustain robust commercial connections.

Finally, statistical hypothesis testing was performed to identify if there is a significant impact of the COVID-19 pandemic on activity ratios. The Friedman test for related samples was run for each category of size of enterprises, and significance level alpha 0.05 for was used for all tests. It was calculated ratios before the COVID-19 pandemic based on values from 2018 and 2019, and during the pandemic based on values from 2020 and 2021. IBM SPSS Statistics software was used for all computations.

Following hypotheses were tested:

- **H0**: The COVID-19 pandemic had not a significant impact on the selected activity ratio. The distribution of selected activity ratio before and during the COVID-19 pandemic is the same.
- **H1**: The COVID-19 pandemic had a significant impact on selected activity ratio. The distribution of selected activity ratio before and during the COVID-19 pandemic is not the same.

RESULTS & DISCUSSION

Firstly, the analysis of activity includes the analysis of median values for all selected ratios (Table 3). The median values of these indicators allow us to identify trends or possible deviations from the expected development, which helps in the process of evaluating the financial performance of V4 enterprises. The calculation was conducted separately for each country and each enterprise size from 2018 to 2021.

From the analysis of activity indicators within the individual states of the Visegrad Four, it follows that the start of the COVID-19 pandemic had an equal impact on all businesses in the individual states. When it comes to indicators analysing the efficiency of corporate assets, Hungarian and Slovak companies, which showed the worst results in the given period, were the most affected. Conversely, Czech companies demonstrated the highest efficiency. The most efficient companies operating in Slovakia were those involved in warehouse stock management. Conversely, Czech and Hungarian companies performed the least well. Polish companies achieved the best results in terms of efficient use of long-term assets, while companies operating in Hungary faced significant challenges during this period. Slovakian companies were the most affected in repaying their obligations, and Hungarian companies were the least affected by the situation. In terms of collection of current trade receivables, Hungarian companies achieved the best results, and Polish companies achieved the worst results.

When analysing activity indicators based on their size, medium-sized Czech enterprises showed the smallest impact of the COVID-19 pandemic due to their superior performance across almost all indicators. Conversely, small businesses experienced the greatest impact. Small businesses in Hungary experienced the worst management situation due to the pandemic. On the other hand, large enterprises did best, as they achieved the most optimal values of activity indicators during this period. In Poland, the impact of the pandemic was most pronounced on small businesses, while it was the least on medium-sized and large enterprises. Small enterprises in Slovakia experienced the greatest difficulties, while medium-sized enterprises fared relatively well.

Secondly, the statistical analysis of selected ratio indicators of activity was run. Specifically, what impact did the COVID-19 pandemic have on the development of activity indicators of the NACE C sector within the individual size categories of enterprises.

Table 4 involves -values and the results of the Friedman test. If the -value is less than significance level alpha, one can reject the null hypothesis and accept alternative hypothesis. This indicates a change in the distribution of

Table 3: Median values of activity ratios

Activity ratio	Size											
	Small				Medium				Large			
AT [coef.]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	0.66	0.55	0.51	0.52	1.39	1.36	1.22	1.34	1.78	1.72	1.59	1.81
HU	0.55	0.45	0.37	0.29	1.19	1.16	1.02	1.07	1.69	1.64	1.35	1.58
PL	0.72	0.67	0.43	0.41	1.53	1.53	1.35	1.53	1.57	1.59	1.43	1.62
SK	0.61	0.54	0.45	0.44	1.39	1.38	1.24	1.35	1.86	1.77	1.62	1.75
LTAT [coef.]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	1.93	1.72	1.34	1.66	4.06	3.98	3.68	4.22	3.39	3.34	3.07	3.68
HU	0.98	0.63	0.72	0.47	2.77	2.64	2.38	2.57	3.36	3.29	2.93	3.32
PL	2.21	1.77	1.26	1.32	4.71	4.66	4.36	5.12	3.5	3.48	3.17	3.76
SK	1.55	1.43	1.15	1.16	4.28	4.06	3.75	4.26	3.6	3.55	3.36	3.82
IT [coef.]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	6.53	5.65	5.05	5.51	8.18	7.83	7.22	7.27	7.99	7.8	7.18	7.5
HU	7.34	5.56	4.74	3.32	7.71	7.12	6.75	6.74	8.21	7.82	7.39	8.02
PL	6.9	6.02	4.82	4.95	9.62	9.61	8.63	8.99	8.65	8.55	7.97	8.42
SK	7.06	6.17	5.41	5.37	10.66	10.21	9.33	9.56	9.5	9.15	8.59	8.63
ATP [days]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	551	666	713	703	262	269	299	272	205	212	230	201
HU	664	812	998	1256	306	314	359	341	216	223	252	232
PL	505	548	857	723	239	240	270	238	230	233	256	225
SK	595	675	813	819	262	265	293	271	196	206	225	209
LTATP [days]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	173	192	254	217	89	90	97	85	108	109	119	99
HU	420	578	505	809	130	138	152	141	109	111	125	110
PL	165	207	290	260	77	78	84	71	104	105	115	97
SK	225	253	313	302	84	88	96	83	100	102	109	95
ITP [days]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	23	21	19	21	43	44	49	48	45	46	50	47
HU	22	34	29	53	46	49	51	51	43	46	48	44
PL	33	36	35	38	36	36	40	38	41	41	45	43
SK	18	20	19	22	28	30	33	32	38	39	41	41
CoPR [days]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	40	38	40	39	43	41	44	38	42	40	43	39
HU	25	23	27	35	38	38	39	33	31	31	32	28
PL	65	71	84	72	53	52	54	46	50	48	51	44
SK	52	53	52	51	46	46	47	42	42	42	43	39
CrPR [days]	2018	2019	2020	2021	2018	2019	2020	2021	2018	2019	2020	2021
CZ	22	21	20	20	25	24	23	22	33	32	33	31
HU	16	22	10	12	23	22	23	21	26	26	28	25
PL	35	30	31	28	29	27	28	25	34	33	33	31
SK	41	40	39	34	38	36	35	32	40	39	41	38

Source: own processing

activity ratios and a significant impact of COVID-19 on the activity indicators of enterprises in the V4 region. 18 tested cases confirmed the significant impact of the COVID-19 pandemic.

Our results are discussed with relevant studies. Ogunnusi et al. (2021) focus on the construction sector. He emphasizes that the construction sector constitutes an important part of a country's GDP and is crucial for sustained economic development and operations, particularly in developing countries. The government's revenue was significantly affected by the severe acute respiratory syndrome-2 disease (COVID-19), leading to the anticipation of several public projects becoming inoperative or postponed, therefore limiting the potential for the development of new public projects. Factors that have been shown to have a positive impact on the future of the construction sector include reduced overheads, remote working environments, a focus on health and safety, im-

Table 4: Friedman test

Activity ratio	Size					
	Small		Medium		Large	
	p-value	H0	p-value	H0	p-value	H0
AT	<0.05	rejected	<0.05	rejected	<0.05	rejected
LTAT	<0.05	rejected	0.002	rejected	0.771	retained
IT	<0.05	rejected	<0.05	rejected	<0.05	rejected
ATP	<0.05	rejected	<0.05	rejected	<0.05	rejected
LTATP	<0.05	rejected	0.338	retained	0.138	retained
ITP	<0.05	rejected	<0.05	rejected	<0.05	rejected
CoPR	0.759	retained	0.759	retained	<0.05	rejected
CrPR	0.4	retained	<0.05	rejected	<0.05	rejected

Source: own processing

proved productivity, and sustainability goals. Conversely, factors indicating a negative impact were low business turnover, delayed payments for construction and production, difficulty working from home, and job loss.=

Nurmet et al. (2021) analyse the working capital indicators to find out the differences between the sizes of Estonian agricultural companies. The smallest agricultural enterprises have more liquidity and a comparatively bigger proportion of highly liquid current assets. Large agricultural enterprises sustain elevated inventory levels and have prolonged inventory turnover periods. Smaller enterprises own a somewhat greater proportion of loans within their current obligations, necessitating the maintenance of a more substantial financial cushion. Smaller enterprises have the longest receivables turnover, indicating they allow extended payment terms for purchasers or may encounter challenges in collecting receivables from sold goods. Due to their limited market strength and prolonged receivables turnover, they possess a comparatively greater requirement for working capital.

Valaskova et al. (2023) also investigated the impact of the COVID-19 pandemic. The authors focused their attention on the NACE I sector (Accommodation and food service activities), but only on one country from the V4, Slovakia. In this case, indebtedness was analysed. Slovak businesses are becoming more mindful of debt financing and are attempting to reduce the risks of going bankrupt.

Gajdosikova et al. (2022) also examined the effects of the COVID-19 pandemic. They focused on the construction sector in Slovakia. A detailed analysis showed the negative impact of the pandemic on many aspects of business in the construction sector of the Slovak Republic. The outbreak of the pandemic affected the financial and economic situation of companies in the construction sector.

Shen et al. (2020) examine the impact of the COVID-19 pandemic on firm performance. The research used financial data of listed Chinese companies. The authors' findings were that COVID-19 has a negative impact on company performance. The extent of this influence is conditioned by the company's investment scale or sales revenue.

Nordhagen et al. (2021) note the effects of the COVID-19 pandemic on various business size categories, specifically in African and Asian countries. The authors focused on micro, small, and medium enterprises (MSMEs) ensuring food and nutrition security. They paid attention to the early impacts of the pandemic on the businesses of the respondents from the analysed countries. About 94.3% of respondents said that the pandemic affected the functioning of their company. Sales decreased, and access to inputs and financing worsened due to limited financial reserves. 84% of companies reported a change in production volume due to the pandemic; some have stopped production, and some have seen a decline in production. Approximately 54% of business entities have changed product prices because of the pandemic. Firms with an annual turnover of less than $50,000 were significantly more likely to experience a severe impact. Remarkably, the likelihood of severe impact was lower for new firms and firms with the fewest employees.

Currently, every business entity faces significant challenges due to intense rivalry. For a corporate entity to achieve success, it must concentrate on critical factors (Vartiak, 2016). For business entities to achieve genuine success, it is essential to evaluate the influence of external factors on the enterprise. This comprehension can facilitate the successful resolution of potential future issues (Salonga, 2023). Not only COVID-19, but also many other external factors impacted a company's performance. Horvathova & Mokrisova (2014) examine the influence of external influences before the pandemic COVID-19 on company success. They underscored the significance of methodically evaluating these effects to enhance corporate strategy. Technology has a significant role in contemporary companies, including production, product sales, and client assistance. Technology enables a corporation to save time and personnel expenses while enhancing efficiency, ultimately providing an edge over the competition over time.

External factors have been evolving rapidly, intensifying competitiveness significantly, and interacting with the COVID-19 pandemic as well. Innovative business entities supplant enterprises that undervalue competition or exhibit poor adaptability. Alterations in the external environment are frequently instigated by the introduction of

newly developed technology via unexpected occurrences such as war, economic crises, and worldwide pandemics and via the implementation of new regulations, including tax policies and minimum wage standards (Study Smarter, 2024). External factors have been investigated in the pandemic era by Engidaw (2021) or Hussain et al. (2023). Three essential domains of technology in commerce are automation, e-commerce, and digital media (Study Smarter, 2024). Hussain et al. (2023) assert that political factors are among the elements affecting a corporate entity's productivity. According to Holcz (2022), the economy is also influenced by geopolitical factors, such as military confrontation, disruption of supply or production chains, and political instability.

International conflicts, such as those between Hamas and Israel, Russia and Ukraine, and nuclear threats from North Korea and Iran, have global ramifications, impacting not only peace and security but also global stock markets and the economy (D'Souza, 2023). Furthermore, Holcz (2022) argues that the Russian-Ukrainian war has hindered economic development and increased inflation rates. Rehman et al. (2021) found that continuous monitoring of interest rates, exchange rates, and inflation is crucial, as these factors adversely affect the performance of examined enterprises. Saleh & Alaallah (2022) indicated a positive correlation between capital adequacy requirements, liquidity, interest rates, inflation, economic growth, and the financial performance of examined businesses. Fatorachian & Kazemi's (2021) research demonstrates that performance enhancements in business processes are significantly influenced by information technology. Innovative technologies are currently transforming the landscape of various sectors and their business strategies. The Fourth Industrial Revolution is impacting supply chains due to the increasing digitalization of operations and the exponential growth of sensitive data (Pfohl et al., 2015). Durana & Valaskova (2022) revealed that smart sensors had a positive impact on financial performance, even during the crisis in the V4 region.

CONCLUSION

The aim of this article was to unveil the impact of the COVID-19 pandemic on indicators of business activity in the V4 region. The Friedman test was performed for small, medium-sized, and large enterprises and confirmed the assumption of a negative impact of the pandemic on the business activity of the Visegrad Four. Within small businesses, the impact is evident in almost all indicators, except for the collection period ratio and the credit period ratio. The pandemic confirmed its impact on asset turnover, long-term asset turnover, inventory turnover, asset turnover period, inventory turnover period, and credit period ratio within medium-sized enterprises. From the point of view of large enterprises, the negative impact was confirmed for the indicators of assets turnover, inventory turnover, assets turnover period, inventory turnover period, collection period ratio, and credit period ratio.

Low resulting enterprise asset turnover values mean that enterprises may have had problems with, for example, inadequate inventory management, inefficient debt collection procedures, or excessive production capacity. A rebound in asset turnover indicates much better ability to manage their assets. High values of turnover of long-term assets mean a high level of long-term assets. When inventory turnover increased, business entities managed inventory better. If the value of the turnover time of long-term assets was still too high, business entities failed to make their asset management more efficient. The increase in the turnover time of long-term assets means that companies continued to manage their assets inefficiently. In the case that there was a further decrease in the turnover of long-term assets at the end of the monitored period for the analysed companies, this indicates that they have certainly begun to use their assets more efficiently. Regarding the values of the inventory turnover time indicator, their return almost to the original value from the first year means that they know how to manage their assets more efficiently. When the values of inventory turnover time have a decreasing trend, it indicates a gradually better efficiency of inventory management. On the contrary, a growing trend means worse efficiency in inventory management. In the case of the collection period ratio, an inconsistent decrease or increase means that the given enterprises did not have stability in the collection of customer invoices. Business units prefer a decrease in the value of the collection time of short-term trade receivables, because it is more critical for them to ensure quick receipt of payments. If there are significant differences when comparing the values of credit period ratio with collection period ratio, it is disadvantageous for businesses.

The primary limitation of the research is its exclusive focus on a single sector and its analysis of activity ratios from 2018 to 2021, excluding the post-COVID years. That is why analysing ratios, including the post-COVID period, could enhance future research. In addition, it is important to concentrate on other sectors and realize cross-sectional study of the development of activity ratios in Visegrad Four.

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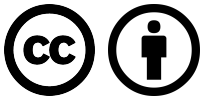

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