The Effects of Selected Financial Ratios on Net Profit – The Case of Enterprises of V4 Countries

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Abstract: The aim of the research was to assess the effects of selected financial ratios (such as Current Ratio, Debt to Assets Ratio and Gross Profit Margin) on Net Profit. The research was conducted among big enterprises operating in the V4 countries (Czechia, Hungary, Poland and Slovak Republic). The research also aimed to compare the economic results of companies before and during Covid-19 (from 2017 to 2021). Based on the best knowledge of the researchers, no previous research had addressed the issue in V4 countries during the pandemic Covid-19. The data of 200 big companies were collected with the help of Orbis database published by Bureau van Dijk. The research was conducted in the middle of April 2023. The last available data were from 2021. The database did not contain the final data from year 2022. Three hypotheses were formulated along with null- and alternative hypotheses. Linear regression was used for testing. According to the results Current Ratio, Debt to Assets Ratio and Gross Profit Margin have no significant impact on Net profit. The research can be treated as a pilot study since more confirmatory examinations are needed.

Keywords: financial ratios; large enterprises; net profit

1 Introduction

The main purpose of this research is the examination of selected financial ratios on Net Profit. There is no need to present the situation caused by Covid-19 and the measures taken to combat the pandemic. However, some effects became visible after the pandemic [1]. In some cases, it is difficult to separate the effects of

Covid-19 from the effects caused by the Russia-Ukraine War [2]. The overall impact of the war is quite difficult to assess since the situation is changing day by day. The impact of the war is unknown since the conflict is not closed. On the other hand, there are economical processes, which have instant impact on the economy e.g., extreme inflation, energy shortages, increasing energy prices and transport costs, and social tensions [3-5].

Despite the fact that the examination of recent economic effects is interesting [6-8], the amount of available data about enterprises is limited. This paper focuses on period from 2017 to 2021, since the data about enterprises can be considered final. Large enterprises were analysed during the research. The Commission Recommendation document no. "2003/361/EC" issued by the European Commission [9, p. 4] declares that "*The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 people, and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million*." The document does not define, but it can be concluded that enterprises with 250 or more employees can be considered as large enterprises. However, in general, the number of employees is considered the only criterion for assessing the size of enterprises [10]. The European Commission [9] is also using the number of employees for grouping the enterprises in their official statistics.

Previous studies [11-17] have already emphasized the socio-economic role of small and medium enterprises (SMEs). On the other hand, the role of large enterprises is crucial for the economy in the time of overlapping crises. Even though several authors [18, 19] emphasize the importance of large companies, the scientific literature is not quite balanced in terms of excessive number of papers focusing on SMEs. According to Moscarini and Postel-Vinay [20], large enterprises are growing faster than SMEs. These are also less responsive to recession and expansion in the economy. This specific characteristic can be crucial in time of consecutive crises. According to Ciani et al. [21], "*large firms ultimately represent vehicles of change*". They are constantly looking for new approaches in management and production processes, which are closely related to innovation. Based on Edmiston [22], large enterprises offer better positions for potential employees than SMEs. They offer better remuneration schemes and workplace stability. Large enterprises enter new markets easier and stabilize their position on the existing markets. SMEs are strongly linked to large enterprises through the structure of the value chains [23].

Based on Eurostat data [24], only 0.2% of all enterprises in the European Union are large enterprises, while they employ 35.7% of all the employed people. On the other side, large enterprises have a share of 47.5% from the value added by all the enterprises. In the case of V4 countries, large enterprises form 0.1% of all enterprises, employ 31.2% of active workforce, and create 45.6% of all the value created by enterprises. All the detailed data are shown in the Table 1 below.

Table 1
Key business statistics of large enterprises in V4 countries and in EU27 Eurostat [24]

	Large enterprises (250 and more persons employed)		
	Ratio (% of all enterprises)	Persons employed (% of all enterprises)	Value added (% of all enterprises)
Czechia	0.2%	32.5%	44.2%
Hungary	0.1%	31.6%	45.0%
Poland	0.2%	33.5%	49.4%
Slovakia	0.1%	27.4%	43.8%
V4 average	0.1%	31.2%	45.6%
EU (27)	0.2%	35.7%	47.5%

Based on Saurav et al. [25], the most adverse effects during the first wave of Covid-19 pandemic in the case of large enterprises were experienced in areas like worker productivity, investment, net income, output and demand. According to Duda et al. [26], large enterprises faced challenges to remain competitive. Islam and Fatema [27] also found that large enterprises had lower survival rate during the waves of Covid-19 pandemic than SMEs. That is why it is important to assess the financial situation of large enterprises during the time of crises.

The study focuses on the four countries: Czechia, Hungary, Poland and the Slovak Republic. The cooperation of V4 countries is determined by the geographical proximity. In addition to geographical closeness, they are connected culturally as well. The shared history of these countries dates back to the first (1370-1384) and the second (1440-1444) personal union between the Kingdom of Poland and Kingdom of Hungary and the personal union between these two and Bohemians (1301-1305). Hungary had also a personal union with Bohemians several times during the history (1419-1439, 1453-1457, 1490-1526 and 1526-1918). During the era of the Dual Monarchy (1867-1918), all the mentioned countries belonged to Austria-Hungary. In the 20th Century, the Czechoslovak Republic (1918-1939, 1945-1992) became independent from Austria-Hungary. The last century (WW I and II, the socialist era and the wave of revolutions) made the ties between these countries even stronger, however the relationship was not always developing in a positive way (e.g., loss of the territories of Hungary after the WW II). After the end of the socialism, all of these countries started to develop independently, but different form of cooperation could be detected among them. The grouping called "Visegrad Four" (or "Visegrad Group") is the most significant and acknowledged political and cultural cooperation between these countries. It was founded in 1991 in Visegrad between Czechoslovakia, Hungary and Poland. In 1993, the Czech Republic and the Slovak Republic became independent countries, but they preserved their membership. Since foundation of V4, the strength of the relationship between the members and the degree of agreement in international or global political questions was not always unanimous. In 2004, all of these four countries joined to the European Union, and have become part of the Schengen

Area in 2007. In terms of economic, historic and cultural research, the Visegrad Four countries are often observed as a single region [28-35, 50-53].

The next chapter of the article describes the types of financial ratios and the ratios (Current Ratio, Debt to Assets Ratio and Gross Profit Margin) used in this study. Previous studies were assessed to form a solid theoretical background for the research. The "Methodology" chapter describes the chosen methods and the calculation of the given ratios. The "Results and Discussion" chapter is the most important part of this study, describing the results of the data evaluation. The similarities and differences with previous studies have also been highlighted in this chapter. In the "Conclusions" part the most important findings and final thoughts are summarized.

This paper contributes to both theory and practice by assessing the impact of selected financial ratios on Net Profit, moving beyond traditional examinations of changes in profit. The study expands on previous research by addressing contradictions in the literature and presenting findings that challenge existing perspectives.

2 Theoretical Backgrounds

2.1 Financial Ratios and Previous Research

Financial ratios are widely used in financial analysis to determine the internal performance of the company, profitability or financial health. The numbers found in the company's financial statement – income statement, cash flow statement and balance sheet are used to perform a quantitative financial analysis. Some of the ratios are used for predicting the future of companies. According to financial experts and the scientific literature [36-39] the financial ratios can be divided into the following categories:

- Liquidity ratios
- Activity (or efficiency) ratios
- Solvency (or leverage) ratios
- Profitability ratios
- Market ratios

There are numerous ratios belonging to these groups. In this study, the effect of Current Ratio (CR), Debt to Assets Ratio (DAR) and Gross Profit Margin (GPM) on Net profit were assessed.

Current Ratio is one of the liquidity ratios. According to Husna and Satria [40, p. 51], the Current Ratio "*is a liquidity ratio used to measure the ability of a company to meet its short-term liabilities that are due by using the total current assets available*". By "short-term", we usually mean "within one year". If the value of Current Ratio is too low, it can be said that the company does not have enough capital to pay its debts. On the other side, if the value is too high, the use of cash is not effective, and the inventory management is inadequate.

Debt to Assets Ratio or Debt to Total Assets Ratio belongs to solvency ratios. This ratio shows the proportion between the funds provided by creditors (who are borrowing money) and the funds provided by owners, shareholders (the assets). It is used to measure debt capacity and helps determine whether the enterprise is able to pay its obligations. Commonly, it is used for comparing various enterprises operating in the same industry, market or country. If the ratios are too high, the risk of investment into the enterprise is high too. If the value is low, there is a low-level of financing through debt [41].

Gross Profit Margin is one of the profitability ratios. Margin ratios provide insight into a company's ability to turn sales into a profit. This ratio assesses the financial health of the enterprise. The higher the value of GPM, the better the enterprise. A high value of GPM means that the enterprise has a high ability to make a certain gross profit and sales, and the enterprise's position is better in the utilization of asset [42].

The study assesses the effect of above-mentioned ratios on Net Profit, which is calculated as the following:

$$\text{Net Profit} = \text{Gross Profit} - \text{Operating Expenses} - \text{Tax} \tag{1}$$

If the value of the Net Profit is positive, the company is making more money than spending it has. If the value is negative, it is called a "net loss".

Several previous studies were dealing with the effects of financial ratios and the relations between them. Based on Meriewaty and Setyani [43], the Current Ratio has an effect on Changes in Profit. Sinurat [44] also found the same results. Oktanto and Nuryatno [45] found that Debt to Assets Ratio has a significant effect on Change in Profit. Nariswari and Nugraha [42] were dealing with the "*Impact of Net Profit Margin, Gross Profit Margin and Total Assets Turnover*". They assessed the impact of the mentioned ratios on Profit Growth, which is similar to Change in Profit. They found that Net Profit Margin, Gross Profit Margin and Total Assets Turnover have a significant impact on Profit Growth. Surbakti, Aginta and Masdiana [38] studied the effect of Current Ratio, Debt to Assets Ratio and Gross Profit Margin on Change in Profit. Based on their results, there is no significant effect between the Current Ratio and Change in Profit, and no relation between Debt to Assets Ratio and Change in Profit, and no connection between Gross Profit Margin and Change in Profit. These contradictions prompted the authors to conduct the research.

2 Methodology

The main purpose of the paper was to assess the effects of selected financial ratios on Net Profit. The importance of big enterprises is crucial in the above-mentioned V4 countries (Czechia, Hungary, Poland and the Slovak Republic).

Current Ratio, Debt to Assets Ratio and Gross Profit Margin were chosen as financial ratios to examine. The ratios were calculated based on accounting information and data published by Orbis database, which is a flagship database for Bureau van Dijk, a major publisher of business information. This study used data between 2017 and 2021. The database contained the data of 200 big companies (with 250 or more employees) of the V4 countries. Data were downloaded, and converted in Microsoft Excel software.

The formula used for calculating the Current Ratio was the following:

$$\text{Current Ratio} = \frac{\textit{Current Assets}}{\text{Current } \textit{Liabilities}} \tag{2}$$

The formula used for calculating the Debt to Assets Ratio was the following:

$$\text{Debt to Assets Ratio} = \frac{\text{Total } \textit{Liabilities}}{\text{Total Assets}} \tag{3}$$

The formula used for calculating the Gross Profit Margin was the following:

$$\text{Gross Profit Margin} = \frac{\textit{Gross Profit}}{\text{Sales}} \tag{4}$$

The effects of above-mentioned ratios (CR, DAR and GPM) on Net Profit (NP) were examined. The Net Profit can be calculated as following:

$$\text{Net Profit} = \text{Gross Profit} - \text{Operating Expenses} - \text{Tax} \tag{5}$$

The following hypotheses were formulated:

- H1: The Current Ratio has positive impact on the Net Profit
  - $H1_0$: The Current Ratio has no impact on the Net Profit
  - $H1_A$: The Current Ratio has impact on the Net Profit
- H2: The Debt to Assets has positive impact on the Net Profit
  - $H2_0$: The Debt to Assets has no impact on the Net Profit
  - $H2_A$: The Debt to Assets has impact on the Net Profit
- H3: The Gross Profit Margin has positive impact on the Net Profit
  - $H3_0$: The Gross Profit Margin has no impact on the Net Profit
  - $H3_A$: The Gross Profit Margin has impact on the Net Profit

While the null hypotheses proposed no existing statistical significance between the observed variables, the alternative hypotheses proposed there is an existing relationship between the variables.

In the case of H1, H2 and H3 a Simple Linear Regression was conducted since one independent and one dependent variable were included.

$$y = \beta_0 + \beta_1 X + \epsilon \tag{6}$$

where,

y = predicted value of the dependent variable of any given value of independent variable

β_0 = intercept (the predicted value of the dependent variable when the value of the independent variable is 0)

β_1 = regression coefficient (how much we expect the value of dependent variable to change as the value of independent variable increases)

X = the independent variable

ϵ = error of the estimate [46].

Before conducting the Simple Linear Regression, three assumptions had to be fulfilled:

- Data should be normally distributed
- There should be no autocorrelation between the data
- Data needs to show homoscedasticity.

In order to test the normality of the dependent variable (Net Profit), we chose to conduct the Jarque-Bera test:

$$JB = n[\sqrt{b1})2 / 6 + (b2 - 3)2 / 24] \tag{7}$$

where,

n = sample size

$\sqrt{b_1}$ = sample skewness coefficient

B_2 = kurtosis coefficient

The p-value of significance of Jarque-Bera is less than 0.05. It means that the data do not follow a normal distribution. If the value of significance is higher than 0.05, the data normally distributed [47].

The autocorrelation in the case of independent variables (CR, DAR and GPM) was tested by conducting Durbin-Watson test. The formula for the Durbin-Watson test is the following:

$$DW = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2} \quad (8)$$

where,

e_t = residual figure

T = the number of observations

Its value is ranging between 0 and 4. Values between 0 and 2 show positive-, while values from 2 to 4 show negative autocorrelation. If the value is 2 (or close to that), it can be stated that there is no autocorrelation. The actual result should be judged based on the Durbin-Watson table, where the number of independent variables and the sample size are taken into account. However, according to a general rule, values between 1.5 and 2.5 are acceptable [48].

The homoscedasticity in the case of independent variables (CR, DAR and GPM) was tested by using the White test. The formula for the White test can be deduced with the help of Lagrange multiplier:

$$LM = nR^2 \sim \chi^2(m) \quad (9)$$

where,

n = the sample size

R^2 = R-squared value

χ = chi-square value

m = degree of freedom, the number of independent variables

If the value of chi-square is higher than the critical value (and the p-value is less than 0.05), we discuss heteroscedasticity. If the value is lower than the critical value (and the p-value is greater than 0.05), there is no heteroscedasticity. Homoscedasticity is needed in order to conduct linear regression. Heteroscedasticity suggests that the regression model needs additional independent variables [49].

The statistical analysis was conducted in Gretl software.

3 Results and Discussion

The first hypothesis of the study was the following:

H1: The Current Ratio has positive impact on the Net Profit

$H1_0$: The Current Ratio has no impact on the Net Profit

$H1_A$: The Current Ratio has impact on the Net Profit

Before conducting the regression, the three assumptions (normality, autocorrelation and homoscedasticity) were checked. According to the results in Table 1, the dependent variable (Net Profit) is normally distributed (Jarque-Bera with p-value 0.429335). In the case of independent variable (CR), the autocorrelation and homoscedasticity needed to be checked. As a first method, the Durbin-Watson test was used. Its value is 1.598522, which is between 1.5 and 2.5. Since the p-value in the case of White test is higher than 0.05 (p = 0.755713), the homoscedasticity is proven.

Table 1
Assumptions for H1

		p-value
NP (dependent variable)	Normality (Jarque-Bera)	0.429335[a]
CR (in dependent variable)	Autocorrelation (Durbin-Watson)	1.598522[b]
	Homoscedasticity (White test)	0.755713[a]

[a] p-value

[b] value

Since all of the three assumptions were fulfilled, the simple linear regression could be conducted (Table 2).

Table 2
Regression results – CR and NP

	Coefficient	Std. error.	t-ratio	p-value
const	15.1928	0.3003956	49.98	1.56e-070
1_Currentratio	0.229073	0.323814	0.7074	0.4810

According to Table 2, the regression model does not predict the dependent variable significantly (p = 0.4810, which is greater than 0.05). This means that the Current Ratio has no impact on the Net Profit – $H1_0$ cannot be rejected, therefore, $H1_A$ is rejected. Previous studies, mentioned in the theoretical part were also examining the relationship between these two factors. Based on the results of Merieway & Setyani [43], Sinurat [44] and Saleh et al. [39], the Current Ratio has a positive impact on Changes in Profit. Surbakti, Aginta & Masdiana [38] found no relation between CR and Changes in Profit. The results of this study are in line with the latter paper, although not the Changes in (Net) profit, but the Net Profit itself was assessed.

H2: The Debt to Assets has positive impact on the Net Profit

$H2_0$: The Debt to Assets has no impact on the Net Profit

$H2_A$: The Debt to Assets has impact on the Net Profit

Before conducting the regression, the three assumptions were checked. According to the results in Table 3, the dependent variable (Net Profit) is normally distributed (Jarque-Bera with p-value 0.429335). In the case of independent variable (DAR), the autocorrelation and homoscedasticity needed to be checked.

As a first step, the Durbin-Watson test was used. The value is 1.598701, which is between 1.5 and 2.5. Since the p-value in the case of White test is higher than 0.05 (p = 0. 420330), there is homoscedasticity proved.

Table 3
Assumptions for H2

		p-value
Net Profit (dependent variable)	Normality (Jarque-Bera)	0.429335[a]
DAR (in dependent variable)	Autocorrelation (Durbin-Watson)	1.598701[b]
	Homoscedasticity (White test)	0.420330[a]

[a] p-value

[b] value

Since all of the three assumptions were fulfilled, the simple linear regression could be conducted (Table 4).

Table 4
Regression results – DAR and NP

	Coefficient	Std. error.	t-ratio	p-value
const	15.5118	0.404295	38.37	4.95e-060
1_Debttoassets	0.232427	0.384598	0.6043	0.5470

Results show (Table 4) that the regression model (in this case Debt to Assets ratio) does not predict the value of Net Profit (p = 0.5470, which is higher than 0.05). $H2_0$ cannot be rejected, therefore $H2_A$ is rejected. Oktanto & Nuryatno [45] and Saleh et al. [39] found that Debt to Assets Ratio has a significant effect on Change in Profit. On the other side, Surbakti, Aginta & Masdiana [38] found that there is no relation between Debt to Assets Ratio and Change in Profit. The results of this study are in line with the latter paper again, although the impact on Net Profit itself was assessed.

H3: The Gross Profit Margin has positive impact on the Net Profit

$H3_0$: The Gross Profit Margin has no impact on the Net Profit

$H3_A$: The Gross Profit Margin has impact on the Net Profit

Before conducting the regression, the three assumptions were checked. According to the results in Table 5, the dependent variable (Net Profit) is normally distributed (Jarque-Bera with p-value 0.429335). In the case of independent variable (DAR), the autocorrelation and homoscedasticity needed to be checked. As a first step, the Durbin-Watson test was used. Its value is 1.522735, which is between 1.5 and 2.5. Since the p-value in the case of White test is higher than 0.05 (p = 0.413697), which proves homoscedasticity.

Table 5
Assumptions for H3

		p-value
Net Profit (dependent variable)	Normality (Jarque-Bera)	0.429335[a]
DAR (in dependent variable)	Autocorrelation (Durbin-Watson)	1.522735[b]
	Homoscedasticity (White test)	0.413697[a]

[a] p-value
[b] value

Since all of the three assumptions were fulfilled, the simple linear regression could be conducted (Table 6).

Table 6
Regression results – GPM and NP

	Coefficient	Std. error.	t-ratio	p-value
const	16.8388	1.12785	14.93	3.36e-026
1_Grossprofitmargin	-3.58791	2.37857	-1.508	0.1349

According to the results (Table 6), the Gross Profit Margin has no impact on the Net profit. The p value is 0.1349, which is indicating the non-existence of a relationship – $H3_0$ cannot be rejected, therefore, $H3_A$ is rejected. Nariswari and Nugraha [42] were studying the impact of Gross Profit Margin (along with other financial ratios) on Profit Growth (in other words Change in Profit). They found that Gross Profit Margin has significant impact on Profit Growth. In contrast, Surbakti, Aginta & Masdiana [38] found that Debt to Assets Ratio has no effect on the Changes in Profit. The results of our study are in line with the latter paper again, although the effect on Net Profit itself was assessed instead of Changes in Profit.

Conclusions

This study aimed to assess the impact of selected ratios on Net Profit. Three ratios, which fall into category of three different financial ratio types were chosen: Current Ratio (liquidity ratios), Debt to Assets ratio (solvency ratio) and Gross Profit Margin ratio (profitability ratio). The research sample included 200 enterprises (with 250 or more employees) operating in V4 countries.

Previous studies [38, 39, 40-45] have already assessed the effect of the given ratios (CR, DAB and GPM) in relation to profit. These studies focused on annual in corporate profit. The contradictions discovered between these studies encouraged the authors to conduct research with a little change – assessing the value of Net Profit instead of changes in its value.

According to the results explained in the “Results and Discussion” part, no significant evidence was found about the impact of Current Ratio, Debt to Assets ratio and Gross Profit Margin on Net Profit.

The results not only enrich theoretical discussions on the relationship between ratios and Net Profit but also provide practical insights for businesses and policymakers, encouraging a nuanced understanding of financial dynamics and decision-making. Overall, this paper advances both theoretical discourse and practical implications, offering a valuable contribution to the field of financial analysis.

One of the limitations of the study is the relatively low number of enterprises (200) included in this study. According to the Orbis database used in this study, there are more than 6000 enterprises in the V4 countries with 250 or more employees. However, the database was incomplete. This forced the authors to consider those enterprises, where all data were known. The examined period between 2017 and 2021 shows volatile results in the bookkeeping records of the examined enterprises. Further limit of this study was that data for 2022 were not or only partially available.

The results of this study can serve as a basis for further scientific research. It would be useful to target more enterprises even SMEs in future research. Since no relevant data were available from the year 2022, as well from the years before the pandemic, it might be useful to carry on with the research and compare data with the period after the pandemic to understand the impact of COVID-19 on enterprises. In addition, the effect of other ratios on Net Profit should be assessed.

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