sciendo
ISSN 1392-1142 (Print), ISSN 2335-8750 (Online)
ORGANIZACIJŲ VADYBA:
SISTEMINIAI TYRIMAI 2023.90
https://doi.org/10.2478/mosr-2023-0012

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Audit Fee Determinants in CEE Companies Before and During COVID-19

Audit fee serves not only as a compensation for external audit firms to ensure the accuracy and reliability of a company's financial statements, but it also plays a role in the financial market, by simultaneously reflecting the accounting quality and overall standing of the auditee. This exploratory study aims to identify the factors determining the audit fees of Central and Eastern European companies taking into account periods before and during COVID-19 pandemic. Our findings indicate an upward trend in audit fees for CEE companies during COVID-19, with total assets of auditee and affiliation with Big Four auditors being positive determinants in both periods.

Keywords: audit fee, audit fee determinants, Central and Eastern Europe, COVID-19.

Audito mokestis parodo ne tik kompensaciją išorės auditoriams už įmonės finansinių ataskaitų tikslumo ir patikimumo užtikrinimą, bet ir atlieka svarbų vaidmenį finansų rinkoje – atspindi audituojamos įmonės apskaitos kokybę ir bendrą įmonės būklę. Šiuo tyrimu siekiama nustatyti veiksnius, nulemiančius Vidurio ir Rytų Europos įmonių audito mokesčio dydį, atsižvelgiant į laikotarpius iki COVID-19 pandemijos ir jos metu. Tyrimo rezultatai parodė, kad COVID-19 pandemijos laikotarpiu audito mokesčiai padidėjo, o audituojamos įmonės turtas ir auditorių priklausymas Didžiojo ketverto įmonėms buvo reikšmingi audito mokesčius abiem laikotarpiais didinantys veiksniai.

Raktiniai žodžiai: audito mokestis, audito mokesčio veiksniai, Vidurio ir Rytų Europa, COVID-19.

Introduction

Relevant and faithful represented financial information is a key determinant of the efficient capital allocation in financial markets. The primary function of an audit is to examen the faithfulness of financial information provided by a company and to provide assurance to users of financial information that it is relevant, accurate and reliable. In times of uncertainty, such as the COVID-19 pandemic, it is important for clients of audit services and users of audited financial statements to understand how the service is priced to provide a true and fair view of the financial position, performance and quality of management of the audited entity. Various disruptions, such as

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financial crises or the current COVID-19 pandemic, affect companies and create additional difficulties that may not be apparent to outsiders. It is therefore the auditor's duty to analyse the changing situation of the audited entity, to assess the risks and to price its services fairly. In the financial markets, the amount of audit fee and its changes over time are also perceived as a proxy for the quality of the auditee's accounting (Hribar et al., 2014; Kanakriyah, 2020). The audit fee is also identified as a reflection of the sincerity of the financial statements. Sincerity can be understood in two ways: first, accurate and actual numbers, and second, accounting in accordance with the law. After the implementation of the Statutory Audit Directive in 2006 and following the amendments and additions in 2014 and 2016, the audit partially assumes the role of regulation, ensuring that the audited financial statements are consistent with the applicable law and International Financial Reporting Standards. Therefore, the audit fee is not only an indicator of quality, but can also serve as a regulatory penalty, as financial statements that do not comply with the applicable standards require more time and cost to evaluate. Regarding the regulation of the audit market in the European Union, two sets of rules were adopted in 2014: Directive 2014/56/EU and Regulation No. 537/2014 (European Commission, 2022). The former is structures statutory audits and improves the supervision of auditors, meanwhile the later sets the requirements for the public interest entities (PIEs) audits. While the Directive and Regulation were approved in 2014, some countries did not adopt it for years. For example, based on the study by M. Willekens et al. (2019), in June 2021 Slovenia was in the first stage of regulation implementation lagging the other CEECs, which all have fully implemented the regulation by December 2017. Regulatory intervention in the auditing market will have a lasting impact, including the size, design, and determinants of audit fees (Widmann et al., 2021). Apart from regulation the size of audit fee and its changes over the time are affected by various audit company and auditee specific factors (Hribar et al., 2014; Widmann et al., 2021), with auditee size, complexity, and auditor status being among the most resistant in various environments and samples. As discussed in systematic research by M. Widmann et al. (2021), D. Hay (2013) and D. Hay et al. (2006) research on audit fee and its determinants is rather extensive. However, focus on Central and Eastern European (CEE) companies is limited. A few most recent studies by K. Rewczuk and P. Modzelewski (2019) and M. Z. Groff et al. (2017) indicate a scarcity of research in this region. Furthermore, the emerging topic of the impact of COVID-19 on audit fees and its determinants is gaining attention globally. Studies by C. D. Hategan et al. (2022), A. A. Al-Qadasi et al. (2022) and R. H. Alkebsee et al. (2023) provide mixed insights into the effects of the COVID-19 pandemic on audit fees. The limited research on the audit fee determinants in CEE with a clear gap on the situation in this region during COVID-19 pandemic leads to the **research problem** of this study – what are the factors determining audit fees of Central and Eastern European companies before and during COVID-19.

The aim to identify the factors that determine the audit fees of Central

and Eastern European companies taking into account the periods before and during the COVID-19 pandemic.

Research methods. In this study, we first used a comparative literature analysis to gather relevant evidence on the concept and role of audit fees and their determinants, including an overview of previous research in general, in CEE countries and during the COVID-19 pandemic. Descriptive statistics was carried out for the dependent and independent variables and econometric research was conducted using OLS regression with two models for the periods before and during COVID-19 pandemic. A critical comparative analysis was then carried out to discuss and compare our findings with those of previous research.

The paper is divided into four main sections. The first section presents the literature review. The next section is dedicated to the research methodology. The third section presents the results of our study. Discussion of our findings is presented in the fourth section of the paper.

Literature review

Audit fee and its role in the financial market. The audit fee is the amount charged by an auditor to conduct a review and receive a reasonable assurance on the quality of company's financial statements. It is the price for the services provided by the audit firm (Pong, Whittington, 1994). In general, audit fees are affected by the supply and demand part of the service (Widmann et al., 2021). The audit fee is designed to cover the cost of the auditor's time, effort, and expertise in conducting the audit. The fee is typically based on the complexity of the audit, the size of the organization, the experience of the auditor, and the time required to complete the audit (Hribar et al., 2014; Widmann et al., 2021) which means that companies with higher levels of accounting complexity and greater audit risk generally have higher audit fees.

Audit fees play an important role in financial markets because they help ensure that companies are accurately and honestly reporting their financial information. The audit process helps build investor confidence in financial statements, which can lead to increased demand for a company's stock and bonds. Auditors also provide independent assurance that the information provided is accurate and reliable. This increases transparency in the markets, helping to maintain trust and protect investors. Audit fees are related to the quality of a company's accounting because audit fees are typically based upon the complexity of the audit and the risk involved in the audit process. Companies with higher levels of accounting complexity and greater audit risk tend to have higher audit fees. Higher audit fees provide assurance to investors that more detailed work has been done to ensure that accounting information is accurate and reliable. This helps build trust in a company's financial statements and provides investors with higher quality information.

Review of previous research. Audit fees and their determinant have been extensively analysed in previous research (Widmann et al., 2021), but only a few studies have been conducted recently in

Central and Eastern Europe. D. A. Simunic (1980) is considered to be the pioneer of audit fee related research while his study remains the most cited research on audit pricing models. His research covered 1,207 companies in the United States and incorporated variables defining both auditee and auditor. The auditee variables included their size, complexity, relative audit risk, ratios concerning assets and industry of the auditee, while the auditors were represented by their classification to Big Eight and non-Big Eight. Interestingly, D. A. Simunic (1980) study did not find evidence of Big Eight concentration or monopoly but concluded on the relation between the complexity of the audit, the risk, and the audit fee. The later significant study was conducted by C. M. Pong and G. Whittington (1994) who analysed audit fee data of 577 large listed UK companies. Even though their study did not explicitly state to be based on D. A. Simunic's work, their methodology had similarities with Simunic's model but used smaller number of variables. The study of C. M. Pong and G. Whittington (1994) used a total amount of profits in contrast to D. A. Simunic (1980) who used dummy variable determining if the auditee has been profitable; and total sales to define auditee's size as an alternative to total assets in D. A. Simunic model. Results of C. M. Pong and G. Whittington (1994) study did not find evidence, that Big Eight companies' variable costs differentiate from other companies, however they concluded that newly appointed auditors charge less for the services and the trend is slightly stronger among non-Big Eight auditors. The more recent widely cited paper was conducted by P. Hribar et al. (2014) in the United States and included data on 54,545 company-years (for the period 2000–2010). The study was based on the works of D. A. Simunic, C. M. Pong and G. Whittington aiming to identify the portion of audit fee not explained by the independent variables concluding that it represents auditee's accounting quality. The variables in this model included the ones used by D. A. Simunic (1984), replacing audit companies by Big Four and adding litigation risk, IPO or SEO, book-to-market equity, and other popular ratios. More recent research was published by R. Kanakriyah (2020), where audit fee determination model was constructed and tested on companies listed on Amman Stock Exchange. The research analyses different variables such as auditee's size, profitability, risk, complexity, and industry to which an auditee belongs, as well as auditor's classification, independence, and rotation. The results of this research generally are in line with other research indicating that the strongest factors affecting audit fee were audit report lag, auditee's risk, size and complexity, and auditor's status. A very progressive study was also conducted by S. Mat Roni et al. (2022) suggesting that traditional statistical analysis should be improved. The authors used data from 408 Australian companies and employed artificial neural network as a supplement to the OLS data analysis to test the robustness of findings. Variables used in S. Mat Roni et al. (2022) study included auditee and auditor specific variables similar to the ones used in the above-mentioned studies. As discussed by systematic review of (Widmann et al., 2021), there are plethora of research on audit fees, the largest analysis representing the data from a cross-country

comparison in the period of 1996–2012 and the most common audit fee determinants being size and complexity on the auditee side and the Big-N premium and auditor specialization on the auditor side. The other most often identified audit fee determinants were grouped into such categories as auditee size, profitability, financial position, and other factors (Widmann et al., 2021) with multiples measures used depending on the research sample and availability of research data.

Studies on audit fee determinants in Central and Eastern Europe are rather limited. The most recent study on audit fees in Central and Eastern European countries was conducted by K. Rewczuk and P. Modzelewski (2019), who analysed the data of companies listed in Warsaw Stock Exchange and included a few most common determinants. K. Rewczuk and P. Modzelewski (2019) concluded that determinants of audit fees in Central and Eastern Europe are limited to size, profitability and complexity of auditee and the auditor size. In comparison, study conducted by M. Z. Groff et al. (2017) analysed non-listed Slovenian manufacturing companies based on the original model of D. A. Simunic (1980) modified for Slovenian audit market. This study did not find any high-quality evidence of audit fees but concluded that audit fees in Slovakia were negatively affected by financial crisis of 2008. Such evidence allows interpretations that the other disruptive event, namely COVID-19 pandemic, might have a negative effect on audit fees across CEE companies.

Similarly, to our view on the empirical research on Central and Eastern Europe, there still is a rather limited scope of studies analysing COVID-19 effects on audit fee. A study by C. D. Hategan et al. (2022) analysed the data of 870 companies from European stock exchanges, with over 50% of companies' headquarters based in the UK, incorporating the effects of COVID-19 pandemic. The study concluded that the impact of COVID-19 was recognized in 70% of the cases. Another research incorporating audit fee and COVID-19 effect was conducted by A. A. Al-Qadasi et al. (2022) in Oman using 268 firm-year observations. The study incorporated COVID-19 as dummy variable along with the other most common audit fee determinants. Findings of the study show that COVID-19 and audit fees are positively associated, thus audit fees are higher during COVID-19, including the evidence of abnormal audit fees. Also, higher audit fees are associated with Big Four auditors, which confirms the results of previous research on the difference in audit fees between Big Four and smaller auditors. This study also proved that threat of risk, complexity and legal liability circumstances were statistically significant determinants of higher audit fees during the COVID-19 pandemic. The recent study of R. H. Alkebsee et al. (2023) questioned the impact of the COVID-19 pandemic on audit fees of a sample of 5,008 international firms over the period 2014 to 2020. Their study concluded on a decrease in audit fees due to the COVID-19 pandemic. Some other recent studies conducted in the context of COVID-19 questioned the impact of COVID-19 epidemic on audit quality and the response of family vs non-family firms to COVID-19 in Jordan (Alharasis, Mustafa, 2023); the impact of COVID-19 closure on audit fees and audit delay in

more than 3400 firms in 52 countries (Harjoto, Laksmana, 2022), but to our knowledge no prior research in CEE is yet available.

Research methodology

Research background and aim. As noted in the review of previous empirical research, there is a gap in the literature on audit fees in Central and Eastern Europe, so the aim of this research is to identify the factors that determine audit fees for Central and Eastern European companies. In addition, as the most recent financial year data available is affected by COVID-19, this research incorporates the effects of COVID-19 and compares audit fees in the period before and during COVID-19.

The sequence of the research was as follows. Firstly, the data on Central and Eastern European companies were obtained. Second, descriptive statistics of audit fees and independent variables were analysed for periods before and during the COVID-19 pandemic. Then, regression was performed using the data before and during COVID-19 to identify factors determining the audit fee in those two periods. The obtained results were compared to identify changes in audit fee determinants and discussed in the light of previous studies. Finally, conclusions of the paper were drawn.

Research method and variables. To identify factors affecting the size of audit fee this research used OLS regression model proposed by P. Hribar et al. (2014). The model was modified according to the availability of data. The modified model is as follows:

$$l\_AF = \beta_0 + \beta_1 l\_SIZE + \beta_2 EMP + \beta_3 FREV + \beta_4 BTM + \beta_5 REC + \beta_6 INV + \beta_7 RISK + \beta_8 CURR + \beta_9 DEBT + \beta_{10} AOP + \beta_{11} PRO + \beta_{12} ROA + \beta_{13} BIG4 + \varepsilon$$

OLS regression is a common research method used in previous studies assessing audit fee determinants including COVID-19 related studies (Hategan et al., 2022; Alharasis, Mustafa, 2023; Al-Qadasi et al., 2022).

Table 1 presents dependent and independent research variables along with their measurement. The last column of the table refers to previous research incorporating the same research variables.

Risky industries were determined based on European Commission published classifications of how the crisis affected different economic sectors (Papadimitriou, Blasko, 2020). According to their study COVID-19 pandemic had high and medium-high impact on following sectors: wholesale and retail trade; manufacturing; accommodation and food services; real estate; business and administrative activities; arts, entertainment and recreation, and other services; transport, storage, and communication (Papadimitriou, Blasko, 2020). Thus, in our study communication services, consumer discretionary, consumer staples, industrials, information technology and reals estate industries were assumed to be risky and in the model were denominated as 1. Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers are Big Four companies, therefore for the purpose of this study those audit companies belonging to global networks of the mentioned audit companies were denominated as Big Four.

Table 1. **Explanation of variables**

Code	Variable	Measurement	Reference to previous research
Dependent variable			
l_AF	Audit fee	The log of amount of audit fee (in euro)	M. Widmann et al. (2021), P. Hribar et al. (2014), D. Hay (2013)
Independent variables			
l_SIZE	Size of auditee	Log of total assets (in euro)	S. Mat Roni et al. (2022), K. Rewczuk and P. Modzelewski (2019), R. Kanakriyah (2020), M. Z. Groff et al. (2017), P. Hribar et al. (2014), D. Hay (2013)
EMP	Number of employees	Number of employees	P. Hribar et al. (2014), M. Widmann et. al. (2021), D. Hay (2013)
FREV	Ratio of foreign revenue	= (Total revenue – Domestic revenue) / Total revenue * 100%	P. Hribar et al. (2014), M. Widmann et al. (2021), D. Hay (2013)
BTM	Book-to-Market ratio	= Market Capitalisation / Total Book Value	P. Hribar et al. (2014), M. Widmann et al. (2021)
REC	Receivables	= Accounts and Notes receiva-ble scaled by total assets	K. Rewczuk and P. Modzelewski (2019), M. Widmann et al. (2021), M. Z. Groff et al. (2017), P. Hribar et al. (2014), D. A. Simunic (1980)
INV	Inventories	= Inventories scaled by total assets	
RISK	Industry's risk	1 if industry is considered risky, 0 otherwise	C. D. Hategan et al. (2022), D. Hay (2013), D. A. Simunic (1980)
CURR	Current ratio	= Current assets / Current liabilities	K. Rewczuk and P. Modzelewski (2019), R. Kanakriyah (2020), M. Widmann et al. (2021), P. Hribar et al. (2014)
DEBT	Net debt	= Short-term debt + Long-term debt	S. Mat Roni et al. (2022), M. Widmann et al. (2021), P. Hribar et al. (2014)
PRO	Profitability	1 if company is profitable, 0 if making loss	S. Mat Roni et al. (2022), P. Hribar et al. (2014)
ROA	Return on assets	= Operating income / Total assets	S. Mat Roni et al. (2022), P. Hribar et al. (2014),
BIG4	Size of auditor	1 if auditor is from Big Four, 0 if otherwise	A. A. Al-Qadasi et al. (2022), S. Mat Roni et al. (2022), C. D. Hategan et al. (2022), M. Widmann et al. (2021), K. Rewczuk and P. Modzelewski (2019), R. Kanakriyah (2020), M. Z. Groff et al. (2017), P. Hribar et al. (2014), D. Hay (2013), D. A. Simunic (1980)

Due to the limitations of sample and company level data we opted not to include the COVID-19 variable into a single model, but instead, to run the OLS regression twice taking different datasets corresponding to periods before and during COVID-19. Such approach will not identify the effect of COVID-19 on audit fee determinants and could be viewed as one of limitations of this research. Rather it will allow us to separately view two periods, average audit fees and their statistically significant determinants.

Sample. According to OECD Glossary of statistical terms, Central and Eastern European countries (CEECs) are

determined as 12 following countries – Albania, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia (2001). However, for the purpose of this paper, Albania was omitted from the sample due to being the only country in Central and Eastern Europe not belonging to the European Union (EU). The data sample consisted of Central and Eastern European companies level data for years 2019 (period before the COVID-19) and 2021 (the period during the COVID-19). Year 2020 was excluded from the study based on the assumption that audit agreements are signed with the previous year's financial reports, therefore audit fees paid in 2020 would not reflect the pandemics. Our sample included companies traded on Central and Eastern European stock exchanges. The data was obtained from Bloomberg database. The initial sample size was 2,164 companies, for which information was available in Bloomberg database, however audit fee was available only for 474 companies in the year 2019 and 361 companies in the year 2021. The sample size further decreased when data for independent variables were collected. Thus, the final sample consisted of 101 companies in the year 2019 and 203 companies in the year 2021, for which all necessary data was available.

Results

Descriptive statistics. Table 2 summarizes the data on audit fees paid by the sample companies in the years 2019 and 2022. On average, in 2021 CEE companies for their audit paid almost 212 000 euro with the minimum value of 0 euro and the highest value of almost 4.3 million euro. Skewness of 4.6 indicate that the data has positive skewness and is distributed to the right. By comparison, in 2019 average audit fee was approximately 171,000 euro, with minimum value of 0 euro and maximum value – 8.13 million euro. Even bigger positive skewness of audit fee is observed in year 2019.

Table 2. **Descriptive statistics of audit fees paid by CEE companies in 2019 and 2021**

Summary Statistics for the variable l_AF	2019 (N = 478)	2021 (N = 361)
Maximum	8.8134e+006	4.2861e+006
Minimum	0.00000	0.00000
Mean	1.7052e+005	2.1175e+005
Median	23 607.	44 623.
Std. Dev.	6.3181e+005	4.8985e+005
C.V.	3.7053	2.3133
Skewness	8.6676	4.5989
Ex. kurtosis	94.220	26.770
5% Perc.	2203.4	3327.8
95% Perc	8.3797e+005	1.1835e+006
IQ range	65947.	1.2070e+005

Summary statistics of dependent variable allow assumption that on average audit fee increased in year 2021 affected by COVID-19, however highest value of audit fee was cut in half.

Descriptive statistics on independent variables for 2019 and 2021 is presented in Table 3. Analysing independent variables, differences in pre- and during the COVID-19 variables are observed. In line to the overall increase of audit fees, the average size of audited companies had also increased by 90 million euro from 2019 to 2021. The upwards trends were also noted in the number of employees, receivables, and inventories. During the two analysed periods, receivables almost doubled, which seems to be a consequence of COVID-19 difficulties caused to companies. Also, COVID-19 affected trading volumes and it has increased during the lockdowns, this effect is visible in CEE companies' data as well. Book-to-market ratio indicates that in 2019 on average CEE companies were undervalued and after COVID-19

Table 3. **Descriptive statistics of independent variables for 2019 and 2021**

Variable	Year	Mean	Median	S.D.	Min	Max
SIZEeur	2021	2.72e+009	1.34e+008	1.06e+010	0.000	9.16e+010
	2019	1.81e+009	5.66e+007	8.08e+009	0.000	8.17e+010
EMP	2021	3.06e+003	678.	7.36e+003	1.00	6.50e+004
	2019	2.22e+003	355.	5.75e+003	1.00	4.19e+004
FREV	2021	28.7	13.5	32.7	0.000	100.
	2019	31.4	16.3	33.9	0.000	100.
BTM	2021	-26.1	1.59	422.	-6.70e+003	300.
	2019	1.82	1.42	30.9	-288.	310.
RECeur	2021	1.01e+008	7.43e+006	4.31e+008	0.000	5.55e+009
	2019	5.20e+007	3.83e+006	2.10e+008	0.000	2.56e+009
INVeur	2021	6.48e+007	5.16e+006	2.73e+008	0.000	4.03e+009
	2019	4.51e+007	3.27e+006	1.87e+008	0.000	2.93e+009
RISK	2021	0.587	1.00	0.493	0.000	1.00
	2019	0.521	1.00	0.472	0.000	1.00
CURR	2021	8.62	1.55	78.5	0.000	1.31e+003
	2019	6.69	1.39	86.4	0.000700	1.82e+003
DEBTeur	2021	1.18e+007	2.96e+006	8.94e+008	-7.48e+009	4.44e+009
	2019	8.70e+007	2.74e+006	6.41e+008	-4.74e+009	6.35e+009
PRO	2021	0.967	1.00	0.180	0.000	1.00
	2019	0.944	1.00	0.231	0.000	1.00
ROA	2021	2.71	3.20	136.	-2.52e+003	159.
	2019	8.68	2.76	185.	-3.82e+003	243.
BIG4	2021	0.388	0.000	0.488	0.000	1.00
	2019	0.402	0.000	0.397	0.000	1.00

increased trading volumes, CEE companies became highly overvalued in 2021. Even though the current ratio of observed companies was good in 2019, uncertainty caused by COVID-19 encouraged companies to look at liquidity, and therefore it increased by almost 2 units, which may be due to decreased total debt. The average return on asset ratio in 2021was 2.71 with a more than 3 times decrease from 8.68 in 2019 demonstrating the impact of COVID-19 on this performance measure. Data analysis showed that in 2021 most CEE companies retained the same auditor as in 2019. If compared to previous research (Hribar et al., 2014; Rewczuk, Modzelewski, 2019; Groff et al., 2017), concentration of Big Four companies in our sample is only around 40%, while other studies report higher concentration of Big Four auditors in the market.

Audit fee determinants across CEE companies in 2021 (during COVID-19). Results of the regression analysis for 2021 are presented in Table 4. Adjusted R-squared for the year 2021 model is 58%, which is considered a pretty accurate model, yet the results need to be interpreted taking this into consideration. The other tests performed on this model indicated that during-COVID-19 model had no issues with heteroscedasticity, collinearity and was not mis-specified, meaning no significant variables were omitted. However, the issue with normality of residuals was observed, thus the model might be not stable. The test for normality of residual indicates that the error is normally distributed (Chi-square = 149.539 with p-value = 3.37306e-33), heteroskedasticity not present (LM = 109.661 with p-value = P (Chi-square (94) > 109.661) = 0.12875). Ramsey's RESET test for the model fitness showed that the models had adequate specifications (F (2, 187) = 0.471024, p-value = P (F (2, 187) > 0.471024) = 0.625101), identifying that no significant variables were omitted and therefore the model is complete, and its results can be trusted.

Using data from the year 2021, a period considered as being affected by COVID-19, four variables were found significant on different significance levels. The most significant variables determining audit fee are total assets of auditee (l_SIZE, $\beta = 0.561886$) and the ratio of foreign revenue (FREV, $\beta = 0.00677$). Both variables are significant when the confidence interval is 99%. The coefficients of variables translate to the idea that if auditees size in terms of total assets grows by 1%, audit fee will increase by 0,56% and increasing the rate of foreign revenue by 1%, audit fee will increase by 0.68%. These variables were positively correlated with audit fees and were the most significant determinants. Moreover, auditor size (BIG4, $\beta = 0.35398$) was also identified as statistically significant determinant, but only when confidence interval is decreased to 95%. Calculated coefficient indicates that on average, Big Four companies charge 35% higher audit fees, however it is worth to mention that in this model only around 40% of auditors are associated with Big Four. Another variable that was found to be significant in the confidence interval of 90% was a number of employees (EMP, $\beta = -1.96957e\text{-}05$). This variable, representing yet another measure of auditee's size, has a significant positive influence on the audit fee, meaning the more

Table 4. **Results of during COVID-19 OLS regression model for audit fee determinants in 2021**

	Coefficient	Std. Error	t-ratio	p-value
const	0.296618	1.13063	0.2623	0.7933
l_SIZEeur	0.561886	0.0533840	10.53	<0.0001***
EMP	−1.96957e-05	1.18452e-05	−1.663	0.0980*
FREV	0.00677356	0.00216489	3.129	0.0020***
BTM	0.0134107	0.0118493	1.132	0.2592
RECeur	3.15590e-010	5.93684e-010	0.5316	0.5956
INVeur	−1.30140e-010	3.87397e-010	−0.3359	0.7373
RISK	0.122736	0.155419	0.7897	0.4307
CURR	−0.000710334	0.00180900	−0.3927	0.6950
DEBTeur	3.76702e-010	2.31649e-010	1.626	0.1056
PRO	−0.273548	0.528418	−0.5177	0.6053
ROA	−0.00735678	0.00497715	−1.478	0.1410
BIG4	0.353984	0.169503	2.088	0.0381**

Mean dependent var	10.79439	S.D. dependent var	1.539627
Sum squared resid	186.7312	S.E. of regression	0.993980
R-squared	0.610027	Adjusted R-squared	0.583204
F (13, 189)	22.74224	P-value(F)	4.73e-32
Log-likelihood	−279.5657	Akaike criterion	587.1313
Schwarz criterion	633.5162	Hannan-Quinn	605.8968

employees an audited company had, the higher audit fee it paid. The remaining independent variables included in our 2021 model were not significant when determining COVID-19 affected audit fees.

Audit fee determinants across CEE companies in 2019 (before COVID-19). COVID-19 adjusted R-squared for the year 2019, i.e. the model that used the pre-COVID-19 data, is 56%. The model explains more than a half of the population and shall be taken into consideration when interpreting the results. Other tests run on this OLS regression model indicate that there are issues with normality of residuals (Chi-square = 11.6112 with p-value = 0.00301069), however no signs of heteroskedasticity (LM = 7.71986, with p-value = P (Chi-square (22) > 7.71986) = 0.997828) and the model is adequately specified. Another measure of fitness – Ramsey's RESET test shows that the models has specifications that are adequate ($F(2, 85) = 0.382376$, p-value = $P(F(2, 85) > 0.382376) = 0.683406$), meaning that no variables were omitted, therefore it can be concluded that the model is complete, and its results can be trusted.

The pre-COVID-19 model resulted in partially different determinants of audit fees (see Table 5). As in the COVID-19 model (year 2021), the pre-COVID-19 model identified the total assets variable (l_SIZE, $\beta = 0.489139$) as a significant

Table 5. **Results of pre-COVID-19 OLS regression model for audit fee determinants in 2021**

	Coefficient	Std. Error	t-ratio	p-value
const	2.38254	1.85809	1.282	0.2032
l_SIZEeur	0.489139	0.0900171	5.434	<0.0001***
EMP	−1.71534e-05	2.20109e-05	−0.7793	0.4379
FREV	0.00485724	0.00312918	1.552	0.1242
BTM	0.00697881	0.0121587	0.5740	0.5675
RECeur	−4.25840e-011	8.30163e-010	−0.05130	0.9592
INVeur	3.23735e-010	5.45150e-010	0.5938	0.5542
RISK	−0.249626	0.210144	−1.188	0.2381
CURR	−0.129361	0.0675956	−1.914	0.0589*
DEBTeur	2.53500e-010	2.94716e-010	0.8601	0.3921
PRO	−0.329536	0.490311	−0.6721	0.5033
ROA	−0.000667074	0.00832734	−0.08011	0.9363
BIG4	0.371059	0.205370	1.807	0.0743*

Mean dependent var	10.87224	S.D. dependent var	1.320428
Sum squared resid	67.11885	S.E. of regression	0.878340
R-squared	0.615041	Adjusted R-squared	0.557518
F (13, 87)	10.69215	P-value(F)	3.65e-13
Log-likelihood	−122.6757	Akaike criterion	273.3514
Schwarz criterion	309.9631	Hannan-Quinn	288.1728

and positive determinant at the 99% confidence interval. Moreover, two other variables, current ratio (CURR, $\beta = -0.129361$) and auditor's size (BIG4, $\beta = 0.371059$) were also identified as significant determinants of audit fee in confidence interval of 90%. The current ratio (CURR) was found to be negatively correlated with audit fee and indicated that an increase in current ratio by 1 unit would decrease audit fee by 12%. The pre-COVID-19 model also showed that belonging to Big Four audit companies had a positive effect on the audit fee size. More specifically, in 2019, the Big Four audit companies charged on average almost 34% higher fees than other audit companies. Other not mentioned variables are insignificant and do not explain audit fees in this model, including rate of foreign revenue (FREV) and number of employees (EMP) variables, which proved to be the significant audit fee determinants in 2021.

Discussion

This paper investigated the determinants of audit fees across CEE companies taking into consideration COVID-19 effect. Due to the data limitations, two OLS models were employed – one before and another one during COVID-19 with audit fee as dependent variable and ten auditee and one auditees' industry and one audit

company specific independent variables. The pre-COVID-19 model used annual company level data for 2019 and during-COVID-19 model explored company data for the year 2021. Descriptive statistics indicated that in 2021, if compared to 2019, the average audit fee increased from 170,520 euro to 211,750 euro, which could reflect both – growth of the auditees size as well as the costs of additional audit procedures and perceived as a COVID-19 risk premium paid by the auditees. Changes of audit fees during the times of COVID-19 was also documented in previous research. M. A. Harjoto and I. Laksmana (2022) found that COVID-19 and subsequent lockdown has increased audit fees across international company sample, while R. H. Alkebsee et al. (2023) concluded on the opposite effect. Their study reported a negative relationship between the COVID-19 pandemic and audit fees across the sample of international companies.

Table 6 summarizes statistically significant audit fee determinants in the periods before and during COVID-19. Results of our study should be viewed as exploratory, as both pre-COVID-19 and during-COVID-19 models yielded in 56–58% accuracy. Both models also had some issues with normality of residuals, a model with pre-COVID-19 data is significantly more stable than with data affected by COVID-19.

Regression analysis for both periods indicated that size of auditees total assets was the most significant and positive determinant of audit fees paid by these companies; however, in the models the coefficient of this variable was higher in 2021, reflecting on the COVID-19 related risk premium charged by the audit companies. Another variable that was found to be significant and positive in both models was the auditor's size, more specifically, whether an audit was conducted by Big Four audit company. Similarly, to auditee's size (measured by the total assets) the coefficient next to auditor size variable was higher in 2021, meaning that not only Big Four audit companies charged premium if compared to the other audit companies, but also this premium increased over the research period. Interestingly, that during the COVID-19 period the ratio of auditee's foreign revenue was identified as a significant positive determinant of audit free, which again could be related to the higher auditee risk in the time of market disturbances and additional audit procedures needed to be performed by the audit company. Our model also identified two significant audit fee determinants with a negative impact of audit fees. In

Table 6. **Determinants of audit fees paid by CEE companies in the periods before and during COVID-19**

Pre-COVID-19 (2019) determinants	During-COVID-19 (2021) determinants
Size of auditor (+)	Size of auditor (+)
Total assets of auditee (+)	Total assets of auditee (+)
Current ratio of auditee (-)	Ratio of auditee's foreign revenue (+)
	Auditee's number of employees (-)

the pre-COVID-19 model (for the year 2019) it was the auditee's current ratio, while in the during-COVID-19 model (for the year 2021) this was the auditee's number of employees.

The results of models run on pre- and during-COVID-19 data are in line with previous research. Both, the size of auditee in terms of its total assets and the size of auditor in terms of belonging to Big Four companies were identified as key variables determining audit fee in previous studies. Both our, pre-COVID-19 and during-COVID-19, models demonstrated that the size of auditee is a significant determinant of audit fee. Comparable results were documented by P. Hribar et al. (2014), R. Kanakriyah (2020), M. Z. Groff et al. (2017) and S. Mat Roni et al. (2022) in relation to COVID-19, as well as by K. Rewczuk and P. Modzelewski (2019) in CEE countries context. Previous research has also proved that audit fee is positively related to the size of auditee and is higher when the company conducting audit belongs to Big-N (Big Four recently). Such results were confirmed both in COVID-19 conditions (Al-Qadasi et al., 2022; Mat Roni et al., 2022; Hategan et al., 2022) and periods before the pandemic (Rewczuk, Modzelewski, 2019; Kanakriyah, 2020; Groff et al., 2017; Hribar et al., 2013; Simunic, 1980). Our study also concluded that ratio of auditee's foreign revenue, representing auditee's complexity, has an increasing effect on audit fees during the COVID-19 pandemic. A systematic literature review of M. Widmann et al. (2020) listed auditee's complexity among the most common audit fee determinants with a positive effect on audit fees during the times of normal and disturbing market conditions. The influence of other two statistically significant determinants in our study, current ration during pre-COVID-19 period and number of auditee's employees during COVID-19, is had been among the significant determinants in other studies (Hribar et al., 2014), however, as discussed by M. Widmann et al. (2021), findings on their influence are situation specific and inconclusive. Current findings should be interpreted with caution and further analysis in this respect is needed.

The current study brings interesting and relevant findings on the audit fees and their determinants across Central and Eastern European companies, as this topic was neither widely explored in this geographical setting nor in the context of the recent COVID-19 pandemic. While the models demonstrated 56–58% accuracy and faced normality of residuals challenges, the pre-COVID-19 model proved more stable. The study contributes interesting insights into audit fees and their determinants in CEE companies amid the COVID-19 pandemic, yet, like other research this study has its data and methodological limitations, and its results should be regarded as exploratory. Future research could delve deeper into the nuances of specific determinants, addressing the limitations of the current study. The results of this study could also be used by legislators, supervisors, and the auditing industry to better understand the dynamic of audit fees in Central and Eastern Europe and their determinants.

Conclusions

This study delves into the role and determinants of audit fees, serving both as compensation for external audit firms' opinion on company's financial statements reliability and as a reflection of the accounting quality and overall standing of the auditee in the financial market. The research specifically explores the determinants of audit fees for Central and Eastern European companies, encompassing both periods before and during the COVID-19 pandemic. Literature review revealed a substantial body of research on audit fees in international context, with an evident research gap in the context of Central and Eastern Europe. The few existing studies in CEE underscored the influence of factors such as auditee size, profitability, and complexity, along with auditor size, on audit fees. Moreover, recent investigations exploring the impact of the COVID-19 pandemic on audit fees yielded mixed findings, with some studies suggesting an increase while others reported a decrease, highlighting the need for further research in the CEE region to better understand these dynamics.

The sample of this study included data from companies traded on CEE stock exchanges, with the analysis based on information from 2019 (pre-COVID) and 2021 (during COVID). The econometric research utilized Ordinary Least Squares (OLS) regression to investigate the ten most frequently used auditee-specific factors and one audit company-specific factor influencing audit fees. Two models were employed for the periods before and during COVID-19 to identify the determinants of audit fees. While the models exhibit an accuracy of 56–58%, with challenges related to the normality of residuals, the pre-COVID-19 model is deemed more stable.

The results reveal changes in audit fees between 2019 and 2021, with an increase in average audit fees during the COVID-19 period. The regression analysis identifies significant determinants of audit fees for both periods. In 2021, total assets, foreign revenue ratio and number of employees of the audited entity as well as auditor size (Big Four) are identified as significant determinants of audit fees. In 2019, total assets, current ratio and auditor size (Big Four) are identified as significant determinants of audit fees. The findings of our study align with previous research, emphasizing the significance of auditee size and auditor size (Big Four firms) as key determinants of audit fees. The results of this study contribute relevant insights into the dynamics of audit fees across CEE companies, offering considerations for legislators, supervisors, and the auditing industry. However, faced with the issue of data availability the study acknowledges its exploratory nature and suggests that further research could delve deeper into specific determinants, addressing the limitations of the current analysis.

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The paper submitted: October 10, 2023
Prepared for publication: December 20, 2023

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VIDURIO IR RYTŲ EUROPOS ĮMONIŲ AUDITO MOKESTĮ NULEMIANTYS VEIKSNIAI IKI COVID-19 PANDEMIJOS IR JOS LAIKOTARPIU

Santrauka

Finansų rinkose audito mokestis parodo ne tik atlygį auditoriams už nuomonę apie įmonės finansinių ataskaitų patikimumą, bet ir atlieka kitą svarbų vaidmenį – atspindi audituojamos įmonės apskaitos kokybę ir jos poziciją rinkoje. Šiame tyrime analizuojami Vidurio ir Rytų Europos (VRE) įmonių audito mokesčiai bei juos nulemiantys veiksniai, apimant tiek laikotarpius prieš COVID-19 pandemiją, tiek jos metu. Literatūros apžvalga atskleidė platų tyrimų audito mokesčių tematika lauką ir juose nagrinėjamų veiksnių spektrą, tačiau buvo nustatytas akivaizdus tyrimų šia tematika Vidurio ir Rytų Europos kontekste trūkumas. Keliuose tyrimuose, kurie buvo atlikti minėtame regione, buvo nustatyta tokių veiksnių kaip audituojamo subjekto dydis, pelningumas ir sudėtingumas bei auditoriaus dydis įtaka šio regiono įmonių mokamiems audito mokesčiams. Be to, naujausiuose tyrimuose, sutelktuose į COVID-19 pandemijos poveikį audito mokesčiams, prieita prie prieštaringų išvadų: kai kuriuose tarptautinėje aplinkoje atliktuose tyrimuose buvo nustatytas audito mokesčių padidėjimas, o kituose – sumažėjimas. Tyrimų apie COVID-19 pandemijos poveikį audito mokesčiams Vidurio ir Rytų Europos įmonėms taip pat nepavyko rasti, ir tai parodo šio tyrimo Vidurio ir Rytų Europos regione aktualumą siekiant geriau suprasti tiek audito rinkos, tiek visos rinkos dinamiką.

Į šio tyrimo imtį buvo įtraukti VRE vertybinių popierių biržose prekiaujamų įmonių duomenys, o analizė yra paremta 2019 m. (iki COVID-19 pandemijos) ir 2021 m. (COVID-19 pandemijos metu) informacija. Ekonometriniame tyrime buvo naudojama įprastų mažiausių kvadratų (OLS) regresija. Tyrime naudoti dešimt ankstesniuose tyrimuose dažniausiai kaip reikšmingų nustatytų audituojamą įmonę atspindinčių veiksnių (audituojamos įmonės dydis, matuojamas jos turto dydžiu, darbuotojų skaičius, užsienio pajamų santykis, apskaitinės ir rinkos vertės santykis, gautinių sumų dydis, atsargų dydis, veiklos sektoriaus rizika, bendrasis likvidumo koeficientas, grynasis pelningumas, turto grąža) ir vienas audito įmonei būdingas veiksnys (audito įmonės dydis, matuojamas kaip (ne)priklausymas Didžiojo ketverto audito įmonėms). Atsižvelgiant į tyrimo duomenų ribotumus, audito mokesčius nulemiantiems veiksniams nustatyti pasirinkta sudaryti du modelius: vieną laikotarpiui prieš COVID-19 pandemiją (naudojant 2019 m. duomenis) ir kitą COVID-19 pandemijos laikotarpiui (naudojant 2020 m. duomenis). Modelių patikimumo analizė parodė, kad jų tikslumas yra 56–58 %, o normalumo analizė parodė, kad modelis iki COVID-19 pandemijos laikomas stabilesniu.

Tyrimo rezultatai atskleidė vidutinio audito mokesčio dydžio pokyčius Vidurio ir Rytų Europos įmonių imtyje, indikuojant, kad audito mokesčiai COVID-19 pandemijos laikotarpiu didėjo. Atlikta regresinė analizė parodė, kad 2021 metais, kurie tyrime identifikuojami kaip COVID-19 pandemijos laikotarpis, reikšmingi audito mokesčio didinimo poveikį turintys veiksniai buvo audituojamos įmonės turtas ir pajamos iš užsienio bei auditorių dydis (priklausymas Didžiajam ketvertui), o audituojamos įmonės darbuotojų skaičiaus poveikis buvo reikšmingas, bet neigiamas. Palyginkime: 2019 m. audituojamos įmonės turtas bei auditorių dydis (priklausymas Didžiajam ketvertui) taip pat buvo nustatyti kaip reikšmingi audito mokestį didinantys veiksniai, o bendrasis likvidumo koeficientas – kaip šį mokestį mažinantis veiksnys. Mūsų tyrimo išvados sutampa su išvadomis ankstesnių tyrimų, kuriuose audituojamos įmonės dydis ir auditoriaus priklausymas Didžiojo ketverto audito įmonėms buvo nustatyti kaip du dažniausiai nustatomi audito mokesčius nulemiantys veiksniai tiek įprastinėmis veiklos sąlygomis, tiek COVID-19 pandemijos laikotarpiu. Šio tyrimo rezultatai suteikia įžvalgų apie audito mokesčių dinamiką Vidurio ir Rytų Europos įmonėse, kurios galėtų būti naudingos įstatymų leidėjams, rinkos priežiūros institucijoms ir audito rinkai priimant įvairius politikos formavimo, rinkos priežiūros ir audito kainodaros sprendimus. Visgi, atsižvelgiant į duomenų prieinamumo problematiką ir metodologinius apribojimus, dabartinį tyrimą reikėtų traktuoti kaip žvalgybinio pobūdžio. Ateityje, išsprendus dabartinės analizės apribojimus ir praplėtus tyrimo laikotarpį taip, kad jis apimtų visą COVID-19 pandemijos trukmę, būtų tikslinga plėtoti tyrimus, kuriuose būtų nagrinėjami Vidurio ir Rytų Europos įmonių audito mokesčio dydis, veiksniai ir poveikis finansų rinkoms bei jų dalyvių sprendimams.