

# Audit Quality in the Context of Audit Reform Across the European Union: The Case of Croatia

*Toni Šušak*

*Faculty of Forensic Sciences, Split, Croatia*

## Abstract

This research analyzes if the audit reform in the Republic of Croatia, which was a part of the legislative audit reform across the European Union, contributed to audit quality measured with one of its most objective proxies – audit adjustments. Croatian unique financial statement report disclosure environment enables the utilisation of this measure. The research sample included the financial data that companies listed on the Zagreb Stock Exchange have publicly disclosed during the financial years from 2016 to 2019. Panel regression was used to formulate the research model. The results have confirmed that the earnings audit adjustments were higher on average after the implementation of the new Audit Act in the Republic of Croatia. Unlike the claims in most of the existing studies, these results indicate the overall effectiveness of the multidimensional audit reform in terms of auditors' efforts to increase the reliability of financial statements. These results provide valuable insights for legislators and professional organisations in the context of future audit regulation reforms.

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## Introduction

The central purpose of the European audit reform was to reinforce market stability by fostering confidence in the external audit (Ratzinger-Sakel & Schönberger, 2015). To address the trust issues in the work of auditors and increased public expectations that have appeared during the financial crisis which commenced in 2007 and the increased concentration of the audit market, the European Parliament and the Council have adopted on 16<sup>th</sup> April 2014 the Directive 2014/56/EU amending Directive 2006/43/EC on statutory audits of annual accounts and consolidated accounts, as well as the Regulation (EU) No 537/2014 of the on specific requirements regarding statutory audit of public-interest entities and repealing Commission Decision 2005/909/EC (Jurić, 2018; European Parliament and Council, 2014a; European Parliament and Council, 2014b).

These regulative acts have entered into force since 17<sup>th</sup> June 2016, and they could be considered as “the most important reform of audit regulation in the (...) history” of the European Union (Castillo-Merino et al., 2024, p. 89) which introduced “new provisions, such as the mandatory rotation of the audit firm and the extended auditor’s report”, while reinforcing ones previously implemented, including “the prohibition of joint provision of audit services and most nonaudit services (...) by the statutory auditor” (European Parliament and Council, 2014a, 2014b, in Castillo-Merino et al., 2024, p. 89).

The primary focuses of these regulative efforts were to increase the quality of audit engagements through elevated transparency of audits, enhanced independence of external auditors and a more competitive market of audit services (European Parliament and Council, 2014a, 2014b, in (Castillo-Merino et al., 2024). These legal acts on the level of the European Union were transposed in the Croatian legal system through the Audit Act (Official Gazette, 2017), which was enacted on the 8<sup>th</sup> December 2017 and entered into force on 1<sup>st</sup> January 2018. Despite the premise that reforms should bring benefits to the professional areas they are intended to, previous research mostly does not corroborate that notion (Ratzinger-Sakel & Schönberger, 2015; Castillo-Merino et al., 2024; Graschitz & Steller, 2025).

Thus, the main objective of this research was to determine if there is a statistically significant relationship between the audit reform implemented through the Croatian Audit Act, which has transposed the EU audit regulation into the national legal framework, and the magnitude of audit adjustments recorded by external auditors in the Croatian business environment. The Croatian audit environment has certain specificities in comparison to the audit environments in developed countries across the European Union due to less complex audits, lower market competition, especially in the context of larger listed companies, and a less effective legal system. Previous archival research has used other proxies of audit quality (e.g. discretionary accruals), but the audit adjustments used in this research provide a more objective and precise approximation of audit quality. This constitutes the scientific contribution of this research.

The research is organised in six sections. The first section starts with the introductory remarks on the topic, the second section refers to the literature review of previous

research on the audit reform in the European Union, the third section contains the details on how the research sample was formed, the research model used for hypothesis testing, as well as the statistical methodology utilised to produce the results of the research. The fourth section includes the results of descriptive statistics, correlation analysis and regression analysis, the fifth section discusses the important matters of the research, and the sixth section provides concluding remarks of the paper.

## Literature review

Ratzinger-Sakel and Schönberger (2015, p. 61) analysed the measures implemented as a part of European audit reform “in light of both current national restrictions of non-audit services and auditor fee disclosure requirements in France, Germany and the United Kingdom” and “potential impact of the cap on the volume of non-audit services by providing descriptive evidence on current fee levels”. They have also critically assessed “the impact of the audit reform regarding non-audit services in light of audit research by analysing the state-of-the-art” (p. 61). In this context, they are sceptical of European reform efficiency and its capacity to foster trust in financial reports verified by an external auditor.

Garcia-Blandon et al. (2017) have examined the relationship between audit quality and two dimensions of external auditors’ engagement - audit firm tenure and non-audit services in the context of audit reform in the European Union. They did not find a significant relationship between longer audit tenures and non-audit services with decreased audit quality, but they highlighted that the results of their research “are conditional on the validity of using abnormal accruals to measure audit quality” (p. 251).

Castillo-Merino et al. (2024) conducted interviews with audit partners and concluded that the benefits of the European Union regulatory audit reform are not sufficient to overbalance its costs. They found that the mentioned regulatory reform has increased auditor’s job complexity and rigour through mandatory rotation of an audit firm, extended reporting on completed audit work, reduced possibilities regarding non-audit services that an audit firm can provide to its clients, and more rigorous quality controls. They stated that these changes had repercussions on the audit market, calling into question the efficiency of the audit reform regarding the increase in audit quality.

Graschitz and Steller (2025) examined the impact of audit reform in the European Union on the sample of Austrian companies. The reform slightly reduced audit market concentration. They used high competition as an explanation for the reduction of audit fees after the audit reform, as well as restatements and discretionary accruals as proxies for audit quality and acknowledged the inconclusive effect of the reform on audit quality. They highlighted “the unique characteristics of the Austrian audit market” and stated that “the aims of the EU Audit Reform were partially met in Austria” (p. 295).

Mnif and Bouassida (2026) had questioned the European regulators’ effectiveness in the context of audit quality and, using the research sample of European companies

listed on a stock exchange, found the negative relationship between the introduction of the new EU audit regulation in 2014 and earnings management proxied by the discretionary accruals. They highlight the audit tenure, non-audit services cap and audit committee expertise as deterrents of earnings management after the introduction of the new EU regulation. Conversely, prohibiting non-audit services has produced a contrasting effect on the audit quality proxy. They stress their research as “first to empirically assess the impact of the EU audit reform on audit quality immediately after the regulatory change, compared to the preregulation period” (p. 191).

Given the inconclusive results of previous research on audit reform across the European Union and scepticism expressed over its efficiency, the non-directional hypothesis was established as follows:

*H1: There is a statistically significant relationship between the audit reform implemented through the Croatian Audit Act and the magnitude of audit adjustments.*

## Sample, Research Model, and Methodology

The research sample included 59 non-financial companies listed on the Zagreb Stock Exchange. Given that the panel regression analysis was employed as a method of statistical analysis, the data were gathered for the period from 2016 to 2019. Since these pervasive global events could distort the results of statistical analysis, the financial years before the timeframe considered for the research were excluded because of the severe global financial crisis, which started in 2008, and whose repercussions were present several years after. Similarly, the financial years after 2019 were also excluded because of the devastating effects of the COVID-19 financial crisis caused by the outbreak of the coronavirus.

The following model was established to test the research hypothesis:

$$EAA_{it} = \beta_0 + \beta_1 * NREG_{it} + \beta_2 * BIG4_{it} + \beta_3 * LEV_{it} + \beta_4 * SIZE_{it} + \beta_5 * ROA_{it} + e_i \quad (1)$$

The magnitude of earnings audit adjustments was used as a dependent variable, a dichotomous variable indicating the implementation of new audit regulation as a test variable, and several independent variables frequently utilised in the existing research were included as the control variables, namely the affiliation of an audit firm to the Big Four, leverage ratio, company size, and return on assets. All research variables are elaborated in Table 1.

R Language and Environment for Statistical Computing (R Core Team, 2024) was used for the panel statistical analysis, while PAST: Paleontological Statistics Software Package for Education and Data Analysis was used for calculating the descriptive statistics and the correlation analysis (Hammer et al., 2001). In order to decide between fixed effects and the random effects panel estimator, the Hausman test was applied (Hausman, 1978). R packages `lm` test (Zeileis & Hothorn, 2002), `plm` (Croissant & Millo, 2008;

Croissant & Millo, 2018), car (Fox & Weisberg, 2019), and stargazer (Hlavac, 2022) were also used as part of the R Language and Environment.

Table 1

Explanation of the variables included in the research

<b>Dependent Variables:</b>			
<b>Abbreviation</b>	<b>Variable Name</b>	<b>Calculation</b>	<b>Source</b>
EAA	The Magnitude of Earnings Audit Adjustments	The absolute value of the difference between the audited and unaudited value of net profit divided by the lagged value of total assets.	Tong et al. (2023)
<b>Independent Variables:</b>			
NREG	Implementation of New Audit Regulation	Binary variable differentiating between the years before (= 0) and after (= 1) the new Croatian Audit Act entered into force.	Graschitz and Steller (2025)
BIG4	The Affiliation of an Audit Firm with the Big Four	Binary variable denoting if a Big Four audit firm was appointed (= 1) or not (= 0).	Garcia-Blandon et al. (2017); Graschitz and Steller (2025)
LEV	Leverage Ratio	The sum of short-term and long-term liabilities divided by total assets.	Garcia-Blandon et al. (2017); Graschitz and Steller (2025); Mnif and Bouassida (2026)
SIZE	Company Size	The natural logarithm of the company's total assets.	Garcia-Blandon et al. (2017); Graschitz and Steller (2025); Mnif and Bouassida (2026)
ROA	Return on Assets	The profitability is calculated by dividing the net profit of a company by its total assets.	Graschitz and Steller (2025); Mnif and Bouassida (2026)

Source: Author's work.

## Results

Research results include descriptive statistics such as mean, standard deviation, and percentiles. A correlation matrix was calculated to analyse correlation coefficients between research variables and to eliminate, together with the variance inflation factor values, the possibility of multicollinearity in the results. Finally, a panel regression model was estimated and used to test the research hypothesis.

Table 2

Descriptive statistics of research variables

Measure / Variable	EAA	BIG4	LEV	SIZE	ROA
Minimum	0	0	0,001	17,8	-2,44
Maximum	1,63	1	2,73	23,8	0,22
Mean	0,09	0,63	0,46	20,5	-0,004
Standard error	0,01	0,03	0,02	0,09	0,01
Variance	0,04	0,23	0,08	1,7	0,03
Standard deviation	0,20	0,48	0,28	1,3	0,18
Median	0,03	1	0,44	20,5	0,02
25th percentile	0,00001	0	0,28	19,8	-0,01
75th percentile	0,08	1	0,59	21,1	0,05

Source: Author's calculation using the financial data publicly available at the Zagreb Stock Exchange official website and the Past software for statistical analysis (Hammer et al., 2001).

Descriptive statistics measures are presented in Table 2. For instance, audit adjustments between the value of audited and unaudited earnings accounts for 9 % of the total assets of a company. In addition, companies included in the research sample predominantly appointed audit firms affiliated with the Big Four, the leverage was 46 % of total assets on average, and the relative financial result expressed with return on assets was slightly negative.

Table 3

Correlation Matrix for Independent Research Variables

Variable	NREG	BIG4	LEV	SIZE	ROA
NREG	1				
BIG4	-0,04	1			
LEV	0,05	-0,03	1		
SIZE	-0,03	0,13*	-0,01	1	
ROA	-0,08	-0,01	-0,21***	0,12*	1

Source: Author's calculation using the financial data publicly available at the Zagreb Stock Exchange official website and the Past software for statistical analysis (Hammer et al., 2001).

The correlation matrix shows that affiliation of an audit firm to Big Four and profitability of a company had a weak positive correlation to the size of a company, while leverage had a weak negative correlation to the profitability of a company. All other correlation coefficients were not statistically significant. Considering these notions, there was no multicollinearity problem in the regression model because the value of 0,8 was used as a cutoff for the multicollinearity problem (Mason & Perreault Jr, 1991).

Table 4

Variance Inflation Factors for Independent Research Variables

Variable / Model	Model 1 and 2
<b>NREG</b>	1.006
<b>BIG4</b>	1.013
<b>LEV</b>	1.046
<b>SIZE</b>	1.024
<b>ROA</b>	1.061

Source: Author's calculation using the financial data publicly available at the Zagreb Stock Exchange official website and the R software for statistical analysis (R Core Team, 2024).

Starting from the conclusions regarding multicollinearity drawn from the correlation matrix, the variance inflation factors for the variables in Table 4 are lower than the value of 5 (Kyriazos & Poga, 2023), corroborating the notion of the absence of multicollinearity in the research model.

Table 5

Results of panel regression analysis

Independent variables:	Dependent variable:	
	EAA	
Model	(1)	(2)
NREG	0.046** (0.020)	0.045*** (0.016)
BIG4	0.004 (0.030)	-0.002 (0.025)
LEV	0.085* (0.049)	0.077 (0.061)
SIZE	-0.047*** (0.015)	-0.047*** (0.014)
ROA	-0.175*** (0.060)	-0.324** (0.147)
Constant	0.983*** (0.310)	0.998*** (0.288)

Source: Author's calculation using the financial data publicly available at the Zagreb Stock Exchange official website and the R software for statistical analysis (R Core Team, 2024).

The results in Table 5 imply a statistically significant positive relationship between the entering into force of the new Croatian Audit Act and the magnitude of earnings audit adjustments. Given that the minimal and maximal values of certain variables, as well as the standard deviations in Table 2, were rather distant from their average values, an additional statistical model (2) was estimated to eliminate the possibility that the results are influenced by the outliers. Thus, the winsorization process (Tukey, 1962) at 1 % of the highest and lowest values of continuous independent variables was conducted, and the conclusions drawn are identical to those made using the initial samples. Except for the variable denoting the Big Four affiliation, all other control variables were statistically significant at the significance level of 1 percent. Leverage

was positively associated with the magnitude of audit adjustments, while profitability and the size of a company were negatively associated with the dependent variable.

## Discussion

According to the influential research conducted by DeAngelo (1981), audit quality can be considered as a combination of (1) the auditor's competence and (2) the auditor's independence. If only one of these elements is not present, the quality of the audit comes into question. This theoretical framework proves to be relevant in contemporary audit practice, given that it can be analysed in the context of changes introduced in the auditing profession through the provisions of the Auditing Act (Official Gazette, 2017). The new Audit Act explicitly introduced the auditor's independence, which can be considered as a *conditio sine qua non* upon which the entire audit profession depends. Considering its potential for increasing the independence of the external auditor, a strengthened position of the audit committee as a corporate governance mechanism was also important in this context. Greater emphasis was also placed on the professional knowledge of external auditors, given that audit profession entry prerequisites were tightened, and the revocation of work permit introduced for external auditors who do not meet the stipulated extent of professional development. A stricter supervision of the external auditor's work was ensured through transferring audit oversight from the professional organisation, Chamber of Auditors, to the Ministry of Finance of the Republic of Croatia. The oversight by the government through legislation and sanctions is much more robust and can achieve established objectives more efficiently.

As Croatia is a member of the European Union, the results of this research are comparable to the other studies examining the EU audit reform. Archival research covering this topic in the context of audit quality is extremely scarce, and it comes down to studies conducted by Garcia-Blandon et al. (2017) and, recently, by Graschitz and Steller (2025) and Mnif and Bouassida (2026). The findings of this research are in line only with the research conducted by Mnif and Bouassida (2026), but this research considered the individual audit reform variables, such as non-audit services, auditor tenure, audit committee expertise, and independence. Similarly, Garcia-Blandon et al. (2017) analysed only non-audit services and auditor tenure. The comprehensive effect of audit reform was analysed only by Graschitz and Steller (2025), who did not find that the reform was significantly related to the audit quality. Given that the legal enforcement and audit quality differ among the members of the European Union, it is also possible that audit quality before the audit reform was, on average, higher in Austria than in Croatia, and thus, the potential for its improvement was limited.

This research utilised audit adjustments as a proxy of audit quality. To calculate this variable, which can be described as "the most direct evidence on whether auditing has value", the information in the audited financial statements had to be compared to the information from unaudited financial statements, which are seldom publicly available (DeFond and Zhang, 2014, p. 292, in Šušak and Stapić, 2025, p. 224). Given that Garcia-Blandon et al. (2017) question their insignificant research results because they used

discretionary accruals as a measure of audit quality, the proxy used in this research should be more reliable in estimating audit quality. In this context, the research conducted by Graszitz and Steller (2025), which was also based on discretionary accruals, generated inconclusive results.

## Conclusion

The nature of the external auditor's work is rather complex, given that they are constantly under pressure and in conflict of interest. Their independence was frequently questioned in different business environments, and they were often the central figures of high-profile accounting scandals. These events usually led to the decline of confidence in the auditing profession and spurred legislative actions to improve the existing audit regulation. The purpose of this research was to analyze if audit quality improves after an audit reform. The research results showed that the magnitude of earnings audit adjustments increased on average in the financial years after the new Croatian Audit Act entered into force. Given that the audit reform in the Republic of Croatia was multidimensional, it included the combined effects of an increase in auditor independence, strengthening the position of the audit committee, prioritisation of auditors' professional knowledge, and transferring oversight from the professional body to the government. The comparative advantage of this research to existing research on EU audit reform was the use of audited adjustments as a measure of audit quality.

Research limitations also have to be acknowledged. Despite the efforts to include factors that could interfere with the results of panel regression, it is plausible that the research suffers from omitted variable bias, i.e., that certain variables that are relevant for the estimation of the dependent variable were not included in the model. Other research proxies could be included to corroborate the results of the research, such as the proposed audit adjustments. Although major external effects, such as global financial crises, were considered and efforts to isolate them were taken in the research, there is a possibility that other external events that were not included in the model influenced the research results. Future research could analyse the impact of the audit reform in the other European Union members, which were not included in the existing research. Also, a cross-country research could be conducted. In this way, more country-specific regulations, as well as other differences, could be addressed to get a complete understanding of this important issue. Given that previous results were not conclusive, this research provides valuable insights for legislators and professional organizations in the context of stimulating future regulative reforms as a measure for improving the audit quality, which, consequently, results in improved financial reporting quality.

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## About the author

Doc. dr. sc. Toni Šušak, univ. mag. oec., univ. mag. iur. is employed at the Faculty of Forensic Sciences at the University of Split, where he is in charge of accounting and finance courses at the Department of Economic Sciences in Forensics and holds the position of vice-dean for students and student standards. He authored more than 40 scientific and professional papers and university textbooks, "Accounting for Banks", "Forensic Examination in Finance and Accounting" and "Accounting for Beginners", and he is a member of the editorial board of the international scientific journal "International Journal of Finance and Accounting Forensics" and actively participates in peer review for international scientific journals and conferences. The author can be contacted at: [toni.susak@forenzika.unist.hr](mailto:toni.susak@forenzika.unist.hr).