

THE THESIS OF THE PHD DISSERTATION

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HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

OPPORTUNITIES TO IMPROVE ACCOUNTING QUALITY THROUGH AUDIT REGULATION

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The PhD School

Name: Hungarian University of Agriculture and Life Sciences
Doctoral School of Economic and Regional Sciences

Discipline: Management and Business Administration

Head: **Prof. Dr. H.c. József Popp**

professor, correspondent member of the MTA
Hungarian University of Agriculture and Life Sciences
Institute of Economics

Supervisors: **Dr. Anita Tangl Vajna Istvánné**

associate professor, PhD
Hungarian University of Agriculture and Life Sciences
Institute for Business Regulation and Information
Management

Dr. habil. Zsuzsanna Széles

head of institute, associate professor, PhD
Budapest Metropolitan University
Institute of Economics

associate professor, PhD
University of Sopron,
Lámfalussy Sándor Faculty of Economics
Institute of Finance and Accounting

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Approval by the head of the school

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Approval by the supervisor

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Approval by the supervisor

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1. ANTECEDENTS AND OBJECTIVES OF THE WORK

1.1. Introduction, objectives

When choosing the topic of my dissertation, I was looking for a current problem, which, in addition to bringing novel scientific results, can help the economic development of Hungary.

This is how I found the international studies about accounting quality. In these research projects numerous interesting findings were made; several correlations were mapped. These explorations would not have been possible without conducting of these research projects. In several cases, they disprove the existence of relationships that previously were thought to be clear or obvious. In other cases, necessary conditions were revealed. This is exactly why I decided to research the influencing factors of accounting quality. Many times, we accept connections that seem to be clear and logical, but in reality, they do not exist. It is easy to admit that such erroneous preconceptions are likely to be detrimental, and in the accounting field, they can have consequences that not only generate huge social costs but can also negatively affect Hungary's competitiveness.

Considering the harmonization between the European and Hungarian accounting and audit regulations, moreover the range of data used in the above-mentioned research projects and the methodology used to support their conclusions, I strongly believe, similar research projects can be carried out in the Hungarian economic environment as well. With proper planning and data collection, useful results and real suggestions with meaningful conclusions can be made.

After choosing my research topic, I defined the problems and objectives that need to be examined. The first figure illustrates the way of making a suggestion and the system of relationships among the chapters of the dissertation.

At the beginning of the research, I formulated an axiom from which I developed the concept of the research.

A1: *Accounting quality can be improved by audit regulation.*

The above finding is not difficult to admit but identifying which areas of audit regulation requires attention and how to modify them to truly improve accounting quality is a much more complex task. To answer these questions, the following objectives have been set.

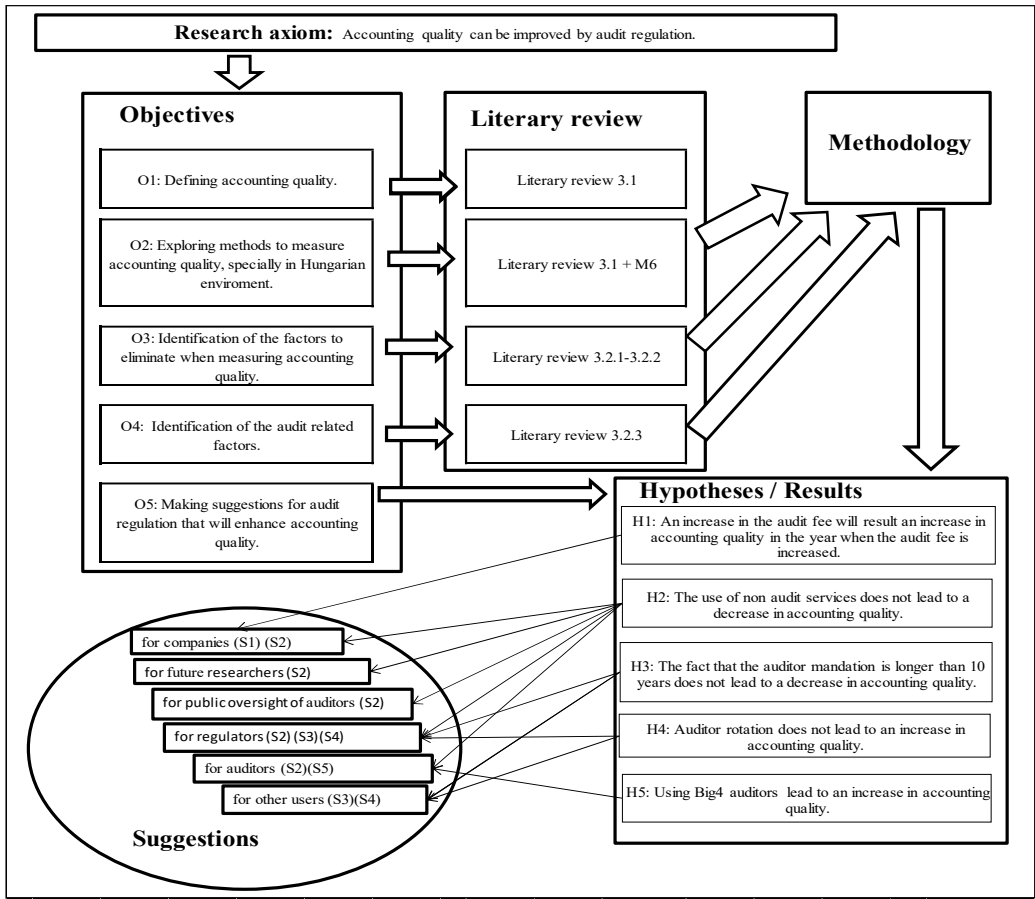
O1: *Defining accounting quality.*

My first objective is necessary to be achieved to examine the topic of accounting quality. I present what is accounting quality based on the international literature and how all this can be interpreted to the Hungarian environment. Achieving this

goal is possible within the framework of the literature review. The foundations of the dissertation could be laid by fulfilling this goal.

O2: *Exploring methods to measure accounting quality, especially in Hungarian environment.*

Measuring accounting quality is not uniform. There are a number of approaches and methodologies. The review of these was essential in order to build the right methodology. In fulfilling this objective, I gained a comprehensive knowledge of the methods used in previous research projects. I achieved this goal with the help of the literature review.



1. Figure: The fulfillment of objectives
Source: own edit

O3: *Identification of the factors to eliminate when measuring accounting quality.*

It is crucial to filter out irrelevant factors during the analysis. However, to do so, it was necessary to identify the factors that needed to be eliminated. The objective was achieved with the help of the literature review, by getting to know the control

variables used in the previous research projects, and then by presenting the situation of the relevant factors regarding Hungary.

O4: *Identification of the audit related factors.*

An important step is the selection of the factors related to auditing, which may result an increase in accounting quality. The hypotheses were formulated in connection with the factors identified during the achievement of the present objective.

C5: *Making suggestions that will enhance accounting quality.*

By fulfilling the fifth objective, I produced the main outcome of the research. By the end of the research, I have enhanced the literature with results that contain useful information for many stakeholders. The results can be useful for legislators and regulators. They may take into account previously undiscovered contexts when shaping the regulatory environment. They can avoid making costly changes to the law when benefits fall short of expectations. In addition, the results of the research may provide additional information to both external and internal users of financial reports. Risk analysts, investors, owners, and other stakeholders may be able to draw more informed conclusions if they better understand the relationship between audit regulation and the quality of financial reports. Last but not least, the results can be useful for researchers dealing with accounting quality. It can be the basis for future research, or it can help to interpret their existing results.

1.2. Hypotheses

The hypotheses of the research are as follows.

H1: *An increase in the audit fee will result an increase in accounting quality in the year when the audit fee is increased.*

An audit is a service provided for a company that publishes the financial statements. If the interests of the owners and / or the management is that the company's financial statements give a reliable and true picture about the company's property, financial and income situation, they are willing to pay more for the audit. I think, that it is really worth paying more for an audit, as increasing audit fees mean a higher quality audit service, which results in an increase in accounting quality.

H2: *The use of non-audit services does not lead to a decrease in accounting quality.*

With regard to other services provided in addition to audit services, I consider it worthwhile to examine whether or not it impairs accounting quality. The fact that this improves accounting quality is less relevant, given that I would like to make

a suggestion to the regulators, which means either banning / partially banning other services or allowing it. Prescribing other services is not an option. Other services provided by the auditor may in part reduce the effectiveness of the audit, as consideration for the services may compromise the auditor's independence. My hypothesis, however, is that at the same time, these services increase the efficiency of the audit, as the audit firm gets to know the company better during the provision of consulting services, and it is more likely to detect material misstatements. As a result of the combined effect of the two effects, the use of other services does not degrade accounting quality.

H3: *The fact that the auditor mandate is longer than 10 years does not lead to a decrease in accounting quality.*

I also approach the issue from a regulatory point of view during the third hypothesis. Public interest entities are required to perform a mandatory audit rotation every 10 years. My hypothesis is that this does not necessarily pay off, as as the length of the audit engagement increases, the auditor gets to know the company better, so the auditor is able to conduct a more effective audit.

H4: *Auditor rotation does not lead to an increase in accounting quality.*

My hypothesis is that, analogous to the third hypothesis, auditor rotation does not increase accounting quality either, as it interrupts the auditor's learning process, thereby reducing audit efficiency.

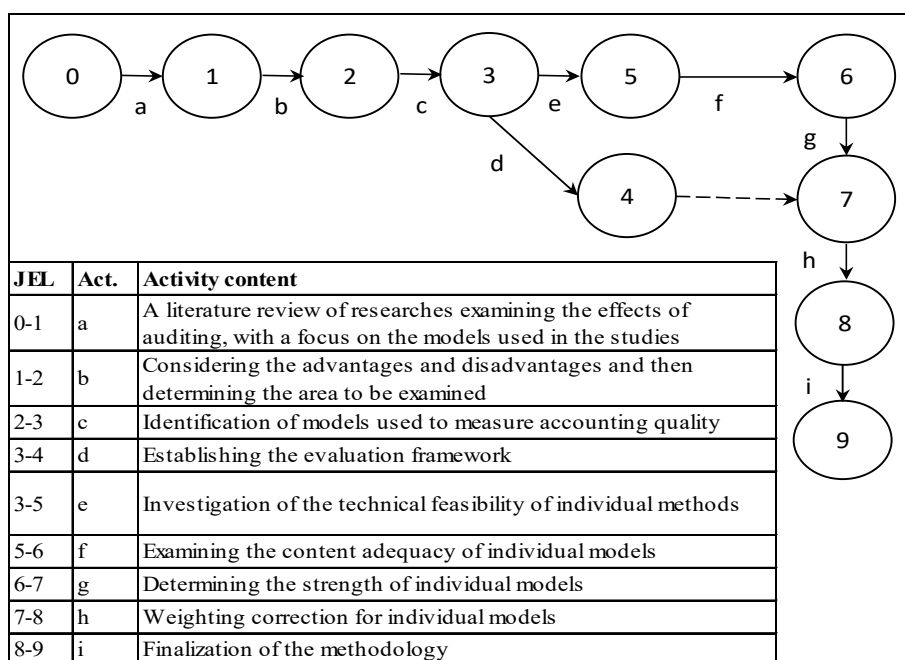
H5: *Using Big4 auditors lead to an increase in accounting quality.*

I hypothesize that Big4 audit firms provide a higher quality audit compared to other auditors, resulting in an increase in accounting quality.

2. MATERIAL AND METHOD

2.1. Development of Methodology

The influencing factors of accounting quality are a non-widespread research area in Hungary. So, I could not select a well-proven model that has been used many times. The available literature is mostly related to foreign environments, only a couple of research projects can be found in Hungary for example “*A Nemzetközi Pénzügyi Beszámolási Standardok alkalmazásának hatása a magyar tőzsdén jegyzett vállalatok számvitelének minőségére*” research project of BEDŐHÁZI (2009). As a result, I had to carry out a comprehensive literature research on the methodology of measuring accounting quality as well, in order to map out the possibilities. The network plan and the list of activities about the development of the methodology used in the research are in the second Figure.



2. Figure: The network plan and the list of activities about the development of the methodology used in the research

Source: own edit

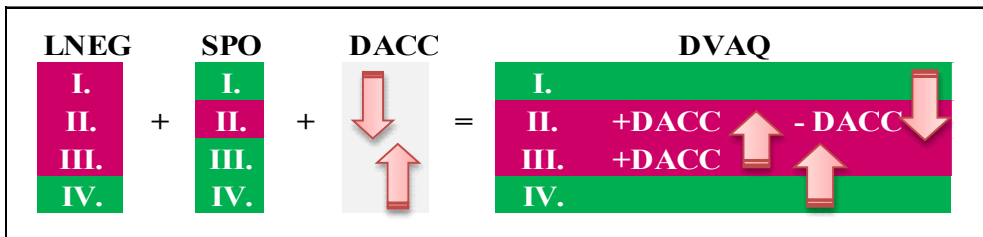
During the development of the methodology, I examined the methodology of each study processed during the literature review. If it was technically and substantively appropriate, I incorporated it into the methodology of the dissertation. The test data sheets of the built-in methods can be found in the 6th Annex of the dissertation.

During the analysis, I determined the measurement of accounting quality using the following methods:

- Discretionary accruals (M1)
- The volatility of earnings (M2)
- Timely loss recognition (M3)
- Earning managements towards small positive incomes (M4)
- Analysis of an own variable (M5)
- Benford law (M6)

Acceptance or rejection of hypotheses is based on a joint evaluation of the results of the individual methods.

Due to the length limit, I present one of the specific calculations of the above individual methods, my own developed custom variable (own variable).



3. Figure: The structure of the own variable (Dummy variable of accounting quality, DVAQ)

Source: own edit

The own variable was created by logically associating the variables of three popular models. The three variables are SPO (earnings management towards small positive incomes), LNEG (timely loss recognition) and | DACC | (discretionary accruals). Figure 3 shows the merging of the three methodologies and at the same time the merging of the profit after tax ranges.

The calculation of the variable can be written as follows:

$$DVAQ_{ti} = 1 \text{ if}$$

$$DACC_{ti} \neq 0 \quad \& \quad 0 < \frac{P/L_{it}^{after \text{ tax}}}{TA_{ti}} \leq 0,01 \quad (1)$$

$$DACC_{ti} > 0 \quad \& \quad -0,2 \leq \frac{P/L_{it}^{after \text{ tax}}}{TA_{ti}} \leq 0 \quad (2)$$

$DVAQ_{ti} = 0$ in all other cases.

Where, DACC: Discretionary Accruals, i for company, t for date; TA: Total assets, i for company, t for date; $P/L^{\text{after tax}}$: P/L after tax, i for company, t for date.

Accounting quality is higher in the group where it is less common for the DVAQ variable to take a value of 1.

2.2. Statistical methodology

Although I measured accounting quality using a total of six different methods, they can be statistically divided into two groups. To test for compliance with Benford's law I used the Chi-square test. To the other methods I used the methods shown in table 1, row 1-6.

1. table: Statistical methodology

nr.	Method	Content
1.	Descriptive statistics	Descriptive presentation.
2.	Kolmogorow-Smirnov test	Examination of normal distribution.
3.	Mann-Whitney-Wilcoxon trial	Comparison of groups.
4.	Binary logistic regression	Relation examination.
5.	Dubrin-Watson test	Autocorrelation
6.	VIF variable	Investigation of multicollinearity.
7.	Chi-square test	Fit test.

Source: own edit

2.3. Design of the sample

2.3.1. Data and variables required for the analysis

The data were obtained from several sources. I have previously examined which balance sheet and income statement data are required by the selected procedures and have marked only these on the data order form. Items other than balance sheets and income statements were also included in the research.

Two control variables were developed to measure the effects of taxation. The first indicates the effect of profit manipulation resulting from regulatory changes (TAX1), and the second indicates whether or not the company publishing the report can be considered to have an effective tax strategy. (TAX2). The control variables used in the analysis are shown in table 2.

The other group of variables are the variables with which I examined the main issues of the research. These are described in the third table. Most of the examined

factors have already been analyzed in previous studies on audit and accounting quality.

2. Table: Summary of the control variables used in the examination of the hypothesis

Variable	Source	Data source	Calculation
SIZE	CHENG & WARFIELD (2005)*	balance sheet	$\ln(\text{total assets})$
LEV	LANG et al. (2003)*	balance sheet	$\text{liabilities} / \text{equity}$
DISSUE	CHRISTENSEN et al.(2015)*	balance sheet	$\Delta \text{liabilities}$
GROWTH	AMES (2013)*	income statement	$\Delta \text{ sales revenue}$
TURN	PAGLIETTI (2010)*	balance sheet, income statement	$\text{sales revenue} / \text{total assets}$
OCF	LIU et al.(2011)*	balance sheet, income statement	$\text{Operative Cash flow} / \text{total assets}$
TAX1 TAX2	WATRIN et al. (2012)*	balance sheet, income statement	see text section
ROA	KOTHARI et al. (2005)**	balance sheet, income statement	$\text{profit after tax} / \text{total assets}$
STATE	CHAFEN & ZHIWEN (2008)**	company statement	1, in the case of majority state ownership, 0 in all other cases
PROF	LEBERT et.al (2019)*	income statement	1, if after-tax profit > 0, 0 in all other cases
* The source literature used a variable similar to the variable as a control variable or to form groups			
** Source literature refers to the theoretical basis of the variable			

Source: own edit

The variable AFEE is intended to measure the impact related to the audit fee, including whether it is too low or too high in relation to the expected audit fee, and shows what proportion of the auditor's total revenue, increased, or decreased. I measured the increase in the audit fee.

The NAS variable can be used to examine the impact of non-audit services provided by auditors.

The AFMA variable measures the effect of the length of the audit engagement. It is possible to examine current years, but the effect of the maximum values appearing in the related regulations can also be analyzed.

The AFR variable can be used to examine rotational situations. These include the arrival of the new audit firm or a new audit partner, the leaving of the audit firm or audit partner, and their joint interpretation.

3. table: A summary of the variables used to test the hypothesis

Hyp.	Variable	Used a variable related to a factor:	Data source
H ₁	AFEE (Audit fee)	MARTINEZ & MORAES (2017)	notes
H ₂	NAS (Non audit services)	CHOI et al. (2010b)	notes
H ₃	AFMA (Audit firm mandate)	JACKSON et al.(2008)	notes + company statement
H ₄	AFR (Audit firm rotation)	KRISHNAN (2003)	notes + company statement
H ₅	BIG4 (Big4 auditor)	BOUCHAREB et al. (2014)	notes

Source: own edit

The BIG4 variable indicates whether the audit firm performing the audit is a Big4 audit firm or not.

Obtaining the above mentioned information requires manual data processing, which is a bottleneck for the sample size. These difficulties also has a positive consequence from the point of view of researchers, namely that this is why it is not a densely researched field in Hungary, so it is possible to create new findings and suggestions.

2.3.2.Selections

Before compiling the sample, I had to determine the selection criteria. These criteria determined which financial reports were included in the sample. The chosen parameters were influenced by both the number and nature of the questions. In the course of my dissertation, not one, but five questions are examined, which would make it difficult to compile samples that are structured symmetrically along the examined problems. A further counterargument to the paired sample is the data required for a possible pairing have to be manually collected afterwards. So, it is not possible to take these values into account during sorting. The symmetric pattern was also opposed by the results of previous research projects e.g. MCNICHOLS & STUBBEN (2018) that found that the results of paired samples were more exposed to bias than random samples. Therefore, I rejected the compilation of symmetrically constructed samples along the examined questions. The examined issues, such as the rotation of auditors, show the actual situation in a given environment (sample).

My goal was to collect a large sample of 2,400 items.

The specific selection is as follows.

- 1) Registered in Hungary.
- 2) Operating in non-financial sector.
- 3) Only active enterprises with an active status that are not subject to any liquidation proceedings.
- 4) Disclosed their financial reports between 2013 and 2017.
- 5) Using the national accounting standards, not IFRS
- 6) The corporate form is Ltd. or Private Lc.
- 7) Employees over 50, in all 6 years.
- 8) The balance sheet total is greater than HUF 1.2 billion in all 6 years.
- 9) The annual net sales did not remain below HUF 300 million in any of the examined years.
- 10) Of the above, the 400 companies with the highest sales revenue are among the most recent (2017) reporting data available at the time of selection.

The first selection criteria serves the geographical delimitation of the research.

Companies in the financial sector were excluded due to their business and reporting specialties.

Companies with an inactive status and companies in liquidation proceedings are also excluded. This elimination was necessary to comply with the going concern principle.

Compliance with the disclosures for the period under review was necessary to maximize the sample size used for analysis.

For the sake of comparability, I definitely consider the analysis of reports compiled on the basis of the same reporting framework to be ideal. The chosen set of accounting rules is the national regulation, because it still dominates in Hungary.

In the selection process of the corporate forms, I considered two main aspects. The first is that enterprises operating in a given corporate form should include enterprises with significant economic performance. Secondly, the absence of publicly listed companies, as the accounting quality of publicly listed companies significantly exceeds the accounting quality of other companies, which would make it unnecessarily difficult to quantify the effects of the examined factors. Examining the companies present only on the BSE (Budapest Stock Exchange) would have led to low numbers of financial reports.

In determining the headcount and balance sheet total data, I took into account the limit values determined according to 9th paragraphs of the HLA. This was necessary, among other things, because the detailed disclosure of data related to auditors was prescribe by HLA (§ 88) to the supplementary notes for the annual report.

The value of sales revenue is according to HLA paragraphs 155. Together with the previous headcount data, the audit obligation of the selected reports is ensured.

The last, tenth selecting condition is to narrow the sample created after previous selections to the 400 companies with the highest sales revenue, all based on 2017 data. The key role of sales is not only methodologically but also professionally justified from an accounting point of view. The largest companies with the highest turnover were included in the study because, in general, in accordance with the audit regulations, the financial statements of large companies with higher sales are more important for stakeholders, these companies have a bigger impact on other participants in the economy.

It can be seen that after the above selections we get only 2000 financial reports. The database was supplemented later, when the 2018 data were also available, reaching the target number of 2400 items.

2.4. Software supporting of the dissertation

In accordance with the requirements of the 21st century, I actively relied on the support of IT software during the preparation of the dissertation.

I used Windows 10, Microsoft Word 2010 and Google Chrome.

In addition to library literature research, freely available (e.g., Google Scholar) and other scientific databases played a significant role in the literature review (e.g.: Scopus, EBSCO, Web of Science). I processed the literature using the open source reference management software, called Zotero.

For the analysis of the data I used SPSS statistical software package version 25 and Microsoft Excel 2010.

I used Microsoft PowerPoint 2010 to present my results.

3.RESULTS AND DISCUSSION

3.1. Impact of the increase in audit fees

The increase in audit fees was examined on the basis of the information disclosed in the supplementary notes. As the HLA does not require specific method in connection with the presentation of this information, it has been determined by the accounting policy and disclosure practices of the disclosing company. As a result, this data was provided in different places, ways and forms in the 2,400 supplementary notes.

A total of 332 reports do not include data about audit fees, which is 13.83% of the reports. The missing data are not evenly distributed between the years. In 2013, the number of the missing data is the highest, 72, which gradually decreases to 36 until 2017, and then rises to 54 in 2018.

Average audit fees show an increasing trend. While in 2013 an average of 10,346 THUF had to be paid for the audit, in 2018 this value was already 11,595 THUF. The growth will only break in 2016, when the 2015 average fall by 329 THUF. Growth have been seen again in 2017, but the level of 2015 only be crossed again in 2018. The average change in audit fees in each year exceeds the increase in both the consumer price index and the consumer price index for services. According to them, the average increase in audit fees was not just a nominal increase. The fees invoiced by Big4 audit firms are higher in each year compared to the averages of the entire sample. While the average of the total sample is 11,076 THUF, the sample filtered for Big4 audit firms is 12,859 THUF, more than 16% higher. The difference is not permanent. Fees invoiced by Big4 companies showed a decrease not only in 2016 but also in 2014 and 2017. The audit fees invoiced to state-owned companies remained well below the average of the entire sample in each year examined, with an average value of 8,688 THUF calculated for the entire sample. They showed a decrease in 2014, 2015, 2016 then a smaller increase in 2017 and a larger increase in 2018. Despite the growth of the last two years, they did not reach the average level of the whole sample for 2018.

The model shows negative relationship between the group of reports more affected by discretionary accruals and the increase in the audit fee for the current year. ($B = 0.094$) The direction of the relationship between the two variables meets my expectations. However, this relationship is not significant, given that the p-value for the variable is greater than 0.05. ($p = 0.388$) VIF values ranged from 1 to 2.2, so there is no problem of multicollinearity. The result of the Durbin-Watson test is 1,929, so the problem of autocorrelation does not skew the result.

The increase in the audit fee shows a positive relationship ($B = 0.22$) with the variable measuring the variability of earnings. This result means higher

accounting quality for the reports affected by increase in audit fees, which is in line with my expectations. The p value for the variable is 0.046, which remains below 0.05, so the relationship can be said to be significant. The values of VIF for each variable remain between 1 and 10 so the problem of multicollinearity does not cause the bias of the obtained results. The result of the Durbin Watson test is 1.863 which means a negligible effect of autocorrelation on the results.

Evaluation of the three binary variables (LNEG, SPO, DVAQ) using binary logistic regression is not possible because the classification accuracy of the models is too low for a value of 1. This problem arose in the examination of all five hypotheses. I will not repeat this fact again.

According to the results of the chi-square test, none of the groups followed the Benford distribution for total sales and total assets. Examining the profit after-tax, however, we can see that both groups follow Benford's distribution. The groups were further subdivided using two important factors, profitability (PROF = 1) and whether the report was audited by Big4 auditor (BIG4 = 1) or not (BIG4 = 0). We can see a discrepancy by examining the total value of the assets in case of BIG4=1&AFEE=0 vs, BIG4=1&AFEE=1. Data from the second group followed Benford's distribution. The following discrepancy is between the sales data. The data of loss-making companies followed Benford's distribution if they were affected by an increase in audit fees. In the absence of an increase in audit fees, the data did not follow Benford's distribution. It can be seen that in both cases, the subgroups followed Benford's distribution where an increase in audit fees was observed.

3.2. Impact of the other services provided by the auditor

In the analysis of the use of other services, the input data were derived from the supplementary notes, similarly to the audit fee. The lack of disclosure of data in this case was more difficult to establish than in the case of audit fees. The information I was looking for came in many forms, I came across both clear and less clear disclosing practices.

The number of companies that used other services ranged from 41 to 48. This value means values between 10.25% and 12%, which means a subsample of uniform, not very high, but already analyzable size. A total of 253 reports lacked disclosure on the use of other services, which accounted for 8 to 13% of the reports on an annual basis. The average disclosed fee was the highest in 2013, 6,686 THUF, then decreased in 2014 and 2015, increased slightly in 2016, then decreased further in 2017, increased minimally in 2018, practically stagnated. The observable declining trend will only be reversed in 2016, which is most likely due to the impact of the large-scale changes in accounting laws for 2017 and the convergence of IFRS.

The other services provided by the auditor shows a negative, non-significant relationship with the occurrence of discretionary accruals according to both the Mann-Whitney test and the binary logistic regression. ($p = 0.18$) The VIF variable ranged from 1.01 to 2.2 for all variables included in the study, so there is no problem of multicollinearity. Based on a Durbin-Watson test value of 1.95, the risk of autocorrelation cannot be determined either.

We can see a negative, insignificant relationship between the variability of earnings and the other services provided by the auditor. The problem of multicollinearity does not exist for the studied variables. The value of the Durbin Watson test is 1.896, which does not indicate autocorrelation.

Based on the results of the chi-square test, five of the six variables differ significantly, while one does not differ significantly from the Benford distribution. The Benford distribution was followed by the profit after-tax values of companies that did not use other services from the auditor ($NAS = 0$), so this group has a higher accounting quality when examined for compliance with Benford law. The chi-square test could not be performed for the $NAS = 1$ & $Big4 = 0$ and $NAS = 1$ & $PROF = 0$ subsamples due to the too low expected values, so I did not take into account the results of the related $NAS = 0$ & $Big4 = 0$ and $NAS = 0$ & $PROF = 0$ subsamples. There was a difference between $NAS = 0$ & $PROF = 1$ and $NAS = 1$ & $PROF = 1$, according to which companies that do not use other services have a higher accounting quality.

3.3. Impact of the length of the audit mandate

The average mandate length from the starting point of 8.33 years in 2013 is gradually increasing until 2017, where it reaches a maximum of 9.6 years. In 2018, it drops minimally to 9.59. The number of businesses that have not changed auditors for more than 10 years is on the rise between 2013 and 2018, and a decrease is also only observable in the last year.

Looking at the AFMA variable (Audit firm's mandate is longer than 10 years), it can be seen that, like descriptive statistics, the regression equation also shows a negative relationship with the occurrence of discretionary accruals. ($B = -0.15$) However, the relationship is not significant, the p for the AFMA variable is greater than 0.05 ($p = 0.13$). VIF is 1.02, so there is no risk of multicollinearity. Of the control variables, ROA shows a significant relationship ($p = 0.01$), which is positive ($B = 1.56$). The Durbin-Watson test scores 1.935, so autocorrelation does not distort the above results. The VIF for control variables was between 1.01 and 2.17, so there is no multicollinearity.

The AFMA variable shows a negative ($B = -0.09$) relationship to the volatility of earnings ($H|DNI|$), this relationship is not significant ($p = 0.46$), indicating that the accounting quality of firms that have not changed auditor for more than 10 years

is not lower. Three of the control variables show a significant relationship with the H| DNI| variable. TURN and ROA are positive, while PROF variable shows a negative relationship with the dependent variable. The VIF of the variables was between 1 and 2.08, so it can be said that the model is not exposed to multicollinearity. The Durbin-Watson test results are 1,914, which indicates no autocorrelation.

For total assets and net sales, we can see a deviation from the Benford distribution ($p < 0.01$). The taxed profit data followed the Benford distribution for both AFMA=0 ($p = 0.33$) and AFMA=1 ($p = 0.13$). The subgroups are still created along the lines of profitability and the labeling of auditors Big4 - not Big4. By Big4 companies, the higher quality of firms with audit mandates of more than 10 years was observed. A reverse deviation could be documented when examining the groups of profitability, notably in the group of loss-making enterprises. The difference exists between the balance sheet total data. The reports of enterprises in the AFMA=1 group differed significantly from the Benford distribution, while the reports in the AFMA=0 group followed it.

3.4. Impact of the rotation of auditors

The rotation of auditors shows stable values in the years under review. The value of the leaving companies is between 26 and 43, and the value of the leaving partners is between 74 and 82. (If zero is not taken into account due to the data gap in 2018.) The value of new companies ranges from 26 to 42, and the value of new partners ranges from 67 to 82. It can therefore be concluded that the rotation of auditors is stagnant during the period under review and no decreasing or increasing trend can be observed.

AFR (Auditor rotation period) and H|DACC| shows positive ($B = 0.06$) but not significant ($p = 0.67$) relation. Overall, with binary logistic regression, even after the involvement of control variables, we get the same result as indicated in the Mann-Whitney test. The rotation period has a negative impact on accounting quality when looking at discretionary accruals, but this effect is not significant. Of the control variables, ROA is the one that shows a significant link between H| DACC| which confirms that the effects of performance should be taken into account when looking at accounting quality. The VIF values of the variables are between 1,01 and 2,34, which does not indicate multicollinearity. The Durbin Watson's test result is 1,934, which means that autocorrelation is not a problem.

The AFR variable shows a negative ($B = -0.16$), non-significant ($p = 0.37$) relationship with the H| DNI| variable. This result does not support the higher quality of the reports involved in the rotation. Among the control variables, the TURN, ROA and PROF variables also show a significant relationship with the target variable ($p < 0.01$). Profitability is negative ($B = -3.21$), return on assets ($B = 9.55$) and return on assets ($B = 0.13$) show a positive relationship with H| DNI|

variable. The VIF values of the variables included in the equation were between 1.01 and 2.09, so there is no problem with multicollinearity. Durbin Watson is 1.980, which means that autocorrelation is not a problem.

Neither the total assets nor the net sales figures follow the Benford distribution ($p < 0.01$). In the case of a taxed result, according to the chi square test $AFR=1$ follow rotation ($p=0.07$), while $AFR=0$ do not follow ($p=0.03$) the Benford distribution. Looking at the groups that have the control function, we can see that in both the profitability and Big4 labeled groups, the reports affected by rotation have a higher quality. The exception is $AFR=0 \& PROF=1$ and $AFR=1 \& PROF=1$, where no difference can be found.

3.5.Impact of Big4 audit firms

During the whole period under review, the dominance of the Big4 auditors can be observed. The ratios ranged from 68.5% to 73.75% in a very narrow interval, practically constant. This constant rate of roughly 70 to 30% represents adequate basic data for the analysis of the impact of Big4 audit firms on accounting quality.

The BIG4 variable shows a negative ($B=-0.04$) relationship to the variable that captures discretionary accruals. The negative relationship refers to the higher accounting quality of firms using Big4 firms, but this is not significant ($p=0.73$). Of the control variables, the ROA variable shows a significant ($p=0.01$) positive ($B=1.58$) relationship to $H|DACC|$ variable. VIF values ranged from 1.01 to 2.17 for each variable, Durbin-Watson took 1.924, so neither autocorrelation nor multicollinearity distorts the above results.

The BIG4 variable shows a significant positive relationship with $H|DNI|$ variable. This result represents a higher quality of the financial reports of companies with the big4 audit firm, which is in line with my suggestion about the impact of Big4 auditors on accounting quality. I examined the problem of multicollienarity with a VIF indicator, which did not exceed 5 for any variable, so multicollienarity does not distort the results presented above. To test autocorrelation, I ran the Durbin-Watson test, which resulted 1.934, that indicates neither positive nor negative autocorrelation.

The total assets and net turnover showed a significant deviation from the Benford law for both groups examined ($p < 0.01$). Looking at the taxed result, the two groups produced different results. The data of companies that were not audited by Big4 audited followed the Benford distribution, while the reports audited by the Big4 auditor were not. According to the results of the sub-groups, there is no difference between the financial statements audited by the big4 auditors and the financial statements which audited by non-Big4 auditors.

4.CONCLUSIONS AND SUGGESTIONS

The results of the hypothesis tests are shown in Table 4.

4. Table: The results of the hypothesis tests

Hypothesis	Methods	Result
H₁: <i>An increase in the audit fee will result an increase in accounting quality in the year when the audit fee is increased.</i>	Non-parametric tests Chi square test Regression analysis	ACCEPTED
H₂: <i>The use of non-audit services does not lead to a decrease in accounting quality.</i>	Non-parametric tests Chi square test Regression analysis	REJECTED
H₃: <i>The fact that the auditor mandate is longer than 10 years does not lead to a decrease in accounting quality.</i>	Non-parametric tests Chi square test Regression analysis	ACCEPTED
H₄: <i>Auditor rotation does not lead to an increase in accounting quality.</i>	Non-parametric tests Chi square test Regression analysis	ACCEPTED
H₅: <i>Using Big4 auditors lead to an increase in accounting quality.</i>	Non-parametric tests Chi square test Regression analysis	ACCEPTED

Source: own edit

Examining the first hypothesis, the methods that produced statistically interpretable results in every case supported my suggestion. Discretionary accruals showed a negative but not significant relationship with the variable marking the increase in the audit fee. The relationship between the analysis of volatility of earnings and the assessment of compliance with the Benford distribution is significant. The analysis of large negative incomes, earnings management towards small positive incomes and the examination of the own developed variable did not yield any appreciable results, due to the insufficient ability of the constructed models to classify. Based on the above, I accepted the first hypothesis.

S1: On the basis of the acceptance of hypothesis number one, I have formulated a suggestion for businesses. For businesses that are obliged to disclose their financial statements, I suggest to consider what their annual reports are currently being used for. What it could be used for, but because of various reasons (such as lack of reliability, low accounting quality) cannot or do not want to use it. Consider how much additional costs it will cost them to compile ad-hoc reports, summaries, conclude contracts for. Could this be replaced in whole or in part by the financial statements? If there are areas relevant to their company where higher quality financial statements would be an advantage (e.g. acquisition of fresh capital, opening up to new markets, maintaining the trust of creditors), they should take into account that cooperation with the auditor can be an added-on that makes these objectives available and can be better at hand. It's not free, of course. As the results show, the increase in audit fees may also indirectly contribute to accounting quality. I therefore suggest that, if the undertaking decides to do so, the strategy is to set out the objective of increasing accounting quality, which can also be achieved by concluding an audit contract with the appropriate conditions.

In the course of the examination of the hypothesis concerning other services, results were obtained which make the negative impact of the use of other services on accounting quality likely. For two of the three binary variables (SPO, DVAQ), the Mann Whitney test yielded a positive significant result, which means lower accounting quality when using other services. Although I was not able to confirm this using binary logistic regression, the lack of this relation is not proven. The Benford law also showed lower accounting quality for companies using other services. On the basis of the above results, it is not clear that the use of other services would not lead to a reduction in accounting quality, so I reject my hypothesis number two.

S2: On the basis of the hypothesis concerning other services, other services provided by the auditor are not clearly considered to be neutral in terms of accounting quality. In this connection, I will make a number of suggestions addressed to future researchers, regulators, auditors' public supervisors and companies using other services provided by auditors and to the auditors themselves. For future researchers, I recommend exploring and investigating the subject in more detail in order to better understand the effects of other services. I recommend that regulators monitor future research and keep its results in mind when make a change in regulation. I recommend that the public oversight body investigate other services provided by the auditor in the event that the audit firm comes under audit. However, as a separate selection criterion, I do not recommend the fact that other services are provided. I recommend that audit firms and their clients, prior to agreeing on other services, examine whether it actually complies with the current rules and whether it should cause a loss of independence and thus a reduction in the accounting quality.

In the course of the examination of the third hypothesis, I have not received any results which would have supported the negative impact of the longer audit mandate on accounting quality. The analysis of the recognition of large losses (LNEG) yielded a neutral result. Based on the results of the Mann-Whitney test, the groups did not significantly differ in the case of LNEG, and I was not able to evaluate binary logistic regression results due to the model's insufficient classification capability. In the case of the own developed variable (DVAQ) and small income (SPO) examination, the Mann Whitney test has already shown a significant difference between the two groups, whose descriptive statistics show that the financial statements of firms with more than 10 years of mandated auditors have lower DVAQ and SPO values, i.e. higher accounting quality. In the examination of discretionary accruals, I found that although the Mann Whitney test did not show a significant difference between the two groups, based on the results of the descriptive statistics, we could see that the use of discretionary accruals for firms with more than 10 years of mandate was less typical, which means higher accounting quality. This also produced an analog but not significant result for the model using binary logistic regression. The examination of the volatility of earnings also supported my suggestion. Both the descriptive statistics and the Mann Whitney test and the binary logistic regression model. According to the results obtained in the study of the volatility of earnings, there is no significant difference in quality between the groups examined. In examining compliance with the Benford law, it was not possible to clearly show the difference between the two groups. For the above reasons, I accept the third hypothesis.

S3: My suggestions are for regulators and users of financial reports. I recommend that regulators and users of the financial statements take into account that getting to know larger businesses is a time-consuming process, so the efficiency of auditors, auditing, and thus the quality of audited accounting reports, will not be reduced if auditors have been investigating the same company for more than 10 years. Any independence issues are outweighed by the benefits of learning about the business. If, in the future, market confidence is lost, I am not suggesting to extend the mandatory rotation of auditors, but to communicate the positives of the presence of an experienced auditor, who is also familiar with the audited company.

The descriptive statistics can be interpreted in the results of five methods, three of which saw a higher accounting quality of the financial reports not covered by the audit rotation and in two cases a neutral result (LNEG, H| DNI|). The Mann-Whitney test showed two cases (SPO and DVAQ) of significant differences between the groups with rotational and non-rotational financial statements. The model built using binary logistic regression yielded evaluation results in two cases (H| DACC| and H| DNI|). In both cases, the statements show higher accounting quality which are not subject to rotation. According to the

results of the Benford law examination, in case of a taxed result, data from the reports covered by the rotation are followed, while the data of the reports not covered by the rotation not follow the Benford distribution. Control groups have confirmed this discrepancy. The results of each method can be aggregated according to the basics laid down in the methodological section to suggest the higher quality of the financial statement not covered by the rotation. So I accept the related hypothesis.

S4: In examining the fourth hypothesis, I have analyzed whether the rotation as a whole has a positive effect and whether the accounting quality is better during rotation periods. The results were in line with my assumption that accounting quality was not higher during the rotation period. This suggestion is addressed to regulators and users of the report, as is the triple hypothesis. The result of hypothesis four is consistent with the results of the triple hypothesis, so is the proposal. The rotation has no positive impact on the quality of the financial statements, so I recommend that regulators and users take this into account when making decisions on regulation or other areas.

In the study of discretionary accruals, I showed a negative but not significant link between the use of Big4 audit firm and the use of discretionary accruals. Based on the examination of the variability of earnings, we can clearly see that the reports audited by the Big4 auditors are of higher quality. This is supported by both the Mann-Whitney test and the results of the binary logistic regression. The difference between the studied groups is significant according to both methods. In recognition of large losses, management towards small positive incomes and examining my own developed variable, the evaluation of the model did not produce acceptable results. The Benford compliance test yielded a neutral result. In view of the above results and the strength of each method, I accept the hypothesis assuming the positive impact of the audit of Big4 companies on accounting quality.

S5: My final specified suggestion is for Big4 audit companies. Given that the research has not been able to confirm the higher quality of the financial reports audited by Big4 auditors by all methods (and even not for all Big4 companies), I suggest a review of the factors that they believe to make them different from other auditors in the market. Review whether they do indeed have characteristics conducive to their differentiation on the market. If they are not, or are no longer, able to rise above competitors in the quality of service, this may lead to a reduction in their market share and their audit fee per contract. I suggest mobilizing their accumulated knowledge and resources in order to continue to provide higher quality services.

S6: Reading the results of the dissertation, we can conclude that despite a high degree of accounting regulatory convergence within the European Union, domestic research about factors affecting accounting quality is essential. Results

in Western European countries cannot be implemented one-on-one. The only way to get an accurate picture is to try to monitor the quality of the Hungarian financial statements. Of course, we are not in an easy situation, I understand that, as a Member State of the European Union, we cannot shape regulations completely independently. However, we can still benefit from knowing the impact of individual factors on accounting quality. Even if not from the accounting regulatory side, we can shape the situation through other incentives. We also saw that among the variables measuring accounting quality, it was the variables of a continuous nature that could be used to produce results. This is essentially due to the size of the sample, which could be eliminated by allocating adequate resources to this research topic. Overall, I suggest to research accounting quality and the consideration of the results obtained, both in the modification of regulations and in the development of other incentive schemes.

5. NEW SCIENTIFIC RESULTS

1. **I have developed a new theoretical model for measuring accounting quality.** I validated the model on a self-compiled database, which included, in addition to the audit data published in the notes included in the research, information that could be deduced from the evaluation of the data.
2. **I have** reviewed the models used in international research projects to measure accounting quality and **found which models can be adapted to measure the quality of financial statements produced in the Hungarian environment.**
3. **I have demonstrated empirically that in the Hungarian environment, an audit mandate of more than 10 years does not result a reduction in accounting quality.**
4. **I have statistically demonstrated that the rotation of auditors does not have a positive impact on accounting quality.**

6. PUBLICATIONS RELATED TO THE TOPIC OF THE DISSERTATION

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