FORECASTING THE STRUCTURE
OF THE ROMANIAN AUDIT MARKET

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ABSTRACT. This study aims to establish a methodology starting from certain criteria pertaining to the performance level of audited companies, according to which one may achieve a forecast of the changes in the financial audit services market, from the viewpoint of three categories of financial auditors: Big Four companies, Non-Big Four companies and accredited individuals that carry out audit missions by means of individual private practices. Following the application of the optimal regression models established, it results a measurement of the differences between the present level and the one anticipated with the help of a competition analysis technique: the distance procedure. Starting from these forecasts regarding the evolution of the activity of the three categories of financial auditors within a time-span of five financial years, on the basis of a set of criteria pertaining to the size, position and financial performance of audit beneficiaries, it is estimated that Big Four auditors will experience an ascending trend in terms of market share, while Non-Big Four auditors will meet with a significant decline, to a greater extent than individual audit practices of accredited professionals.

Key words: Big Four companies, financial audit, forecasting, regression model, investors

JEL classification: M42, M41, M48

1. Introduction

Achieving a forecast with regard to the evolutionary perspectives of the structure of the audit market is important for both providers and beneficiaries of audit services. The objective or this study is to conceive a statistical methodology, so as to produce forecasts regarding the evolution of the structure of the audit market, within the next five financial years.

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Albeit the verification of the latter has been accomplished at the level of a sample group established by double stratification, this procedure can be explained at any level, on any sample, regardless of its size.

There is a plethora of factors that may favour one type of auditor or another. In light of this, our study aims to split auditors into three major categories: Big Four auditors, Non-Big Four auditors and auditors that work independently, in the form of accredited individuals, organised into private professional practices.

In this regard, specialised literature acknowledges that the following may influence audit service providers, both Big Four and Non-Big Four ones: the adoption or not within national legislation of international accounting regulations, in order to facilitate the access of foreign auditors to audit services; the size of audited companies and of the financial performance recorded and reported by means of financial statements; the quality and performance of government systems; the quality of internal control services provided by external audit beneficiaries; the area of activity; the structure of management and shareholders; the predominant source of financing; the capital market or the monetary market; the existence or lack of operations meant to restructure the activity; mergers and splits. Even the national level of culture is likely to influence the option of audit services beneficiaries for one category of auditors or another.

2. Review of literature

If a state adopts international accounting regulations, certain specific nationally-applicable procedures are removed from that country's legislation. Hence, foreign audit companies overcome the hurdle of learning national regulations, whilst making fewer efforts to undergo specific operations pertaining to financial audit (Tsipouridou and Spathis, 2012). A country with poor government systems may favour the increase in market share of audit companies from the Big Four category (Houqe et al., 2012). Hence, such companies with a high level of credibility are able to fill in, in the eyes of foreign investors, the confidence gaps stemming from a poor government system, one that is unable to ensure the stability of its legal environment, thus having an effect on the confidence of foreign investors in the reality and sincerity of the annual accounts published. On the other hand, the more effective a company is, it appears the more it

will be tempted to contract audit services from the Big Four. Effectiveness can be given by the level of income, total assets; profits achieved or even the level of dividends and taxes paid. (Walace, 1998). Moreover, widespread companies from a territorial point of view will be more open towards Big Four audit companies, as they require a great workload to be dealt with simultaneously in different locations. Hence, the auditor will need not only qualified personnel, but also a greater number of employees. Companies that do not have an efficient internal control system or that lack one altogether will try to compensate for this deficit through more expanded financial audit services, which are more likely to be provided by large audit companies, namely the Big Four (Krishnan and Visvanathan, 2007). Companies that are active in the area of manufacturing have a more complex activity from an accounting perspective, which entails more thorough professional knowledge on the part of auditors and the availability to undertake a higher workload, naturally associated with greater audit fees. (DeFond et al., 2000; Craswel et al., 1995). Foreign investors will always grant extra confidence in international auditors, (Citron and Manalis, 2001), as the latter ensure more credibility to audited companies before potential investors (Tu, 2012). The existence of changes in the structure of the activity (absorption or joint mergers, splits) entails a high level of professional preparation, which provides Big Four auditors with premises for contracting audit services from aforementioned companies (Firth, 2003).

Countries with Anglo-Saxon customs, which exhibit greater openness towards the public that uses financial-accounting information: investors, commercial and financial creditors, state institutions (Răchişan and Groşanu, 2010), where the level of conservatism is low, while professional reason prevails, will also have more confidence in an international auditor, from the Big Four category (Jenkins and Velury, 2011; Hope et al., 2008).

3. Material and methods

This study aims to conduct research on the evolution of financial auditors at the Romanian level, with regard to their capacity of dominating the audit market. The methodology of our paper relies on double stratified sampling. From this point of view, we have firstly selected the North-West region, at the national level. This can be considered representative of the entire country, as, according to forecasts produced by the National

Prognosis Commission for the time-span 2013-2016, economic perspectives there are at the level of the national average, in terms of gross domestic product, average salaries, unemployment rate, average number of employees and structure. On the other hand, in order to explain double stratification, we have to mention the fact that the second selection criterion involves taking into account, at the level of this region, the largest companies that benefit from financial audit services. This has been achieved due to the provisions of accounting laws, which, in accordance with the European regulations in the financial-accounting area, require audited companies to transmit to the National Commerce Register Office information regarding the contracting of audit services: name of auditor and duration of audit contract. The research method is inductive, starting from data pertaining to audited companies and auditors, while the study concludes by presenting a theoretical model of forecasting the evolution of audited companies. To achieve this, the auditors have been divided into three categories: Big Four companies, Non-Big Four companies and accredited professionals. We have selected, from all companies in the North-West region, those that were subjected to financial audit in the time-span 2005-2012. Moreover, from the latter, we have eliminated those that failed to publish, by means of the Ministry of Finance or the National Commerce Register Office, their annual statements in each financial year from the period 2008-2012. Thus, the sample group has been reduced to 185 audited companies, selected from the North-West region of Romania.

Our paper aims to study the perspectives of expanding the audit services market of these companies, through several financial indicators of the audited companies, extracted from financial statements. These indicators are owned capitals and net profit, while there are other parameters which, in accordance with national regulations matching European directives, establish the criteria pertaining to the obligation of undergoing the audit of financial statements: total assets, net turnover and average number of employees. For each of the three categories of auditors: Big Four companies (C_{BF}), Non-Big Four companies(C_{NBF}) and private individuals as auditors (C_{PA}), we have calculated a sum of these five indicators in the case of each financial year comprised between 2008 and 2012. From a monetary perspective, the values of indicators have been calculated in the national currency (lei), and, subsequently, we have converted the latter into euros, on the basis of the average exchange rate set by the National Bank of Romania for each respective

year. The data obtained has been statistically interpreted with the help of STATgraphics Plus 3.0. Hence, we have verified, for each of the five indicators (performance criteria), which regression model is optimal, in order to be used in the subsequent forecasting process. The following regression models have been analysed from this point of view:

Table 1.

Diversity of regression models tested in order to forecast the evolution of performance criteria in the time-span 2013-2017, starting from values recorded in the 2008-2012 period

No.	Name of regression model tested	General formula for regression model tested
1	Reciprocal - X	$Y = a + b / X$
2	Reciprocal - Y	$Y = \dfrac{1}{(a + bxX)}$
3	Double reciprocal	$Y = \dfrac{1}{(a + b/X)}$
4	Exponential	$Y = e^{a+bxX}$
5	Square root - X	$Y = a + b\sqrt{X}$
6	Square root - Y	$Y = \sqrt{a + bxX}$
7	Linear	$Y = a + bxX$
8	Multiplicative	$Y = axX^b$
9	Logarithmic - X	$Y = a + bx\ln X$
10	S curve	$Y = e^{a+b/X}$

Source: Statistical data calculated by the author

In this context, Y is the symbol utilised successively to measure the value of total assets, net turnover, capitals owned, net result and average number of employees for audited companies (dependent variable), whilst X depicts the financial years 2008-2012 (independent variable).

In order to establish the optimal regression model, we have analysed the values calculated for the following statistical parameters and their meaning:

- correlation coefficient, which measures the connection between two variables;

-R-squared, indicating the extent to which a certain regression model explains the evolution of the dependent variable Y;

-p-Value, utilised in order to pinpoint any statistically significant relation between the dependent variable and the independent one, for a pre-established confidence level.

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After the statistical calculation of data starting from these premises, we have obtained a situation depicting the most relevant regression models that can be used in order to forecast (establishing an option for a regression model has meant taking into account not only the statistical parameters calculated, but also the economic relevance of the results obtained, in other words the fact that each statistical model should be adequate from an economic viewpoint).

Once the values forecasted for the five performance criteria of audited companies have been statistically grounded, so as to study the evolution of the three categories of auditors, we have additionally calculated the effective values of the latter, according to the financial statements published in 2008-2012.

In order to analyse the differences between the current values (2008-2012) of the dimensions of audited companies by each of the three categories of auditors and the ones that have been forecasted (2013-2017), we have opted for a popular competition analysis method: the distance procedure. This implies measuring the distance for each category of audited entities, for each performance criterion, from the value recorded to the one considered to be optimal for a certain criterion. In the case of direct criteria (which are optimised through maximisation), the optimal value, from the perspective of this study, will be considered the greatest, while for indirect criteria (which are optimised through minimisation), the optimal value will be the smallest recorded. The category of entities with the lowest value of this indicator can be regarded as the most competitive one, as we shall consider that it exhibits the shortest distance from the optimal values of effective performance criteria, as forecasted on a case by case basis.

Depending on application variants (statistical - without taking into account importance or economic criteria - while considering importance criteria to establish competitiveness), the calculation of distances becomes as follows:

$$De(k) = \sqrt{\sum_{i=1}^{n}\left(1 - \frac{Ii(k)}{Ii(e)}\right)^2}$$

Where,

$De(k)$ – the distance between each category of audited entities "k" and the standard category;

$Ii(k)$ – the direct or indirect indicator of performance "i" of the category of audited entities k;

$Ii(e)$ – the indicator of performance criteria „i" of the category of audited entities considered standard (with an optimal value for the respective criterion).

(1)

In this way, one will be able to estimate the evolution of the audit services market over a five-year time-span, compared to the current situation of Big Four companies, Non-Big Four ones and accredited professionals, depending on the size of audited companies.

4. Results and discussions

Based on the econometric calculations achieved with the help of the application STATgraphics Plus 3.0, we have assessed the optimal variant for each of the ten regression models, from the perspective of the correlation coefficient, R-Square, p-Value, the confidence level for forecasting, prediction and confidence limits. These results are presented synthetically in Table 2.

Table 2.

Selecting the best fitted models for regression analysis of performance criteria and the respective statistical parameters

No.	Performance criteria	Type of audit companies	Best fitted regression model for analysis from an economic and statistical viewpoint	Statistical parameters calculated for the evolution of performance criteria in the time-span 2008- 2012, regarding the most appropriate statistical model			
				Correlation coefficient	R-Squared	p-Value	Confidence level for forecasting
1	Total assets (mil euro)	Big Four (C_{BF})	Reciprocal - Total Assets	-0,9280	86,13%	0,0229	95%
		Non Big Four (C_{NBF})	Reciprocal - Year	0,8681	75,36%	0,0563	75%
		Professionals authorized (C_{PA})	Double reciprocal	-0,0402	0,16%	0,9488	95%
2	Net Turnover (mil euro)	Big Four (C_{BF})	Double reciprocal	0,3239	10,49%	0,5950	95%
		Non Big Four (C_{NBF})	Reciprocal - Year	0,9006	81,11%	0,0370	75%
		Professionals authorized (C_{PA})	Square root - Net turnover	-0,8931	79,77%	0,0413	75%
3	Equity (mil euro)	Big Four (C_{BF})	Reciprocal - Equity	-0,2169	4,70%	0,7261	85%
		Non Big Four (C_{NBF})	Square root - Year	-0,9877	97,56%	0,0016	95%
		Accredited professionals (C_{PA})	Linear	-0,9481	89,89%	0,0141	95%

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No.	Performance criteria	Type of audit companies	Best fitted regression model for analysis from an economic and statistical viewpoint	Statistical parameters calculated for the evolution of performance criteria in the time-span 2008- 2012, regarding the most appropriate statistical model			
				Correlation coefficient	R-Squared	p-Value	Confidence level for forecasting
4	Net Result (mil euro)	Big Four (C_{BF})	Reciprocal - Year	0,5898	34,79%	0,2952	60%
		Non-Big Four (C_{NBF})	Double reciprocal	-0,7380	54,46%	0,1545	95%
		Accredited professionals (C_{PA})	Linear	-0,7006	49,09%	0,1875	75%
5	Number of employees (number)	Big Four (C_{BF})	Reciprocal - Year	0,8596	73,89%	0,0618	95%
		Non-Big Four (C_{NBF})	Reciprocal - Year	0,8962	80,32%	0,0395	90%
		Accredited professionals (C_{PA})	Reciprocal - Year	0,8930	79,74%	0,0413	85%

Source: Statistical data calculated by the author

The majority of statistical parameters calculated for each model indicate an average intensity - strong between dependent variables (Y) and the independent variable (X). Thus, the values calculated for the correlation coefficient within the intervals [-1; -0,3], respectively [0,3; 1], become particularly relevant. The regression models established are representative of the vast majority of dependent variables (a level calculated for an R-square of over 50%), while the values calculated in order to exhibit any statistically relevant relation are reasonable in the case of most statistical models, compared to the confidence level. On the basis of these statistical models, we have achieved a forecast of the value of the dependent variable over a five-year time-span. This period of time, comprised between 2013 and 2017, has been shaped at the same level (5 years) as the time-span from which we have extracted data in order to argue in favour of our forecast (2008-2012). The forecast results, as well as the intervals marking their potential variation, are presented in Table 3:

Table 3.

Values of performance criteria and safety intervals forecasted

No	Performance criteria	Type of auditors	Best fitted model for regression analysis from an economic and statistical viewpoint	Value predicted	Predicted values for the period of time 2013- 2017 (5 years) with an average probability of 85,67%			
					Prediction limits for new observations		Confidence limits for the mean of many observations	
					Lower	Upper	Lower	Upper
1	Total assets (mil euro)	Big Four (C_{BF})	Reciprocal – total assets	7.783,53	6.047,20	10.918,6	6.619,60	9.444,08
		Non-Big Four (C_{NBF})	Reciprocal - Year	1.044,97	709,53	1.380,42	873,01	1.216,94
		Accredited professionals (C_{PA})	Double reciprocal	171,99	133,72	240,98	149,98	201,57
2	Net Turnover (mil euro)	Big Four (C_{BF})	Double reciprocal	2.739,54	-5.103,86	1.079,94	1.532,32	12.912,3
		Non-Big Four (C_{NBF})	Reciprocal - Year	644,76	511,94	777,58	576,67	712,85
		Accredited professionals (C_{PA})	Square root - Net turnover	65,64	45,69	89,18	52,99	79,63
3	Equity (mil euro)	Big Four (C_{BF})	Reciprocal - Equity	1.101,40	967,08	1.279,07	1.015,76	1.203,80
		Non-Big Four (C_{NBF})	Square root - Year	331,10	266,44	395,75	293,03	369,17
		Accredited professionals (C_{PA})	Linear	51,80	42,19	61,41	45,91	57,69
4	Net Result (mil euro)	Big Four (C_{BF})	Reciprocal - Year	74,56	25,36	123,76	49,34	99,78
		Non-Big Four (C_{NBF})	Double reciprocal	-23,37	-4,38	7,00	-7,25	19,10
		Accredited professionals (C_{PA})	Linear	-3,07	-6,04	-0,09	-4,89	-1,25
5	Number of employees (number)	Big Four (C_{BF})	Reciprocal - Year	14.046,6	13.241,4	14.851,8	13.633,8	14.459,4
		Non-Big Four (C_{NBF})	Reciprocal - Year	16.466,6	13.768,3	19.164,8	15.083,3	17.849,9
		Accredited professionals (C_{PA})	Reciprocal - Year	1.381,12	881,81	1.880,44	1.125,14	1.637,10

Source: Statistical data calculated by the author

To compare the current situation of audited values by each of the three categories of auditors (2008-2012) to the one forecasted (2013-2017), we shall turn to the application of the competition analysis method: the distance procedure or that of the standard company. This data in synthesised in Table 4:

Table 4.

Average values calculated (2008-2012) of parameters considered, so as to establish the evolution of audit companies for the time-span 2013-2017

No.	Parameter name	Effective value for the period 2008-2012			Statistically-estimated value over a five-year timeframe		
		(C_{BF})	(C_{NBF})	(C_{PA})	(C_{BF})	(C_{NBF})	(C_{PA})
1	Total Assets (mil euro)	6.653,51	1.312,08	172,76	7.783,53	1.044,97	171,99
2	Net Turnover (mil euro)	2.167,81	829,33	95,55	2.739,54	644,76	65,64
3	Equity (mil euro)	1.087,73	445,35	59,27	1.101,40	331,10	51,80
4	Net result (mil euro)	100,00	-22,16	-1,33	74,56	-23,37	-3,07
5	Number of employees (number)	14.297	17.829	1.684	14.047	16.467	1.381

Source: Statistical data calculated by the author

For each of the two time intervals, we have measured, for the three categories of auditors, the optimal value of total assets, net turnover, equity, net result and number of employees. Since it is desirable that each of these five performance criteria should yield the highest possible results for each audited company, it is considered that they become optimised through maximisation, namely the better value recorded will be the higher one. The distance procedure has involved, for each criterion associated with every auditor for all time intervals, measuring the distance to this greater value, considered to be optimal (standard value). The distance calculated has been measured in indicators. The shorter the distance to the standard value, the smaller the value recorded by the indicator (the respective auditor is closer to the standard, i.e. to the optimal level).

Table 5.

*Forecasted evolution of audit companies for the time-span 2013-2017,
on the basis of the distance procedure (points accumulated)*

Category of auditor	Indicators calculated by applying the distance procedure for auditors		
	Average value calculated for the 2008-2012 period	Statistically forecasted value over a five-year timeframe	Variation
	Calculated value	Calculated value	
Big Four Companies (C_{BF})	0,198	0,148	-25,25%
Non-Big Four Companies (C_{NBF})	1,694	3,548	109,45%
Accredited professionals (C_{PA})	2,146	2,177	1,45%
Total	4,038	5,873	45,44%

Source: Statistical data calculated by the author

Results indicate the fact that, statistically speaking, auditors from the Big Four category are closer to the optimal level, in both cases. From an economic standpoint, this means they audit altogether the largest share of net turnover, total assets, capitals owned, profits and average number of employees. If we take into account the five aspects, we notice that Big Four companies lag behind only when it comes to the part dedicated to employees, namely the sole segment where they do not cover most of the audit market. From this point of view, we may state that the leaders of the audit services market are Big Four audit companies. If we consider the results of our research from a statistical and evolutionary perspective, it becomes evident that in the next five years, Big Four audit companies will experience smaller values with regard to the distance to the optimal level, by 25,25%. The economic importance of this is the fact that they will tend to increase their market share in the future, at the expense of Non-Big Four audit companies and accredited professionals. This conclusion relies on the tendency to increase the net turnover, total assets, average number of employees, capitals owned and audited profits in the future, dealt with by Big Four companies. The explanation may consist either of the increase in the number of companies that will contract audit services from the Big Four, or in the further enhancement of performance on the part of companies audited by the Big Four, at the expense of companies audited by the other categories of auditors.

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On the other hand, Non-Big Four audit companies will meet with the most significant increase in distance, compared to the standard considered to be optimal, statistically speaking, in the next five years (109,45%). We expect these companies to lose some of their market share at a higher pace, as portrayed by the five performance criteria. Individual accredited auditors will not experience such a drastic decrease in terms of the segment of companies audited, since the distance to the standard company will only increase insignificantly (1,45%).

5. Conclusions

The methodology of our research has prompted us to combine several econometric notions, so as to select adequate regression models, with elements of financial analysis, in order to apply the distance procedure in measuring the remoteness to the standard company, i.e. to the optimal level. This paper has revealed the fact that Big Four auditors will meet with a steady improvement of their market share, in the next five years, from the viewpoint of total assets, net turnover, equity, profits and number of employees of audited companies. This does not necessarily mean that the number of companies audited by the Big Four will increase. It is likely that this context is also due to the increase in profitability and size of audited businesses by this category of companies. On the other hand, auditors from Non-Big Four companies will experience a prominent shrinkage of services provided, whilst individual financial auditors will not perceive this diminution of services at a very acute level, in the future.

The methodology is relevant, irrespective of the size of the sample group. Nevertheless, a thorough selection of the latter has led to our gathering pertinent information. For a more punctual prediction, one may expand this database, by collecting financial accounting data by means of financial statements from audited companies for a broader timeframe (more financial years). Such an endeavour would enhance the econometric parameters that measure the relevance and accuracy of the statistical models evaluated. This would entail building several models, based on higher values of correlation coefficients (tighter connection amongst the variables of the model), greater figures for the R-square (better representativeness of the regression model for the evolution of the quantified phenomenon), lower p-Values (a more representative statistical relation between variables, with a higher confidence indicator, i.e. over 95%). A

consequence of this would be the ability to predict more accurate values, over a broader time interval, with more restrained forecasting and confidence limits. The research may be furthered by including into the database, as well as into the forecast study, other parameters that are likely to paint a more complex picture of the growth that the audit services market exhibits: the evolution, for each of the three categories of auditors, of the number of audited companies, with foreign management or shareholders, of the structure based on areas of activity of audited companies, of the frequency of restructuring operations, of the territorial dimension (the number of locations where audited companies conduct their activity), of the form of organisation of the activity of audited companies (limited liability companies or joint-stock entities), of whether such audited companies are traded or not on the capital market. According to literature in the field, these are the determining factors in the matter of orientation of audited companies towards Big Four or Non-Big Four auditors. Thus, a more complex and accurate image may be formed, with regard to the evolutionary perspectives within the structure of audit services in Romania.

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