Why Auditors Increasingly Rely on Analytical Procedures: An Empirical Approach in Portugal

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Abstract

The increasing sophistication and quantity of transactions considered to be financial facts included in accounting records and financial statements raises additional issues in terms of financial auditing.

Finding more corroborating evidence for the claims made in balances, transaction classes and disclosures is naturally made more difficult by the fact that accounting information and financial reports are increasingly complex both in terms of the corroborative strength of the evidence and its quantity.

Auditing work therefore relies increasingly on statistical and non-statistical data and on the auditor's use of substantive analytical review procedures, or, to put it briefly, analytical procedures.

The conclusions of this empirical study point to the fact that, in general terms, the increasing use of analytical procedures stems from a risk-based approach to auditing together with reasons that have to do with time pressure and the need to carry out more efficient audits with fewer substantive detail tests as well as improvements in the interpretation of standards applicable to auditing work.

Key-words: Auditing, Financial Record, Risk, Analytical Procedures.

1. Introduction

The International Standard on Auditing 520 – Analytical Procedures (ISA 520)[1] states that the use of analytical audit procedures is inevitable in the planning stage, during the risk assessment period, and in the stage in which an audit opinion is expressed after a joint and contextualized review of financial statements. Furthermore, this standard also suggests that analytical procedures should be used as corroborating evidence for the claims made in transaction classes and in financial statements and corresponding disclosures.

This norm corroborates previous studies carried out by Ameen and Strawser (1994), Albrecht (1977), Hylas and Ashton (1982), Blocher and Willingham (1988), and Calderon and Green (1994), in which the use of analytical procedures was found to be consistent at each stage of an audit, that is, in the planning and execution stages and in the stage in which the audit opinion is expressed in line with the stipulations made in the above-mentioned ISA 520. These studies highlight the undeniable usefulness of analytical procedures, which enhance the efficiency and efficacy of the audit, being very appealing in cost terms and in their ability to guide the auditor's work and to provide relevant evidence to support the conclusions.

Other works share a different view, concluding that the analytical procedures should mostly be used in the planning phase of the audit (Coakley, 1982, Loebbecke and Steinbart, 1987, and Biggs, *et al*., 1989).

Finally, other studies claim that analytical procedures are more useful at the stage when auditors must state their opinion (Puncel, 2007).

Regardless of the fact that opinions might diverge on the stage of auditing work in which this type of procedure might be more relevant, it is clear that, during an audit, material errors are detected through the use of substantive procedures, whether they be detail tests or analytical procedures (Marten, *et al*., 2006).

[1] The Portuguese translation for *International Standard on Auditing* is Norma Internacional de Auditoria.

In Portugal, research work already conducted on this matter (Pinho, 2011) has concluded that, in general terms and regardless of the size of the audit company and the way that professionals work, Portuguese auditors use analytical procedures more frequently during the planning phase to the detriment of the phases in which evidence is collected and opinions formed. This study also revealed that although little use is made of these procedures during the evidence-collection stage in comparison with other countries, the use of analytical audit procedures is increasing across the country.

Our study aims to reflect on the reasons behind this increasing use of analytical procedures during evidence collection as a way of corroborating the claims made in financial statements.

2. Problem Definition

In recent years, the topic of auditing efficiency and efficacy has been increasingly discussed (Sullivan *et al*., 1985; Tabor and Willis, 1985; McDaniel, 1990; and Messier, 1995). In general, audit professionals tend to define efficiency as the fulfilment of the goals set for the auditing work in the shortest possible period of time (Hollingshead, 1996).

McDaniel (1990) studied the impact of time pressure on audit results. In order to assess auditing efficiency, the quantity of relevant evidence collected was divided by the time spent by the auditor. The conclusions of the study show that time pressure only affected auditing efficiency in extreme cases. On the other hand, Apostolou *et al*. (1993) defined efficiency as the ability to comply with a pre-established time budget, which corresponded to a variation in percentage terms between the time established for the work and the time actually spent doing the work.

The reasons behind auditors' increasing use of analytical procedures mainly have to do with the growing pressure to reduce the costs of auditing work in view of the increasing competition between companies in this sector (Ameen and Strawser, 1994, Mulligan and Inkster, 1999, Anderson et al. 1995), the new risk-assessment based approach to auditing (Mulligan and Inkster, 1999), and the growing development of the information and accounting systems used by the companies being audited and computer tools supporting the

auditor's work that make it more efficient to use this type of procedure (Mulligan and Inkster, 1999, and Blocher, 2002). However, Fraser et al. (1997) reject this last reason, stating that the use of more complex or elaborate analytical procedures has not risen significantly despite developments in and the generalized use of computers and computer tools.

Another important issue concerns the impact of auditing standards on the degree to which analytical procedures are used. With regard to this question, previous studies (Mulligan and Inkster, 1999, Ameen and Strawer, 1994 and Blocher and Loebbecke, 1992) suggest that the positive impact of the audit standards has been particularly felt by small and medium-sized audit companies, leading the Big 4 to anticipate the extensive use of analytical audit procedures in their internal audit manuals for the planning phase, the evidence-collection phase and the final review phase of the work (Lin and Fraser, 2003) even before they were published.

According to these authors, one of the main flaws in the standards is that they provide no guidelines for unusual or unexpected variations, which, in practice, leaves it up to the auditor to define what is reasonable and what is unreasonable. This factor brings an undesirable degree of subjectivity to the auditor's work and to the auditing profession as a whole.

Using these starting premises to approach this problem, this study aims to assess the relative importance of each of the above-mentioned factors, thereby defining the basic vectors underlying the significant increase in the use of analytical procedures within financial audits.

3. Definition of Analytical Procedures

In the terms of the International Standard on Auditing 520 - Analytical Procedures[2] (ISA 520), these procedures correspond to assessments of financial information stemming from analysis of the plausible relationships between financial and non-financial data as well as investigations into fluctuations and identified relations that are inconsistent with other relevant information or that differ from expected values by a significant amount.

[2] Paragraph 3 of ISA 520 - Analytical Procedures.

According to ISA 520, analytical procedures can be divided into two main categories[3]:

(i) Comparisons of financial information, including information from previous years, comparisons with the auditor's budgets or predictions or even ratios (relationships) between the entity under audit and sectorial values for similar-sized companies; and

(ii) The establishment of relations between the financial data of the company under audit (including gross income, gross added value, asset profitability) or between financial data and non-financial data (such as average salaries).

ISA 520 also highlights that when unusual elements - such as unexpected time fluctuations or unexpected variations in relations or ratios - are detected through the use of analytical procedures the auditor should take the following actions:

(i) Ask for additional explanations from the management body of the company under audit; and

(ii) Corroborate every answer with additional audit evidence resulting from detail tests and their own knowledge of the business, assessing whether it is necessary to adopt more extensive and thorough substantive procedures in relation to the matter.

The use of analytical audit procedures also includes the following basic goals according to ISA 520 (paragraph 7):

a) *"As risk-assessment procedures in order to understand the entity and its environment;*

b) *As substantive procedures when their use might be more effective or efficient than detail tests in reducing to an acceptably low level the risk that the claims have been materially distorted;*

[3] Paragraph 4 and 5 of ISA 520 - Analytical Procedures.

c) *As an overall review of financial statements in the final phase of the audit."*

4. Methodology

This study was based on the preparation of a survey that was sent by email to every working auditor through the Portuguese Auditors Association (Professional Representative Body).

The survey was developed in order to collect information on the reasons why auditors make increasing use of analytical procedures in auditing work. Therefore, the total number of professionals surveyed is around 897 working auditors, according to the data supplied by the last Report and Accounts published by the Auditors Association (2012).

To determine whether the size of the sample was relevant to this research, it was assumed that:

- The average number of individuals who use analytical audit procedures is 92.9%, according to the number resulting from the random sample of 99 surveys collected from working auditors.

- The target population was finite (897 working auditors) according to the data made available by the Auditors Association.

- The margin of error is 5%.

- The level of confidence was 95%, corresponding to a statistical significance of 5%.

From this perspective, according to Reis *et al.* (2007), the size of the relevant sample for this study should be calculated as follows:

$$n = \frac{0.929\, x\, 0.071}{\frac{0.05^2}{(1.96)^2} + \frac{0.929\, x\, 0.071}{897}} \quad = \quad 91 \qquad (1)$$

Therefore, the conclusion is that the size of the sample used in this research (*n = 92*) is appropriate, being higher than the result above. Therefore, the conclusions can be extended to the population, in this case the population of Portuguese working auditors.

However, the average value of the distribution includes variance, so the minimum value of the sample should validate the hypothesis in terms of the value of the variance. According to Reis *et al.* (2007), this validation can be carried out using the chi-square test (χ^2) with a significance level of s_α and a number of degrees of freedom equal to the size of the sample less one unit. In this case, the distribution function of χ^2 for a sample of 92 and α = 0.05 is 114.27, a number that is higher than the statistic T = 93.42, thus the hypothesis that the population variance is less than or equal to 0.0651[4] is accepted.

In short, the sample of 92 used in this study meant that it was not necessary to reject the hypothesis concerning the average value of the distribution or the hypothesis concerning the distribution variance. In this case, it is safe to conclude that the sample is statistically relevant for the study.

The selected sample may be described on the basis of the elements that characterize the respondents, as follows:

Table 4.1. – Composition of Sample

Type of Practice	**Volume of Business**			**Total**
	< €500,000	**> €500,000 and < €1,500,000**	**> €1,500,000**	
Individual Auditor	40	0	0	40
Partner of Audit Firm	18	12	8	38
Employee	0	0	14	14
Total	**58**	**12**	**22**	**92**

[4] The variance is the product of *p (1-p)*, in this case 0.93 x 0.07 = 0.0651.

The sample results shown in Table 4.1. are consistent with the empirical observation of the Portuguese audit sector. Individual auditors have less turnover potential, which is why they are all included in the class of auditors with smaller business volumes.

Auditors working as employees (non-members) fall into the class of auditors with larger business volumes since they usually work for large audit companies, including the Big 4.

The data was initially subjected to a descriptive analysis of absolute and relative frequencies. In the second phase, the main components were analysed.

This methodology consists of a process that allows the original space of the variables to be projected into a smaller space. Variables deriving from the originals are the main components. In this context, it is possible to transform a set of intercorrelated original variables into a new set of non-intercorrelated variables that can be called main components. According to Reis and Moreira (1993), the procedure for analysing main components creates a division in the variance of the main components, each main component being calculated in a way that retains the largest variation seen in the original variables.

Taking vector $\underset{\sim}{X} = \lfloor X_1\ X_2\ X_3 \ldots X_p \rfloor$, averages μ and variance is $\sum$ the intention is to create a new set of variables Y_1, Y_2, … Y_p among which no correlation exists and whose variances are decreasing, that is:

$$Var\ Y_1 \geq VarY_2 \geq VarY_3 \geq \ldots \geq VarY_p \qquad (2)$$

Each new variable Y_j corresponds to a linear combination, such that:

$$Yj = a_{1j}X_1 + a_2 jX_2 + \ldots + a_{pj}X_p = \underset{\sim}{a'}_j\ \underset{\sim}{X} \qquad (3)$$

Therefore, the first main component Y_1 is calculated in such a way that the constant vector a_1 allows it to obtain the maximum possible variance. If λ is the variance of $\lfloor \underset{\sim}{a'}1\ \underset{\sim}{X} \rfloor$, then the higher value λ parameters should be selected so that the smaller number of main

components can explain the maximum possible variance in the responses. In this case, the proportion of variance explained by the j^{th} main component is calculated as follows:

$$\frac{\lambda_j}{\sum_{j=1}^{p} \lambda_j} \qquad (4)$$

By default, the statistical software used in this study[5] determines that the main components for which $\lambda > 1$ should be removed.

5. Research Results

The reasons stated in the survey stem from the above-mentioned reasons behind the definition of the problem. Therefore, taking into account several studies carried out in other countries that have already been mentioned in this study, the following were selected as reasons for the increasing use of analytical procedures in auditing works:

a) Time pressure to carry out the work quickly; (A)
b) Better understanding of applicable standards; (B)
c) More technical sophistication of analytical procedures; (C)
d) Risk-based auditing methodology; (D)
e) Improvement of available auditing tools; (E)
f) Influence of auditing standards. (F)

The following table provides a descriptive analysis of the absolute and relative frequencies of the answers provided to this question:

[5] SPSS v.17.

Table 4.2. – Descriptive Analysis

	A	B	C	D	E	F
Frequency	22	6	38	74	50	22
Average	0.239	0.065	0.413	0.804	0.543	0.239
Variance	0.184	0.062	0.245	0.159	0.251	0.184
Confidence	0.150	0.014	0.310	0.722	0.439	0.150
Interval (5%)	0.328	0.117	0.516	0.887	0.647	0.328

In terms of the frequencies observed, the study makes it very clear that the answer concerning risk-based auditing is that most frequently cited by auditors (80.4%) while the improvement of computer tools is indicated as the second most relevant reason (54.3% of auditors surveyed). Curiously enough, both the reasons related to standards and time pressure associated with auditing costs present considerably low frequencies although they have very high variability.

It should, however, be noted that four of the people interviewed added the following reasons to the previously mentioned options:

- *"It is generally the most efficient way of obtaining review evidence";*
- *"To check that the evidence obtained from substantive tests supports the analytical procedures";*
- *"Reliability of internal data"; and*
- *"Possible variations in income in view of planning predictions and greater efficacy in the detection of significant variations".*

In terms of content, the first reason relates to the time pressure to carry out a job and was therefore included in the first option.

The second and fourth answers have to do with the *risk-based approach*, which is also included in the options that had been given.

Lastly, the answer regarding the reliability of external data was not considered in that it relates to the audit context, which is analysed in another question, and is not a reason that can justify the use of analytical audit procedures on its own.

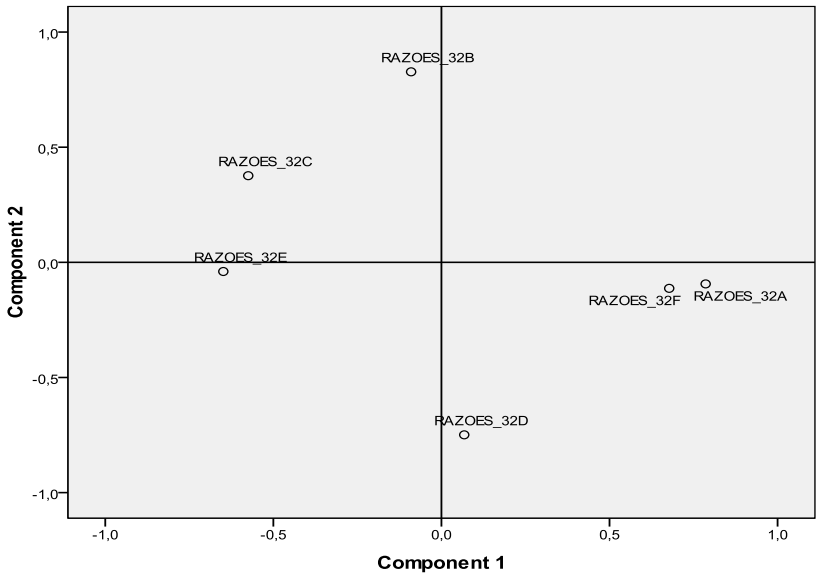
In view of these results, the main components were analysed in order to define the series of reasons that explain the variance seen in this question. The conclusions found are shown below:

Table 4.3. – Main Component Analysis (Output SPSS)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
C1	2.139	35.648	35.648	1.841	30.682	30.682
C2	1.112	18.537	54.186	1.410	23.503	54.186
C3	.825	13.751	67.936			
C4	.790	13.165	81.102			
C5	.596	9.937	91.039			
C6	.538	8.961	100.000			

Table 4.3. shows the reasons that characterize the two main components (variance greater than 1).

Chart 4.1. – Varimax Rotation for Determining Main Components



Analysis of this graph shows that Main Component 1 is essentially made up of reasons related to time pressure in auditing work (A) whereas Main Component 2 is associated with the improvement of applicable standards (B).

6. Conclusions

The results suggest that Portuguese auditors are increasingly using analytical audit procedures because the new approach (risk-based auditing) demands that they be used as part of their working methodology. In this respect, the concentration of answers is higher than 80%. This merely descriptive analysis reinforces what Mulligan and Inkster (1999) had already suggested in their studies.

Despite the near unanimity of the responses, the main component analysis suggests that time pressure, associated with a better understanding of the standards, would explain a large part of the variable.

This confirmation upholds the conclusions reached by Albrecht (1977), Hylas and Ashton (1982), Blocher and Willingham (1988) and Calderon and Green (1994), who highlight the undeniable usefulness of using analytical procedures, arguing that they are a proven way of increasing the efficiency and efficacy of auditing work. According to the

collected data, analytical procedures are especially attractive in cost terms, which is something that auditors appreciate.

It is worth noting that, even though Portuguese auditors are increasingly using analytical procedures when collecting evidence - for the reasons described above and validated by the work undertaken - such procedures do not always provide evidence to corroborate the claims made in financial statements. Such evidence is generally obtained by means of detail tests that often remain an indispensable part of financial auditing in many areas of work.

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