Using client performance measures to identify pre-engagement factors associated with qualified audit reports in Greece

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Abstract

The purpose of this paper is to test the extent to which client (corporate) performance measures can be used to enhance the ability to discriminate between the choice of a qualified or unqualified (clean) audit report. Audit firms face the risk of losing the client if they issue a qualification. On the other hand, failing to qualify exposes the auditor to potential lawsuits and loss of reputation. We examined the financial statements, auditors’ opinions, and financial statements notes for companies in Greece that received a qualified audit report and for those that received an unqualified audit report. We modeled the auditor’s qualification using a multicriteria decision aid classification method (UTADIS—UTilite´s Additives Discriminates) and compared it with other multivariate statistical techniques such as discriminant and logit analysis. The qualification decision is explained by financial ratios and by nonfinancial information such as the client litigation. The developed models are accurate in classifying the total sample correctly with rates of almost 80%.

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Keywords: Qualified audit report; Financial statements; Multicriteria decision aid; Performance measures; Greece
1. Introduction

References to qualified audit reports have increased in frequency over the last few years. All European Union (EU) member states have some type of corporate legislation that prescribes the form and content of the auditors’ annual reports. The way in which professional standards are applied, however, has an impact on both the form and content of the audit report. Greece, as a member of the EU, applies the Fourth Directive on Company Law, which imposes the requirement of giving “a true and fair view” on financial reporting. Two components should be present in the annual reports from companies within the EU. First, the financial accounting framework used in the preparation and presentation of the financial information should be consistent with the concept of true and fair view. Second, the auditor’s report should include an expression of opinion on whether the financial statements give a true and fair view.

The qualification of financial statements as well as the detection of falsified financial statements have been recently in the limelight in Greece because of the increase in the number of companies listed on the Athens Stock Exchange (and raising capital through public offerings) and the attempts to reduce taxation on profits. The years 2000–2002 were very difficult for the Greek stock market; the stock market in Greece suffered from stagnation both in terms of share prices and liquidity. The market’s decline along with the increase in the number of qualified audit reports has piqued the interest of regulators, Stock Market authorities, the Ministry of the Economy, individual and institutional investors, and the banking sector. In Greece, the public has been consistent in its demand for qualified opinions as warning signals of business failure. There is increasing demand for greater transparency, consistency, and more information to be incorporated in the financial statements. The increasing demand and the absence of studies for audit opinions in Greece motivated us to consider the Greek case.

The focus of this study is the development of models that consider client performance measures, including financial information and other indicators such as client litigation, to explain qualifications of audit reports of publicly traded Greek companies. Researchers can use empirical models to assess the extent to which a qualification could be expected based on publicly available data (Dopouch, Holthausen, & Leftwich, 1987). The outcomes of such models are an estimation of the likelihood of a company receiving a qualified opinion. Bell and Tabor (1991), as well as Chen and Church (1992), note that auditors can use the output of such models to plan specific auditing procedures that can be applied to achieve an acceptable level of audit risk. These models can also be used as a quality control tool in the review or final stage of an engagement and for contingency analyses on how changes in specific variables could add or detract from the probability of obtaining a qualified opinion (Kleinman & Anandarajan, 1999). Our approach also examines the extent to which auditors’ opinion is affected by the performance of the firms. The analysis in this paper is based on a nonparametric multicriteria decision aid classification method, the UTADIS (UTilités Additives Discriminates) method (Zopounidis & Doumpos, 1999). The use of nonparametric classification techniques (e.g., neural networks, mathematical programming, machine learning, fuzzy sets, rough sets, etc.) in business, finance, and accounting has rapidly increased during the past 20 years (Duda, Hart, & Stork, 2001; Gehrlein & Wagner, 1997; Zopounidis
& Doumpos, 2002), mainly due to their flexibility with regard to the model development process and the form of the models developed.

The analysis, using UTADIS, focuses on two main issues: (1) investigate the relationship between client performance measures and the auditors’ qualification decisions; and (2) investigate the performance of the resulting classification that is, detecting firms that receive qualified reports in comparison with models developed using linear discriminant analysis (LDA) and logistic regression (LOGIT). The results indicate that there is negative relationship between client performance measures and the likelihood that a firm receives a qualified audit report; high performance (healthy) firms are more likely to receive a nonqualified (clean) report compared to low performance firms. Furthermore, an extensive bootstrapping experiment shows that models developed using the UTADIS methodology provide superior classification performance (predictive ability) as compared to traditional statistical classification models. This result suggests that the classification models of the UTADIS method are able to explain more accurately the auditors’ decisions to qualify their reports. The UTADIS method was also used in an earlier study (Spathis, Doumpos, & Zopounidis, 2002) to model detection of management fraud related to the falsification of financial statements (FFS) in Greece. Using a random sample of 76 Greek firms (a different sample from the one used in the present study), a Jackknife analysis for model validation was performed and a strong relationship was found between FFS and the financial characteristics of the firms. In particular, the ratios of total debt to total assets, inventories to sales, net profit to sales, and sales to total assets were found to be strong predictors of FFS. The present study complements the earlier one on FFS detection, thus contributing to an integrated analysis of the accounting practice in Greece covering the analysis of audit reports and the detection of FFS.

The remainder of this paper is organized as follows: The next section reviews previous research on qualified audit reports. Section 3 outlines the method and the sample data used in the study. Section 4 describes the empirical results. Finally, the Section 5 provides the concluding remarks.

2. Previous research

2.1. Audit qualification opinion

Several models have been developed to explain qualifications of audit reports. The general consensus of these models has been that financial and nonfinancial factors affect the audit opinion decision. Dopouch et al. (1987) developed a probit model to investigate the extent to which models based on financial and market variables predict auditors’ decisions to issue qualified audit reports. Their results showed that the most significant variables in qualification prediction are current year loss, industry rate of return, and the change in the ratio of total liabilities to total assets. Keasey, Watson, and Wynarzcyk (1988) used logistic regression based on 12 financial and nonfinancial variables to explain audit-report qualification for small companies. They showed that the likelihood that a company receives a qualified audit report increases if (a) a large accounting firm audits the company; (b) the company has few directors;
(c) few nondirector shareholders; (d) a secured loan; and (e) if there was a long lag between the auditing year-end and the signing of audited accounts.

Krishnan and Krishnan (1996) considered audit opinion models by incorporating economic tradeoffs that arise in the auditor’s litigation risk, the extent of outsider ownership, the relative importance of the client in the auditor’s portfolio, and future growth as important factors in the audit opinion decision. In modeling the auditor’s opinion decision for financially distressed companies, Mutchler, Hopwood, and McKeown (1997) concluded that qualitative variables involving good and bad news items had no incremental explanatory power relative to financial variables. Laitinen and Laitinen (1998) used logistic regression analysis based on 17 financial and nonfinancial variables to explain qualifications in large companies in Finland. Their results showed that the likelihood of receiving a qualified audit report is higher with low growth rate, low equity/total assets, and small number of employees.

Casterella, Lewis, and Walker (2000) developed an opinion prediction model introducing a bankruptcy resolution variable, a proxy of the auditor’s prognosis of the ultimate disposition of the soon-to-be-bankrupt company. They found that auditors are less able to predict either bankruptcy filing or resolution. The model suggests that auditors are less likely to issue a modified opinion when the financial prospects of the company are not clear and when auditors are faced with incentives to delay or avoid issuing a modified opinion. Some studies on auditor’s going-concern assessment have also focused on hybrid approaches such as those used in Lenard, Alam, Booth, and Madey (2001). They combined a decision support system with a statistical model that predicts bankruptcy as a component of the auditor’s decision to show that bankruptcy prediction is an important component of the going-concern decision. Arnold, Collier, Leech, and Sutton (2001) present a theoretical framework of the audit decision process that consists of four broad-based components within the overall audit environment: (a) the auditor, (b) evidence gathering and analysis, (c) auditor/audited contracting, and (d) social contracting. Finally, Reynolds and Francis (2001) found that Big Five auditors do not treat large clients more favorably than smaller firms.

Most prior studies used qualitative variable(s) in developing audit opinion models. However, qualitative indicators of potential solvency problems indicate bad news characteristics such as client litigation. While Kida (1980), LaSalle, Anandarajan, and Miller (1996), and Mutchler, Hopwood, and McKeown (1997) argue that this type of specific information cues may not necessarily be sufficient to trigger the qualified audit report, and may cause the auditor to focus more extensively on whether a qualified report should be issued.

### 2.2. Client litigation

The effects of client (firm) litigation on the type of audit opinion have not been considered but disclosure issues have been examined. Skinner (1997) provides evidence on whether managers can reduce stockholder litigation costs by disclosing adverse earnings news early. He found that voluntary disclosure occurred more frequently in quarters that result in litigation than in quarters that did not. Managers’ incentives to predisclose earnings news increased as the news became more adverse, presumably because of the expected reduction in the cost of resolving litigation. Hughes and Sankar (1997) analyzed the impact of expected litigation-
related costs on discretionary disclosure. Using data from lawsuits, Karpof and Lott (1998) found that press coverage of punitive lawsuits led to statistically significant decreases in the market values of defendant companies. Johnson, Kasznik, and Nelson (2001) provided direct evidence on the relation between the legal environment and voluntary disclosure of good news in high-technology industries. Evans and Shridar (2002) found that under certain circumstances potential shareholder litigation can interact with the influences of capital and product markets to make voluntary disclosures more credible.

2.3. Greek auditor’s report

The accounting and auditing standards in Greece represent a blend of governmental and professional involvement. The codified Roman law system is a more rigid system and may impact auditing characteristics by requiring more reliance on the stated legal objectives of the auditing profession. The accounting standards are closely related to taxation and corporate legislation. In particular, accounting standards are based mainly on established corporate laws; the standards were established by the Ministry of National Economy, the interpretations were issued by the National Accounting Standards Board (ESYL) and the Greek General Chart of Accounts (Institute of Certified Auditors of Greece, 1999). Greek accounting standards differ from the International Accounting Standards (IAS) due to the absence of specific rules on recognition and measurement. Recently, the European Commission ruled that all companies operating within EU prepare their consolidated financial statements in accordance with IAS from 2005 onward. Therefore, accounting standards in Greece will soon comply with those of IAS. In addition, the European Commission’s fourth directive and the increase in global capital market activity are expected to increase harmonization in auditors’ reports. Greek auditors’ reports to this point have been harmonized de jure and de facto with International Standard on Auditing (ISA) 13. Greece is also influenced by both the United States and the EU with regard to the form and content of auditors’ reports.

The auditing standards that are being applied by certified auditors have been published in the Official Government’s Gazette (the issue 1119/B/18.12.1979 specified the basic standards and fieldwork standards, while the issue 126/B/5.3.1993 specified the Auditor’s report standards). The auditor’s report on the annual financial statements is addressed to the entity’s SA shareholders (e.g., audit assignors). The auditor’s report contains:

(a) Identification of audited and attested financial statements.
(b) Compliance with the provisions of article 37, Law 2190/20 and the auditing procedures considered appropriate within the framework of auditing principles and policies.
(c) Specific information and confirmations as required by the existing legislation.
(d) Any observations (notes) on the part of the auditor on material matters taken into account by the auditor to support his conclusions, whenever these contain some qualification, adverse opinion, or disclaimer of opinion.
(e) The auditor’s opinion on the financial statements.
(f) Any necessary clarifications on the part of the auditor.
(g) Place and date of the report, with full name and signature of the issuing auditor/s.
In addition, existing legislation required that the auditor’s report refer to:

(a) Information necessary for the audit.
(b) Knowledge of full accounting reports of entity branches.
(c) Appropriate accounting for production cost.
(d) Application of the appropriate accounting plan.
(e) Modification of valuation method as related to the preceding financial year.
(f) Verification on consistency between the contents of the director’s report and the relevant financial statements.
(g) Information contained in the notes on the accounts.

The auditor qualifies his audit report whenever he thinks that one of the following circumstances is concurrent: (a) there exists material influence on specific items or on the overall picture of the financial statement attested, and (b) there has been a limitation in his possibility to formulate a sufficient opinion on one or more items and other disclosures that are included, or should have been included in the financial statement attested. In the opinion paragraph of the report, the auditor expresses with clarity his professional opinion that is classified as: (a) unqualified, (b) qualified, (c) adverse, or (d) disclaimer of opinion. The incidents of adverse opinion and disclaimer of opinion are rare. On the other hand, empirical evidence obtained from certified auditors in Greece indicates that about 50% of the firms receive qualified reports. While this figure is surprisingly high, it should be emphasized that until recently audit reports in Greece were not given much attention and consequently firms did not have any major motivation for preparing appropriate financial reporting. Recently, the attention paid to audit reports has increased, and consequently, the number of firms that receive qualified reports is soon expected to decrease.

3. Methodology

3.1. Sample

The sample used in this analysis involves 100 Greek firms. Certified auditors have checked all the companies included in the sample. All public limited companies (societies anonyms) and limited liability companies are obliged to submit to a certified auditor’s control when they fulfill two of the following three criteria: (a) total revenues are over €2.9 million, (b) total assets are over €1.5 million, and (c) the average number of employees is over 50 (Caramanis, 1997).

According to data availability over the past few years (1997–1999), 50 firms were included in the sample having received qualifications such as the ones noted in Table 1. The number of qualified opinions over the period of analysis is: 12 for 1997, 18 for 1998, and 20 for 1999. Qualifications can be characterized based on inappropriate accounting method, inadequate disclosure, and scope limitation. The audit qualifications have to do with accounting events where the Greek Generally Accepted Accounting Principles (GAAP) were not followed. For example, certain expenses were not recognized, or Greek GAAP was incorrectly applied, or the tax accounting rules and regulations were followed instead of GAAP for external reporting.
Issuing audit opinions of serious doubts as to the correctness of the accounts of financial statements is sufficient to classify the report as “qualified.” These are typically for firms that refuse to recognize (i.e., incorporate in the accounts and the financial statements certain accounting events) or disclose certain events. A qualified report includes explanatory paragraphs and examples of events that discuss these doubts (cf. Appendix A). The items disclosed in the opinions of qualified audit reports and descriptive statistics for the audit reports are presented in Table 1.

The median value for the total number of qualifications in the audit reports for the sample firms described below is 5. Qualifications for bad debts, redundancy payments, inadequate depreciation, and participation in other companies were not as frequent as qualifications involving inaccurate estimation of the taxes payable and other qualifications. A comparison sample of firms with clean (nonqualified) reports was selected by matching to reduce the effects of other factors such as industry sector, fiscal year-end, and company size. The sample does not include financial firms because of the specialized nature of their accounting standards.

Some of the characteristics of the qualified and nonqualified samples of companies are presented in Table 2. Although the mean value of total assets for qualified firms is €30.4 million and €34.3 million for nonqualified firms, the difference is not statistically significant ($t = 0.376, p = .708$). There is a statistically significant difference between average profits of qualified firms, with losses averaging at €0.2 million, and nonqualified firms, profit averaging €3.1 million ($t = 2.695, p = .008$). The difference in the equity of qualified firms and non-

<table>
<thead>
<tr>
<th>Items</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total qualifications per audit report</td>
<td>Mean</td>
</tr>
<tr>
<td>Inadequate depreciation</td>
<td>0.80</td>
</tr>
<tr>
<td>Understatement of bad debt expenses</td>
<td>0.88</td>
</tr>
<tr>
<td>Nonrecognition of severance payments</td>
<td>0.88</td>
</tr>
<tr>
<td>Overstatement of the long-term investments</td>
<td>0.86</td>
</tr>
<tr>
<td>Inaccurate estimation of the taxes payable and other reasons for audit qualifications</td>
<td>2.04</td>
</tr>
</tbody>
</table>

Table 2
Characteristics of firm’s means and $t$ tests

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Nonqualified</th>
<th>Qualified</th>
<th>$t$ test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>34,324</td>
<td>30,357</td>
<td>0.376</td>
</tr>
<tr>
<td>Equity</td>
<td>18,401</td>
<td>13,564</td>
<td>0.815</td>
</tr>
<tr>
<td>Sales</td>
<td>32,537</td>
<td>19,419</td>
<td>1.367</td>
</tr>
<tr>
<td>Net profit</td>
<td>3143</td>
<td>-208</td>
<td>2.695**</td>
</tr>
</tbody>
</table>

The amounts are reported in thousand Euros.
$t$ test: $df = 98$ (two-tailed).

** Significant at the 5% level.
qualified firms is also statistically nonsignificant with €13.6 million and €18.4 million, respectively \( t = 0.815, p = .417 \).

3.2. Variables

A set of 20 variables served as the initial set, this choice benefited by previous studies and considered client litigation, financial distress, and other publicly available financial information (i.e., financial ratios).

3.2.1. Client litigation

The client litigation variable is coded as 1 if a company had litigation in the year preceding the audit opinion, and as 0 otherwise. A company is considered to have litigation in the following cases (Skinner, 1997): (a) a lawsuit has been filed in a Greek court; (b) there has been an allegation of common stock price fraud; (c) there has been an allegation of stock exchange violation under the Greek law, i.e., when the suit alleges some misstatement or omission of material information. This procedure provides a sample of 21 lawsuit filings. The information on the above cases was obtained from the available financial press (newspapers and magazines).

3.2.2. Financial distress

Clients with a high probability of bankruptcy are more likely to receive qualified opinions because their ability to continue to operate is in greater doubt (Bell & Tabor, 1991; Krishnan & Krishnan, 1996; McKeown, Mutchler, & Hopwood, 1991; Reynolds & Francis, 2001). A proxy for the probability of bankruptcy is the Altman \( z \)-score (Altman, 1983), although it has some limitations because it was developed under a different time period, under different economic conditions, and in a different country (USA). It is, nevertheless, used in many studies, especially since a generally accepted model has not been established for Greek companies (Doumpos & Zopounidis, 1999; Theodosiou, 1991).

3.2.3. Financial information

Auditors give qualifications when there are uncertainties about material events that management would not or could not explicitly provide in financial statements. The material uncertainties will usually be reflected in one or more components representing the financial position and performance of the company. Since the financial soundness of a company is represented in its financial statement variables, many researchers have used financial variables in the last 20 years to formulate audit opinion expectations (Dopouch et al., 1987; Francis & Krishnan, 1999; Kida, 1980; Krishnan & Krishnan, 1996; Mutchler et al., 1997; Laitinen & Laitinen, 1998; Sundgren, 1998; Reynolds & Francis, 2001).

However, from a practical point of view, developing an auditor’s opinion model that considers a large number of variables poses problems to the use of the model by the auditor. This is because the application of the model requires that the auditor collect all necessary data, which leads to increased time and cost for data collection and management. Furthermore, the consideration of a large number of variables in a multidimensional context raises multi-
collinearity concerns. This may lead to the development of models that are sample-based, unstable, and difficult to interpret (Morrison, 1967). For these reasons, we have adopted an ad hoc variable selection process considering both the correlation of the variables and their statistical significance measured through a univariate test. In particular, indicators that were highly correlated were dropped to reduce the effects of multicollinearity. The retained variables relate to profitability, solvency/liquidity, and managerial performance (Courtis, 1978). Except for the correlation analysis, the statistical significance of mean differences between the indicators for the two groups of firms in the sample was also calculated using the Kruskal–Wallis test (Table 3).

This combination of correlation analysis and Kruskal–Wallis test led to the selection of a limited set of eight financial ratios, one dummy variable (the client litigation), and the z-score (the selected ratios are marked in Table 3 in italics).

3.3. Method

The method used to develop the qualification identification model in this study is the UTADIS Multicriteria Decision Aid Method. The UTADIS method aims at developing an
additive utility model for the classification of a set of alternatives in predefined homogeneous groups. In this case, the alternatives correspond to the firms, whereas the classification involves two groups, i.e., the firms that receive a qualified audit opinion and those that receive a clean opinion.

The method operates on the basis of a nonparametric regression-based framework that is similar to discriminant analysis, logit, probit, etc. Using a training sample, the classification model is developed using linear programming techniques. If the classification accuracy of the model in the training sample is satisfactory, then it could be applied to any other sample for extrapolation and decision-making purposes. The form of the developed classification model, its interpretation, and its advantages over traditional classification techniques, are outlined in Appendix B. A detailed description of the method can be found in Zopounidis and Doumpos (1999).

4. Results

4.1. Bootstrap methodology and main findings

A bootstrapping approach is employed in applying the UTADIS method to investigate the relationship between corporate performance and the likelihood of issuing a clean or a qualified audit report and in evaluating the performance of the method for classifying firms. Most often the predictive ability of models developed from past data is tested on a holdout sample. However, data availability problems make it impossible to collect the appropriate data for such a sample. Thus, resampling techniques such as bootstrapping (Efron & Tibshirani, 1993) and cross-validation (Stone, 1974) provide an alternative. Bootstrapping is used in this study because it provides estimations with moderate bias and low variance (Efron & Tibshirani, 1997).

The bootstrap analysis in this study enables the assessment of the predictive performance of the models developed for discriminating between firms that receive qualified or nonqualified audit reports. The bootstrap analysis is performed by constructing 200 bootstrap samples at random with replacement. Each sample consists of 100 firms (i.e., the bootstrap samples are of the same size as the complete sample for firms). According to Efron and Tibshirani (1993, 1997), 50 bootstrap samples are generally adequate for estimating the error rate of a classification/regression model, while more bootstrap replications are required to investigate the stability of the parameters of the model. Since this analysis involves both the examination of the significance of the selected indicators and the analysis of the classification performance of the UTADIS method, an increased number of 200 bootstrap replications are considered. Each bootstrap sample is used as a training sample for the UTADIS method in order to construct a model for the distinction between the firms that receive qualified audit reports and those that receive clean reports. The model is then used to classify the firms not included in the bootstrap sample.

Using this process, two different bootstrap experiments are performed, considering two slightly different sets of financial ratios. The first experiment considers all the indicators
selected through the procedure described in Section 3.2, including the z-score, which is a linear combination of some financial ratios. Thus, it can be argued that the consideration of the z-score implies an “overuse” of financial information by the developed models. Therefore, in a second stage, the analysis is also performed without the z-score as an independent variable.

For both sets of independent variables, statistics of robustness are summarized in Table 4. This table illustrates the significance of each financial ratio in the discrimination between firms that receive a qualified audit report and firms that do not, according to the models developed through UTADIS.

The results clearly indicate that receivables/sales are the most crucial factor in the UTADIS model for the classification of the firms. Net profit/total assets and working capital/total assets are also found to be significant in both cases, with the assigned weights being higher than 10%. In particular, the analysis showed that high receivables/sales, low net profit/total assets, and low working capital/total assets characterize qualified firms. Reynolds and Francis (2001) argue that companies are more likely to receive a qualified report if they are financially distressed and the financial statements were qualified in prior periods. The z-score has a moderate weight (8.75%) in the model developed using the complete set of ratios, but its importance cannot be overlooked. In examining empirical evidence of auditor’s opinion decisions, Mutchler et al. (1997) found that companies with qualified reports displayed a low degree of financial distress (as evidenced by high discriminant scores). They explained this unexpected result by suggesting that, in these situations, “contrary information” (bad news) was the driving factor in the auditor’s decision. The most significant differences in the weights of the financial ratios involve the ratios of sales/total assets, net profit/fixed assets, and current assets/current liabilities. The latter ratio is found to be the most important factor when the z-score is excluded from the analysis, whereas in the case where all the ratios are considered, its weight is rather moderate. In contrast, Lenard et al. (2001) found that the ratio of current assets/current liabilities is a significant variable for explaining an assessment of going concern

<table>
<thead>
<tr>
<th></th>
<th>Average weight</th>
<th>Standard error</th>
<th>Average weight</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIENT LIT</td>
<td>5.61</td>
<td>0.48</td>
<td>7.63</td>
<td>0.95</td>
</tr>
<tr>
<td>SAL/TA</td>
<td>12.86</td>
<td>0.67</td>
<td>4.70</td>
<td>0.67</td>
</tr>
<tr>
<td>NP/SAL</td>
<td>9.00</td>
<td>0.36</td>
<td>7.19</td>
<td>0.53</td>
</tr>
<tr>
<td>REC/SAL</td>
<td>14.87</td>
<td>1.38</td>
<td>16.39</td>
<td>1.26</td>
</tr>
<tr>
<td>Z.SCORE</td>
<td>8.75</td>
<td>0.37</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>NP/FA</td>
<td>6.93</td>
<td>0.91</td>
<td>16.10</td>
<td>1.34</td>
</tr>
<tr>
<td>NP/TA</td>
<td>14.23</td>
<td>0.60</td>
<td>10.14</td>
<td>0.93</td>
</tr>
<tr>
<td>CA/CL</td>
<td>7.09</td>
<td>0.46</td>
<td>19.25</td>
<td>1.12</td>
</tr>
<tr>
<td>WC/TA</td>
<td>11.37</td>
<td>0.46</td>
<td>10.54</td>
<td>0.79</td>
</tr>
<tr>
<td>GP/TA</td>
<td>8.66</td>
<td>0.28</td>
<td>7.71</td>
<td>0.87</td>
</tr>
</tbody>
</table>
because the owners of the firms that receive the qualified opinions face higher risk and lower returns than the owners of firms receiving the clean opinions; they are more likely to sue auditors in the event of bankruptcy. Auditors are therefore compelled to warn stockholders as well as other users that the situation is worse than it appears since certain events with adverse economic consequences may not have been fully recognized.

A comparison with the results of the previous study on FFS detection (Spathis, Doumpos & Zopounidis, 2003) shows that the factors that describe qualified audit reports differ from the ones found useful in detecting FFS. In particular, Spathis et al. found that the total debt, total assets, inventories sales, net profit-to-sales ratio, and sales total assets ratios contribute significantly to explain FFS. In this study, the first two ratios (total debt to total assets, inventories sales) are not considered in model development because they were not statistically significant in the first step of the analysis (Kruskal–Wallis test; cf. Table 3). The net profit-to-sales ratio was found statistically significant, but its contribution to explaining qualified audit report models is below 10%. Finally, the sales/total assets ratio was found to be significant for the complete set of ratios with an average weight of 12.86%.

4.2. Classification results

Table 5 summarizes the classification results for the two bootstrap experiments obtained using the UTADIS method. For comparative purposes, the results of LOGIT and LDA are also reported as benchmarks for the UTADIS results.

The presented results are for the overall error rate, as well as for Type I and Type II error rates. The Type I error refers to the classification of firms that receive qualified audit reports as receiving clean reports. Similarly, the Type II error refers to the classification of firms that

<table>
<thead>
<tr>
<th>Error types</th>
<th>Estimators</th>
<th>UTADIS</th>
<th>LDA</th>
<th>LOGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-score considered</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td>$\text{Err}^{(32\text{e}+)}$</td>
<td>20.68</td>
<td>30.38</td>
<td>25.58</td>
</tr>
<tr>
<td></td>
<td>$\text{Err}^{(1)}$</td>
<td>24.57</td>
<td>34.10</td>
<td>32.33</td>
</tr>
<tr>
<td>Type II</td>
<td>$\text{Err}^{(32\text{e}+)}$</td>
<td>20.17</td>
<td>19.46</td>
<td>22.89</td>
</tr>
<tr>
<td></td>
<td>$\text{Err}^{(1)}$</td>
<td>23.76</td>
<td>22.64</td>
<td>24.58</td>
</tr>
<tr>
<td>Overall</td>
<td>$\text{Err}^{(32\text{e}+)}$</td>
<td>21.17</td>
<td>25.66</td>
<td>25.30</td>
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<tr>
<td></td>
<td>$\text{Err}^{(1)}$</td>
<td>24.17</td>
<td>28.37</td>
<td>28.47</td>
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<tr>
<td>z-score not considered</td>
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<tr>
<td>Type I</td>
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<td>30.58</td>
<td>25.79</td>
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<td></td>
<td>$\text{Err}^{(1)}$</td>
<td>24.84</td>
<td>34.41</td>
<td>29.16</td>
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<tr>
<td>Type II</td>
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<td></td>
<td>$\text{Err}^{(1)}$</td>
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<td>25.61</td>
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<tr>
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<td>$\text{Err}^{(1)}$</td>
<td>24.68</td>
<td>28.81</td>
<td>27.39</td>
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</table>
receive clean audit reports as receiving qualified reports. The overall error rate is the average of the Type I and Type II errors. These three types of errors are summarized in Table 5. This table reports both the leave-one-out bootstrap error rate estimator $\text{Err}^{(1)}$, as well as the 632+ estimator $\text{Err}^{(632+)}$ (Efron & Tibshirani, 1993, 1997). $\text{Err}^{(1)}$ measures the expected classification error rate estimated from firms not included in the bootstrap samples; thus, it is expected to be an upwardly biased estimator of the true error rate. On the other hand, the apparent error rate ($\text{err}$) calculated from the whole sample of firms (re-substitution error) is a downwardly biased estimate. To address these bias issues in the estimates of classification performance, Efron and Tibshirani (1997) proposed the $\text{Err}^{(632+)}$ estimator that considers both $\text{Err}^{(1)}$ and $\text{err}$ in order to provide an unbiased error rate estimate.

The comparison of the methods on the basis of the overall error rate shows that the UTADIS method outperforms LDA and LOGIT in terms of the $\text{Err}^{(632+)}$ and the $\text{Err}^{(1)}$ estimators, both when the complete set of ratios is considered, as well as in the case where the $z$-score is excluded from the analysis. The differences between UTADIS and other statistical methods according to the $\text{Err}^{(632+)}$ estimator are larger compared to those measured according to $\text{Err}^{(1)}$, because $\text{Err}^{(632+)}$ considers both $\text{Err}^{(1)}$ and the apparent error rate $\text{err}$. The classification models developed through UTADIS have increased degrees of freedom compared to the models of LDA and LOGIT, which require only the estimation of the discriminant coefficients. Therefore, the apparent error rate $\text{err}$ is lower for UTADIS than for LDA and LOGIT. For instance, when the complete set of ratios is considered, the apparent estimate for the overall error is 14% for the UTADIS method as opposed to 19% and 17% for LDA and LOGIT, respectively. (The same figures are 16% for UTADIS, and 21% for LDA and LOGIT when the $z$-score is excluded).

Bearing in mind these remarks, it is interesting to note the pattern of differences between the UTADIS method, LDA, and LOGIT for the $\text{Err}^{(1)}$ estimates of the overall error rate, the Type I and Type II errors. In particular, when the complete set of ratios is considered, the differences in the $\text{Err}^{(1)}$ estimates of the overall error rate are statistically significant at the 5% level ($t$ values $-2.054$ and $-2.410$ for UTADIS–LDA and UTADIS–LOGIT, respectively). The superiority of the UTADIS method is mainly due to its superiority in terms of the Type I error rate (24.57% for the UTADIS method, as compared to 34.10% for LDA, and 32.33% for LOGIT). The differences of the methods in terms of the $\text{Err}^{(1)}$ estimates are highly significant ($t$ values $-5.227$ and $-5.468$, for UTADIS–LDA and UTADIS–LOGIT, respectively). On the other hand, the differences between the methods in terms of the Type II error rates are not significant.

There are small changes in the error rates when the $z$-score is excluded from the analysis, but the ranking of the methods does not change. In particular, the performance of UTADIS and LDA is slightly inferior compared to the results with the $z$-score, whereas the performance of LOGIT is slightly improved. In terms of the overall error rate [$\text{Err}^{(1)}$ estimate] the differences between UTADIS (24.68%), LDA (28.81%), and LOGIT (27.39%) are significant at 10% ($t$ values $-1.975$ and $-1.718$ for UTADIS–LDA and UTADIS–LOGIT, respectively). Once again, these differences are due to the superiority of UTADIS in terms of the Type I error ($t$ values $-5.222$ and $-3.780$ UTADIS–LDA and UTADIS–LOGIT, respectively), whereas for Type II error all methods perform almost equally well.
These results show that the superiority of the models developed through UTADIS over the models of LDA and LOGIT is due to the higher ability of the UTADIS models to describe correctly the firms that receive qualified audit reports. It is also interesting to note that on the basis of the acceptable classification results of the UTADIS method [the overall error rates according to the unbiased Err(632+) estimator are approximately 20%], the assumption that there is a positive relationship between the performance of firms (as perceived by the auditors) and the likelihood that they receive a clean report seems to be valid.

5. Concluding remarks

The primary objective of this study was to develop a model that identifies factors associated with qualified audit reports and predicts whether firms will receive qualified or clean reports. To achieve this goal, a sample of qualified and nonqualified firms was considered. Univariate tests were employed to select the appropriate explanatory variables and a multicriteria decision aid classification method (UTADIS) was used. The results were compared to well-known multivariate statistical techniques, namely, logistic regression and discriminant analysis. Ten variables (eight financial ratios, one dummy variable, and the \( z \)-score) were selected to explain qualified audit reports. These variables appeared to be important in prior research and constituted ratios derived from published financial statements. The variables selected by the above techniques as possible useful indicators were: the receivables/sales ratio, the net profit/total assets ratio, the sales/total assets ratio, and the working capital/total assets ratio. The UTADIS method was found quite effective in predicting qualified/clean reports, providing an estimated classification accuracy of approximately 80%. This result suggests that there is potential in identifying pre-engagement factors associated with qualified audit reports through analysis of publicly available financial statements.

The results are encouraging in that we believe we have developed a reliable model for assessing the likelihood of identifying qualified audit reports of businesses in Greece. The use of the proposed methodological framework could be of assistance to professionals who are interested in the financial health of the firms they follow.

Alternative methods for the identification qualified audit reports such as adaptive logit networks and neural networks can be used. Furthermore, there are several publicly available variables which are worth considering in future research. These variables include the firm’s standing within industries, long-term trends, corporate governance, and auditor independence.

Acknowledgements

We would like to thank the anonymous reviewers of The International Journal of Accounting for their valuable comments and suggestions. An early version of this paper was presented at the 24th Congress of the European Accounting Association held in Athens, Greece on April 18–20, 2001.
Appendix A. Main explanatory paragraphs and examples of events used in qualified audit reports

1. Inadequate depreciation
The depreciation charged to the Profit and Loss account was not in accordance with the law . . . the rate of depreciation was lower than the one required by the tax authorities for those assets for the amount . . .

2. Understatement of bad debt expenses
There was no provision for bad debts for the amount of . . .

3. Non recognition of severance payments
There was no provision for redundancy payments for the amount of . . .

4. Overstatement of the long-term investments
The value . . . of the investment in other companies which are not listed at the Athens Stock Exchange cannot be verified.
The value . . . of the investment in other companies which are not audited cannot be verified.

5. Inaccurate estimation of the taxes payable and other reasons for audit qualifications
There are tax liabilities overdue for the amount of . . .
The company accounts have not been examined by the tax authorities for the tax years . . . therefore the tax liabilities are not confirmed.
There was no asset revaluation in accordance with the law.
The shareholders’ funds are negative and amount to 50% of the share capital. It is therefore essential that capital reconstruction and increase must follow.
The Profit and Loss account is not debited with losses arising from the valuation of bonds (or financial instruments, shares in other companies).
Repairs of assets for the amount of . . . have been capitalized.

Appendix B. Outline of the UTADIS method

The use of the UTADIS method in this study aims at the development of a model that classifies a set of \( n \) firms \( a_1, a_2, \ldots, a_n \) into two groups \( C_1 \) (firms with clean reports) and \( C_2 \) (firms with qualified reports). Details for the general multigroup case can be found in Zopounidis and Doumpos (1999).

The first major distinguishing feature of the method over traditional statistical techniques (e.g., discriminant and logit analysis) is that the groups are defined in an ordinal way, assuming that the firms of group \( C_1 \) have higher overall performance compared
to the firms of group $C_2$. This assumption implies a positive relationship between the overall performance of the firms, as perceived by the auditors, and the likelihood that a firm receives a clean report. The use of the UTADIS method and the ordinal definition of the groups enable the investigation of the validity of this assumption. Should the classification results be satisfactory, then this will indicate that the above assumption is valid.

Within this context, the overall evaluation of the firms and their classification in the two groups is considered as a monotonic function of the partial performance of the firms on each evaluation criterion (client performance measure). This monotonic relationship is modeled through an additive utility function [$g$ denotes the criteria vector, i.e., $g=(g_1, g_2, \ldots, g_m)$]:

$$U(g) = \sum_{i=1}^{m} p_i u_i(g_i) \in [0, 1]$$

where $p_i \geq 0$ is the weight of criterion $g_i$ ($p_1 + p_2 + \ldots + p_m = 1$) and $u_i(g_i)$ is the corresponding marginal utility function normalized between 0 and 1. The criteria weights indicate the contribution (significance) of each criterion in estimating the overall performance of the firm (the higher the weight the more significant is the criterion). The marginal utility functions $u_i(g_i)$ provide the partial performance of the firms for each individual criterion $g_i$, measured on a scale ranging between 0 and 1. The higher the marginal utility of firm on a criterion, the higher is its performance as perceived by the auditor. Generally, the marginal utility functions are monotone functions defined on each criterion’s scale. These functions are increasing for criteria, which are positively related to the performance of the firms (the ratios $SAL/TA$, $NP/SAL$, $NP/FA$, $NP/TA$, $CA/CL$, $WC/TA$, $GP/TA$, and the zeta score), and decreasing in the opposite case (CLIENT LIT and REC/SAL ratio). Nevertheless, there is no a priori specific functional definition of the marginal utility functions. Instead, these are treated as unknown parameters of the model and they are estimated during the model development process. This special feature of the UTADIS method adds flexibility to the developed classification model, which may take a linear or nonlinear form depending on the sample data under consideration. This flexibility of the classification models developed through UTADIS is a major advantage over models developed through the statistical and econometric techniques such as discriminant and logit analysis, which have a well-specified and less flexible functional form.

Conceptually, the global utility $U(g)$ of a firm $a_j$, as defined in Eq. (1), is an aggregate index measuring the overall performance of the firm on the basis of all criteria. The global utility measures the value (overall performance) of the firm as perceived by the auditor during the examination of its financial characteristics (financial ratios). The higher the global utility, the higher the overall performance of the firm (as perceived by the auditor) is. Considering the aforementioned assumption on the positive relationship between corporate performance and the likelihood that the firm receives a clear report, it can be concluded that the higher the global utility of a firm, the more likely that the firm will receive a clean audit report. Therefore, the following simple classification rule is used to
distinguish between firms that receive clean reports (group $C_1$) and the ones that receive qualified reports (group $C_2$).

$$U(g_j) \geq u_1 \Rightarrow a_j \in C_1$$

$$U(g_j) < u_1 \Rightarrow a_j \in C_2$$

(2)

All the parameters of the additive utility model (criteria weights, marginal utilities, cutoff point $u_1$) are estimated using linear programming techniques in order to minimize the violations of the classification rule (Eq. (2)) for a training sample of firms.

References


