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Master Thesis

“DETERMINANTS OF AUDITOR CHOICE
IN THE EUROPEAN MARKET”

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INTRODUCTION

Engaging with an audit firm is a significant corporate governance mechanism in order to alleviate several disorders or conflicts which can be created in a company’s internal environment. Taking into consideration many scandals that have happened the previous years, it is obvious that the compelling need of the investors, companies and public for reliable and precise financial information is continuously growing. Generally, auditing can provide better quality regarding the financial information that investors receive which results in the mitigation of information asymmetries. In such occasions, the capital inflow in the company can be achieved more easily and in a subsequent lower cost of capital. As regards the internal benefits of auditing, the company can deal with the agency costs that arise and are responsible for a majority of corporate failures. Additionally, auditing can amplify a company’s process effectiveness and regulatory compliance. The choice of a specific auditor is not a simple decision and varies across the firms since every company has its own incentives and evaluates each auditor using different criteria. According to Wallace (1981), there are a lot of benefits for a company to hire an auditor such as reduction in information asymmetries, improvement of operational effectiveness, higher adjustment in specific regulatory environments. The optimum mix of these benefits seems to be taken into account by every firm when it comes to deal with the auditor choice. For a public company, shareholders primarily care about the elimination of disastrous information asymmetries and the reduction of the capital cost, stemming from the reliable financial statements and the related information. Non public companies might view the auditor choice from a different perspective. They probably focus on issues regarding operation and process efficiency and effectiveness, or legal constraints. Since the audit value and benefits vary across
different organizations it can be assumed that the auditor choice depend on specific clients’ characteristics. Throughout this dissertation, different hypotheses about the determinants of auditor choice are tested. After applying the quantitative method of regression analysis some interesting findings are presented regarding the internally-driven and external influencers of auditor choice. Taking into account previous related literature reviews and researches, the variables that included in the regression model was the internal complexity and size of a company, its leverage degree, its need for external financing and its financial distress level. In the research were included data from 3.728 listed companies based on 22 European countries (German, France, Austria, Luxembourg, Belgium, Denmark, Spain, Portugal, Netherlands, Italy, Greece, Latvia, Norway, Finland, UK, Portugal, Sweden, Czech Republic, Estonia, Slovakia, Poland). Opposite to the predicted outcome, the level of internal complexity in a company seems to have a negative association with the selection of a Big-4 auditor. The two variables added in order to test the first hypothesis, provide us with diverging assumptions which will be fully analyzed in the related part of the dissertation. The way of financing of a firm is quite a significant variable according to the formulated econometric model. The higher the leverage level of a company, the higher the probability to engage with a Big-4 auditor. The variable of the percentage growth of sales which was included in order to indicate and associate the need for external financing with the determinants of auditor choice was found statistically insignificant and was extremely low-weighted in the regression model. It is crucial to focus on the last one variable reflecting the financial distress of a company. By contributing to previous researches, the econometric analysis provided an interesting finding regarding the specific determinant. Z-score had the largest estimated coefficient in the regression analysis accompanied with a negative sign, which means that
companies facing the risk of bankruptcy are more likely to choose a non Big-4 auditor. Further analysis about the possible explanations of the generated outcomes is presented in the following parts of the master dissertation. The next part is consisted of a general literature review, representing different perspectives and authors’ views. After this point, the four hypotheses that are going to be tested are formulated, supported by the appropriate explanations. Then, useful information regarding the data collection and methodology are provided analytically, followed by the results of the regression and the related conclusions.

LITERATURE REVIEW

AUDITING AND ITS IMPORTANCE

Even when it is not mandatory by the national legislation, many companies are subjected to external auditing for array reasons. The main problem responsible for the majority of the internal conflicts is the repercussions of the principal-agent model. Having observed many related scandals (Enron, 2001), it is quite a common phenomenon a corporate manager to have incentives not completely aligned with the owners’ incentives and interests. Jensen and Meckling (1976) characterize the structure of a corporation as a “nexus of contracts” among different individuals. Within a firm these individuals are supposed to desire the fulfillment of their own interests and goals by achieving the most beneficial contractual relationship. Jensen and Meckling attribute the divergence between ownership and management to the fact the managers do not maintain a complete residual claim. Subsequently, if management acts in a way to boost the company’s profits, they do not receive the full
return on their efforts accomplished while deals with the negative aspects the effort’s cost. Thus, there is a significant incentive for managers to adjust their efforts in order to achieve their personal goals – of which they can gain full benefits. Due to these agency costs, there are equivalent ways in which ownership tries to control managerial behavior and actions. It is not rare the fact that owners increase debt with a view to smooth the divergence of interests between ownership and management. Jensen contends that debt enforces the firm to commit part of the cash in order to pay back the company’s liabilities. This consequently diminishes the available cash accessible to the management.

Grossman and Hart (1983) also mention that the increase of debt can be used effectively in order to restrain the behavior of the agents-managers. They believe that excessive debt liabilities increase the possibility of bankruptcy of a firm. Although the managers will not be legally responsible for this, they may view bankruptcy negatively to them (fear of losing their jobs). As a result, increased debt will make managers work harder without exploiting the cash flows of the firm for the accomplishment of their own ambitions and make more efficient investment choices. By hiring an external auditor the information asymmetries caused by the principal-agent model can be mitigated and both the agent’s and manager’s incentives can converge.

The cornerstone of a continuous and sustainable development of a company is the attraction of investors who can provide the firm with the appropriate capital inflows crucial for the completion of strategic investments. Investors need reliable, accurate and timely information in order to trust their money in a firm. (Knechel and Williams, 2006). Financial statements that have been audited and monitored by an external auditor are supposed to be more trustworthy in the business word than those that have not. Lenders, investors and potential clients often demand audited financial
statements before making the decision to cooperate with a specific firm. Financial statements verified by external auditors gives lenders, stakeholders and potential investors some security that the financial statements are free of error and that have not been committed illegal actions while composing the statements to secure a loan, or a new investment.

THE AUDITOR CHOICE VARIABLES
EXTERNAL DETERMINANTS

When a company decides to engage with a specific auditor regarding the external monitoring that will be exerted, it has to take into account various aspects before dealing with the audit firm. One of the most significant characteristics is the cost the company will be charged in order to be audited. Management has to analyze the marginal costs and benefits regarding the auditor and conclude to the most beneficial choice. According to previous researches (Simunic, 1986; Francis and Simon, 1987; Shivakumar, 2004), it is expected a Big-4 auditor to charge higher prices, something that should definitely be taken into account before making the decision. The concept is that auditors of large corporations have to spend enough time and effort on examining and analyzing the financial statements and all the related information of the firm. Another important characteristic is the size of the audit firm. According to DeAngelo (1981), a company’s financial statements verified by a large audit firm depict higher levels of confidence in the marketplace compared to the financial information audited by smaller audit firms. It is generally accepted that the size of a company is positively related with the quality of the services it provides. Thus, since managers’ criterion involved the auditor
choice is the quality of the services it is provided, it is assumed that the size of the audit firm is a determinant, too. Embracing the theory of DeAngelo (1981), since the agency costs are not the same, the demand for audit monitoring is different too, depicting different levels of audit quality. According to this finding we can infer that quality plays a major role in the selection of the auditor. Previous researches on audit quality have focused on the differences between Big-4 audit firms and non Big-4 audit firms. DeAngelo (1981) also supports that the Big-4 provide superior quality audits because they face excessive reputational and legal risk. Analyzing findings from various studies we can infer that audits by the Big-4 are associated with higher fees (Simunic,1986; Francis and Simon,1987; Shivakumar), lower levels of discretionary accruals (Francis et al. 1999), higher rates of compliance with GAAP (Krishnan and Schaur 2000), more informative indications of financial instability and distress and less mispricing of IPOs (Menon & Williams,1991). Consequently, companies with a tendency to report adjusted earnings will probably not choose a larger audit firm. On the contrary, when a company desires to increase its disclosure quality with a view to prove its financial stability in the eyes of the stakeholders has the incentive to hire a Big-4 auditor.

**INTERNALLY DRIVEN VARIABLES**

The conventional theory of principal-agent problems states that there may be conflicts between managers and ownership due to the misalignment of incentives and interests (Jensen and Meckling, 1976). The separation between ownership and control of the firm results into many information asymmetries, which permits managers to act against the benefits of the shareholders and exploit the financial assets of the company they are involved in. However,
this phenomenon exists in firms whose ownership is dispersed among a lot of shareholders. According to the finding of La Porta et al. (1999), dispersed ownership is more common in marketplaces of a few developed countries, such as the United States and United Kingdom, unlike with the European environment this dissertation is based on. Thus, the above theory does not apply in a company with concentrated ownership, where the largest shareholder has the control of the firm. La Porta et al. (1999) argue that highly-concentrated shareholdings and a prevalence of controlling ownership express the form of corporate governance at the majority of capital markets all over the world. In these firms, the agency problem may arise between the controlling shareholder and minority shareholders, where the former have the ability to enjoy the company’s earnings in a more advantageous way at the expense of the latter (Shleifer and Vishny, 1997). The benefits from the possession of control tend to be higher in firms with a higher level of ownership concentration, as well as in less-developed marketplaces with inadequate minority shareholders protection. Based on all the above information we can infer that in the interest of concealing the expropriation of minority investors, controlling shareholders may not choose a Big-4 auditor to deliberately provide distorted financial information. According to previous findings (La Porta et al.; 1999, El Ghoul; 2007) we know that companies in less developed marketplaces, as the European, the ownership is concentrated among family members. Usually families continue to have significant stakes even if they are not involved in the company’s management (Burkart et al., 2003). Regarding this aspect of the determinant choice, previous studies depict contradictory arguments. Based on De Angelo (2000), family shareholders are more likely to act in a way that allows them to expropriate the weaker shareholders by specific management of dividend yields. On the other hand Anderson et al., (2003) supports
that companies which are under family control have no incentive to conceal the true performance of the company and their incentives are aligned with the interests of the non controlling investors. Thus, these firms who care about their reputation and their survival and intend to pass to the next generation will not achieve increased quality if the auditing of their financial statements is verified by a Big-4 auditor. El Ghoul et al. (2009), presents a perspective of how the presence of many shareholders affects the agency problems. According to his findings, the existence of multiple controlling shareholders intensifies the internal monitoring and results in a more efficient control and prevention of opportunistic behaviors. Consequently, in these types of ownership structure there are not strong incentives to hire a Big-4 auditor. Finally, another aspect which affects the company’s decision to hire a certain auditor is the existence of outside members to the board of directors. Fama (1980) supports that the independent directors are introduced in the firm’s environment in order to mitigate the conflicts between the managers and the shareholders. Outside members have less incentives to distort the financial information provided to the stakeholders compared to the inside directors. Consequently, the involvement of outside members is positively associated with the selection of a high-quality auditor.

**DISTINCTION OF AUDITORS**

The audit firms are categorized as high-quality auditors and non-high-quality auditors. Previous researches have estimated the variables that can categorize a specific auditor as a high-quality one. Since the costs derived from the principal-agent problem are not the same and can change over the time, the demand for audit monitoring is different too, depicting different levels of audit quality.
The companies’ need for different levels of quality can affect their choice regarding the audit firm they intend to engage with. A firm is willing to hire a specific auditor with a view to reap the benefits of external monitoring adjusted to its current level of needed quality. According to De Angelo (1981), “the quality of audit services is defined to be the market-assessed joint probability that a given auditor will both discover a breach in the client’s accounting system and report the breach’. She also argued that the measurement of quality can be indicated by the size of the audit firm. Large audit firms’ clients are much more compared to the smaller audit firms’ hence they have no incentive to be involved in misstatements regarding a specific client. Moreover, its reputation plays more significant role that in the case of a small audit firm (Simunic and Stein, 1997). As a result, big audit firms face higher risk to be involved in a situation that could damage its reputation. Another indicator of the services’ quality an auditor provides are the fees it charges. Many different studies (Simunic; 1983, Francis and Wang; 2008) investigate the relationship between audit-firm premiums as a determinant of audit quality. They explain that large Big-4 audit firms charge higher fees compared to the non-Big-4 as an indicator of their higher quality monitoring services they provide. This fee premium has generally been characterized as a sign of “differentiation”, meaning that the clients may have this perception even if it is not real. The authors have concluded in a positive relation between the high prices charged and other quality measures and suggest that higher audit fees are an indication of higher real or perceived audit quality. Thus, it is generally accepted that when we refer to Big-4 auditors we define them as high-quality auditors. Big-4 auditors are comprised of:
Undoubtedly, issues regarding the worldwide financial crisis have gained the protagonist’s role in the references of the mass media. During 2007, America faced the tremendous consequences of a banking crisis which led to the collapse of large financial institutions, the bailout of banks (Lehman Brothers, 2008) and downturns in stock markets. A couple of years later the repercussions of the financial crisis were obvious in the European Union, too. Euro zone tried to reform its monetary and fiscal policies but some members seemed to face significant problems. Greece’s huge government budget deficit caused an extreme widening of the bond yield spreads and only the International Monetary Fund could finance its deficit since the trustworthiness of the country was suffering.

The cornerstone of a business’s survival among such a volatile and unstable economic environment is to remain dependable and reliable in the eyes of the stakeholders and the shareholders. In order to achieve this it is crucial to hire auditors who convey unqualified and accurate opinion with regard to the financial statements of a company. Investors need reliable, accurate and timely information in order to invest their money in a firm. (Knechel and Williams, 2006). During the crisis, many have accused auditors of not signaling the financial distress of their clients and not protecting the public. The rationale is that the management of the company is responsible for disclosing issues related with its financial condition. It is quite often, in periods when firms face difficulties to
switch auditors. However, a company can change its auditors due to many reasons such as general disagreements, high audit fees or changes in the company control. Especially, when a company decides to go through the Initial Public Offerings (Menon & Williams, 1991) it is important to choose a Big-4 auditor with a view to attract more investments, signaling that it performs under healthy and reliable conditions. In a period of extensive recession the role of the auditor become much more crucial. In an unstable economy it is difficult to make accurate estimates and the hazard of a bankruptcy in case you did not make the right decision is much higher.

Another aspect which must be mentioned, although it is not referred to the whole European market, is the recent liberalization of the auditing profession in Greece and its importance. The full liberalization was enforced by the IMF and the consequent undersigned obligations that Greece has been subjected to by the European Union. Auditing in no longer a closed profession with restrained audit fees, meaning that there is the opportunity for a company to charge higher audit fees. However, in a period of crisis this could be a reason for a company to choose its audit firm under the criterion of the related cost savings. According to prior researches a continued audit success depends on the way the various challenges appeared are handled in an effective way. (Bromwich & Hopwood, 1982). The worldwide crisis we are still going through is absolutely a great challenge. A major reason for a firm to change auditor is the amount of the audit fees charged. According to Shivakumar (2004), the fees required to hire a Big-4 auditor are much higher than hiring a non Big-4 auditor. During a recession is quite likely that a company will choose a non Big-4 in order to save some costs. Another interesting research shows us that failing companies, which have increased significantly during the period of the global financial crisis, are more engaged in auditors’
switching compared to healthier firms. (Eichenseher, J.W., D.Shields, 1983). Relying on this finding we can infer that companies with long debts are likely to choose an auditor of a high quality.

HYPOTHESIS DEVELOPMENT

THE RELATIONSHIP BETWEEN THE INTERNAL COMPLEXITY AND THE AUDITOR CHOICE

Auditing can provide substantial benefits to the internal environment of a corporation such as increased efficiency, better compliance with the legal environment, increased disclosure quality and lower rates of incidents stemming from information asymmetries. The benefits of this external monitoring are related to the various components of internal complexity of the audited firm. When the size of the company is small allows the management to control effectively on its own the function of the firm. On the contrary, when a company increases its size it becomes difficult to control all the actions and the operations inside the company’s environment. Consequently, in a large company the agency problems that arise are more significant compared to a smaller one. The delegation of responsibilities becomes more difficult and the process of monitoring can be deteriorated as the observability in every hierarchical level is reduced. In these situations managers face a growing demand of filtering the actions of the management in order to avoid opportunistic behaviors that can affect the financial assets of the company. As has been mentioned and analyzed in this dissertation the involvement of external monitoring can provide solutions with regard to the above problems and support the owners in controlling effectively the operational flow of their company.
Knechel et al. (2008) and many other researches, contend that large companies characterized by excessive internal complexity are more likely to choose a Big-4 auditor. An important aspect that has to be stated is the relationship between the cost of monitoring and the growing size of a firm. It is obvious that the fixed costs related to the auditing are reduced as the size of the company grows. Moreover, the initial monitoring is usually the same for a company despite its size since the auditing includes the verification of balance sheets and other financial information. The variable expenses increase with a lower rate that the firm’s size and this results in a lower marginal cost. Additionally, when a specific auditor is engaged with a firm for a long period, it is more familiarized with the specifications and needs of its client. So, it becomes easier and less costly for the auditor to exert the auditing process. According to the above findings the following hypothesis is tested:

H$_1$: Companies with high internal complexity are more likely to hire a Big-4 auditor.

There are two variables that are used in order to measure the internal complexity of the firm. The first is the variable IVREC and calculates the ratio of inventories and receivables to total assets. It has been generally used by many relevant researches (Knechel; 2008), and reflects the level of transactions accomplished by the firm. The specific variable is expected to have a positive association with the selection of a Big-4 auditor since it indicates the internally driven complexity of the firm. The second variable included in the regression model is the SIZE and is determined by the total assets of a company. It is assumed that the model will result in a positive association between this variable and the selection of a high-quality auditor.
THE RELATIONSHIP BETWEEN THE DEGREE OF LEVERAGE AND THE AUDITOR CHOICE

External debt can create significant problems between the shareholders and the debt holders. According to Jensen and Meckling, agency issues arise and depict the misalignment of interests of these two parts. Sometimes, management’s actions can benefit the shareholders in the expense of the creditors. This could happen either through a change in the dividend payout policy or through the selection of specific alternative investment with high discounted present value but excessive risk. It is widely known that creditors face significantly higher risk compared to the shareholders, since in a case of bankruptcy the potential loss of the former exceeds to a great extent the harm that shareholders are going to be subjected to. Jensen and Meckling also contend that the agency problems in the relationship of the two parts are exacerbated as the debt of a company increases. Normally, for a firm with existing debt liabilities it will be more difficult to cover the new interest expenses. It is widely accepted in the literature that engaging with a Big-4 auditor indicates more safety for the investors and this can lead to relatively lower effective interest rates for the borrower. Taking into account all the above findings, similarly to many other researches, the following hypothesis is tested:

H₂: High-leveraged companies are more likely to hire a Big-4 auditor.

The variable LIAB_ASSETS is included in the test of the above hypothesis. The variable derives from the calculation of total liabilities to total assets of the company. Although many researchers have used different definitions of leverage, the chosen ratio is
widely considered as the main indicator of the debt proportion in a firm. Generally, it is accepted that there is a positive relationship between the auditor choice and the level of leverage in a company, although similar studies have concluded in arguing findings. Grossman and Hart (1982) contend that a high degree of leverage indicates an amplified financial risk for the company hence managers would avoid any decision that could deteriorate the value of the firm. On the contrary, they could hire a non-Big-4 auditor with a view any financial distress and earnings variations to remain concealed. Broye and Weill (2008), after conducting a relevant research in the European countries, found that there are great variations between the auditor choice and the debt of a company stemming from the legal environment in which the companies were activated.

THE RELATIONSHIP BETWEEN THE NEED FOR EXTERNAL FINANCING AND THE AUDITOR CHOICE

It is inevitable for many firms to require additional external financing in order to extend their business, to fulfill research and development actions and to achieve some growth of their entity. When a need for external financing arises, normally the companies will firstly try to gain the needed capital through the financial institutions. The accomplishment of capital inflow in a company is proportional to the risk the investors face by providing financing to it. If the risk is low the subsequent cost of capital for the company will be at lower levels, too. It is quite important for the investors to gain precise information about the collateral they receive and to avoid distorting accounting methods which overestimate the value of these collaterals. They want reliable information especially when they intend to invest on a company that is engaged with complex operations. Pittman and Fortin (2004) have found evidence that
companies can achieve a lower effective interest rate when is verified by a high-quality auditor.

H₃: A company with high need of external financing is more likely to be engaged with a Big-4 auditor.

In order to measure the need for external financing of a company the variable SALESGROWTH is included and represents the percentage sales growth of the firm the last year. When the sales are increased, the company’s operations are extended and consequently the inflow of additional financial resources will be needed. Then, the company has to choose the most cost effective way to support and finance its operations. If the free cash flow of the firm is not adequate, seeking for a borrower probably is the next solution. Since, the investors need reliable and precise information in order to invest their money in a financially healthy company, it is assumed that a high-quality auditor would intensify their confidence and trust in a specific company. Thus, it is expected to exist a positive relationship between this variable and the choice of a Big-4 auditor.

THE RELATIONSHIP BETWEEN THE FINANCIAL DISTRESS AND THE AUDITOR CHOICE

The outbreak of the financial crisis during the 2008 has caused innumerable cases of bankruptcies and general financial distress in the business world. Performing in such a volatile environment can affect the company’s decision regarding the characteristics of the audit firm it will cooperate with. After having analyzed previous related researches, it was found that the theories about this variable express quite different views. In accordance with Grossman
and Hart (1982), companies which experience financial distress and risk of bankruptcy, will try to maintain and increase any favorable view they possess in the marketplace. Therefore, it is more likely to prefer engaging with a auditor of high-quality which could mitigate the impact of the company’s performance on the investors’ decisions. Moreover, a Big-4 auditor is supposed to provide a more effective monitoring of the company’s debt liabilities. Francis & Wilson, 1988, have concluded in converging findings. Companies which are insolvent and are characterized by unhealthy financial condition are more likely to hire audit firms with recognized independence in order to intensify the confidence of investors and creditors as well as to alleviate the litigation risk. On the contrary, Titman and Truman (1986) have concluded in an opposite perspective. They support that when a company undergoes difficult financial conditions, it is more likely to hire a non-Big-4 auditor in order to hide or distort the level of financial distress they experience. As it is mentioned already in this dissertation, the Big-4 auditors are considered to be of greater quality compared to non-Big-4 audit firms. Since they maintain a large clientele and they are not dependent in specific clients they have no incentives to perform distorting of disclosure quality issues. Additionally, they would not be eager to decrease their reputation and brand-name associations as these aspects are strongly interrelated with the high fees charged for their services. By contributing to previous researches the following hypothesis is tested. Since, the evidence from the related studies are diverging it is not easy to predict the outcome of the specific analysis.

H₄: Companies experiencing financial distress are more likely to hire a Big-4 auditor.
The variable Z-SCORE included in the econometric model is indicative of a corporation’s financial distress. This variable reflects the widely used Z-score model, introduced by Altman (1968). Altman’s findings support that the Z-Score is a precise forecaster of bankruptcy up to two years. The Z-Score model has retained its great accuracy and is still well-recognized despite being introduced over 40 years ago. Gradually, the Z-Score model has become a popular technique for analyzing, as it has proved to be one of the most effective statistical models for measuring the financial position of a company and calculating the probability of bankruptcy within 2 years. This is the reason I decided to include the Z-Score model as an indicator of a company’s distress. The specific multivariate model combines significant ratios that affect the financial condition of a company and is formulated as:

\[ Z = 1.2(X_1) + 1.4(X_2) + 3.3(X_3) + 0.6(X_4) + 1.0(X_5) \]

Where

- \( X_1 = \frac{\text{working capital}}{\text{total assets}} \)
- \( X_2 = \frac{\text{retained earnings}}{\text{total assets}} \)
- \( X_3 = \frac{\text{earnings before interest and taxes}}{\text{total assets}} \)
- \( X_4 = \frac{\text{market value equity}}{\text{book value of total liabilities}} \)
- \( X_5 = \frac{\text{sales}}{\text{total assets}} \)

**Value definition:**

- **\( Z > 2.99 \)** Safe Zone: Financially healthy company
- **\( 1.81 < Z < 2.99 \)** Grey Zone: Company with financial instability but not facing the risk of bankruptcy
- **\( Z < 1.81 \)** Distress Zone: Risk that company will declare bankruptcy within two years

Since, Z-score constitutes a dummy variable which can take value 1 or 0, companies categorized in the grey zone, defined as financial stressed or not based on how close were to the value boundaries.
Due to the fact that there was a wide range regarding the values of the specific variable, only few companies defined in the grey zone needed to be adjusted. The lower the z-score for a company, the higher the financial distress it faces. For the formulation of the above model some relevant financial ratios are used with different coefficients which indicate the importance of its ratio. Based on Altman, a brief description of its ration in presented:

Working capital/Total assets
Working capital is the difference between current assets and current liabilities and is related to the liquidity of an examined company. Total assets comprise the current and fixed assets and depict the size of the company. When a firm is operating under unhealthy financial conditions, is supposed to experience reduced current assets compared to the total assets.

Retained earnings/Total assets
Retained earnings are the amount of reinvested earnings or losses of a firm. It is a signal of accumulated profitability over the years. Companies which operate many years are more likely to preserve large amounts of retained earnings and to deal with a financial difficulty over the time. This is the reason that most firms who declare a bankruptcy count few years of existence. The specific ratio is considered to measure the level of leverage in a company. Increased value of retained earnings to total assets means that a company is able to finance its assets o its own and will not be subjected to debt obligations.

Earnings before interest and taxes/Total assets
This ratio calculates the productivity of a company’s assets and seems to have the highest importance of all the variables in the Z-
score model. This is why it is multiplied with the highest coefficient in the model’s equation. The amount of earnings before interest and taxes indicates the level of efficiency with regard to the operations of a firm and is crucial for its development and sustainability.

Market Value of Equity/Book Value of Total Liabilities
The market value of equity is the market capitalization of a firm and is found by multiplying the number of shares with their price. The book value of total liabilities is the sum on current and long-term liabilities as they are presented in the financial statements. This ratio measures how much the assets of the company can be reduced in order to maintain its liabilities in relatively lower levels and remain viable. It is also indicative of the leverage degree and the subsequent financial risk a firm may face due to excessive debt. Last but not least, in this ratio is included the view of the stock in the market. When the stock price of a firm remains in high levels, it will easier for the firm to raise additional capital through equity issues. A fall in the stock price may be a signal for upcoming unfavorable events. Thus, the systematic risk which is crucial in a financially unstable environment is internalized to some extent through the Z-score model.

Sales/Total assets
The value of the above ratio is widely used to measure the ability of a company’s assets to generate sales. It shows how effectively the company responds to the requirements of a competitive environment. The value of the sales is the one reported in the Income Statement.
DATA COLLECTION

In order to obtain the appropriate information needed for the accomplishment of the specific dissertation, I used the database of ThomsonOne. Through this database you can extract the most recent financial information for a wide range of companies. The sample used in the econometric model consists of 3,728 listed companies based in the Europe. (German, France, Austria, Luxembourg, Belgium, Denmark, Spain, Portugal, Netherlands, Italy, Greece, Latvia, Norway, Finland, UK, Portugal, Sweden, Czech Republic, Estonia, Slovakia, Poland). At this point, it should be mentioned that the proportion of data availability is not the same for every country since we refer to different financial environments and conditions. ThomsonOne updates its data frequently thus information about the previous fiscal year was collected in order to process the following analysis. Companies and organizations with specific characteristics in their financial statements are not concluded in the sample in order to avoid producing any kind of biased results.

THE REGRESSION MODEL

Having conducted a broad review with regard to the related literature, four hypotheses are tested with a view to determine the influencers of auditor choice. The variables analyzed in the above section of the dissertation are formulated in a regression model:

\[
\text{Auditor\_Choice} = C + a_1 \cdot \text{IVREC} + a_2 \cdot \text{ASSETS} + a_3 \cdot \text{LIAB\_ASSETS} + a_4 \cdot \text{SALESGROWTH} + a_5 \cdot \text{Z\_SCORE} + a_6 \cdot \text{ROA}
\]
The dependent variable is a dummy one which becomes 1 when the company is engaged with a Big-4 auditor and 0 when it is verified by a non Big-4 auditor. The variables IVREC and ASSETS support the analysis of the first hypothesis. The former is the ratio of receivables and inventories to total assets and is indicative of the transactional complexity of the company. The latter is the value of the total assets which are reported in the financial statements of every company and depict the size of the company. The variable LIAB_ASSETS is calculated as the ratio of current ant long-term liabilities to total assets. The specific ratio which compares the debt to equity reflects the leverage volume of the examined companies and is used in order to define the association between the auditor choice and leverage degree, analyzed in the second hypothesis. SALESGROWTH represents the percentage growth in sales of the sample’s companies. It is engaged with the third hypothesis, about the relationship between the auditor choice and the firms’ need for external financing. The last one variable Z_SCORE characterizes the likelihood a company to declare bankruptcy in a time period of two years. As was analyzed in previous part of the dissertation the equation that formulates the z-score is the following:

\[ Z = 1.2(X_1) + 1.4(X_2) + 3.3(X_3) + 0.6(X_4) + 1.0(X_5) \]

Where

- \( X_1 \) = working capital/total assets,
- \( X_2 \) = retained earnings/total assets,
- \( X_3 \) = earnings before interest and taxes/total assets,
- \( X_4 \) = market value equity/book value of total liabilities,
- \( X_5 \) = sales/total assets

Since it was suggested generally in the related literature and conducted in similar studies, the variable ROA was added in the regression model, too. ROA is defined as the ratio of profit or loss to the total assets of a company.
The information for all the needed data were extracted from the companies’ financial statements which were available at the ThomsonOne database.

**METHODOLOGY**

Since the dependent variable we examine is qualitative the methodology that is applied is the logistic regression model. The method of Ordinary Least Squares could not lead to reliable outcomes as it generates many weaknesses when it has to deal with qualitative variables. Logistic regression is an approach to prediction, like Ordinary Least Squares (OLS) regression. By performing a logistic regression, is tested a dichotomous outcome. These conditions create obstacles for the assumptions of OLS that the error variances (residuals) are normally distributed. Instead, they are more likely to follow a logistic distribution. Therefore, is inevitable that the interpretation of the generated results in a logistic regression is much more complicated compared to the method of the Ordinary Least Squares. Due to the fact that the dependent variable is not a continuous one, the function of logistic regression is different to some extent, because the model predicts the likelihood that Y is equal to 1 (rather than 0) when the inputs of the variable X are certain. That is, if X and Y have a positive linear relationship, the probability that the score of Y = 1 will increase as values of X increase. Thus, the model is applied with a view to predict probabilities rather than the scores of dependent variable. However, the OLS method was applied additionally to the main model of the logistic regression in order to compare the results of the two models. Heteroskedasticity was tested in the residuals of our additional OLS regression by employing White’s test for
heteroskedasticity. The null of homoscedastic residuals was tested against the alternative that the residuals exhibit heteroskedasticity. White’s test yields a value of $nR^2=270.8623$, where $n$ is the number of observations in our sample and $R^2$ is the unadjusted coefficient of determination from the auxiliary regression of our test statistic. Comparing this value against the value of the chi-square distribution with degrees of freedom equal to the number of regressors in the auxiliary regression, excluding the constant, of our test statistic (26 in our case) we can reject the null of homoscedasticity at every conventional significance level (p-value of 0.000) and conclude that the residuals of our OLS regression are heteroskedastic. However, despite the presence of the heteroskedasticity in the OLS model the sign of the estimated coefficients and the significance levels are the same with the outcomes of the logistic regression.

DESCRIPTIVE STATISTICS AND REGRESSION RESULTS

In the following tables are reported the outcomes of the statistical methods used. Firstly, some basic descriptive statistics are presented in order to depict a general overview of the variables’ values. Out of the 3,728 observations included in the model it was found that 2,316 companies were audited by a Big-4 auditor whereas 1,412 chose a non Big-4 auditor. Based on the findings of Broye and Weil (2008), listed companies are more likely to select a high-quality auditor since they have great incentives to signal their intention to provide precise and reliable financial information. Furthermore, they are subjected to more complex environments and larger international networks. The mean value of the variable IVREC is around 0.306 which is close to the findings of similar
researches. The variable DEBT_ASSETS reflects a mean value of 1,222 which is a bit high compared to the optimum values of the certain ratio. However, we must take into consideration that all the data were reported within a period which is characterized by a global unstable financial environment and deep recession. Thus, many ratios regarding the leverage and the relevant financial information probably incorporate this difficult economic situation. Additionally, the ratio ROA with a mean value of -2.94 indicates the previously described conditions in the European marketplace. However, as it is reported in the table with the descriptive statistics the percentage growth of the companies’ sales represents a positive outcome. Due to the fact that the variance of this variable’s values is high, it would be more helpful to focus on the median value in order not to misinterpret the estimated results. Thus, the median value of the variable SALESGROWTH is 3,475, meaning that most companies has an increase in the volume of their sales. Finally, in the appendices we can see some interesting findings about the variable Z_SCORE which was included in the model in order to determine the relationship between the financial distress and the auditor choice. The specific variable is a dummy one, which takes a value 1 if a company’s z-score indicates high probability of a future bankruptcy or a value 0 when the company belongs to the ‘safe zone’. According to the statistical results we can infer that a large proportion of the examined companies are subjected to tough financial conditions. This is another sign of the general financial recession that prevails in the marketplaces the last years. Out of the 3,728 companies of the sample, there are 1,372 observations of firms which are characterized from financial distress. Regarding these companies, 794(57,871%) are engaged with a non-Big-4 auditor, whereas the remained 578(42,128%) have chosen a high-quality auditor. After having investigated the behavior of the binary dependent variable it can be concluded that the descriptive
statistics are in accordance with the results of the regression analysis which are presented in the following section of the dissertation.

<table>
<thead>
<tr>
<th></th>
<th>IVREC</th>
<th>ASSETS</th>
<th>DEBT_ASSETS</th>
<th>SALES Growth</th>
<th>ROA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.306394</td>
<td>3332.307</td>
<td>1.222187</td>
<td>131.2622</td>
<td>-2.942967</td>
</tr>
<tr>
<td>Median</td>
<td>0.285931</td>
<td>150.9450</td>
<td>0.522106</td>
<td>3.475000</td>
<td>3.330000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.207594</td>
<td>17310.99</td>
<td>36.44870</td>
<td>5046.072</td>
<td>35.83656</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.521591</td>
<td>12.26818</td>
<td>60.26215</td>
<td>56.58020</td>
<td>-6.286876</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.712006</td>
<td>201.7290</td>
<td>3660.695</td>
<td>3317.977</td>
<td>129.9974</td>
</tr>
<tr>
<td>Probability</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
</tr>
<tr>
<td>Sum</td>
<td>1142.235</td>
<td>12422841</td>
<td>4556.314</td>
<td>489345.6</td>
<td>-10971.38</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>160.6165</td>
<td>1.12E+12</td>
<td>4951348.</td>
<td>9.49E+10</td>
<td>4786435.</td>
</tr>
<tr>
<td>Observations</td>
<td>3728</td>
<td>3728</td>
<td>3728</td>
<td>3728</td>
<td>3728</td>
</tr>
</tbody>
</table>

**Table 1 descriptive statistics**

<table>
<thead>
<tr>
<th>Number of defaults</th>
<th>1372</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big-4 auditors</td>
<td>578</td>
</tr>
<tr>
<td>Non Big-4 auditors</td>
<td>794</td>
</tr>
</tbody>
</table>

**Table 2 descriptive statistics**

The results of the regressions analysis are reported at the table 3. As we can see the variables added to test the first hypothesis are, INVREC and ASSETS, have both statistically significant coefficients (5% level). The former has a negative sign whereas the latter a positive one. Contrary to the prediction that was made at the hypothesis development part, the negative sign of IVREC depicts that firms with excessive transactional complexity are less likely to hire a Big-4 auditor. This issue might be interrelated with the fact that the firms choose different corporate governance mechanisms in order to control, to alleviate or to conceal any problems that could stem from the transactional complexity they are dealing with. The estimated coefficient of ASSETS is positive but
low-weighted. In accordance with the findings in the literature review, larger firms are more eager to hire Big-4 auditor in order to achieve a better control of their entity since responsibilities are delegated among a lot of organizational levels. The second hypothesis is tested by including the variable DEBT_ASSETS which is statistically significant with an estimated coefficient of 0.182. The value of the coefficient and the positive sign in the regression analysis allow us to believe that this variable is quite significant with regard to the selection of audit firm. According to Jensen and Meckling, in highly leveraged companies, agency issues can arise and depict the misalignment of interests between the shareholders and the debt holders. Consequently, firms with large debts compared to its total assets are more likely to select a high-quality auditor. This finding is in accordance with the initial prediction made in the hypothesis development part of the dissertation although some literature review (Broye and Weil; 2008) suggest that in the European marketplace the degree of leverage has adverse impacts on the auditor selection process due to lack of criteria’s homogenization. The third hypothesis tested the need for external financing as a determinant of the auditor choice. The outcome of the regression analysis reflects that the variable SALESGROWTH included to test the specific hypothesis, is negative but statistically insignificant. A possible reason for this is that the equity issuance to outsiders is a relatively ambiguous aspect among the examined companies. The added variable Z_SCORE shows us important evidence about the association of the auditor choice and the auditor selection procedure. As it is inferred from the table where are reported the results of the regression analysis, the financial distress is the most significant variable in the model. The value of the estimated coefficient is 0.645 and the sign is negative. It is suggested that firms which operate under financial distress are less likely to choose a Big-4 auditor. Grossman and Hart (1982)
contended that companies which are insolvent and are characterized by unhealthy financial situation are more likely to hire audit firms with recognized independence in order to boost the confidence of investors and creditors as well as to mitigate the litigation risk. On the contrary, Titman and Truman (1986) have concluded in an opposite perspective. They support that when a company faces issues of financial distress and potential bankruptcy, it is more likely to hire a non-Big-4 auditor in order to conceal or distort the level of financial distress they experience. The finding of the specific research is at convergence with the latter authors’ perspective. In the regression model was also added the ratio ROA as a proxy for the companies’ profitability. Abbott and Parker (2000) supported that Return On Assets is positively associated with the engagement of an ‘differentiated’ auditor, since a more profitable firm is more likely to accept the fee premium charged by a generally recognized audit firm. They indeed find a positive relationship between ROA and high-quality auditors. On the contrary, Citron and Manalis (2001) did not found an important difference between the ROA levels of two clients of the two groups of auditors- the Big-4 versus the non-Big-4 in the Greek market. Additionally, they suggested that the Big- 4 clients are more profitable compared to those of non-Big-4 firms, but surprisingly, the clients of local audit firms have higher ROA than those of second tier audit firms. In the specific research the ratio ROA appears statistically significant but the estimated coefficient reports a low value. Possible explanations can derive from the literature review provided.
At the last part of the statistical results’ analysis some basic figures about the correlation of the included variables are going to be mentioned. As it is reported in the table 4, there is a positive relationship between the DEBT_ASSETS and the Z_SCORE which it not surprising since highly leveraged companies with large debts are more likely to experience a situation of financial distress. It is also found that the correlation between the ASSETS and the Z_SCORE is negative, which can be explained by the fact that large companies with subsequent long history may have accumulated profits and can overcome a difficult situation. As was also mentioned in the literature review the majority of the bankruptcies are experienced in the early years of a company, since it is difficult for a firm achieve a satisfying level of accumulated retained profits within a short time period. Furthermore, we can notice a negative correlation between the variables ASSETS, INVREC and the DEBT_ASSETS. A possible explanation might be that large companies with increased transactional complexity and high volume of assets have managed to gain share capital which can result in lower levels of reported total liabilities. Last but not least, it should

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated coefficient $\hat{b}$</th>
<th>Standard error</th>
<th>p-value</th>
<th>Exponentiated coefficient $\exp(\hat{b})$</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.619572</td>
<td>0.078269</td>
<td>0.0000</td>
<td>1.858</td>
</tr>
<tr>
<td>INVREC</td>
<td>-0.419107</td>
<td>0.173082</td>
<td>0.0155</td>
<td>0.658</td>
</tr>
<tr>
<td>ASSETS</td>
<td>0.000104</td>
<td>1.58E-05(0.000158)</td>
<td>0.0000</td>
<td>1.000</td>
</tr>
<tr>
<td>DEBT_ASSETS</td>
<td>0.182027</td>
<td>0.080330</td>
<td>0.0235</td>
<td>1.199</td>
</tr>
<tr>
<td>SALESGROWTH</td>
<td>-0.000081</td>
<td>9.10E-06(0.00000910)</td>
<td>0.3328</td>
<td>0.999</td>
</tr>
<tr>
<td>ROA</td>
<td>0.005719</td>
<td>0.001339</td>
<td>0.0000</td>
<td>1.005</td>
</tr>
<tr>
<td>DEFAULT</td>
<td>-0.644783</td>
<td>0.079566</td>
<td>0.0000</td>
<td>0.524</td>
</tr>
</tbody>
</table>

Table 3 logistic regression
be mentioned that the variables ROA and Z_SCORE have the strongest correlation value (-0.293955). It can be easily explained as the ratio ROA which consists a proxy for a company’s profitability could not have a positive correlation coefficient with the variable determining its financial distress.

<table>
<thead>
<tr>
<th></th>
<th>INVREC</th>
<th>Assets</th>
<th>Debt_assets</th>
<th>Z_score</th>
<th>ROA</th>
<th>Salesgrowth</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVREC</td>
<td>1.000000</td>
<td>-0.080271</td>
<td>-0.024205</td>
<td>-0.091069</td>
<td>0.071782</td>
<td>-0.016100</td>
</tr>
<tr>
<td>Assets</td>
<td>-0.080271</td>
<td>1.000000</td>
<td>-0.003100</td>
<td>-0.097904</td>
<td>0.041255</td>
<td>-0.004657</td>
</tr>
<tr>
<td>Debt_assets</td>
<td>-0.024205</td>
<td>-0.003100</td>
<td>1.000000</td>
<td>0.028585</td>
<td>0.125548</td>
<td>-0.000667</td>
</tr>
<tr>
<td>Z_score</td>
<td>-0.091069</td>
<td>-0.097904</td>
<td>0.028585</td>
<td>1.000000</td>
<td>-0.293955</td>
<td>-0.001693</td>
</tr>
<tr>
<td>ROA</td>
<td>0.071782</td>
<td>0.041255</td>
<td>0.125548</td>
<td>-0.293955</td>
<td>1.000000</td>
<td>0.014517</td>
</tr>
<tr>
<td>Salesgrowth</td>
<td>-0.016100</td>
<td>-0.004657</td>
<td>-0.000667</td>
<td>-0.001693</td>
<td>0.014517</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Table 4 correlations

**CONCLUSIONS**

The aim of this master dissertation is to provide some evidence related to the procedure of auditor selection by employing findings from previous researches and introducing some new aspects. After having collected data from 3.728 listed companies based on 22 European countries (German, France, Austria, Luxembourg, Belgium, Denmark, Spain, Portugal, Netherlands, Italy, Greece, Latvia, Norway, Finland, UK, Portugal, Sweden, Czech Republic, Estonia, Slovakia, Poland) and analyzed them with the appropriate statistical methods the subsequent conclusions have been made up. Out of the 3.728 observations included in the model it was found that 2.316 companies were audited by a Big-4 auditor whereas 1.412 chose a non Big-4 auditor. In accordance with the findings of Broye and Weil (2008), public companies are more likely to choose a Big-4 auditor since they have great incentives to convey their intention to provide accurate and reliable financial information. Furthermore,
they are subjected to more complex environments and larger international networks. The first hypothesis that was tested included two characteristics of the companies’ internal environment, its size and its transactional complexity. According to the regression analysis which was conducted and fully analyzed, the larger the firm, the more likely is to choose a Big-4 auditor. On the contrary, the internal complexity of a company seems to play a significant role in the auditor’s selection but is negatively associated with the decision to select a Big-4 auditor. The second hypothesis that was tested refers to the way a company is financed. The outcome of the regression model is consistent with the predicted one. The higher the debt a company owns, the decision to engage with a high-quality auditor becomes more likely. The third hypothesis that was tested predicted that companies with a growing demand for external financing are more likely to hire a high-quality auditor as they want to attract more easily capital inflow and to gain a lower cost of capital. However, the generated results of the regression show us that the variable incorporated with a view to reflect the need for external financing depicted a negative association with a Big-4 preference and was reported as statistically insignificant. The last one hypothesis which contributes to previous researches is the investigation of the relationship between the financial distress of a company and its auditor choice. The famous variable z-score was calculated and incorporated in the model with a view to provide us with the appropriate information needed. Throughout the literature review there are adverse opinions regarding this issue. It was derived from the value of the estimated coefficient that there is a strong relationship between the company’s decision to hire a specific auditor and its financial distress. The negative sign though, was an indicator that a company which performs under tough financial condition is more likely to choose a non-Big-4 auditor. This finding is in accordance with the research of Titman and Truman.
(1986), mentioned in the literature review part. They argued that when a company faces issues of financial difficulties and potential bankruptcy, it is more likely to choose a non-Big-4 auditor in order to conceal or distort the level of financial distress it experiences.

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