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The impact of external auditing in business valuation:

A case for United Kingdom

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- **Abstract:**

This research intends to measure and analyze the influence of external auditing on the UK companies' valuation, which was modeled through a multiple linear regression that has as explanatory variables: Tenure, Fees, Scope and Materiality; and as dependent variables: Tobin's Q and PB. Using the FTSE 100 as the reference market index and considering a linear relationship between business valuation and the variables indicated, this paper allows to infer about its effects. The hypothesis that these audit characteristics are not significant is rejected and each variable contributes for the value of the firms. Moreover, it also suggests that size has a relevant influence in the study and that some regression's specifications are valuable insights for interpretation purposes.

Keywords: Audit Tenure; Audit Fees; Audit Scope; Audit Materiality; Firm's Value.

TABLE OF CONTENTS

1. INTRODUCTION

According to FTSE 100 Auditors Survey 2016/17 (Accountancy Daily, 2017) audit fees totaled £637 million, distributed by the Big 4 (EY, PwC, KPMG and Deloitte). Unlike other services in which clients pay to have support and to have an opinion that is in accordance with his business and procedures, auditing is an activity in which the auditor is paid to provide services, insights and to conduct procedures based on judgement, criticism and skepticism. So, why do companies perceive value to pay premium fees for the service?

Finance is the heart and a major concern of any business in the world. It originates the most controversial discussions and may became a very sensitive issue, especially due to its importance and impact in everyone's lives. In the business world, finance is mostly reflected in the financial reports, which provide information to all stakeholders, namely investors, creditors and analysts. In this sense, having a third independent, accredited and credible party that can validate and increase confidence to its veracity can, effectively, add a tremendous value to a company, which auditing contributes with its existence and valences. J.P. Russel (2007) defines it as an independent, systematic and documented process to obtain evidence and to evaluate it objectively, determining the extent to which audit criteria are satisfied.

Ramamoorti (2003) traces its origin back to public finance systems in Babylonia, Greece, the Roman Empire and the City States of Italy. The need for it was related to the suspicion of fraud and corruption of some officials who had the power and incentive to adulterate the financial accounts for their own benefit. Thus, it was developed a control to keep tracing the money and to conclude if it was being properly recorded. The concept evolved side by side with the growth of the businesses, especially when the need for efficient financial management and fraud prevention emerged. So, it was appointed an independent individual

to execute the controls and financial reviews. Nowadays, auditing is a function of great visibility and importance for business operation, capital markets transparency and the economy by adding credibility to financial records (Rezzae, 2004).

Contrariwise, public opinion does not have the best consideration for auditing, especially because when audit gets media attention is due to a scandal or financial error. In fact, in the recent past we have witnessed several financial frauds causing serious repercussions at all levels of stakeholders, namely Enron, WorldCom, Tyco, HealthSouth, AIG, Lehman Brothers, etc., even resulting in the bankruptcy of a previous Big 5: Arthur Andersen. Although fairly relevant, it's also important to contextualize that these errors were punctual events and represented a minimal percentage of audit unsuccess, even though were quite expressive and reflected a tremendous media attention. Historically, auditing has a strong societal intervention, especially in finance performance by reducing financial errors, frauds, for reducing information asymmetry and protecting all level of stakeholders (Heil, 2012). Moreover, the prevalence of fraud cases highlighted by the media is an even stronger reason for companies to protect their brand reputation through audit services.

The objective of this research goes in line with the idea of external audit adding value to the overall economy by primarily support each company individually. The study will focus in the United Kingdom (UK) economy, based on the market index FTSE 100 and pretends to explain the impact of external auditing on business valuation. The methodology to address this question will be based on a multiple linear regression, whose dependent variable will be Firm's Value (represented by Tobin's Q ratio and Price to Book) and independent variables defined by: Tenure, Fees, Scope and Materiality. Tenure is a variable that is represented by the number of years that a firm is audited by the same audit company; Fees is the amount, in

pounds (£), that the companies pay for auditing services; Scope is defined by the coverage of audit work, quantified by the percentage of clients' revenue; and Materiality is the threshold determined by the audit team from which they will departure to plan and execute the necessary procedures to obtain reasonable assurance of the exemption of material misstatements in the financial reports. Moreover, to remove firms' specifications effects that might deviate the results and interpretations, it will be included two control variables: Age and Size. To support and assist the analysis, Stata Software will be used along with SPSS to conclude on outputs estimation, hypothesis tests and regression validation tests.

The analysis will be structured in four main topics. It is going to be introduced by a literature review with the objective of finding evidence in the academic researches, by credible authors of the variables that are relevant and have ground to be modeled in the investigation. Next, it will be detailed the data used, where did it come, its specificities and the methodology conducted to address the study's objective. Then, it will be shown the outcome resulting from the model, aligned with the respective discussion, interpretation, hypothesis testing and, lastly, the conclusion of the overall research.

2. LITERATURE REVIEW

- **Audit Tenure**

The concept Tenure refers to the quantification of the time that an external audit company provides audit services to a company, usually expressed in number of years. The discussion about the regulation, whether firm rotation should be mandatory or not has been quite debated and controversial, however there has been a legislative effort to mitigate the issue.

There are several academic arguments for the introduction of legislation for mandatory and frequent audit rotation, namely the fact that a longer relationship may create personal bonds and close relationships between the auditor and the client, that may represent a threat for the independence requirements and that can affect firm valuation (Mautz & Sharaf, 1961). Davis and colleagues (2009), shows evidence that new audit engagements can effectively increase earnings in the first years; while Rather, Johnson and Lys (1990) argue that a bigger audit turnover may be beneficial, as it can improve the efficiency of the services provided, according to their new needs. Lastly, Deis and Giroux (1992) associate audit tenure with quality deterioration due to the inefficiency of keep updating and improving audit procedures.

On the other hand, the divergent vision is related to the fact that new engagements may mean higher costs (audit fees), considering that the new team will have greater difficulties to understand the business operation, industry and client's specifications (Geiger and Raghunandan, 2002). Furthermore, there are academic studies showing a higher probability of having audit reporting errors in the initial years of the engagement and that the rotation rational does not improve earnings quality (Myers *et al*., 2003; Chen, Lin and Lin 2008).

- **Audit Fees**

The past academic researches have proved that there is evidence of a correlation between the fees paid to the audit firm and the companies' performance being audited (Hay, Knechel and Wong, 2006; Stanley, 2011). Consequently, audit fees are directly related with the time and resources spent on the revision and validation of the financial statements (Moutinho *et al*., 2012). Therefore, the larger the audited company, the greater the resources and audit costs associated, due to the amount of data and procedures to be executed. So, it's possible to infer a positive correlation between company size and audit fees (Palmrose, 1986).

The market for audit service is, generally, divided in two groups: the Big 4, namely EY, Deloitte, PwC and KPMG and the others, with low business volume and service quality. The reputation and value of a Big 4 will not only compromise a better assurance quality, contributing positively for the firm valuation, as they have less historical litigation antecedents, which naturally, inflate the fees (Craswell, Francis and Taylor, 1995; Francis and Krishnan, 1995; Francis and Reynolds, 2000). The firms that are willing to pay those fees are, normally, large companies, so that also implies more liability costs, which may represent an incentive for a better audit performance (Behn, Choi and Kang, 2008).

- **Audit Scope**

Audit scope is defined as the extent to which the external audit team will perform procedures and tests to evaluate and improve the confidence on the financial reports. It can be quantified by the depth of work, namely through number of documents, amount of time, percentage of firm's revenue with the objective of keeping errors, misstatements and frauds out of reports. The coverage of audit depends on the risk of the accounts or transactions, which means that a riskier account will need greater analytic procedures to assure that it's free from errors. For instance, if a firm has historic fraudulent conducts or financial errors, the external audit team will have to check more documents and perform more tests, covering a greater scope.

To preserve credibility, professionalism and audit quality, which is generally determined by the joint probability of an auditor to verify and report a material financial distortion (DeAngelo, 1981), the external auditor will want to maximize the level of audit assurance, coverage and the probability of finding material misstatements, which can be achieved by a greater audit scope (Abbott *et al.*, 2003).

- **Materiality**

According to Global Reporting Initiative and Robecosam (2015), "materiality is the threshold at which aspects become sufficiently important that they should be reported" and is one of the most important aspects in an audit, as it allows the auditor to perform its work, from the planning to the audit opinion. Its quantification is consonant with business characteristics and is usually determined through a percentage of revenue, assets, profit, etc. The level of materiality will determine the disclosures of financial statements, i.e. only material misstatements will be declared; it's determinant for audit effort, as the extension of audit procedures is also dependent on the level of materiality (Blokdijk, Drieenhuizen, Simunic and Stein, 2003); and crucial for audit opinion, since the project's partner will prepare the opinion consonant on whether there are material misstatements and risks or not.

The decision on whether to disclose the materiality on the independent auditor's report has been deliberated for some time by academics (Holstrum and Messier, 1982; Messier, MartinovBennie, and Eilifsen, 2005). UK is an early adopter in this matter, as auditors effectively quantify it in their report and explain the rationale behind its determination.

3. DATA DESCRIPTION AND METHODOLOGY

The research aims to use the UK case for its sample analysis, hence, it will be used a market index that tracks the performance of the 100 largest companies listed in the LSE (London Stock Exchange), representing approximately 80% of its entire market capitalization, with a quite international strand, as its constituents operate in more than 150 countries and with a very diversified industry portfolio, being an accurate representation for the UK market – the FTSE 100. The study comprises 2944 company observations dated from 2014 to 2017,

accounting for 92% of the total observations for the same time interval. Missing data justified the exclusion of some companies from the analysis.

The external audit influence on UK firms' value will be studied through a multiple linear regression, in which the audit characteristics are characterized by Tenure, Fees, Scope and Materiality; while the value of the firm will be analyzed through two indicators: P/B (price-to-book) and Tobin's Q (which is very common to be applied in similar studies). Moreover, it will be included two control variables, namely Age and Size, since, a priori, the removal of their effects is beneficial for interpretation purposes. Age is a relevant control dimension as it reflects the number of years of market experience and knowledge, which might reflect a solid or immature business; while Size is also crucial, as the impact of audit procedures and consequences is, naturally, greater in bigger companies. So, the model that comprises the literature and the variables aforementioned is: $logFirm\,Value = \beta_0 + \beta_1 logTenure + \beta_2 logFees + \beta_3 Scope + \beta_4 logMateriality + \beta_5 logAge + \beta_6 logSize + \varepsilon,$ where:

Firm value can be represented by two ratios: Tobin's Q and P/B. The first is often applied in the financial literature due to its diversified applicability, namely in corporate governance (Singhal and colleagues, 2016) and it's determined by the ratio of market capitalization by the total asset value of the firm. P/B is also commonly used for value estimator, due to its stability and ease to compare with market price (Brahmana and Hooy, 2011). Tenure is measured by the number of years the company is audited by the same firm, which means that the observations are bigger or equal to one. Fees is represented by the pound amount paid to the audit firm, which comprises audit and non-audit fees, since the insights and services that audit firms provide at other dimensions, as Tax consultancy, can also add much value. Scope is the depth of work that the audit firm will devote, based on the risk and characteristics of

the company's financial accounts and it's represented by the percentage of revenue. Materiality is the threshold that is the basis to determine the nature and extend of audit procedures, which is disclosed in recent UK firms' annual reports. Age is the number of years since the company's foundation and Size is represented by the firms' book value of total assets. Moreover, as verified in the equation above, the variables were subject to a logarithmic transformation (except for Scope, since it's a percentage and has small variance), because these variables are right skewed due to data from some huge firms that damage model's accuracy. The logarithmic application is typical used in large amount variables, since it allows to remove inconvenient skewness and to soften the variance, enabling a more impactful research.

Data was collected through two distinctive sources: annual report manual extraction (registering Materiality, Scope and Fees for each company and for every year of the analysis through the independent auditor's report section of the 368 reports) with the support of "FTSE 100 auditors survey"; and through Bloomberg platform that enabled the extraction of market firm data, especially for the control and dependent variables.

4. HYPOTHESIS TESTING

- **Tenure:** Academic opinion is not consensual in this matter and there are valid arguments for both sides, however, UK has one of the strongest and efficient financial markets, in which the business knowledge and professionalism is uniformly provided by the companies, especially at a Big 4 level. Thus, it's reasonable to accept that audit quality won't depend on the number of years of experience providing services for a company, but a higher audit rotation can add an incentive to keep improving methodologies, investing in innovation and to become more efficient by providing better resources and conditions.

H_1: Audit Tenure negatively affects firm valuation

- **Fees:** It is expectable that the findings differ according to the region or time period being studied. Nevertheless, considering the specifications and characteristics of the UK index being analyzed (FTSE 100), that is, very large firms and complex business activities that requires superior quality audit procedures, the amount of resources will also be reflected in fees. Furthermore, the vast majority of these firms are audited by Big 4, that typically charge higher fees for their quality services and credibility. So, it's foreseen a positive relation between audit fees and the valuation of the company being audited.

H_2: Audit Fees positively affects firm valuation

- **Scope:** It's academically accepted that a greater level of audit scope positively contributes to audit quality. The greater the depth of the procedures performed and time invested, the greater the chance to enhance audit recommendations and to operate efficiently. Moreover, the thesis of this research is supported on the hypothesis that audit quality will favor the business valuation. Then, it is reasonable to predict that the bigger the scope of an audit, the better for the firm, as the probability of finding and mitigating a mistake increases.

H_3: Audit Scope positively affects firm valuation

- **Materiality:** Overall, it is quite unclear the relation of the materiality threshold and mechanics disclosure with an impact on investors decision and thus, on the value of the firm. However, assuming two companies in the same industry and with similar volumes of business, the one which has a lower level of materiality is the one that, theoretically, will have a higher risk associated with its financial accounts, as the audit approach will be more conservative. In this sense, the greater the materiality of a company, the less risk of financial

misstatements and a better economic valuation. Furthermore, it is important to have control variables that guarantee a more accurate coefficient estimation.

H_4: Level of materiality positively affects firm valuation

Additionally, it's convenient to introduce econometrics' specifications that are likely to be present in the model and that might bias the inferences. It's foreseen the presence of simultaneity effects between Firm Value and Fees as a higher firm valuation represent an incentive for audit firms to reduce fees in order to win the client. Moreover, the omitted variable bias is clearly present, since the dependent variable is explained by others relevant dimensions than those included in the study.

5. DESCRIPTIVE STATISTICS

This section provides a summary and general perspective regarding the sample data that, after being collected, was processed and treated as panel data to be ready for further analysis. It is considered Balanced Panel, since all companies have observation for each point in time. For interpretation purposes, the descriptive will be mainly focus on the original data, i.e. before being logged, as it enables to have a clearer perspective and critical sense, although both results are illustrated in the Appendix 1. As observable, the sample is composed by 368 observations of each variable (two dependent, four independent and two control variables).

The tables demonstrate that Materiality is, on average, £160,53 million and it can be inferred that the variable have a reasonably high fluctuation, as the minimum value is £1 million and the maximum £1,415 billion. It can be concluded that the FTSE100 companies between 2014 and 2017 are, on average, audited by the same firm for approximately 16 consecutive periods, which is considerably a long period of time. For instance, Barclays was audited for 121 years,

until 2016 by PwC, which is an abnormal tenure. The coverage that the audit firms use to perform their work in the UK companies is approximately 88% of revenue and the scope tends not to vary much, which is in accordance to the audit concept of ensuring the veracity and minimizing financial statement errors. Moreover, Fees has arithmetic mean of £8,25 million, which is the £ amount paid by period to the audit firm. It's 10% of the maximum paid in the 4 years of the analysis and the minimum is £0,12 million, which is a small amount given the service in study. It is possible to observe that there is a lot of heterogeneity in what concerns to the age and the size of the companies. While, there is a company with half a millennium of existence, others are barely new; the same applies to the Size, as there are banks with billions of pounds in assets and other entities much more modest. This inequality is evidenced in the respective standard deviations presented on the table (85,45 years for Age and £323.259 million for Size). Furthermore, it's also possible to evaluate statistically dependent variables: Tobin's Q ratio arithmetic average is 1,99 which means that investors are more willing to pay for companies' total assets than their book value, since the ratio is greater than one and it ranges from 0,02 to 80,07; while PB's average allows one to infer that these stocks costs 10,43 times as much as its assets could be sold for, although it varies from 0,32 to 874,23 and the variable has a standard deviation approximately 10 times greater than the mean.

This analysis is also useful to understand, practically, how log transformations can be advantageous in the observations' distribution, or in the variables' standard deviations, due to its variance stabilizing ability. Otherwise, the regression and the respective variables would be non-significant as the mathematical model applied in the study would not be able to capture accurately the impact of the variables in the firms' asset value due to the dispersion

of data and diversity of observations scales and magnitude. Variables characteristics enable the transformation application, since there aren't null or negative observations in the sample.

6. RESULTS

The main findings, quantitative analyses and interpretations of the model and research will be presented and discussed in this area with the support of the relevant appendixes.

Firstly, in order to evaluate the relation between the model's constituents, it was elaborated a correlation matrix (Appendix 2). It can be concluded that there are variables more significantly correlated than others. Scope is the variable with less significant correlations within the model, while Fees' correlations are significant at 1% with every variable. The last is strongly and positively associated with Materiality (0,723) and with Size (0,765), which is coherent with the inherent concept of the variables in the sense that is expectable that a greater company (higher asset value) will have a greater materiality evaluation which, consequently, involves more resources and hours of auditing, i.e. fees. Besides, Materiality's correlation with Size is 0,822, which corroborates this argument. The strongest correlation in the model is between Size and Tobin's Q (-0,827), meaning that a company with a big asset magnitude has a negative association with its valuation. Lastly, PB and Tobin's' Q are also strongly related (0,667), which suggests that they co-move in similar directions and an indicator that both represent relatively similar asset valuation.

As aforementioned, external audit procedures' effects will be mainly explained and sustained by the regression, hence, studying its inputs (data), results and interpretations will be the main focus of the analyses. The overall results of the model are detailed in Appendix 3 and before manifesting any conclusive observation, it's important to infer about its significance.

F-test is the statistical test that allows to evaluate the overall models' significance, as it assumes multiple coefficients simultaneously. As verified in Appendix 3, the F-test for the firms' value represented by Tobins' Q ratio is greater than the one with PB, as F (6,361) = 485,59 > F (6,361) = 23,90, respectively. So, the null hypothesis that all variables are equal to zero can be rejected, as the p-values for both models are equal to zero, which means that one can trust that the relations within the model are, at least, jointly statistically significant.

While F-test provides a formal hypothesis for the models' significance, R-squared (R^2) allows to infer about the strength of relationships between the explanatory and response variables. In this sense, Model 1 fits the data substantially better than Model 2, as the first generated an R^2 equal to 0,890 and the second 0,352 and indicates evidence that Tobin's Q model is more powerful explaining the relationship between the variables. However, both indicators abovementioned are insufficient to infer about the biased coefficient estimation and appropriateness of the model, i.e. it might be the case that the relationship between the variables are not linearly explained. So, it was conducted a residual analysis through a residual plot assessment in order to test the assumption that the relation between dependent and independent variables is effectively linear. The plots for both models are shown in Appendix 4 and they cross the residuals (difference between the observed and predicted values) and the predicted values, which allows one to evaluate if the observed error in prediction (residuals) is consistent with stochastic error. It's reasonable to verify a fairly random distribution pattern around the horizontal axis in both graphs, which suggests that the linear model is appropriate for the data and to conduct the research.

Another critical issue to have in consideration when analyzing a multiple linear regression is the risk of heteroskedasticity, which consists of a nonconstant variability (standard deviation)

of a variable across a specific time period. In fact, its presence does not imply unbiased estimators, but inappropriate standard errors that may conduct to misleading conclusions. Therefore, it was conducted the White's Test and the null hypothesis of homoskedasticity was rejected assuming 5% significance level, since p-values are zero for both cases (Appendix 5), which implies a heteroskedastic model and the violation of the condition $Var(u_t) = \sigma^2$. According to empirical findings, this issue must be corrected to avoid inefficient estimators and wrong inferences, which is why robust standard errors were applied in the regression, inducing consistency to standard errors.

Now that the relevant model specifications are presented, studied and properly managed, it's possible to conduct further analyses, as the results give confidence to trust the model. Coefficient inferences and interpretations are not valid if they are not statistically significant, reason why it's important to exclude those variables from the analyses first. In the first model, all explanatory variables are statistically significant, as p-values are inferior to 5% except for Age, even though it's a control variable. On the other hand, p-values for PB's model are considerably higher: Tenure and Fees are insignificant variables, Materiality is statistically significant at 10% (p-value=0,059) and all other independent and control variables are significant at 5%. This result was indicted by the R^2 in the sense that Model 2 explains the linear relationship between the variables poorly than Model 1.

As coefficient estimates signs are equal for both models, to avoid being too exhaustive and as it also predicts better, the analyses will focus on Tobin's Q model. Although some literature controversy regarding Tenure, the model proved that it is negatively associated with firm valuation for UK companies. It reinforces the idea that the institutional relationships developed throughout the audit are, on average, prejudicial for companies' financial

valuation, as it may lead the investor to believe the audit opinion is somehow conditioned by the issuer. The argument that a higher Tenure could improve it due to the business knowledge may be refuted by the fact that the audit firms concerned are hundreds of years of experience, with very qualified and competent employees that are used to work with the most diverse companies and sectors. Nevertheless, the coefficient indicates a relatively small impact, as 1% increase Tenure is associated with a 0,046% decrease in Tobin's Q. Furthermore, Fees' coefficient sign is positive and shows that an increase of 1% in Fees causes an increase of 0,105% in Tobin's Q. Even though higher fees could be associated with riskier financial statements, it proved to have a better outcome, which can be explained with the quality of service and the amount of resources that imply higher audit costs. Differently, the results for Scope contradict the initial expectation, in the sense that both regressions estimate a negative coefficient sign. Model 1 indicates that 1% increase in Scope contributes to -0,46% in Tobin's Q and it was expected a positive sign due to the rationale that a bigger scope of audit procedures would ensure, a priori, a greater confidence on the respective financial reports and contribute for a better firm valuation. However, the results suggest the idea that a smaller valuation (Tobin's Q) imply a broader scope to increase the chance to identify eventual financial errors and to give confidence to investors that the additional risk is being properly mitigated. This type of interaction harms the accuracy of the results, since it reveals a reverse causality issue that will be addressed later. Moreover, Materiality is a variable that contributes positively to the dependent variable and coincide with the hypothesis elaborated, as its coefficient was expected to be positive. Materiality is, mainly, a function of risk and size of the firms' accounting, meaning that a small Materiality is equivalent to a conservative audit, implying a big inherent risk. The results show that 1% increase in Materiality leads to

a 0,743% increase in Tobin's Q, as a big level of Materiality is expected to be linked with a lower risk assessment, whose "healthier" financials support the idea of a greater firms' value.

Size is a relevant input for the interpretation quality of the regression, as it can strongly impact experimental results. To study its influence in the model, it was conducted the same regression analysis for companies with asset value (size) bigger or equal to £50,000 million and for smaller than £50,000 million, with Tobin's Q as dependent variable and excluding control variables (Appendix 6). It is possible to infer that data fits better for the sample with greater companies, as the R^2 is higher and the null hypothesis of non-jointly statistically significant is more easily rejected. Furthermore, all explanatory variables are statistically significant at 5%, except for Tenure. The clearer size effect relates to the negative coefficient Fees sign for both sub-sample groups, which contradicts the initial result. This result can be explained by the side effects of other services provided by the audit firms, resulting in higher non-audit fees, that can damage audit focus and independence (Martinez and Moraes, 2014). This result is stronger in bigger companies, as the coefficient estimate dictates. On the other hand, Materiality has an opposite influence in Tobin's Q for smaller firms, which may indicate that as a smaller materiality represents greater audit procedures, the risk of fraud and financial misstatements detection increases, which is strongly evidenced in smaller firms.

Besides the results' discussion, it's pertinent to address the accuracy of the findings, which may be reflected by the exogeneity assumption. A model is considered exogenous when the condition $(E(u|X)=0)$ is respected, otherwise, if the error term is correlated with any explanatory variable, the regression's predicted coefficients are, mostly likely, biased. It's a critical aspect for OLS theory, since it might not reflect the true parameters values. The zero-conditional mean is very likely to fail due to the existence of simultaneity effects, in the sense

that, there might be a co-implication of causality between dependent and explanatory variables and a reverse causality issue, which are both arguments for endogeneity. These hypotheses were addressed above and involves the causality effect of Firm Value on Fees and Scope. Specifically, the higher the value of a firm, the stronger the price competition between audit firms to win the deal, which culminates in a decrease of audit fees (controlling for size). Although the sign of the coefficient estimate Fees is positive (Appendix 3), this argument can be supported with the value of the correlation between both variables (-0,498 for Tobin's Q and -0,336 for P/B), since it indicates that they fluctuate, on average, in opposite directions. Furthermore, firm valuation is also determined by other dimensions than the ones regressed in the present models that affect both dependent and explanatory variables, such as economic effects, namely financial crisis, that tends to affect negatively companies' valuation and firms' ability to charge higher fees, which empirically, is designated as an omitted variable issue, which represents another source of endogeneity. A formal method to mitigate this issue is through an instrument variable, Z, whose conditions for its validity are the uncorrelation with the error term Corr (Z, ε) = 0 (thus, dissociated with y) and the correlation with the endogenous regressor: Corr (Z, X) $\neq$ 0. Usually, for companies of similar characteristics a distinction factor for the fees charged is the distance for the audit firm's headquarters. So, a hypothesis for the instrument could be represented by the number of kilometers between the headquarters and the firm being audited, as it's related with Fees and, a priori, uncorrelated with Firm Value, minimizing the risk of biased coefficient estimators. Hence, it was determined the respective distances for each company for each year of analysis and it was conducted the endogeneity tests. Unexpectedly, although it was possible to reject the null hypothesis that the IV was weak, the first stage regression failed in the sense that the coefficient sign of distance was negative, which contradicts the initial assumption underlying

the instrument. Furthermore, it's pertinent to add that there's an implicit time budget stated in the contract with the audit firm, which if exceeded, it's charged additional fees. It's recurrent to happen due to the delay of the information provided by the company and, usually, imply extra hours to complete the audit. Thus, a potential IV may be represented by the number of additional hours spent on the audit, as it's directly related with Fees and not associated with Firm Value.

Regarding the hypothesis of reverse causality between Firm Value and level of Scope, one of the determinants of the scope of an audit is the methodology that the audit firms adopts that although is specific for each entity, the fundamentals are based on the International Standards on Auditing (ISAs). These standards suffer frequent adjustments and can dictate if the audit is more conservative or less exhaustive, for instance, through the determination of number of documents to analyze or the introduction of a new analytical procedure to test. The propensity for change of these standards would be an interesting IV to include in the regression through a variable that comprised three values: {-1,0,1} - when the methodology was less conservative, when there were no alterations and when the standards implied an increase in Scope, respectively.

Overall, the reported findings allow one to acknowledge evidence of reasonable implication of some audit characteristics in the firm valuation of the UK market. Yet, to increase confidence about the results, it's recommended to introduce the suggested IVs and it's important to note that firm valuation is caused by other dimensions than those presented.

7. CONCLUSION

The financial markets' trustworthiness has suffered severe threats in the recent past due to the greed and frauds of some individuals and entities. The process to return people's financial

security and credibility to institutions is long, whereby external auditing can have a positive influence. By checking and ensuring the integrity and reliability of financial records, auditing enhances credibility and act as a deterrent to illegal activities (Kenny, 2005). The research is interested in modeling and to study how external auditing impacts on firm's valuation.

Using a sample of UK's market index FTSE 100, this research collected relevant literature insights and translated it into four variables: Tenure, Fees, Scope and Materiality. Moreover, firm value was tested through Tobin's Q and PB ratios (Model 1 and 2, respectively). The results allow one to conclude that data fits better in Model 1, sustained by the strength of the tests and relations. Beyond that, there's evidence to conclude that variables' relations and causalities can be studied by a linear relationship.

As for the variables, UK's new rules require public interest entities to rotate auditor company after a maximum period of twenty years, with a mandatory tender at the tenth year, which is a positive measure, as a longer Tenure proved to be harmful for firm value. On the other hand, paying higher fees showed to contribute to a better valuation, while dividing it by size, the negative impact of non-audit fees revealed to be stronger than the benefits of an expensive service. The negative impact of Scope is suggested to be explained by the reverse causality of a smaller valuation to marginally increase the scope of the audit. To mitigate this risk, it's proposed the introduction of an IV that measures the ability of the ISAs to influence Scope. Finally, the results of the most important concept of an audit engagement proved to support the idea that a higher materiality can be associated with a lower level of risk and with a better company value assessment. Although there's empirical evidence of a relationship between companies' valuation and external auditing, it's important to highlight that the presence of simultaneity effects and omitted variables, which instigate endogeneity, are relevant issues

to take in consideration when analyzing the relations between variables. Thus, the inclusion of the IVs is expected to reduce the probability of biased coefficient estimators, leading to an increase of the accuracy of the results.

Overall, it's possible to conclude that auditing can effectively impact the value of a firm and that each dimension has a specific role, whose effect can be influenced by companies' specifications, like size, market and business risk. George Box once said that "all models are wrong, but some are useful", which allows one to infer about the accuracy of the study and the depth of the formulation of the opinion about the outputs. Thus, although the study adds foundation to the existing literature on the effect of external audit on the valuation of firms and on the economy, it's also pertinent to take in consideration the limitations of the model and how that impacts the respective interpretation.

8. LIMITATIONS

As most studies, this one also went through some constraints and not always the results corresponded to the initial expectations. A clear example is the fact that the research was initially designed to be a fixed effects model controlling for size, since it's the most adequate method to work the panel data. However, due to the difficulty of the manual procedure to collect data from the annual reports, it was only possible to collect four years of data, which would be insufficient to test the time effect in such limited time period. Besides, a wider time interval would lead to better results. Furthermore, two interesting variables to be included would be to examine the effect of a qualified or unqualified audit opinion and if companies were audited by a Big 4, or another audit firm. Yet, in this sample case, only eight observations didn't comprise a Big 4 and there were no qualified opinions, which would not be significant for the research.

9. APPENDIX

Appendix 1: Descriptive Statistic Table

Descriptive Statistics						
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**	**Variance**
Materiality (millions)	368	1,00	1415,00	106,53	185,11	34266,88
Tenure	368	1,00	121,00	15,54	16,54	273,58
Scope	368	0,41	1,00	0,88	0,12	0,02
Fees (millions)	368	0,12	82,30	8,25	11,46	131,36
Age	368	2,00	501,00	87,71	85,45	7301,25
Size (millions)	368	43,15	2634139,00	112165,49	323259,43	104496662243,43
TobinsQ	368	0,02	80,07	1,99	6,66	44,32
PB	368	0,32	874,23	10,43	60,83	3700,42
logMateriality	368	0,00	3,15	1,65	0,55	0,31
logTenure	368	0,00	2,08	0,96	0,50	0,25
logFees	368	-0,94	1,92	0,55	0,60	0,36
logAge	368	0,30	2,70	1,74	0,45	0,20
logSize	368	1,63	6,42	4,16	0,86	0,73
logTobinsQ	368	-1,77	1,90	-0,10	0,58	0,33
logPB	368	-0,50	2,94	0,47	0,46	0,22

Appendix 2: Correlation Matrix

Correlation Matrix								
	logTenure	logFees	Scope	logMateriality	logAge	logSize	logTobinsQ	logPB
logTenure	1							
logFees	0,210**	1						
Scope	-0,094	**-0,409	1					
logMateriality	0,132*	0,723**	**-0,179	1				
logAge	0,041**	0,209**	-0,071	0,230**	1			
logSize	0,128*	0,765**	**-0,154	0,822**	0,279**	1		
logTobinsQ	*-0,107	**-0,498	-0,032	**-0,436	**-0,255	**-0,827	1	
logPB	-0,053	**-0,336	-0,074	**-0,373	**-0,232	**-0,550	0,667**	1

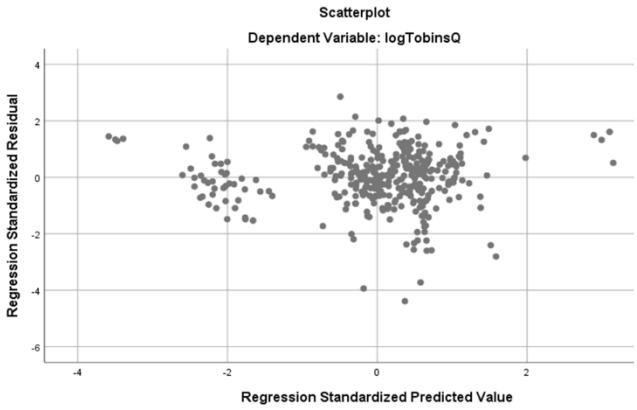
*Correlation is significant at 5%

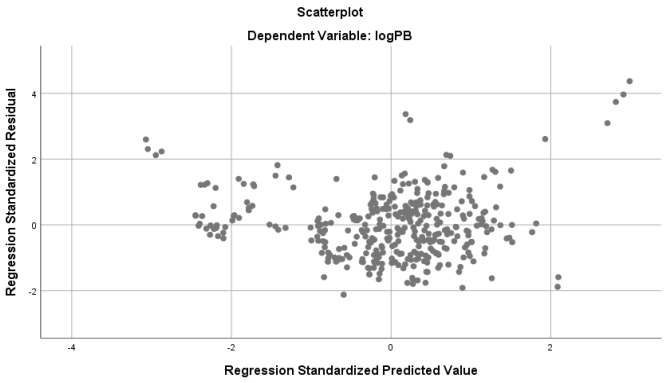
**Correlation is significant at 1%

Appendix 3: Regression Outputs

	Expected	**Model 1** - logTobin's Q				**Model 2** - logPB		
Independent variables	**Sign**	Coefficients	Robust St.Dev.	P-Value		Coefficients	Robust St.Dev.	P-Value
logTenure	(-)	-0,046	0,019	0,017		-0,005	0,033	0,875
logFees	(+)	0,105	0,035	0,003		0,050	0,064	0,436
Scope	(+)	-0,460	0,109	0,000		-0,520	0,161	0,001
logMateriality	(+)	0,743	0,039	0,000		0,171	0,090	0,059
logAge	CV	-0,038	0,024	0,108		-0,092	0,044	0,036
logSize	CV	-1,012	0,024	0,000		-0,414	0,076	0,000
constant		3,335	0,113	0,000		2,498	0,221	0,000
F (6, 361)			485,59				23,90	
Prob > F			0,000				0,000	
R - Squared			0,890				0,352	
Root MSE			0,1933				0,37734	

Appendix 4: Residual Plot





Appendix 5: White's Test for Heteroskedasticity

Model 1 - Tobin's Q			
White's Test	Chi 2 (27) 69,2 Prob > Chi2 0		
	Chi2	dF	p-value
Heteroskedasticity	69,2	27	0
Skewness	9,4	6	0,152
Kurtosis	3,54	1	0,060
Total	82,14	34	0

Model 2 - PB			
White's Test	Chi 2 (27) 227,87 Prob > Chi2 0		
	Chi2	dF	p-value
Heteroskedasticity	227,87	27	0
Skewness	40,21	6	0,000
Kurtosis	4,02	1	0,045
Total	272,1	34	0

Appendix 6: Size analysis

Size	**> 50,000**				**< 50,000**		
Independent variables	Coefficients	Robust St.Dev.	P-Value		Coefficients	Robust St.Dev.	P-Value
logTenure	0,045	0,104	0,666		-0,009	0,416	0,833
logFees	-1,168	0,228	0,000		-0,278	0,061	0,000
Scope	-1,252	0,409	0,003		-0,876	0,182	0,000
logMateriality	1,256	0,168	0,000		-0,154	0,050	0,002
constant	-1,216	0,406	0,004		1,212	0,168	0,000
F	18,27				15,61		
Prob > F	0,000				0,000		
R - Squared	0,392				0,198		
Root MSE	0,49373				0,3421		

10. BIBLIOGRAPHY

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