LISBON SCHOOL OF ECONOMICS & MANAGEMENT
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MASTER

ACCOUNTING, TAXATION AND CORPORATE FINANCE

MASTER'S FINAL WORK

DISSERTATION

EARNINGS QUALITY: EIKON MEASURE VS ACADEMIC MEASURE

RODRIGO DA SILVA ALMEIDA

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Resumo

O objetivo principal deste estudo é determinar se o modelo de qualidade dos lucros criado pela Thomson Reuters Eikon está de alguma forma correlacionado com o modelo de Dechow & Dichev, ajustado em Francis et al. (2005). Além disso, este estudo procura aprofundar o conhecimento sobre os modelos quantitativos elaborados por bases de dados eletrónicas, mais especificamente o modelo de *earnings quality* da Eikon e seus respetivos componentes. Para atingir os objetivos, foram analisadas 2321 empresas europeias cotadas ao longo de um período de 14 anos (2005 a 2018). Para a primeira parte da análise foram realizados testes de correlação, de Spearman e Pearson, realizados entre os dois modelos. De seguida, foi construída uma regressão usando o trabalho de Bens et al. (2019), adaptada ao objetivo deste estudo. Os resultados obtidos na análise de correlação sugerem que o modelo Eikon está positivamente correlacionado com o modelo académico, embora seja um valor fraco para ambos os testes. Porém, em nenhuma das análises foi possível identificar um padrão ou motivo evidente para os resultados da correlação positiva por país, setor e ano. Além disso, determinou-se que a relação entre os dois modelos é melhor explicada quando se considera o tamanho da empresa, o nível de endividamento, o número de analistas que acompanham a empresa e o índice de rendibilidade dos ativos.

Palavras-Chave: *Earnings quality*, *Thomson Reuters Eikon*, Correlação

Abstract

The main aim of this study is to determine if the earnings quality model provided in Thomson Reuters Eikon is correlated with the Dechow & Dichev model, adjusted in Francis et al. (2005). Moreover, this study tries to deepen the knowledge on the quantitative models created by electronic databases, namely the Eikon earnings quality score and the respective components. To achieve the objectives, 2321 European listed companies were analysed over a 14-year period (2005 to 2018). For the first part of the analysis Spearman and Pearson correlation tests, were performed between the two models. After that, a regression was constructed using the work by Bens et al. (2019), adapted to the purpose of this study. The results obtained through the correlation analysis suggest that Eikon model is positively correlated with the academic model, albeit it being a small value for both tests. However, it was not possible to identify a pattern or evident reason for the positive correlation results by country, industry and year present in the sample. Additionally, it was determined that the relation between the both models is better explained when taking company size, level of debt, number of analysts following the firm and return on assets ratio.

Keywords: Earnings quality, Thomson Reuters Eikon, Correlation

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Abbreviations

CFO – Cash Flow from Operations

DD – Dechow & Dichev

EQ – Earnings Quality

GAAP – Generally Accepted Accounting Principles

GICS – Global Industry Classification Standard

IFRS – International Financial Reporting Standards

ISA – International Standard on Auditing

IT – Information Technology

KAM – Key Audit Matter

PPE – Property, Plant and Equipment

NIBE – Net Income Before Extraordinary Items

ROA – Return on Assets

RNOA – Return on Net Operating Assets

SD – Standard Deviation

TA – Total Accruals

TCA – Total Current Accruals

US – United States

1. Introduction

Financial statements are the most important source of information in the decision-making process. Within financial statements, earnings present itself as one of the most valuable accounting number used by stakeholders (e-g., investors, regulators, and executives). Therefore, the primary aim of earnings reporting is to produce reliable information for individuals with interest in financial reports (Francis et al. 2004).

Knowing that, it is easily perceivable that earnings need to be calculated accurately, in order to be reliable and provide assurance to the financial statement users and help investors to better assess firm value and performance and to make improved investment decisions (Gaio & Raposo, 2011).

Earnings quality (EQ), as a concept, is a significant topic and has been gathering a lot of attention in the last couple of decades. That is explained by various factors such as the development of the Jones Model (1991), the accounting scandals in the beginning of the millennium and the extensive adoption of IFRS in different countries. Another important factor is the emergence of computer accessed databases, which provide a more efficient way for academics and analysts to gather data, including a wide variety statistical models, including models that measure the quality of the earnings reported by companies. How one thinks about earnings quality is to some degree in the eye of the beholder (Nelson & Skinner 2013). In fact, in Dechow et al. (2010) states that earnings quality is context specific.

The growth in EQ research, and the big amount of measures created, can also be explained by the wide array of EQ uses. For investor to optimize the success of investments and to avoid the bad allocation of resources; for contracting purposes, influencing lender decisions; compensation committees, who can decide on executives compensations; standard setters who can investigate the effectiveness of their policies.

Despite these facts, does not exist a clear, generally accepted definition and model to measure EQ. Different studies provide their own metric, focusing on one or more aspect of earnings like predictability, persistence and sustainability, although in this great variety of a models there is no clear evidence of the superiority of any of them. (Licerán-Gutiérrez & Cano-Rodríguez, 2019). In Francis et al. (2004) the authors divide earnings properties between accounting-based and market-based. Also, in Dechow et al. (2010)

the authors separate the proxies for EQ in three categories: Properties of earnings, investor responsiveness to earnings and external indicators of earnings misstatement.

The accounting-based measures are the most used in the literatures, taking cash or earnings itself as the reference construct and, consequently, are computed using accounting information only. This study uses the accruals component of earnings, since accruals are an accounting number, require estimation and are prone to be managed, meaning that they can be a sign of underlying volatility in the company's operations and low-quality earnings (Guay et al., 1996; Dechow & Schrand, 2004).

Despite the various uses of EQ, it is important to acknowledge that most of the potential users will not proceed to calculate one of the many EQ statistical model when time comes to decide. In a fast-moving world, that we live today, immediate access to information and high availability is extremely valuable. Financial information databases provide exactly the capability to access a variety of information on many industries and companies, making them essential. The connection between this world and EQ is made in Thomson Reuters Eikon database, where is provided a model consisting on a 0-100 score that takes into consideration various earnings components, generating daily updated EQ score.

The objective of this study to understand the correlation between Eikon EQ measure and the earnings quality measure created by DD, adjusted in Francis et al. (2005), bringing two different worlds together, database provided professional analysts models and academic models. Scarso (2019) tests the possible correlation between the Eikon score and seven other scholar measures. All seven are proxies based on properties of earnings, provided by models such as accruals quality. Out of all the models tested, the only model that had a positive, significant correlation was the abnormal accruals created by Dechow & Dichev adjusted in Francis et al. (2005).

By testing the correlation, it is possible to further investigate and deepen the research on these financial database quantitative models, and how are they related to academic research. Also, this study has as objective to understand and amplify the knowledge on the components of the Eikon EQ score. Since there is a big gap in current earnings quality literature, in respect to the use of models developed by databases, and overall investigation to these scores, it serves as motivation. Moreover, this study differs in

respect to the sample used. While in Scarso (2019) the authors use US-based companies only, the investigation will be applied to European-based companies.

The reminder of the study is divided into different sections: section 2, the literature review, where subjects such as the concept of EQ are approached more in-depth. Section 3 presents the hypothesis, sample used and the research methodology. Section 4 is where the results obtained are discussed and analyzed and, finally, section 5 presents the main conclusions of the study, along with the study limitations and future investigation suggestions.

2. Literature Review

2.1. Earnings Quality

The topic of EQ is quite common in accounting research, most notably in the last twenty years. There are many reasons behind the growth in the last decades. According to Defond (2010), the growth gained momentum with the many high-profile cases of fraud, that took place in the beginning of the millennium, propelling the earnings management investigation. Also, the creation of the abnormal accruals model in Jones (1991), while it has been and continues to be disputed, the Jones Model is noteworthy for providing the literature with a safe measure.

Moreover, the emergence of newly set of accounting standards being implemented internationally, namely the widespread adoption of International Financial Reporting Standards (IFRS), created the interest and opportunity to analyze and compare variations in factors that can impact EQ, trough cross-country research. Ultimately, the computer accessed databases enabled researches to gather data in an easier and less costly way, also amplified the uses and fields in which earnings quality could be applied (Defond 2010). Some of these databases, like Thomson Reuters Eikon, also developed their own earnings quality measure, which is going to be very important to this study and will be discussed later.

Despite the amount of research in earnings quality, there is still no generally accepted definition and methodology to measure it. According to Dechow & Schrand (2004, pp. 5) “high-quality earnings number accurately reflects the company’s current operating

performance, is a good indicator of future operating performance, and is a useful summary measure for assessing firm value."

In Dechow et al. (2010, pp. 1), "higher quality earnings more faithfully represent the features of the firm's financial performance that are relevant to a specific decision made by a specific decision-maker." Meaning that the definition used in each study applies to the specific final goal, since that in EQ research there is a lot of variation in the purpose of the analysis. Nonetheless, information on how good the proxies for earnings quality really are is sparse and knowing which measure should be used in any given circumstances is not always easy. (Ewert, R., & Wagenhofer, A., 2011; Perotti & Wagenhofer, 2014)

In Dichev et al. (2013), the authors perform surveys to 169 chief financial officers of public companies and interview 12 of them, plus 2 standard setters. The objective was to understand the view on EQ by top executives, their definition, and insights on how it can be used. The most frequent concept defended by the inquired executives was that high-quality earnings are sustainable, repeatable, and have the highest chance of being repeated in future periods.

There is also no consensus on the reliability in the earnings components since the difference between earnings and cash flow data is the accrual adjustments. Cash flows are not estimated, unlike the accrual component, which uses estimation and therefore can contain errors. In addition, cash flows are harder to manipulate and manage, making cash flows look relatively reliable (Dechow & Schrand 2004).

Finger (1994) found that the two components of earnings have similar predictive capability for one year ahead, but that cash flows produce less forecasting errors in the long run, compared to earnings. The study by Barth et al (2001) supports this statement. Nonetheless, studies for predictiveness of these components give mixed evidence. Dechow et al. (1998) concluded that when studying companies with long operating cycle and for long periods, earnings are more predictive than cash flows. The mixed evidence is explained by the fact that not all components of accruals are equally useful. While some, like change in accounts payable/receivable are used in accrual accounting to provide a more comprehensive look into financial performance of companies, transitory and less recurring components like special items can threaten the usefulness of accruals.

Since the final objective of the analysis varies a lot, earnings quality can be used in various contexts. Also, means that can be of interest for those who use financial reports in decision making, which encompasses different individuals. EQ is of use in investment decision making. Low quality earnings can lead to ineffective capital allocations, therefore reducing economic growth as the capital is diverted from projects or companies that can produce positive outcomes (Schipper & Vincent 2003; Dichev et al., 2013). Financial analysts pursue the objective of evaluating the performance of a company, to assess if current earnings points toward future performance and whether the current stock price reflects intrinsic firm value.

Financial statement users also take EQ in consideration for contracting purposes, measures of EQ are used in compensation arrangements and in debt agreements. Overstated earnings can mask the firm's true performance, making lenders mistakenly to continue lending or to defer foreclosure. (Holthausen & Watts, 2001; Dechow & Schrand, 2004; Dichev et al., 2013; Tumewang, 2019). EQ can also be used by regulators and standard setters, as an indicator of how effective the financial reporting standards in certain industry or country are (Schipper & Vincent, 2003; Dechow & Schrand, 2004; Dichev et al, 2013).

2.2. Accruals Measures

In accruals accounting, the economic events are recognized at the time in which the transaction occurs rather than when cash is paid or received. Its purpose is to reflect the company performance more accurately, by recognizing future expected cash inflows or outflows. Dechow & Schrand (2004) argued that certain firms characteristics, like the stage in its life cycle, the length of its operating cycle, and the volatility of its underlying operations, influence the dimension of accruals.

Nonetheless, accruals come with the cost of estimation and assumption making (Dechow & Dichev 2002), so whether they improve the predictive ability of earnings relative to cash flows is not clear. Taking into consideration that estimation can produce error and error reduces the ability of earnings to reflect future cash flows (Dechow & Schrand 2004). These errors can either be intentional or unintentional. Intentional errors emerge from the existence of incentives for earnings management, and unintentional error

arises from management lapses and uncertainty about the environment (Francis et al. 2005).

In various models, accruals are separated in two components: normal and abnormal. The normal (nondiscretionary) part should represent the performance of a company, while abnormal (discretionary) one should reflect misspecifications generated by the application of accounting rules or earnings management (Dechow et al. 2010).

One of the most widely accepted study in the area is the Jones (1991) Model. It has been subject to many modifications. Usually scholars use Jones model as a starting point but providing their own interpretations.

A second common accruals measure is accruals quality, presented in Dechow & Dichev (2002). The authors observe that accruals are temporary adjustments, transferring cash flows across periods. Since there is estimation in this process, the errors and the respective correction, generate meaningless noise in accruals, reducing their beneficial role.

Accruals anticipate upcoming cash collections/payments and reverse when cash is effectively received/paid (Dechow et al. 2010). Therefore, they apply a regression of change in working capital on past, current and future cash flow from operations. Essentially, the measure is defined as an extent to which accruals map into cash flow realizations, where a low match means low accrual quality (Dechow & Dichev 2002). For the authors the errors origin does not matter, whether they came from managers intension, or through unintentional reasons, the result is low accruals quality. So, the authors decide not to separate both components.

Dechow and Dichev (DD) only address the short-term accruals with their model, which represents a problem, since the long-term accruals are possible to manipulate, such as with property, plant and equipment (PPE), and is as important as their counterpart (Dechow et al., 2010).

With this in mind, Francis et al. (2005) suggested a modification and amplification to the DD model. The authors added growth in revenue to take into consideration the performance of the firm, but also extended the regression with PPE, so that the long-term accruals could be incorporated.

2.3. Earnings Quality in Financial Databases

Technologic advances in the last decades brought new possibilities in every aspect of life. Financial investigation was not excluded. Computer accessed databases have given the possibility for researchers to gather large amount of data and so analyze it in an easier way.

Some electronic databases provide more than just real time market data and companies financial data records, also provide analysis and quantitative models. This is the case for Thomson Reuters Eikon database, which provides, a model for earnings quality, developed by Starmine, a company acquired by Thomson Reuters in 2007.

Consisting of a 0-100 score, that takes into consideration various earnings components, EQ score is daily updated. Eikon defines EQ as the degree to which past earnings are reliable and are likely to persist. For investors that without this model would not calculate their own EQ scores, using a daily updated model, they can make more informed decisions.

In an article published by the Financial & Risk Business of Thomson Reuters, Refinitiv (2014), analysts would pick three companies in North America that were expected to be good short candidates and tried to find companies with low EQ scores to see how they fared in the future. The article showed that the analysts was accurate with most of their picks, given that most of the high-quality picks had high returns in a 180-day period, and the reverse for low quality scores. Analysts were also capable of finding companies in a risk of bankruptcy, and in fact, some companies identified, like Eastman Kodak and Overseas Shipping would eventually declare bankruptcy.

Eikon score can be useful to financial analysts and investors, as well as for scholars. Despite that, academic papers addressing database earnings quality measures are still very sparse, but, the potential for further use in research is enormous. Scarso (2019) studied the correlation between Eikon score and several scholar metrics. Moreover, the author identified three determinants of EQ and analyzed how they can influence the score. Additionally, Bens et al. (2019) demonstrated how can a new expanded audit report regime (ISA 700) can influence the quality of financial reporting, and the quality of earnings, using Eikon score as measure for EQ.

2.4. Eikon Earnings Quality Model Factors

Understanding the EQ model created by Thomson Reuters Eikon is one of the main objectives of this study. This sub-section exists to achieve it, understanding the components and foundation behind the development is important when assessing the correlation results, so it is possible to see which components bare the more similarities with the academic model.

The 0-100 score is composed of four factors: accruals, cash flow, operating efficiency and exclusions, the last one being applied only to companies from the United States (US). After the components are weighted it is performed an adjustment to a geographic region benchmark. In this sub-section it will be displayed the factors that affect the model and a brief review of their respective literature, based on Atas (2004). Atas was the Eikon Starmine's director of research at the time.

Eikon defines EQ as the degree to which past earnings are reliable and are likely to persist. Hence the objective of the developers was to analyze earnings, and the respective sources, in order to understand which were the most sustainable. Sources were decomposed through three ways: between cash flow and accruals (additive approach); modified Dupont analysis (Multiplicative approach); net income is composed of Non-GAAP, also called pro forma earnings, plus exclusion (exclusions approach).

2.4.1. Accruals

For the accruals factor it was referenced Sloan (1996), a study that focus on the earnings components and to which extent are they reflected in stock prices. It was found that the accruals component shows a lower persistence than the cash flow component and that companies with high levels of accruals show a negative future abnormal stock return.

Based on Sloan (1996), Richardson et al. (2005) expanded its work by compassing total accruals, because focusing only on current accruals leave behind many components that affect the measures created, both for accruals and cash flows, since cash flows can be computed as the difference between earnings and accruals.

Eikon approach splits accruals in ten sub-factors through a regression, so that the impact of each factor on earnings persistence can be obtained and it is expected that accruals factors with higher values present lower reliability. The results suggested that

high accruals negatively impact profitability and that when tackling earnings, accruals cannot be considered a sustainable source.

2.4.2. Cash Flow

Sloan (1996) argued stocks behave as if investor cannot differentiate between the two components of earnings, focusing only on earnings as whole. Nonetheless, cash flows offer more persistence in earnings performance than accruals.

In Houge & Loughran (2000), which expanded the work by Sloan (1996), found similar results, arguing that investors fall in a cognitive error when try to evaluate the information in earnings. The authors find that companies with high value for cash flows outperform the benchmark, defending that a company with higher EQ presents a larger proportion of cash earnings than a lower EQ one. By focusing on earnings, investors under-estimate the long-term persistence of cash flows.

2.4.3. Operating Efficiency

In respect to the third factor in the Eikon EQ model, the theoretical basis was found in Soliman (2004), a study on the usefulness of the Dupont analysis in predicting changes in return on net operating assets (RNOA).

In a decomposed calculation, profitability derives from two components: profit margin, that measures the degree to which profit that can be generated from total sales, and asset turnover, which measures how effectively companies are using their assets to generate sales.

In Soliman (2004) is explained that although companies from two different industries can achieve identical values for RNOA, they do it through different combinations of profit margin and asset turnover, since industries possess very different operating structures and ways to generate profit.

Eikon use of operating efficiency finds that earnings provided by the two components are more likely to persist. Both strong profit margins and asset turnover are important factors for EQ. Nonetheless, of the two, asset turnover is the most powerful indicator.

2.4.4. Exclusions

The fourth factor in the model only applies to US companies. That is explained by the accounting standards used in the country, allowing public companies to classify gains or losses as extraordinary items in their non-GAAP reports. There are many reasons for this decision, for instance: compliance with loan agreements, to determine managers compensation, and for reporting to investors 'core' earnings that are most likely to recur in the future (Jennings & Marques 2011).

Pro forma earnings are an earnings measure that excludes components of GAAP earnings. Since this earnings number are not subject to undergo an audit, managers determine the exclusions at their own discretion (Frankel et al. 2011).

Eikon followed the work by Doyle et al. (2002), where the difference between GAAP earnings and Non-GAAP earnings is separated in two components: special items and other exclusions. Special items comprise restructuring charges, asset write-downs, and losses on sale of assets. While special items are easier to identify, other exclusions can differ between companies, other exclusions can be for instance: in-process R&D from acquisition, goodwill amortization, stock compensation expense, legal settlement costs and operations from stores scheduled to be closed in future (Atas 2004).

Doyle et al. (2002) stress that the expenses excluded from Non-GAAP earnings are far from unimportant or nonrecurring. Also, they find that companies who present large differences between the two reports, present lower future cash flows and that the market cannot fully capture the e predictive power of the excluded expenses.

2.5. Hypothesis

The objective is not only to deepen the knowledge on the Eikon EQ model, and its components, but also to verify if the Eikon score is correlated with the academic EQ measure. Database scores are yet to be used by scholars in a large scale, so we could see a growth in use for academic purposes, or even replacing some scholar measures if correlations are proven to be high. This association between both measures is made and analyzed at the global, country, industry and year levels.

A few models could be used to perform the correlation test. This study followed Scarso (2019), who tested correlation for different proxies. The chosen model was DD´s

model, adjusted in Francis et al. (2005) because it presented the best correlation with the Eikon score, out of all the models.

It is expected that results show a positive correlation between the two model. The expectation is based on the results reached in Scarso (2019), and in the similarity of components between the models.

The hypothesis:

H1: There is a positive correlation between EIKON and EQ model.

3. Empirical Analyses

Scarso (2019) tested the possible correlation between the Eikon score and seven academic measures. All seven are proxies based on properties of earnings, such as quality of accruals, smoothness, and persistence. Nonetheless, in the present study it will only be used the model created by DD adjusted in Francis et al. (2005). Which was the only that proved to have a statistically significant relationship with the Eikon score, reaching 13% through a Pearson and Spearman correlation. Additionally, a regression was performed based on the work in Bens et al. (2019), adjusted to this study. The author examined the effects created by the adoption of a 2013 International Standard on Auditing (ISA) 700, on EQ, measured by Eikon.

3.1. Sample

The sample was taken from Thomson Reuters Eikon database in June 2020, the timespan of information is 16 years (from 2019 to 2004). The companies chosen are those from the EU15 country grouping that use Euro as currency, so a total of 12 countries after eliminating Sweden, England and Denmark. Moreover 10 different industries, according to Global Industry Classification Standard (GICS), are present in the sample, since all the observations from the financial sector were taken out. After that, the sample was winsorized for the bottom and top 10 percent, so that the effect of possible outliers is mitigated. The final sample is composed of 5905 observations, belonging to 10 industries from 12 countries of the EU15 country grouping.

3.2. Empirical Models

3.2.1. Eikon Earnings Quality Measure

Eikon developed an earnings quality model, a percentile (0-100) ranking provided to investors through the Thomson Reuters Eikon database. It is calculated by using computer-driven models and generates a daily updated score for all the listed companies.

The Eikon EQ score rewards companies that prove having sustainable earnings. Being attributed a high EQ score means that the reported earnings accurately reflect the company's current and past operating performance and can be a trustworthy predictor of future performance, hence a good tool for investment decision making.

Moreover, the rank takes into consideration the geographical areas, every score is compared to a benchmark that refers to geographical area, not a sector or industry. The final score is a weighted average[1] of the following four components, each one having its own score:

- Accruals: measured as changes in both current and non-current operating assets and liabilities from the four passed quarters to the most recent quarter, scaled by average assets.
- Cash Flow: measured as the annualized free cash flow, scaled by average assets.
- Operating Efficiency: using return on assets (ROA), decomposed in sub-components as a Dupont analysis, the asset turnover and profit margin are compared to a sector benchmark. This is done because companies from different sectors can produce the same ROA value, despite having a great structural difference in the sub-components. Profit margin is measured by using the annualized operating profit margin as a percentage of annualized sales. Asset turnover is calculated by using the annualized sales to average net operating assets.

[1] Information on the weight of each components, that make up the Eikon score, is not available to public.

3.2.2. Academic Earnings Quality Measure

The measure used to test the correlation with the Eikon score is developed in Francis et al. (2005), being an accrual quality metric. It was created using Dechow & Dichev's (2002) metric as starting point, that provides a relation between current period working capital accruals and cash flows from operations in the previous, current and future periods.

The model by DD has limitations. Due to the long lags between non-current accruals and the realization of respective cash flow, the model only tackles short-term accruals. Understanding this limitation, Francis et al. (2005) enhanced the model with the proposition provided by McNichols (2002), which defends that change in sales revenue and property, plant and equipment are important for assessing current accruals. Showing that when the two variables were added to the DD regression, the explanatory power increased. Therefore, the following model was used:

$$\Delta TCA_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i.t+1} + \beta_4 \Delta REV_{i,t} + \beta_5 PPE_{i,t} + \mu_{i,t} \quad (1)$$

where ΔREV represents firm change in revenue from year t-1 to t, while PPE expresses the company's gross value of property, plant, and equipment. As for the dependent variable, total current accruals (TCA) is:

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t} \quad (2)$$

where ΔCA represents the change in current assets, ΔCL is change in current liabilities, $\Delta CASH$ stands for change in cash and cash equivalents and $\Delta STDEBT$ is change in a firm debt in current liabilities.

Cash flow from operations (CFO) is calculated by subtracting total accruals (TA) to net income (NI). TA is calculated using the same components of TCA, the only difference is a subtraction of depreciation and amortization expense ($DEPN$):

$$CFO_{i,t} = NI_{i,t} - TA_{i,t} \quad (3)$$

Lastly, the regression's accrual quality measure is the absolute value of the first equation's residuals. All variables are scaled by total assets. Since a high Eikon score means high quality, while a high value of discretionary accruals signifies a low EQ, the absolute value of residuals is multiplied by minus one, in order compare both measures. Pearson and Spearman correlation tests were applied between the Eikon score and the residuals of the model, multiplied by minus one. These tests were made for each country, industry and year present in the sample.

3.3. Linear Regression

For the second part of the empirical study, it was developed a linear regression based on Bens et al. (2019) study on the effect of the adoption of ISA 700, that requires for audit reports to provide more information, including materiality levels and KAM's, on the financial reporting quality. The authors developed a regression that has Eikon's score as its dependent variable, a dummy variable for post/pre-adoption of the ISA and various control variables, such as leverage and size. This study use Eikon's EQ score (*EIKON*) as well as the dependent variable in the model as follows:

$$\boldsymbol{EIKON_{i,t}} = \beta_0 + \beta_1 EQ_{i,t} + \beta_2 SIZE_{i,t} \quad (4)$$
$$+\beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 ACOV_{i,t} + \alpha_1 INDU_i + \alpha_2 COUNTRY_i + \alpha_3 YEAR + \mu_{i,t}$$

SIZE represents the logarithm of total assets, *LEV* represents the level of indebtedness, *ROA* is return on assets and *ACOV* represents the number of analysts covering the firm. Controls were introduced for year of observation (*YEAR),* for industry *(INDU)* and lastly for country *(COUNTRY)*. The control variables chosen where obtained in Bens et al. (2019) work and are explained in detail in Table I.

Variables	Authors	Calculation Formula	Observations
SIZE	Bens et al. (2019)	Logarithm of total assets	Refers to a company dimension
LEV	Bens et al. (2019)	Total debt/Total assets	One of the most used leverage ratios, defines the total amount of debt relative to assets owned by a company. It can reflect how financially stable a company is.
ROA	Bens et al. (2019)	Net Income /Total assets	Return on assets is an indicator of how profitable a company is relative to its total assets. Informs on how efficient a company is at using its assets to generate earnings.
ACOV	Bens et al. (2019)	-	Number of analysts following a firm, meaning actively tracking and publishing opinions on a company and its stock.
YEAR	-	-	Controls the effect of the years and corresponds to each one of those years in the sample.
INDU	-	-	Controls the effect of the industries different characteristics and was created for each of the industries in the sample.
COUNTRY	-	-	Controls the effect of the different countries and represents the country where the company is headquartered.

Table I - Variables Description

4. Empirical Results

In this section it will be presented the results of the different tests and analysis. Firstly, it is provided the descriptive statistics for the variables present in the regression. The second sub-section presented the results from the correlation tests performed between Eikon's score and the academic measure. Includes a global analysis, encompassing the whole sample and an analysis by industry, country, and year. Lastly, a third sub-section gathers statistic information on the two regressions and coefficients for both, with and without control variables. Despite 2019 being the last year in the sample, the analysis will focus on 2018-2005 period. To analyze year 2019, the Francis model requires the values to 2020, to compute variations of the different variables, which is not yet available.

4.1. Descriptive Statistics

Table II presents descriptive statistics. Due to the fact that the academic model is a quite complex model to put together and that only observations with all the variables can produce residuals, the total number of observations are the ones generated by EQ variable.

After removing the effect of outliers, we can see that for the EIKON variable the maximum and minimum is a score of 90 and 4, respectively, with a mean of 44, rounded to nearest whole number.

Variables	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
EIKON	5905	43,6931	41	30,1008	4	90
EQ	5905	-0,0086	-0,0120	0,0522	-0,0914	0,0859
SIZE	5905	5,2765	5,2022	0,9011	3,9911	6,7753
LEV	5905	0,2180	0,2076	0,1600	0,0013	0,4858
ROA	5905	0,0146	0,0262	0,0653	0,1221	0,1019
ACOV	5905	4,5354	1	6,4516	0	19

Table II - Descriptive Statistics

Relative to EQ variable, the standard deviation (SD) strikes out, a low value of 0,0522 indicates that the values tend to be close to the mean of the set, which is expectable when using residuals of scaled variables.

When looking at the control variables is found that the average firm has a mean log of total assets of 5,2765 and the average company in the sample has 21,8% of its assets are financing by debt. ROA yields a mean of 0,01460, meaning that for every euro invested in assets it generates 1,46% of net income. Also, the number of analysts covering firms ranges from 0 to 19, while the mean is 5, rounded to the nearest whole number.

Ultimately, it is important to refer that the data is almost symmetric distributed, since most of the variables generated close values for mean and median, suggesting the mean is a good measure for assessing data's behavior.

4.2. Correlation Tests

4.2.1. Global Analysis

After computing the residuals and performing correlation tests it is possible to understand whether Eikon's measure is in fact correlated with the academic measure chosen. Table III represents the correlation coefficient, p-value and number of observations between the EQ measure and Eikon's score, which has a total of 5905 observations.

In respect to Pearson's test there was a small positive correlation between Eikon's EQ score and EQ measure of 0,0856, with a p-value of 0. Therefore, we could conclude that EQ measure is correlated at 8,56% with the Eikon score, statistically significant at the level of 1%.

		Correlation
Pearson	**Coefficient**	0,0856***
	P-Value	0,0000
Spearman	**Coefficient**	0,1071***
	P-Value	0,0000
Observations	**n**	5905

***, ** and * indicates statistically significance at the 1%, 5% and 10% level, respectively

Table III - Correlation: Global Analysis

Moreover, Spearman test presented a small positive coefficient of 0,1071, with a p-value of 0. Hence the EQ measure is correlated 10,71% with Eikon's measure, statistically significant at the level of 1%.

The positive correlation can be explained by the introduction of ΔREV and PPE in the Francis et al. model, in comparison to the DD model. As seen in Scarso (2019), these two additions take into consideration long-term accruals and financial performance of companies. Also, the change from working capital to TCA in the dependent variable of the model makes it more relatable to the Eikon score, since in TCA there are change in accruals presented also in the accruals part of Eikon. CFO are also probably a small part of thar correlation, since that the Eikon model takes cash flows into consideration as well.

4.2.2. Country Analysis

		Pearson	Spearman	Observations
Germany	**Coefficient**	0,1483***	0,1689***	1020
	P-Value	0,0000	0,0000	
Austria	**Coefficient**	0,1572*	0,1674*	127
	P-Value	0,0776	0,0599	
Belgium	**Coefficient**	(0,0321)	(0,0284)	335
	P-Value	0,5582	0,6042	
Spain	**Coefficient**	0,1791***	0,2041***	246
	P-Value	0,0048	0,0013	
Finland	**Coefficient**	0,2230***	0,2564***	248
	P-Value	0,0004	0,0000	
France	**Coefficient**	0,0512**	0,07373***	2509
	P-Value	0,0103	0,0002	
Greece	**Coefficient**	0,1613**	0,1401**	222
	P-Value	0,0161	0,0370	
Netherlands	**Coefficient**	0,0662	0,0944	191
	P-Value	0,3628	0,1941	
Ireland	**Coefficient**	(0,0076)	0,1194	55
	P-Value	0,9560	0,3851	
Italy	**Coefficient**	0,0604	0,0877**	680
	P-Value	0,1155	0,0221	
Luxemburg	**Coefficient**	0,1611	0,1770*	88
	P-Value	0,1338	0,0990	
Portugal	**Coefficient**	0,0745	0,0716	184
	P-Value	0,3147	0,3343	

***, ** and * indicates statistically significance at the 1%, 5% and 10% level, respectively

Table IV - Correlation: Country Analysis

Table IV gathers information on correlation tests on each of the 12 countries in the sample. It is possible to observe that 8 of the 12 countries have a small positive correlation, with statistically significance, for at least one of the tests. Nonetheless, Spearman's test seems to provide higher correlation coefficients than Pearson's in most of the countries.

Finland presents the highest positive correlation of all countries, reaching the value of 25,64%, statistically significant at the 1% level, for Spearman's test. Followed by Spain that has a statistically significant coefficient of 0,2041, at the level of 1%.

Italy and Luxemburg are the only countries that have a statistically significant positive correlation with Spearman's and could not reach the same results with Pearson's. For Portugal, Netherlands, Ireland and Belgium no significant correlation between the Eikon score and EQ measure is found.

4.2.3. Industry Analysis

		Pearson	Spearman	Observations
Communication Services	**Coefficient**	0,1370***	0,1399***	571
	P-Value	0,0010	0,0008	
Consumer Discretionary	**Coefficient**	0,1314***	0,1431***	973
	P-Value	0,0000	0,0000	
Consumer Staples	**Coefficient**	0,1758***	0,1899***	459
	P-Value	0,0002	0,0000	
Energy	**Coefficient**	0,1271*	0,1616**	185
	P-Value	0,0846	0,0280	
Health Care	**Coefficient**	(0,0743)*	(0,0700)*	647
	P-Value	0,0589	0,0754	
Industrials	**Coefficient**	0,0820***	0,1062***	1340
	P-Value	0,0027	0,0001	
IT	**Coefficient**	0,1395***	0,1753***	973
	P-Value	0,0000	0,0000	
Materials	**Coefficient**	0,0332	0,0517	491
	P-Value	0,4631	0,2527	
Real Estate	**Coefficient**	0,3425**	0,2880*	38
	P-Value	0,0353	0,0795	
Utilities	**Coefficient**	0,1212*	0,1132*	228
	P-Value	0,0677	0,0880	

***, ** and * indicates statistically significance at the 1%, 5% and 10% level, respectively

Table V - Correlation: Industry Analysis

Table V provides information on correlation tests by each of the 10 industries in the sample. 9 out of 10 present a statistically significant correlation for both tests. Again, the Spearman test gathers the best results overall.

Real Estate has the highest correlation between the two models of all the industries, with a coefficient of 0,3425 and statistically significance at the 5%, being one of the few examples where Pearson test outperformed Spearman's. Nonetheless, Real Estate has the lowest number of observations.

The second highest coefficient belongs to Consumer Staples industry, that generated a small statistically significant coefficient of 0,1899, at the level of 1%, for the Spearman correlation test.

It is important to mention that Health Care industry presented a small negative correlation of 7,43% that is statistically significant at the level of 10%, which means that for the Health Care industry the Eikon score and EQ measure move in opposite directions. Lastly, Materials industry is the only industry that does not present a significant correlation coefficient.

4.2.4. Year Analysis

In Table VI it is presented the information on Spearman and Pearson correlation tests by each year present in the sample. Out of the 14 years studied, 11 of them have statistically significant positive correlation, at least in one of the two tests.

Year 2005 presents the best results out of all the years, with both tests being significant at the 1% level, Spearman's test provided a result of 26,43%. Not only 2005 but the year of 2007 presented a significant positive correlation, at the 1% level, of 21,71%, at its best with Pearson's test.

The years of 2016 and 2012 gathered a statistically significant score in only one of the tests, specifically Spearman's, presenting a low score of 7,4% and 9,17%, respectively. While 2008, 2011 and 2015 could not provide a significant result for both correlation tests. Nonetheless it seems that there is no type of trend between the years and their scores.

		Pearson	Spearman	Observations
2005	**Coefficient**	0,2490***	0,2643***	132
	P-Value	0,0040	0,0022	
2006	**Coefficient**	0,1546*	0,1704**	154
	P-Value	0,0556	0,0346	
2007	**Coefficient**	0,2171***	0,2059***	156
	P-Value	0,0065	0,0099	
2008	**Coefficient**	(0,0439)	(0,0336)	171
	P-Value	0,5687	0,6631	
2009	**Coefficient**	0,1548**	0,1725**	203
	P-Value	0,0275	0,0138	
2010	**Coefficient**	0,1246***	0,1392***	441
	P-Value	0,0088	0,0034	
2011	**Coefficient**	0,0387	0,0499	458
	P-Value	0,4082	0,2867	
2012	**Coefficient**	0,0706	0,0917*	448
	P-Value	0,1357	0,0524	
2013	**Coefficient**	0,1243***	0,1423***	469
	P-Value	0,0070	0,0020	
2014	**Coefficient**	0,0968**	0,1009**	582
	P-Value	0,0195	0,0148	
2015	**Coefficient**	0,0127	0,0490	647
	P-Value	0,7463	0,2132	
2016	**Coefficient**	0,0576	0,0740*	691
	P-Value	0,1303	0,0519	
2017	**Coefficient**	0,0778**	0,1581***	689
	P-Value	0,0411	0,0000	
2018	**Coefficient**	0,1048***	0,1138***	664
	P-Value	0,0069	0,0033	

***, ** and * indicates statistically significance at the 1%, 5% and 10% level, respectively

Table VI - Correlation: Year Analysis

4.3. Regression analysis

In table VII it is presented the variables coefficients and their respective t-statistic (bellow in parenthesis). It is possible to see that the overall model is statistically significant at the 1% level, meaning that the coefficients are jointly not equal to zero and the null hypothesis can be rejected. Concluding that your model provides a better fit than the intercept-only model. Also, all the variables in the regression are statistically significant at the level of 1%, except Size which is statistically significant ate the 10% level.

When looking at the variable's coefficients, in the second model there is a bigger effect on Eikon score when there is an increase in EQ. Meaning that, with controls inserted in the model, an increase in EQ provides a bigger increase in Eikon, than in the first regression.

	(1)	(2)
Cons	**46,0593**	**41,2671**
	115,78	12,11
EQ	**50,3317*** **	**89,0421*** **
	6,60	11,72
SIZE	-	**1,2681***
		1,81
LEV	-	**(30,6916)*** **
		(11,20)
ROA	-	**219,84*** **
		33,22
ACOV	-	**0,2654*** **
		3,25
F-Statistic	F(1,5903) = 43,57	F(5,4631) = 335,99
Prob>F	0,0000	0,0000
R-Squared	0,0073	0,2662

***, ** and * indicates statistically significance at the 1%, 5% and 10% level, respectively. T-statistics beneath the coefficients within parentheses.

Table VII - Variables Coefficients Analysis

Addressing the SIZE variable, an increase in the company's size, generates an increase in the EIKON variable. if other things held constant. Current literature defends the idea that big companies have less opportunity and incentive to manage earnings. Mostly since they are more controlled by and subject to more restrictions created by regulators (Albrecth and Richardson, 1990; Dechow et al., 2010). Also, the bigger the company the more the attention it attracts, which means more analysts and investors following the firm, which can explain the results obtained in the ACOV variable as well.

LEV variable is the only one that has a negative effect on the dependent variable, when the amount of debt to equity in a company increases the EIKON variable decreases, if other things held constant. There is an important study in Ghosh and Moon (2010), in this work the authors also use the Francis et al. adaptation of the DD model, but to study the relation between debt and EQ. Results show that for low levels of debt , exists a positive relation with EQ, but that reverses as debt levels go up. Explained due to the incentive for managers to manipulate earnings in order to avoid covenants violations, rather than report correct and informative earnings

Looking at ROA we see that as it increases the dependent variable tends to increase too. This information goes accordingly with the presented literature review, where it is exposed that, when constructing EIKON, was taken in consideration the high persistence provided by earnings derived from high profit margins and good asset turnover. Agreeing with the general literature, where is provided evidence that companies with poor performance tend to manipulate earnings, hurting the ability to predict future earnings correctly.

Lastly, the coefficient for the ACOV variable shows that for every new analyst following the firm, the EIKON variable increases, everything held constant. Theoretically, a firm being followed by many analysts means that attracts attention, and subsequently has less opportunity to manage accounting numbers, improving EQ.

The R-Squared value of 0,2662 shows that the percentage of the response variable variation that is explained by the model is 26,62%. Looking at the (1) column is visible that the model excluding the control is also statistically significant at the 1% level, whilst generating a significantly lower R-Squared of 0,0073, meaning that the percentage of the response variable variation is better explained with controls introduced in the model.

5. Conclusion

5.1. Synthesis

The main objective of this study is to understand the relationship between academic research and analyst models, in the topic of earnings quality, and by doing so, deepening the knowledge on the components and foundation of the Eikon EQ model.

To achieve the objective, it is used a sample composed of companies from 12 European countries and empirical research was performed in two sections. The literature

that perform these tests is very sparse and recent, so it was important to choose a different sample that the one chosen in Scarso (2019).

The academic earnings quality measure selected was the accruals quality measure generated by the DD model, adjusted in Francis et al. (2005), which is used as proxy. After the data was treated for outliers and for companies of the financial sector, the first empirical study was made by performing Pearson and Spearman correlation test between the two measures, using the residuals provided by EQ against the score for EIKON. The second empirical study was conducted to study the association between the two measures through a regression analysis. Providing two regressions, with and without controls, using EIKON as dependent variable and EQ as explanatory variable.

The main results obtained show that, for the sample chosen, the correlation between the two earnings quality measures are positive and statistically significant at the level of 1% for both tests, specifically, 8,56% for Pearson's test, and 10,71% for Spearman's. For the overall analyses, the Spearman test gathers the best results out of the two tests.

In respect to the correlation by industry, results present a small positive correlation, with statistically significance, for 8 of the 12 countries, at least for one of the tests. Most notably Finland and Spain, which have the highest statistically significant scores, with 25,64% and 20,41%, respectively, at the 1% level, for Spearman's test.

When addressing industry analysis, 9 out of the 10 industries in the sample proved to have a positive statistically significant correlation for both tests. Moreover, the highest positive scores came from the Real Estate industry, providing a result of 34,25%, with a statistically significance level of 5%. Followed by Consumer Staples industry with a result of 18,99% at the 1% level. In contrary, that the Health Care industry presents a negative statistically significant result of 7,43%, at the level of 10%.

These results supports previous literature and is explained by the fact that both models use similar components in their calculation, most notably the inclusion of PPE and REV in the Francis model, captures long term accruals plus the use of cash flows which is also inside the EIKON model. So even if small, a positive correlation proves that the models measure some of the components in the same way. Moreover, the fact that EIKON is not quite fully explained and documented to the public makes it harder to determine exactly how and what is considered in terms of its computation.

In the latter sub-section is observed that both regressions are statistically significant at the 1% level. As for percentage of response variable variation explained by the model, there is an increase from 7,3% to 26,62%, when comparing EQ only model to the regression with controls. All the variable's coefficients are statistically significant. As for EQ, an increase in the Francis model residuals provides an increase in EIKON. For SIZE, ROA and ACOV variables, an increase in the company's size, profitability and for every new analyst covering the firm, the EIKON variable also increases, if other things held constant. LEV variable is the only that has a negative effect on the dependent variable.

The results generated in the second section of the empirical tests go accordingly with the work used as a basis for this section, in Bens (2019). Variables used as controls move in the same direction and behave accordingly with expectations provided by prior literature. Despite using a model created for a different explanatory variable, the results generated are interesting, with a R-squared of 26,62% is visible that model is improved by the use of controls and that EIKON variation is also explained by size of company, performance, levels of debt and number of analysts following the firm.

5.2. Limitations

The main limitations in this study are related to the lack of specific information on the construction of EIKON score, making it harder to evaluate the components responsible for the correlation results. Although it is possible to extract the value for the 4 components individually, it was not feasible to this study. Since for the majority of the observations, it was not possible to extract values for all components. Furthermore, due to the complex structure of the model used to compute academic earnings quality measure, many original observations were lost, decreasing the sample size significantly. In fact, in the industry and country analyses, some countries/industries produce a small number of observations, so, there is a possibility that some conclusions are lost due to not being represented in a sufficient number.

5.3. Suggestions for Future Research

The earnings quality topic has a quite broad research literature, in which a wide variety of studies and proxies were created, yet there is still a big gap in respect to quantitative models such as Eikon's. Amplifying the knowledge on financial databases

models for EQ and their potential uses in academic research is of interest. To achieve such objective, studies could use the sub scores for the 4 components of the Eikon score, to perceive whether some of those components are differently related with academic measures. The previous suggestion is still dependent on the successful extraction of information on each component. Also, the use of Eikon type models to access their association with share profitability, or stock price variation in financial markets could be an interesting and feasible approach to the topic, enhancing knowledge on financial database models for EQ.

References

Albrecht, W. D., & Richardson, F. M. (1990). Income smoothing by economy sector. *Journal of Business Finance & Accounting*, *17*(5), 713-730.

Atas, K. (2005). Finding Sustainable Sources of Earnings. Starmine Professional. Available at: https://chicago.qwafafew.org/wp-content/uploads/sites/5/2017/01/chicago-20051020-atas.pdf

Barth, M.E., Cram, D.P. & Nelson, K.K., (2001). Accruals and the prediction of future cash flows. *The accounting review*, *76*(1), pp.27-58.

Bens, D., Chang, W. J., & Huang, S. (2019). The Association between the Expanded Audit Report and Financial Reporting Quality, *Working Paper*.

Dechow, P., & Dichev, I. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, *77*(s-1), 35-59.

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of accounting and economics*, *50*(2-3), 344-401.

Dechow, P. M., Kothari, S. P., & Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of accounting and Economics*, *25*(2), 133-168.

Dechow, P. M., & Schrand, C. M. (2004). Earnings quality. *The Research Foundation of CFA Institute.*

DeFond, M. L. (2010). Earnings quality research: Advances, challenges and future research. *Journal of Accounting and Economics*, *50*(2-3), 402-409.

Dichev, I. D., Graham, J. R., Harvey, C. R., & Rajgopal, S. (2013). Earnings quality: Evidence from the field. *Journal of Accounting and Economics*, *56*(2-3), 1-33.

Doyle, J. T., Lundholm, R. J., & Soliman, M. T. (2002). The Predictive Value of Expenses Excluded from'Pro Forma'Earnings. *Available at SSRN 303563*.

Ewert, R., & Wagenhofer, A. (2011). Earnings quality metrics and what they measure. *Available at SSRN 1697042*.

Finger, C. A. (1994). The ability of earnings to predict future earnings and cash flow. *Journal of accounting research*, *32*(2), 210-223.

Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The accounting review*, *79*(4), 967-1010.

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of accounting and economics*, *39*(2), 295-327.

Frankel, R., McVay, S., & Soliman, M. (2011). Non-GAAP earnings and board independence. *Review of Accounting Studies*, *16*(4), 719-744.

Gaio, C., & Raposo, C. (2011). Earnings quality and firm valuation: international evidence. *Accounting & Finance*, *51*(2), 467-499.

Ghosh, A., & Moon, D. (2010). Corporate debt financing and earnings quality. *Journal of Business Finance & Accounting*, *37*(5-6), 538-559.

Guay, W. R., Kothari, S. P., & Watts, R. L. (1996). A market-based evaluation of discretionary accrual models. *Journal of accounting research*, *34*, 83-105.

Gutiérrez, A. L., & Rodríguez, M. C. (2019). A review on the multidimensional analysis of earnings quality. *Revista de Contabilidad-Spanish Accounting Review*, *22*(1), 41-60.

Holthausen, R. W., & Watts, R. L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of accounting and economics*, *31*(1-3), 3-75.

Houge, T., & Loughran, T. (2000). Cash flow is king? Cognitive errors by investors. *The Journal of Psychology and Financial Markets*, *1*(3-4), 161-175.

Jennings, R., & Marques, A. (2011). The joint effects of corporate governance and regulation on the disclosure of manager-adjusted non-GAAP earnings in the US. *Journal of Business Finance & Accounting*, *38*(3-4), 364-394.

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of accounting research*, *29*(2), 193-228.

McNichols, M. F. (2002). Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, *77*(s-1), 61-69.

Nelson, M. W., & Skinner, D. J. (2013). How should we think about earnings quality? A discussion of "Earnings quality: Evidence from the field". *Journal of Accounting and Economics*, *56*(2-3), 34-41.

Perotti, P., & Wagenhofer, A. (2014). Earnings quality measures and excess returns. *Journal of business finance & accounting*, *41*(5-6), 545-571.

Refinitiv. (2014). Starmine's earnings quality model may point to short selling picks. Refinitiv. Available at: http://lipperalpha.refinitiv.com/2014/12/starmines-earnings-quality-model-may-point-short-selling-picks/ .

Richardson, S. A., Sloan, R. G., Soliman, M. T., & Tuna, I. (2005). Accrual reliability, earnings persistence and stock prices. *Journal of accounting and economics*, *39*(3), 437-485.

Scarso, L. (2019). *Earnings quality: measures and determinants*. (Master´s Thesis, Universita degli studi di Padova, Padova, Italy). Available at: http://tesi.cab.unipd.it

Schipper, K., & Vincent, L. (2003). Earnings quality. *Accounting horizons*, *17*, 97-110.

Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting review*, 289-315.

Soliman, M. T. (2004). Using industry-adjusted DuPont analysis to predict future profitability. *Available at SSRN 456700*.

Tumewang, Y. K. (2019). A comparison of non-financial performance and earnings quality between QIIB and BIB. *Jurnal Ekonomi & Keuangan Islam*, *5*, 25-3