



End of Degree Project:

Empirical analysis of the quality on risk disclosure by Spanish firms

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Abstract: The conventional wisdom in the literature based on voluntary disclosure stressed that the amount of risk that companies disclose can be used as a proxy for the quality. However, when analysing the risk disclosure it is essential to know not only the amount of disclosed risk, but also the quality of the information disclosed, and how it is reported.

The main objective of the study is to measure the quality of risk information disclosed by industrial companies listed on the IBEX 35, and to establish a quality ranking. In order to perform this study we have relied on the model proposed by Beretta and Bozzolan (2004). Additionally, it has been tested if the quality of the risk information has changed between the studied years.

KEYWORDS: *content analysis; quality risk disclosure; risk management.*

JEL codes: G32, M48.

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ABBREVIATIONS

EU: European Union

FFR: Financial Reporting Release

GAS: German Accounting Standard

GASB: German Accounting Standards Board

GASC: German Accounting Standards Committee

IAS: International Accounting Standard

IFRS: International Financial Reporting Standard

MD&A: Management discussion and analysis report (within the study it is mentioned as an equivalent of the Spanish 'Informe de Gestión'). Its equivalent in UK would be the OFR

OFR: Operating and Financial Review, for listed companies, (non-mandatory)

PGC: Plan General de Contabilidad. (Spanish General Accounting Plan)

SABI: Sistema de Análisis de Balances Ibéricos

SEC: Securities and Exchange Commission

VaR: Value at Risk

Empirical analysis of the quality on risk disclosure by Spanish firms

1. INTRODUCTION

In the last years, both, authors and accounting organisations have denounced the lack of information related to risks in their financial statements (Cea, 1992; Aicpa, 1994; Solomon et. al., 2000; ICAC, 2002). Risk disclosure has significant advantages for stakeholders but also for the firms that disclosure this information. In this sense, the ICAEW (1997), has denounced the limitation of profit forecasts based exclusively on historical data, and boosts companies to disclose risk information with the purpose to be aware of the factors that may affect results or future cash flows. In the same line, Kwok (2003) revealed that the risk information disclosed by companies under the FRR (FRR No. 48¹) disseminated by the SEC (1997), could improve the accuracy of the profit forecasts.

One of the major advantages attributed to the risk disclosure is its influence in dropping the cost of equity. Risk perceptions of investors are a main factor in terms of determining the cost of equity that a firm has to undertake. Therefore, by presenting the risk information the investors would be allowed to reduce their uncertainty about the firm, and consequently, the required risk premium. In this topic, there is a study by Guo (2003) based on an analysis of the risk disclosure impact on the cost of debt. Other research related to this issue has been made by Verrecchia (1999), as his theoretical research argued that higher levels of disclosure resulted in a decrease in the cost of equity. Nevertheless, the empirical research has not found conclusive results on the hypothesis, and the difficulty on estimating the cost of capital remains as one of the main problems (Leuz and Verrecchia, 2000).

The research related to the degree of risk disclosure has been supported so far by an analysis of the content (Lajili and Zéghal, 2003; Mohobbot, 2005; Linsey and Shrikes, 2006; Abraham and Cox, 2007). The studies utilised the sentences as a proxy of the degree of risk disclosure: they assume the more sentences a firm discloses, the more risk related information provided. Nonetheless, it is not necessarily true, since the narrative may be more or less extensive, but it does not imply that a further extension leads into more information.

¹ FRR No. 48: This standard forces to the listed companies to present both quantitative and qualitative information about the market risk caused by the use of derivatives and other financial instruments.

The aim of the present final degree project is to apply a process to quantify the disclosure degree of risk information by firms, saving the inconvenience of the previous methods above-mentioned. It would follow the proposed method of Beretta and Bozzolan (2004), which introduced an indicator that is based on stages of content and not only the quantity of disclosure pieces (i.e. sentences or paragraphs).

Furthermore, within the study, an empirical analysis has been realised, examining the degree of risk information disseminated by the representative Spanish firms. Besides, there have been considered some corporate characteristics (such as the size and the industry) associated with a greater or lesser degree of disclosure in such information.

The research is organised as follows. After the present introduction, the second section reviews the previous literature and empirical studies analysing the risk disclosure. In the third one, the risk disclosure regulation is introduced. Sections fourth to fifth contain an explanation of the theoretical framework and the proposed method for the measurement, and the research method followed. In section sixth, the empirical evidence and the obtained results are described. Section seventh mentions the limitations and recommendations of the study, and finally, in section eighth several conclusions are expounded.

2. REVIEW OF THE PREVIOUS LITERATURE AND EMPIRICAL STUDIES ON RISK DISCLOSURE

The appearance of regulations on the reporting of risks has led to an emerging line of research that pursues objectives as knowing the disclosure degree of risk information by firms, its usefulness for certain users of accounting information (stakeholders), and new suggestions in order to incorporate risk measures in the financial statements.

In 1997, the SEC issued the FRR No. 48 with the purpose to conduct the lack of information on market risks within the financial statements. The regulation has led to a series of studies analysing its usefulness (Jorion, 2002; Liu et al., 2004; Woods et al., 2008; Yeow and Mui-Siang, 2007; Linsmeier et al., 2002; Rajgopal, 1999) and its effect on market variables. Under this approach, Jorion (2002) and Liu et al. (2004) study the VaR as a risk measure for a sample of US banks, demonstrating the utility of this measure in terms of predicting the variability of the revenues in the trading portfolio.

Furthermore, Cabedo and Tirado (2004) mentioned the weakness that produce the lack of information on risk disclosure, and they introduced the value at risk as a

proper method to quantify the major part of a firm risks, since according to them it can be used to measure the business, credit and market risks.

Conversely, Woods et al. (2008) are critical about the usefulness of VaR in terms of providing information related to the market risk. Linsmeier et al. (2002), and also Rajgopal (1999), investigated the relationship between the exposure to the commodity price risk and the sensitivity in the market for gas and oil. Despite its positive relationship, Rajgopal (1999) noted that it could not be demonstrated an increment on the utility for investors when they know the risk measure.

Roulstone (1999) indicated that the quality of risk information submitted by the firms significantly improved as consequence of the FRR No. 48, although there are still significant weaknesses. He proposed further details related to the quantitative measures of the market risk and its management. Meanwhile, Kwok (2003) evidenced a better accuracy in the profits forecasts realised by financial analysts when they are using the information on market risks established in the FRR No. 48.

Contrasting the FRR No. 48, that only deals with the treatment of market risks; the GASB enforced to submit a comprehensive report of all the risks that firms are facing through the release of GAS No. 52 in the year 2000. Several studies, for instance Bungartz (2003), Kajüter (2004) or Fischer and Vielmeyer (2004); ascertained that the disclosed information about risks under GAS No. 5 was inaccurate, and generated a high degree of displeasure among the users.

Woods and Reber (2003) conducted a comparative analysis of market risk information disclosed by firms in UK and Germany. The results demonstrated that despite of the disclosure of the risk information was not compulsory, British companies offer higher levels of risk disclosure than the German ones. They had a greater degree of financial risk disclosure than the German firms, while the German had a higher detail on revealing their nonfinancial risks.

The methodology used by the researches about the degree of risk disclosure that is not regulated and furthermore merely voluntary; is based on the content analysis. The studies refer the number of sentences as a proxy to measure the level of risk reported by companies. There are many studied traits that may be related with a larger degree of risk disclosure. In this regard, Linsley and Shrives (2006), Beretta and

² GAS No. 5 is explained on Risk Disclosure Regulation section.

Bozzolan (2004), and Mohobbot (2005); evidenced a positive relationship of the size, an also of the corporate governance composition (Abraham and Cox, 2007).

As regards the type of information disclosed of risks, Linsley and Shrides (2006) and Beretta and Bozzolan (2004) evidenced that the qualitative risk information prevails the quantitative ones, being the latter a small proportion of the disclosures about risks.

In turn, the results indicated that the firms disclosed more risk information related to the past; and managers remained reluctant to facilitate future risks information (forward-looking risk) Mohobbot (2005), Linsley and Shrides (2006).

The previous studies that have analysed the degree of risk disclosure on the companies have applied a narrative content analysis. This method involves categorising the narrative information in several categories, and it establishes a unit of information measurement (Beattie et. al., 2004). Linsley and Shrides (2006) and Abraham and Cox (2007) considered the sentences as the unit of measurement on risk information content. Thus, it is generally accepted that the higher the number of the reported sentences, the greater the information content on reporting risks. It should be noted that this measure assumes that if a firm discloses two sentences about a given risk, it is disclosing twice than the company which reports only one sentence about the same risk. Indeed, it is possible that the two companies are reporting the same content although one expressed a 'greater narrative'.

Three main ideas are derived from the previous literature:

- Firstly, there exists a concern about risk information, both by the accounting entities and by the accounting literature.
- Secondly, accounting entities have included regulations with the purpose to guide the deficiencies arising from the communication of risk disclosure. Representing the accounting literature, there have been a series of studies and papers (several research lines) in order to analyse the usefulness of the risks reports. Other studies examine the degree of risk disclosure and its relationship with the corporate variables.
- Thirdly, there is still a lack of studies that investigate on the quality of the disclosed information. As it was mentioned previously, the degree of disclosure has been taken as a proxy for the quality. In this sense, Beretta and Bozzolan (2004) proposed a quality index of the risk information disclosure to analyse the quality of the risk information. Within the proposed framework, the quality of risk disclosed by firms depends on the amount of information disclosed but also on the wealth of additional

information. Thus, using only the amount of shared information would not be an appropriate proxy to determine the quality of it.

The suggested index was applied to sample of Italian companies. Their results evidence that their index is not affected either by the size of the company or the industry.

3. RISK DISCLOSURE REGULATIONS

It is expected that the process of accounting reform in Spain will be useful to reduce the gap related to the risk information disclosed by the firms. If the international accounting standards are adopted in our accounting system, along with the adjustment of the Commercial Code and Corporations Law and an adapted Spanish Corporate legislation; it would be feasible an international harmonization based on the EU legislation, which has already made compulsory the disclosure of the financial risks by the firms.

For the case of Spanish financial institutions, risk disclosure is regulated by the Bank of Spain in its 'Circular 4/2004 of December, 22, under the Standards of public and reserved financial information, and the financial statements model.

3.1. Listed Spanish groups.

At the moment, the listed groups from the Spanish stock exchange have to formulate their consolidated financial statements according to the IAS. Regarding to the risks, they must apply IFRS No. 7³. Companies have to report information about risks in the years beginning from 2007. The standard specifies three types of financial risks that are compulsory to report: credit risk, liquidity risk and market risk. It is voluntary to report other types of financial risks.

3.2. Unlisted Spanish groups.

The Spanish firms that are not listed on the stock exchange or the ones that are listed but do not pertain to a group, have to prepare their financial statements according to the Spanish legislation and the PGC. According to the Law 31/2014 of Corporations Act, section 262; it is compulsory to include the risk-related information within the MD&A statement. The firm should explain the main risks and uncertainties of the company, and report the exposure to the price risk, credit risk, liquidity risk and

³ IFRS No. 7 is related to Financial Instruments. This standard regulates the submission of information on risks by using financial instruments.

cash flow risk derived from the use of financial instruments. Furthermore, it should contain a description of the objectives and policies for financial risk management used by the company in order to mitigate the risk.

In this sense, the Spanish regulation follows the same line adopted by the international standards, being voluntary the disclosure about other risks than those arising from the use of financial instruments. The present moment of accounting reform is undoubtedly an excellent opportunity to include the obligation to provide risk information on all risks (financial and nonfinancial) in the same way that is followed by the GASB in German (resulting in more advanced standards). In year 2000, the GASC issued the GAS No. 54 with the aim of regulating the disclosure of risks within German firms groups. This standard requires the presentation of a risks statement that has to be included in the management report.

According to Cabedo and Tirado (2007), given the limited information provided voluntarily by companies, it seems necessary to submit risk information in a compulsory system.

4. QUALITY INDEX OF RISK INFORMATION

To be fully aware of the risks that a company faces is essential, both for investors and other stakeholders of the company. The number of risks that the company faces and their intensity are decisive in its valuation and in its value creation.

This stands in contrast with the fact that so far no regulatory institutions have explicitly provided specific regulation for business risks disclosure, as some authors have been mentioned for some time. As it was mentioned in the section about risk disclosure regulations, the Spanish stock market does not regulate the overall the risk disclosure of nonfinancial companies. Except for the financial and market risks, almost all the disclosures made by the firms are voluntary and not biased by the standards or compulsory norms that could influence both the content disclosure and the way in which the disclosure is reported.

Beretta and Bozzolan (2004) propose an index of the quality on risk disclosure that differentiates four dimensions: quantity dimension, density dimension, depth dimension and outlook profile dimension.

⁴ GAS No. 5 defines risk as the possibility of a future negative impact on the economic position of the group. It can be understood as a negative impact, loss of wealth expressed either in terms of lower future earnings, cash flow or any other variable that represents the impact.

In order to avoid the shortcomings on the measure used in the previous studies, in this project it is proposed a quality index based in the four dimensions suggested, that reflects in a more adjusted manner the disclosed risk information content to the reality. It requires analysing completely the risk information issued by firms in their published financial information. A series of stages are set in terms of disclosure. It is understood by a stage an information level, regardless of the number of sentences concerning to a certain aspect of the risk.

The classification within the stages is not exclusive. Any company is feasible to disclose risk information from several stages. For each one of the firms and years of the sample, five different stages have been considered following the 5 stages classification proposed by Cabedo and Tirado (2009):

Stage 1: Only mentions the risks to which it is exposed.

Stage 2: Makes a description of the risk and how it affects to the company.

Stage 3: Reports the measurement of risk impact.

Stage 4: Reports its risk management.

Stage 5: Reports the types of instruments used in order to mitigate the risk.

The business risk model that has been used is the one proposed by Arthur Andersen, which has been also applied by the ICAEW (1997) to propose a framework for business risks disclosure. Authors such as Linsley and Shrive (2006) and also Kajüter (2004) use this model with the aim of analyse the degree of disclosure of business risks. It establishes six categories of risks: financial risk, business risk, strength risk, information processing and technological risk, integrity risk and strategic risk. The several categories are described in the research method section, in order to explain how they have been codified.

4.1. Size effect

According to the paper of Beretta and Bozzolan (2004), some authors stated that the larger companies tend to have greater proportions of outside capital, since the firms that borrow higher amounts of their assets from banks have a tendency to disclose more information to meet the needs of their lenders. In this sense, we could affirm that the size is a strong driver for disclosure.

Additionally, highly levels of financial communication require a widespread of highly expert individuals. Therefore the larger a company is, the higher the ability to attract experts. So it could be argued that the size is an enabler for disclosure.

4.2. Industry effect

In general, firms are pressed to disclose information related to their industry in their annual reports. It is due to the fact that external investors need to evaluate the relative position of the firm within its industry. The disclosure could also be shaped by the behaviour of the dominant company (Cooke, 1992) or historical reasons (Cooke, 1989).

Regarding the case of risk disclosure, the industry could also be additionally underlined by the technological or market constraints due to competitors, industrial environment, etc. In addition, each risk type of a firm is strongly related to its critical-success factors but also to the characteristic models of the industry.

4.3. Dimensions considered in the model

There are several aspects related with the measurement of the proposed dimensions for the analysis of risk disclosure.

- In terms of *quantity of information* disclosed, it has to be noticed that the total amount of the disclosed paragraphs has been considered as a proxy for the amount of disclosure provided by the companies. It is the first dimension considered.
- In addition, the information voluntarily disclosed also varies in *density* (quality), as the relevance by risk-related information depends on the weight it has in the global statement.

As concerns semantic properties, there have been considered several aspects:

- The disclosure of the expected impacts of the considered risks, as the *depth* dimension.
- The management strategies related to programs, actions and other resources in order to mitigate risks, as the *outlook profile* dimension.

The following sections explain each one of the dimensions considered in the model with more detail.

4.4. Quantity dimension

Relative quantity index (*RQT*) is calculated by the difference between the observed disclosure for a company and the expected disclosure, which is estimated through standardized residuals of an *OLS5* (Ordinary Least Squares) regression, using the size and the industry as the independent variables. We consider that a good proxy in order to determine the size of the firm could be the total assets of the companies' balance sheets. The industry variable corresponds to a dummy variable.

The higher the difference between the quantity of disclosed information by the company and its expected value, the higher the value of the *RQT* index.

While the quality of disclosure using the traditional framework has been widely studied in theoretical and empirical literature with a controversial effect for the majority of the factors, it would seem that at least for two of them have clear effects: size of firm and industry (Ahmed and Courtis, 1999; Belkaoui and Karpik, 1989; Cooke, 1989, 1992; Lang & Lundholm, 1993; Raffournier, 1995).

Since the above mentioned studies evidenced that the quantity of disclosure is vastly influenced by the size and the industry sector of the firm, it is believed that an absolute index is not sufficient in order to better know the relative quantity of disclosure made by a firm. So that, it is proposed an index that is able to measure the relative quantity of the disclosure. With that purpose, the standardized residuals resulting from the regression are used as a proxy for the relative disclosed quantity.

Equation 1: Multiple linear regression model

$$\widehat{D}_i = \hat{\beta}_0 + \sum_{j=1}^{k-1} \hat{\beta}_j IND_j + \hat{\beta}_k \ln SIZE_i$$

\widehat{D}_i is the estimated disclosure for company *i*.

$\hat{\beta}_0$ is the estimated intercept.

$\hat{\beta}_j$ represent the estimated regression coefficients corresponding to each one of the industries considered in the model.

$\hat{\beta}_k$ is the estimated regression coefficient of the natural logarithm on size.

⁵ Ordinary least squares are used in statistics as a method for estimating the unknown parameters in a linear regression model.

IND_j represent the regressors of the industry, dummy variables.

$\ln SIZE_i$ represents the natural logarithm of the size on firm i , by using the total assets as a proxy of the size.

k is the number of industries, as the industries are dummy variables the model should contain $k - 1$ industries, to avoid multicollinearity.

i is the number of observations.

j is the firm industry.

Equation 2: Relative quantity index (Standardized residuals related to the relative quantity)

$$RQT_i = D_i - \hat{D}_i$$

D_i is the disclosure for company i .

RQT_i index represents the relative quantity for the i company, it is greater if a company discloses more information than the average companies from the sample that belong to the same industry, adjusted by size. Hence, the quantity of risk information disclosure is adjusted by the two external factors (size and industry) that are expected to influence in the level of disclosure.

4.5. Density dimension

In the aim to measure the density dimension of the disclosure, the writing style may inevitably influence the narrative of the report. Furthermore, its relevance will be influenced by the amount of risks disclosed with respect to the total disclosures.

In this sense, a small amount of risk-related paragraphs regarding a large total amount of narrative within the report, makes difficult for the reader of being aware of the risks that affect to the performance of the company.

Furthermore, a limited amount of risk information within a dense document may reveal a strategy of deliberately concealing relevant information concerning risks by the company, to make it difficult for the reader to find it.

In the analysis we define the density of the disclosure as the ratio between the amount of paragraphs within the risk related note out of the total amount of paragraphs included in the MD&A report.

Therefore the value of DEN_i rate will be between 0 and 1.

If it is close to 1, it means that in the index value indicate a greater relevance of the information disclosed about the company risks.

Equation 3: Density index

$$DEN_i = \frac{1}{k_i} \sum_{j=1}^{k_i} RFL_{ij}$$

Where DEN_i is the density index for the company i .

k_i is the paragraph amount within the annual report of the company i .

$RFL_{ij} = 1$, if the j paragraph within the annual report of the company (MD&A) contains risk-related information.

$RFL_{ij} = 0$, if the j paragraph within the annual report of the company (MD&A) does not contain risk-related information.

4.6. Depth dimension

The depth is the third dimension agreed to quantify the risk communication. It is related to the disclosure of information with respect to the expected economic impact of the identified risks, in terms of the future performance of the company.

This index summarizes both the sign of the economic impact and the measures used to communicate the expected performance.

Equation 4: Depth index

$$DPT_i = \frac{1}{rfl_i} \sum_{j=1}^{k_j} ECS_{ij} + \frac{1}{rfl_i} \sum_{j=1}^{k_j} MSR_{ij}$$

Where DPT_i is the depth index for the firm i .

rfl_i is the number of risk items disclosed by the firm i .

k_j is the number of paragraphs within the annual report (MD&A) of firm j .

$ECS_{ij} = 1$, if the j paragraph within the annual report of the company i contains information on the expected future performance.

$ECS_{ij} = 0$, if the j paragraph within the annual report of the company i does not contain information on the expected future performance.

$MSR_{ij} = 2$, if the j paragraph within the annual report of the company i contains a quantitative measure of future performance.

$MSR_{ij} = 1$, if the j paragraph within the annual report of the company i contains a qualitative measure of expected future performance.

$MSR_{ij} = 0$, if the j paragraph within the annual report of the company i does not contain any measure of expected future performance.

4.7. Outlook profile dimension

The outlook profile is the fourth dimension assumed. It is associated to the concerns of how the management transfers the methodology implemented to face the recognised risks.

Because risk disclosure is able to communicate only the existence of risks, or moreover to explain the risk-management approach adopted by the organisation (by providing information about programs or actions planned). Thus, the proposed index has a range between 0 and 1. It presents higher values as the firm discloses more information regarding the several actions considered or programs intended by management in order to face the recognised risks.

Equation 5: Outlook profile index

$$OPR_i = \frac{1}{rfl_i} \sum_{j=1}^{k_j} ACP_{ij}$$

Where OPR_i is the outlook profile index for the firm i .

rfl_i is the number of risk items disclosed by the firm i .

k_j is the number of paragraphs within the annual report (MD&A) of firm j .

$ACP_{ij} = 1$, if the j paragraph within the annual report of the company i contains information concerning actions or programs planned or taken in order to face the identified risks.

$ACP_{ij} = 0$, if the j paragraph within the annual report of the company i does not contain information concerning actions or programs planned or taken in order to face the identified risks.

4.8. Quality index as the aggregation of the four dimensions

Firm's disclosures can be analysed from two different perspectives according to the framework and proposed indexes.

4.8.1. First analysis perspective

Using this perspective is feasible to build a synthetic measure of the risk quality communication by the company. To calculate the summary index, the four dimension indexes are synthetized in a global measure obtained as their simple arithmetic mean. It is necessary to standardize them in order to avoid a scale effect.

It is important to remember the fact that each index has a different variation range:

Density (DEN) and outlook profile (OPR), vary on their values between 0 and 1.

Relative quantity (RQT) is distributed as standardized normal and does not have a predefined variation range.

Depth (DPT) vary on its values between 0 and 3. If there is only quantitative measure of the risk impact its value is 2, if there is a qualitative measure its value is 1. But if there are both, the value is 3. Obviously, if there is no measure related to the risk impact the value will be 0.

In order to standardize the different dimensions, it has been adopted the same equation that the Beretta and Bozzolan (2004) research.

Equation 6: Standardized index

$$IND_i^S = \frac{IND_i - \min_i(IND_i)}{\max(IND_i) - \min_i(IND_i)}$$

Where IND_i^S is the standardized index for the firm i .

IND_i is the observed index for the firm i .

The summary index measures the quality of the disclosed risk by the companies. It has been obtained following once more the one proposed in the paper mentioned in

the previous equation. The four different dimensions have been standardized previously by applying the standardized index.

Equation 7: Summary index

$$QUALITY_i = \frac{1}{4} (RQT_i^S + DEN_i^S + DPT_i^S + OPR_i^S)$$

Where RQT_i^S is the standardized relative quantity for the firm i .

DEN_i^S is the standardized density for the firm i .

DPT_i^S is the standardized depth for the firm i .

OPR_i^S is the standardized outlook profile for the firm i .

The index obtained from this equation symbolizes the quality of the risk disclosure. It provides an overall impression of the intensity of the disclosure process among the firms. In addition, it is useful to rank companies by their quality of risk disclosure. Its value can oscillate between 0 and 1.

Unfortunately, when taking into account the first analysis perspective, the reader should aware that the summary index does not explain by itself the diverse risk-communication approaches adopted by each firm.

This is due to the fact that voluntary disclosure (as many other phenomena) is very complex, and the measurement of several dimensions into a single synthetic value has its limitations in terms of usefulness.

4.8.2. Second analysis perspective

In order to compensate the limitations of the previous perspective, this standpoint assimilates the four dimensions of analysis with the purpose to illustrate the communication profile implemented by a company, referring to its risk disclosure.

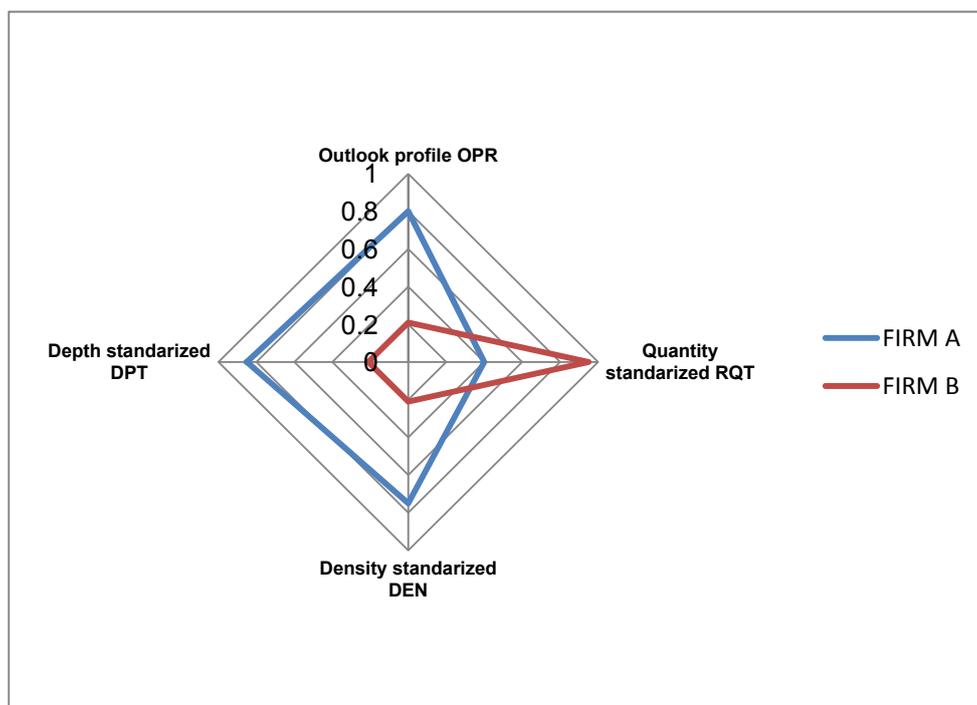
A graphical representation of the risk-communication silhouette can be obtained for each firm, by positioning the four dimensions along the two axes and connecting the points of the measures obtained in each one of the dimensions.

The graphical representation can offer some assistance related to the understanding and comparison of the disclosures made by the different firms. The proposed diagram is limited as a diagnostic tool because of the graphical aspect. There are limited numbers of risk-communication shapes that could be depicted at the same

time, and the diagram does not allow to be used to analyse long, historical series for the same company, nor for comparing large populations of firms.

For instance, we can assume two different companies, firm A and firm B. According to the traditional measure of disclosure suggested by the literature, firm B makes a greater disclosure of risks than firm A. This is due to the fact that company B has a large relative quantity of disclosed risk. However, the diagram evidences that the quality of risk disclosure in company A is greater on the other three dimensions.

Figure 1: The risk-profile diagram: visualizing risk-communication strategies



5. RESEARCH METHOD

An empirical analysis has been conducted with the objective to identify all the features that a more articulated framework is able to obtain in comparison with the traditional method of merely counting the number of pieces disclosed.

The companies from the sample and also their industries are explained below. To assure homogeneity requirements, financial companies have not been considered in the analysis.

The analysed data has been collected from the company annual reports, since the source is public (available), comprehensible, and it has wide coverage. More concretely, it was collected from the MD&A⁶, because as Krippendorf (1980) stated 'it permits repeatability and valid inferences from data according to their context' (Beretta and Bozzolan, 2004:276). The study was on voluntary disclosure, through a content analysis. The process of downloading and handling the data is widely explained on the Annex.

It was elaborated and named a 'Quality Index' Excel file, with several sheets, in order to calculate de quality index on risks disclosure.

5.1. Firms considered within the sample and their industry

The companies from the sample were listed on the Spanish stock exchange Ibex 35 in the years 2007 and 2013. The sample of firms is composed as follows, and to each one of them has been assigned its corresponding ticker from the stock exchange.

The ticker is the code for which are recognised the shares of the firm in the stock exchange, to facilitate the uniformity in classifying.

⁶ Recall that we refer to MD&A as the equivalent of the Spanish 'Informe de Gestión'.

Table 1: Non-financial firms from the sample

TICKER	FIRM
ABE	ABERTIS INFRAESTRUCTURAS, SA.
ABG	ABENGOA, S.A.
ACS	ACTIVIDADES DE CONST.Y SERVIVIOS, S.A.
ACX	ACERINOX, SA.
AMS	AMADEUS IT HODLING
ANA	ACCIONA, S.A.
CIN	CINTRA CONC.DE INF.DE TRANSPORTE, S.A.
DIA	DIA, S.A.
EBRO	EBRO FOODS, S.A
ELE	ENDESA, S.A.
ENG	ENAGAS, S,A.
FCC	FOMENTO DE CONSTR. Y CONTRATAS, S.A.
FER	FERROVIAL, S.A.
GAM	GAMESA CORPORACION TECNOLOGICA, S.A.
GAS	GAS NATURAL SDG, S.A.
GRF	GRF GRIFOLS,S.A.
IAG	IAG INTERNATIONAL CONSOLIDAT. AIRLINES GROUP
IBE	IBERDROLA, S.A.
IBLA	IBERIA, LINEAS AEREAS DE ESPAÑA, S.A.
IBR	IBERDROLA RENOVABLES, S.A.
IDR	INDRA SISTEMAS, S.A.
ITX	INDITEX, S.A.
JAZ	JAZZTEL, S.A.
MTS	ARCERLORMITTAL
OHL	OBRASCON HUARTE LAIN, S.A.
REE	RED ELECTRICA CORPORACION, S.A.
REP	REP REPSOL YPF,S.A.
SYV	SACYR VALLEHERMOSO, SA.
TEF	TELEFONICA, S.A.
TL5	MEDIASET ESPAÑA COMUNICACIÓN
TRE	TECNICAS.REUNIDAS, S.A.
UNF	UNION FENOSA, S.A.
VIS	VISCOFAN, S.A.

According to SABI, there can be identified 6 different sectors corresponding to:

- 1 Oil and Energy
- 2 Basic Materials, Industry and Construction
- 3 Consumption Goods
- 4 Consumption Services
- 5 Real Estate
- 6 Technology and Telecommunications

5.2. Multiple regression

There has been made a multiple regression to determine whether if the quantity index of disclosure is influenced or not by the size of the company or the industry sector. It was estimated for each one of the years separately, so the initial sample was split into two subsamples, one in the year 2007 and other in the year 2013.

As it was previously explained, there have been used as independent variables the size and the industry of the firm. The data was downloaded from the SABI database. The total assets were obtained through SABI for each one of the considered companies.

In our regression, each industry is a dummy variable. As oil and energy, basic materials, consumer goods and consumer services are the dummy variables; their value is 0 if the firm does not belong to the industry. Its value will be 1 if the firm belongs to the industry. None of the firms from the sample pertain to the real estate industry, so finally 'dummy 5' variable do not exist in the concrete samples of the study.

The dummy variable corresponding to Technology and Telecommunications industry has not been included into the regression in order to avoid the multicollinearity. This explains the 5 degrees of freedom of the regression tables that are depicted on the Empirical evidence section.

Equation 8: Multiple linear regression

$$QNT = \beta_0 + \delta_1 oil + \delta_2 basic\ mat + \delta_3 cons\ goods + \delta_4 cons\ services + \beta_1 \ln total\ assets + u$$

Where QNT is the amount of disclosed risk.

β_0 , is the intercept.

β_1 , represents the coefficient corresponding to the natural logarithm of the firm total assets.

$\delta_1, \delta_2, \delta_3, \delta_4$ are the coefficients corresponding to their respective industries.

oil, basic mat, cons goods, cons services, are the dummy variables of the industries chosen in the regression.

Ln total assets, represents the natural logarithm of size, by using the total assets as a proxy of the size.

u , represents the error term.

As it was mentioned previously, with the purpose to verify that the proposed dimensions and the synthetic index of the analysis are not biased by the size or the industry factors, it has been estimated an *OLS* model in order to calculate the relative quantity dimension. Note that the relative-quantity dimension is per construction independent from its industry and size. It relates the standardized residuals of the regression with the quantity of disclosure as the dependent variable, while size and industry are the independent variables.

5.3. Paragraphs counting procedure

It is extremely important the criterion chosen to count the number of paragraphs in each report in order of not to bias the computation. The initial idea was to compute the number of paragraphs that mentioned risk both in the MD&A and also in the Notes to the financial statements. As the majority of the Notes reports were especially large, it was decided to estimate the overall amount of paragraphs in each one of the Notes reports⁷. According to that, the paragraphs computation was considered as follows:

There were counted the overall number of paragraphs within the MD&A report, and the number of paragraphs within the note referred to risks. The counting procedure has been defined basically as follows:

⁷ The procedure to estimate the total amount of paragraphs within the Notes report to the financial statements is deeply explained on the Annex section.

- A paragraph has been computed when one or several sentences were separated from the next group by a larger space. Therefore in some cases they were descriptive paragraphs or argumentation, and the paragraph consisted of several sentences. In other cases they were enumerative paragraphs, so the paragraph consisted of a few words or a sentence.
- In the case of paragraphs that began in one page and ended in the next one, they were computed within the page in which they begin.
- In the case of long lists of CEOs, Directors or shareholders that are mainly common within the Annexes of the studied reports, they were computed in the same paragraph as it was a single table or list in order to avoid distorting the computation.
- Figures and tables were computed as a paragraph, but cover notes and legends concerning them were not computed.
- In the case of multiple tables or sub nested tables, they were considered as a single table when they had their appropriate heading above the columns.
- Titles and subtitles were not computed as paragraphs, neither were the headers, titles, headings or subheadings.
- It is considered that a mathematical expression (equation) is a paragraph.
- A footnote is considered one paragraph, independently on its extension.

Although it may seem that this part could not be very relevant for the study, actually it was essential in order to compute all the paragraphs reports using the same approach, with the purpose of not bias the computation.

5.4. Risk types coding procedure

The business risk model proposed by Arthur Andersen has six risk categories. We have divided and codified each one of them into several subcategories. Below there are the definitions for each category, as well as the different subcategories, that have been codified as follows:

Financial risk (RF): it is derived from fluctuations in cash flows of the company because of failing to address contractual financial liabilities, or variations in the interest rate, commodity price or currency price.

- **Interest rate risk (RFTI):** it is generated by changes in the contractual interest rates on the financial operations within the company.

- **Exchange rate risk (RFTC):** it is derived from changes in the value of the exchange rates of company currencies.

- **Commodity risk (RFCO):** it results from changes in the price of goods and raw materials.
- **Liquidity risk (RFLI):** it is the potential loss due to the lack of liquidity in order to meet short-term liabilities.
- **Credit risk (RFCR):** it is consequence by unexpected defaults in the customer portfolio of the company, caused by reduced liquidity or solvency.
- **Other financial risks (RFOT):** it includes other types of financial risks.

Business risk (RN): it affects the competitiveness of the company (reduction of the competitive advantages) and value creation for shareholders. It is related to the product market in which companies operate and includes technological innovation, product design and marketing.

- **Customer satisfaction risk (RNSC):** it is related with the dissatisfaction on the customer's side because of the acquired goods or services, reducing potential sales.
- **Product development risk (RNDP):** potential losses arising from the failure of the new developed products.
- **Efficiency and performance risk (RNER):** it is caused by a decrease in the efficiency of the company.
- **Sourcing risk (RNSO):** it is occasioned from a supplier that turns into a competitor.
- **Losses on the stock value risk (RNPS):** it is caused by weakening of the stock as of the obsolescence of the products.
- **Product or service failure risk (RNFP):** it is generated by the failure of products or services in the company portfolio.
- **Environmental risk (RNME):** it is caused by the toxic emissions, waste disposal, and depletion of the resources arising from the productive activities of the company.
- **Brand risk (RNMA):** derived of the prestige loss of the brand, and therefore competitiveness.
- **Other business risks (RNOT):** it includes other types of business risks.

Empowerment risk (RE): they are all those risk factors that influence the internal strength of the company, in terms of its management, external communication and adaptability to the new environment.

- **Leadership and management risk (RELG):** caused by the loss of leadership (i.e. the abandonment of the company's leader) and members of the management team as a whole or partially.
- **Outsourcing risk (REOS):** it is generated from problems caused by outsourcing to other companies (solvency, deadlines, quality, etc.) activities.
- **Incentives risk (REIR):** it is occasioned from an incentive scheme of managers that is not aligned with the overall objectives of the company.
- **Stagnation risk (REES):** it is consequence of the firm not being prepared to adapt to the changing environment.
- **Communication risk (RECO):** it is due to not having suitable communication channels to the outside.
- **Other empowerment risks (REOT):** it includes other types of empowerment risks.

Information processing and technological risk (RPIT): it is caused by inadequate information processing technology systems.

Integrity risk (RI): it is derived from unethical actions of employees or the management team that influence the reputation of the company and reduce funding.

- **Fraud risk (RIFR):** it is caused by employees or management fraud.
- **Illegal acts risk (RIAI):** it is the consequence of illegal actions that can jeopardize the enterprise's reputation and even its survival.
- **Other integrity risks (RIOT):** it includes other types of integrity risks.

Strategic risk (RS): it is associated with future plans and business strategies, including plans to take part in the business new lines, or expanding the existing services through mergers and acquisitions, infrastructure improvement, changes related to the area where develops its activity or political environment.

- **Business portfolio risk (RSCN):** it affects the businesses that constitute the company's activities as a result of economic or political changes.

- **Competition risk (RSCO):** it is derived by an increase of more competitors that diminish the market share of the company.
- **Planning risk (RSPL):** it occurs because one or more company plans went wrong.
- **Lifecycle risk (RSCV):** it is caused for the site where the company is located within the life cycle of the industry (i.e. mature, declining growth.).
- **Regulatory risk (RSRE):** it is generated by a change in the regulation of the industry sector or country that may affect the development of the business.
- **Country risk (RSPA):** it is associated with country-specific factors affecting investments that the company has within the state (i.e. change of political regime, armed conflicts, nationalization of companies or industry sectors, etc.).
- **Other strategic risks (RSOT):** it includes other types of strategic risks.

5.5. Risks computing procedure

The first sheet of the 'Quality Index' Excel file was named Paragraphs.

Each line of the sheet was structured as follows:

Ticker of the company, year, total amount of paragraphs within the notes to the consolidated financial statements⁸, amount of paragraphs risk-referred within the notes to the consolidated financial statements, total amount of paragraphs within the consolidated MD&A, amount of paragraphs risk-referred within the consolidated MD&A.

In some of cases, due to different mergers or acquisitions, several companies' annual reports weren't found. Deeply details are given on the Annex section.

⁸ The columns are related to the mentioned initial idea of conducting an analysis in both MD&A and the Notes to the financial statements.

Figure 2: Preview of the beginning of the Excel sheet Paragraphs.

	A	B	C	D	E	F
1	TICKER	YEAR	Total amount of paragraphs within the Notes to the consolidated financial statements	Amount of paragraphs risk-referred within the Notes to the consolidated financial statements	Total amount of paragraphs within the consolidated MD&A	Amount of paragraphs risk-referred within the consolidated MD&A
2	ABE	2007	568	26	91	0
3	ABE	2013	912	63	74	10
4	ABG	2007	696	45	235	29
5	ABG	2013	1149	104	493	148
6	ACS	2007	835	53	192	9
7	ACS	2013	1128	126	244	17
8	ACX	2007	552	80	246	79
9	ACX	2013	612	102	202	2
10	AMS	2007	510	26	76	12
11	AMS	2013	660	62	337	33
12	ANA	2007	945	79	247	38
13	ANA	2013	886	84	276	22
14	CIN	2007	474	76	352	12

The second sheet was named MD&A risks.

Each line of the sheet was structured as follows:

Ticker of the company, year, risk type, number of paragraphs from stage 1 to stage 5 within the MD&A, *ECS*, *MSR* and *ACP*.

If a paragraph referred to two stages, it was counted in both of them.

If there were one or more paragraphs in stage no. 3, thus it was assigned the same number on the *ECS* of each risk type with a conditional function of excel. If not, it was assigned 0.

The same conditional functions procedure was followed in order to assign the *MSR* value. If there were one or more paragraphs in the stage no. 3, consequently it was assigned the value 2 (quantitative measure) on the *MSR* of each risk type. If not, it was assigned 0. Value 1 (qualitative measure) has not been assigned within this study, since there was no qualitative measure. Therefore, a value 3 neither has been assigned, since it represents quantitative and also qualitative measures.

ACP value of 1 was assigned if there was any paragraph from stage four or five on each risk type. If not, it was assigned a 0. Again, it was calculated using conditional functions of excel.

Examples of conditional functions for the risk type of line 4:

ECS: =SI(\$F4>0;\$F4;0)

MSR: =SI(\$F4>0;2;0)

ACP: =SI(\$G4+\$H4>0;1;0)

Figure 3: Preview of the beginning of the Sheet MD&A Risks.

	A	B	C	D	E	F	G	H	I	J	K
1	TICKER	YEAR	Risk type	Number of Paragraphs from stage 1	Number of Paragraphs from stage 2	Number of Paragraphs from stage 3	Number of Paragraphs from stage 4	Number of Paragraphs from stage 5	ECS	MSR	ACP
22	ABG	2013	RFOT	4	2		1		0	0	1
23	ABG	2013	RFTC	9	1	1	2	3	1	2	1
24	ABG	2013	RFTI	7	1		2	5	0	0	1
25	ABG	2013	RIAI	4	3		1		0	0	1
26	ABG	2013	RIOT	3	2		2		0	0	1
27	ABG	2013	RNME	1			1		0	0	1
28	ABG	2013	RNOT	20	16		5	4	0	0	1
29	ABG	2013	RPIT	3			3		0	0	1
30	ABG	2013	RSCN	5	2		1	1	0	0	1
31	ABG	2013	RSCO	2	1				0	0	0
32	ABG	2013	RSLI	5	4				0	0	0
33	ABG	2013	RSOT	7	4		3	2	0	0	1
34	ABG	2013	RSPA	13	5		1	1	0	0	1
35	ABG	2013	RSPL	5	3		1		0	0	1

The third sheet was named *ECS*, *MSR* and *ACP*.

Each line of the sheet was structured as the sheet of MD&A risks. But in this sheet, there were added new columns that were useful in order to sum the different *ECS*, *MSR* and *ACP* obtained in each risk type, according to the total number of risks found on each firm.

Again, were used 'if clauses' from excel functions in order to mechanise the sum and to decrease the percentage of human error. It was assigned a label or criterion (that was the ticker of the firm) and a range (FIRMS2007 or FIRMS2013).

Examples of conditional functions for the risk type of line 4:

TOTAL *ECS*: =SUMAR.SI(FIRMS2007;\$M4;ECS_YEAR2007)

TOTAL *MSR*: =SUMAR.SI(FIRMS2007;\$M4;MSR_YEAR2007)*2

TOTAL *ACP*: =SUMAR.SI(FIRMS2007;\$M4;ACP_YEAR2007)

Figure 4: Preview of the beginning of the Sheet ECS, MSR and ACP.

	M	N	O	P	Q
1	IF CLAUSE TO SUM	YEAR	TOTAL ECS	TOTAL MSR	TOTAL ACP
2	ABE	2007	0	0	0
3	ABG	2007	6	8	5
4	ACS	2007	0	0	4
5	ACX	2007	13	20	7
6	AMS	2007	0	0	2
7	ANA	2007	0	0	7
8	CIN	2007	0	0	0
9	EBRO	2007	0	0	11
10	ELE	2007	3	8	5
11	ENG	2007	0	0	0
12	FCC	2007	0	0	3
13	FER	2007	0	0	0
14	GAM	2007	0	0	1

6. EMPIRICAL EVIDENCE

It has been run a multiple linear regression, in order to obtain the quantity dimension of the risk disclosure. The confidence level is set on 95 percent.

In the case of the year 2007, corresponding to the sample of Spanish firms before the crisis; the results of the regression confirm that the size effect and industry effect were not statistically significant in explaining the quantity of risk disclosure in their MD&A.

Nevertheless, in the case of the year 2013, corresponding to the sample of Spanish firms after the crisis, the results of the regression illustrate that the size effect is in fact statistically significant at the highest level of significance (extremely significant). In the case of the industry, it occurs the same than in the year 2007, the industry does not have any influence on the quantity of risk information disclosed by the firm.

The results obtained from the two regressions realised are displayed below. Since the regression has been made by using Excel, decimals are separated by points.

Table 2: Regression for year 2007

SUMMARY OUTPUT

<i>Regression statistics</i>	
Multiple R	0.3604
R Square	0.1299
Adjusted R Square	-0.0514
Standard Error	20.5155
Observations	30

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	1508.235	301.647	0.7167	0.617
Residual	24	10101.232	420.885		
Total	29	11609.467			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-41.762	46.447	-0.899	0.377	-137.623	54.099
Oil and Energy	8.592	12.526	0.686	0.499	-17.261	34.445
Basic Materials, Industry and Const.	8.326	12.291	0.677	0.505	-17.040	33.693
Consumption Goods	7.043	15.835	0.445	0.660	-25.639	39.724
Consumption services	-3.872	15.669	-0.247	0.807	-36.211	28.468
Neperian logarithm of total assets	3.363	2.929	1.148	0.262	-2.682	9.408

Table 3: Regression for year 2013

SUMMARY OUTPUT

Regression statistics	
Multiple R	0.6491
R Square	0.4214
Adjusted R Square	0.2899
Standard Error	36.4595
Observations	28

ANOVA					
	Df	SS	MS	F	Significance F
Regression	5	21298.218	4259.644	3.204	0.025
Residual	22	29244.496	1329.295		
Total	27	50542.714			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-308.278	95.831	-3.217	0.004	-507.018	-109.537
Oil and Energy	-5.979	23.396	-0.256	0.801	-54.500	42.542
Basic Materials, Industry and Const.	-5.560	22.083	-0.252	0.804	-51.357	40.237
Consumption Goods	-1.821	28.282	-0.064	0.949	-60.474	56.832
Consumption services	1.241	25.784	0.048	0.962	-52.232	54.714
Neperian logarithm of total assets	21.722	5.962	3.643	0.0014	9.358	34.086

The four dimension indexes obtained from the MD&A report have been standardized according to the summary index equation. Although in 2013 the size of the firm was statistically significant, it does not result in a bias on the quality of risk disclosure.

The quality risk indexes of the different samples have been ranked, obtaining the top 20 quality risk disclosers. It can be observed that there are firms from the year 2013 but also from the year 2007. As it is interesting to determinate if the quality on risk disclosure has changed due to the crisis, it has been estimated a Spearman rank correlation coefficient⁹. So, it has been compared the pair of ranked firms from the year 2007 with the ones of the year 2013.

⁹ In statistics, Spearman correlation coefficient, ρ (rho) is a measure of the correlation (association or interdependence) between two continuous random variables. To calculate ρ , the data is sorted and replaced by their respective order.

Figure 5: Top 20 Quality Index Risk Disclosure Ranking

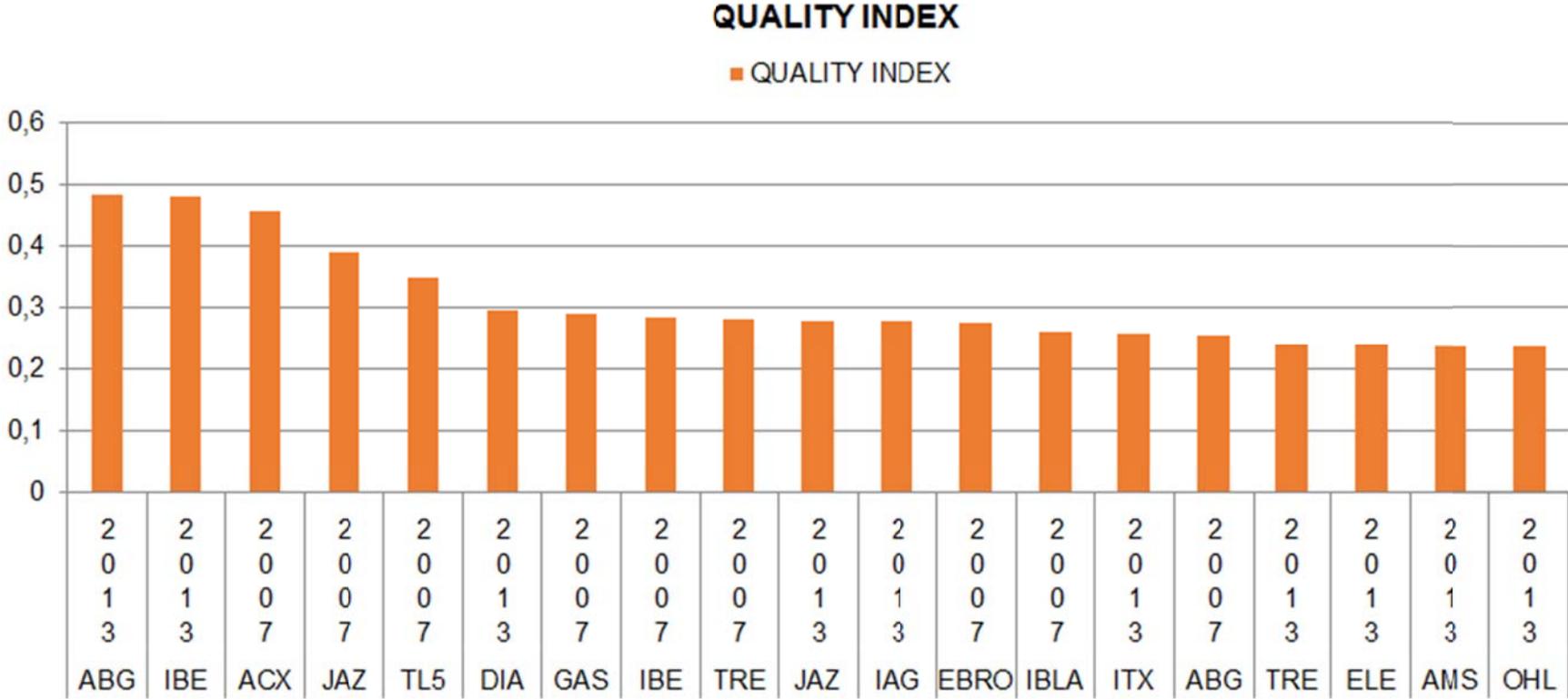


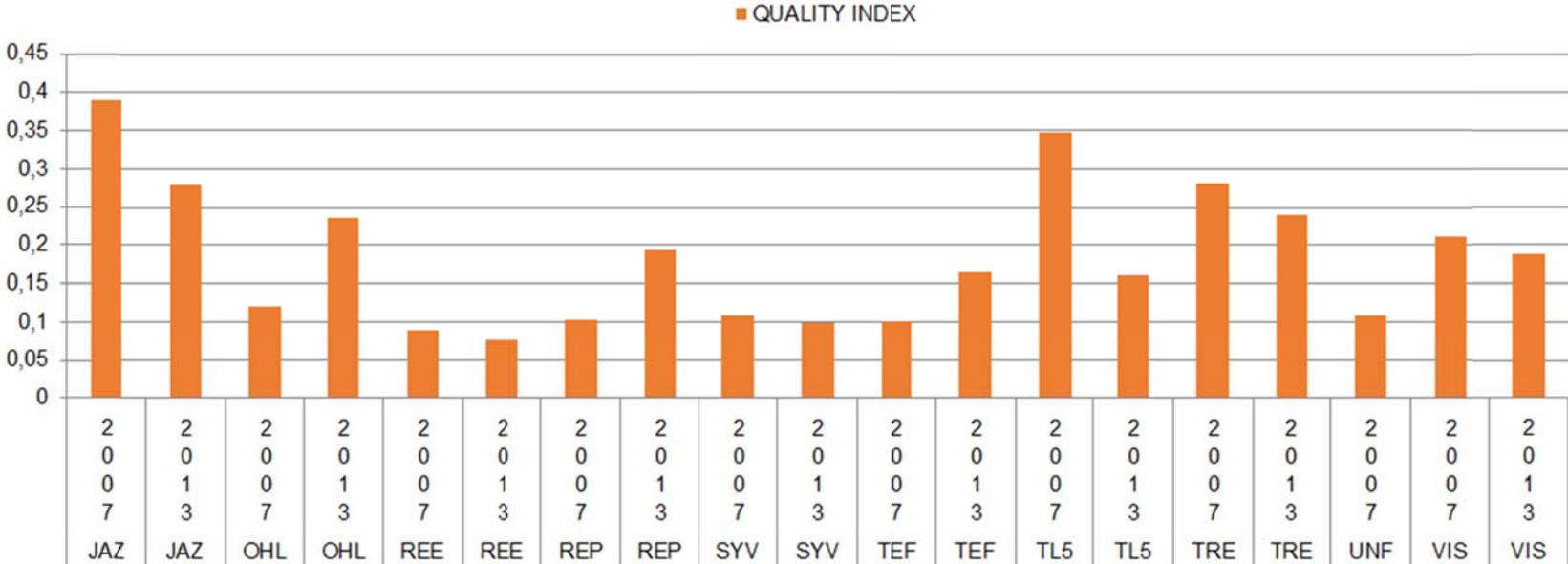
Figure 6: Comparison between years, part 1



Figure 7: Comparison between years, part 2



Figure 8: Comparison between years, part 3



Equation 9: Spearman's rank correlation coefficient

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

The Spearman correlation coefficient is similar to a Pearson correlation coefficient between ranked variables. In our case the size of the sample, $n = 27$ because is the pair of firms that can be ranked in the both studied years.

Where $d_i = x_i - y_i$ is the difference between the corresponding order of statistical $x - y$.

Since our sample is greater of 20 observations, we can use the following approach to t-distribution:

Equation 10: T-student distribution approach

$$t = \frac{\rho}{\sqrt{(1 - \rho^2)/(n - 2)}}$$

Table 4: Spearman coefficient and t-student results

Spearman Coefficient	0.198
t student distribution	1.009

The results indicate that the correlation is positive, but practically it does not exist lineal association between the two variables. There is low correlation.

Furthermore, it has been run a t-test paired two samples for means, using excel analysis tools and being $\alpha = 0.05$. The results obtained corroborate the low Spearman correlation coefficient results. Note that the means practically do not differ between years.

Table 5: t-test paired two samples for means

	<i>Year</i>	<i>Year</i>
	<i>2007</i>	<i>2013</i>
Mean	0.1832	0.1888
Variance	0.0120	0.0118
Observations	27	27
Pearson Correlation	0.217	
Hypothesized Mean Difference	0	
Df	26	
t Stat	-0.212	
P(T<=t) one-tail	0.417	
t Critical one-tail	1.706	
P(T<=t) two-tail	0.833	
t Critical two-tail	2.056	

Spearman and Pearson correlation coefficients are both low. They are not strictly equal because:

Pearson correlation coefficient is parametric, utilised in numerical variables with normal distribution, calculated according on the variance and the covariance of the variables.

Spearman correlation coefficient is not parametric, utilised in ordinal variables or without normal distribution, calculated based on a series of assigned ranks.

7. LIMITATIONS AND RECOMMENDATIONS OF THE STUDY

It has been realised a similar process of downloading the data and counting the number of paragraphs that mention risk on the Notes to the Financial Statements, and also it has been estimated the overall number of paragraphs contained in them. However, due to a lack of time, it has been not possible to codify the risks types and to apply the proposed indexes. The procedure is widely explained on the Annex section, together with the procedure used on MD&A paragraph counting. Conducting a deep analysis considering also the Notes to the Financial statements would complement the actual study.

8. CONCLUSIONS

The objective of this study was to evaluate the quality of the risks disclosed by firms within the financial statements. It has been conducted through the development of a synthetic index based on the quality of the disclosed risks.

It has been followed the model proposed by Beretta and Bozzolan (2004), that distinguishes four different dimensions with respect to disclosure of the risks: quantity, density, depth and outlook profile.

The analysis was performed over a sample of non-financial companies listed on the Spanish Ibex 35.

Regards the dimension related to the quantity of risk disclosed, a multiple linear regression was performed, and the obtained residuals were utilised as a proxy with the objective to calculate the relative quantity of risk information disclosed. Thus, the relative quantity of risk information disclosed is not biased by the size or the industry of the company, which are factors that could influence the amount of risk disclosure.

In the year 2007 the regression demonstrates that the quantity of disclosed risk was not dependant neither by the size or the firm's industry.

However, in the year 2013 there is empirical evidence that the quantity of disclosed risk was highly influenced by the size of the firm, but was not dependant on the industry.

In the studied sample, the results of the quality index have been compared by using correlation coefficients and then corroborated by a t-test of paired two samples for means. It has been concluded that there is no empirical evidence (in average terms), to show that there has been a significant change in the quality of risks disclosed by companies due to the crisis (year 2007 was previous to the start of the crisis, while in year 2013 the crisis was obvious).

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11. ANNEX

Data related to firms size and industry.

It has been downloaded from SABI database, available at:

<https://sabi.bvdinfo.com/version-2015617/home.serv?product=sabineo>

Companies excluded from the initial sample, peculiarities, and non-found reports.

It has been excluded from the previous list ARCERLORMITTAL (MTS), not being a listed company on the CNMV (Comisión Nacional del Mercado de Valores).

Reference years of this study are the years 2007 and 2013 respectively, all companies financial year run from January 1 to December 31; except Inditex, SA which close its year on January 31.

In some cases it has been not possible to download the reports from all the firms for both years. The concrete cases are explained using the ticker of each firm's group, to avoid large companies' group names, i.e.:

CIN, year 2013: it was already merged into FERROVIAL group.

DIA, year 2007: it was part from CARREFOUR group.

IAG, year 2007: didn't exist. The group was created on 2011.

IBLA, year 2013: it was already merged into IAG group, since the merging was in 2011.

IBR, year 2013: it was already merged into IBERDROLA group.

Sources of data collection

Data have been obtained from the Notes to the Consolidated Financial Statements report and the MD&A report, which are included within the consolidated financial statements in each one of the groups of companies. It is feasible to access to the report by the corporate website, or by searching on CNMV web:

<https://www.cnmv.es/Portal/consultas/busqueda.aspx?id=25>

Pdf files were preferably downloaded from the corporate website of the firm. Nonetheless, due to the fact that some of these sites and publications covered the last

5 years; in many cases it has not been possible to obtain the year 2007 from this source, so it has been downloaded from the register of the annual financial statements of the CNMV.

The main handicap to download information from the CNMV is usually because the reports are digitalised images, in which is impossible to search specific words or terms, or even to transcribe a paragraph to another document. Moreover many of these PDF documents are protected against printing or editions, so is not possible to print individual pages or page ranges. Below the software used to solve these issues is explained:

- Free Online PDF Unlocker:

<http://www.crackmypdf.com/>

- Foxit PhantomPDF: Software, optical character recognition (OCR) to convert scanned images into editable text:

<http://www.foxitsoftware.com/spanish/products/phantomPDF/standard/>

There has been created 32 folders that correspond to the assigned tickers of each of the groups of firms.

Estimation of the total number of paragraphs in the Notes to the financial statements.

Once downloaded and unlocked the consolidated financial statements reports, the Notes to them were extracted and renumbered, assigning the page no. 1 of the report to one where the Note 1 begins. The Annexes to the Notes have been included in the computing of the number of pages. Thus, it has been obtained the total amount of pages of each one of the overall Notes report, using a uniform approach.

In an Excel file that has been called "Paragraphs Estimation of the Notes" it has been estimated the total number of paragraphs from a stratified sample with a proportional allocation. Both the Excel sheet and the renumbered Notes, are openly available in a folder called "Risk Disclosure by Firms 2007 & 2013" at the following link:

<https://drive.google.com/folderview?id=0B3OJyROm3TlSfmFabHdPU3A4Q3IMZGtmTGdGaEI0QUdYeEczVVVhOEs5ZXNrQ0FuUUhMejQ&usp=sharing>

It was obtained a sample of pages from each report, based on their number of pages, by using the expression below.

Equation 11: Estimation of overall paragraphs from Notes reports.

$$EAOP = \frac{z^2 \cdot N \cdot \sigma^2}{\varepsilon^2 \cdot (N - 1) + z^2 \cdot \sigma^2}$$

- EAOP is the estimated amount of overall paragraphs.
- N refers to the population size (number of pages in the Notes to financial statements report).
- Z is the value corresponding to z of a normal distribution for a given confidence level (used a confidence level of 75 percent).
- σ is the standard deviation of the population, as in this case is not known a predefined value, has been assigned a constant value of 0.5.
- ε is established sampling error, in this case 10 percent.
- They were generated as many random numbers as many pages were in the report, which were distributed into two groups or strata:
 - First strata, corresponding to the first 20 pages of the report; since these do not usually have graphics or tables. So a unique count of paragraphs within this group is carried out. In this part, the random numbers correspond to the pages with numbers between 1 and 20.
 - Second strata, remaining pages in the report. In this stratum are the numbers between the 21 and the last page.

The paragraphs were computed for each page of the random generated page numbers.

The paragraphs average in each one of the strata were calculated, and the total amount of paragraphs within the Notes report was estimated adding up the results for both strata.

The registers of each one of the firms were maintained within the excel file. This detail is important in order to know from which pages from the report was based the estimation.

Figure 9: Preview of the Paragraphs estimation of the Notes Excel file.

	A	B	C	D	I	J	K	L
1		VIS 2013			Copy to value format		Paragraphs	
2					First 20 pages	Remainder of the document	First 20 pages	Remainder of the document
3	Population size	84			13		7	
4					6		7	
5	Confidence level	0.75			14		8	
6	z de alpha/2	1.1503494			15		9	
7	Maximum error	0.1			16		10	
8	Standard deviation	0.5			5		8	
9						67		8
10	Numerator	27.789378				29		11
11	Denominator	1.1608259				27		8
12						82		8
13	Sample size	24 Pages				38		8
14						45		5
15	Stratification	20 Pages				54		9
16	First 20 pages	6				37		2
17	Remainder of the document	18				31		9
18						45		5
19	Notes estimation paragraphs	608				37		2
20	Average paragraphs 20 initial pag	8				82		8
21	Average paragraphs remainder of	7				59		8
22						32		10
23						39		5
24						71		6
25						49		11
26						35		2
27								

Navigation: Estimation on the Notes report | Register of firms | List of estimated paragraphs

Computation of the amount of risk-related paragraphs within the Notes to the financial statements.

The paragraphs were computed from the Note related to the risks, which is inside the report of Notes to the financial statements.

Furthermore, there were collected all the paragraphs that mentioned the word ‘risk’ from outside the Note related to risks. These paragraphs were registered in word files for each one of the firms. Note that the paragraph only was copied once on the word file, independently if the word ‘risk’ was mentioned one, two or more times within the same paragraph.

A word file was used for each one of the firms and years considered in the study. In the following link there are available the folders of each one of the firms, named by their respective ticker. Inside each one of the folders the word files can be found:

<https://drive.google.com/folderview?id=0B4MgPxPZbZYNtm10VTBGYIRId28&usp=sharing>

Figure 10: Preview of the Word file containing all the paragraphs related to risks within the Notes to the financial statements.

<p>Nota 2.- Resumen de las Principales Políticas Contables. 2.3. Información financiera por segmentos.</p>	<p>Un segmento del negocio es un grupo de activos y operaciones encargados de suministrar productos o servicios sujetos a riesgos y rendimientos diferentes a los de otros segmentos del negocio. Un segmento geográfico está encargado de proporcionar productos o servicios en un entorno económico concreto sujeto a riesgos y rendimientos diferentes a los de otros segmentos que operan en otros entornos económicos (Véase Nota 5).</p>
<p>Nota 2.- Resumen de las Principales Políticas Contables. 2.7. Pérdidas por deterioro de valor de los activos no financieros.</p>	<p>El importe recuperable es el mayor entre el valor de mercado minorado por los costes de venta y el valor de uso, entendiéndose por éste el valor actual de los flujos de caja futuros estimados. Para el cálculo del valor de uso las hipótesis utilizadas incluyen las tasas de descuento, tasas de crecimiento y cambios esperados en los precios de venta y en los costes. Los Administradores estiman las tasas de descuento antes de impuestos que recogen el valor del dinero en el tiempo y los riesgos asociados a la unidad generadora de efectivo. Las tasas de crecimiento y las variaciones en precios y costes se basan en las previsiones internas y sectoriales y la experiencia y expectativas futuras, respectivamente.</p>
<p>Nota 2.- Resumen de las Principales Políticas Contables. 2.8. Inversiones financieras (corrientes y no corrientes) d) Activos financieros disponibles para la venta.</p>	<p>Las adquisiciones y enajenaciones de inversiones se reconocen en la fecha de negociación, es decir, la fecha en que se compromete a adquirir o vender el activo. Las inversiones se reconocen inicialmente por el valor razonable más los costes de la transacción para todos los activos financieros</p>