DISCLOSURE INDICES DESIGN: DOES IT MAKE A DIFFERENCE?

EL DISEÑO DE LOS ÍNDICES DE REVELACIÓN: IMPACTO EN LA INVESTIGACIÓN

FRANCISCO BRAVO URQUIZA, Universidad de Sevilla
MARIA CRISTINA ABAD NAVARRO, Universidad de Sevilla
MARCO TROMBETTA, Instituto de Empresa Business School

ABSTRACT

Measurement of information disclosed by companies is a complex task. Accounting research usually relies on disclosure indices to obtain a proxy for the information disclosed by companies. However, there is no consensus about the best design for these indices. The purpose of this paper is to investigate if there are significant differences among the indices that are used in disclosure studies. Three indices that measure disclosure of forward-looking information are compared: A "quality index" of a multidimensional nature; a "scope index" designed specifically to measure the scope of information, and a "quantity index" that measures information disclosed exclusively in terms of quantity. Results of the empirical analysis indicate that although the indices are correlated, they have a big impact in the rankings of companies. Evidence against the idea of the irrelevance of the particular index chosen is provided.

KEY WORDS: Disclosure research, disclosure indices, forward-looking information.
JEL: M49

RESUMEN

La medición de la información divulgada por las empresas es una tarea compleja. La investigación contable normalmente se apoya en índices de revelación para obtener una aproximación cuantitativa a la información divulgada por las compañías. Sin embargo, no hay consenso sobre el diseño de estos índices. El objetivo del trabajo es investigar si hay diferencias significativas entre los índices empleados en los estudios sobre divulgación de información. Se comparan tres índices que miden la revelación de información previsional: un índice de calidad, de naturaleza multidimensional; un índice de alcance, diseñado específicamente para medir la cobertura de la información; y un índice de cantidad que mide la información divulgada exclusivamente en términos de cantidad. Los resultados del análisis empírico indican que aunque los índices están correlacionados, tienen un gran impacto en los rankings de las compañías. El análisis proporciona evidencia en contra de la irrelevancia del diseño de un índice en particular.

PALABRAS CLAVE: Investigación sobre divulgación de información, índices de revelación, información previsional.

Enviado /Submitted: 18 /2 /2009
Primera revisión /First revision: 29 /4 /2009
Aceptado /Accepted: 22 /12 /2009

1 INTRODUCTION

Corporate disclosure is critical for the functioning of an efficient capital market. Firms disclose information through regulated financial reports, including financial statements, footnotes, management discussion and analysis, and other regulatory filings (Healy and Palepu, 2001). In the last years, the nature of business has changed dramatically. To satisfy market information needs and provide information required for corporate transparency and accountability there is a consensus that business reporting model needs to expand beyond the traditional financial reporting model that emphasizes backward-looking, quantified, financial information (Beattie, McInnes and Fearnley, 2004). In recent times, demand for disclosure of listed companies has increased and bankruptcies of large companies listed on the most important stock exchanges place extra pressure on listed companies and standard setters for increase in corporate reporting quality (Beretta and Bozzolan, 2005). Disclosure topics continue to attract a great interest in accounting research. However, some relevant questions are still open, such as the measurement of disclosure quality.

It is common to use disclosure indices in order to obtain a proxy for disclosure quality. However, there is no consensus about the best design for these indices. In most disclosure studies a measure of the level of information disclosed is used, under the assumption that quality or transparency of disclosure is captured. Better conclusions may be obtained from disclosure studies if the disclosure measure is designed in terms of quality. It is possible to conjecture that the results of studies in this research field might differ if different measures are used.

The purpose of this paper is to determine the impact that the fact of using different measures for information disclosure may have in disclosure studies. Three indices are compared: a "quality index" of a multidimensional nature; a "scope index" designed specifically to measure the scope of information, and a "quantity index" that measures information disclosed exclusively in terms of quantity. Scope and quantity indices are self-constructed indices - designed according to methodologies used in previous literature - and the quality index was designed by Beretta and Bozzolan (2005). As far as our knowledges reaches, there is no previous empirical evidence showing how the use of different measures of voluntary disclosure might yield different results. This evidence would contribute to the existing literature by helping to reveal difficulties associated to information measurement.

For the empirical analysis, we focus on forward-looking information published in annual reports of IBEX 35 Spanish companies. The indices are compared by using descriptive analysis and correlation analysis. Moreover, companies are also ranked according to indices values.

Our results suggest that the choice of the index plays a crucial role in empirical disclosure studies. Different indices produce significantly different rankings of companies in terms of their disclosure. Consequently, the results of disclosure studies may be determined by that choice.

The rest of the paper is organized as follows: in the next section we review the literature related to our research. Section 3 describes the methodology employed in the analysis. Section 4 presents the results of the empirical analysis. Section 5 summarizes the main contributions of the paper.

2 PREVIOUS LITERATURE

One of the most important limitations encountered in disclosure studies is the difficulty in measuring the extent of voluntary disclosure (Healy and Palepu, 2001). In this section we review the literature on disclosure measurement.

Quality is a complex concept, and has a multifaceted and subjective nature (Beattie, McInnes and Fearnley, 2004). There is no theoretical support that enables to construct proxies for this concept. The extant literature adopts a variety of approaches to disclosure measurement, under the implicit assumption that what is being measured is disclosure quality. Although some of the studies adopt a qualitative perspective (readability or linguistic analysis), the use of disclosure indices has become generalised in research. According to Beattie, McInnes and Fearnley (2004), the different approaches followed to measure disclosure can be classified in two categories: subjective ratings or semi-objective studies.

Subjective ratings refer to analysts' scores that rank companies according to the amount of information disclosed. This includes scores elaborated by the AIMR[1] (Association for Investment Management and Research) or by Standard & Poor's. Semi-objective studies include those that use tools such as thematic content analysis, readability studies, linguistic analysis, and disclosure indices.

Although AIMR and Standard & Poor's scores are used in many studies, analysts' subjectivity could influence their validity. Moreover, the number of companies that compose the AIMR or S&P samples cause self-selection bias, since these scores are only available for certain companies and not for the whole population.

In order to overcome limitations of subjective ratings, self-constructed disclosure measures are developed. The use of disclosure indices designed by the researcher to measure the level of both mandatory and voluntary information has become widespread.

(1) As of 9 May 2004, AIMR changed its name to CFA institute.

One way of measuring information disclosed is to count all data items, as the number of words or sentences included in the annual report (Marston and Shrives, 1991). It is common to employ the sentence as the unit of analysis (Entwistle, 1999; Williams, 1999; Hussainey, Schleicher and Walker, 2003; Aljifri and Hussainey, 2007). However, it is not clear yet whether the use of a measure of information quantity is the most appropriate way of obtaining a proxy for disclosure quality. A higher number of sentences disclosed do not necessarily imply a higher level of transparency or a higher information quality.

Most of the indices used in the empirical disclosure literature consider scope (or coverage) as a proxy for disclosure quality (Singhvi and Desai, 1971; Cooke, 1989; Wallace, Naser and Mora, 1994; Giner, 1997; Haniffa and Cooke, 2002; Alsaeed, 2005; Hossain, Ahmed and Godfrey, 2005; Hossain and Reaz, 2007). It is common to design an index that takes into account several information items, which are measured in terms of dummy variables, considering the two possibilities of disclosure (value of 1) versus non-disclosure (value of 0). Other times, items are valued according to the nature of the information assigning a higher value to quantitative information (Botosan, 1997), or they are weighted in correspondence with their relative importance, although there is no consensus about the convenience of weighting them. In fact, most authors prefer to employ unweighted indices due to the subjectivity that weighted measures might introduce (Ahmed and Courtis, 1999).

More recently, Beattie, McInnes and Fearnley (2004) provided a richer perspective than the simple count of disclosed items, and according to this framework, Beretta and Bozzolan (2005) proposed an index that measures disclosure quality and has a multidimensional character. This index takes into account two dimensions: quantity and richness of disclosure. These dimensions are then divided into sub-dimensions that aim to include factors related to disclosure quality. It seems to be clear that quality is a complex concept that depends on different factors. Several dimensions are expected to be related to information richness, and in this sense, Beretta and Bozzolan (2005) base their measure of quality of disclosure on relevant frameworks (AICPA, 1994; FASB, 2001; CICA, 2002). The development of this new multidimensional index provides a great opportunity to start a debate about the parameters associated with disclosure quality.

Table 1 presents some of the studies that employ an index based on the level of coverage of certain topics. In spite of the generalized use of this type of indices, there is no empirical evidence supporting the association between scope or coverage and quality of information disclosed by companies. Some care is needed when using these indices as a proxy for disclosure quality, because a higher number of disclosed items are not necessarily a sign of a higher information quality. Besides, although the design of these indices is similar, there is no evidence supporting the fact that the results obtained by using different indices are comparable. We conjecture that these results might be different despite of using similar indices and consequently not comparable.

TABLE 1.- STUDIES THAT EMPLOY INDICES TO MEASURE COVERAGE OF DISCLOUSURE

Author	Country	Nº Items
Singhvi (1968)	India	34
Singhvi & Desai (1971)	USA	34
Buzby (1975)	USA	39
Firth (1979)	United Kingdom	48
McNally et al. (1982)	New Zealand	41
Chow & Wong-Boren (1987)	Mexico	24
Cooke (1989)	Sweden	224
Cooke (1992)	Japan	106
García & Monterrey (1993)	Spain	13
Malone et al. (1993)	USA	129
Hossain et al. (1994)	Malasia	78
Wallace et al. (1994)	Spain	79
Gray et al. (1995)	USA, UK, France, Germany, Holland	85
Raffounier (1995)	Switzerland	30
Botosan (1997)	USA	35
Giner (1997)	Spain	50
Archel & Lizarraga (2001)	Spain	10
Depoers (2000)	France	65
Larrán & Giner (2002)	Spain	16
Kent & Ung (2003)	Australia	7
Akhtaruddin (2005)	Malasia	160
Alsaeed (2005)	Saudi Arabia	20
Bukh et al. (2005)	Denmark	78
García-Meca & Martínez (2005)	Spain	71
Hossain et al. (2005)	New Zealand	18
Hossain & Reaz (2007)	India	65

Source: Self Research

3 EMPIRICAL ANALYSIS

The objective of this study is to compare several disclosure indices, so as to investigate how the use of diverse disclosure measures influences the results obtained from disclosure studies. Three indices are investigated: quality index, scope index and quantity index. Scope and quantity indices are self-constructed indices, the first designed specifically to measure the scope of information, and the second to measure information disclosed only

in terms of quantity. The quality index is the multidimensional index proposed by Beretta and Bozzolan (2005).

We focus on forward-looking information disclosed in the annual report. The existence of an index specifically designed for the measurement of forward-looking information (Beretta and Bozzolan (2005) index) is at the basis of our choice. However, the choice of forward-looking information is also motivated by its relevance to decision making. The importance of prospective financial information for investors was pointed out by several official reports (AICPA, 1973; ICAEW, 1975; AICPA, 1994; FASB, 2001; CICA, 2002; ICAEW, 2002).

The sample is composed of the listed companies that make up the Spanish IBEX 35 stock market index during the period 2000-2004. We exclude financial companies because of their special characteristics. For a company to be included in the sample, it was required that it was one of the companies considered to calculate the index at least in one of those years. The final sample was composed of 36 companies over 3 years (2002, 2003 and 2004). The choice of IBEX 35 companies is dictated by the need to keep the task of content analysis of the annual report to a manageable level and by the higher tendency for disclosure of these companies. Previous research has shown (Espinosa and Trombetta, 2007) that in the Spanish market, size is associated to a higher amount of information disclosed.

The sources of information are consolidated annual reports. The whole of the annual report was analysed. Although there are other sources of information, previous literature has shown that the annual report provide a good proxy for the level of information disclosed by a company (Botosan, 1997). The reports were obtained from the companies' websites.

The code unit chosen is the sentence. Quantification may be done in a number of ways. Hackston and Milne (1996) suggest that measurement error between various quantification techniques is likely to be negligible. Therefore, using sentences for both coding and measurement seems likely to provide complete, reliable and meaningful data for further analysis (Milne and Adler, 1999). Quality and quantity indices use the sentence as recording and measurement unit. However, as it is explained below (see section 3.1.2.) the scope index has a different measurement unit, as an ordinal scale of three ranks is used to measure sentences.

In order to assure robustness of results, the coding process must be reliable. A preliminary test was performed so as to set up several coding rules that enable to minimize subjetivity in the coding process. Using the same procedure as Beretta and Bozzolan (2005), two annual reports (excluded from the sample) were examined independently by two different researchers, and the results were compared to identify possible disagreements and measure reliability.

Once the coding criteria were established and the reliability of the preliminary coding was considered to be satisfactory, the whole sample (108 annual reports) was coded according to the criteria established in the design of each index, which are described as follows.

3.1. Indices design

The three different indices used are shown below:

- *Quality Index*
- *Scope Index*
- *Quantity Index*

3.1.1. Quality index

The *quality index* (QLI) is designed according to Beretta and Bozzolan (2005)[2] and is claimed to capture both quantity and quality of forward-looking information disclosed by companies. Our purpose is to adopt the multidimensional framework designed by Beretta and Bozzolan (2005) for the appreciation of disclosure in order to consider both the quantity of information disclosed and the richness of its content.

Beretta and Bozzolan (2005) distinguish two dimensions measured by two different indices: *relative quantity index* and *richness index* (see table 2).

TABLE 2.- QUALITY INDEX

	Sub-indices		
Quality Index (QLI)	Relative Quantity Index (RQT)	Standardized residuals of an OLS regression (size and industry as independent variables)	
	Richness Index (RCN)	Width (WID)	Coverage (COV) Dispersion (DIS)
		Depth (DEP)	Measure and economic sign (ESM): type of measure (financial/non-financial, quantitative/qualitative) and economic sign (positive, negative and neutral) Outlook profile (OTL): actual state of business, management's hypothesis/expectations, planned actions, decisions/actions taken.

(2) The robustness of this index has been assessed by different methods and it has been recognized as a possible measure to capture quality of disclosure. An updated version of the working paper (Beretta and Bozolan, 2005) has been published recently (Beretta and Bozzolan, 2008; Bozzolan, Trombetta and Beretta, 2009).

Relative quantity index (RQT) is calculated by the difference between observed disclosure for a company and the expected disclosure, which is estimated through standardized residuals of an OLS regression, using size and industry as independent variables. Many studies support, empirically, the influence of both size and industry on disclosure. The higher the difference between the quantity of the information disclosed by the company and its expected value, the higher the value of the index.

The *richness index* (RCN) aims to capture only disclosure quality. It includes two other dimensions: *width* and *depth*.

Width (WID) depends on both coverage (COV) of important topics (topics disclosed at least once divided into total number of topics considered) and on dispersion (DIS) of disclosure (which measures concentration of the items disclosed). Forward-looking disclosure is classified taking into account the suggestions of the Jenkins report (AICPA, 1994). The following items are chosen:

- strategy,
- corporate background (including four items: financial structure, corporate structure, organizational structure and operations),
- external environment (including four items: political, economic, financial and social items, environmental topics, industry and legal aspects).

Coverage and *dispersion* are measured in the following way:

[1]

[2]

Where:
INF_{ij} has a value of 1 if the annual report of company i discloses forward-looking information about subtopic j, and 0 otherwise.
P_{ij} is the amount of information disclosed in subtopic j (number of sentences) divided by total disclosure of company i (total number of sentences with forward-looking information).
st is number of topics (9 topics).

The value of *width* dimension is obtained as the arithmetic mean of coverage and dispersion dimensions:

[3]

Both coverage and dispersion are associated to information richness, under the assumption that the fact of revealing information about a higher number of relevant topics is related to the richness of the information provided (higher coverage) and that information quality will be greater when information published about each of the topics considered is high instead of disclosing only a few information units about some of them (higher dispersion). Since the coverage dimension (COV) is built in a similar way as most of indices employed in previous literature, this measure will also be examined independently, in order to extend comparisons among different indices.

Depth (DEP) depends on the type of measure used in an information unit (MSR), on the communication of the economic sign of the disclosed items (ES) and on the outlook profile of disclosed information (OTL). Sentences containing information about measures and economic sign, as well as information about actions, programs, or any information useful for forecasting must contribute to the quality of global disclosure for a company. Therefore, these features are expected to be related to information richness.

First, an *economic sign and measure index* (ESM) is calculated as follows:

$$ESM_i = \frac{1}{2}\ \frac{1}{id_i}\sum_{j=1}^{id_i} MSR_{ij} + \frac{1}{id_i}\sum_{j=1}^{id_i} ES_{ij} \qquad [4]$$

Where:
Id_i is total forward-looking disclosure of company i (number of sentences).
MSR_{ij} has a value of 1 if a measure of j forward-looking information (quantitative or qualitative) is disclosed in the annual report of company i and 0 otherwise.
ES_{ij} has a value of 1 if the economic sign of information j is disclosed in the annual report of company i and 0 otherwise.

Second, the *outlook profile index* (OTL) is obtained:

[5]

Where:
OTL_i is the outlook profile index for company i.
ACP_{ij} has a value of 1 if the j information (forward-looking) disclosed by company refers to decisions, actions or programs and 0 otherwise.
FL_{ij} has a value of 1 if the j forward-looking information disclosed by company i can be considered as useful for investors forecasts (sales, earnings, and other financial data).

Depth is obtained averaging the *economic sign and measure index* and the *outlook profile index*.

[6]

Next, *richness* is obtained as a result of averaging *width* and *depth*. As a result, this index is composed of several dimensions that are expected to be related to information quality.

[7]

Finally, the quality index (QLI) is obtained making the average between the relative quantity index and the richness index. Simple averages are used since there is neither evidence nor theoretical motivations to weight the indices. The value of the index ranges between 0 and 1.

[8]

This includes different dimensions, associated with both quantity and quality of the information disclosed by a company. In this sense, it is an important step forward in order to develop a proxy for quality of disclosure.

3.1.2. Scope index

The *scope index* (SCI) is a self-constructed index that is very similar to many indices employed in the previous literature. For a given a list of items, the index is calculated as the result of dividing the number of forward-looking information items disclosed by that company by the total number of forward-looking information disclosure items that might be disclosed. The list of items chosen is based on the guidance offered by professional

bodies and the classification scheme suggested by Robb, Single and Zarzeski (2001), where forward-looking information is grouped into three categories: corporate background, environment and strategies. Three more categories were added so as to obtain a more complex index: information related to dividends policy, investments, and organizational matters. Hence, six categories of forward-looking information are considered:

Environment (legal issues, nature, economy, etc).
Company's development (market position and company's earnings).
Goals, strategies and business policies.
Information related to dividends policy.
Information about future investments.
Organization and corporate structure.

Moreover, a higher value is assigned to quantitative information than to narrative information, under the assumption that quantitative information is more specific than qualitative information. This procedure is in line with previous studies (Botosan, 1997). Quantitative information seems to imply greater liability, and hence an increase in reputational costs (Bhrojraj, 1999). Narrative information is more easily manipulated (Balata and Breton, 2005). However, the scope index is not a weighted index; the importance given to each category is the same. The punctuation for each item ranges from 0 points if there is no forward-looking information of that type to 0.5 points if the information provided is narrative and to 1 point if the information is quantitative (see table 3).

[9]

TABLE 3.- SCOPE INDEX

Information items	No disclosure	Narrative information	Quantitative information
Environment	0	0.5	1
Evolution	0	0.5	1
Goals, strategies and business policies	0	0.5	1
Information related to dividends policy	0	0.5	1
Information about future investments	0	0.5	1
Organization and corporate structure	0	0.5	1
Maximum value			6

Although this index looks similar to the coverage dimension (COV) of the Beretta and Bozzolan (2005) index, there is a difference to be highlighted: it does not only measure coverage. A company that discloses information regarding all the items but without any quantitative measure would score the maximum value in the coverage dimension (COV), but it would only score half points in the scope index (SCI). Moreover, information categories are not exactly the same. Nevertheless, the design is very similar, like most of the indices employed in previous studies, and consequently an agreement in the measurement of disclosure is expected.

3.1.3. Quantity index

The *quantity index* (QNI) is designed to measure the amount of information disclosed by companies, taking into account only number of units (sentences) with forward-looking information. Every sentence with forward-looking information is considered. It is a simple index that only captures absolute quantity of disclosure. This index is standardised in order to make it relative to the sample, and is calculated as follows:

[10]

Where:
fl_i is number of sentences with forward-looking information disclosed by company i.
Max is maximum number of sentences with forward-looking information disclosed by a company across the sample.
min is minimum number of sentences with forward-looking information disclosed by a company across the sample.

The quantity index also ranges between 0 and 1.

3.2. Coding, reliability tests and analysis

We study 36 firms during 2002, 2003 and 2004. Therefore 108 annual reports were analyzed in order to find sentences with forward-looking information. These sentences were coded according to the criteria mentioned above for each index. The appendix includes some examples of how coding rules were applied to codify each sentence for each of the three indices.

A preliminary test was conducted so as to homogenize coding rules among different coders (inter-coder reliability). This test was applied to two annual reports of companies which were not included in the sample. Coding of sentences according to their information

content (scope index) did not involve noticeable difficulties, and had a high reliability. However, in order to obtain the values of the quality index, several dimensions were coded (content, economic sign, measure and outlook profile). The reliability was tested for each of these dimensions by employing the alpha agreement coefficient proposed by Krippendorf (1980). On average, the value of the coefficient was around 0.75, which is sufficiently above the reference value of 0.60 for a reasonable level of reliability. As results were satisfactory, we coded the whole sample and obtained the values for the three indices. At the end of the process, a reliability test was performed again, obtaining an average value of 0.86 for the coding of the quality index dimensions.

Once the whole sample was coded and the robustness of this process was verified, a statistical analysis is performed to analyse the values of each index. Values are compared through a descriptive analysis, where descriptive statistics, correlations and distributions are observed. In addition, companies are ranked according to the values of each index, searching for possible differences in rankings due to the use of one particular index instead of another.

The analysis includes not only quality, scope and quantity indices, but also one of the quality index dimensions, coverage (COV), which was designed according to traditional criteria, based on the coverage of information items made by the company.

4 RESULTS

Table 4 contains the descriptive statistics[3] for the values of the indices, whereas tables 5 and 6 show correlation coefficients. The dimensions of the quality index are also included. Since some of the three main indices do not follow a normal distribution (as indicated by Kolmogorov-Smirnov test), we evaluate correlations among them with the Spearman rank test.

Since the median does not differ greatly from the mean, we can claim that there is no presence of outliers. The distribution of the values is uniform, as can be inferred by the percentiles values.

Indices values are expected to be correlated, (see table 5) since indices share the same purpose, i.e. to measure forward-looking information disclosed by companies. All correlations are statiscally significant, and the highest correlation exists between quality and quantity indices (0.715). However, this does not necessarily imply that the use of different indices will not have a significant impact in the results of disclosure studies that use this kind of measures. Although they may be measuring information attributes that

(3) Descriptive statistics for the *scope index* are not included in the table, due to the different nature of this variable.

TABLE 4.- DESCRIPTIVE STATISTICS: DISCLOSURE INDICES
(108 firm-year observations. Years 2002, 2003 & 2004)

Variable	Mean	Standard Deviation	Minimum	Maximum
QUALITY INDEX	0.4470	0.1066	0.24	0.78
QUANTITY INDEX	0.2672	0.2042	0.00	1.00
Variable	Median		Percentiles	
		25	50	75
QUALITY INDEX	0.4360	0.3710	0.4360	0.5160
QUANTITY INDEX	0.2060	0.1065	0.2060	0.4260

DIMENSIONS OF THE QUALITY INDEX

Variable	Mean	Standard Deviation	Minimum	Maximum
COVERAGE	0.5852	0.1448	0.22	0.89
DISPERSION	0.5867	0.1448	0.29	0.75
WIDTH	0.5834	0.1137	0.26	0.80
ECONOMIC MEASURE	0.5881	0.1596	0.15	0.95
OUTLOOK PROFILE	0.3491	0.1802	0.00	0.94
DEPTH	0.4663	0.1524	0.10	0.89

TABLE 5.- SPEARMAN CORRELATIONS: DISCLOSURE INDICES
(108 firm-year observations. Years 2002, 2003 & 2004)

Variable	QUALITY INDEX	SCOPE INDEX	QUANTITY INDEX	COVERAGE DIMENSION
QUALITY INDEX	1.000	0.406***	0.715***	0.505***
SCOPE INDEX		1.000	0.575***	0.550***
QUANTITY INDEX			1.000	0.645***
COVERAGE DIMENSION				1.000

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.

TABLE 6.- SPEARMAN CORRELATIONS: QUALITY INDEX DIMENSIONS
(108 firm-year observations. Years 2002, 2003 & 2004)

	COV	DIS	WID	ESM	OTL	DEP	SCI	QNI
COV	1							
DIS	0.785***	1						
WID	0.946***	0.935***	1					
ESM	0.072	0.104	0.104	1				
OTL	-0.054	0.076	0.032	0.338***	1			
DEP	0.052	0.139	0.118	0.827***	0.780***	1		
SCI	0.550***	0.394***	0.494***	0.191**	0.032	0.180*	1	
QNI	0.645***	0.441***	0.582***	0.033	-0.132	-0.031	0.575***	1

COV: Coverage; DIS: Dispersion; WID: Width; ESM; Economic sign and measure; OTL: Outlook profile; DEP: Depth; SCI: Scope index; QNI: Quantity index.
* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level.

might be related, the use of one index or another may lead to a different ranking of the companies being analized and, as a result, affect the empirical evidence obtained.

Other interesting conclusions might be drawn from the results presented in table 6. The dimensions that compose width - i.e. coverage (COV) and dispersion (DIS) - are correlated with the width (WID) index. Those that comprise depth - i.e. economic sign and measure (ESM) and outlook profile (OTL) - are also correlated with the depth (DEP) index. Correlations are high and statiscally significant as expected, given that the indices are composed by these dimensions. The coverage (COV) and dispersion (DIS) dimensions are also correlated, although the correlation is lower (0.785). Finally, the correlation between economic sign and measure (ESM) and outlook profile (OTL) is low (0.338), although it is statistically significant ($p<0.01$). This result is consistent with the purpose of the quality index, which considers coverage and dispersion associated to information width, and measure, sign and outlook profile as an indicative of information depth. However, there is no relationship between width and depth dimensions, as it was expected. Although there is a low correlation between them (0.118), the value is not statiscally significant. It seems that they measure different aspects theoretically related to information richness. Finally, table 6 also includes correlations between the dimensions of the quality index and the scope and quantity indices. These correlations are low or non-significant as expected. The scope and quantity indices are designed as most of the indices in previous literature and do not capture features that are related to information richness.

Next, companies were ranked according to the values of each index in order to assess the effects of using different indices on these rankings. The results are included in tables 7, 8 and 9. We show that rank-orderings differ depending on the index used. A partial ranking is performed, year by year, and the results show that there is no agreement in the order of the companies when considering different measures. These results show differences when companies are ranked according to the values of the three different indices. For instance, Abertis in 2002 comes first in the ranking when using the quality index, but it comes fourth when the coverage index is used. However, again in 2002, the same company is far from the top in the rankings according to the scope and quantity indices. In 2004, Inditex (Industria de diseño textil, S.A.) is at the bottom when using the quality and quantity indices, but it comes third for the scope index. Additionally, there are also differences in the rankings by year. For example, Abertis leads the quality index ranking in 2002 but it is at the bottom in the following years.

These rankings reflect the impact of using one particular index to measure information disclosed by companies. Although there was some concordance in the distributions of the values obtained for disclosure indices, measurement of information disclosed by companies through each of the indices leads to significant differences. Quality, scope and quantity measures produce different rankings. Even indices that are similar, such as the scope index and the coverage dimension of the quality index, do not agree in the results. Therefore any difference in the design of the disclosure measure is likely to influence the results obtained from disclosure studies, as self-constructed indices are one of the variables usually employed in this research area.

Linear regression analyses are frecuently performed in empirical disclosure research. Some authors propose to transform absolute values into ranks to overcome limitations of linear regressions (Wallace, Naser and Mora, 1994; Cooke, 1998; Chavent et al., 2006). Results from rank regressions will be affected by the use of diverse disclosure indices since they result in different companies' ranking.

Some companies score a similar relative value for more than one index and therefore they are in the same place in the ranking. However, this does not influence our general conclusions, since there are important divergences. In fact, there are companies that score a high place in the ranking according to one of the indices and, at the same time, are in one of the lowest places in the ranking according to some of the other indices.

TABLE 7.- COMPANIES RANKING (YEAR 2002)

Company	QLI	SCI	QNI	COV
1. ABERTIS INFRAESTRUCTURAS S.A.	1	22	16	4
2. ACCIONA S.A.	11	19	7	2
3. ACERINOX S.A.	7	11	30	11
4. ACS S.A.	18	19	18	4
5. AGUAS DE BARCELONA S.A.	17	7	12	11
6. ALTADIS S.A.	21	22	19	11
7. AMADEUS GLOBAL TRAVEL DISTRIBUTION S.A.	30	22	34	20
8. ARCELOR S.A.	31	11	1	11
9. CARREFOUR S.A.	36	35	28	36
10. ENAGAS S.A.	16	22	22	4
11. ENDESA S.A.	12	2	6	2
12. FOMENTO DE CONSTRUCCIONES Y CONTRATAS S.A.	15	7	15	11
13. GAMESA CORPORACION TECNOLOGICA S.A.	26	11	24	29
14. GAS NATURAL SDG S.A.	20	11	17	20
15. GRUPO FERROVIAL S.A.	3	7	4	11
16. HIDROCANTABRICO S.A.	32	22	25	20
17. IBERDROLA S.A.	4	5	3	4
18. IBERIA LINEAS AEREAS DE ESPANA S.A.	13	22	9	20
19. INDRA SISTEMAS S.A.	28	19	32	20
20. INDUSTRIA DE DISENO TEXTIL S.A.	23	11	26	20
21. METROVACESA S.A.	2	7	12	11
22. NH HOTELES S.A.	23	22	14	29
23. PROMOTORA DE INFORMACIONES S.A.	25	35	31	29
24. RED ELECTRICA DE ESPANA S.A.	19	22	28	20
25. REPSOL YPF S.A.	22	32	22	29
26. SACYR VALLEHERMOSO S.A.	5	1	2	1
27. SERVICE POINT SOLUTIONS S.A.	8	11	10	4
28. SOGECABLE S.A.	9	2	20	11
29. SOL MELIÁ S.A.	33	11	21	20
30. TELEFONICA MOVILES S.A.	29	2	11	11
31. TELEFONICA PUBLICIDAD E INFORMACION S.A.	14	32	34	29
32. TELEFONICA S.A.	27	5	8	4
33. TELEPIZZA S.A.	35	22	32	20
34. TERRA NETWORKS S.A.	34	32	36	29
35. UNION FENOSA S.A.	6	11	5	4
36. ZELTIA S.A.	10	22	26	29

QLI: Quality index; SCI: Scope index; QNI: Quantity index; COV: Coverage dimension.

TABLE 8.- COMPANIES RANKING (YEAR 2003)

Company	QLI	SCI	QNI	COV
1. ABERTIS INFRAESTRUCTURAS S.A.	36	31	35	6
2. ACCIONA S.A.	14	15	13	1
3. ACERINOX S.A.	20	20	30	6
4. ACS S.A.	17	15	22	23
5. AGUAS DE BARCELONA S.A.	27	10	25	6
6. ALTADIS S.A.	12	3	8	3
7. AMADEUS GLOBAL TRAVEL DISTRIBUTION S.A.	34	31	36	32
8. ARCELOR S.A.	1	20	1	3
9. CARREFOUR S.A.	32	31	23	15
10. ENAGAS S.A.	28	36	30	23
11. ENDESA S.A.	6	6	3	6
12. FOMENTO DE CONSTRUCCIONES Y CONTRATAS S.A.	30	10	17	23
13. GAMESA CORPORACION TECNOLOGICA S.A.	22	27	25	32
14. GAS NATURAL SDG S.A.	15	3	11	3
15. GRUPO FERROVIAL S.A.	9	27	7	15
16. HIDROCANTABRICO S.A.	26	20	17	15
17. IBERDROLA S.A.	2	6	4	6
18. IBERIA LINEAS AEREAS DE ESPANA S.A.	8	1	10	6
19. INDRA SISTEMAS S.A.	25	27	20	23
20. INDUSTRIA DE DISENO TEXTIL S.A.	31	15	30	23
21. METROVACESA S.A.	3	10	9	15
22. NH HOTELES S.A.	18	10	13	15
23. PROMOTORA DE INFORMACIONES S.A.	16	31	28	32
24. RED ELECTRICA DE ESPANA S.A.	24	31	29	23
25. REPSOL YPF S.A.	19	15	12	23
26. SACYR VALLEHERMOSO S.A.	5	3	2	6
27. SERVICE POINT SOLUTIONS S.A.	28	10	16	6
28. SOGECABLE S.A.	7	20	24	15
29. SOL MELIÁ S.A.	21	6	19	15
30. TELEFONICA MOVILES S.A.	33	6	27	23
31. TELEFONICA PUBLICIDAD E INFORMACION S.A.	23	20	34	32
32. TELEFONICA S.A.	10	1	6	1
33. TELEPIZZA S.A.	13	20	15	23
34. TERRA NETWORKS S.A.	34	27	33	32
35. UNION FENOSA S.A.	4	15	5	6
36. ZELTIA S.A.	11	20	20	15

QLI: Quality index; SCI: Scope index; QNI: Quantity index; COV: Coverage dimension.

TABLE 9.- COMPANIES RANKING (YEAR 2004)

Company	QLI	SCI	QNI	COV
1. ABERTIS INFRAESTRUCTURAS S.A.	33	18	1	12
2. ACCIONA S.A.	24	27	32	1
3. ACERINOX S.A.	25	27	17	12
4. ACS S.A.	34	27	32	12
5. AGUAS DE BARCELONA S.A.	27	3	20	28
6. ALTADIS S.A.	6	10	25	4
7. AMADEUS GLOBAL TRAVEL DISTRIBUTION S.A.	14	10	7	4
8. ARCELOR S.A.	4	10	24	4
9. CARREFOUR S.A.	36	18	2	28
10. ENAGAS S.A.	18	27	36	28
11. ENDESA S.A.	1	10	21	1
12. FOMENTO DE CONSTRUCCIONES Y CONTRATAS S.A.	28	27	21	12
13. GAMESA CORPORACION TECNOLOGICA S.A.	11	10	14	12
14. GAS NATURAL SDG S.A.	8	6	9	4
15. GRUPO FERROVIAL S.A.	9	10	5	4
16. HIDROCANTABRICO S.A.	32	27	26	28
17. IBERDROLA S.A.	5	10	4	4
18. IBERIA LINEAS AEREAS DE ESPANA S.A.	2	6	3	4
19. INDRA SISTEMAS S.A.	17	10	18	12
20. INDUSTRIA DE DISENO TEXTIL S.A.	35	3	32	12
21. METROVACESA S.A.	3	6	6	12
22. NH HOTELES S.A.	15	18	15	12
23. PROMOTORA DE INFORMACIONES S.A.	7	34	29	34
24. RED ELECTRICA DE ESPANA S.A.	21	18	28	12
25. REPSOL YPF S.A.	26	27	19	34
26. SACYR VALLEHERMOSO S.A.	12	3	8	4
27. SERVICE POINT SOLUTIONS S.A.	28	18	16	12
28. SOGECABLE S.A.	31	18	30	12
29. SOL MELIÁ S.A.	13	1	10	12
30. TELEFONICA MOVILES S.A.	30	18	13	12
31. TELEFONICA PUBLICIDAD E INFORMACION S.A.	22	18	35	28
32. TELEFONICA S.A.	16	1	10	1
33. TELEPIZZA S.A.	20	34	23	34
34. TERRA NETWORKS S.A.	18	6	27	28
35. UNION FENOSA S.A.	23	18	10	12
36. ZELTIA S.A.	10	34	31	12

QLI: Quality index; SCI: Scope index; QNI: Quantity index; COV: Coverage dimension.

5 CONCLUDING REMARKS

The aim of this paper was to make a comparison among several disclosure indices. Two self-constructed indices were compared with a more sophisticated index that has been developed by Beretta and Bozzolan (2005) to measure both quantity and quality of disclosure.

The sample was composed of non-financial listed companies that make up the Spanish IBEX 35 stock market index during the period 2000-2004. The sources of information were the annual reports of companies. The code unit chosen was the sentence and we focused on forward-looking information due to the relevance of this type of information for external users.

Comparisons among indices were performed by using descriptive procedures. Our results provide evidence against the idea of the irrelevance of the particular index chosen in disclosure studies. The choice of an index instead of another can affect crucially the results of the analysis.

To summmarize, our results provide empirical evidence about the importance of the design of an index to measure disclosure of information. The main indices analysed could be used as a proxy for the global disclosure of a company, because they seem to be correlated. Particularly, disclosure quantity can be used as a proxy of disclosure quality. In spite of this, the use of one particular index has a big impact in the rakings of companies. This analysis reveals differences when disclosure is measured through differenciated indices that capture different concepts, such as quality, scope or quantity. Even the use of similar indices (scope index and coverage dimensions) presents some divergences. This supports even more strongly the idea of a non-trivial impact that the selection of a measure of disclosure might have in this research area.

The measurement of disclosure seems to be an important limitation in this research area. It is a controversial question that is still open. Efforts must be made to solve the limitations associated to information disclosure measurement, specially looking for an increase in comparability among measures. It is necessary to be cautious in the design of the disclosure index and define its objectives clearly, explaning in detail the purpose of the measure. Prior studies pointed out the importance of measurement units and scales and other problems associated to index design (Jones and Alabaster, 1999; García-Meca and Martínez, 2004), which could be explored in future research.

Our research provided evidence of the consequences of selecting one particular design for the disclosure index. Future research will have to test the impact that the selection of the disclosure index has on the results obtained from the research about disclosure topics, such as determinants and consequences of disclosure. However, that is beyond of the scope of this paper.

APPENDIX

Examples of coding rules

Sentence 1 (Acciona, 2004):
"In Australia, the Cathedral Rocks wind farm (66 MW) is scheduled to enter into service and, in Germany, new projects will move forward, with plans to install 232 MW."

Index		Score	Explanation
QLI DIMENSIONS	COV[1]	1 in topic "operations"	Discussion about expected operations (future projects in Australia and Germany).
	ESM	1	Disclosure of a non-financial measure (quantitative), but no information about the economic sign.
	OTL	1	Information about planned actions.
SELF-CONSTRUCTED INDICES	SCI	1	Organization and corporate structure.
	QNI	1	Sentence with forward-looking information.

Sentence 2 (Telefónica, 2003):
"During 2004, it will complete that process with the transformation of the Ibercom Service that will allow our accessories to use scenarios for integration in Next Generation Networks."

Index		Score	Explanation
QLI DIMENSIONS	COV	1 in topic "operations"	Discussion about future operations.
	ESM	1	No measure and no information about the economic sign
	OTL	1	Information about planned actions.
SELF-CONSTRUCTED INDICES	SCI	1	Organization and corporate structure.
	QNI	1	Sentence with forward-looking information.

Sentence 3 (Telefónica, 2003):
"Projections for 2005 indicate that the acquisition of TBI will increase turnover of Abertis by 17%, whilst consolidating activity in the airport sector, which will be similar in scale to Telecommunication Infrastructures, representing some 15% of income."

Index		Score	Explanation
QLI DIMENSIONS	COV	1 in topic "operations"	Discussion about strategic information.
	ESM	1	Disclosure of financial measures (quantitative) and about the economic impact (positive).
	OTL	1	Information related to management´s hypothesis and expectations.
SELF-CONSTRUCTED INDICES	SCI	1	Goals, strategies and business policies.
	QNI	1	Sentence with forward-looking information.

[1] COV: Coverage; ESM; Economic sign and measure; OTL: Outlook profile; SCI: Scope index; QNI: Quantity index.

REFERENCES

American Institute of Certified Public Accountants, AICPA (1973), *Informe Trueblood*. New York.

American Institute of Certified Public Accountants, AICPA (1994), *Improving Business Reporting – A customer focus*. New York.

Ahmed, K. and J.K. Courtis (1999), "Associations between corporate characteristics and disclosure levels in annual reports: a meta-analysis", *British Accounting Review*, 31: 35-61.

Akhtaruddin, M. (2005), "Corporate mandatory disclosure practices in Bangladesh", *The International Journal of Accounting,* 40: 399-422.

Aljifri, K. and K. Hussainey (2007), "The determinants of forward-looking information in annual reports of UAE companies", *Managerial Auditing Journal*, 32 (9): 881-894.

Alsaeed, K. (2005), "The association between firm-specific characteristics and disclosure: the case of Saudi Arabia", *Journal of American Academy of Business, Cambridge*, Sep., 7 (1): 310-321.

Archel, P. and F. Lizarraga (2001), "Algunos determinantes de la información medioambiental divulgada por las empresas españolas cotizadas", *Revista de Contabilidad*, enero-julio, 7 (4): 139-153.

Balata, P. and G. Breton (2005), "Narratives vs numbers in annual report: are they giving the same message?", *Review of Accounting and Finance*, 4 (2): 5-25.

Beattie, V.; B. McInnes and S. Fearnley, (2004), "A methodology for analysing and evaluating narratives in annual reports: a comprenhensive descriptive profile and metrics for disclosure quality attributes", *Accounting Forum*, 28: 205-236.

Beretta, S. and S. Bozzolan (2005), "Quality vs quantity: the case of forward-looking disclosure", *Working paper*. Bocconi University & University of Padova.

Beretta, S. and S. Bozzolan (2008), "Quality versus quantity: the case of forward-looking disclosure", *Journal of Accounting, Auditing and Finance*, 23 (3): 333-375.

Bhrojraj, S. (1999), *Management earnings forecasts: A theoretical and empirical analysis*. Doctoral dissertation. University of Florida.

Botosan, C. (1997), "Disclosure level and the cost of equity capital", *The Accounting Review*, 72 (3); 323-349.

Bozzolan, S.; M. Trombetta and S. Beretta (2009), "Forward-looking disclosures, financial verifiability and analysts' forecasts: A study of cross-listed European firms", *European Accounting Review*, 18 (3): 435-473.

Bukh, P.N.; C. Nielsen; P. Gormess and J. Mourtisen (2005), "Disclosure of information on intellectual capital indicators in Danish IPO Prospectuses", *Accounting, Auditing & Accountability Journal*, 18 (6): 713-732.

Buzby, S. (1975), "Company size, listed versus unlisted stocks, and the extent of financial disclosure", *Journal of Accounting Research*, Spring: 16-37.

Chavent, M.; Y. Ding; L. Fu; H. Stolowy and H. Wang (2006), "Disclosure and determinants studies: an extension using the Divisive Clustering Method (DIV)", *European Accounting Review*, 5 (2): 181-218.

Chow, C.W. and A. Wong-Boren (1987), "Voluntary financial disclosure by Mexican corporations", *The Accounting Review*, 62 (3): 553-541.

Canadian Institute of Chartered Accountants, CICA (2002), *Management`s discussion and analysis: Guidance on preparation and disclosure*.

Cooke, T.E. (1989), "Disclosure in the corporate annual reports of Swedish companies", *Accounting and Business Research*, 19 (74): 113- 124.

Cooke, T.E. (1992), "The impact of size, stock market listing and industry type on disclosure in the annual report of Japanese listed corporations", *Accounting and Business Research*, 22: 229-237.

Cooke, T.E. (1998), "Regression analysis in accounting disclosure studies", *Accounting & Business Research*, 28 (3): 209-224.

Depoers, F. (2000), "A cost-benefit study of voluntary disclosure: some empirical evidence from French listed companies", *European Accounting Review*, 9 (2): 245-263.

Entwistle, G.M. (1999), "Exploring the R&D disclosure environment", *Accounting Horizons*, 13 (4): 323-341.

Espinosa, M. and M. Trombetta (2007), "Disclosure interactions and the cost of equity capital: evidence from the Spanish continuous market", *Journal of Business Finance and Accounting,* 34 (9&10): 1371–1392.

Financial Accounting Standards Board, FASB (2001), *Improving Business Reporting: Insights into Enhancing Voluntary Disclosure*. Steering Committee Report. Business Reporting Research Project.

Firth, M. (1979), "The impact of size, stock market listing, and auditors on voluntary disclosure in Corporate Annual Reports", *Accounting and Business Research*, Autumn: 273-280.

Garcia Benau, M.A. and J. Monterrey, (1993), "La revelación voluntaria en las companías españolas cotizadas en Bolsa", *Revista Española de Financiación y Contabilidad*, enero-marzo: 53-70.

García-Meca, E. and I. Martínez (2004), "Divulgación voluntaria de información empresarial: Índices de revelación", *Partida Doble*, 157: 66-77.

García-Meca, E. and I. Martínez (2005), "Assessing the quality of disclosure of disclosure on intangibles in the Spanish capital market", *European Business Review*, 17 (4): 305-313.

Giner, B. (1997), "The influence of company characteristics and accounting regulation on information disclosed by Spanish firms", *European Accounting Review*, 6 (1): 45-68.

Gray, S.; G. Meek and C. Roberts (1995), "International capital market pressures and voluntary annual report disclosures by U.S and U.K. multinationals", *Journal of International Financial Management and Accounting*, 6 (1): 43-65.

Hackston, D. and M.J. Milne (1996), "Some determinants of social and environmental disclosures in New Zealand companies", *Accounting, Auditing & Accountability Journal*, 9: 77-108.

Haniffa, R.M. and T.E. Cooke, (2002), "Culture, corporate governance and disclosure in Malaysian corporations", *ABACUS*, 38 (3): 317-349.

Healy, P.M. and K.G. Palepu (2001), "Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature", *Journal of Accounting and Economics*, 31: 405-440.

Hossain, M., L.M. Tan and M. Adams (1994), "Voluntary disclosure in an emerging capital market: some empirical evidence from companies listed on the Kuala Lumpur stock exchange", *The International Journal of Accounting*, 29 (3): 334-351.

Hossain, M.; K. Ahmed, and J.M. Godfrey (2005), "Investment opportunity set and voluntary disclosure of prospective information: A simultaneous equations approach", *Journal of Business Finance and Accounting*, 32: 871-907.

Hossain, M. and M. Reaz (2007), "The determinants and characteristics of voluntary disclosure by Indian banking companies", *Corporate Social Responsability and Environmental Management*, 14: 274-288.

Hussainey, K.; T. Schleicher and M. Walker (2003), "Undertaking large-scale disclosures studies when AIMR-FAF ratings are not available: the case of prices leading earnings", *Accounting and Business Research*, 33 (4): 275-294.

Institute of Chartered Accountants in England and Wales, ICAEW (1975), *Corporate Report*.

Institute of Chartered Accountants in England and Wales, ICAEW (2002), *Prospective financial information: Guidance for UK directors*.

Jones, K. and T. Alabaster (1999), "Critical analysis of corporate environmental reporting scoring systems", *Journal of Enviromental Assessment Policy and Management*, March, 1 (1): 27-60.

Kent, P. and K. Ung (2003), "Voluntary disclosure of forward-looking earnings information in Australia", *Australian Journal of Management*, 28 (3): 273-285.

Krippendorf, K. (1980), *Content analysis: an introduction to its methodology*, Beverly Hills, CA: Sage Publications.

Larrán, M. and B. Giner (2002), "The use of Internet for corporate reporting by Spanish companies", *Internacional Journal of Digital Accounting*, 2 (3): 53-82.

Malone, D.; C. Fries and T. Jones (1993), "An empirical investigation of the extent of corporate financial disclosure in the oil and gas industry", *Journal of Accounting, Auditing and Finance*, 8: 249-273.

Marston, C. and P. Shrives (1991), "The use of disclosure indices in accounting research: a review article", *British Accounting Review*, 23: 195-210.

McNally, G.M.; L.H. Eng and C.R. Hasseldine (1982), "Corporate financial reporting in New Zeland: an analysis of user preferences, corporate characteristics and disclosure practices for discretionary information", *Accounting and Business Research*, 12: 11-20.

Milne, M.J. and R.W. Adler (1999), "Exploring the reliability of social and environmental disclosures content analisis", *Accounting, Auditing & Accountability Journal*, 12 (2): 237-256.

Raffournier, B. (1995), "The determinants of voluntary financial disclosure by Swiss listed companies", *European Accounting Review*, 4 (2): 261-280.

Robb, S. W. G.; L.E. Single and M.T. Zarzeski (2001), "Nonfinancial disclosures across Anglo- America countries", *Journal of International Accounting*, 10 (1): 71-83.

Singhvi, S. (1968), "Characteristics and implications of inadequate disclosure: a case study of India", *The International Journal of Accounting*, 3 (2): 29-43.

Singhvi, S. and H. Desai (1971), "An empirical analysis of the quality of corporate financial disclosure", *The Accounting Review*, 46: 129-138.

Wallace, R.S.O; K. Naser and A. Mora (1994), "The relationship between the comprehensiveness of corporate annual reports and firm characteristics in Spain", *Accounting and Business Research*, 25 (97): 41-53.

Williams, S.M. (1999), "Voluntary environmental and social accounting disclosure practices in the Asia-Pacific region: An international empirical test of political economy theory", *The International Journal of Accounting*, 34 (2): 209-238.