

The impact of board and audit committee characteristics on voluntary disclosure: a meta-analysis

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Abstract

In this paper we apply meta-analysis to a sample of 64 empirical studies to identify the potential moderators to the relationship between board, audit committee characteristics and voluntary disclosure. We examine whether the results are affected by the differences in the construction of disclosure index, the type of voluntary disclosure, the method of disclosure, the definitions of variables relating to corporate governance, the level of investor protection, and country geographic location. We find that, whilst board size, board composition and audit committee have a significant positive effect on voluntary disclosure, CEO duality has a significant negative effect. In addition, country geographic location moderates the association between board size, board composition, CEO duality and voluntary disclosure. Furthermore, the association between CEO duality and voluntary disclosure is moderated by disclosure type, disclosure method and the level of investor protection. Finally, differences in the definitions of explanatory variables moderate the association between board composition and voluntary disclosure. We conduct a sensitivity analysis which provides evidence that, in respect of the time period, prior to 2002, CEO duality has a significant negative effect on voluntary disclosure and has an insignificant effect for the period thereafter.

Keywords: Board characteristics, audit committee, type of voluntary disclosure, disclosure index construction, disclosure method, investor protection level, country geographic location, meta-analysis.

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1. Introduction

Although disclosure theories suggest a positive association between corporate governance and disclosure, empirical research offers mixed results (Wang & Hussainey, 2013). Brown, Beekes, and Verhoeven (2011:153) note that since the literature on corporate governance “*already has a degree of maturity, most improvements will be incremental*”. Generally, empirical evidence is restricted to only one country and, consequently, this may reduce the capability to ascertain and generalize the research findings which limits the theoretical development of this research area. To gain a better understanding of the association between corporate governance and voluntary disclosure, we conduct a meta-analysis of 64 empirical studies¹.

Anderson, Mansi and Reeb (2004: 319 & 320) state that, “*In the debate over director efficacy, prior literature primarily focuses on four board characteristics; (i) board independence, (ii) board size, (iii) committee structure, and (iv) specific occupational characteristics or expertise of independent directors*”. The worldwide codes of best practice recommend that a corporation should have a large and independent board of directors; separate roles for the chairman and CEO; and a large and independent audit committee (Gregory, 2009). Given this importance, we focus on these governance attributes².

For this paper, our motivation is to reconcile the inconsistent research findings and draw logical conclusions which are not obvious from narrative reviews. Narrative reviews suffer

¹ 64 studies as compared to the 27 studies in García-Meca and Sánchez-Ballesta (2010).

² In order to assess meta-analytically the effect of internal governance attributes on voluntary disclosure, it is necessary to have a sufficiently large number of studies which address empirically a particular research question. Our decision to focus on specific mechanisms is influenced by this criterion. Initially, we look for other board characteristics including the number of meetings and the percentage of financial expertise. However, given the limited number of studies, we discard these variables in order to obtain robust meta-analytic findings.

from a lack of acceptable rules to extend the individual results to generalized findings. Therefore, these can lead to false conclusions since, generally, the differences of the significance across studies are attributed to the sampling errors (Rosenthal, 1991).

Our paper offers three novel contributions. First, when compared to Pomeroy and Thornton's (2008) and García-Meca and Sánchez-Ballesta's (2010) studies, we offer distinguishing features. Pomeroy and Thornton (2008) focus on the independence of audit committee whilst García-Meca and Sánchez-Ballesta (2010) examine board independence and ownership concentration. We complement this line of research by considering several corporate governance attributes (board size, board composition, CEO duality and audit committee). Second, by focusing on intellectual, social, environmental and internet disclosures, we are motivated by García-Meca and Sánchez-Ballesta (2010:622) who call for "*new analyses, studying for example whether the results depend on the type of voluntary information reported (social, environmental, intellectual capital, etc.)*". Finally, we examine whether disclosure index construction, disclosure method, the definition of explanatory variables and research settings² moderate the results reported in the empirical literature.

Our meta-analytic findings show that country geographic location moderates the association between board size, board composition, CEO duality and voluntary disclosure. In addition, we find that the level of investor protection, the type and the method of disclosure affect the relationship between CEO duality and voluntary disclosure. Finally, we document that the proxies used to measure explanatory variables moderate the relationship between board composition and voluntary disclosure.

The remainder of this study is organized as follows. Section 2 reviews the literature and formulates the hypotheses. Section 3 describes the data collection. Section 4 presents the methodology. Section 5 reports the results. Section 6 concludes.

² We use an updated classification of countries and investor protection ranking.

2. Literature Review

Board and audit committee characteristics are considered as key determinants of corporate reporting policy (Chau & Gray, 2010; Chen & Jaggi, 2000). In this section, we review the theoretical foundations for the association between board size, board composition, CEO duality, audit committee and voluntary disclosure.

2.1. Board Size

Board size may play an important role in promoting corporate transparency. For instance, a large board size may be beneficial to the firm since it increases the pool of expertise and available resources (Hidalgo, García-Meca, & Martínez 2011). Based on the concept of expert power, a large board size allows diverse experiences and opinions which, in turn, increase the board's supervisory capacity implying more voluntary disclosure (Gandia, 2008).

On the other hand, Herman (1981) argues that large boards are more likely to be ineffective. For instance, Lipton and Lorsh (1992) suggest that the arrangement of meetings and the reaching of a consensus, concerning some issues discussed during the board meetings, are more difficult for a company characterized by a large board. Therefore, the board's monitoring ability is reduced implying less effectiveness and, consequently, less voluntary information.

Empirical studies are supportive of a positive association between board size and voluntary disclosure (e.g. Abeysekera, 2010; Allegrini & Greco, 2013). However, other empirical works, including Arcay and Vazquez (2005) and Prado-Lorenzo and Garcia-Sanchez (2010) find that there is an insignificant association between both variables. Therefore, we formulate the following non-directional hypothesis:

H1: There is an association between board size and voluntary disclosure.

2.2. Board Composition

Agency theory suggests that the existence of independent directors on the board may have a significant impact on the effectiveness of board's monitoring activities (Fama & Jensen, 1983). Based on the reputation effect, Patelli and Principe (2007) argue that, by providing more voluntary disclosure, outside directors may gain greater public esteem to build their reputations as expert monitors in the labor market. García-Meca and Sánchez-Ballesta (2010) use the 'domino effect' concept of independent directors to push inside board members to improve corporate reporting policy through more voluntary disclosure.

By contrast, Patelli and Principe (2007) suggest that outside directors are normally appointed by dominant shareholders. In case of collusion with them, the monitoring role of independent directors will be limited (Demb & Neubauer, 1992). Under these conditions, the presence of a high proportion of outside directors may have a negative effect on voluntary disclosure.

The empirical evidence on the association between board composition and voluntary disclosure is inconclusive. While Adams and Hossain (1998) and Cheng and Courtenay (2006) find a significant positive association between voluntary disclosure and board composition, Abdelsalam and Street (2007) and Eng and Mak (2003) document a negative association between both variables. Therefore, we formulate the following non-directional hypothesis:

H₂: There is an association between board composition and voluntary disclosure.

2.3. CEO Duality

A combined leadership structure may facilitate CEO entrenchment (Pfeffer, 1981) and it is considered as the primary cause of the misalignment of interests (Kim, Al-Shammari, Kim, & Lee, 2008). On the one hand, Fama and Jensen's agency framework (1983) indicates that a unified leadership structure reduces the importance of the separation between decision control (chair of the board) and decision management (CEO). Accordingly, CEO duality may constrain the desired system of checks and balances and compromise the board independence

in overseeing top management behavior (Cerbioni & Parbonetti, 2007). On the other hand, the CEO has a superior knowledge of the private information dealing with the firm's competitive advantages and its internal conditions. Therefore, duality may limit the complete transfer of private information between the CEO and board members resulting in less voluntary disclosure (Kim et al., 2008).

However, Anderson and Anthony (1986) point out that duality enables a clear-cut leadership in the formulation and the implementation of firm's strategy and this leads to greater efficiency. They argue that a unified leadership structure reduces information sharing costs and conflict of interests between CEO and non-CEO chairman. Proponents of duality also highlight the importance of clear lines of authority and unity of command to reduce conflicts and improve decision making (Rhoades, Rechner & Sundaramuthy, 2001). Therefore, CEO duality may result in more voluntary disclosure.

We also note that the empirical evidence on the relationship between voluntary disclosure and CEO duality is mixed. Whilst Allegrini and Greco (2013) and Li et al. (2008) document a significantly negative association between CEO duality and voluntary disclosure, other studies (e.g. Cheng & Courtenay, 2006; Haniffa & Cooke, 2002) report an insignificant or a positive association between both variables. Therefore, we formulate the following non-directional hypothesis:

H3: There is an association between CEO duality and voluntary disclosure.

2.4. Audit Committee

The key role of audit committee is to assist the board of directors in overseeing corporate reporting policy (Pincus, Rusbarsky, & Wong, 1989). For instance, Arcay and Vazquez (2005) suggest that, in terms of clarity, relevance and completeness of information an audit committee plays a crucial role in fulfilling investors' needs for information. As a control mechanism over top management, an audit committee ensures that there is an increased

voluntary disclosure to allow an accurate assessment of the top management's decisions and behaviors (Allegrini & Greco, 2013) and align the management's and the shareholders' interests (Laksmana, 2008). Therefore, such a monitoring mechanism is expected to improve corporate reporting policy. For instance, The Blue Ribbon Report (1999) and the Smith Report (2003) suggest that the audit committee plays a pivotal role in monitoring board activities by improving the quality of the disclosed information and ensuring the protection of shareholders' interests through the release of price-sensitive information.

Generally, we note that empirical studies are supportive of a positive association between audit committee characteristics and voluntary disclosure (Al-Shammari & Al-Sultan, 2010; Barako et al. 2006 and Ho & Wong, 2001). By contrast, some studies do not find such an association (e.g. Allegrini & Greco, 2013 and Mangena & Pike, 2005). Therefore, we formulate the following non-directional hypothesis:

H4: There is an association between audit committee characteristics and voluntary disclosure.

2.5. Variables intervening in the association between board, audit committee characteristics and voluntary disclosure

By considering the potential moderators to the relationship between governance attributes and voluntary disclosure, we move beyond a simple statistical summary of the association between them. Six potential moderators are successively discussed below.

First, we identify three types of voluntary disclosure scores; total, social, environmental and intellectual capital disclosures. Total disclosure includes different types of information such as historical, financial, social, environmental and intellectual capital information. Total voluntary disclosure is oriented specifically towards stock markets participants and improves investors' abilities to predict future earnings (Gelb & Zarowin, 2002). The main part of total disclosure score deals with historical financial information (Lim, Matollocky, & Chow, 2007). Intellectual capital information targets, also, investors' needs since it deals with the firm's future prospects and provides both strategic and competitive advantage information (Meek,

Roberts, & Gray, 1995). By contrast, social and environmental disclosure is dominated by information concerning firms' social and environmental actions. Therefore, this kind of information is reserved specifically to satisfy stakeholders' needs and signal firm's legitimacy in its society (Lim et al., 2007).

Since these three types of disclosure integrate different aspects of information and target diverse users of information, different factors are expected to influence each type of information (Lim et al, 2007). This is particularly true for the board of directors which is, generally, aligned with shareholders and focuses on the maximization of profits rather than serving stakeholders' interests (Adams, Licht, & Sagiv, 2011). Wang and Dewhirst (1992) argue that board characteristics (e.g. CEO duality and the percentage of outside directors) may have an impact on the board's stakeholder orientation and, consequently, on social and environmental disclosure. Lim et al. (2007) find that board characteristics have different effects on disclosure types.

Given the fact that, generally, audit committee and board members are considered as representative of shareholders' interests (Ayuso & Argandona, 2007), they are more likely to be in line with investors' needs and put more emphasis on financial and strategic information. By contrast, the CEO, who is, also, the chair of the board, will try to reduce financial disclosure to preserve his/her dominant position on the board and facilitate his/her entrenchment. In addition, the proprietary costs theory predicts that CEO will try, also, to reduce the extent of social and environmental disclosure in order to improve the firm's performance in the short term and increase his/her own compensation. Therefore, we formulate the following hypothesis:

H5: Disclosure types intervene in the relationship between board, audit committee characteristics and voluntary disclosure.

Second, we note that the disclosure method (annual report versus company website) may moderate the relationship between voluntary disclosure and the examined governance

attributes. The annual report is a statutory document that management produces on an annual basis. According to Marston and Shrivies (1991) and Beretta and Bozzolan (2004) annual reports represent the “main disclosure vehicle,” and the most comprehensive financial report available to the public. The structure of annual report is formalized. Therefore, one can compare the content of these reports between companies. By contrast, web-based disclosure is optional, freely accessed by all types of investors and requires supplementary costs of preparing and updating the firm’s website. Consequently, there is an expectation that the board of directors and audit committee members will put more emphasis on the formal communication channel (i.e. annual report disclosure). Therefore, we formulate the following hypothesis:

H6: Disclosure method (annual report versus company website) intervenes in the relationship between board, audit committee characteristics and voluntary disclosure.

Third, we also note that the conflicting findings across studies can be attributed to the diversity of the respective countries’ legal and institutional systems. For instance, the level of investor protection may affect the relationship between board of directors, audit committee characteristics and voluntary disclosure (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998). We note that, in an environment characterized by a high level of investor protection, directors face more litigation risk. Consequently, they are inclined to improve corporate reporting policy in order to reduce the information asymmetry between large and minority shareholders. By contrast, a CEO, who is, also, the chair of the board, will try to reduce the extent of voluntary disclosure in order to diminish, in a high investor protection setting, litigation risk. Therefore, we formulate the following hypothesis:

H7: The level of investor protection intervenes in the relationship between board, audit committee characteristics and voluntary disclosure.

Fourth, legal origin and institutional characteristics play an important role in shaping corporate governance mechanisms and their effects on voluntary disclosure (García-Meca & Sánchez-Ballesta, 2010). For instance, Ahmed and Courtis (1999: 36) suggest that ‘these

inconclusive results could be due to differences in socio economic and political environments between countries’.

The Report on Observance of Standards and Codes (e.g. Egypt, 2009) suggests that, whilst many directors may be outside the firm, they may not be truly independent since, generally, they have close relationships with large owners. Similarly, in Kenya, Barako et al. (2006) suggest that outside directors are not truly independent since they have close relationships with large shareholders. This situation may compromise the board’s and the audit committee’s roles in enhancing corporate reporting policy. When directors are not truly independent, the CEO will operate in a more comfortable situation which, in turn, increases his/her discretion over corporate reporting policy. Therefore, we formulate the following hypothesis:

H8: Country geographic location intervenes in the relationship between board, audit committee characteristics and voluntary disclosure.

Fifth, we note that there is no definitive theoretical guidance concerning how to construct a disclosure index and, consequently, researchers develop the index often based on their objectives (Artiach & Clarkson, 2011). Whilst some researchers use a dummy variable approach to measure voluntary disclosure, others estimate the extent of voluntary disclosure using a disclosure checklist. According to Bravo, Abad, and Trombetta (2010), the second approach is more able to capture the richness of firm’s voluntary disclosure policy. Accordingly, we place studies into two groups to assess the moderating effect of the disclosure index construction on the association between voluntary disclosure and the examined governance attributes. Therefore, we formulate the following hypothesis:

H9: The construction of the disclosure index intervenes in the relationship between board, audit committee characteristics and voluntary disclosure.

Finally, we note that prior meta-analyses on the determinants of voluntary disclosure (García-Meca & Sánchez-Ballesta, 2010; Khlif & Souissi, 2010), argue that, the differences in the

definition of explanatory variables, can affect the hypothesized relationships³. The empirical literature uses three main proxies to measure board composition, namely, board independence (e.g. Patelli & Prencipe, 2007), non-executive directors (e.g. Haniffa & Cooke, 2002), and independent non-executive directors (e.g. Ghazali & Weetman, 2006). Corporate governance literature (e.g., Dalton et al., 1999) suggests that, in substance, executive directors are not so independent. Therefore, we expect that this proxy for board composition is less linked to voluntary disclosure. Similarly, we note that audit committee characteristics are measured using different proxies including the existence of an audit committee, the percentage of independent members and the size of audit committee. This diversity of measures may also moderate the relationship between audit committee and voluntary disclosure. Therefore, we formulate the following hypothesis:

H10: The proxies, used to measure board size, board composition and audit committee characteristics, intervene in the relationship between these governance attributes and voluntary disclosure.

3. Sample of studies included in the meta-analysis

We conduct an extensive search for relevant articles. We collect papers from several accounting and finance journals indexed by Science Direct, Ebsco, Blackwell, Springer, Emerald, Inderscience, ABI Inform, and Social Science Research Network (SSRN). Our initial search uses keywords including: “voluntary disclosure and corporate governance mechanisms”. The term voluntary is then replaced by “internet-based, intellectual capital and social and environmental”. In order to identify the maximum number of empirical studies dealing with such a topic, we replace the word “corporate governance” with “board characteristics”, “CEO duality” and “audit committee”. We also consult specialized journals of accounting and finance (e.g. *Corporate Governance: An International Review*, *Journal of Management Governance*) and references in the collected studies. Initially, we search for

³ With the exception of some studies that use a dummy variable that takes 1, if directors on the board exceed a certain number and, 0 otherwise, board size is measured commonly by the number of directors.

several board characteristics including board size, board composition, CEO duality, the number of audit committee meetings, the percentage of financial expertise, and audit committee characteristics. However, we focus only on board size, board composition, CEO duality and audit committee characteristics and we discard the other board characteristics given the limited number of studies allowing us to obtain robust meta-analytic findings.

Our searches yield a total of 64 research articles between 1997 and 2013. Amongst the 64 papers, 34 articles are published in top ranked journals (Elsevier, Wiley-Blackwell, Springer, Francis & Taylor); 14 in decent journals (Emerald, Inderscience and Macmillan); 15 papers appear in other journals; and only Fleo's (2010) paper is available in SSRN. Therefore, 53 per cent (34/64) of the studies examined are published in ranked journals implying more reliability of the statistical inferences in our meta-analysis. Table 1 illustrates the sample selection process and Table 2 presents the studies included in the analysis.

Insert Table 1 about here

Insert Table 2 about here

4. Meta-analysis technique

Meta-analysis is an alternative to a narrative literature review. It is defined as a statistical method to summarize and analyze previous quantitative empirical literature. Narrative review may be misleading since individual studies may have different characteristics in term of sample size, variables proxies and time period (Hunter & Schmidt, 1990). The meta-analysis technique allows researchers to examine the effect of these different data characteristics on the findings of primary studies (Hunter & Schmidt, 1990; Rosenthal, 1991).

4.1. Effect size

In meta-analysis, the effect size measures the magnitude of the relationship between two variables. In our study, it represents a metric proxy of the degree of connection between

voluntary disclosure and explanatory variables⁴. Meta-analytic data should be analyzed using the following three steps as suggested by Hunter et al. (1982) and Hunter and Schmidt (2000).

(i) Firstly, the mean correlation (\bar{r}) is calculated as: $\bar{r} = \frac{\sum(r_i \cdot N_i)}{\sum N_i}$ (1) where N_i is the

sample size and r_i is the Pearson correlation coefficient for study i .

(ii) Secondly, the observed variance (S_r^2) and the sampling error variance (S_e^2) are calculated

using the following formulas $S_r^2 = \frac{\sum N_i (r_i - \bar{r})^2}{\sum N_i}$ (2) and $S_e^2 = \frac{(1 - \bar{r}^2)^2 K}{\sum N_i}$ (3) where K is

the number of individual studies included in the meta-analysis.

(iii) Finally, the estimates of population mean (\bar{r}) and the standard deviation $\sqrt{S_r^2/K}$ are used normally to construct a 95 per cent confidence interval.

In order to test for moderating variables and determine whether the observed variance is

trivial or higher than expected, a chi-square statistic ($\chi_{K-1}^2 = \frac{N S_r^2}{(1 - \bar{r}^2)^2}$ (4)) is used to assess

whether the observed variance is due to moderating effects or to some statistical errors. If the computed chi-square statistic is inferior to the tabulated one, the association is considered to be homogeneous and the variation in results across studies is due only to some statistical errors. Nevertheless, if the computed chi-square statistic is significant at the 5 per cent significance level, we conduct further analyses to test for moderators and reduce the heterogeneity in the observed variance.

4.2. Moderating factors

We consider six moderating variables. Disclosure score is classified into: total score (TS); intellectual capital disclosure (ICD); and social and environmental disclosure (CSED). As the second moderating factor, we consider annual reports disclosure against internet-based

⁴ In computing the effect size from the reported statistics, different procedures can be used. When a study reports Pearson's r coefficient, such a statistic is used to calculate the effect size between voluntary disclosure score and explanatory variable. When other statistics such as Student t and Z value are reported, the following formulas are used to compute the effect size respectively $\sqrt{\frac{t^2}{(t^2 + df)}}$ where df is the degree of freedom and $\frac{Z}{\sqrt{N}}$.

disclosure. In the third and fourth moderating factors, we examine the moderating effect of country geographic location⁵ and the level of investor protection⁶. As the fifth moderating factor, we consider the approach used to measure voluntary disclosure (disclosure checklist versus a dummy variable: 1 if the information is disclosed and 0 otherwise). Finally, board size is sub-grouped into: the number of directors on the board; and a dummy variable. Board composition is sub-grouped into: the percentage of independent directors (PID); the percentage of independent non-executive directors (PIND); and the percentage of non-executive directors (PND). Audit committee is sub-grouped into: dummy variable (DV): 1 if audit committee exists and 0 otherwise; the number of audit committee members (NAC) and the percentage of independent non-executive directors (INDC).

5. Results

Tables 3 and 4 summarize the study's results. In each table, we present, firstly, the results of the overall meta-analysis and, if the homogeneity test is rejected, we conduct refined analyses according to the moderating factors cited above.

5.1. Board size

The board size has a mean correlation of 0.193 ($Z= 8.137$) with a 95 per cent confidence interval between 0.146 and 0.239 (Table 3 A). Therefore, the results support hypothesis H₁. However, only 41.659 per cent of the observed variance is explained by the sampling error variance. This indicates a high degree of heterogeneity across studies. This is also evident

⁵ We group together countries which share several similarities in terms of disclosure policy; directors' liability; and the ease of shareholders suits. Based on the World Bank's classification, we identify the following five groups : (i) MENA including Egypt, Iran, Saudi Arabia, Tunisia and Turkey; (ii) OECD high income countries including Australia, Canada, France, Greece, Italy, Ireland, New Zealand, Spain, UK and USA; (iii) Sub-Saharan Africa (SA) including Kenya, Nigeria and Zimbabwe; and (iv) East Asia Pacific (EAP) including Bangladesh, China, Hong Kong, Indonesia, Malaysia and Singapore.

⁶ We classify studies with respect to the level of investor protection in the countries examined. High (low) investor protection countries are those which have an investor protection ranking inferior (superior) to the median of our sample.

from the significant ($p < 0.01$)⁷ chi-square statistic of 64.810. In order to reduce heterogeneity⁸, we undertake further tests for moderating variables.

When we conduct a sub-group meta-analysis with respect to disclosure type (social and environmental, intellectual and total score disclosures), there remains a significant association regardless the type of disclosure. Similarly, disclosure method (annual report versus web-based) does not moderate the examined relationship. Therefore, we establish that H₅ and H₆ are not supported. In addition, when the checklist approach is used to measure disclosure score, the relationship is also significant with a mean correlation of 0.192 ($Z = 8.152$).⁹

When we examine the moderating effect of the level of investor protection, the results show that the association remains significant for high and low investor protection groups (0.224; $Z = 10.246$) and (0.183; $Z = 3.878$) respectively. Therefore, H₇ is rejected. With respect to geographic location, the association remains significant for OECD high income countries (0.252; $Z = 6.224$), East Asia and Pacific settings (0.210; $Z = 8.617$) and Sub-Saharan African countries (0.226; $Z = 3.321$). By contrast, the relationship becomes insignificant for MENA region (0.068; $Z = 0.753$). Therefore, H₈ is supported. However, this result should be interpreted with cautions given the insufficient number of studies for some regions (e.g. MENA and Sub-Saharan African settings).

Finally, the meta-analytic results show that there is only a significant association between board size and voluntary disclosure when the former is proxied by the number of directors on the board with a mean correlation 0.200 ($Z = 8.403$), whilst, as measured by a dummy variable (-0.001; $Z = -0.026$), there is an insignificant association. Therefore, H₁₀ is supported.

⁷ The tabulated chi-square, with a degree of freedom of (27-1= 26) at significance level of 0.01, accounts for 45.642.

⁸ Corporate governance literature (e.g. Boone, Field, Krapoff and Raheja, 2007) suggests other moderating factors including firm size, firm's degree of diversification and tension between monitoring and strategy roles. However, the primary data, which we collect from empirical studies, does not allow us to control these moderating factors in respect of the relationship between board size and voluntary disclosure.

⁹ Since only the paper of Buniamin et al. (2008) uses a dummy variable approach, we can not test for H₉.

However, given the limited number of studies for dummy variable group, this result should be interpreted with cautions.

5.2. Board composition

As shown in Table 3 (B), the relationship between voluntary disclosure and board composition has a mean correlation of 0.115 ($Z = 6.096$) and a 95 per cent confidence interval between 0.078 and 0.152. Since the overall explanatory power of this variable is substantially low ($\chi^2_{k-1} = 194.498$; $p < 0.001$), we undertake further analyses to test for the presence of moderating variables.

When we sub-group studies according to disclosure scores, there is, also, a significant association for total, social, environmental and intellectual capital scores. Therefore, these results do not confirm H₅. When we classify studies according to disclosure method (annual report versus web), the findings show that there remains a significant association for web-based disclosure (0.108; $Z = 2.469$), and annual report disclosure (0.116; $Z = 5.596$). Therefore, H₆ is rejected. Furthermore, when we conduct a sub-group meta-analysis with respect to disclosure index construction, the findings show a significant mean correlation of 0.125 ($Z = 6.076$) for the checklist index group. By contrast, the relationship becomes insignificant for the dummy variable index group with a mean correlation of 0.046 ($Z = 1.100$). Therefore, the construction of disclosure index moderates the relationship and H₉ is supported. This result should be interpreted with cautions given the limited number of studies using a dummy variable approach.

Another moderating variable, the definition of board composition, shows that the studies, employing the percentage of independent directors and independent non-executive directors, have significantly positive mean correlations of 0.137 ($Z = 7.056$) and 0.167 ($Z = 3.870$) respectively. On the other hand, the association becomes insignificant for studies employing

the percentage of non-executive directors (0.047; $Z = 1.018$)¹⁰. Our results are in line with García-Meca and Sánchez-Ballesta (2010) who, also, find that there is an insignificant association between the percentage of non-executive directors and voluntary disclosure. Therefore, the proxies used to measure board composition moderate the relationship. These findings support H₁₀.

When we classify studies according to the level of investor protection, the results remain significant for high and low investor protection groups (0.117; $Z = 5.247$) and (0.112; $Z = 3.561$) respectively. Hence, H₇ is not supported.

With respect to geographic location, there is a significant association for OECD high income countries (0.134; $Z = 5.283$) and East Asia Pacific countries (0.125; $Z = 4.799$). By contrast, there is an insignificant association for MENA settings (0.059; $Z = 1.161$) and Sub-Saharan African countries (-0.102; $Z = -0.974$). Consequently, country geographic location moderates the relationship and this supports hypothesis H₈.

Insert Table 3 about here

5.3. CEO duality

Table 4 (C) shows that there is a significant negative relationship between CEO duality and voluntary disclosure with a mean correlation of -0.053 ($Z = -2.796$) and a confidence interval between -0.091 and -0.016. We reject the homogeneity test since 33 per cent of the observed variance is explained by the sampling error variance. This is also evident from the significant ($p < 0.01$) chi-square statistic of 97.581. Therefore, we conduct further analysis to test for the presence of moderating variables.

When we classify studies according to disclosure score, there remains a significant negative association for social and environmental score -0.064 ($Z = -3.441$) and total score (-0.070; $Z = -1.950$), while it is insignificant for intellectual capital information (-0.001; $Z = -0.020$).

¹⁰ We exclude the study of Abeysekera (2010) from the analysis since it uses the number of independent directors on the board.

Therefore, these results support hypothesis H₅. As predicted by the proprietary costs theory, the dissemination of social and environmental information increases disclosure costs. CEO will try to avoid such a type of voluntary disclosure to improve the firm's short term profitability and, thus, his/her own compensation. When we examine the moderating effect of disclosure method, we document that the negative association is maintained for annual report disclosure (-0.061; Z = -2.748), whilst it is insignificant for internet-based disclosure (-0.006; Z = -0.023). Therefore, these results also support hypothesis H₆.

Moreover, since there is a significant association for the disclosure checklist method (-0.053; Z = -2.551) and the dummy variable approach (-0.062; Z = -5.428), we conclude that the disclosure construction approach does not moderate the association.

When we examine the moderating effect of the level of investor protection, we find that there is a significantly negative relationship for high investor protection group (-0.081; Z = -3.892), whilst it becomes insignificant for low investor protection group (-0.024; Z = -0.762). Therefore, these results support hypothesis H₇. Our findings are consistent with those reported by Rogers and Van Buskirk (2009), which suggest that, despite the high quality judicial systems, the litigation process reduces managers' incentives to disclose information. Similarly, we find that the country geographic location moderates the relationship between CEO duality and voluntary disclosure since there is only a significant negative association for OECD high income countries with a mean correlation of -0.072 (Z= -2.167) and a confidence interval between -0.138 and -0.007. Therefore, these results also confirm hypothesis H₉.

5.4. Audit committee

Table 4 (D) reports the results of 22 studies in respect of the relationship between audit committee and voluntary disclosure. The overall meta-analysis results show a significant association between both variables with a mean correlation of 0.199 (Z = 6.498) and a 95 per cent confidence interval between 0.139 and 0.260. Therefore, H₄ is accepted. The computed

chi-square statistic of 103.002 ($p < 0.05$) and the percentage of observed variance explained by the sampling error variance of 21.358 indicate a high degree of heterogeneity across studies. Therefore, we undertake further analyses to identify moderators.

When we study the moderating effects related to voluntary disclosure, the relationship remains significant regardless the type of disclosure score, the approach used to construct disclosure index and the disclosure method. Therefore, these results do not support hypotheses H5, H6 and H9. The lack of moderation for disclosure type and tool should be interpreted with cautions given the limited number of studies for some disclosure types (social, environmental and intellectual capital information) and internet-based disclosure.

When we sub-group studies according to the proxies used to measure the audit committee variable (the percentage of independent directors, the number of audit committee members and a dummy variable), the association remains significant with mean correlations of 0.105 ($Z = 4.039$), 0.171 ($Z = 3.195$) and 0.293 ($Z = 6.322$) respectively. Therefore, the proxy used to measure the audit committee variable does not moderate the relationship and H10 is rejected.

Finally, we undertake further meta-analytic comparisons by grouping studies according to the level of investor protection and country geographic location. The meta-analytic findings show that, for all the groups, the significant relationships remain. Therefore, the level of investor protection and country geographic location do not moderate the examined relationship and, thus, H7 and H8 are rejected. Here it should be noted that, given the limited number of studies, the results, obtained for Sub-Saharan African and MENA countries, have to be interpreted with cautions.

Insert Table 4 about here

A summary of meta-analytic results is shown in Table 5.

Insert Table 5 about here

5.5. Additional and sensitivity analysis¹¹

Before 2002, numerous financial scandals have accrued (e.g. Enron in the USA). Since meta-analysis allows researchers to examine how time period affects the primary studies' findings (Hunter & Schmidt, 1990), we control for time effect by considering the period before 2002 (including 2002) and the period thereafter. We exclude all studies using samples spanning from the pre- to the post-2002 periods. The results show that, for the pre- and post-2002 periods, there remains a significant association between board size, board composition, audit committee and voluntary disclosure. However, for the pre-2002 period, there is a significant negative relationship for CEO duality (-0.096; $Z = -3.238$), while there is an insignificant relationship (-0.039; $Z = -1.671$) for the post-2002 period. We also conduct tests of equality of means for pre- and post-2002 periods. Results show that there is an insignificant change for the association between board size and voluntary disclosure with a T-statistic of 0.216. For board composition, the mean correlation witnesses a significant increase moving from 0.105 for the pre-2002 period to 0.124 for the post-2002 period with a T-statistic of 6.998. For CEO duality, the mean correlation moves from -0.096 for the pre-2002 period to -0.039 for the post-2002 period with a significant T-statistic of 22.110. Finally, the mean correlation for audit committee witnesses a significant decrease moving from 0.284 for pre-2002 period to 0.184 for the post-2002 period with a T-statistic of -16.650.

In order to test whether the publication bias influences the conclusions drawn from our meta-analysis, we apply Orwin's (1983) approach to determine the extent of the file drawer problem. This method requires the estimation of the fail-safe N being the number of unreported studies with insignificant results required to reduce the mean effect size to a

¹¹Although several authors call for the control of endogeneity when examining the association between disclosure and corporate governance attributes (e.g. Core, 2001; Hermalin, and Weisbach, 2003) as for corporate governance and corporate performance, the majority of studies dealing with this stream of research consider corporate governance attributes as a determinant of disclosure policy. Therefore, it is not possible for us to control for reverse causality or endogeneity since primary studies in their models consider voluntary disclosure as a consequence of board and audit committee characteristics.

specified criterion¹². We calculate the fail-safe N when significant associations are reported. The file drawer analysis indicates the stability of significant results obtained for the overall samples since the fail-safe N ranges from 33 for board size to 14 for CEO duality. When sub-samples include a limited number of studies, the computed fail-safe N s also indicate the stability of the results for audit committee variable (MENA and Sub-Saharan African settings) and board size (Sub-Saharan African settings).

We conduct another sensitivity analysis with respect to the type of items included in the total scores. We identify 14 studies¹³ which focus exclusively on financial information in their disclosure index. For board size and audit committee, there remains a significant association for financial information and mixed information scores. By contrast, for board composition, the significantly positive association is maintained only for financial scores (0.132; $Z = 3.581$), whilst it is insignificant for mixed information scores (0.074; $Z = 1.907$) with a confidence interval between -0.002 and 0.150. Similarly, there is a significant negative association between total score and CEO duality only for financial scores (-0.097; $Z = -3.110$), whilst it is insignificant for the mixed information scores (-0.050; $Z = -0.810$). This sensitivity test also supports hypothesis H5 since disclosure type moderates the association between board composition, CEO duality and voluntary disclosure.

Moller and Jennions (2001) suggest that the meta-analytic results may be affected by the publication bias since quality journals tend to accept studies with significant results. Therefore, we divide our overall sample into two groups: (i) quality journals and (ii) low quality journals. The results show that the publication quality does not moderate the relationship between board size, board composition, audit committee and voluntary

¹²We calculate the fail-safe N using the following equation: $K_0 = K \left[\frac{ES_k}{ES_0} - 1 \right]$; K_0 : the fail-safe N or the number of insignificant, unpublished studies; K : the number of studies included in the meta-analysis; ES_k : the effect size of studies included in the analysis and ES_0 : the criterion effect size level which would reduce the effect size.

¹³ The studies which deal exclusively with financial information are as follows: (Adams & Hossain, 1998; Allegrini & Greco, 2013; Apostolou & Nanopoulos, 2009; Arcay & Vazquez, 2005; Baek et al., 2009; Bujaki & McConomy, 2002; Cheng & Courtenay, 2006; Chen & Jaggi, 2000; Juini, 2013; Fleo, 2010; Khodadadi et al., 2010; Mangena & Pike, 2005; Mangena & Tauringana, 2007 and Mohamad & Sulong, 2010).

disclosure. By contrast, the publication quality moderates the association between CEO duality and voluntary disclosure since the mean correlation accounts for -0.064 ($Z = -2.447$) for high quality papers, whilst it amounts to -0.044 ($Z = -1.599$) for low quality journals.

The analyses, presented above, include all the effects from all the studies which may cause a stochastic dependence amongst the observations. In order to address this concern, we use only one observation per study as a sensitivity analysis. The sensitivity meta-analytic findings show that there remains a significant association with a high degree of homogeneity for board size, board composition and audit committee. The mean correlations and chi-square statistics account for (0.207 ($Z = 7.561$); $\chi^2_{K-1} = 0.600$); (0.143 ($Z = 6.437$); $\chi^2_{K-1} = 1.323$); and (0.237 ($Z = 6.824$); $\chi^2_{K-1} = 0.655$) respectively. By contrast, there is an insignificant association for CEO duality since the mean correlation and chi-square statistic account for (-0.035 ($Z = -1.439$); $\chi^2_{K-1} = 0.668$).

Finally, we control for outliers in our meta-analysis^{14 15}. For board size, we identify 5 studies as outliers. After dropping them from the analysis, the mean correlation becomes 0.202 ($Z = 8.623$) with an insignificant χ^2_{K-1} of 23.929. Similarly, we identify 9 outliers for the association between board composition and voluntary disclosure. Following their elimination, the association becomes more significant (0.125 ($Z = 8.397$); $\chi^2_{K-1} = 123.874$). After dropping 3 studies identified as outliers, there is, also, a more significant relationship for CEO duality

¹⁴We identify outliers by using the Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviancy statistic (SAMD).

For each study, we compute the SAMD as follows: $SAMD(i) = \frac{r_i - \bar{r}}{\sqrt{Var(i) - Var(\bar{r})}}$ Where: $Var(i) = \frac{(1-r^2)^2}{N_i - 1}$ and $Var(\bar{r}) = \frac{(1-\bar{r}^2)^2}{N - K}$;

then we compute \overline{SAMD} and $Var(SAMD)$ to obtain a standardized absolute value of SAMD as follows: $\left| \frac{SAMD - \overline{SAMD}}{\sqrt{Var(SAMD)}} \right|$. The

effect size of the study is not considered to be an outlier if it is close to 0 (Huffcutt and Arthur, 1995). In our analysis, we consider a cut-off point of 1.5. Each study that has a standardized absolute value of SAMD that equals or exceeds 1.5 is considered as outlier and we eliminate it.

¹⁵ The studies identified as outliers are as follows: (i) board size (Arcay & Vazquez, 2005; Allegrini & Greco, 2013; Ganda, 2008; Prado-Lorenzo & Garcia-Sanchez, 2010; Samaha et al. 2012); (ii) Board composition (Abdelsalam & Street, 2007; Adams & Hossain, 1998; Barako et al., 2006; Eng & Mak, 2003; Haniffa & Cooke, 2005; Khan et al, 2013; Mallin et al. 2013; Mangena & Pike, 2005; Samaha & Dahawy, 2011); (iii) CEO duality (Rouf, 2011; Al-Janadi et al. 2013; Chau & Gray, 2010) and (iv) audit committee (Barros et al., 2013; Li et al., 2008; Mangena & Pike, 2005 Samaha & Dahawy, 2011).

(-0.058 (Z= -4.341); $\chi^2_{k-1} = 40.863$). Finally, after dropping 4 studies considered to be outliers, the association between audit committee and voluntary disclosure becomes more significant (0.226 (Z= 9.884); $\chi^2_{k-1} = 34.384$). The exclusion of outliers leads to more homogeneous relationships since the percentage of the observed variance explained by the sampling error variance amounts to 100 per cent for board size, board composition and CEO duality, while it is about 75 per cent for audit committee. Here, it should be noted that the results generated from sub-group meta-analyses remain stable after the exclusion of outliers.

6. Conclusion

In this meta-analysis, we investigate the link between board size, board composition, CEO duality, audit committee and voluntary disclosure. We also test whether the relationships are moderated by the differences in disclosure type, method and construction; the differences in research setting; and the differences in the measurement of explanatory variables. Our primarily meta-analytic findings show that there is a significant positive association between board size, board composition, audit committee and voluntary disclosure, while CEO duality has a significant negative effect on voluntary disclosure. Our sub-group meta-analytic results provide evidence that country geographic location moderates the association between board size, board composition, CEO duality and voluntary disclosure. In addition, disclosure type, disclosure method and the level of investor protection moderate the association between voluntary disclosure and CEO duality. Finally, differences in the definition of the explanatory variables moderate the association between board composition and voluntary disclosure. Our sensitivity analysis with respect to the time period provides evidence that, prior to 2002, CEO duality has a significantly negative association with voluntary disclosure. However, for the period following 2002, CEO duality has an insignificant effect on voluntary disclosure.

Overall, our meta-analytic findings emphasize the need to explicitly consider the country geographic location when one analyzes the association between board characteristics and voluntary disclosure. In addition, the negative effect of CEO duality on voluntary disclosure is more pronounced in high investor protection settings implying that the litigation process, in high quality judicial systems, reduces managers' incentives to disclose information.

One limitation of our results is the 'apples and oranges' problem caused by the wide range of econometric methodologies used to estimate the effect size. However, recent accounting literature applied largely meta-analysis and our analysis is in line with previous meta-analyses (e.g. García-Meca & Sánchez-Ballesta, 2010). In addition, the meta-analysis technique represents a simple test of the association between two variables and it does not allow us to control for endogeneity or reverse causality if the primary study does not control such an issue. Since the empirical disclosure studies, included in our meta-analysis, do not address this issue, we find it impossible to control for endogeneity.

Several avenues for future research exist. Firstly, there is a need for more research on the problem of endogeneity between voluntary disclosure and corporate governance. Secondly, since virtually all studies dealing with the impact of corporate governance on voluntary disclosure eliminate financial companies from their samples, it will be interesting to study explicitly, for financial companies, the impact of corporate governance on voluntary disclosure to see if there is a significant difference from those of non-financial companies. Finally, the association between the voluntary disclosure of executive compensation and board characteristics represents an interesting field of future research.

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Table 1. Sample selection

Initial sample	96
Criteria leading to exclusion of studies:	
▪ Studies providing only descriptive statistics	(3)
▪ Other measures of disclosure	(2)
▪ CG variables not included in our meta-analysis (e.g. ownership attributes)	(27)
= Final sample	64

Table 2. Studies included in the meta-analysis

Studies	Country	No of firms	Reporting years	Disclosure proxy	Number of items	Effect size (Pearson's coefficient)			
						BOS	BCOM	CEOD	AC
Halme & Huse (1997)	SC	140	1992	CSED	3	0.140			
Adams & Hossain (1998)	New Zealand	34	1988-1993	TS	189		0.377		
Chen & Jaggi (2000)	Hong Kong	87	1993-1994	TS	30		0.156		
Ho & Wong (2001)	Hong Kong	98	1997	TS	20		0.108		0.210
Haniffa & Cooke (2002)	Malaysia	167	1995	TS	65		0.123	0.047	
Bujaki & Mcconomy (2002)	Canada	269	1997	TS	25		0.223		
Eng & Mak (2003)	Singapore	158	1995	TS	55		-0.157		
Gul & Leung (2004)	Hong Kong	385	1996	TS	43		0.102	-0.141	
Xiao et al. (2004)	China	300	2001	IBD	18		0.150		
Haniffa & Cooke (2005)	Malaysia	139	2002	CSED	41		-0.241		
Arcay & Vazquez (2005)	Spain	91	1999	TS	18	-0.038	0.306	-0.168	0.383
Mangena & Pike (2005)	UK	262	2002	TS	113		0.005		-0.097
Barako et al.(2006)	Kenya	43	1993-2001	TS	47		-0.220	-0.043	0.280
Brammer & Pavelin (2006)	UK	447	2000	CSED	DV		0.093		
Cheng & Courtenay(2006)	Singapore	104	2000	TS	72	0.256	0.278	0.085	
Ghazali & Weetman (2006)	Malaysia	87	2001	CSED	53		-0.137		
Abdelsalem and Street (2007)	UK	115	2006	IBD	11		-0.206	0.119	
Cerbioni & Parbonetti (2007)	SC	54	2002-2004	ICD	132	0.209	0.316	0.139	
Huafang & Jianguo (2007)	China	559	2002	TS	30		0.103	-0.082	
Boesso & Kumur (2007)	Italy	36	2002	TS	42		-0.050		
Boesso & Kumur (2007)	USA	36	2002	TS	42		0.260		
Lim et al. (2007)	Australia	181	2001	CSED	21	0.247	0.204		
Mangena & Tauringana (2007)	Zimbabwe	51	2002	TS	86	0.322	0.413		0.361
Patelli & Prencipe (2007)	Italy	171	2002	TS	74		0.248		
White et al. (2007)	Australia	96	2005	ICD	78		0.238		
Barako & Brown (2008)	Kenya	40	2005	CSED	22		0.272		
Buniamin et al. (2008)	Malaysia	243	2005	CSED	DV	0.148	0.102	-0.050	
Donnelly & Mulcahy (2008)	Ireland	51	2002	TS	50	0.430	0.340		
Ezta & El-masry (2008)	Egypt	50	2006	IBD	11	0.305	0.262	-0.128	
Gandia (2008)	Spain	92	2003	IBD	32	0.481			
Kelton & Yang (2008)	USA	284	2003	IBD	36		0.179	-0.056	
Li et al. (2008)	UK	100	2005	ICD	61		0.340	-0.073	0.511
Lim et al. (2008)	Malaysia	743	2003	CSED	27		0.194	-0.082	
Apostolou & Nanopoulos (2009)	Greece	72	2004	TS	56		0.338		
Baek et al. (2009)	USA	374	2000	TS	99		0.113		
Cormier et al. (2009)	Canada	155	2005	ICD	16	0.194	0.149		0.165
Said et al. (2009)	Malaysia	150	2006	CSED	41	0.232	-0.011	-0.055	0.153
Abeysekera (2010)	Kenya	26	2002-03	ICD	5	0.064	0.218		
Akhtaruddin & Haron (2010)	Malaysia	124	2003	TS	64				0.120
Al-Shammari & Al-Sultan (2010)	Kuwait	170	2007	TS	76		0.043	-0.054	0.155
Chau & Gray (2010)	Hong Kong	273	2002	TS	85		0.207	-0.267	
Fleo (2010)	USA	429	2001	TS	98	0.192	0.174	-0.107	
Khan (2010)	Bangladesh	30	2007-2008	CSED	60		0.550		
Khodadadi et al. (2010)	Iran	106	2001-2005	TS	33		-0.007	-0.034	
Mohamad & Sulong (2010)	Malaysia	40	2003 & 2006	TS	40		0.113	-0.115	0.145
Nor et al. (2010)	Malaysia	93	2005-2006	ICD	DV		-0.023	-0.088	
Prado-Lorenzo & Garcia-Sanchez (2010)	SC	283	2007	CSED	27	0.061	-0.044	-0.163	
Siregar & Bachtiar (2010)	Indonesia	87	2003	CSED	41	0.200			
Adebimpe & Peace (2011)	Nigeria	48	2008	TS	60	0.302	0.051		
Hidalgo et al. (2011)	Mexico	100	2005-2007	ICD	58	0.220	0.070	0.010	0.210
Mert (2011)	Tuerky	173	2009	IBD	60	0.037	0.148		
Rouf (2011)	Bangladesh	120	2008	TS	105	0.339	0.232	0.482	0.468
Samaha & Dahawy (2011)	Egypt	100	2006	TS	80		0.497		0.703
Yap, Saleh & Abessi (2011)	Malaysia	254	2008	IBD	270	0.182	0.161	0.062	0.122
Cormier et al. (2012)	Canada	136	2005	IBD	100	0.340	0.020	-0.110	0.260
Li et al. (2012)	UK	100	2005	ICD	61		0.340		0.216
Michelon & Parbonetti (2012)	SC	114	2003	CSED	178	0.217	0.076	-0.076	
Samaha & Abdallah (2012)	Egypt	99	2011	IBD	DV		0.268	0.292	0.199
Samaha et al. 2012	Egypt	100	2008	IBD	72	-0.128	-0.164	-0.041	
Allegriani & Greco (2013)	Italy	177	2007	TS	60	0.400	0.226	-0.238	0.061
Al-Janadi et al. (2013)	Saudi Arabia	87	2006	TS	21	0.270	0.417	0.275	0.107
Barros et al. (2013)	France	206	2006-2009	TS	112		0.024		0.057
Juini (2013)	Tunisia	22	2004-2009	TS	57	0.021	-0.066	-0.204	
Khan et al. (2013)	Bangladesh	116	2005-2009	CSED	20		0.269	0.003	0.325
Mallin et al. (2013)	USA	135	2005-2007	CSED	121		0.073	-0.071	

Notes: TS: total score; CSED: corporate social and environmental disclosure; ICD: intellectual capital disclosure; IBD: internet-based disclosure. BOS: board size; BCOM: board composition; CEOD: CEO duality; AC: audit committee. DV: Dummy variable: 1 if the firm makes such a disclosure and 0 otherwise; SC: several countries.

Table 3. Board size, board composition and voluntary disclosure

	Sample (N)	Number of studies (K)	Mean correlation \bar{r}	Observed variance S_r^2	Estimated error variance S_e^2	Percentage explained S_e^2 / S_r^2	Z-statistic	95 % confidence interval	χ^2_{K-1}	File-drawer
Board size (A)										
Overall meta-analysis	3945	27	0.193***	0.015	0.006	41.659	8.137	0.146; 0.239	64.810**	33
<i>Moderating factors</i>										
TS	1290	10	0.229***	0.017	0.007	40.076	5.509	0.147; 0.311	12.927**	17
CSED	1198	7	0.162***	0.004	0.004	100.000	6.329	0.112; 0.212	5.817	6
ICD	652	4	0.198***	0.001	0.005	100.000	9.693	0.112; 0.212	1.190	5
IBD	805	6	0.176**	0.034	0.007	20.145	2.318	0.027; 0.365	29.783***	4
Annual reports	3140	21	0.197***	0.010	0.006	60.956	8.956	0.154; 0.240	34.450***	27
Disclosure checklist	3702	26	0.192***	0.015	0.006	42.249	8.152	0.150; 0.245	61.538***	31
Number of directors	3802	25	0.200***	0.014	0.006	42.549	8.403	0.153; 0.247	58.755***	38
Dummy variable	203	2	-0.001	0.002	0.013	100.000	-0.026	-0.068; 0.067	0.344	-
High protection	1729	10	0.224***	0.005	0.005	100.000	10.246	0.267; 0.181	9.217	16
Low protection	1534	13	0.183***	0.027	0.008	27.207	3.878	0.090; 0.276	49.780***	15
High income OCDE	1457	9	0.252***	0.014	0.005	36.948	6.224	0.172; 0.331	24.358***	19
MENA	369	4	0.068	0.032	0.011	39.936	0.753	-0.109; 0.245	12.144***	-
Sub-Saharan African	151	3	0.226***	0.013	0.017	100.000	3.321	0.092; 0.360	2.347	5
East Asia & Pacific	958	6	0.210***	0.002	0.005	100.000	8.617	0.162; 0.258	3.756	9
Board composition (B)										
Overall meta-analysis	12628	61	0.115***	0.022	0.005	21.594	6.096	0.078; 0.152	194.498***	19
<i>Moderating factors</i>										
TS	6728	31	0.100***	0.023	0.005	19.119	3.633	0.046; 0.154	162.146***	5
CSED	3258	13	0.139***	0.021	0.004	18.165	3.465	0.060; 0.218	71.564***	8
ICD	1131	8	0.165***	0.017	0.007	38.964	3.565	0.074; 0.256	20.529***	8
Annual reports	11117	52	0.116***	0.022	0.004	20.364	5.596	0.075; 0.156	206.237***	17
IBD	1511	9	0.108**	0.017	0.006	33.210	2.469	0.022; 0.195	27.099***	2
Disclosure checklist	11651	57	0.125***	0.022	0.005	21.041	6.076	0.081; 0.159	199.604***	24
Dummy variable	977	4	0.046	0.007	0.004	56.496	1.100	-0.036; 0.130	74.341***	-
PID	7404	35	0.137***	0.013	0.004	34.159	7.056	0.099; 0.176	102.459***	21
PIND	1497	9	0.167***	0.017	0.006	33.569	3.870	0.082; 0.252	26.809***	9
PND	3675	17	0.047	0.034	0.004	12.681	1.018	-0.043; 0.137	126.169***	-
High protection	6895	33	0.117***	0.016	0.004	27.698	5.247	0.073; 0.161	119.141***	11
Low protection	5422	27	0.112***	0.026	0.004	18.990	3.561	0.050; 0.164	149.173***	8
High income OCDE	5258	25	0.134***	0.016	0.004	28.255	5.283	0.084; 0.184	88.878***	14
MENA	1341	8	0.059	0.021	0.006	28.075	1.161	-0.041; 0.160	28.494***	-
Sub-Saharan African	581	4	-0.102	0.044	0.007	15.091	-0.974	-0.331; 0.104	26.505***	-
East Asia & Pacific	4911	20	0.125***	0.014	0.003	26.894	4.799	0.076; 0.182	74.346***	9

Notes: TS: total score; CSED: corporate social and environmental disclosure; ICD: intellectual capital disclosure; IBD: internet-based disclosure; (PID): percentage of independent directors; (PIND): percentage of independent non-executive directors; (PND): percentage of non-executive directors; *p < .10; **p < .05; ***p < .01.

Table 4. CEO duality, audit committee and voluntary disclosure

	Sample (N)	Number of studies (K)	Mean correlation \bar{r}	Observed variance S_r^2	Estimated error variance S_e^2	Percentage explained S_e^2 / S_r^2	Z-statistic	95 % confidence interval	χ^2_{K-1}	File-drawer
CEO duality (C)										
Overall meta-analysis	7918	33	-0.053***	0.012	0.004	33.817	-2.796	-0.091; -0.016	97.581***	14
<i>Moderating factors</i>										
TS	3814	15	-0.070*	0.019	0.004	19.906	-1.950	-0.102; 0.000	75.206***	4
CSED	2334	7	-0.064***	0.002	0.003	100.000	-3.441	-0.109; -0.027	5.752	2
ICD	732	4	-0.001	0.006	0.005	83.124	-0.020	-0.080; 0.078	4.812	-
IBD	1038	7	-0.006	0.006	0.007	100.000	-0.023	-0.064; 0.051	6.318	-
Annual reports	6880	26	-0.061***	0.013	0.003	29.308	-2.748	-0.104; -0.017	88.710***	8
Disclosure checklist	7388	30	-0.053***	0.013	0.004	30.823	-2.551	-0.094; -0.012	97.328***	12
Dummy variable	530	3	-0.062***	0.000	0.005	100.000	-5.428	-0.084; -0.039	14.490	1
High protection	3736	14	-0.081***	0.006	0.004	60.702	-3.892	-0.122; -0.040	23.063***	2
Low protection	3640	16	-0.024	0.016	0.004	26.871	-0.762	-0.087; 0.038	59.542***	-
High income OCDE	1698	9	-0.072**	0.010	0.005	51.982	-2.167	-0.138; -0.007	17.343***	2
MENA	1168	7	-0.031	0.011	0.006	52.510	-0.761	-0.109; 0.048	13.330***	-
East Asia & Pacific	3925	13	-0.050	0.005	0.003	21.354	-1.458	-0.117; 0.017	60.878***	-
Audit committee (D)										
Overall meta-analysis	4565	22	0.199***	0.021	0.004	21.358	6.498	0.139; 0.260	103.002***	28
<i>Moderating factors</i>										
TS	2691	13	0.168***	0.026	0.004	17.304	3.741	0.082; 0.256	75.124***	12
CSED	730	2	0.289***	0.005	0.002	47.605	5.894	0.193; 0.385	4.201***	5
ICD	655	4	0.246***	0.013	0.005	41.437	4.318	0.134; 0.293	9.653**	8
IBD	489	3	0.176***	0.003	0.006	100.000	5.091	0.108; 0.243	1.866	3
Annual reports	4076	19	0.202***	0.023	0.004	18.810	5.852	0.134; 0.270	101.005***	25
Disclosure checklist	4466	21	0.199***	0.021	0.004	20.387	6.280	0.137; 0.262	103.004***	27
DV	1865	9	0.293***	0.019	0.004	20.758	6.332	0.202; 0.384	43.356***	21
INDC	1493	7	0.105***	0.005	0.004	96.476	4.039	0.054; 0.156	7.255	2
NAC	1207	6	0.171***	0.017	0.005	27.002	3.195	0.066; 0.277	22.219***	7
High protection	1709	11	0.160***	0.012	0.006	49.372	4.778	0.094; 0.266	22.279***	9
Low protection	2856	11	0.223***	0.024	0.003	14.281	4.750	0.131; 0.315	77.022***	17
High income OCDE	1842	8	0.123***	0.017	0.004	23.651	2.616	0.031; 0.216	33.824***	4
MENA	456	4	0.275**	0.052	0.007	14.354	2.412	0.051; 0.499	27.864***	9
Sub-Saharan African	481	2	0.288***	0.001	0.003	100.000	16.365	0.254; 0.324	0.355	5
East Asia & Pacific	1486	7	0.244***	0.012	0.004	33.739	5.713	0.157; 0.322	20.747***	13

Notes: TS: total score; CSED: corporate social and environmental disclosure; ICD: intellectual capital disclosure; IBD: internet-based disclosure. (DV): 1 if audit committee exists and 0 otherwise; (NAC): number of audit committee members; (INDC): percentage of independent directors in the audit committee. *p < .10; **p < .05; ***p < .01.

Table 5. Summary of meta-analytic findings

Variables	Overall association (H1 –H4)	Disclosure type H5	Annual report vs Website H6	Investor protection H7	Geographic location H8	Checklist vs Dummy H9	Measurement of board proxies H10
Board size	Yes	NO	NO	NO	YES	(1)	(1)
Board composition	Yes	NO	NO	NO	YES	(1)	YES
CEO duality	Yes	YES	YES	YES	YES	NO	N/A
Audit committee	Yes	NO	NO	NO	NO, (1)	NO	NO

Notes: (1) Insufficient studies in one or more sub-groups to test based on a combination of the number of studies (2, 3, or 4) and the file drawer number; N/A non applicable.