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Corporate governance efficiency and internet financial reporting quality
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Corporate governance efficiency and internet financial reporting quality

Corporate
governance
efficiency

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Abstract

Purpose – This paper aims to shed some light on the role of boards of directors in improving internet financial reporting (IFR) quality.

Design/methodology/approach – The empirical study uses a data envelopment analysis (DEA) approach on a sample of 32 French firms belonging to the CAC40 index as of December 2007.

Findings – The empirical results show that 28 percent of the sample firms are located on the efficiency frontier for all IFR components. These firms' boards of directors and their committees seem to act as effective monitors of top executives, which improves the quality of the firm's disclosure policy through, *inter alia*, an increase in the level of IFR. Under efficient board control, firms develop user-friendly and readily accessible web sites disclosing the information required by various stakeholders. Additional empirical results show that 46.9 percent of the sample firms lie outside the efficiency frontier for all IFR measures, suggesting inefficiencies in the composition, structure, and/or functioning of their boards of directors. The inefficient monitoring and oversight of top executives by the board allowed for lower levels of IFR quality for nearly half of the CAC40 firms in 2007.

Research limitations/implications – The study uses only CAC40 companies, which are relatively large and financially healthier than the average French firms, exhibiting diffuse ownership structures, with heavy foreign shareholding, and investing more in communications. This may limit the generalizability of the results to other French listed firms.

Originality/value – The paper extends the literature on corporate governance and voluntary corporate disclosure by investigating the association between board characteristics and IFR quality. It examines the relative performance of the board directors in improving IFR policy.

Keywords Financial reporting, Audit committees, Corporate governance, Data envelopment analysis, Board of directors

Paper type Research paper



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1. Introduction

Prior research in finance has emphasized the role of disclosure quality in mitigating information asymmetry between firm insiders and outsiders (Lang and Lundholm, 1996; Chang and Sun, 2010; Iatridis and Alexakis, 2012). This issue is now particularly pressing as investors' need for information about their companies becomes paramount, especially with increasing use of the internet. Taking advantage of recent advances in information technology, companies worldwide are increasingly using the internet to disclose a wide range of reports and documents about their activities. Marston and Polei (2004) report that the amount of information disseminated on the web sites of German firms grew remarkably, with much improved formatting, from 2000 to 2003. The importance of this issue has made regulatory authorities more willing to specifically recommend web-based disclosure among best practices for compliance with good corporate governance. In France, recommendations on corporate governance diffused by the AFG[1] in 2004 and updated in 2008 suggest that companies should use their web sites to facilitate shareholder access to documents and information such as that related to general meetings. Indeed, web disclosure can provide all interested parties with easy, low-cost access to the information necessary for making proper decisions (Beattie and Pratt, 2003).

Academic research in this area emphasizes the merits of the internet as a channel for financial disclosure. Healy and Palepu (2001) document that the adoption of internet financial reporting (IFR) practices can help mitigate the information asymmetry problem between insiders and outsiders. In this spirit, Hodge *et al.* (2004) show that financial disclosure transparency is a major determinant of investor decisions. In support of this view, Ettredge *et al.* (2002) and Debreceeny *et al.* (2002) argue that managers may choose to voluntarily disseminate financial information on corporate web sites with the intention of signaling to outsiders the qualities and specificities of their firms. Debreceeny and Rahman (2010) show that a higher frequency of web-based disclosure leads to market efficiency. Jones and Xiao (2003) argue that the process for disseminating financial information has been dramatically improved by taking advantage of the unique and user-friendly features of the internet.

Despite the beneficial aspects of web disclosure, information included in the IFR remains at the discretion of managers, as the ultimate responsible parties for their firms' disclosure policies (Kelton and Yang, 2008). This makes IFR practices largely voluntary and unregulated, raising concerns about their quality and reliability for outsiders. For instance, when deciding on what information should be disclosed on the web, managers may intentionally hide information deemed to reveal private rent seeking activities. Moreover, IFR may encompass information – other than financial statements – that is not audited by professional auditors (Uyar, 2012).

In sum, IFR seems to increase the level of firm transparency but is also likely to be subject to greater managerial discretion over voluntary disclosure. Accordingly, corporate governance mechanisms may be important in explaining the differences in IFR levels between firms. The current research studies the relationship between corporate governance and IFR quality using a sample of French firms belonging to the CAC40 index. This topic is all the more relevant since these firms have been shown to suffer from a lack of transparency in their financial reporting (Fitch Ratings, 2004).

Boards of directors have a central role as an internal governance mechanism. They are charged, among others, with the responsibility of ensuring a high-quality corporate disclosure policy (Jensen, 1993). They have a duty to fully and fairly disclose all

material events that may have an important impact on firm value. The objective of the present study is to examine IFR practices in light of the efficiency of boards of directors, as well as of audit and compensation committees. To do so, we gauge the diligence of the governing bodies (board of directors, audit and compensation committees) by the independence of their members, as well as the number and attendance rate at their meetings during the fiscal year. The board's size is also included in assessing its effectiveness.

To examine the role of the board of directors in shaping the extent of IFR, the present research uses an original approach based on a data envelopment analysis (DEA) methodology. The study sample consists of 32 non-financial French listed companies belonging to the CAC40 index as of December 2007. Our findings indicate that French firms have a medium level of IFR, implying that they are moderately incited to communicate complete and accurate financial information on the internet. As such, we show that only 28 percent (nine firms) of our sample firms are located on the efficiency frontier for all IFR components, that is, suggesting that they are fully efficient. Boards of directors as well as audit and compensation committees in these firms seem to effectively monitor their web disclosure policy, which results in the development of more easily accessible web sites that disclose much information required by various stakeholders. However, 15 firms (46.9 percent) lie outside the efficiency frontier, yielding an efficiency score of less than one for all IFR components. This result suggests that the governing bodies in these firms suffer from inefficiencies in terms of composition or functioning since they do not seem to monitor effectively enough to enhance the IFR level. This result is consistent with the conclusions of Fitch Ratings (2004), where listed firms can do more to improve their disclosure policies through, *inter alia*, web disclosure.

This paper supports related studies (Xiao *et al.*, 2004; Marston and Polei, 2004), suggesting that the information content of corporate web sites is more relevant to investors than the presentation format. Notably, we find evidence that firms located on the efficiency frontier for web site content information but not presentation quality are on the efficiency frontier for the overall IFR measure. However, firms on the efficiency frontier for their web site presentation format but not the information content level are inefficient in terms of overall IFR.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature and discusses the effect of corporate governance on voluntary disclosure. Section 3 explains the DEA methodology. Section 4 presents the data and variable construction. Section 5 presents the results of the empirical analyses. Section 6 discusses the results and concludes the paper.

2. Literature review

2.1 *The board of directors and IFR quality*

Agency costs arise from the divergence of interests between managers and shareholders induced by the separation of ownership from control (Jensen and Meckling, 1976). This separation can also result in information asymmetry since managers have access to private information about the firm's future prospects and may know better than others what the firm's true value is. Managers are able to mitigate these agency problems and show to shareholders that they will not act in a manner detrimental to them by voluntarily undertaking various actions, such as corporate disclosure and submission to monitoring (Xiao *et al.*, 2004).

Jensen (1993) argues that the quality of board monitoring can alter managerial incentives toward firm disclosure. Indeed, active and effective board oversight and monitoring of management reduces the likelihood of managers withholding information, thus improving disclosure policy.

Corporate disclosure on the internet has recently attracted growing academic interest. Kelton and Yang (2008) argue that the internet is a unique disclosure tool that provides immediate, inexpensive, and ubiquitously accessible information with flexible forms of design and various presentation capabilities. The authors also contend that the majority of IFR practices are voluntary and mainly unregulated. Hence, IFR as a voluntary disclosure practice in itself is likely to depend on the quality of board monitoring. The characteristics of the board are often used to capture the extent to which directors are effective as monitors. We therefore use these characteristics to examine whether boards of directors are effective in improving the extent of IFR.

Conventional wisdom suggests that independent boards are effective in reducing managerial opportunism, inducing less important agency problems. In this regard, Weisbach (1988), among others, explains that independent directors can incur reputation costs when they are not accountable to shareholders, which gives them incentive to monitor managerial behavior more carefully and to ensure high-quality disclosure. In this vein, numerous studies (Chen *et al.*, 2008) find strong evidence that the presence of independent directors positively affects the extent of firm voluntary disclosure. In support of this view, Koh *et al.* (2007) advance that better monitoring by more independent boards contributes to enhancing the value of financial reporting. Srinivasan (2005) provides evidence consistent with the view that the failure of a firm's financial reporting policy can harm its board's reputation. Accordingly, independent directors have strong incentives to lessen agency problems and reduce the information asymmetry between management and shareholders by providing greater voluntary disclosure. Similar findings are reported for IFR. Specifically, Kelton and Yang (2008), among others, report a positive association between board independence and a firm's propensity to use internet-based disclosure. The authors suggest that independent directors play an effective role in improving corporate transparency, especially through internet reporting.

The corporate governance literature documents that board size captures the quality of board monitoring. Smaller boards are considered conducive to more effective managerial oversight since smaller groups are associated with lower coordination costs, better exchange of ideas, and less free riding among members (Jensen, 1993; Lipton and Lorsch, 1992). As such, directors serving on small boards have fewer communication difficulties, allowing them to better coordinate their efforts in limiting managerial opportunistic behavior. In this spirit, Jensen (1993) advocates that the efforts of independent directors sitting on large boards are diluted by the presence of multiple inside members, which limits their ability to contribute effectively in monitoring tasks. Moreover, Lipton and Lorsch (1992) argue that agency problems can arise in large boardrooms where directors are less likely to function effectively, which weakens their monitoring role. Empirical evidence on the superiority of small boards is provided by Vafeas (2000), among many others.

Bushman *et al.* (2004) argue that small boards are more likely to provide better quality information to outside investors. The directors of these boards are arguably more concerned about their responsibilities to ensure effective monitoring to guarantee

high-quality corporate disclosure. Vafeas (2000) documents that board size is negatively associated with earnings informativeness, supporting the view that large boards increase the probability of low-quality information disclosure due to potential conflicts between multiple directors. To the extent that small boards are more likely to enhance monitoring, they are then expected to be associated with better disclosure decisions.

In addition to board attributes, the internal functioning of boards of directors may matter in the quality of monitoring activities exerted by its members[2]. Studies such as Vafeas (1999) and Lipton and Lorsch (1992) suggest that the annual number of board meetings provides a metric for the intensity of board activity. Consistent with this view, Shivdasani and Zenner (2004) contend that the frequency of board meetings should meet the company's needs in terms of tightly monitoring managers' actions. Vafeas (1999) highlights that the number of board meetings increases following a period of poor performance, resulting in subsequent performance improvements. Brick and Chidambaran (2010) consistently find that the frequency of board meetings positively affects corporate performance as well as firm value. In light of these arguments, managers are less likely to retain information when the number of board meetings is relatively high since they are under pressure to better fulfill their disclosure obligations.

Board meetings are effective when attended by all directors to voice their opinions on discussed matters. Cai *et al.* (2009) argue that maintaining an excellent attendance record at board meetings allows the board to better fulfill its fiduciary duties and responsibilities in the best interests of all shareholders. Indeed, directors may benefit from their frequent involvement in board activities to obtain detailed information about the firm's management. Thus, a high attendance rate at board meetings is a potentially important vehicle for monitoring managers and, in particular, ensuring adequate information dissemination (Chou *et al.*, 2010). Interestingly, Sarkar *et al.* (2008) find that more diligent boards, in terms of directors' meeting attendance, reduce the extent of earnings management and thereby increase information quality. In sum, higher board meeting attendance seems to provide directors the possibility to limit managerial opportunism, notably by ensuring high-quality disclosure. To the extent that the meeting attendance rate reflects board diligence, we expect that better directors' attendance at board meetings allows more effective monitoring of managers' behaviors, notably those involving disclosure decisions. Based on these arguments, we propose to discuss the effect of board size, board independence, and board meeting frequency and attendance on the IFR levels.

2.2 Specialized committees and IFR quality

2.2.1 Audit committee characteristics and IFR quality. The availability of financial audit services in a firm largely influences the quality of corporate financial reporting (Healy and Palepu, 2001). Most notably, audit committees are charged with oversight of the financial reporting process in a manner that reduces earnings manipulation and warrants high-quality information for investors (Klein, 1998). As such, agency problems between managers and shareholders are expected to be lower in firms with audit committees (Davidson *et al.*, 1998). In this vein, Klein (2002b) shows that firms are unlikely to engage in earnings management when they have an audit committee.

The independence of this committee is considered the cornerstone of its effectiveness. The Blue Ribbon Committee (1999) consistently claims that

independence is the most important attribute of an audit committee that improves the effectiveness of other attributes. The extant literature documents that high independence of audit committees improves management monitoring and enhances the quality of financial reporting. In this respect, Klein (2002b) and Bedrad *et al.* (2004) show that more independent audit committees bring about less aggressive earnings management practices. Moreover, Lee *et al.* (2004) find that the independence of audit committees is negatively associated with auditor resignations, while Abbott *et al.* (2004) show that such independence reduces the occurrence of restatements. In sum, the independence of the members of the audit committees appears to reduce managerial discretion over financial reports. We thus expect the quality of IFR to be better in firms with more independent audit committees.

Several studies in this research area focus on determining the optimal level of audit committee independence. Bronson *et al.* (2009), Klein (2002a) and Bedrad *et al.* (2004) verify whether a totally independent audit committee is necessary to acquire the monitoring benefits of auditor independence. Klein (2002a) and Bedrad *et al.* (2004) examine the relation between audit committee independence and earnings management. Both studies suggest a negative relationship between audit committee independence and abnormal accruals; however, they disagree on the independence threshold at which these relations appear. Klein (2002a) finds that firms with more independent auditors have significantly smaller abnormal accruals. In contrast, Bedrad *et al.* (2004) documents a negative relation between completely independent audit committees and abnormal accruals. Bronson *et al.* (2009) demonstrate that the benefits of independent directors are consistently achieved only when the audit committee is completely independent[3].

Effective audit committees are self-aware and able to determine the frequency of their meetings and how best to carry out their main tasks. Beasley *et al.* (2000) find that more frequent meetings of the audit committee reduce the likelihood of fraudulent financial reports. Abbott *et al.* (2004) show that firms whose audit committees meet at least four times per year are less likely to have restated audited financial statements. Bronson *et al.* (2006) use the number of meetings to capture audit committee diligence. The authors find a positive association between the frequency of audit committee meetings and voluntary disclosure of internal control in management reports. Kelton and Yang (2008) focus on disclosure via the internet and find that the quality of IFR improves with the number of meetings held annually by the audit committee. The authors suggest, hence, that firms with more diligent audit committees are more likely to disclose more information on their web sites. Similarly, Cormier *et al.* (2010) reveal that the effectiveness of audit committees, as indicated by the frequency of their meetings, is positively related to web-based voluntary disclosure. Based on this line of reasoning, we propose to discuss the effect of the characteristics of the audit committee (i.e. size, independence, meeting frequency and attendance rates) on the IFR levels.

2.2.2 Compensation committee characteristics and IFR quality. Agency theory suggests that executive compensation is an important corporate governance mechanism that aligns the financial interests of the CEO with those of shareholders, thus improving firm value (Jensen and Meckling, 1976). Extant empirical evidence is generally consistent with this argument. The design of the executive compensation program is shown to be associated with firm valuation (Core *et al.*, 1999). For instance, Nagar *et al.* (2003) show that executive compensation plans based on stock options or related to

corporate market value reduce the severity of agency problems and encourage managers to improve their disclosure quality. Lakhali (2005) provides consistent evidence that firms that reward their managers with stock options have better levels of disclosure.

A compensation committee is charged with the responsibility to assist the board in developing and implementing appropriate compensation policies and programs that allow the firm to attract and retain capable and experienced managers and motivate them to meet shareholder expectations in both the short and long run [4]. The committee is required to report on a yearly basis to firm shareholders on behalf of the board of directors. This report should fully depict the managerial remuneration policy and detail the compensation package, including the pension entitlements of each individual director, which contributes to mitigating the information asymmetry problem (Lo, 2003). Besides, the key role of compensation committees in fixing executive compensation packages reduces managerial incentives to extract private benefits at the expense of shareholders (Sun *et al.*, 2009). As a result, a number of constituents, such as financial analysts and governance rating agencies (e.g. Standard & Poor's, Institutional Shareholders Services, and GMI), are now placing a particular emphasis on compensation committees as a governance mechanism to assess firm efficiency.

The empirical literature addressing the effectiveness of compensation committees in limiting managerial discretion is relatively scant and mainly focuses on the composition of these structures. Newman and Mozes (1999) find that management pay-performance sensitivity is more advantageous to executives when compensation committees include inside members. Newman (2000) shows that the presence of insiders on the compensation committee is positively related to CEO stock ownership and negatively tied to the shareholding of non-executive employees. This suggests that less independent compensation committees exacerbate agency problems. In support of this view, Bannister and Newman (2002) report that insiders on compensation committees induce lower disclosure on returns, as well as more biased benchmark return choices. Lakshmana (2008) argues that compensation committees should devote the necessary time and human resources for adequate disclosure decisions. Using a sample of Standard & Poor's 500 firms, Lakshmana shows that more independent compensation committees are more likely to make decisions that support greater disclosure. In addition, the author documents that more diligent compensation committees facilitate information sharing among directors and ensure better monitoring, leading to higher levels of voluntary disclosure on the compensation policy. Chandar *et al.* (2012) show that the financial reporting quality is higher when members of the audit committee are also on the compensation committee.

The above arguments suggest that a better disclosure policy is partly driven by diligent and effective compensation committees. In light of these arguments, we discuss the effect of the characteristics of the compensation committee on the IFR levels.

3. The DEA methodology

The DEA methodology originates from the breakthrough paper of Charnes *et al.* (1978). It is a commonly used non-parametric method that estimates Pareto-optimal frontiers to evaluate the efficiency of decision making units (DMUs). In this approach, each firm consists of a unique DMU. As a performance analysis tool, the DEA methodology has been extensively used to provide guidelines for decision makers and to correct inefficient management choices. Generally speaking, it promotes positive effects from competition.

Moreover, it permits managers to assess firm performance indicated by productivity and scale, detect benchmarks among peer firms, and identify target inputs and outputs. As a result, the DEA technique provides managers with useful information about which slack resources are available and whether there is a low production of desirable outputs.

As a non-parametric technique, the DEA has some interesting features. It has the advantage of requiring only very few assumptions, no statistical distribution of deviations from the efficiency frontier, and no a priori specification for the functional form of the cost or production frontier (i.e. how inputs are transformed into outputs) (Botti *et al.*, 2009). Another consequence of being a non-parametric technique is the absence of sample constraints; however, it is recommended that the number of DMUs included in the sample exceed two times the sum of inputs and outputs (Nooreha *et al.*, 2000). The DEA focuses on individual observed data, allows one to draw conclusions based on efficiency comparisons with peers, and gives indications on needed policy changes (Charnes *et al.*, 1994). Previous studies have also shown that DEA estimation has good asymptotic statistical properties (Banker, 1993) and better accuracy than econometric approaches in estimating efficiency in the presence of heteroskedasticity (Banker *et al.*, 2004). So far, a voluminous amount of research has spawned a large number of theoretical extensions and hundreds of empirical applications of DEA in various fields, including economics and finance (Feroz *et al.*, 2008).

Despite being based on a rigorous mathematical programming method, the underlying rationale to the DEA procedure can be explained using a simple literal and graphical presentation (Botti *et al.*, 2009). The method distinguishes inefficient DMUs from efficient ones based simply on whether or not they lie on the efficient frontier of the possibility set. This set is composed of all feasible input-output combinations with a production technology that transforms a vector of N inputs $x = (x_1, \dots, x_N) \in \mathfrak{R}_+^N$ into a vector of P outputs $y = (y_1, \dots, y_P) \in \mathfrak{R}_+^P$. This possibility set can be simply written as:

$$T = \left\{ (x, y) \in \mathfrak{R}_+^{N+P} : x \in \mathfrak{R}_+^N \text{ can produce } y \in \mathfrak{R}_+^P \right\}$$

In Figure 1, input x and output y are measured along the horizontal axis and up the vertical axis, respectively. Points I, J, and K represent the input-output bundles of the DMUs (I), (J), and (K).

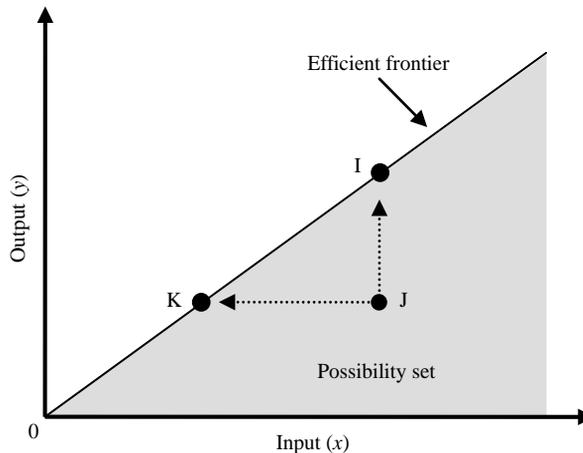


Figure 1.
The possibility set T
and the efficient frontier

and (K), respectively. The DMU (I) is considered to be efficient (efficiency score is equal to one) because the used input quantity cannot be decreased proportionally to produce the same quantity of output. The DMU (J), however, is considered to be inefficient because:

- the output quantity produced can be expanded proportionally until reaching that of DMU (I); or
- the used input quantity can be reduced proportionally until reaching that of DMU (K).

Then, with access to the same technology, any of the DMUs may or may not be on the frontier of this technology. The distance of a particular DMU from the efficiency frontier can depend on various factors that may be endogenous to the DMU, such as corporate governance characteristics.

Inefficient DMUs are those for which it is possible to minimize the use of inputs, given the same level of outputs, or to maximize the outputs while keeping the same level of inputs. Efficient firms are those that succeed in using minimum inputs to produce maximum outputs. Accordingly, our paper analyzes efficiency using an output-oriented projection model, i.e. producing as large as possible outputs from a given set of inputs. The DEA solves the following linear programming problem for each firm:

$$\max \theta$$

subject to:

$$\sum_{i=1}^m \lambda_i x_n^j \leq x_n^j, \quad n = 1, \dots, N \quad \theta y_p^j \leq \sum_{i=1}^m \lambda_i y_p^j, \quad p = 1, \dots, P \quad \lambda_i \geq 0, \\ i = 1, \dots, m$$

where λ represents the intensity of each production unit, m is the number of firms in the sample, N is the number of inputs used by the analyzed firm, and P is the number of produced outputs.

Recently, the use of the DEA technique was substantially developed to examine firm performance in many management fields. Its use in corporate finance and accounting is still limited, compared to other research fields. This study uses DEA to check the efficiency of boards of directors and specialized committees. The DEA technique produces efficiency frontier estimates for a firm by comparing it to its peers. Fully efficient firms are those operating on the “best practice” frontier. The efficiency scores obtained from the DEA technique for a given firm are relative since they are determined in comparison with those of their best-performing peers.

4. Data and variable construction

4.1 Sample selection and data sources

Our starting point for the data is all the French CAC40 firms as of December 2007. After excluding financial firms (SIC codes between 6000 and 6999) because they are subject to specific disclosure requirements, the final sample consists of 32 companies. All these companies have web sites. The choice of CAC40 firms was made for three reasons. First, in conformity with extant studies, large listed firms with a wide shareholding base are more likely to adopt an IFR policy. Any failure to do so by these firms is more likely

the result of a deliberate choice than a problem of financial resources. Second, CAC40 firms are more likely than others to disclose detailed information of the characteristics of their boards of directors, audit committees, and compensation committees. Third, compensation committees are legion among CAC40 firms, which is not the case for other French listed firms.

Corporate governance data were hand-collected from annual reports available on the AMF web site[5]. Annual reports provided details on the characteristics of various governing bodies. Firm web sites were visited during December 2007 and analyzed using an offline browser[6]. Our DEA models can be presented as shown in Figure 2, where the ten inputs enter DMUs to provide one output.

4.2 Outputs

We construct an additive and unweighted internet disclosure index compiled of 71 items to gauge the extent of voluntary disclosure by our sample firms. The disclosure checklist originates from early work by Marston and Polei (2004), Ettredge *et al.* (2002) Debreceeny *et al.* (2002), Deller *et al.* (1999) and Pirchegger and Wagenhofer (1999). According to the Financial Accounting Standards Board, IFR should be described in terms of content and presentation. Prior research consistently indicates that both the content and presentation format of internet disclosures are important in improving disclosure quality. We therefore use three disclosure indexes as measures of IFR quality: the IFR score is the total score, including all 71 collected items. According to Debreceeny *et al.* (2002), we divide this score into an internet content (INC) score and an internet presentation (INP) score.

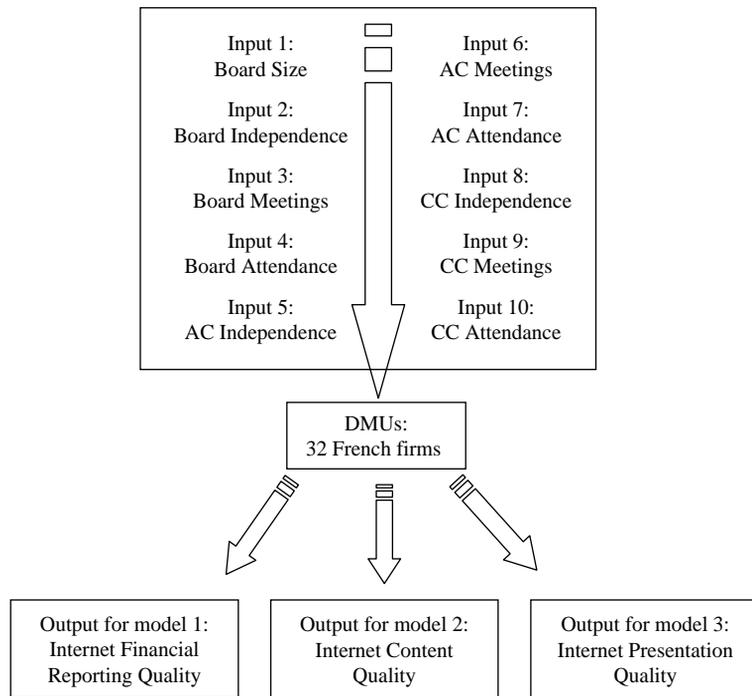


Figure 2.
Three DEA models

The INC score (48 items) deals with what firms disclose on their web sites, which falls into three different categories, namely:

- (1) financial information (27 items);
- (2) corporate governance information (13 items); and
- (3) corporate and social responsibility (eight items).

The presentation format items assess the use of a variety of web technologies and advantages unique to the internet to provide additional value to the online disclosed information (Ettredge *et al.*, 2002). The INP score is composed of 23 items. It includes, *inter alia*, use of a text-only format, internal search option, sitemap, "Help" section, hyperlink to investor relations service, and the use of various file formats. These items fall into two categories:

- (1) technology (seven items); and
- (2) convenience and timeliness (16 items).

The disclosure index score is computed for all CAC40 firms by assigning a point to any of the 71 items if it does exist on the firm's web site. Each item composing the disclosure index takes a value of 1 when it is available, and 0 otherwise. In some situations, a given item can be disclosed more than once on a firm's web site. In this case we assign only one point to this item to avoid situations of duplicate counting (Cooke, 1989). We assume that all items have the same importance. Therefore, the total score is computed as an equally weighted sum of the scores of each item.

The content score distinguishes between current and past years' information since web disclosure should provide investors with both timely and historical information to better gauge firm performance. In contrast to other communication channels, the internet provides specific information to investors in a timely fashion, with access to recent news, press coverage, and upcoming financial releases. Investors can also subscribe to a company mailing list to be informed of news items, recent events, and major updates of shareholder interest. In addition, internet technology offers many ways for firms to inform shareholders at little additional cost, including providing financial data in processable formats, frequently asked questions, an online investor information order service, and audio and video files. An internet search engine allows investors to search within the firm web site for pages containing particular information.

Table I presents the checklist of items used to construct the internet disclosure measures. The definitions of inputs and outputs are given in Table II.

4.3 Inputs

The current research uses a DEA approach to examine the association between the characteristics of the governing bodies and the extent of IFR for a sample of CAC40 firms as of December 2007. We consider ten inputs that proxy for the structure and functioning of these bodies, namely, board size as well as the independence, meeting frequency, and attendance rate of the board of directors and audit and compensation committees. The existing literature shows that these inputs affect the efficiency of the monitoring system and hence CEO behavior.

Table II reports the definitions of the variables used in our empirical analysis.

I – items of content (48 items)

A – financial information (27 items)

A-1 – quarterly report of past years	F
A-2 – quarterly report of current year	E-F
A-3 – half-year report of past years	F
A-4 – half-year report of current year	A-B-D-F
A-5 – annual report of past years	D-F
A-6 – annual report of current year	C-D-E-F
A-7 – auditor report of past years	B-F
A-8 – auditor report of current year	B-C-D-E-F
A-9 – analysts list	
A-10 – balance sheet of past years	B-F
A-11 – balance sheet of current year	A-B-C-D-E-F
A-12 – turnover of past years	
A-13 – turnover of current year	
A-14 – evolution of turnover	
A-15 – cash flow statement of past years	B-F
A-16 – cash flow statement of current year	A-B-C-D-E-F
A-17 – dividend payout ratio of current year	
A-18 – dividend payout ratio of past years	
A-19 – summary of key ratios over at least three years	A-B-C-D-E-F
A-20 – historical share prices	D-E-F
A-21 – current share price	A-B-C-D-E-F
A-22 – stock price performance in relation to stock market index	D-F
A-23 – sales of key products	F
A-24 – market share of key products	F
A-25 – earnings or sales forecast	C-F
A-26 – summary of financial data of previous years	C-D-F
A-27 – press releases or news	A-B-C-D-E-F

B – corporate governance information (13 items)

B-1 – organizational structure/chart	F
B-2 – shareholder structure	D-F
B-3 – composition of the board of directors	
B-4 – CV of the members of the management or the board of directors	D
B-5 – sideline activities of the board directors	D
B-6 – compensation of the board directors	D
B-7 – information about share option programs	D
B-8 – information about the directors dealing	D
B-9 – compensation of the management board	D
B-10 – information on the audit committee	
B-11 – information on the compensation committee	
B-12 – past year resolution of the shareholders' meeting	F
B-13 – current year resolution of the shareholders' meeting	F

C – corporate social responsibility information (eight items)

C-1 – corporate responsibility report	D
C-2 – environmental protection report	D
C-3 – recycling and energy policy	
C-4 – charitable donation or sponsoring	D
C-5 – social/safety or health report	D
C-6 – employees' training report	

Table I.
Disclosure checklist
of items

(continued)

	Overlap with existing studies
C-7 – discussion of the products quality	
C-8 – code of ethics	D
II – items of presentation (23 items)	
<i>A – technology (seven items)</i>	
A-1 – text only alternative available	C-D-F
A-2 – financial data in processable format (such as excel)	A-D-F
A-3 – annual report in PDF format	A-C-D-F
A-4 – annual report in HTML format	D-F
A-5 – graphics images	C-D-F
A-6 – sound files	D-F
A-7 – video files	B-D-F
<i>B – convenience and timeliness (16 items)</i>	
B-1 – one click to get to investor relations information	B-D-F
B-2 – one click to get to press releases (or news) web page	B-D-F
B-3 – online investor information order service	A-B-D-F
B-4 – mailing list	A-B-D-F
B-5 – postal address to investor relations	B-D-F
B-6 – e-mail to investor relations	A-B-C-D-F
B-7 – phone number to investor relations	D-F
B-8 – direct e-mail hyperlink to investor relations service	B-C-D-F
B-9 – internal search engine	A-B-C-D-F
B-10 – sitemap/table of content	B-C-D-F
B-11 – contact to the webmaster	F
B-12 – “help” information	C-D-F
B-13 – display and announcements	
B-14 – English version of the web site	B-D-F
B-15 – frequently asked questions (FAQ)	A-D-E-F
B-16 – financial calendar	A-D-E-F

Notes: This table presents the checklist of items used to develop the internet disclosure index; it also shows which items overlap those in existing studies; A – Deller *et al.* (1999), B – Pirchegger and Wagenhofer (1999), C – Debreceny *et al.* (2002), D – Marston and Polei (2004), E – Ettredge *et al.* (2002) and F – Xiao *et al.* (2004)

Table I.

5. Results

5.1 Descriptive statistics

Table III provides descriptive statistics for all the variables used in the analysis. Panel A shows the statistics of the output variables. The total internet-based reporting score (IFR) ranges from 37.5 to 72.2 percent, with a mean (median) value of 53.7 percent (52.8 percent), which indicates that corporate disclosure on the web varies dramatically across CAC40 firms. The web sites of these firms serve not only commercial purposes but also as a mean of communication with investors. Indeed, CAC40 firms disclose at least one-third of the content items. The mean (median) score for content is 51.4 percent (52.1 percent). It can also be observed that, on average, the score for information presentation (58.1 percent) is higher than that for content (51.4 percent). The highest presentation score is 85.3 percent and the lowest 33.3 percent, indicating great variation in the quality of the web site of CAC40 firms.

Panel B of Table III gives the descriptive statistics of the input variables. The boards of CAC40 firms have, on average, 13.78 members, among which 57.7 percent are independent. These boards meet, on average, 7.78 times a year and have an average

Variables	Abbreviation	Description
<i>Outputs</i>		
Internet financial reporting quality	IFR	The total disclosure score is measured as the percentage of the actual score awarded to the maximum possible score
Internet content quality	INC	Total score for content items to the maximum possible score
Internet presentation quality	INP	The score for presentation to the maximum possible score
<i>Inputs</i>		
Board size	BoardSize	The total number of directors on the board
Board independence	BoardIndependence	The ratio of independent to total number of directors on the board
Board meeting frequency	BoardMeetings	The number of board meetings
Board diligence	BoardAttendance	The average attendance rate of board directors at board meetings
Audit committee independence	ACIndependence	The ratio of independent to total number of directors on the audit committee
Audit committee meeting frequency	ACMeetings	The number of audit committee meetings
Audit committee diligence	ACAttendance	The average attendance rate of directors at audit committee meetings
Compensation committee independence	CCIndependence	The ratio of independent to total number of directors on the compensation
Compensation committee meetings	CCMeetings	The number of compensation committee meetings
Compensation committee diligence	CCAttendance	The average attendance rate of directors at compensation committee meetings

Table II.
Summary of variable definitions

Note: This table presents the abbreviation and the description of output and input variables

	Min.	First quartile	Mean	Median	Third quartile	Max.	SD
<i>Panel A: outputs</i>							
IFR	0.375	0.472	0.537	0.528	0.597	0.722	0.082
INC	0.333	0.417	0.514	0.521	0.583	0.708	0.098
INP	0.333	0.500	0.581	0.687	0.750	0.853	0.119
<i>Panel B: inputs</i>							
BoardSize	7	11	13.780	14	16.500	21	3.434
BoardIndependence	0.286	0.429	0.577	0.547	0.714	1	0.183
BoardMeetings	4	6	7.781	7	10	12	2.562
BoardAttendance	0.750	0.809	0.868	0.870	0.923	0.980	0.065
ACIndependence	0.400	0.667	0.807	0.800	1	1	0.208
ACMeetings	3	4	5.063	4.500	6	11	1.950
ACAttendance	0.500	0.835	0.906	0.960	1	1	0.123
CCIndependence	0	0.550	0.685	0.708	1	1	0.301
CCMeetings	0	3	3.938	3.500	5.500	10	2.154
CCAttendance	0	0.815	0.862	0.975	1	1	0.256

Table III.
Descriptive statistics

Note: This table summarizes the descriptive statistics of variables used in the analysis

attendance rate of 86.8 percent. On average, audit committees are more independent (80.7 percent versus 68.5 percent, respectively) and meet more frequently than compensation committees (5.06 versus 3.93 times a year, respectively). The average meeting attendance rate is 90.6 percent for audit committees and 86.2 percent for compensation committees. The results show that CAC40 firms are not homogeneous with regard to their governing bodies. For instance, some firms have fully independent compensation committees that meet many times a year, whereas others have completely dependent committees that meet only occasionally (or never).

5.2 DEA application results

The current paper aims to shed some light on the role of the board of directors and its committees in improving IFR. Table IV shows the efficiency scores and the ranking of

DMU	Content		Presentation format		IFR	
	INC efficiency score	INC rank	INP efficiency score	INP rank	IFR efficiency score	IFR rank
2	1	1	1	1	1	1
4	1	1	1	1	1	1
10	1	1	1	1	1	1
12	1	1	1	1	1	1
15	1	1	1	1	1	1
17	1	1	1	1	1	1
20	1	1	1	1	1	1
21	1	1	1	1	1	1
26	1	1	1	1	1	1
11	1	1	0.9888	14	1	1
1	1	1	0.9203	16	1	1
6	1	1	0.8880	17	1	1
32	1	1	0.9236	15	0.9859	13
16	0.7176	28	1	1	0.9706	14
3	0.8508	15	1	1	0.9585	15
22	0.7278	27	1	1	0.8937	16
27	0.7507	24	1	1	0.8423	17
18	0.8017	19	0.8177	19	0.8405	18
23	0.8329	17	0.6986	25	0.8228	19
25	0.8716	14	0.6499	29	0.8045	20
28	0.7731	23	0.8268	18	0.8003	21
31	0.8467	16	0.6870	26	0.7956	22
29	0.8280	18	0.7107	24	0.7888	23
13	0.7751	22	0.6513	28	0.7826	24
30	0.7375	26	0.7749	21	0.7768	25
7	0.7862	21	0.7137	23	0.7616	26
24	0.6819	29	0.8028	20	0.7599	27
14	0.7503	25	0.6823	27	0.7532	28
19	0.7863	20	0.5975	30	0.7340	29
5	0.6433	30	0.5077	31	0.7184	30
9	0.6113	32	0.7174	22	0.6533	31
8	0.6195	31	0.4787	32	0.5746	32

Note: This table presents the efficiency scores and the ranking of our sample firms for web site content, presentation format and IFR, respectively

Table IV.
Efficiency scores

sample firms (named DMUs) for the IFR level and INC and INP scores. These efficiency scores were obtained by solving the optimization program presented in Section 3.

The IFR efficiency score equals one for 12 DMUs (37.5 percent), which means that these DMUs are located on the efficiency frontier. Roughly two-fifths of the DMUs (13) are efficient when we consider the INC or INP efficiency scores. Companies that are efficient in one score are not the same as those efficient in the other score. Moreover, nine of the 12 DMUs (DMUs 2, 10, 15, and 26) are efficient for all the internet disclosure measures, suggesting that only 28.12 percent of CAC40 firms are completely efficient in 2007. The boards and their committees in these firms seem to effectively monitor management behaviors, including disclosure decisions. Under such control, the management team has strong incentives to improve IFR and provide web sites that are easily accessible, useful, and user-friendly.

Observing DMUs 1, 6, and 11, we document that efficiency scores equal one for the INC and IFR levels, but are different from one for the INP score. This result suggests that these three companies are located on the efficiency frontier for IFR and INC but not for the quality of presentation. The boards of these companies seem to be run effectively, which has improved their disclosure policy, including, *inter alia*, the level of information (IFR level and web site content) provided via the internet. However, they are more focused on the content of their web sites than on the presentation format.

The DMUs 3, 16, 22, and 27 have efficiency scores below one for IFR levels and web site content, but equal to one for the presentation format criterion. These firms are located on the efficiency frontier only for INP quality. With the same board and specialized committee characteristics, these four companies (DMUs 3, 16, 22, and 27) can improve their IFR levels by 4, 3, 11, and 16 percent, respectively. Similarly, they can enhance the content of their web sites by 15, 28, 27, and 25 percent, respectively.

Table IV shows that firms that are located on the efficiency frontier for their web site content but not for presentation format quality have the highest efficiency scores for the overall IFR level. All these firms, except one (DMU 32), are on the efficiency frontier (DMUs 1, 6, and 11). However, firms located on the efficiency frontier for the INP format but not for the quality of their content are located outside the frontier for overall IFR levels (DMUs 3, 16, 22, and 27). These findings support previous studies suggesting that the content of corporate web sites is more important than the presentation format. Stakeholders seem to be more concerned about the extent of corporate disclosure than the technology used or the convenience or timeliness of internet information disclosure. The results show that 46.9 percent (15 DMUs, including DMUs 8, 30, 25, and 18) have efficiency scores less than one for all disclosure criteria. This result suggests that these 15 DMUs can enhance the quality of their web disclosure using the same characteristics of their governing bodies. For instance, DMUs 8, 30, and 18 can improve their IFR levels by 43, 22, and 16 percent, respectively; their web sites content by 38, 26, and 20 percent, respectively; and their web site presentation quality by 52, 23, and 18 percent, respectively.

Table V and Figure 3 show the efficiency positions of our sample firms according to the three web disclosure categories (INC, INP, and IFR level). The findings provide evidence that 46.9 percent of the CAC40 firms are located outside the efficiency frontier for each category. The composition and functioning of the governing bodies of these firms do not seem to lead CEOs to adopt efficient behaviors, including voluntary web disclosure. Moreover, this percentage of inefficient companies is considered high for

Efficiency position	Number of firms	Percentage of firms
Totally efficient	9	28.12
Efficient IFR quality	12	37.50
Efficient internet content	13	40.62
Efficient presentation format	13	40.62
Totally inefficient	15	46.87
Total firms	32	100.00

Note: This table presents the number and the percentage of efficient firms for each category of internet disclosure index

Table V.
The efficiency position

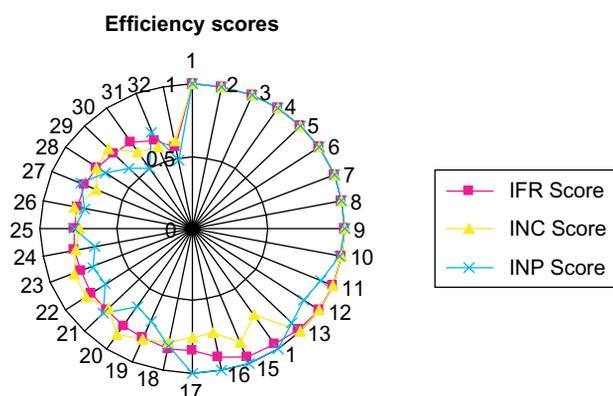


Figure 3.
The presentation
of the efficiency position
of our sample

French firms with the largest market capitalization, suggesting problems of inefficiency in the composition, structure, and/or functioning of their governing bodies.

6. Conclusions and discussion

The current study sheds further light on the role of board directors in improving IFR levels. The empirical study uses DEA, a non-parametric methodology, on a sample of 32 French listed companies belonging to the CAC40 index as of December 2007. The empirical findings of the DEA approach show that only 28 percent of our sample firms are completely efficient (nine firms). Boards of directors seem to effectively monitor the top executives of these firms, which improves their disclosure decisions, including that of increasing the IFR level. Such firms develop user-friendly and readily accessible web sites that contain the information required by various stakeholders to assess firm performance and make sound decisions.

The empirical analysis also provides evidence that 46.9 percent of our sample firms (15 firms) have efficiency scores different from one for all web disclosure proxies, suggesting that they lie below the efficiency frontier. The boards of directors of these firms do not seem to be effective monitors of managerial decisions with respect to firm disclosure policy. The inefficient board monitoring and oversight of top executives gives them more leeway to opt for more opaque disclosure policies. Consistent with extant studies (Ettredge *et al.*, 2002), our findings suggest that web site content features are more important than presentation features. Almost all firms located on the efficiency

frontier when considering only web site content as an output are indeed efficient for the overall IFR level (12 firms). Moreover, firms that have an efficiency score that equals one when taking into account only presentation quality as output are inefficient for the overall IFR level.

Although the results are interesting, they should be interpreted with caution, given the presence of certain limitations, which should be addressed in future research. First, DEA results are sensitive to the choice of input variables. One possible solution to mitigate the effects of this problem is to base the choice of inputs on sound literature so that the chosen inputs alone must influence the outputs (the exclusivity criterion) (Thanassoulis, 2001). The input variables used in the study are considered in the literature as the most important characteristics of the governing bodies that influence the extent of monitoring, limiting the severity of the problem. In addition, our variables are relevant for all sample firms, which eliminates situations where full efficiency is automatically assigned to firms with no peers or those with an unusual inputs/outputs mix. Second, the homogeneity of our sample firms is questionable, despite the fact that they share, to a great extent, several peculiarities (i.e. large size, large market capitalization, substantial foreign shareholding, more visibility, etc.). Firms from different industries may face different levels of monitoring and may therefore not be directly comparable. However, we can always claim that the units are heterogeneous and not comparable to be included in one sample for an analysis using a DEA approach. Moreover, applying a DEA approach for a small sample of CAC40 firms increases the likelihood that a given firm will be found relatively efficient, thus limiting the generalizability of our conclusions. Third, our research design does not allow us to disentangle which characteristic of the governing bodies operates ineffectively compared to the others. It would therefore be interesting to add only one feature of the governing bodies to the inputs at a time to gauge the change in the firms' positions on the efficiency frontier.

Notes

1. The *Association Française de la Gestion Financière* (AFG) is the French asset management association that represents the interests of the French asset management industry.
2. Numerous rating agencies, such as Moody's, Governance Metrics International (GMI), and Fitch Ratings, as well as recommendations for good governance practices in France (Viénot Reports and Bouton Report) use the frequency of board meetings to gauge the quality of governance practices. For example, French governance codes recommend that boards of directors meet, on average, four times per year to ensure effective monitoring of management. They also require listed companies to provide the annual number of meetings of the board of directors in their reports.
3. The Viénot Reports (1995, 1999) recommend that independent directors constitute at least one-third of the audit committees of French firms. The Bouton Report (2002) suggests increasing the proportion to two-thirds.
4. Sun *et al.* (2009) note that "compensation committees have regularly attracted the attention of politicians and regulators because of their central role in establishing CEO compensation, and setting the parameters for the compensation of other senior executives".
5. *Autorité des Marchés Financiers* (AMF) is the French equivalent of the US Securities and Exchange Commission (SEC).

6. Web site content and design are updated frequently. Therefore, it was important to analyze the web site content of all sample firms during the same period. To do so, we used an offline browser that allowed previously downloaded web site content to be searched, browsed, or viewed later, without access to internet, an unlimited number of times. All the web site content was downloaded using the same browser and analyzed offline to make sure any changes made to the web sites during the research period did not influence our results.

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