Voluntary financial disclosure, the introduction of IFRS and long-term communication policy: An empirical test on French firms

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Abstract

The purpose of this study is to determine if the process of filtering out financial information voluntary disclosed by firms was modified by the introduction of the IFRS. Voluntary information disclosed by French firms during the 2003-2008 period is compiled. This original dataset includes several years both before and after the introduction of the IFRS in the European Union in 2005. We use regression analysis to identify the determinants of the communications policies of listed firms followed in this study. We show that publication score, for some firms, indicates how much useful qualitative information is brought to the market. Particularly, we show that highly communicative firms reduce the information asymmetry as measured by the dispersion of analysts' earning forecasts. The voluntary disclosure of information and earnings forecasts by analysts are endogenous and exhibit a complex two-way relationship. Voluntary communication policies did not change with the introduction of the IFRS.

Keywords: publication score, voluntary disclosure, financial communication, information policy, IFRS introduction, analysts' forecasts

JEL: M40, M41

Introduction

The International Financial Reporting Standards (IFRS) were introduced in 2005 for European listed firms. These standards were intended to improve the transparency and quality of the financial information broadcast by companies, to create common and better accounting principles and to improve the mandatory information standards. The goal of the IFRS is to increase the informativeness of the financial information delivered to investors and, more globally, to financial market participants. Voluntary financial disclosure refers to additional information disclosed beyond the mandatory information. We analyze voluntary disclosure as a tool of an existing communication policy. The strength and the scope of this policy are analyzed using an individual voluntary disclosure score. This paper presents the individual quantitative scores of voluntary disclosure for French firms over the 2002-2008 period, which includes the introduction of IFRS in 2005.

We determine the quality of the disclosed information by looking at its effect on analysts' earnings forecasts. If the delivered information is useful, analysts will exploit it and converge more easily toward a consensus. The level of voluntary financial disclosure may be related to the level of mandatory financial and accounting disclosure. Exogenous and univocal changes in the latter, such as the introduction of new accounting standards, may be a key determinant of voluntary disclosure. Therefore, the introduction of IFRS rules in Europe offers a framework for an empirical test. However, voluntary disclosure may also refer to firms' long-term information choices. The determinants of these choices may be specific to the firm. In addition, there are consequences of the disclosure of information: (i) the improved quality of financial information available to the market and (ii) the reduction of information asymmetry. Our main research aim is to track the relationship from determinants to consequences. Accounting research often focuses on the determinants of a particular dimension of financial information quality (for instance, earning quality or, like here, a voluntary disclosure score) or on the consequences of the resulting financial information (Dechow et al. 2009). We try to disentangle the "complete path", similarly to Bowen et al. (2008), who consider the question of earnings quality.

As Dechow et al. (2009) pointed out, the importance of the endogenously determined availability of non-earnings information (i.e., voluntary financial disclosure) raises questions about the association between earnings quality and the market consequences of financial information. Voluntary disclosure may be endogenously set and the complete path approach may be only partial if we show that voluntarily disclosed information plays a strategic role as complementary information. This role develops at the firm level in a voluntary communication policy.

The paper shows that at least some firms design a communication policy and adopt a long-term perspective in following the policy. We do not find a simple negative and mechanical relationship linking the voluntary disclosure score and the error or dispersion of analysts' forecasts. Moreover, the year 2005, when the IFRS were introduced in the European Union, does not show any global break in the voluntary disclosure scores. In some situations, for weakly communicative firms, the score does not help to enrich forecasts. The information delivered in these situations is pure noise. When considering highly communicative firms, the score negatively impacts the dispersion of forecasts and helps to reduce information asymmetry. It leads analysts to question the communication policy in terms of trustfulness and to check if any effect of reputation may qualify the voluntarily delivered information. In that sense, our results are in line with the "commitment to transparency" and the "label adopter" hypotheses (Daske et al., 2009).

Our empirical study confirms that the disclosure of voluntary information develops in a dynamic, long-term process defining a communication policy. Voluntary disclosure itself selectively reduces the asymmetry of information in the financial market. We show that highly communicative firms should differ from others. Comparing the effect of the IFRS and the firm-specific effect, we show that the dispersion and accuracy of analysts' forecasts are more strongly influenced by a firm-specific effect than they are by the switch to the IFRS. This relationship is highlighted in the context of long-term strategic communication policy. Our score methodology and data collected over a relatively long period of time (2003-2008) allow us to capture this long-term firm-specific policy. The empirical results support the idea that voluntary information disclosure and analysts' forecasts are linked in a two-way relationship. Forecast errors and the asymmetry of information are not exogenous but endogenous in a communication policy framework. From a methodological point of view, we

recognize the endogenous setting of communication policy using panel systems of simultaneous equations. To our knowledge, this approach has not been previously been used.

The paper is structured in the following way. The first section reviews the literature. The second section will present the score of voluntary disclosure, which is a genuine proxy of quantitative communication. The third section presents the hypothesis, and the fourth presents the empirical results. A conclusion follows.

1- Review of the literature

Financial communications fulfill legal or statutory obligations and aim at increasing the visibility and the valuation of a company with regard to a target public. A definition with regard to mandatory standards is proposed by Depoers (2000), who distinguishes between financial communication and financial information. She defines financial information as all legal obligations of publications; thus, financial communication constitutes "a space of freedom, a room for discretionary choices, which the manager can exploit to modify the accounting image of his company" (also Dye, 1985; Raffournier, 1995). For instance, Gabteni (2009) chooses to consider financial communication as any strategic and non-mandatory set of information disclosed by an issuing company to any of its stakeholders.

The idea of information quality refers to the capacity to reproduce a reality in a way that is not biased either by the perception and the judgments of the issuer or by the form that makes this reality understandable (Michaïlesco, 2009). The quality of accounting and financial information is also defined by the Financial Accounting Standards Board (FASB), which specifies that accounting information is of good quality when it meets the relevance, reliability, comprehensibility and comparability conditions. In addition, we should take into account the constant evolution of the financial information standards in many countries, particularly in France. Indeed, it would seem that it is becoming harder and harder to distinguish what depends on financial information and what depends on voluntary financial communication. De Bruin (1999) and Léger (2008) agree that the boundary between these two notions is hardly perceptible.

1.1 Causes and determinants

Watts and Zimmerman (1986) focus on the determination of accounting standards and, more specifically, on pressures leading to the development of such standards. For example, the IFRS accounting standards encourage greater transparency in financial statements and better comparability of accounts between companies. They are exogenous and discrete deterministic changes that introduce a new regime in firms' financial information choices. As a consequence of mandatory new accounting standards, firms become more visible and therefore more exposed to potential costs. The new IFRS introduce a change of regime in the cost/benefit equilibrium with regard to the delivered financial and accounting information. One way to overcome this increased exposure could be to disclose more voluntary information to protect the outside image of the firm. Voluntary disclosure can then be described as strategic behavior in the sense of Waterhouse, Gibbins and Richardson (1990). Voluntary information disclosure, understood as a strategic behavior, implies the three following conditions:

- There is a network composed of at least two actors, and information is distributed asymmetrically. One of the two actors is the manager of the firm, whereas the second may be an investor, a competitor, a regulator or a pressure group. Of these two actors, one can decide whether to disclose the financial information he holds.

- There is a communication channel between the two actors. The key considerations are whether this channel should be used and what kind of information should be transmitted.

- The players' rewards are interdependent and conditioned by disclosures.

The task of a financial regulatory authority or of regulations is to efficiently solve agency conflicts that may arise between investors and managers (Healy and Palepu, 2001). Thus, we can question the ability of IFRS to reduce information asymmetry among firms. Several studies have investigated this last issue and confirmed the hypothesis that financial publication regulations provide investors with new and relevant information (Hope, 2003; Byard et al., 2011). However, it is difficult to isolate the impact of IFRS on the quality of financial information. Chen et al. (2010) compare the quality of the financial information of listed companies in the 15 member states of the European Union. To measure the quality of the information, they use several proxies, such as earnings management, discretionary accruals, accrual quality and earnings smoothing measures. They find a difference between

pre- and post-IFRS adoption. The general business environment and institutional features of financial markets are not found to be highly significant in explaining this evolution.

One of the main challenges to financial communication, understood as a strategic decision, refers to the reduction of the information asymmetries existing between the firm and its stakeholders. Alphonse and Hallot-Gauquié (2003) show that meetings of financial analysts with French listed firms are followed by a significant decrease in information asymmetry. Similarly, Healy and Palepu (2001) outline theoretical reasons why disclosures may mitigate the agency problems in the firm. They consider that disclosures will enable firms to capture potential informative and incentive problems that may exist between managers and investors. Managers are encouraged to follow a disclosure strategy when they intend to make an issue in the market and to reduce the external financing cost of their company. Therefore, one of the leading motivations of listed companies engaged in a strategic disclosure process is the reduction of information asymmetry and the reduction of the cost of capital (Diamond and Verrecchia,, 1991; Verrecchia, 1994).

Other studies confirm the link between voluntary disclosure practices and public offering of assets (Lang and Lundholm, 1993 and 1997, Healy et al., 1999). Managers will disclose more strongly in the period before the proposed public offering, but this approach to reducing information asymmetry is likely to generate a market misperception of the signal constituting the proposed public offering (Myers and Majluf 1984). Botosan (2006) investigates the link between disclosure level and the cost of capital. One of the main outcomes is that a high level of disclosure generates a lower cost of capital for a sample of firms followed by relatively few analysts. Conversely, firms followed by many analysts do not show a significant relationship between the disclosure level and the cost of capital. Botosan and Plumlee (2002) consider the relationship between the cost of capital and three possible categories of publications: annual reports, quarterly reports and other publications. They find a negative relationship between the cost of capital and the level of publication in the annual report. Conversely, there is a positive relationship between the cost of capital and the disclosure level in more frequent reports, such as quarterly reports.

The signal theory brings about a new issue: even if the disclosed information is shared by all, it is nevertheless not necessarily perceived by all in the same way. Verrecchia (1983) shows that managers' discretionary policy is influenced by issuing information costs. The

firm's investors are aware of the existence of private information held by the managers. The manager may publish or hold the information he has; this decision is a signal for the asset value. However, the disclosure of information held by the manager will reduce the asset's future value in the sense that there is a disclosure cost. Verrecchia (1983) states that the cost of publication may be of two distinct natures, direct or indirect: direct costs are related to the preparation, verification and dissemination of information, whereas indirect costs, known as proprietary costs, include all of the risks incurred by the company because of the publication of such information (e.g., increased competition and increased political visibility). Verrecchia (1983) outlines that firms prefer to publish only favorable information that increases the firm's value. Uninformed investors are unable to distinguish between firms. They are in a position where they do not know whether the firm is hiding bad news. Similarly, Dye (1985) postulates that if investors have no certainty about managers' withholding of private information, they cannot interpret the absence of information as a sign that the firm in question is withholding bad news. Both Verrecchia (1983) and Dye (1985) conclude that managers disclose only good news, with bad news being disclosed only if the disclosure cost is low enough or if the information asymmetry between the firm and its investors is sufficiently high.

La Porta et al.'s (1998) analysis underlines the role of investors' protection. In a dispersed ownership context such as the USA, Baek et al. (2009) show that share ownership does not influence financial communication as measured by the S&P transparency index. Results are similar in other countries, even where ownership is more concentrated, such as Singapore (Eng and Mak, 2003) and Canada (Ben-Amar and Benjenoui, 2008). However, in France, a negative relation is identified between concentrated capital ownership and the quality of financial communication (Labelle and Schatt, 2005; Lakhal, 2006; Ben Ali, 2008). Institutional investors may also influence the financial communication of the firm. Healy et al. (1999), Bushee and Noe (2000) and Beak et al. (2009) highlight the positive relationship between institutional investors' ownership and financial disclosure or transparency of firms, at least in an Anglo-Saxon context. In France, the empirical results vary: positive for Lakhal (2006) and insignificant for Ben Ali (2008, 2009).

1.2 Consequences

Verrecchia (2001) first set forth the voluntary disclosure theory. His work was motivated by the fact that voluntary disclosure is an eclectic topic that borrows from accounting, finance and economics. Verrecchia proposes three avenues of research:

(i) The consequences of disclosure on investors' behavior, more precisely through the reactions of stock prices and trading volumes. This first field of research is called "association-based disclosure".

(ii) The "discretionary-based disclosure approach" follows the idea that if the managers' objective is maximizing the market value of the firm and there are costs of publishing information, then a balance is achieved only when information is released that increases the market value of the firm.

(iii) The study of preferred disclosure channels in the absence of previous knowledge. This third line of research is called "efficiency-based disclosure". More specifically, work on efficiency-based disclosure focuses on a possible link between disclosure and information asymmetry reduction. Diamond and Verrecchia (1991) and Kim and Verrecchia (1994) state that voluntary disclosure reduces information asymmetries between the informed and uninformed investors.

The decision to voluntarily publish accounting and financial information is subject to a cost/benefit analysis. The costs are the costs to produce, certify and disseminate information. Opportunity costs should also be considered, with eventuality costs linked to weakening of competitiveness or advantages (Verrecchia, 2003). The benefits of voluntary disclosure come from its consequences. It helps in reducing the uncertainty and information asymmetry faced by investors. It may also lower the cost of capital.

Francis, Khurana and Pereira (2005) analyze the relationship between voluntary disclosure and the cost of capital. Previous works (Healy and Palepu, 2001; Verrechia, 2001) highlight that disclosure tends to reduce adverse selection costs and information asymmetry between managers and outside investors. Francis et al. (2005) notice the possible relationship between additional information disclosure and the cost of capital reduction in the U.S. market, where investors are highly protected (La Porta et al. 1998) and firms have easy access to external financing. Questioning if the results found in the U.S. market may be extended to markets with different legal and financial systems, Francis et al. (2006) check whether disclosure reduces information asymmetries in other institutional environments. They consider a sample of 672 observations from 34 countries with different financial and legal

systems. All firms in their sample show high disclosure levels if they have large financial needs, and strongly disclosing firms benefited from low equity and debt costs. Gassen and Selhorn (2006) analyze the consequences of voluntary IFRS adoption by German firms. They point out a decline in bid-ask spreads and an increased volatility of stock prices for IFRS adopters compared with other firms. Differences in earnings quality between the two groups are also highlighted.

1.3 Information environment and communication policy

The information environment has been known to be important since the early works of Brown (1983), who examines the impact of accounting methods on earnings predictability. The latter is traditionally measured by analysts' forecast errors and dispersion. Other studies, like Elliott and Philbrick (1990), show more mixed results. In the context of IFRS introduction, Byard et al. (2011) demonstrate that IFRS do not curb forecast errors entirely. The global legal influence is strongly moderated by firm-specific variables. In the same way, Daske et al. (2009) study IFRS adoption by international companies. They identify a communication policy commitment from a group of firms that appear as "label adopters". As a consequence, these firms, considered as "transparent", will show a reduction in the information asymmetry level. Following Dechow et al. (2009), "if we assume that analysts are unbiased and qualified predictors of future earnings, we can use variation in their forecasts to infer attributes of earnings that improve its predictability" (p.136). The tests will then appear as joint tests of the analysts' system efficiency and quality of information.

Amir and Lev (1996) introduce the financial information "informativeness" idea. They study industries where "informativeness" is low and where non-financial information is used and is relevant. It suggests a balancing complementary mechanism. Francis et al. (2002) analyze the idea that competing information from analysts will complement and erode the "informativeness" of earnings. Firms supplement poor fundamental informativeness with additional information (Chen et al. 2002; Lougee and Marquartt, 2004). Informativeness level seems to depend on industry and other firm characteristics, such as age, existence of losses and analysts' forecast errors. The idea is that voluntary information is disclosed in a global setting. The management of the informativeness of earnings is analyzed in Dechow et al. (2009).

The decision to develop a communication policy will lead some firms to disclose earnings quality or other elements of information that are more "informative" than others' information. This fundamental quality is attached either to the earnings or, as in this article, to the mandatory accounting information. This quality may be complemented, balanced, or integrated is a more global setting. The basic idea is that disclosure decisions are (partially) endogenously determined by the quality of the "official" financial information produced elsewhere or by mandatory channels. As Dechow et al. (2009) note, voluntary disclosure may be endogenously determined. So we need a "complete path" approach to allow for the possibility of a feedback effect in testing the association between the level of accounting and financial disclosure and the market consequences of financial information. We must first proxy the level of voluntary financial disclosure by calculating a publication score.

2 - The construction of a voluntary publication score

The context of the paper is the balance between a macro-level exogenous norm (the mandatory standards) and the micro-level idiosyncratic behaviors of delivering genuine information to financial investors. We must first build a publication score.

2.1. Methodology and previous studies

The first study in which a score was calculated to quantify firms' voluntary publication of financial information was conducted by Cerf in 1961 in the U.S. market. He looked at the annual reports of 25 companies listed on the New York Stock Exchange (NYSE) and showed that the voluntary disclosure of information was positively associated with firm size, the number of shareholders, and the profitability level. In 1971, inspired by Cerf, Singhvi and Desai studied information disclosed in the annual reports of U.S. firms by calculating a score index from 34 voluntary disclosure items. The results obtained confirm firm size, the number of shareholders and profitability as voluntary disclosure determinants. Buzby (1974) offered an analysis of 88 U.S. firms' annual reports during the year 1971. He built a list of 38 items related to financial and non-financial disclosure that were supposed to be disclosed in the annual reports of the entities considered. The relative importance of each of the 38 items was determined by a preliminary survey using questionnaires to financial analysts. Many authors (Cerf, 1961; Singhvi and Desai, 1971; Buzby, 1975; Stanga, 1976; McNally, Eng and

Hasseldine, 1982) have addressed the question of weighting items. Buzby's results show a low correlation between the utility of items as recognized by financial analysts and their publication by firms under study. In other words, the information disclosed by the companies is uncorrelated with user expectations. Tables 1 and 2, presented below, provide an overview of the literature related to voluntary disclosure scores in the U.S. and international markets, respectively.

INSERT TABLE 1

INSERT TABLE 2

2.2. Design of a voluntary disclosure score for French firms in the pre-/post-IFRS period

Our approach to constructing a voluntary disclosure score is to identify, from legal and accounting standards and current financial regulations, a series of "optional" items for which publication is not mandatory. Once this list is established, we will compare it to the annual reports of the sample firms.

Common to our analysis and others is that the annual report remains the fundamental document for calculating the voluntary disclosure score. Bertrand (2000) explains the primacy of the annual report by the fact that it is a central source of information that is easily available and accessible. A very large number of studies on the quality or scope of information are cross-sectional analyses that calculate scores based on a single annual report and therefore refer to a given year. We follow the voluntary disclosure strategies of the SBF 120 listed companies during each of the years in the 2003-2008 period. The choice of study period is justified by the fact that we aimed to observe the companies' financial communication strategy both before and after IFRS.

The first step is to set up the list of optional information items. The compilation of the list of voluntarily disclosed items to be searched for within the content of the annual reports is a key point in the literature. To proceed, we have to consider the informational context of the

IAS-IFRS. Therefore, we first consider the lists used in the literature, excluding the lists developed in the North American context. These are presented in Table 3.

INSERT TABLE 3

Based on the lists of items developed in the literature, we compiled a list of 40 items that may go beyond simple mandatory information. When the information item is present in a firm's annual report, the value 1 is given (0 otherwise). As a result, each firm for each year is given an individual score ranging from 0 to 40. However, we should remark that these lists have been developed in informational environments different from the IFRS because they refer mainly to periods before the introduction of the IFRS.

2.3. Sample

The sample is composed of listed firms belonging to the French SBF 120 index. The initial sample therefore consisted of the 120 listed companies comprising in the SBF 120. Banks, finance companies and insurance companies were excluded because these companies are subject to specific informational requirements. We excluded from our sample firms that were not listed in the index over all six years of the study period. Individual firms in the sample are present in the sample for all six years, except for two firms with observations missing only for the year 2008 (Clarins and Thomson). The final sample consists of 67 companies operating within the SBF 120 index during all years from 2003 to 2008. Table 4, presented below, gives the details.

INSERT TABLE 4

The selected study period is the interval before and after the introduction of the IFRS. We specifically analyze the annual reports of the firms in the sample during the years 2003 and 2004 for the period prior to the transition to IFRS and for the years 2006, 2007 and 2008 for the period after the move to IFRS. It should be noted that the year of the transition to IFRS, the year 2005, is also examined. The research involves comparing over time the score

of the annual reports or reference documents of the 67 firms in the sample. The content analysis focuses on the study of 400 annual reports, or the so-called "document de réference" (when available) of the SBF 120 companies, which are posted on the website of the French Financial Markets Authority (AMF). We compiled approximately 135,000 pages of documents.

2.4. Setting the scope of a global index

Forty items from the global list were searched for in the documents from the 67 firms in the sample. When information related to a given item was present in the annual report, the value 1 was given (0 otherwise). The number of hits is the number of times a given item was disclosed over the six-year period. The maximum score for a specific item is 400. The total number of potential disclosures of information is 16000 (i.e., 400x40) considering the whole sample. The cumulated number of recorded hits is 10402. In other words, 65.01% of the potential set of relevant voluntary information is effectively disclosed.

Looking at Table 5, we see that many items are systematically disclosed to investors. Items 6 and 24 were publicized 399 times of a possible 400[2]. The number of employees (item 39) was always indicated. These elements of information are quasi-mandatory in French annual reports. This result raises the question of the scope of items to consider. When considering the total number of mentions of a given item of information for any firm and any year, we see that some items are systematically reported, with more than 350 occurrences (of a theoretical maximum of 400). This is the case for items 1, 6, 9, 11, 12, 13, 14, 23, 24, 25, 27, 28, 29, 30, 33, 35 and 39. On the other hand, some items are rarely reported: items 2, 3, 4, 16, 18, 19, 20, 22 and 31. However, the items with no or very scarce information should not be dropped. For instance, items 2 and 3 deal with forecasting of profits and are very poorly documented[3]. However, these are very important pieces of information.

INSERT TABLE 5

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[2] The total number of 67 firms time 6 years of annual report gives 400 firm/year observations if we remove the two firms absent in 2008.
[3] The reason may be that making explicit forecasts of future profit may engage the firm's responsibility vis-à-vis its shareholders.

To create a global score, we need to address the two related issues of (i) the scope of the individual items considered to build the score and (ii) their possible weights in the global score's calculation. A simple equal weighting is commonly used in the literature (Chow and Wong-Boren, 1987; Cooke, 1989). Weights are sometime used, but rarely in a rigorous way. The voluntary disclosure items have different utilities for different user groups; thus, relative weights as a function of the importance of each item to specific user groups, defined as auditors, bankers, chartered accountants or financial analysts, may be used. This method was chosen in particular by Cerf (1961).

We try to justify the calculation and the scope of the global score used hereafter. A principal components analysis (PCA) of the 67 firms and the large set of 40 items was performed. We choose to add the individual scores of each item per firm in a 67x40 matrix[4]. The first principal component (PC1) appears very strong and explains 89.4% of the variance. The second component is far behind, with 1.4% of the variance. Based on this result, we privilege simple arithmetic calculation to an arbitrary weighting. The choice of a simple average is justified by the very strong correlation between the average score based on an arithmetic 40-item average score and the first principal component. The R-squared value between the former and the equally weighted scores is 0.91.

We select now a list of 28 items based on the literature on voluntary disclosure items relevant to the IFRS accounting framework. If an item was mentioned twice in the previous literature, we decided to keep it (following McNally, Eng and Hasseldine, 1982; Firer and Meth, 1986). However, we acknowledge that the lists of items in this literature do not refer to the IFRS standards. The lists presented in Table 3 were developed in informational contexts different from the IFRS context. It seems appropriate to consider the selected items one by one with regard to the IFRS to check if we can still consider them as voluntary disclosure items. To do this, we used as support the FOCUSIFRS website, established jointly by the High Council of the Institute of Chartered Accountants and the national organizations of auditors, which identifies all texts relating to IFRS. For instance, items 6, 14, 34 and 35 are mandatory or quasi–mandatory according to IFRS rules, so they were dropped. Items 5, 12, 17, 23, 24, 25, 33 and 36 were not cited twice or more in our review of the literature. We decided to drop these items because we concluded that they were not totally voluntary or not

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[4] This matrix cumulates the number of occurrence of an item through the years 2003 to 2008. This summing avoids handling a three dimension matrix items/firms/years.

commonly referred to in the literature. Thus, after analyzing the voluntary nature of each voluntary disclosure item, our second list of optional items is limited to 28 voluntary disclosure items. As a result, each firm for each year is given an individual score ranging from 0 to 28.

We performed a PCA on the reduced 28-item score matrix. The first principal component explained 88.1% of the global variance. The equally weighted 28-item score was calculated and compared to the PC1 results. The R-squared between the two is 0.88, indicating that our 28-item score mimics the first principal component well.

- Robustness check and alternative scores

We tried to employ a statistical rather than a conceptual analysis to define the scope of relevant items. We considered the results of the 40-item PCA and neglected 11 items correlated to the PC1 with a coefficient below 0.10 in absolute value. A low coefficient means that the item contributes poorly to the first principal component. These are items 2, 3, 4, 5, 16, 18, 19, 20, 21, 22 and 31. Eliminating these 11 items leaves 29 remaining items. We calculated an arithmetical 29-item score for each firm. As in the previous analysis, a PCA using this subset yielded a very significant PC1, with an R-squared value of 0.92 between the 29-item score and the first component. However, this score ignores some items that are conceptually important with regard to voluntary disclosure. Item 2 (although rarely disclosed) deals with qualitative information on future profits. Item 4 give the same information for future cash flows. Advertising expenses, returns on invested capital and cash ratios are also ignored. Because of these drawbacks, we did not consider the 29-item score calculation further.

Another score was built on a set of 35 items by deleting those in the 40-item list that are mandatory under the IFRS rules, i.e., items 6, 11, 14, 34 and 35[5]. We explored a 35-item score with equal weights and compared it to the results of a PCA. The first component explained 90% of the total variance. The equally weighted 35-item score is consistent with the first component. Their correlation is very high, with an R-squared of 0.88. Table 5 identifies

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[5] The average number of answers of these 5 items is 366.4 compared to a maximum of 400 answers. The information is delivered 92% of the time with regard to these items.

the items belonging to the 28-, 29- and 35-item scores. Table 6 presents the results of the PCA of each of the individual scores based on different numbers of items.

INSERT TABLE 6

Globally, we conclude that arithmetical scores are highly consistent with the data and mimic well the first principal component of the global scoring system. Considering the scope of the items, we privilege the 28-item score because of its conceptual rationale with regard to the IFRS. It is strongly correlated with other scores envisaged in this section (see Table 7). Hereafter, the 28-item score will be used as the global score. Alternatively, we cross-checked the results of this paper using the 35-item score. This less parsimonious global score index leads to similar results (not reported).

INSERT TABLE 7

2.5 Disclosure of financial information: Descriptive analysis

The descriptive summary of the 400 annual reports (or "documents de réference", if available) is presented in Table 8[6]. This prompts a number of comments about conditions under which the companies in our sample increased the volume of their voluntary disclosure during the period of 2003-2008. Conversely, the results reflect a relative decline in voluntary disclosure activity during 2007, two years after the official transition to the IFRS.

INSERT TABLE 8

If we average the score indexes over the 67-firm sample, we get similar evolution from 2003 to 2008. The score increases up to 2006, then declines moderately (or stays flat) in 2007 and, finally, increases in 2008. The four average score curves show similar patterns. An increase is also evidenced when considering the median values. Figure 1 shows an upward-sloping voluntary disclosure score regardless of the type of score we refer to. We do not see any instantaneous shift around 2005. However, we do not know if the increase is due to the IFRS transition, if it can be explained by a historical and deterministic evolution, or both. If a

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[6] The "document de référence" is a more complete statement than the legal annual report. It is asked and approved by the French Financial Market Authority when a financial operation involving investors occurs.

historical trend is effective, it would have to have found its momentum before 2005, the year of the transition to IFRS. The evolution of financial communication among our sample firms may be the result of both the transition to IFRS and a historical trend of development. The global upward trend is not monotonic, with a (relative) decrease of the average score in 2007.

INSERT FIGURE 1

A global test of the difference between the pre-2005 and the post-2005 40-item scores shows a significantly increasing score. We added the individual scores for 2003 and 2004 and the individual scores for 2006-2007. The two are significantly different, with a t-statistic of 3.52 (p-value: 0.00). Similar results are obtained when using the 28-, 29- and 35-item scores. The results globally support the idea that the level of voluntary disclosure was not the same before and after 2005, which is the year of the mandatory application of the IFRS norms. However, Figure 1 does not show an abrupt increase but a continuously rising average score. The voluntary disclosure of information may be not due to the exogenous mandatory IFRS application in the 2005 financial report. We cannot exclude the possibility that voluntary disclosure follows a time deterministic trend. As time passes, firms are more and more inclined to disclose financial information voluntarily. Exogenous mandatory regulations are only one element among several explaining this trend.

To develop this hypothesis, we calculated the correlation between the 2003-4 individual score values and the 2006-7 scores for each firm. The correlation is positive and strong at 0.70. We also calculated the rank correlations of individual firms between the two periods to answer the question: was the most communicative firm in the 2003-4 period still the most communicative firm in the 2006-7 period? The rank correlation is 0.59, meaning that firms continue to disclose similar amounts of information over time.

This result raises the possibility that voluntary disclosure is a long-term communication policy of a firm. It is one feature of the communication policy that is firm specific. We calculated the probability of changing the level of disclosure by separating the sample into two groups of firms: those with a score above the median, which are considered

high-disclosing, and those with a score below the median, which are considered low-disclosing. Between the two sub-periods of 2003-4 and 2006-7, the median score increased from 50 to 53.

INSERT TABLE 9

The highly communicative firms were likely to remain highly communicative even if an exogenous event such as the IFRS implementation occurred. On the other hand, the behavior is not symmetric. Most low-disclosing firms remained poorly communicative, but one third of them tried to change their policies.

3 - Hypotheses and models

3.1. Hypotheses

Our goal is to examine the changes through time in the quantity of voluntary disclosed financial information. To analyze the financial communication policies of the French SBF 120 firms before and after the implementation of IFRS, we need to question the determinants of voluntary disclosure. One goal of the IFRS standards is to clarify and to make more transparent the financial information offered to the public. A single change to a regulatory and normative framework is enough to modify the behavior, often strategic, of listed firms. The relationship is not causal and univocal. We need to address the issues of relevance, utility and quality of the delivered financial information. Firms can engage in strategic communication for idiosyncratic purposes. If such policies exist, they are built within a time dimension that may cover several instances of information reporting. They will also imply the behavior of those to whose attention the disclosure is targeted. Financial analysts are by definition those who focus on the communication policy of listed firms.

The voluntary disclosure score is considered in the literature both as a score of quantity (Cooke, 1989; Barrett, 1976; Depoers, 2000), in that it allows a measure of voluntary disclosure, and as a qualitative measure of the voluntarily disclosed information (Cerf, 1961; Singhvi and Desai, 1971, Lang and Lundholm, 1993). A voluntary disclosure score may also measure the quality of the delivered information. However, the latter idea remains to be

tested, as firms that disclose more information do not necessarily deliver the highest quality information.

Figure 1 shows the mean score values of 28, 29, 35 and 40 items. Their evolution is similar; a positive trend in voluntary disclosure appears for each. However, the idea of a trend indicates a deterministic global pressure that pulls the firms upward in the quantity of financial information that they deliver. This is how continuity over time is viewed. Behind the phenomenon is a permanent contextual and institutional pressure by the financial actors to get more information. Another explanation is that the adoption of the IFRS in 2005 introduced a change of regime in the policies of disclosure. In this case, firms reacted to a single event. To test this idea, we test the difference between the 2003-2004 scores and the 2006-2007 scores. It appears significant. However these are two point observations; both explanations, the change of disclosure due to IFRS and the deterministic long-term evolution, can explain this difference.

Voluntary disclosure will depend positively on environmental pressure. The first hypothesis is:

H1: The evolution in the quantitative score of disclosure is explained by an exogenous change dated by the introduction of IFRS rather than by a long-term trend evolution.

As mentioned above, the voluntary disclosure of financial information may be explained by the regulatory context. It can also be determined by the firm's characteristics. The offer of voluntary information is explained by a balance between costs and benefits (Verrecchia, 2003). We can hypothesize that visible firms will follow a voluntary communication policy. Big firms or members of the CAC 40 index may be more outstanding than other firms. Because of their larger size, they can spread out the cost of disclosure. Their size enhances the importance of their financial communication policy. High leverage and high risk will increase the demand for information by investors. Thus, a firm may disclose information to reduce the risk perceived by investors.

H2(a): Voluntary disclosure is positively linked to firm size. A large firm or one belonging to the CAC index is more likely to have a voluntary communication policy.

H2(b): The publication score index is positively linked with leverage and the level of financial risk.

Corporate governance and the structure of ownership may increase the need for information. Institutional investors holding blocks of shares may demand more financial information. Important shareholders will also exert pressure to disclosure more information. The relation between institutional investors and financial disclosure may be positive because large blockholders may want to assure outside investors and levy the idea of private benefits. It may also be negative because dominant shareholders may access private information directly at the firm level through other channels (e.g., boards), making public disclosure unnecessary.

H3(a): The score index is increasing with institutional investors' ownership.

H3(b): The score index may be related positively or negatively to large shareholders' ownership.

Looking at the consequences of the disclosure, we can identify benefits in Verrecchia's sense. The first is the reduction in information asymmetry. The dispersion of analysts' forecasts should be influenced by the score. The voluntary information delivered is useful for analysts and helps to reduce the asymmetry of information. It should improve the quality of analysts' forecasts by reducing the absolute error between the current earnings announced by the firm and the average consensus forecasts. The alternative hypothesis is that the publication score includes information that is noisy or useless.

H4: The score will be linked positively and negatively, respectively, with the dispersion of analysts' forecasts and the errors in forecasting future earnings.

The concept of communication policy demonstrates the endogenous relations between offers and demand. The voluntary offering of financial information may be explained by a high level of asymmetry of information and by important needs of investors. The score is the result of a communication policy. It results from a firm's decision to commit itself to a communication policy over the long term. It is built on an idiosyncratic framework. A firm that communicates strongly now also did so in the past. We saw in the descriptive statistics that the rank correlation between scores pre- and post-IFRS is strong.

H5(a): The voluntary disclosure choice results from a long-term policy and has a long-term autoregressive component.

A dynamic relationship requires the firm also to answer to the pressure of financial analysts. The extent of the asymmetry of information leads the firm to issue voluntary information to analysts. The asymmetry of information may be measured by the dispersion of forecasts throughout the year or by the number of analysts. The endogenous roles of some variables can be tested.

H5(b): The voluntary publication score is positively linked with the previous level of asymmetry of information and the number of analysts.

- The role of a communication policy

If H5 is true, communication policy should be viewed as a long-term filtering process in which financial information is disclosed. This process lends trustworthiness and a global framework to pieces of disclosed information. We can introduce a distinction between so-called communicative firms, which follow such an approach, and other, less communicative firms. A high score indicates a willingness to disclose massively. The long-term perspective becomes apparent when comparing a firm's scores though time. The communication policy gives "informativeness" to elements of information that are voluntarily disclosed. Otherwise, even voluntarily disclosed pieces of information may be of low quality or useless. At the limit, an untrustworthy voluntary disclosure of information is pure noise.

H6: With useful disclosed information, the accuracy and the dispersion of forecasts should be negatively linked with the score index.

However, the previous hypothesis does not introduce any difference in behaviors. Some firms may be highly communicative and reliable as a result of a trustful communication policy. Others may follow a weak or unreliable communication policy. When these firms issue voluntary information, it has no impact on the asymmetry of information. Dividing the sample into two parts, the probability of an above-median disclosing firm to remain above the median is a behavioral feature that signals a high-level communication policy.

H7: The existence of differences in communication policy may result in different reactions in the market's asymmetry of information. Highly communicative firms will effectively influence the market's asymmetry of information.

3.2. Variables

The dependent variable is the individual firm's score in a given year, SCORE. We used the score index calculated with 28 items. We divided the sample in two parts to separate communicative and uncommunicative firms, where the former are those with a voluntary publication score above the median. We identify these firms as following a communication policy. SCOREDUMYEAR is a dummy variable that takes the value 1 for highly communicative firms. For each year, we calculate the median score and identify the firms that scored above the median[7]. The cross interaction term SCOREHIGHYEAR gives the score value for only the highly communicative firms; it returns a zero value for other firms. On the analysts' side, we consider the dispersion of forecast earnings (FOR_STD), the number of analysts issuing a forecast (NB_ANAL) and the mean accuracy of EPS forecasts (ACCUR). These data are provided by IBES and considered at the end of each fiscal year. We used the absolute value of the forecast error ACCUR and normalized by dividing it by the stock price at the end of the fiscal year (FOR_ACCUR_NORM). Normalization is necessary because the earnings per share are very different among firms. The same is true for FOR_STD. We divided it by the stock price to obtain the FOR_STD_NORM variable.

The usual control variables are considered. The market risk of the firm (RISK_MKT) is measured by its beta coefficient. Market risk is preferred here because we focus on the consequences of information communication directed toward investors and the financial market. Beta coefficients are calculated yearly by taking weekly returns and regressing them on the returns of the SBF 120 stock index. Capital ownership structure is integrated through the institutional investors' ownership (INST_OWN) and the percentage of capital held by the three major shareholders (TOP_3). The size of the firm is measured by the logarithm of the total assets (LNTA); the debt leverage is the long-term debt ratio over the book capital value

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[7] Using the median of the whole sample will bias the variable in favor of observations belonging to the most recent part of the sample.

(LT_DT_OV_CAP). The market-to-book ratio (MTB) and the operating profit margin expressed in percentage (OP_MARGIN) were also considered. We used the ICB large industry sector classification codes of Thomson Financial. A dummy CAC variable was used to flag firms that are members of the first-tier CAC 40 index. A trend variable (TREND) was created to indicate the year. A dummy IFRS was added that takes the value 0 before IFRS enforcement (i.e., in 2003 and 2004) and 1 thereafter. We have data on a sample of 64 firms throughout the 2003-2008 period (see Table 10). The descriptive statistics of the variables are presented in Table 11.

INSERT TABLE 10

INSERT TABLE 11

3.3. Models

In a first look at the data, we consider them as randomly distributed in the time dimension. We may consider them as a set of independent observations to get a first insight into the variables explaining the value of SCORE. We do not input any preset time dimension into the data to explain the score values. We integrate a time dimension only by imputing either the TREND variable or the dummy IFRS as an explanatory variable.

We used a Poisson regression of the SCORE variable to suit the structure of the score values, which are not continuous. The model is highly significant. The control variables used are dispersion of forecasts, size, number of analysts, leverage, equity ownership by institutional investors, ownership concentration, forecast accuracy and market risk. Both the TREND and IFRS variables' coefficients are significant. They have the expected sign of an increase in the score index with time. However, we cannot discriminate between them. We do not consider the sign of other variables here because the model is not suitable. We also checked the results using an ordered Logit model to explain the score values using the same set of control variables and obtained the same results. We can conclude that the score of

voluntary disclosure has a significant time dimension and is increasing with time. Thus, a panel model must be used.

INSERT TABLE 12

The remainder of the empirical study will use panel analysis. A test to confirm the individual effects of the 64 firms and a time effect of the 6 years was performed. The SCORE variable has a panel data structure, as does forecast accuracy. The dispersion of forecasts (FOR_STD_NORM) does not demonstrate significant differences between individual firms or between years.

INSERT TABLE 13

4 Empirical results

4.1. Determinants of the voluntary disclosure score

To explain the disclosure score, we use a panel regression analysis with individual effects. We model the time effect explicitly by considering either the TREND or the IFRS variable. This approach allows us to question the nature of the time effect. Allowing a simple time effect in the panel model would introduce dummies for each of the 6 considered years. By doing so, we would not have been in a position to determine the nature of the time effect, i.e., whether it is a deterministic trend or pre-/post-IFRS decision. To set up the model, we had to choose between fixed (intercept) effects and random effects. We used random effects in a first trial because it is the less constrained model. We then tested the final specification against a fixed effects intercept using Hausman's test. The difficulty with the SCORE variable is that it is discontinuous and has limited range. We checked whether the SCORE variable has a normal distribution. Globally, it shows significant skewness, but we can reject the kurtosis hypothesis at the 1% level. The Jarque-Bera statistic is not significantly different from zero (p=0.00), and we reject normality. However, looking at annual score data, normality prevails.

We cannot reject normality for four years out of six (at the 5% level). Non-normal score values are identified in 2005 and 2006. Because score is the dependent variable, we checked that the residuals of the regression did not show abnormal distributions.

The M1 and M2 regressions include many explanatory variables and refer to industry dummies; they only differ in whether the time dimension is modeled with TREND or with IFRS. The models M3 and M4 do not include industry dummies. The results are similar to the previous ones except that the constant becomes significant. Both TREND and IFRS are significant. We still cannot discriminate between them. The analysts' forecast dispersion, forecast error, leverage, CAC membership, the number of analysts and institutional investors' ownership or ownership concentration variables are not significant in explaining the score of voluntary disclosure. The risk variable is positive and significant in one instance. The only significant variables are the increasing time dimension characteristics (TREND or IFRS) and the past disclosure score value SCORE(-1), i.e., the previous value of the score index. Autoregressive scores confirm a long-term communication policy. A highly communicative firm will continue to be highly communicative in the following year.

The models M5 to M7 have different dependent variables. We now look at DSCORE, which is the yearly variation in the disclosure score. We introduce lagged variables of forecast accuracy, which are moderately significant. The past forecast errors made by the analysts seem to explain the variation in the disclosure score. A large error in the last-year forecast will imply a higher score, i.e., a more disclosure. This is coherent with our hypothesis H4.

The models M8 to M10 again explain the score. We test the idea that the past value of the forecast errors or forecast dispersion will explain the future level of disclosure. The two variables FOR_ACCUR_NORM(-1) and FOR_STD_NORM(-1) are not significant. Only the autoregressive component is significant, along with the effect of industry dummies (see model 8). The M9 and M10 models test the random fixed effect in the panel model. The set of explanatory variables does not refer to industry because it would be redundant with the fixed individual effect, which introduces a fixed constant for each firm. The Hausman test rejects the fixed intercept coefficients specification (F=1.22, p-value of 0.28). The beta coefficients are not significantly different, so we prefer the less constrained model, i.e., the random effects model. The normality of residuals is rejected at the 5% level, but not at the 1% level, for most models, particularly the M9 regression. Variation in score models (M5 to M7) show non-

normal residuals. In any cases, the rejection results from the presence of kurtosis and not from skewness.

The variable linked to the financial riskiness of the firm is conclusive only if we refer to a time dimension featured by the IFRS dummy; it is not significant otherwise. The leverage does not explain the disclosure levels. The ownership structure variables (TOP3, INSTOWN) do not influence the setting of the communication policy. The asymmetry of information does not appear as a determinant; neither the forecast accuracy nor the number of analysts are significant. Introducing the previous value of the information asymmetry variable does not appear to be useful. When considering whether to use the IFRS dummy or the TREND variable, we get similar results with similar significance. With the exception of an increase with time and a positive autoregressive component, other explanatory variables seem to contribute little. Some are weakly significant. When looking at the fixed effect estimates, we find similar results, although the autoregressive component of the score index is less significant (see Table 14).

INSERT TABLE 14

Each firm's communication policy is peculiar to it and has a strong permanent form. This single-equation panel does not strongly identify any idiosyncratic determinants at this level. One reason for the poor result in terms of the explanatory variables is that the score level is endogenous but poorly captured in a simple equation, leading to one-way causality. This problem will become clearer later on.

4.2. Analysts' forecast accuracy and dispersion.

A complete model to analyze the disclosure scores of firms should take into account cross-relationships where the disclosure of information may also explain variation in the accuracy or the dispersion of forecasts. The causality may be complex and involve dynamic behaviors from firms that follow communication policies.

First, we analyze as the dependent variable the absolute mean forecast error, FOR_ACCUR_NORM. The higher its value, the lower its accuracy in anticipating earnings. The first model, M1, shows that the forecast error is negatively linked to the profitability of the firms, their risk, and their membership in the CAC stock index (see Table 15). It is positively linked with firm size and does not depend on the number of analysts. The explanation here is that large firms are generally complex, multidivisional or multinational. Their future earnings are more difficult to forecast. It is also interesting to point out that the characteristics of being a high communicator of financial information in the past (as appraised by the variable SCOREDUM(-1)) does not indicate any improvement in the following period's accuracy. The model M2 highlights that the disclosure score index SCORE is negatively linked (only at the 5% level) with the forecast error. This result is weak because it is not confirmed in the other model specifications. This point is important, as it provides a way to test H6. Crucially, the relation is not lagged but contemporaneous. The disclosure of financial information is measured by the information delivered in the annual report at the end of the fiscal year. However, the annual report gathers all financial information, either newly disclosed or already announced throughout the year through other media; for example, presentations to analysts, public announcements, or material posted on the firm's website. Voluntary disclosure is an attitude that does not lead the firm to retain useful pieces of information. Disclosure to the public is privileged when it is useful and disclosure may develop continuously. This explains why the contemporaneous correlation between the quantity of information voluntarily disclosed during the fiscal year up to the financial report delivery and the forecast error at the announcement of the actual earnings per share a few months after the fiscal year end, is negative[8]. The model M3 introduces the forecast dispersion FOR_STD_NORM as a positive and significant explanatory variable. This means that the analysts' dispersion of forecasts is negatively linked to the accuracy of forecasts. Dispersion is a signal of an important asymmetry of information and the absence of consensus. It also accompanies forecast errors. The asymmetry of information covers the situation of underinformed analysts who differ systematically in their forecasting. This increases the dispersion of forecasts around the mean. As a result, the average error of the forecasts increases. Conversely, if everybody is equally informed or adopts herd behavior, dispersion is low. Errors of forecasts may exist but be randomly distributed over a sample of

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[8] If, instead of SCORE, we use the previous year score value SCORE(-1), the score variable turns insignificant in model 2.

stocks[9]. The positive relation between FOR_STD_NORM and errors in forecasting is confirmed in models M5 and M6. The difference between them is the presence of a random or a fixed effect. The Hausman test accepts the equality of estimated coefficients (F= 0.93, p=0.48). We also highlight that the TREND and IFRS variables are equally significant. There is a time-increasing feature that makes the forecasting error lower and the accuracy higher with time. We cannot distinguish whether this is a global phenomenon linked to the institutional environment or if it is a consequence of the introduction of IFRS.

INSERT TABLE 15

The FOR_STD_NORM variable is a proxy of information asymmetry as perceived by analysts (see Table 15, lower part). We introduce the dummy SCOREDUM for highly communicative firms, as opposed to moderately communicative firms. It is not significant in model M1, but it is significant in models M2 and M3. It has the expected negative sign. A firm that was highly communicative in the previous period will lower the dispersion of analysts' forecasts in the following year. This mechanical information-providing mechanism is only weakly significant at the 10% level. The SCORE(-1) variable is significant in models 2 and 3, but weakly. Contrary to our expectations, it shows a positive sign. This result suggests that the delivery of financial information does not reduce, but increases, the dispersion of analysts' forecasts. However, we have to consider that the sign of SCORE(-1) is balanced by a significant negative sign of the dummy variable SCOREDUM(-1). The negative sign of the latter means that the delivery of information negatively impacts the dispersion of forecasts and reduces the market asymmetry of information, but only for communicative firms. This point does not confirm our offer-demand scheme, nor does it mean that the firm does not provide any information to the market to reduce asymmetry of information. It could mean that the information provided by the firm, even in increasing quantity, is not useful to the market. We reject the idea that the quantity of information is linked with its quality for all firms in the market. Information may be pure noise or useless if it does not reduce the dispersion of analysts' forecasts. On the other hand, models 2 and 3 show a strong positive autoregressive component in the dispersion of forecasts. Coefficients around one are coherent with the idea that any stock is followed by a population of analysts that is stable from one year to the next. This explains why the fixed-effects model is not

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[9] Except in the situation of a behavioral bias of systematic pessimism or overconfidence.

different from the random-effects panel specification when comparing models M2 and M3. The Hausman test rejects the fixed effect (F=0.47, p=0.86). The dispersion of forecasts has some persistence, which is not linked to peculiar characteristics of the firms.

Some other results are not in line with the literature: Analysts' dispersion is not a function of the number of analysts. Interestingly, the IFRS variable is also not significant. The introduction of IFRS did not reduce the asymmetry of information significantly.

4.3 Endogeneity and systems of equations

The univariate panel analyses described above showed that disclosure policy does not seem to be explained by the demand for information from the outside. Paradoxically, the characteristic of the demand for information by analysts is not significant either through the past error in forecasting or through asymmetry of information. This choice appears to be affected only by deterministic variables such as CAC membership. The model of forecast errors demonstrates that accuracy is influenced by the dispersion of forecasts and not by the disclosing policy of the firms. The asymmetry of information (as measured by FOR_STD_NORM) is influenced by a complex mix of determinants. It refers to the disclosure activity of the previous year. The linkage between the three aspects at this stage seems to be quite poor.

This finding may be explained by the univariate methodology, which does not take into account potential endogenous relations. A joint setting is necessary when analyzing disclosure scores, forecast accuracy and the dispersion of forecasts. A system of joint panel data is estimated. We used four systems of joint equations. The first one is a system of two panel equations; the first equation (EQ1) explains the score value and the second equation (EQ2) explains the mean forecast error. The second system has three equations, the dependent variables of which are SCORE (EQ1), FOR_ACCUR_NORM (EQ2) and FOR_STD_NORM (EQ3). These two sets of equations use the TREND variable as the time dimension to explain the score in EQ1. The other two systems of equations are strictly similar to the previous one, with 2 and 3 equations each, respectively. The only difference is that EQ1 now uses the IFRS dummy. EQ1 stresses the offer of information by the firm through the score index. It has to do with the firm's communication policy. The two other equations focus on the capacity of

analysts as a whole to forecast earnings. They identify the strength of the demand for information.

INSERT TABLE 16

The results of the multivariate panels are shown in Table 16. The estimates of the four systems agree with one another[10]. In EQ1, the disclosure score is now significantly (at the 5% level) linked to FOR_ACCUR(-1): a large error in the previous year's forecast makes the firm voluntarily disclose more information in the following year. This result is new and did not appear in the univariate test. The disclosure activity has a permanent component and is part of a long-term policy. The value of SCORE at time t-1 is helpful for identifying a communication policy. The new score value is nearly 70% of the previous one. Considering this result, the market and analysts know that the firm will continue to communicate more than the required information. The results underline the dynamic process of communication. Disclosure follows a long-term policy. The firm also reacts by voluntarily delivering more information if the past forecasting error was important. It is explained by indirect costs associated with forecasting error (increased cost of financing, loss of reputation). Our hypothesis H5(a) is accepted, but H5(b) is not confirmed because the previous asymmetry of information does not result in higher publication scores.

The only characteristic of the firms that explains disclosure better is the risk level, as measured by its beta. Neither profitability nor institutional investors' investment or ownership concentration are significant. Size does not appear to be significant, although it influences the results indirectly through the firm's listing on the CAC stock index. Our hypotheses H2 and H3 are partially and totally rejected, respectively. A deterministic time-increasing component is also highlighted. Ceteris paribus, firms will disclose more information with time. However, we cannot distinguish the cause of this trend. It may be explained by the introduction of IFRS standards, but it could also be explained by the pressure of the global environment[11]. In Table 15, analysis of EQ1 shows that the TREND and the IFRS variables are only slightly significant; both are rejected at the 1% level. In that sense, we do not find results similar to

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[10] The normality of the residuals of EQ1 is poor. It is rejected at the 5% level but not rejected at the 1% level.
[11] We tested the model with at the same time the IFRS and the TREND variables. Both have positive but insignificant signs.

Chen et al. (2010), and we cannot draw a conclusion on H1 regarding the impact of the introduction of IFRS.

The analysts' forecasting accuracy is not influenced by the level of voluntary disclosure (see EQ2 in Table 15). The information delivered does not help improve the mean EPS forecast. Analysts' forecasts will question the usefulness of the voluntarily disclosed information. On average, this information is pure noise. Accuracy does not improve with the number of analysts or with the size of the firm. Forecast accuracy is better if the firm belongs to the top-tier CAC stock index. Globally, accuracy improves with time (measured by either TREND or IFRS). The positive relation between FOR_STD_NORM and FOR_ACCUR_NORM is confirmed. The existence of dispersion in forecasts makes the forecasting error larger. This result is in line with the hypothesis of information asymmetry.

The dispersion of forecasts latter aspect is analyzed by the third equation. The dispersion in individual analysts' forecasts has a permanent component. It does not seem to decrease with time, particularly with the introduction of IFRS. The variable SCOREDUM(-1) is still significant (only at the 10% level) in a system setting. It has a negative sign, indicating that only highly communicative firms tend to generate lower dispersion in analysts' forecasts. The score variable itself becomes nonsignificant. Disclosing information is not enough to curb information asymmetry. A simple one-way relationship between the quantity of information delivered and the reduction of information asymmetry is not evidenced. In that sense, we reject our hypothesis H4. We cannot simply validate the hypothesis that the quantity of "raw" information delivered globally to the market is useful information. Our results are in line with Byard et al. (2011) and underline the importance of the firm-specific disclosure policy. From the investors' viewpoint, the disclosed information may be no help in understanding the firm. However, it is important to distinguish between highly communicative and moderately communicative firms. Among the former, information disclosure may reduce the conflict of interest. However, it may also add fuzziness and confusion in the market and does not reduce the asymmetry of information for poorly communicative firms. This finding suggests that only highly communicative and reliable firms effectively reduce the asymmetry of information by disclosing voluntary information. A policy of disclosing trustworthy information creates value and is useful. Such information is issued by communicative firms within a policy framework. Information coming from moderately communicative firms has no impact.

This result leads to the idea that we can identify different communication policies. On the one hand, some firms follow long-term high disclosure standards and appear as "label adopters" (Daske et al., 2009). The information they deliver to analysts will help to reduce the asymmetry of information and indirectly contribute to reducing forecast errors. In contrast, disclosing information voluntarily does not help when the firm is not identified as trustworthy. The information is then pure noise and does not help to reduce the situation of asymmetry or, indirectly, to improve the accuracy of forecasts.

The disclosure score index, the forecasting accuracy and the dispersion of forecasts are endogenously related and have to be considered jointly. Our results lead to the idea that increasing voluntary information by delivering a significant quantity of information may result in pure noise. The hypothesis that the extra information mechanically improves the accuracy of forecasts or reduces the asymmetry of information is not accepted. The hypothesis H6 of a direct relationship is not accepted. However, the hypothesis H7 of a complex and indirect relationship is accepted. The market is sensitive to the communication policies of certain firms, but not all firms. Those firms that are globally good communicators and provide a large set of voluntary information will be identified, and the market reaction to their communication will be good, i.e., asymmetry of information will shrink. Those firms that are moderately communicative have only a small influence on the market's perception. The voluntary information they disclose may be considered as noise. Our results may corroborate the idea that communication policies and reliability are filters with regard to the voluntary disclosure of quantitative information.

Conclusion

The present research has two goals. It measured the voluntary disclosure of financial information through a quantitative proxy of financial and non-financial data measured by 28 items. The publication scores are very different over time and between firms. The introduction of the IFRS affected the voluntary disclosure of information. The disclosure of information increased significantly over the 2003-2008 period. However, the increase seems to be explained by global pressure of the institutional environment as well as by the mandatory introduction of the IFRS in 2005. We could not separate the two effects.

Previous studies have analyzed firms' voluntary disclosure behavior. We test the communication policies followed by some of the SBF 120 firms. We relate the publication score to analysts' forecast errors and the existence of asymmetry of information, as measured by the dispersion of earnings per share in forecasts by financial analysts.

A dynamic process of communication is evidenced in our empirical study. A distinction should be made between highly communicative firms following a long-term policy and others. Complex and idiosyncratic communication policies aimed at the reduction of asymmetry of information are the main driver of the disclosure of financial information. The communication policies of French firms are based on a long-term perspective. We saw a strong persistence in the level of the quantitative scores and in the level of asymmetry of information measured by the dispersion of earning forecasts. Communication is not limited to the delivery of quantitative pieces of information. Analysts (and the markets) will only react to useful information, i.e., information that is reliable and issued by trustworthy, highly communicative firms. The market process to filter out useful information issued by communicative firms in the framework of a global policy is the major finding of this paper. Future research should confirm the existence of this mechanism over a longer time period.

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Table 1. Summary of studies using disclosure scores on the U.S. market

Author	Year	Sample	Items	Comments
Cerf	1961	258 firms listed on NYSE	31	Positive relationship between disclosure and size, number of shareholder profitability
Singhvi and Desai	1971	100 firms listed on NYSE 55 unlisted firms	34	Firms issuing information correlated to user expectations (financial analysts) are audited by smaller audit firms, are less profitable, have more volatile prices than other firms.
Buzby	1974	44 firms listed on NYSE 44 unlisted firms	39	Existence of a weak correlation between the relative importance of the item and the level of disclosure
Buzby	1975	44 firms listed on NYSE 44 unlisted firms	39	Positive relationship between disclosures contained in the annual report and firm size. ack of relationship between disclosures and listing status
Stanga	1976	80 firms listed on NYSE	79	Positive relationship between disclosures contained in the annual Report and industrial firms in the sample study.
Garsombke	1979	100 firms listed on NYSE	34	Lack of relationship between disclosures contained in the annual report and the level of risk associated with the firm.
Botosan	1997	122 manufacturing firms	60 items structured into five categories	For firms with a low analyst following, higher disclosure is linked with lower cost of equity capital. For firms with low analyst following, no link between disclosure lever and cost of equity capital

Table 2. Summary of research using disclosure scores on other markets (non US studies)

Source	Year	Sample	Number of items	Comments
Choi	1973	72 firm listed on European markets	36	The listing on a European financial market is generating improvements in the level of disclosure
Barrett	1976	15 US firms 15 Japanese firms 15 British firms 15 French firms 15 German firms 15 Swedish firms 13 Netherlands firms	17	The levels of disclosure in annual reports of American and British companies are significantly larger than those present in the annual reports of other companies in the study sample.
Firth	1978	250 CFOs 250 accountants working for audit firms 120 financial analysts 130 bankers	75	The purpose of this study was to test the importance placed by different users to different items of publication. The results show that CFOs and auditors give equal weight to items / financial analysts and bankers give equal weighting to the items.
Firth	1980	278 British manufacturing firms	48	The small firms significantly increase their level of publication in the issuance of new securities. This relationship does not hold for large firms
Firth	1984	100 British firms	48	The study results reflect the lack of significant relationship between the level of disclosure and systematic risk measured by beta.
Chow et Wong-Boren	1987	52 Mexican listed firms	24	The information voluntary disclosure level is higher for large firms than for small firms.
Cooke	1989a	38 Swedish unlisted firms 33 firms listed on Swedish market 19 companies listed both on the Swedish market and on at least one foreign market	224	There is a positive relationship between the voluntary disclosure extent and both listing status and firm size.

Cooke	1989b	38 unlisted Swedish firms 33 firms listed on the Swedish market 19 companies listed both on the Swedish market and on at least one foreign market	146	There is a positive relationship between voluntary disclosure extent and both listing status and firm size. Moreover, « commercial firms » publish less voluntary information than firms in other sectors.
Cooke	1991	48 firms listed on Japanese market	106	There is a positive relationship between the voluntary disclosure level and firm size.
Gray, Meek et Roberts	1995	58 U.S. companies and 32 British firms listed on both their domestic market and external market 58 U.S. companies and 32 British firms listed only on their domestic market	128	The firms listed on both the domestic and external markets present publication levels higher than the firms listed only on their domestic market.
Raffournier	1995	161 firms listed on the Swiss market	30	The level of disclosure is significantly correlated with firm size, degree of international openness, size of audit firms and to a lesser extent to the diffuse nature of ownership.
Hossain, Perera and Rahman	1995	55 companies listed on the New Zealand market	95	There is a positive relationship between the level of voluntary disclosure of firms studied and the size, debt level and external listing
Owusu-Ansah	1998	49 listed companies in Zimbabwe	214	The level of disclosure is positively correlated with size, profitability, shareholder structure.
Depoers	2000	102 listed companies in France	65	There is a positive relationship between the level of voluntary publication, size and external activities of firms.
Archambault and Archambault	2003	621 listed companies across 33 countries	85	Disclosure are influenced by three elements: culture (religion, education, individualism ...), national systems (freedom, press, inflation, financial markets ...) and systems company (shareholders, debt, dividends, listeners , size ...).
Eng, Mak and Forker	2003	158 companies listed in Singapore	84	Impact of ownership structure and composition of the board of directors on disclosure strategy.

Table 3. Lists of voluntary items used in the literature

Authors	Year	Country	Items number
Chau and Gray	2002	Hong-Kong	116
Myburgh	2001	South Africa	49
Depoers	2000	France	65
Hossain, Perera, and Rahman	1995	New-Zealand	95
Raffournier	1995	Switzerland	30
Cooke	1989	Sweden	146
Chow, Wong- Boren	1987	Mexico	24

Table 4. Sample of SBF 120 Index firms

SBF 120 firms	120
Companies are not present in the index during the entire study period	- 44
Financial and insurance companies	- 4
Lack of information (not available annual report)*	- 5
Final sample	67

(*Clarins and Thomson are kept; they are present 5 years over 6; in 2008 theses companies did not publicize annual report)

Table 5 List of the 40 items and number of occurrence over the global sample
(Each information disclosure is numbered 1 (hit) / no disclosure is 0; sample of 67 firms over 6 years; theoretical maximum number of occurrence is 16000; two firms absent in year 2008)

#	List of 40 items	Total nb of hits	28 items Score	35 items Score	29 items Score
1	Description of principal products / services - Market share	398	X	X	X
2	Forecast of profit year n +1 (qualitative)	5	X	X	
3	Forecast of profit year n+1 (quantitative)	4	X	X	
4	Future cash at horizon 2 to 5 years	0	X	X	
5	Description of the major factories, warehouses and properties	154		X	
6	Biographical Profile of Directors and Officers (responsibilities, experience, courses)	399			X
7	Capital expenditures (past and futures), Investments	291	X	X	X
8	Directors' biography	261	X	X	X
9	General objectives of the firm – Goals	391	X	X	X
10	Description of marketing network for final goods and services	253	X	X	X
11	Main activity or affiliation of directors with other organizations	397	X		X
12	Information on the social responsibility of the firm	379		X	X
13	Structure of ownership, investors' types and names	394	X	X	X
14	Historical share price – Trend	383			X
15	Cost of sales	224	X	X	X
16	Advertising expenditures: information and amount	77	X	X	
17	Human Resources: Cost of training operations	212		X	X
18	Information on depreciation	38	X	X	
19	Value added statement	54	X	X	
20	Return on capital employed	95	X	X	
21	Return on shareholders' securities	122	X	X	
22	Cash Ratio - Current Ratio	44	X	X	
23	Other financial ratios	344		X	X
24	Economic factors influencing future activity	399		X	X
25	Political and social factors influencing future activity	365		X	X
26	Technological factors influencing future activity	217	X	X	X
27	Discussion on past industry tendencies	377	X	X	X
28	Discussion on future industry tendencies	363	X	X	X
29	Position and competitive environment	394	X	X	X
30	Policy and financial objectives	369	X	X	X
31	Description of activities and transactions linked with government and state entities	14	X	X	

32	Firm history	334	X	X	X
33	Description of the organizational structure	352		X	X
34	Market capitalization and financial operations	259			X
35	Information on fixed assets variations	394			
36	Information on secured and non-secured debts	320		X	X
37	Information on R&D projects	299	X	X	X
38	Development of new products / services	320	X	X	X
39	Number of employees	400	X	X	X
40	Special report on employees and social activities	307	X	X	X
	Grand Total	10402			

Table 6 PCA analysis of the different scope of individual items
(PC1 is the first principal component resulting from the principal component analysis of the array of 67 firms and respectively 40, 28, 29 and 35 items; correlation is the R-squared between the value of the coordinates of each firm on the PC1 and its equally weighted global score; PC2 is the second principal component; items are sum of dummy variable of the presence /absence of the item in the 2003-2008 financial reports; items are between 0 and 6)

	Score 40 items	Score 28 items	Score 29 items	Score 35 Items
Correlation with PC1	0.9091	0.8797	0.9786	0.8996
Variance explained (%)				
PC1	89.4%	88.1%	92.0%	87.7%
PC2	1.3%	1.8%	1.3%	1.6%

Table 7 Cross correlation between alternative global scores
(R-squared values between global scores; score 40 is the global score comprising the 40 items list; respectively for the 28, 29 and 25 items list)

	Score 40	Score 28	Score 29
Score 28	0.8129		
Score 29	0.8429	0.6610	
Score 35	0.9645	0.8720	0.7915

44

Table 8 – Voluntary disclosure scores – Summary statistics
 (Number of items per score is 40, 28, 35 and 29; 67 firms; Coef. Variation: standard deviation divided by mean)

	2003	2004	2005	2006	2007	2008
40 items score						
Mean	24,42	25,00	26,21	26,51	26,13	27,82
Median	25,00	25,00	27,00	27,00	27,00	28,00
Min	13,00	16,00	18,00	18,00	19,00	22,00
Max	30,00	30,00	31,00	32,00	32,00	32,00
Std dev	3,02	2,87	2,53	2,46	2,79	2,16
Coef. variation	0,12	0,11	0,10	0,09	0,11	0,08
28 items score						
Mean	16,96	17,39	18,21	18,45	18,46	19,38
Median	18,00	18,00	19,00	18,00	19,00	20,00
Min	9,00	9,00	11,00	13,00	13,00	14,00
Max	21,00	22,00	23,00	23,00	23,00	23,00
Std dev	2,48	2,61	2,42	2,11	2,35	1,88
Coef. Variation	0,15	0,15	0,13	0,11	0,13	0,10
35 items score						
Mean	21,09	21,66	22,63	22,85	22,70	23,97
Median	22,00	22,00	23,00	23,00	23,00	24,00
Min	11,00	13,00	15,00	16,00	16,00	19,00
Max	26,00	26,00	27,00	28,00	28,00	27,00
Std dev	2,79	2,67	2,40	2,23	2,40	1,83
Coef. Variation	0,13	0,12	0,11	0,10	0,11	0,08
29 items score						
Mean	21,03	21,40	22,36	22,66	22,12	23,69
Median	21,00	22,00	23,00	23,00	23,00	24,00
Min	11,00	14,00	16,00	16,00	16,00	19,00
Max	25,00	25,00	25,00	26,00	26,00	27,00
Std dev	2,72	2,34	2,05	1,88	2,20	1,79
Coef. Variation	0,13	0,11	0,09	0,08	0,10	0,08

Table 9
Median scores over the 2003-2004 sub period and the 2006-2007 sub-period; High disclosing firms are those with an individual score above or equal to the median; low disclosing firms have below median scores; Number of firms belonging to each high/low group; prob. to remain in the group: percentage of firms belonging to the group in the first sub-period still in the group in the second sub-period)

		2003-4	2006-7	Prob. to remains in the group
Median score		50	53	
#Highly disclosing firms		34	39	76,47%
#Low disclosing firms		33	28	60,61%

Table 10 – List of variables

Variables	Definition	Comment
ABS_ACCUR_NORM	Absolute forecast error	Absolute value of the forecast error (see ACCUR) divided by the stock value ate the end of the fiscal year
ACCUR	Forecast accuracy	Forecast errors between the actual EPS related to given fiscal year and the mean analyst forecast at the end of the fiscal year. (IBES)
CAC	Firm belonging to the top tier CAC 40 stock Index	Dummy variable (1 if belongs to the French CAC 40 index)
FOR_STD	Dispersion of earning forecasts	Standard deviation of analysts' forecasts of earning per share. (IBES)
FOR_STD_NORM	Forecast dispersion	Standard deviation of forecast (see FOR_STD) divided by the stock price at the end of the fiscal year
IFRS	Introduction of IFRS standards	Dummy variable (0 in 2003-2004; 1 in 2005-2008)
INST_OWN	Institutional investors' ownership	Equity share of capital held by institutional investors (Thomson Financial)
LNTA	Size of the firm	Log of the total assets (Thomson Financials)
LT_DT_OV_CAP	Leverage ratio	Long term debt over book capital (Thomson Financial)
MTB	Market to Book ratio	(Datastream)
NB_ANAL	Number of analysts following the firm	Number of analysts providing earning per share forecasts. (IBES)
OP_MARGIN	Operating margin	above Operating profit over total sales in percentage (Thomson Financial)
RISK_MKT	Market risk indicator	Yearly beta coefficient using 52 weekly stock returns and regressed with the SBF 120 Stock Index. (Thomson Financial)
SCORE	Financial voluntary publication score	Estimated by the number of items of voluntary disclosed information in the annual report ot the year t by the firm i. (Between 0 and 28)
SCOREDUMYEAR	Highly communicant firms dummy	Dummy variables for highly communicant firms. Considering each year scores, firms with a publication score above or equal to the median value are flagged (1); Non communicant are below the median
SCOREHIGHYEAR	Highly communicant firm score values	Difference of each year score value and its median only is positive, 0 otherwise for forms with scores at or below its yearly median value
TOP_3	Share ownership concentration	Sum of the equity stake of the three first shareholders (Thomson Financial)
TREND	Time trend	1 to 6 for each year of the 2003-2008 period

Table 11 Descriptive statistics
(64 firms; period 2003-2008; source: see Table 10)

Variables	N	Mean	Standard deviation	Min	Max
ABS_ACCUR_NORM	377	0.0403	0.1483	0.000013	1.913543
ACCUR	377	-0.8663	4.0596	-45.80509	4.89036
CAC	384	0.3958	0.4897	0	1
FOR_STD	377	0.3576	0.5882	0.010829	9.42272
FOR_STD_NORM	377	0.0151	0.0664	0.000701	1.24721
IFRS	384	0.6667	0.4720	0	1
INST_OWN	379	16.9417	8.7206	0.13	63.51
LT_DT_OV_CAP	382	34.504062	21.85892	0	150.87853
LNTA	382	8.838708	1.469723	5.299322	11.67249
MTB	379	2.441557	1.757669	-4.87	15.69
NB_ANAL	378	16.611111	6.568923	1	36
OP_MARGIN	382	9.858321	8.485468	-31.68977	45.368
RISK_MKT	379	0.340657	0.174108	-0.05186	0.955
SCORE	384	16.067708	2.37823	8	21.000
SCOREDUMYEAR	384	0.578125	0.494503	0	1
SCOREHIGHYEAR	384	0.625	1.047189	0	5
TOP_3	379	37.435858	21.181419	2.56	87.09
TREND	384	3.5	1.710053	1	6

Table 12 Existence of a time dimension effect in the score variable
(Poisson regression; dependent variable is the voluntary disclosure score index SCORE; variables see table 9; INDUSTRY: set of 10 dummy variables corresponding to the ICB industry codes; sig: significant industry dummies; 64 firms; period 2003-2008; variable description: see Table 10; a,b,c: significant at the 1%, 5% 10% level)

Variables	Coeff	p-val	Coeff	p-val	Variables	Coeff	p-val	Coeff	p-val
LNTA	0.0141	0.06c	0.0128	0.09	ABS_ACCUR_NORM	-0.0385	0.23	-0.0233	0.48
NB_ANAL	0.0007	0.60	0.0003	0.82	LNTA	0.0171	0.04b	0.0148	0.07c
INST_OWN	0.0014	0.14	0.0021	0.02b	NB_ANAL	0.0007	0.62	0.0005	0.75
RISK_MKT	0.0644	0.17	0.1260	0.00a	INST_OWN	0.0013	0.17	0.0021	0.03b
TOP_3	0.0002	0.62	0.0004	0.24	RISK_MKT	0.0414	0.40	0.1077	0.02b
TREND	0.0223	0.00a			LT_DT_OV_CAP	-0.0006	0.15	-0.0005	0.22
IFRS			0.0791	0.00a	TOP_3	0.0001	0.82	0.0004	0.30
					MTB	0.0008	0.82	-0.0010	0.77
					TREND	0.0225	0.00a		
					IFRS			0.0775	0.00a
INDUSTRY	yes	sig	yes	sig	INDUSTRY	yes	sig	yes	sig
LR test	38.95		40.13		LR test	39.88		40.74	
p-val	0.00		0.00		p-val	0.00		0.00	
pseudo R2	0.29		0.30		pseudo R2	0.30		0.30	

Table 13 Individual and time effects
(analysis of variance of series, 64 firms and 6 years, N=384 observations; a,b,c: significant at the 1%, 5% 10%level)

Voluntary score SCORE	F	p-value
Individual firm's effect	8.44	0.00a
Time effect	10.64	0.00a
Forecast accuracy (FOR_ACCUR_NORM)		
Individual firm's effect	2.47	0.00a
Time effect	2.63	0.02b
Analysts' forecast dispersion (FOR_STD_NORM)		
Individual firm effect	1.19	0.17
Time effect	1.59	0.16

Table 14 Determinants of the disclosure score index

(Panel analysis; dependent variable is SCORE or variation SCORE – SCORE{1}; {1} signals a one year lagged variable; Fixed effect: random or fixed individual effect; variables: see table 9;Constant in the variable is the constant in the random individual effect; INDUSTRY: set of 10 dummy variables corresponding to the ICB industry codes; sig: significant industry dummies; Normality: Jarque-Bera test of normality of the residuals, the p-value of the Jarque-Bera statistic is displayed; 64 firms; period 2003-2008; variable description: see Table 10; a,b,c: significant at the 1% level, the 5% level, the 10% level)

M1			M2			M3			M4			M5		
Dependent	SCORE			SCORE			SCORE			SCORE			var in SCORE	
Fixed effect	rand			rand			rand			rand			rand	
FOR_STD	0.6878		FOR_STD	0.9534		Constant	8.2045	a	Constant	8.2300	a	Constant	0.7731	
LNTA	0.1222		LNTA	0.0835		FOR_STD	0.6803		FOR_STD	0.9427		FOR_STD	0.5023	
LEVERAGE	-0.0040		LEVERAGE	-0.0047		LNTA	0.2121		LNTA	0.1817		FOR_STD{1}	-1.6915	
TREND	0.2877	a	IFRS	0.7627	a	LEVERAGE	-0.0024		LEVERAGE	-0.0030		LNTA	-0.0058	
SCORE{1}	0.3259	a	SCORE{1}	0.3238	a	TREND	0.2798	a	IFRS	0.7335	a	LEVERAGE	-0.0023	
CAC	0.2807		CAC	0.3049		SCORE{1}	0.3460	a	SCORE{1}	0.3455	a	TREND	0.0581	
NB_ANAL	-0.0034		NB_ANAL	-0.0055		CAC	0.2849		CAC	0.3077		CAC	-0.2878	
INST_OWN	-0.0147		INST_OWN	-0.0022		NB_ANAL	-0.0014		NB_ANAL	-0.0033		NB_ANAL	-0.0084	
TO_3	-0.0073		TOP_3	-0.0022		INST_OWN	-0.0166		INST_OWN	-0.0044		INST_OWN	-0.0115	
ACCUR	-0.5416		ACCUR	-0.3699		TOP_3	-0.0090		TOP_3	-0.0040		TOP_3	-0.0050	
RISK	0.6998		RISK	1.9956	a	ACCUR	-0.3993		ACCUR	-0.2369		ACCUR	-0.6695	
						RISK	0.7095		RISK	1.9604	a	ACCUR{1}	1.2953	c
												RISK	0.7749	
INDUSTRY	yes	sig	INDUSTRY	yes	sig	INDUSTRY	no		INDUSTRY	no		INDUSTRY	no	
Normality	0.009a			0.014b			0.020b			0.030b			0.000a	
R2	0.74			0.74			0.74			0.74			0.03	

M6			M7			M8			M9			M10		
var in SCORE			var in SCORE			SCORE			SCORE			SCORE		
rand			fixed			rand			rand			fixed		
LNTA	-0.0655		LNTA	0.1984		SCORE{1}	0.3272	a	Constant	9.7856	a	ACCUR{1}	0.4299	
TREND	0.0570		LEVERAGE	0.0015		ACCUR{1}	0.5950		ACCUR{1}	0.8253		SCORE{1}	0.1432	b
ACCUR{1}	1.2657	c	IFRS	0.2821		FOR_STD{1}	-4.7310		SCORE{1}	0.3435	a	CAC	0.5126	
RISK	0.7362		CAC	0.3571		TREND	0.3383	a	CAC	0.6359	c	TREND	0.4448	a
OMARG	-0.0114		NB_ANAL	-0.0356					TREND	0.3214	a	INST_OWN	-0.0226	c
			INST_OWN	-0.0151					INST_OWN	-0.0174		TOP_3	-0.0199	
			TOP_3	0.0022					TOP_3	-0.0079		OMARG	-0.0259	
			ACCUR{1}	1.6122	b				OMARG	-0.0120		FOR_STD{1}	-4.6626	
			RISK	1.2476					FOR_STD{1}	-3.1051		RISK	0.3534	
									RISK	0.7838				
INDUSTRY	yes	non sig	INDUSTRY	no		INDUSTRY	yes	sig	INDUSTRY	no		INDUSTRY	no	
Normality	0.000a			0.003a			0.001a			0.018b			0.004a	
R2	0.08			0.11			0.74			0.74			0.76	

Table 15 Determinants of the forecasting accuracy and the forecast dispersion

(Panel analysis; dependent variable is forecasting accuracy ACCUR or analysts' forecast dispersion FOR_STD; {1} signals a one year lagged variable; Fixed effect: random or fixed individual effect; variables: see table 9;Constant in the variable is the constant in the random individual effect; INDUSTRY: set of 10 dummy variables corresponding to the ICB industry codes; sig: significant industry dummies; Normality: Jarque-Bera test of normality of the residuals, the p-value of the Jarque-Bera statistic is displayed; 64 firms; period 2003-2008; variable description: see Table 10; a,b,c: significant at the 1% level, the 5% level, the 10% level)

M1			M2			M3			M4			M5			M6		
Dependent	ACCUR			ACCUR			ACCUR			ACCUR			ACCUR			ACCUR	
Fixed effect	rand			rand			rand			rand			rand			fixed	
Constant	-0.1415		SCORE	-0.0084	b	Constant	-0.0792		Constant	-0.1200		Constant	-0.0660		SCORE	-0.0057	
SCOREDUM{1}	0.0158		LNTA	0.0230	a	SCORE	-0.0053		SCORE	-0.0032		SCORE	-0.0048		SCOREDUM{1}	0.0157	
FOR_STD	0.1951		NB_ANAL	0.0016		SCOREDUM{1}	0.0214		SCOREDUM{1}	0.0172		SCOREDUM{1}	0.0181		LNTA	-0.0220	
LNTA	0.0335	b	LEVERAGE	-0.0004		LNTA	0.0333	b	LNTA	0.0353	a	LNTA	0.0317	b	NB_ANAL	-0.0002	
NB_ANAL	0.0005		CAC	-0.1011	a	NB_ANAL	-0.0002		NB_ANAL	0.0005		NB_ANAL	0.0003		TREND	-0.0076	
LEVERAGE	0.0002					IFRS	-0.0483	a	IFRS	-0.0453	a	TREND	-0.0131	a	CAC	-0.2211	a
CAC	-0.1612	a				CAC	-0.1734	a	CAC	-0.1653	a	CAC	-0.1690	a	FOR_STD	0.1920	b
IFRS	-0.0422	a				FOR_STD	0.2018	a	RISK	-0.0753	c	FOR_STD	0.2259	a			
RISK	-0.0831	b							FOR_STD	0.2148	a						
OPMARG	-0.0020	c															

M1			M2			M3		
Dependent	FOR_STD			FOR_STD			FOR_STD	
Fixed effect	random			random			fixed	
Constant	0.0167		Constant	-0.0410		FOR_STD{1}	1.0435	a
FOR_STD{1}	1.0230	a	FOR_STD{1}	1.0600	a	SCORE{1}	0.0084	b
SCOREDUM{1}	-0.0068		SCORE{1}	0.0062	c	SCOREDUM{1}	-0.0251	c
LNTA	-0.0014		SCOREDUM{1}	-0.0225	c	LNTA	-0.0457	c
NB_ANAL	-0.0007		LNTA	-0.0041		NB_ANAL	-0.0006	
IFRS	0.0134		NB_ANAL	-0.0009		IFRS	0.0133	
CAC	0.0104		IFRS	0.0068		CAC	0.0234	
			CAC	0.0116				

Table 16 Endogeneity and systems of equations

(Multivariate Panel analysis; panel of individual effects, time effect is analyzed with the TREND (upper part of the table) or IFRS (lower part of the table) variables; dependent variables are voluntary disclosure SCORE, forecasting accuracy ACCUR and analysts' forecast dispersion FOR_STD; {1} signals a one year lagged variable; Fixed effect: random or fixed individual effect; variables: see table 9;Constant in the variable is the constant in the random individual effect; INDUSTRY: set of 10 dummy variables corresponding to the ICB industry codes; sig: significant industry dummies; Normality: Jarque-Bera test of normality of the residuals, the p-value of the Jarque-Bera statistic is displayed; 64 firms; period 2003-2008; variable description: see Table 10; a,b,c: significant at the 1% level, the 5% level, the 10% level)

System 1						System 2								
EQ 1			**EQ2**			**EQ1**			**EQ2**			**EQ3**		
Dependent	SCORE		ACCUR			SCORE			ACCUR			FOR_STD		
Fixed effect	random		random			random			random			random		
Constant	4.5517	a	Constant	0.0015		Constant	4.5517	a	Constant	0.0015		Constant	-0.0582	
ACCUR{1}	1.2982	b	SCORE	0.0019		ACCUR{1}	1.2982	b	SCORE	0.0019		FOR_STD{1}	1.0056	a
SCORE{1}	0.6917	a	LNTA	0.0091		SCORE{1}	0.6917	a	LNTA	0.0091		SCORE{1}	0.0043	
CAC	0.1445		NB_ANAL	-0.0004		CAC	0.1445		NB_ANAL	-0.0004		SCOREDUM{1}	-0.0222	c
TREND	0.1396	c	TREND	-0.0160	a	TREND	0.1396	c	TREND	-0.0160	a	LNTA	0.0019	
INST_OWN	-0.0061		CAC	-0.0346	c	INST_OWN	-0.0061		CAC	-0.0346	c	NB_ANAL	-0.0009	
TO_3	-0.0017		FOR_STD	0.2533	a	TO_3	-0.0017		FOR_STD	0.2533	a	IFRS	0.0072	
OMARG	-0.0035					OMARG	-0.0035					CAC	-0.0006	
FOR_STD{1}	-3.2688					FOR_STD{1}	-3.2688							
RISK	1.1700	c				RISK	1.1700							
Panel	indiv		indiv			indiv			indiv			indiv		
Normality	0.010	b				0.010	b							
R2	0.62		0.07			0.62			0.07			0.09		

System 1						System 2								
EQ 1			**EQ2**			**EQ1**			**EQ2**			**EQ3**		
Dependent	SCORE		ACCUR			SCORE			ACCUR			FOR_STD		
Fixed effect	Random		random			random			random			random		
Constant	4.4733	a	Constant	0.0015		Constant	4.4733	a	Constant	0.0015		Constant	-0.0582	
ACCUR{1}	1.3175	b	SCORE	0.0019		ACCUR{1}	1.3175	b	SCORE	0.0019		FOR_STD{1}	1.0056	a
SCORE{1}	0.6862	a	LNTA	0.0091		SCORE{1}	0.6862	a	LNTA	0.0091		SCORE{1}	0.0043	
CAC	0.1333		NB_ANAL	-0.0004		CAC	0.1333		NB_ANAL	-0.0004		SCOREDUM{1}	-0.0222	c
IFRS	0.5267	b	TREND	-0.0160	a	IFRS	0.5267	b	TREND	-0.0160	a	LNTA	0.0019	
INST_OWN	-0.0006		CAC	-0.0346	c	INST_OWN	-0.0006		CAC	-0.0346	c	NB_ANAL	-0.0009	
TO_3	0.0006		FOR_STD	0.2533	a	TO_3	0.0006		FOR_STD	0.2533	a	IFRS	0.0072	
OMARG	-0.0069					OMARG	-0.0069					CAC	-0.0006	
FOR_STD{1}	-2.1379					FOR_STD{1}	-2.1379							
RISK	1.6027	a				RISK	1.6027	a						
Panel	Indiv		indiv			indiv			indiv			indiv		
Normality	0.018	b				0.018	b							
R2	0.62		0.07			0.62			0.07			0.09		

Figure 1. Average voluntary disclosure score over the 2003-2008 period.