

Signaling Firm Performance Through Corporate Voluntary Disclosure

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ABSTRACT

The present study empirically investigates the link between corporate voluntary disclosure and firm performance. The empirical analyses show a positive relationship between disclosure indexes and firm performance proxies. They provide evidence that the level of voluntary information disclosed in annual reports plays a significant signaling role of firm performance. However, the extent of this role depends on the nature of the voluntary disclosure, i.e. strategic, financial or corporate governance information.

Keywords: Voluntary Disclosure; Signaling Theory; Firm Performance; Data Envelopment Analysis

INTRODUCTION

This study examines the relationship between corporate voluntary disclosure and firm performance. According to signaling theory (Spence, 1973), the main objective of firm disclosure is to inform analysts and investors of about the firm quality and value. In this regard, Verrecchia (1983) suggests that corporate disclosure helps analysts and investors to predict future earnings, as corporate managers have to disclose value-relevant information.

Numerous studies demonstrate that the informativeness of voluntary disclosure reduces the cost of capital (Francis et al., 2008; Karamanou and Nishiotis, 2009; Dhaliwal et al., 2011) and increases the firm value (Lajili and Zeghal, 2006; Banghøj and Plenborg, 2008; Cheung et al., 2010; Hassan and Mohd-Saleh, 2010; Al-Akraa and Jahangir-Ali, 2012). Some other studies especially focus on corporate voluntary disclosure in annual reports. These reports are the main documents published by firms and are generally used by stakeholders to assess firm performance (Lang and Lundholm, 1993; Banghøj and Plenborg, 2008; Hassan et al., 2009; Uyar and Kiliç, 2012). Hence, previous research on voluntary disclosure demonstrates that relevant corporate information reveals firm value. The present paper extends this previous research and investigates whether the extent of voluntary disclosure in annual reports signalizes firm performance.

For the empirical analyses, we use panel data of 1074 firms-years listed on the Euronext Paris stock exchange. Firstly, we deploy a non-parametric approach to assess firm performance. In particular, we rely on data envelopment analysis (DEA) to measure the firm ability to maximize its value (output) given a set of determinants (inputs). Secondly, we employ a parametric approach to explain firm performance proxies. We consider the estimated efficiency scores obtained from the DEA approach as a dependent variable. In parallel, we use disclosure indexes, which measure the level of voluntary disclosure in annual reports, as independent variables.

The empirical findings show a positive relationship between disclosure indexes and performance measures. They provide evidence that the level of voluntary information disclosed in annual reports plays a significant signaling role of firm performance. However, the extent of this role depends on the nature of the voluntary disclosure, i.e. strategic, financial or corporate governance information. The findings presented and discussed in this article should provide useful insights for academics as well as practitioners. As far as we know, this study is one of the first, especially in the French context, to consider the multidimensionality of firm performance when investigating whether the extent of voluntary disclosure signalizes corporate performance. Thus, the methodological

approach and the empirical results of this research enrich the existing literature on the signaling role of corporate voluntary disclosure, relying on an innovative DEA non-parametric approach to assess firm performance.

The remainder of this paper consists of four sections. Section 2 presents the theoretical framework. Section 3 explains the methodology. Section 4 presents and discusses the results and Section 5 serves as a conclusion.

THEORETICAL FRAMEWORK

According to signaling theory (Spence, 1973), the primary objective of corporate disclosure is to inform analysts and investors about the firm quality and value. This suggests that voluntary disclosure decisions lead to the reporting of relevant information about firm performance. Based on these theoretical suggestions, prior studies have attempted to empirically examine the relevance of corporate voluntary disclosure.

Several studies evidence the relevance of corporate voluntary disclosure by its effect on the cost of capital. They point out that firms which have increased the level of voluntary disclosure show a lower cost of capital (Botosan, 1997; Piotroski, 1999; Verrecchia, 2001; Botosan and Plumlee, 2002). In this regard, Gietzmann and Ireland (2005), Espinosa and Trombetta (2007) and Francis et al. (2008) find a negative association between voluntary disclosure and the cost of capital. Some other studies examine the relevance of corporate voluntary disclosure through its effect on the firm value (Lajili and Zeghal, 2006; Cheung et al., 2010; Hassan and Mohd-Saleh, 2010; d’Al-Akraa and Jahangir-Ali, 2012). They evidence the existence of a positive relationship between voluntary disclosure and the firm value. Hence, they highlight the significant signaling role of corporate voluntary disclosure. For instance, Hassan et al. (2009) specify that corporate voluntary disclosure mitigates uncertainty surrounding firm growth perspectives and facilitates share trading. Consequently voluntary disclosure is likely to affect the firm value. Based on the arguments of the signaling theory and the empirical results of prior studies, we anticipate that corporate voluntary disclosure may be considered as a signaling tool revealing firm performance.

An important element of debate in finance research is how to assess firm performance. Performance evaluation through the income statement is the most common approach. Several criticisms have been addressed to the use of accounting measures of performance (Benston, 1985). Market evaluation through for instance market-to-book ratio or Tobin’s Q could be presented as alternative estimates of firm performance. However, market values depend on investor confidence and on other factors outside the direct control of firms (Nanka-Bruce, 2009). Thus, market values as measures of performance are not entirely attributable to firm specific characteristics (Nanka-Bruce, 2009).

In this study, we deploy another alternative multidimensional measure of performance to counteract such difficulties. This measure of performance is based on technical efficiency through both parametric and non-parametric approaches. Note that Technical efficiency relates to the success of firms to produce maximum outputs from a set of inputs under a given production technology (Nanka-Bruce, 2009). Some previous papers have linked technical efficiency to a number of corporate governance aspects, such as board of directors and ownership structure. Nevertheless, to the best of our knowledge, no study has associated this alternative measure of performance with corporate disclosure policy. To summarize, this study aims explicitly to investigate the link between the level of corporate voluntary disclosure indexes and firm multidimensional performance proxies.

METHODOLOGY

Estimating Firm Performance Using Data Envelopment Analysis (DEA)

In this paper, we measure multidimensional firm performance using a non-parametric approach of data envelopment analysis (DEA). In this approach, each firm represents a unique decision making unit (DMU). Based on rigorous linear mathematical programming, the method focuses on the observed data of each DMU. This method makes it possible to draw conclusions based on efficiency comparisons with peers, and gives indications regarding needed policy changes (Charnes et al., 1994). In other words, it distinguishes inefficient DMUs from efficient ones based on whether or not they lie on the efficient frontier of the possibility set. This set is composed of all feasible input-output combinations with a production technology that transforms a vector of N inputs

$x = (x_1, \dots, x_N) \in \mathfrak{R}_+^N$ into a vector of P outputs $y = (y_1, \dots, y_P) \in \mathfrak{R}_+^P$. This possibility set T can be formulated as follows:

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

We analyze the relative performance using an output-oriented projection model, producing the largest possible outputs from a given set of inputs. Efficient firms are those that succeed in using minimum inputs to produce maximum outputs. Concretely, we measure firm performance via its value-creation capacity and, in particular, we examine corporate managers’ ability to maximize firm value with an optimal allocation of the same inputs. In other words, we examine whether operating and investment decisions are optimal with regard to obtaining a higher firm value. We use firm value proxies as outputs and operating and investment policy proxies as inputs.

Inputs And Outputs Selection

The principal difficulty with the DEA approach is the choice and specification of inputs and outputs. We base our selection of inputs and outputs on prior research. We select determinants of firm value that are widely used in corporate finance. Figure 1 illustrates the modeling of firm performance. Table 1 presents the selected inputs and outputs of our DEA analysis, the variable measurements and the main corresponding references, respectively.

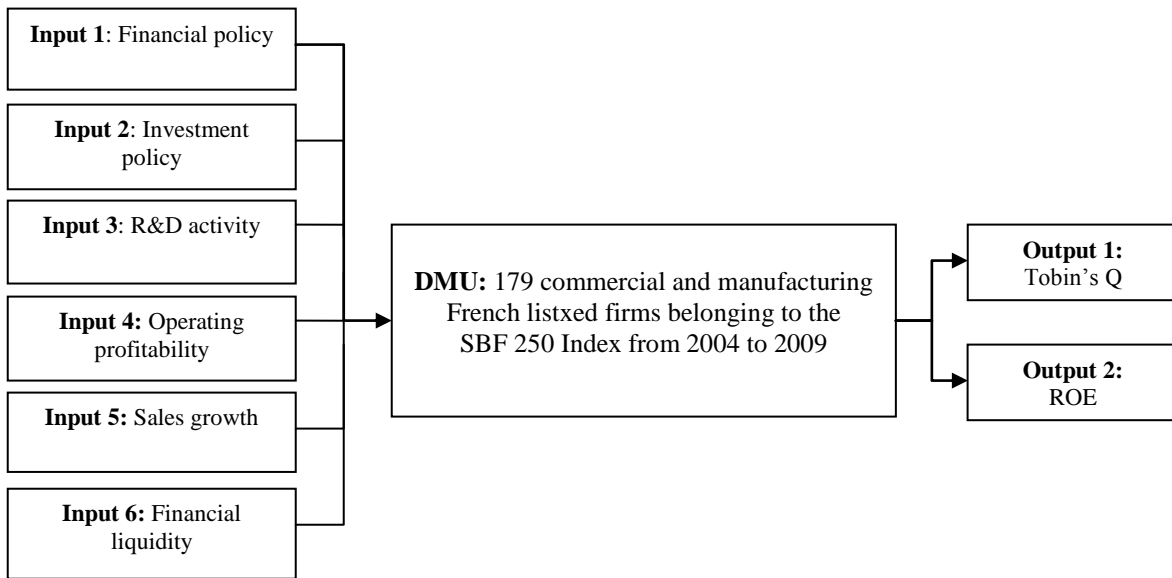


Figure 1: Firm Performance Modeling Using DEA

Table 1: Outputs And Inputs Of The Firm Performance Analysis

Variables	References	References
Outputs		
Firm value	Tobin's Q = Market value of stock + Accounting value of the total debt / Total assets	Himmelberg et al. (1999); Holderness et al. (1999) and Drobetz et al. (2004).
Firm profitability	Return on equity (ROE) = Net benefit / Ownership equity	Demsetz and Lehn (1985); Holderness and Sheehan (1988); Denis and Denis (1994); Thomsen and Pedersen (1996) and Li and Simerly (1998).
Inputs		
Financial policy	Total debt / Total assets	Holderness et al. (1999); Short and Keasey (1999); Oxelheim and Randøy (2003); Habid and Ljungqvist (2005); Bailey et al. (2006) and Zarb (2007).
Investment policy	Tangible assets / Sales	Demsetz and Lehn (1985); Klapper and Love (2004); Habid and Ljungqvist (2005) and Ammann et al. (2011).
R&D activity	R&D expenses / Sales	Demsetz and Lehn (1985); Smith and Watts (1992); Cho (1998); Himmelberg et al. (1999); Habid and Ljungqvist (2005); Olsen and Elango (2005) and Ammann et al. (2011).
Operating profitability	Profit before taxes / Sales	Habid and Ljungqvist (2005) and Ammann et al. (2011).
Sales growth	Sales _t - Sales _{t-1} / Sales _t	Short and Keasey (1999); Olsen and Elango (2005); Bailey et al. (2006); LaPointe et al. (2006); Banghøj and Plenborg (2008); Hassan et al. (2009) and Ammann et al. (2011).
Financial liquidity	Free cash flow / Total assets	Cho (1998); Thomsen and Pedersen (2000); Seifert et al. (2005) and Ammann et al. (2011).

Empirical Specification

To test the relationship between corporate voluntary disclosure and firm performance, we deploy the logit model presented below. The dependent variable (PEFF) takes the value of 1 if a firm is located on the efficiency frontier and 0 otherwise. The voluntary disclosure level is used as an independent variable. Firm size, analyst following, dividend policy and industry are deployed as control variables.

$$PEFF_{it} = \alpha_0 + \alpha_1 VD_{it} + \alpha_2 SIZ_{it} + \alpha_3 ANF_{it} + \alpha_4 DPS_{it} + \alpha_5 IND_{it} + \mu_{it}$$

Where for firm i in year t : VD is equal to the global disclosure index. SIZ is the logarithm of total assets. ANF is the logarithm of 1 plus the number of financial analysts. DPS is the dividend per share. IND is a dichotomous variable coded 1 if the company operates in a high-technology sector and 0 otherwise. μ is the error term.

The independent variable (VD) is the voluntary disclosure score derived from annual reports. We focus on the annual report for several reasons. Firstly, the annual report is considered as the main source of mandatory as well as voluntary disclosures, providing important information for analysts and investors (Wiseman, 1982; Rockness, 1985; Neu et al., 1998). Secondly, the level of firm disclosure is best evidenced by the amount of information contained in an annual report (Zarb, 2007). For instance, Lang and Lundholm (1993) and Holland (1998) find a high positive correlation between corporate disclosure in annual reports and other forms of disclosures. The independent variable (VD) is measured using self-constructed disclosure indexes. We develop a disclosure checklist inspired from Meek et al. (1995), Botosan (1997), Chau and Gray (2002), Eng and Mak (2003), Lim et al. (2007) and Francis et al. (2008). This checklist consists of 112 items (see Appendix) falling into four general categories, namely, strategic information (STGVD, 30 items), non-financial information (NFNVD, 35 items), financial information (FNVD, 36 items), and corporate governance information (GOVVD, 11 items). Following Cooke (1992), we conduct a content analysis to identify the needed information in annual reports. ARVD is the sum of the scores attributed to each item in the voluntary disclosure checklist.

The Appendix presents the checklist of 112 items included in the disclosure scores. To avoid subjectivity, we consider all the disclosed items as equally important, despite the possible variability of information content from one item to another. Thus, we assign a value of 1 when a given item is disclosed and 0 otherwise. The total score is computed as the unweighted score sum of all index items.

The agency theory (Jensen and Meckling, 1976) suggests that firm size affects firm performance because of its impact on ownership structure and the resulting agency problems/conflicts of interest. Indeed, large firms generally realize scale economies which, in turn, influence firm performance (Nanka-Bruce, 2009).

Financial analysts are likely to play a significant role in reducing information asymmetry between corporate managers and investors (Healy and Palepu, 2001). Analysts select firms that are likely to have the most profitable and least risky securities (Boubaker and Labégorre, 2006). As a result, analyst following may reflect firm performance and/or quality to stock market participants. Empirical studies (Pearson, 1992; Chung, 2000; Lang et al., 2004) confirm the signaling role of analyst following. They demonstrate a positive relationship between analyst following and firm value.

According to the signaling theory, the dividend distribution is considered a signal of firm performance. Indeed, in an uncertain economic environment where external investors do not have perfect information about firm profitability, dividends are likely to inform about firm expected cash flows (Bhattacharya, 1979, 1980; Kalay, 1980; Miller and Rock, 1985).

RESULTS AND DISCUSSION

Sample Selection And Descriptive Statistics

Our initial sample consists of all SBF 250 French firms listed the on Euronext stock market from 2004 to 2009. We exclude financial and assimilated firms (SIC codes 4900–4999 and 6000–6999) because they operate in an environment where disclosure is more likely to be a result of specific legal and regulatory requirements. Furthermore, we discard all firms with missing financial or governance data. Finally, we obtain a sample 1074 firms-years (179 firms). Financial figures are obtained from Worldscope database. Corporate annual reports are downloaded from the French stock market authority (AMF) website.

Table 2 shows the descriptive statistics for the dependent and the independent variables.

Table 2: Descriptive Statistics

Variables	N	Min	25%	Mean	Median	75%	Max	St. Dev.
Dependent Variable								
PEFF	179	0	0	0.2672	0	1	1	0.4427
Independent Variables								
ARVD	179	0.0708	0.3438	0.4300	0.4367	0.5044	0.7122	0.1250
STGVD	179	0.0333	0.3513	0.4463	0.4420	0.5440	0.7667	0.1435
NFNVD	179	0	0.27	0.3796	0.3714	0.5091	0.756	0.1554
FNVD	179	0	0.2784	0.3860	0.3618	0.4663	0.9091	0.1629
GOVVD	179	0.0909	0.3725	0.5647	0.5455	0.7273	1	0.2303
Control Variables								
SIZ	179	8.9369	12.8142	14.1258	13.7865	15.4469	18.9310	1.9102
ANF	179	0	1.6094	2.0673	2.1972	2.6391	3.5553	0.7386
DPS	179	0	0.11	1.0473	0.6	1.23	30	2.2668
IND	179	0	0	0.1955	0	0	1	0.3968

The descriptive statistics show that, on average, 26.72% of our sample is located on the efficiency frontier with a standard deviation of 44.27%. We can notice a divergence in the efficiency of these firms. We can also detect diversity in the extent of corporate voluntary disclosure in annual reports. The ARVD ranges from a low value of 0.0708 to a high value of 0.7122. The mean score is 0.43, with a standard deviation of 12.50%.

Regression Results

Table 3 presents the results of the regression model testing for the relationship between disclosure index and firm performance and controlling for firm size, analyst following, dividend policy and industry.

The findings show a positive and statistically significant relationship between the PEFF and VD (measured here by ARVD) variables. They validate our hypothesis predicting the existence of an association between the level of corporate voluntary disclosures and firm performance proxies. Hence, voluntary disclosure in annual reports plays an important signaling role. It provides relevant information explaining firm performance and quality. These findings are consistent with previous studies (e.g. Uyar and Kiliç, 2012) which have demonstrated the significance of voluntary information in revealing firm quality and value.

Table 3: Value Relevance Of The Extent Of Voluntary Disclosure In Annual Reports

Variables	Coefficient	t-statistic	Marginal probability
Constant	2.9926***	4.623	0.5604
VD	1.6291***	2.910	0.3051
SIZ	-0.3232***	-6.095	-0.0605
ANF	-0.1042	-0.832	-0.0195
DPS	0.0197	0.681	0.0037
IND	-0.3479*	-1.870	-0.0616
Pseudo R²		0.0629	
Log likelihood		-584.2179	
LR Chi²		78.4341	
(Prob > Chi²)		(0.0000)	

Further analyses show that the relevance of voluntary disclosure is not homogenous for all information categories. The PEFF variable is negatively and significantly explained by STGVD and GOVVD variables. The NFNVD variable is positively and significantly related to firm performance proxies. These findings raise the question of the extent to which each voluntary information category in annual reports reveals firm performance. Hence, corporate voluntary disclosure decisions appear to be driven by incentives and constraints. Firms may find it advantageous to disclose additional pieces of information (i.e., non-financial voluntary information). In contrast, they may find it disadvantageous to disclose relevant strategic information when they operate especially in a high competitive market. This may explain the divergence in the relevance of voluntary information categories.

Table 4: The Relevance Of Voluntary Information Categories In Annual Reports

Variable	Coefficient	t-statistic	Marginal prob.	Coefficient	t-statistic	Marginal prob.	Coefficient	t-statistic	Marginal prob.	Coefficient	t-statistic	Marginal prob.
Constant	4.0346***	6.128	0.7539	3.5515***	5.712	0.6668	3.3503***	5.321	0.6283	3.8429***	5.971	0.7189
STGVD	-1.1838**	-2.405	-0.2212									
NFNVD				0.0535	0.117	0.0101						
FNVD							0.7766*	1.780	0.1456			
GOVVD										-0.6091**	-1.982	-0.1139
SIZ	-0.3192***	-5.990	-0.0596	-0.3181***	-5.921	-0.0597	-0.3254***	-6.114	-0.0610	-0.3158***	-5.937	-0.0591
ANF	-0.0348	-0.281	-0.0065	-0.0655	-0.530	-0.0123	-0.0596	-0.482	-0.0112	-0.0418	-0.339	-0.0078
DPS	0.0284	0.977	0.0053	0.0195	0.675	0.0036	0.0246	0.844	0.0046	0.0182	0.628	0.0034
IND	0.0284	-1.340	-0.0448	-0.3086*	-1.657	-0.0552	-0.316*	-1.707	-0.0564	-0.2925	-1.578	-0.0522
Pseudo R ²		0.06066			0.0560			0.0585			0.0592	
Log likelihood		-585.6201			-588.5187			586.9656			-586.5564	
LR Chi ² (Prob > Chi ²)		75.6298 (0.0000)			69.8326 (0.0000)			72.9656 (0.0000)			73.7571 (0.0000)	

CONCLUSION

This paper empirically investigated the relationship between corporate voluntary disclosure and firm performance. Based on the signaling theory, we considered corporate voluntary disclosure as a signaling instrument reporting firm performance to investors and financial analysts.

The empirical analyses were based on panel data of 1074 firms-year listed on the Euronext Paris stock market. Performance evaluation has been a critical area of research. We discussed the limits of accounting and financial performance measures and attempted to take into account the multidimensionality of firm performance. Thus, we used a non-parametric approach to measure firm performance via the technical efficiency. Using data envelopment analysis (DEA), we measured a firm ability to maximize its value (outputs) given a set of determinants (inputs). The estimated efficiency scores were used as a dependent variable. We used disclosure indexes which measure the extent of voluntary disclosure in annual reports as independent variable.

The empirical findings reveal a positive relationship between disclosure indexes and performance measures. They provide evidence that the level of voluntary information disclosed in annual reports plays a significant signaling role of firm performance. However, the extent of this role depends on the nature of the voluntary disclosure, i.e. whether it involves strategic, financial or corporate governance information.

AUTHOR INFORMATION

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APPENDIX: Checklist Of Voluntary Disclosure

Checklist Of Items	References	Checklist Of Items	References
A - Strategic information		30. Description of capital project committed	A, B, C
A1. General information about the Firm		B - Non-financial information	
1. Brief history of the company	A, B, C, E	B1. Employee information	
2. General description of the business	B, D	1. Geographical distribution of employees	A, C
3. Main products	B, D	2. Number of employees by gender	A, C
4. Main markets	B, D	3. Number of employees by age	A, C
A2. Corporate strategy		4. Categories of employees by function	A, C
5. Statement of the main objectives	A, B, C, D, E	5. Number of employees for two or more years	A, C, E
6. Statement of the financial objectives	A, C, E	6. Average compensation per employee	A, B
7. Current strategy	A, B, C, F	7. Added value per employee	A, B
8. Impact of strategy on current results	B	8. Data productivity	A, B, C
9. Future strategy	A, B, C	9. Safety policy	A, B, C
10. Impact of strategy on future results	A, C, E	10. Cost of safety measures	A, C
A3. R&D activities		11. Data on accidents	A, C, E
11. Description of R&D projects	A, C	12. Policy on communication	A, C
12. Corporate policy on R&D	A, C	13. Redundancy information	A, C
13. Location of R&D activities	A, C, D	14. Reason for changes in employee numbers or categories over time	A, C
14. Number employed in R&D	A, C, E	15. Recruitment problems and related policy	A, C
A4. Analysis and discussion of management review of projects		B2. Information about the training policy	
15. Review of operations	B	16. Amount spent in training programs	A, C, E
16. Competitive environment	B, D	17. Nature of training	A, C, E
17. The most significant events	B, D	18. Policy on training	A, C, E
18. Change in sales and profits	B, D	19. Categories of employees trained	A, C, E
19. Change in cost of goods sold	B, D	B3. Social policy and value-added information	
20. Change in expenses	B, D	20. Safety of products	A, C
21. Change in inventory	B, D	21. Program of environmental protection	A, C, E
22. Change in share price	B, D	22. Charitable donations	A, C, E
A5. Future prospects		23. Community programs	A, C, E
23. Future development channels	A, B, C	24. Value-added data	A, C, E
24. Qualitative forecast of sales	A, B, C, E	25. Value-added ratios	A, C, E
25. Quantitative forecast of sales	A, B, C, D, F	26. Qualitative value-added information	A, C, E
26. Qualitative forecast of profits	A, B, C, D, E, F	B4. Segmental information	
27. Quantitative forecast of profits	A, B, C, E	27. Geographical distribution of invested capital	A, C, E
28. Assumptions underlying the forecasts	A, B, C	28. Geographical distribution of net assets	A, C
29. Review of forecasts	A, B, C		

Checklist of voluntary disclosure (continued)

Checklist Of Items	References	Checklist Of Items	References
29. Geographical distribution of production	A, C, E	21. Estimates of capital increase	A, B, C
30. Expenditure on the business lines	A, C	22. Earnings estimates	A, B, C
31. Revenue by business line	A, C	23. Effect of inflation currency fluctuations on future operations	A, C
32. Competitor analysis - quantitative	A, C	24. Effect of currency fluctuations of interest rates on future operations	A, C
33. Competitor analysis - qualitative	A, C	C4. Information on exchange rates	
34. Market share analysis – quantitative	A, C	25. Impact of currency fluctuations on current results	A, B, C
35. Market share analysis - qualitative	A, C	26. Impact of currency fluctuations on future operations	A, C, E
C-Financial information		27. Estimates of currency fluctuations	A, B, C
C1. Performance indicators (not included in the financial statements)		28. Exchange rates used in accounting	A, B, C
1. Performance indicators	A, B, C	29. Long-term debt by currency	A, C
2. Financial data for the last five years	A, B, C, D, E	30. Short-term debt by currency	A, C
3. Turnover	A, B, C, D, F	C5. Other financial information	
4. Net income	A, B, C, D, F	31. Share price at year end	A, C
5. Shareholders' equity	A, B, C, D,	32. Share prices trend	A, C, E
6. Total assets	A, B, C, D, F	33. Market capitalization at year end	A, C, E
7. Earnings per share	A, B, C,	34. Trend of market capitalization	A, C
8. Dividend payout policy	A, B, C,	35. Size of shareholdings	A, C
9. Transfer pricing policy	A, B, C,	36. Forecast market share	A, C, D, F
10. Impact of any accounting policy changes on results	A, B, C,	D- Governance information	
11. Advertising expenditure	A, B, C, E	1. Ownership structure	A, C
12. Effect of inflation on results	A, B, C	2. Organizational chart	A, B, C, E
13. Effect of inflation on assets	A, B, C	Composition of the board of directors	
14. Effect of fluctuating interest rates on results	A, B, C, E	3. Personal profiles	A, C
C2. Financial ratios		4. Descriptions of the positions occupied	A, C
15. Liquidity ratio	A, B, C, E	5. Length of time belonging to the company	A, B, C
16. Turnover ratio of assets	A, B, C	6. Number of shareholders sitting on the board of directors	A, B, C
17. Debt ratio	A, B, C, E	7. Academic profile of the directors	A, B, C
18. Profitability ratios	A, B, C, E, F	8. Presence of an Internal Audit Committee	A, B, C
19. Other useful ratios	A, B, C, E	9. Age of the executives	A, B, C
C3. Forecast information		10. Profile of the executives	A, B, C
20. Cash flow forecast	A, B, C, D	11. Individual remuneration	A, B, C

- A: Meek et al. (1995).
 B: Eng and Mak (2003).
 C: Chau and Gray (2002).
 D: Botosan (1997).
 E: Lim et al. (2007).
 F: Francis et al. (2008).

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