Determinants of Voluntary Disclosures in Management Disclosure and Analysis(MD&A): Korean Evidence

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Abstract

This study examines the economic determinants of the voluntary disclosure of management disclosure and analysis (MD&A). The MD&A disclosures in Korea provide a unique setting to test the economic motives of voluntary disclosure because there are no regulations on MD&A contents and formats in Korea. We measure the level of voluntary disclosure by the number of words in an MD&A and the frequency of financial and nonfinancial information keywords within the MD&A. We find the levels of MD&A disclosure are positively associated with external financing, industry concentration, firm size, ownership of small investors, and top management's involvement in MD&A disclosure. These associations are robust to controlling industry membership and using change variables instead of level variables. Our results suggest managers use an MD&A as an information medium to communicate to the public even in the absence of mandatory requirements for MD&A disclosure.

Key words: voluntary disclosure, management discussion and analysis, ownership structure

1. Introduction

This study investigates the economic determinants of voluntary disclosure for management disclosure and analysis (MD&A) in Korea. Specifically, the study examines the firm characteristics that affect management's decision for the voluntary disclosure of financial and/or non-financial information. This is an important question because voluntary disclosure plays a key role in developing countries where mandatory disclosure is relatively less comprehensive. The evidence on determinants of voluntary disclosure can help stakeholders assess the voluntary disclosure and regulatory bodies design more effective and efficient disclosure regulations.

While the Securities Exchange Commission of the US requires publicly traded firms to provide an unaudited narrative called the Management Discussion and Analysis (MD&A) in their annual reports, the Korean regulatory authorities do not explicitly demand any descriptive disclosure similar to the MD&A. Although it is absent in the regulation, many Korean public companies include descriptive information in their annual reports to complement mandated disclosures.[1] Such a disclosure environment provides a natural setting for us to examine the determinants of voluntary disclosure.

While previous literature documents the value relevance of MD&A disclosures in the U.S., few studies have examined the determinants of MD&A disclosures. Since the MD&A disclosures are mandatory in the U.S. and the SEC monitors the ex-post MD&A disclosures, researchers have centered on the content analysis that describes the practices of MD&A disclosures (Hooks and Moon 1993) and the association between the disclosures and stock prices or analyst forecasts (Bryan 1997, Barron et al. 1999). The only exception is Clarkson et al. (1999) that view the MD&A disclosures as a part of a firm's disclosure package and examine the determinants of MD&A disclosure quality. This study extends this stream of research by investigating the determinants of MD&A disclosures in Korea where the MD&A disclosures are entirely voluntary.

We collected and analyzed 1,156 MD&As of public companies listed on the Korea Stock Exchange. We define an MD&A as the narrative section in the beginning of an annual report. The descriptive section is often named as 'overview of operation' or 'message to shareholders' in an annual report. We use content analysis of the MD&As and measure the level of voluntary disclosures by the number of words and the disclosure quality index in an MD&A respectively. We use various determinants of voluntary disclosure documented in prior literature (Lang and Lundholm 1993, Clarkson

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1) For example, LG electronics disclose the current performance and trends of operation through the management discussion and analysis section of 2002 annual report (http://www.lge.co.kr/ir/archive/Annual_report_2002.pdf). The contents and format of the MD&A section is similar to those of the MD&A disclosure in the US.

et al. 1999).   We find that levels of the MD&A disclosure are positively associated with external financing, industry concentration, firm size, ownership of small investors, and top management's involvement in the MD&A disclosure.   The findings do not change qualitatively when we control the industry membership or when we use change variables instead of level variables.

The results of this study are relevant to academics, stakeholders and regulators.   First, this study provides additional evidence that economic incentives suggested in previous literature affect the level of voluntary MD&A disclosure and contributes to the literature of voluntary disclosure.   Especially, the voluntary attribute of MD&A disclosure in Korea provides a powerful setting to examine the determinants of voluntary disclosure. Second, the results help the stakeholders interpret the information contained in the MD&A.   The readers of an MD&A can understand the effect of the underlying economic motives on MD&A disclosure and evaluate the MD&A information.   Third, the results help public policymakers design more effective and efficient regulations on the public disclosure.   Additionally, the findings help regulators prevent a firm's economic incentives from biasing the voluntary disclosure.

The remainder of the paper proceeds as follows.   Section 2 discusses the attributes of MD&A in Korea and reviews related studies on the MD&A and section 3 presents literature that identifies the determinants of voluntary disclosure.   Section 4 discusses the data collection and research design.   Section 5 provides empirical results and section 6 is the conclusion.

2. Management Disclosure and Analysis (MD&A) in Korea

The Securities and Exchange Commission (SEC) of the US mandated since 1980 that public companies' annual reports include a management discussion and analysis (MD&A) section that assesses the enterprises' operation, liquidity, capital resources, and future events and trends that may affect future operations.[2]   The general aim of this requirement is to level the informational playing field by giving the investor an opportunity to look at the company through the eyes of management by providing both short-term and long-term analysis of the business of the company (Bryan 1997). Following the SEC, the Ontario Securities Commission (OSC) adopted similar MD&A requirements in 1989 (Clarkson et al. 1999).

Unlike the SEC and OSC, Korean regulatory authorities such as Financial Supervisory Service neither provide any guidelines for reporting an MD&A nor do they monitor MD&A disclosure practices.   There exists no specific regulation for the contents or

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2)   See the details in Securities Act Release No. 6231 (1980) and Bryan (1997).

formats for reporting the MD&A in Korea. Accordingly, firms are following the general regulation on public disclosure in reporting the MD&A. MD&A disclosures in Korea as a measure of voluntary disclosure therefore bring several benefits to this study.

First, voluntary MD&A disclosures are more likely to reflect economic incentives of a manager or a firm than the alternative measures used in previous studies. Previous studies use either the analysts' survey scores or self-constructed measures as a proxy of voluntary disclosure.[3] Analysts' or investors' survey ratings (e.g. AIMR database) measure the information users' perceived raking of voluntary disclosure. It is unclear if the analysts on the AIMR panels take the ratings seriously, how they select firms to be included in the ratings, and what bias they bring to the ratings (Lang and Lundholm 1993, Healy and Palepu 2001). The survey ratings would be appropriate to examine the market reaction to voluntary disclosures, but inappropriate to extrapolate the clear effect of the firm's characteristics (e.g. a manager's motives) on overall disclosures. Disclosure literature supports the determinant models of voluntary disclosure are more effective in explaining the voluntary disclosure activities with more managerial discretion such as investor relations activities than other mandatory disclosures (Lang and Lundholm 1993). Previous studies also provide evidence that the ranking of mandatory disclosure and that of voluntary disclosure do not necessarily show the same patterns across firms (Botosan and Plumlee 2002). On the other hand, self-constructed measures can be customized for a particular research purpose, but those measures are not free from the researchers' subjectivity. To minimize the subjective bias from researchers, this study forms a comprehensive disclosure index that incorporates all possible information items included in MD&As.

Second, the research on MD&A disclosure is likely to have high external validity and a significant economic influence on the public because as an information medium, MD&A disclosure is more advantageous in terms of the distribution cost and the information accessibility. Firms can communicate with the public through the MD&A at a low cost. The activities to build more desirable investor relations (IR) such as a conference call are accompanied by a high cost. Small companies therefore may not afford such expensive IR activities, which might reduce the external validity of research that uses other voluntary disclosure measures. Firms can alternatively use their websites to reduce information distribution costs, but the likelihood that information users would

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3) Other measures of voluntary disclosure in prior studies include management earnings forecasts (Skinner 1994, 1997, Kaznik and Lev 1995, and Baginski et al. 2002), conference calls (Frankel et al. 1999), and voluntary disclosure of non-mandatory information in annual or quarterly reports (Clarkson et al. 1994, Botosan and Harris 2000, and Chen et al. 2002), which do not focus on the overall level of voluntary disclosure that is the main issue of this study.

visit small firms' websites is relatively low. Using the MD&A data, this study therefore enhances external validity in measuring voluntary disclosures. The public also can easily access MD&A information relative to alternative voluntary disclosures. MD&A disclosure is publicly available through the Internet both in Korea and in the US.[4] In addition, outside information users are likely exposed to the MD&A than other voluntary disclosure because it is included in the annual report that is a major financial information source. As a result, MD&A information would have a large impact on the decision making of the stakeholders.

Third, the legal environment of Korea helps to examine voluntary disclosure of descriptive information. In the US, most of information in an MD&A is disclosed to satisfy the requirement of the regulatory authorities. For instance, managers or auditors are encouraged to preview the MD&A with a checklist before the public disclosure to prevent a potential litigation (Rosenfield and Gill 1991). Consequently, managers caution to include prospective or nonfinancial information, which might hurt the original purposes of the MD&A in the US (Bryan 1997). Such a legal environment within the US suggests that the relationship between litigation risk and voluntary disclosure would affect the choice of voluntary disclosure (Skinner 1994, 1997, Francis et al. 1994, and Johnson et al. 2001).

The voluntary property of an MD&A in Korea, however, allows firms to reveal prospective or nonfinancial information without significant risk of litigation. Since South Korea is a code law country, the general litigation risk is lower in Korea than in other common law countries (La Porta et al. 1997 and Ball, et al. 2000). Furthermore, the lack of monitoring system for MD&A disclosures reduces the risk of lawsuits that might discourage voluntary disclosures. Managers in a less litigious environment such as South Korea therefore can enjoy more discretion in choosing the contents and format of the MD&A than the counterparts in the US (Baginski et al. 2002). Taken as a whole, MD&A disclosures in Korea provide a natural setting to examine the determinants of discretionary disclosures.

Prior literature on the MD&A examines 1) the practices of MD&A disclosures, 2) the association between the disclosures and stock prices or analyst forecasts, and 3) the determinants of MD&A disclosure quality. Early studies on the MD&A concentrate on descriptive researches. Cole (1990) surveys and analyzes the format, length, segment information and environmental matters in MD&As of the S&P Top 100 and provides

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4) While EDGAR (http://www.sec.gov/edgar.shtml) of the US SEC provides the financial information of public companies listed in the US capital market, DART (Data Analysis, Retrieval and Transfer System: http://dart.fss.or.kr/) of Financial Supervisory Service provides the financial information of public companies listed in the Korean capital market.

evidence that most firms provide forward-looking information. Hooks and Moon (1993) examine MD&A disclosure frequencies and compliance of the 1989 SEC release and find the companies in their sample increase their disclosure after the issuance of the 1989 SEC release.

The next category of MD&A research is information content studies that examine the association between MD&A disclosures and stock prices. Bryan (1997) investigates the information content of mandated disclosures contained in MD&As. The results show that prospective MD&A disclosures such as the discussions of future operations and planned capital expenditure are associated with future performance measures and investment decisions. Barron et al. (1999) examine the predictive value of MD&A information and find the association between properties of analysts' earnings forecasts and MD&A quality.

Another category of MD&A research is disclosure studies. Using the survey data from financial analysts and the content analysis data, Clarkson et al. (1999) provide evidence that supports the usefulness of MD&A. Additionally, they show that aggregate MD&A disclosure quality varies with disclosure stimuli similar to those documented in the extant voluntary disclosure literature, and conclude that MD&A is part of a firm's overall disclosure package.

3. Determinants of Voluntary Disclosure

Voluntary disclosure has been the topic of a large amount of attention by accounting researchers. This study employs the determinants of voluntary disclosure documented in the prior literature to explain the patterns of MD&A disclosures rather than develops a theoretical framework. This paper follows the primary stimuli of voluntary disclosures in Lang and Lundholm (1993) and Clarkson et al. (1999) and extends this stream of research by investigating the determinants of the MD&A.[5]

3.1. Firm Performance

Verrecchia (1983) shows that a manager exercises her discretion in disclosing information even though traders have rational expectations about her motivation to withhold unfavorable reports. Empirical studies such as Lang and Lundholm (1993) and Clarkson et al. (1999) support that a firm's disclosure level is positively associated with the firm's performance measured by the change of earnings. Miller (2002) also finds

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5) This study does not include auditor or audit opinion as an independent variable because the MD&A is not audited in Korea. Prior studies of MD&A do not also control for auditor or audit opinion (e.g. Clarkson et al. 1999).

the significant association between discretionary disclosure and time-series earnings, but the direction of association depends on the relation between current earnings and prior earnings time-series. His results suggest that managers choose the quantity, venue and types of disclosures in a strategic manner.

3.2. External Financing

Lowering the cost of capital has been considered as a primary motive of disclosure (e.g. Gigler 1994, Evans and Sridhar 2002). Frankel et al. (1995) find that managers of firms that access the capital market provide more frequent management earnings forecasts. Botosan (1997) and Botosan and Plumlee (2002) report the negative association between public disclosure and cost of equity capital. Sengupta (1998) also find that firms with high disclosure quality ratings enjoy lower cost of debt.

Disclosure studies provide empirical evidence suggesting that managers have incentives to provide more private information to the public to decrease the cost of capital. Lang and Lundholm (1993) and Clarkson et al. (1999) find that firms that are supposed to issue stocks or bonds in the near future are likely to voluntarily disclose more information. Marquardt and Wiedman (1998) and Lang and Lundholm (2000) also document that managers strategically determine the level of voluntary disclosure to reduce the cost of equity capital or to increase their trading profits.

3.3. Industry competition

Analytical accounting literature provides mixed results regarding the effect of proprietary costs on discretionary disclosure. Verrecchia (1983), Dye (1985), Jung and Kwon (1988), and Newman and Sansing (1993) suggest firms withhold private information to avoid a cost associated with the disclosure. On the other hand, Gigler (1994) shows that proprietary costs can actually create the possibility of voluntary disclosures by supplying credibility to such unaudited disclosures. Evans and Sridhar (2002) also find that greater proprietary costs can make a firm's disclosures more credible and increase the frequency of voluntary adverse disclosures.

Existing empirical disclosure studies support that proprietary costs decrease manager's voluntary disclosure of private information. Clarkson et al. (1999) show that return on equity as a proxy of industry concentration has significantly positive relation with the overall disclosure level.

3.4. Firm Size

A large body of accounting literature document that firm size is related to voluntary disclosure level. Firm size is included in almost every disclosure study, either as a variable of interest or as a control variable. Lang and Lundholm (1993) and Clarkson

et al. (1999) report that overall disclosure level significantly increases in firm size. Much more studies use firm size as a control variable (for example, Chen et al. 2002).

3.5. Ownership structure

Agency theory suggests that as the manager's share ownership declines, outside shareholders will increase monitoring of manager's behavior (e.g. Jensen and Meckling 1976). Since managers can access firm-specific private information, managerial shareholders have less incentive to require public disclosure than outside shareholders. Meanwhile, outside shareholders are likely to prefer more public disclosure because they would like to reduce the adverse effects of information asymmetry between managers and outside shareholders.

Abrahamson and Park (1994) and Han (2003) provide empirical evidence suggesting that management (institutional) ownership is negatively (positively) related with disclosure quality. Eng and Mak (2003) also find that managerial ownership affect the disclosure choices of the public firms listed on the Stock Exchange of Singapore. On the other hand, Nagar et al. (2003) report the positive association between discretionary disclosure and the value of shares held by the CEO.

We further predict that foreign investors would show similar preference on public disclosure with institutional investors. The shares held by foreign investors in Korean stock market increased to 36 percent of the total market capitalization in 2002.[6] Most of foreign shareholders are institutional investors in their headquarter countries and are expected to show similar investment strategies with domestic institutional investors.

3.6. Top management

Top management has a huge impact on the decision of disclosure contents and frequency. Clarkson et al. (1999) include the change in the firm's CEO as a control variable to their empirical model to control for the management's influence on voluntary disclosures. We predict that top management's involvement in voluntary disclosure is positively associated with MD&A disclosure levels.

3.7. Control Variables

This study uses performance variability, information environment and leverage as control variables. Empirical evidence on the relation between these variables and voluntary disclosure is mixed. Uncertainty about the future performance likely stimulates voluntary disclosures because investors are likely to prefer stock with less uncertainty on future performance. While Lang and Lundholm (1993) and Chen et al.

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6) Financial Supervisory Service, Dec. 2002, Monthly Financial Statistics Bulletin.

(2002) document that firms with high performance volatility are more likely to disclose discretionary information, Clarkson et al. (1999) find no significant relation between voluntary disclosure and stock return variability.

Previous literature documents that the information environment measured by analyst coverage or return-earnings relation is associated with voluntary disclosure. As more financial analysts follow a firm, the more demand for information the firm will face. Lang and Lundholm (1993), Clarkson et al. (1999) and Chen et al. (2002) find the number of analysts following is positively associated with voluntary disclosures. Correlation between returns and earnings is also likely to be associated with disclosure levels. If return-earnings relation is relatively weak, firms have incentives to provide more information to reduce the uncertainty of future performance and the cost of equity capital. While Lang and Lundholm (1993) provide evidence consistent with the premise and Clarkson et al. (1999) find no significant relation.

Jensen and Meckling (1976) imply that agency costs are higher for firms with proportionally more debt in their capital structure. If creditors force firms with high leverage to disclose more information to reduce potential adverse selection, leverage is likely to be positively related with voluntary disclosures. On the other hand, large creditors can access the management to obtain private information about a firm rather than to rely on public information. Therefore, high leveraged firms may have less incentives to voluntarily disclose more information. Empirical research provides varied results on the relation between leverage and voluntary disclosure. While Meek et al. (1995) document that leverage is positively associated with voluntary disclosure, Hossain et al. (1994) finds no significant relation between the two variables.

3.8. Summary

While the previous discussion provides theoretical and empirical rationales for the correlation between voluntary disclosure and the variables presented in this paper, the direction of the relation is not entirely consistent. Most prior literature suggests a positive relation between voluntary disclosure and external financing, industry concentration, firm size, ownership of outside investors and top management's involvement. However, the relation between voluntary disclosure and firm performance, performance variability, earnings/return correlation and leverage may be conditional on the situation.

4. Data and Research Design

4.1. Data and Measures of MD&A Disclosure

This study uses content analysis of the MD&As of public companies listed on Korea Stock Exchange. We define an MD&A as the narrative section in the beginning of an annual report. The descriptive section is often named as 'overview of operation' or 'message to shareholders' in an annual report. The format of 'overview of operation' is similar with that of an MD&A and the format of 'message to shareholders' is close to that of a president's letter. This study uses both types of disclosures as MD&A data because the two types present similar information regardless of the format. To control for the potential format effect, we include the dichotomous variable classifying the types of formats in the regression analysis.

We collected the MD&A data from Data Analysis, Retrieval and Transfer System (DART) that has archived electronic annual and quarterly reports of all the public companies in Korea since the fiscal year 1998. We obtained accounting and ownership data from KIS-FAS database and stock return data from KIS-SMAT database. Our sample excludes financial institutions (Korean SIC 65006799), firm-years that experience the change in fiscal year ends, and firm-years with missing values in KIS-FAS/SMAT database. Our sample includes 1,156 firm-year observations over the period from 1998 to 2002. Table 1 presents the sample selection procedures and the sample distribution by industry and by year. Our sample is evenly distributed over five years and the sample industry distribution is similar to that of 2002 KIS-FAS/SMAT database.

This study uses the number of words in an MD&A and the disclosure quality index to proxy for voluntary disclosure. The two measures represent the quantity and quality of the MD&A disclosure, respectively. Appendix 1 illustrates the information items and keywords that comprise the MD&A disclosure quality index of this study. We structure the MD&A information by 10 information items and search for 51 information keywords. To calculate the disclosure index, we give one for each information keyword if the particular keyword is disclosed in the MD&A and zero otherwise. The disclosure quality index is computed as the sum of the information keyword frequency. We search for each information keyword in several ways: 1) in different languages (Korean, English and Chinese), 2) in different forms (one-word search, multiple-word search and acronym search). We check for double counting of a keyword in single-word keywords, multiple-word keywords and acronyms. Finally, we add up the frequencies to proxy for the disclosure quality. Using this disclosure index, we examine whether disclosure stimuli documented by prior literature explain the quality of voluntary disclosures.

Prior studies for MD&A disclosures have measured disclosure levels by examining whether the MD&A meets disclosure requirement by regulation. Following SEC's requirement, Bryan (1997) categorizes MD&A disclosures into seven groups: selling

price, sales volume, revenue changes, cost changes, liquidity, capital expenditure, and future trends.   Clarkson et al. (1999) also score MD&A disclosure quality in five subcomponents: operations, financial condition, liquidity, forward-looking information, and risk and uncertainty.   However, the same approach may not work well in Korea where MD&A disclosures are entirely voluntary.   This study instead constructs the MD&A disclosure quality index, using a large set of information items that encompass both financial and nonfinancial information.   Since the main purpose of MD&A is to discuss and analyze the firm performance and the known or anticipated trends of operations, we include financial performance keywords in the MD&A disclosure index.   In addition, we supplement the nonfinancial performance measures in the balanced scorecard (Kaplan and Norton 1996) as a part of the information set because voluntary projection of anticipated trends tends to incorporate nonfinancial information (e.g. customer, productivity and innovation).   Both academic researches and anecdotal evidence document that firms disclose nonfinancial performance information on a voluntary basis (see Eccles 2001 for examples) and that nonfinancial information is value relevant (Amir and Lev 1996 and Ittner and Larcker 1998).

4.2. Research Design

We integrate all the potential determinants reviewed in section 3 and derive an empirical model that explains firms' disclosure policy.   We estimate the following equations using ordinary least squares.   In the regression, we winsorize all continuous independent variables except Herfindahl-Hirschman Index (HHI), firm size (SIZE) and ownership measures at the top and bottom one percent of each variable to control for the effect of outliers.[7]   This winsorization of outliers does not change our results qualitatively.   Table 2 lists the variables in equation (1) and (2) and their measurement. The expected sign for parameter estimate is also shown with each independent variable.

$$
\begin{aligned}
\mathrm{MDA}_{i,t} = \ & \beta_0 + \beta_1 \mathrm{FP}_{i,t} + \beta_2 \mathrm{ROA}_{i,t} + \beta_3 \mathrm{LOSS}_{i,t} + \beta_4 \mathrm{FIN}_{i,t} + \beta_5 \mathrm{HHI}_{i,t} + \beta_6 \mathrm{SIZE}_{i,t} \\
& + \beta_7 \mathrm{LARGEST}_{i,t} + \beta_8 \mathrm{SMALL}_{i,t} + \beta_9 \mathrm{SIGN}_{i,t} + \beta_{10} \mathrm{RV}_{i,t} + \beta_{11} \mathrm{REC}_{i,t} \\
& + \beta_{12} \mathrm{LEV}_{i,t} + \sum_{j=1}^{11} \gamma_j \mathrm{IND}_{i,j} + \varepsilon_{i,t}
\end{aligned} \qquad (1)
$$

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7) We exclude the Herfindahl-Hirschman Index from winsorization because the HHI is industry specific.   We also exclude firm size because the disclosure choices of extreme sized firms are also worth examination.   We do not winsorize the ownership variables and binary independent variables because those variables have values between zero and one (inclusive).

$$\text{MDA}_{i,t} = \beta_0 + \beta_1 \text{FP}_{i,t} + \beta_2 \text{ROA}_{i,t} + \beta_3 \text{LOSS}_{i,t} + \beta_4 \text{FIN}_{i,t} + \beta_5 \text{HHI}_{i,t} + \beta_6 \text{SIZE}_{i,t}$$

$$+ \beta_7 \text{INST}_{i,t} + \beta_8 \text{FOR}_{i,t} + \beta_9 \text{SIGN}_{i,t} + \beta_{10} \text{RV}_{i,t} + \beta_{11} \text{REC}_{i,t}$$

$$+ \beta_{12} \text{LEV}_{i,t} + \sum_{j=1}^{11} \gamma_j \text{IND}_{i,j} + \varepsilon_{i,t} \qquad (2)$$

In equation (1) and (2), we use three proxies for firm performance: increase (or decrease) of annual net income (FP), return on asset (ROA), and loss incurrence (LOSS). We include change of net income and loss incurrence because managers face asymmetric loss function for the two variables (Basu 1997 and Burgstahler and Dichev 1997). External financing (FIN) distinguishes firms that raise long-term debt or equity financing from other firms. We obtain the data on external financing data from the statement of cash flow. We also decompose external financing into debt financing and equity financing to examine the effect of finance sources.

Herfindahl-Hirschman Index (HHI) proxies for industry concentration.[8] Lang and Lundholm (1993) and Clarkson et al. (1999) use the firm's average return on equity over the past five years to proxy for industry concentration. However, returns on equity may reflect both firm performance and industry concentration. Untabulated results confirm that current return on equity and average five-year return on equity are significantly correlated (Pearson correlation coefficient=0.95), which support that returns on equity are likely to reflect the firm performance. Thus, we use the Herfindahl-Hirschman Index as a direct measure of industry concentration.

We use four proxies for ownership structure: largest shareholders, small shareholders, institutional shareholders and foreign shareholders. We include 1) largest and small shareholders or 2) institutional and foreign shareholders in regression equation (1) and (2) respectively because only two of the four variables are mutually exclusive.[9]

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8) Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration. An HHI is calculated by summing the squares of the individual market shares of all of the firms in an industry. For instance, for an industry consisting of three firms with market share of 30%, 30% and 40%, the HHI is 3,400 ($=30^2+30^2+40^2$). The HHI increases both as the number of firms in the market decreases and as the disparity in market share between those firms increases. We calculate market shares using all non-missing sales data in KIS-FAS database. See Bedingfield et al. (1987) for more details.

9) All public companies in Korea are required to disclose the ownership structure in annual reports. KIS-FAS database provides the ownership data which classify shareholders as 1) largest shareholder, small shareholders, and other shareholders and 2) government, government-owned institutions, financial institutions (banks), securities brokers and dealers, insurance companies, other corporations, foreign investors, and individuals. We calculate institutional ownership by the sum of shareholdings of financial institutions, securities brokers and dealers, and insurance companies.

Largest shareholder ownership is measured by the proportion of common shares held by the largest shareholder and his/her related party at the end of the fiscal year. Small shareholder ownership is measured by the proportion of common shares held by the small shareholders who own less than one percent of the number of shares outstanding that amount to less than three hundred million won (approximately a quarter million US dollars) of market value of equity at the end of the fiscal year. Institutional (foreign) shareholder ownership is measured by the proportion of common shares held by institutional (foreign) investors at the end of the fiscal year.

Firm size is measured by the log-transformed total assets at the end of the fiscal year. To proxy for performance variability, we use the standard deviation of market-adjusted annual stock returns over the five-year period prior to the fiscal year. We measure the return-earnings relation by the correlation between annual stock returns and annual earnings over the five-year period prior to the fiscal year t. We proxy the debt-equity ratio at the end of the fiscal year for the leverage. We also measure top management's involvement in MD&A disclosure by whether an MD&A includes a CEO's or CFO's name and/or signature or not.

We include industry dummies to control the effect of industry membership. Using the Korean Standard Industry Classification Code (KSIC), we categorize our sample into twelve industries as presented in Panel C of Table 1. In sensitivity tests, we use industry-adjusted variables for the regression analysis as an alternative way for industry control. Following Lang and Lundholm (1993) and Clarkson et al. (1999), we industry-adjust all the variables except the Herfindahl-Hirschman Index and dichotomous variables by deducting the industry median for the current year.[10]

4.3. Descriptive Statistics

Table 3 presents summary statistics on the level of MD&A disclosure and stimuli of voluntary disclosure. The number of words (NoWords) varies widely from 14 words to 1,576 words. Disclosure index (Dindex) is distributed in a wide range from 0 to 94. The findings indicate the lack of an explicit regulation on MD&A disclosure allows firms to exert large discretion in MD&A disclosure. The sample firms are relatively large in the Korean stock market; the mean (median) of total assets is 964,983 (202,883) million won. These statistics compare to a mean (median) total assets of all Korean Stock Exchange firms on KIS-FAS/SMAT from 1998 and 2002 of 857,182 (177,904) million won. These results are not surprising because the time-series required

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10) We do not industry-adjust the Herfindahl-Hirschman Index because the concentration index depends on industry membership. We do not industry-adjust dichotomous variables because the adjustment does not change economic meaning of binary variables.

for the measures of return variability and return-earnings correlation restrict our sample to large or long-lived firms. Table 3 also shows the level and the change of accounting performance of sample firms. The mean (median) of return on asset is 0.005% (1.6%) and the percentage of firms that experience the increase of net income (the loss) is 58% (28%). The 84% of observations raise equity or long-term debt financing; untabulated results show that equity (long-term debt) financing is positive for 16% (82%) of observations. Approximately half of the observations include top management's name and/or signature in the MD&A.

Table 4 reports correlation coefficients among the primary variables. The lower (upper) triangle presents Pearson (Spearman) correlation coefficients. The correlation between the two measures of MD&A disclosure level, NoWord and Dindex, are significantly positive which means the disclosure index may capture both quality and quantity of MD&A disclosure. As we predicted in Table 2, MD&A disclosure levels are positively correlated with external financing, industry concentration, firm size, the ownership of small, institutional and foreign shareholders, and the involvement of top management. Meanwhile, MD&A disclosure levels are negatively correlated with loss incurrence, return variability, leverage and the ownership of largest shareholder and are not significantly correlated with change of net income, return on asset and return-earnings correlation. We note that the two of three performance proxies are not significantly correlated with disclosure levels. The results suggest the possibility that manager's strategic reporting in an MD&A could confound the relation between the firm performance and the level of voluntary disclosure. In addition, the results show no high correlation between independent variables that might induce multicollinearity. The only exception is the correlation between ROA and LOSS (Pearson correlation coefficient = 0.63). The exclusion of either FP or LOSS from equation (1) and (2) does not affect the overall results. However, the correlation analysis examines univariate relations, which is necessary to take caution in interpreting. In the next section, we perform multivariate analysis to address this issue.

5. Results

5.1. The analysis of disclosure levels

Our first test examines the association between the level of MD&A disclosure and stimuli of voluntary disclosure. Table 5 presents the coefficient estimates of equation (1) and (2) and corresponding White (1980) t-statistics. We report results for two specifications of MD&A disclosure level: the number of words in an MD&A and the MD&A disclosure index. In regression analysis, we use two sets of ownership structure

measures in equation (1) and (2): 1) ownership of largest shareholder and small shareholders and 2) ownership of institutional shareholders and foreign shareholders, respectively.

The results for the number of words and the disclosure index are qualitatively identical. As predicted in Section 3, both measures of MD&A disclosure are positively associated to the external financing, firm size, ownership of small shareholders, and top management's involvement, and negatively associated to leverage.[11] Furthermore, the MD&A disclosure index is positively associated with the industry concentration at the 5 percent level and the number of words is negatively related with foreign ownership at the 10 percent level. The adjusted R-squareds are 36.50% and 36.34% for the number of words and 31.02% and 30.81% for the disclosure index.

The results indicate that both current stimuli (i.e. external financing) and structural variables (i.e. firm size, industry concentration, ownership of small investors and leverage) affect the firm's choice of voluntary disclosure. The significant association between MD&A disclosure and external financing and firm size are consistent with Clarkson et al. (1999). Our results find no significant relations between MD&A disclosure and return variability and return-earnings correlation like Clarkson et al. (1999). However, the significant industry concentration and insignificant firm performance are in contrast with their findings. The significance of industry concentration is due to the use of a different proxy. While the average five-year return on equity in Clarkson et al. (1999) is an indirect measure of industry competition, the Herfindahl-Hirschman Index is a direct measure. Because the average ROE captures both industry competition and firm performance together, the proxy may include noise that could drive insignificant industry competition in Clarkson et al. (1999). Untabulated results also indicate that the average ROE is insignificant when included in the regression model instead of the HHI.

The lack of significant performance variables arises from the voluntary attributes of MD&A disclosure. MD&A is a good information medium for all firms reporting either good performance or poor performance. While high performers emphasize their current performance and project rosy prospects in an MD&A, low performers provide an excuse for the unsatisfactory results and forecast the rebounding of future performance. Consequently, the relationship between a firm's performance and MD&A disclosure can be both positive and negative, which results in insignificant performance variables.

The significant ownership of small shareholders provides an insight on the demand

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11) Untabulated results show that both the disclosure measures are significantly and positively related with debt financing at 5 the percent level, but insignificantly related with equity financing.

and supply of descriptive information through MD&A. The results imply that managers are communicating with small shareholders by MD&A in a voluntary manner. In other words, the results suggest that MD&A disclosures help to fulfill the demand of small investors for descriptive information that supplements other information. The finding is consistent with the notion that MD&A helps to level the playing field for small investors. Individual shareholders that take the majority of small investors have often been characterized as unsophisticated or noise investors who have disadvantages in acquiring and processing information relative to institutional investors (Bartov et al. 2000, Jiambalvo et al. 2002). They have less opportunity to access the private information of management directly and less resource for private information search. As a result, descriptive information in MD&A that complements quantified information in financial statements would be more helpful to small investors than large investors. On the contrary, the negative association between foreign ownership and MD&A disclosure may be due to the use of alternative information. Similar to the largest shareholders, and institutional shareholders, foreign shareholders can obtain alternative information by accessing the management directly or by purchasing the service of financial intermediaries.

The significant management's involvement in MD&A disclosure emphasizes the role of top managers in choosing the quantity and contents of voluntary disclosure. The results also suggest the possible effect of disclosure format does not change the overall relation between voluntary disclosure and economic stimuli. On the contrary, the negative leverage coefficients may be driven by the availability of alternative information. Large creditors may access the management to obtain private information about a firm rather than to rely on public information, which leads to less voluntary disclosure of high-leveraged firms. Especially, many Korean banks have demanded customized reports of operation to monitor the operations of their debtors (Huh and Shim 2003).[12]

5.2. The analysis of disclosure changes

Our second test examines the association between the change of MD&A disclosure and stimuli of voluntary disclosure. The results for changes of MD&A disclosure presented in Table 6 are less significant than the results for levels of MD&A disclosure. Both the number of words and the disclosure index are significantly and positively associated with the changes of industry concentration, firm size and top management involvement.[13] The adjusted R-squareds of change models (12.98% ~ 8.52%) are lower

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12) The results also show that the significance of leverage depends on model specification and control for industry membership. The analysis using change variables or industry-adjusted variables find no significance of leverage in Table 6 and in Table 7.

13) Untabulated results show that the change of MD&A disclosure index is significantly and

than those of the level models (36.50% ~ 30.81%). These results suggest that our models are more effective in explaining the drivers of MD&A disclosure levels than those of disclosure changes.

5.3. Sensitivity analysis

Our third test presented in table 7 uses industry-adjusted variables for the regression analysis as an alternative way for industry control. In particular, all dependent and independent variables except the Herfindahl-Hirschman Index and dichotomous variables are industry-adjusted by subtracting the industry median. Firm size, ownership of small investors and top management's involvement are positively significant at the 1 percent level. The results show the Herfindahl-Hirschman Index is insignificant in the analysis of industry-adjusted variables, which is not surprising because the index depends on industry membership. The industry adjustment in Table 7 does not reduce the explanatory power of our models. The adjusted R-squareds of industry-adjusted variable models (31.98% ~ 27.13%) are similar to those of the level models (36.50% ~ 30.81%).

Taken together, our results suggest that managers use an MD&A as an information medium to communicate with the public even in the absence of mandatory requirement for MD&A disclosure.

6. Conclusions

This study examines the economic determinants of voluntary disclosure in an MD&A, as measured by the number of words and the frequency of information keywords in the MD&A. The empirical results are generally consistent with previous studies on voluntary disclosure. We find a positive association between the level of MD&A disclosure and external financing, industry concentration, firm size, ownership of small investors and the top management's involvement in MD&A disclosure. In contrast, we find no association between the level of MD&A disclosure and firm performance, performance variability, return-earnings correlation, leverage and other ownership structure. The results are robust to alternative variable definitions and model specifications. Evidence suggests that the level of voluntary MD&A disclosure varies with economic incentives that influence disclosure choice in other disclosure channels. In summary, our results imply that managers use an MD&A as an information medium

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positively related with the change of equity financing at 5 the percent level, but insignificantly related with the change of debt financing. The analysis on change in the number of words in MD&A reports no significant relation with the change of equity financing or debt financing.

to communicate with the public even in the absence of mandatory requirement of MD&A disclosure.

The results of this study are relevant to academics, stakeholders and regulators. First, this study supports that the economic incentives suggested in prior literature affect the levels of voluntary MD&A disclosure and contributes to the literature of voluntary disclosure. Especially, the voluntary attribute of MD&A disclosure in Korea has provided a natural setting to examine the determinants of voluntary disclosure. Second, the results help the stakeholders to interpret the information contained in MD&A. The readers of MD&A can understand the underlying motives of MD&A disclosure and evaluate voluntary disclosure. Third, the results help public policymakers design effective and efficient regulations on public disclosure. The findings also help regulators prevent firms' economic incentives from biasing the voluntary disclosure.

This research includes several caveats in measuring the voluntary disclosure. First, the reliability of MD&A information is not guaranteed since the disclosure of MD&A is not explicitly regulated in Korea. Investors might not use the MD&A due to alternative information sources. Further researches are necessary to examine the reliability and value relevance of MD&A disclosures. Second, the construction of disclosure index is quite arbitrary to the researchers. Future study may reorganize the information items or develop a measure that is independent from subjective choices of researchers. Further analysis could also examine the relation between firm characteristics and the components of MD&A information (e.g. financial vs. nonfinancial information or prospective vs. retrospective information).

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Appendix 1.

Information items and keywords that comprise the MD&A disclosure index

Panel A. Hierarchy of information items
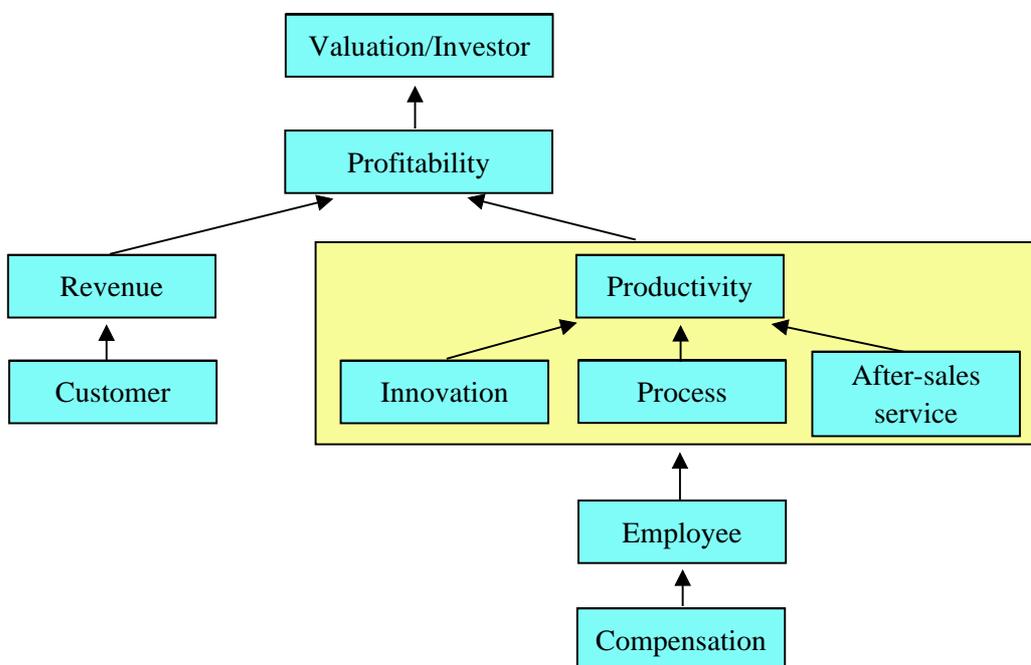
Panel B. Keywords for information items

1. Valuation: valuation, stock price, share price, stock value, share value, intrinsic value, fundamental value, corporate value, price-to-earnings ratio, price-to-book ratio, price-to-cash-flow ratio, return on asset, return on equity, share return, stock return

2. Investor: shareholder, investor, investor relation, transparency

3. Profitability: profitability, profit, earning, loss, income, value-added, economic value-added

4. Revenue: revenue, sales

5. Cost: cost

6. Customer: customer, market share

7. Productivity: productivity, efficiency, quality, quality control, defect

8. Innovation: innovation, new product, research and development

9. Process: process, value chain, activity-based costing, balanced scorecard, enterprise resource planning

10. After-sale service: after-sales service

11. Employee: employee

12. Compensation: compensation, salary, bonus, performance-based compensation, stock option

Table 1

Sample Description

Panel A: Selection procedure for sample firm-years

Selection Criteria	Observations
MD&As of firms listed on Korean Stock Exchange that are available at DART (fiscal year 1998-2002)	2,342
Less: Financial institutions (Korean SIC codes 6500-6700)	350
Observations with missing values in KIS-FAS/SMAT	804
Observations that experience the change in fiscal year ends	32
Sample observations	1,156

Panel B: Distribution of observations by year

Year	Sample	
	n	%
1998	214	18.51
1999	233	20.16
2000	237	20.50
2001	243	21.02
2002	229	19.81
Total	1,156	100.00

Panel C: Distribution of observations by industry

Industry description	Sample		2002 KIS-FAS/SMAT(%)
	n	%	
Fishing	5	0.43	0.90
Mining	8	0.69	0.36
Food	91	7.87	6.85
Textiles and printing/publishing	105	9.08	12.79
Chemicals	333	28.81	23.60
Extractive	70	6.06	6.67
Durable manufacturers	299	25.87	28.47
Utilities	5	0.43	1.62
Construction	89	7.7	7.21
Retail	84	7.27	6.85
Transportation	32	2.77	2.34
Services	35	3.03	2.34
Total	1,156	100.00	100.00

Industry membership is determined by Korean SIC code as follows: fishing (0500-0599), mining (1000-1299), food (1500-1699), textiles and printing/publishing (1700-2299), chemicals (2300-2699), extractive (2799), durable manufacturers (2800-3799), utilities (4000-4199), construction (4500-4699), wholesale and Retail (5000-5299), transportation (6000-6399), and services (6400-8899, excluding 6500-6799).

Table 2

Definition and measurement of variables

Variable	Definition	Measurement
Dependent variables		
NoWords	No. of words	The number of words in the MD&A
Dindex	Disclosure index	The MD&A disclosure index
Independent variables		
FP (?)	Firm performance	A (0, 1) variable with a value of 1 for firms with a positive earnings surprise and 0 otherwise. A firm is classified as reportinga positive earnings surprise if the firm's contemporaneous net income (E_t) exceeds the firm's lagged net income (E_{t-1}).
ROA (?)	Return on asset	The firm's return on asset in the fiscal year t.
LOSS (?)	Loss dummy	A (0, 1) variable with a value of 1 if the firms report net loss in the fiscal year t and 0 otherwise
FIN (+)	Financing by equity issuance	A (0, 1) variable with a value of 1 for firms that raise long-term debt or equity financing during the fiscal year t and 0 otherwise.
HHI (+)	Herfindahl-Hirschman Index	The sum of squared market shares of firms competing in an industry. Industry membership is classified by the one-digit SIC codes.
SIZE (+)	Firm size	The natural logarithm of the firm's total assets at the end of the fiscal year t.
LARGEST (−)	Largest shareholder ownership	The proportion of common shares held by the largest shareholder and his/her related party at the end of the fiscal year t.
SMALL (+)	Small shareholder ownership	The proportion of common shares held by the small shareholders who own less than one percent of the number of shares outstanding that amount to less than three hundred million won of market value of equity at the end of the fiscal year t.
INS (+)	Institutional ownership	The proportion of common shares held by institutional investors at the end of the fiscal year t.
FOR (+)	Foreign ownership	The proportion of common shares held by foreign investors at the end of the fiscal year t.
SIGN (+)	Manager's involvement	A (0, 1) variable with a value of 1 if an MD&A includes a CEO's or CFO's name and/or signature
RV (?)	Return volatility	The standard deviation of market-adjusted annual stock returns over the five-year period prior to the fiscal year t.
REC (?)	Return-earnings correlation	The correlation between annual stock returns and annual earnings over the five-year period prior to the fiscal year t.
LEV (?)	Leverage	The firm's debt-equity ratio at the end of the fiscal year t.
IND (?)	Industry dummies	Industry dummies based on industry membership presented in Panel C of Table 1.

Table 3

Sample Descriptive Statistics

Variable	Mean	S.D.	Min	First Quartile	Median	Third Quartile	Max
Continuous Variables							
NoWords	362.62	232.13	14	188	335.5	480	1576
Dindex	20.5	13.19	0	11	19	27	94
Total Assets (million won)	964,983	2,770,775	7,883	85,423	202,883	587,188	34,439,600
Size	19.33	1.48	15.88	18.26	19.13	20.19	24.26
ROA	0.00	0.14	-0.60	-0.02	0.02	0.05	0.58
HHI	1091.78	976.56	227.93	582.29	680.54	1516.63	8081.05
Largest	0.27	0.17	0	0.14	0.26	0.38	0.98
Small	0.49	0.2	0	0.36	0.49	0.63	1
INS	0.08	0.12	0	0.01	0.04	0.12	0.85
FOR	0.06	0.12	0	0	0	0.05	0.94
RV	0.06	0.02	0.01	0.04	0.05	0.07	0.14
REC	0.05	0.48	-0.92	-0.3	0.07	0.43	0.93
LEV	2.24	4.41	0	0.62	1.25	2.09	34.92
Dichotomous Variables							
FP	0.58	0.49	0	0	1	1	1
Loss	0.28	0.45	0	0	0	1	1
FIN	0.84	0.37	0	1	1	1	1
Signature	0.50	0.50	0	0	1	1	1

The variables are defined in Table 2.

Table 4

Correlation coefficients

	NoWords	Dindex	FP	ROA	Loss	FIN	HHI	Size	Largest	Small	INS	FOR	Sign	RV	REC	LEV
NoWords	1	0.86	0.03	0.04	-0.08	0.13	0.17	0.27	-0.07	0.12	0.17	0.19	0.56	-0.07	-0.02	0.07
		<.01	0.28	0.21	0.01	<.01	<.01	<.01	0.02	<.01	<.01	<.01	<.01	0.02	0.56	0.01
Dindex	0.83	1	0.02	0.05	-0.06	0.11	0.11	0.17	-0.04	0.11	0.12	0.17	0.56	-0.06	-0.03	0.01
	<.01		0.56	0.08	0.04	0.00	0.00	<.01	0.16	0.00	<.01	<.01	<.01	0.05	0.31	0.63
FP	0.03	0.02	1	0.48	-0.45	-0.01	0.03	0.05	0.02	-0.09	0.12	0.05	0.04	0.07	0.02	-0.04
	0.29	0.59		<.01	<.01	0.62	0.31	0.12	0.42	0.00	<.01	0.11	0.20	0.02	0.46	0.20
ROA	0.05	0.05	0.36	1	-0.78	-0.12	0.05	0.08	0.18	-0.22	0.21	0.23	0.04	-0.01	0.05	-0.25
	0.07	0.12	<.01		<.01	<.01	0.09	0.00	<.01	<.01	<.01	<.01	0.22	0.80	0.06	<.01
Loss	-0.07	-0.05	-0.45	-0.63	1	0.01	-0.04	-0.17	-0.14	0.14	-0.22	-0.19	-0.07	0.02	0.01	0.12
	0.02	0.11	<.01	<.01		0.80	0.20	<.01	<.01	<.01	<.01	<.01	0.02	0.43	0.86	<.01
FIN	0.13	0.12	-0.01	-0.08	0.01	1	-0.04	0.24	-0.08	0.15	0.05	0.08	0.04	-0.01	-0.08	0.23
	<.01	<.01	0.62	0.00	0.80		0.21	<.01	0.01	<.01	0.09	0.01	0.23	0.69	0.01	<.01
HHI	0.10	0.05	0.01	0.04	-0.04	0.01	1	0.04	-0.11	0.05	-0.02	0.04	0.13	0.02	-0.01	0.00
	0.00	0.10	0.72	0.17	0.19	0.80		0.19	0.00	0.08	0.56	0.20	<.01	0.53	0.75	0.94
Size	0.36	0.28	0.05	0.14	-0.16	0.22	0.08	1	-0.05	0.02	0.40	0.51	0.00	-0.09	0.01	0.18
	<.01	<.01	0.08	<.01	<.01	<.01	0.01		0.10	0.53	<.01	<.01	0.93	0.00	0.80	<.01
Largest	-0.06	-0.03	0.03	0.16	-0.13	-0.07	-0.03	-0.06	1	-0.46	0.05	-0.06	-0.06	-0.05	-0.08	-0.05
	0.05	0.31	0.38	<.01	<.01	0.01	0.36	0.05		<.01	0.10	0.06	0.05	0.08	0.01	0.10
Small	0.13	0.11	-0.09	-0.17	0.13	0.13	0.03	0.04	-0.42	1	-0.01	0.02	0.10	-0.02	-0.03	0.04
	<.01	0.00	0.00	<.01	<.01	<.01	0.33	0.15	<.01		0.63	0.47	0.00	0.47	0.36	0.20
INS	0.11	0.10	0.15	0.16	-0.14	-0.01	0.01	0.28	0.00	-0.07	1	0.33	0.06	0.04	0.09	0.02
	0.00	0.00	<.01	<.01	<.01	0.61	0.66	<.01	0.90	0.01		<.01	0.03	0.19	0.00	0.58
FOR	0.12	0.11	0.08	0.14	-0.15	0.01	0.03	0.46	-0.05	-0.04	0.13	1	0.09	-0.05	0.06	-0.09
	<.01	0.00	0.01	<.01	<.01	0.67	0.26	<.01	0.10	0.14	<.01		0.00	0.12	0.03	0.00
Sign	0.47	0.47	0.04	0.03	-0.07	0.04	0.09	0.01	-0.05	0.09	0.05	0.01	1	-0.01	-0.01	-0.03
	<.01	<.01	0.20	0.29	0.02	0.23	0.00	0.62	0.11	0.00	0.10	0.63		0.65	0.82	0.25
RV	-0.08	-0.07	0.08	0.01	0.02	-0.02	-0.01	-0.11	-0.05	0.01	-0.06	-0.07	-0.01	1	0.12	0.02
	0.01	0.01	0.01	0.74	0.55	0.61	0.76	0.00	0.08	0.74	0.03	0.01	0.67		<.01	0.52
REC	0.00	-0.02	0.03	0.01	0.00	-0.08	0.04	0.03	-0.09	-0.02	0.03	0.07	0.00	0.10	1	-0.07
	0.95	0.51	0.34	0.74	0.91	0.00	0.15	0.37	0.00	0.50	0.30	0.01	0.88	0.00		0.01
LEV	-0.04	-0.06	-0.07	-0.09	0.18	0.03	-0.03	-0.03	-0.08	0.11	0.04	-0.10	0.04	0.03	-0.02	1
	0.16	0.05	0.02	0.00	<.01	0.35	0.30	0.39	0.01	<.01	0.19	0.00	0.22	0.36	0.47	

The variables are defined in Table 2. The lower (upper) triangle presents Pearson (Spearman) correlation coefficients. Each correlation coefficient is presented with its p-value.

Table 5

Regression Analysis of the MD&A disclosure level

	NoWords				Disclosure index			
	β	t-value	β	t-value	β	t-value	β	t-value
Intercept	-794.183	-4.67†	-792.767	-4.80†	-48.092	-5.27†	-46.993	-5.12†
FP	3.852	0.33	2.782	0.24	-0.102	-0.14	-0.192	-0.27
ROA	32.861	0.68	28.429	0.57	3.043	1.03	2.774	0.90
LOSS	10.640	0.60	9.084	0.53	1.105	1.04	1.013	0.97
FIN	22.615	1.81*	23.252	1.82*	1.731	2.27‡	1.794	2.33‡
HHI	0.0185	0.59	0.011	0.38	0.003	2.16‡	0.003	1.95‡
SIZE	51.960	9.70†	56.381	9.71†	2.352	8.02†	2.550	7.76†
LARGEST	49.935	1.38			3.268	1.49		
SMALL	83.496	3.09†			4.696	2.99†		
INS			0.296	0.01			0.949	0.36
FOR			-112.097	-1.84*			-5.644	-1.55
SIGN	207.772	18.79†	209.578	18.74†	11.994	18.43†	12.080	18.45†
RV	-303.982	-1.43	-324.669	-1.52	-16.476	-1.33	-18.061	-1.45
REC	5.781	0.52	5.519	0.49	-0.050	-0.08	-0.103	-0.15
LEV	-1.366	-1.62	-1.518	-1.77*	-0.112	-2.20‡	-0.121	-2.32‡
Adjusted R-squared	36.50%		36.34%		31.02%		30.81%	
Number of observations	1,156		1,156		1,156		1,156	

† significant at the 1 percent level

‡ significant at the 5 percent level

* significant at the 10 percent level

The variables are defined in Table 2. T-statistics are based on White (1980) standard errors. Coefficients on industry dummies are suppressed.

Table 6

Regression Analysis of the MD&A disclosure changes

	ΔNoWords				ΔDisclosure index			
	β	t-value	β	t-value	β	t-value	β	t-value
Intercept	10.214	0.22	8.954	0.20	1.666	0.66	1.636	0.65
Δ FP	3.459	0.49	4.727	0.67	-0.751	-1.64	-0.759	-1.65
Δ ROA	-31.847	-1.04	-30.429	-0.99	0.645	0.37	0.514	0.30
Δ LOSS	15.713	1.33	16.471	1.40	0.602	0.71	0.623	0.74
Δ FIN	1.787	0.18	-0.039	-0.00	0.451	0.69	0.426	0.66
Δ HHI	0.079	1.76*	0.081	1.79*	0.006	2.35‡	0.006	2.25‡
Δ SIZE	36.743	1.66*	37.042	1.65*	3.819	2.68†	3.822	2.66†
Δ LARGEST	10.8728	0.32			1.020	0.45		
Δ SMALL	25.904	0.96			1.146	0.59		
Δ INS			-55.384	-1.30			0.586	0.22
Δ FOR			-138.589	-1.43			-2.470	-0.57
Δ SIGN	195.730	4.89†	196.103	4.93†	9.791	5.20†	9.777	5.17†
Δ RV	-69.143	-0.25	-47.076	-0.17	-6.037	-0.33	-6.603	-0.36
Δ REC	1.456	0.12	1.365	0.11	-0.211	-0.29	-0.237	-0.33
Δ LEV	0.135	1.32	0.114	1.08	-0.006	-0.83	-0.007	-0.87
Adjusted R-squared	12.20%		12.98%		8.52%		8.52%	
Number of observations	858		858		858		858	

† significant at the 1 percent level

‡ significant at the 5 percent level

* significant at the 10 percent level

Each variable is measured as a change variable over a fiscal year for the correspoding variable defined in Table 2. T-statistics are based on White (1980) standard errors. Coefficients on industry dummies are suppressed.

Table 7

Regression Analysis of the industry adjusted MD&A disclosure level

	NoWords				ΔDisclosure index			
	β	t-value	β	t-value	β	t-value	β	t-value
Intercept	-198.670	-1.70*	-201.790	-1.70*	-3.599	-0.56	-3.790	-0.59
FP	-0.069	-0.00	-1.009	-0.07	-0.120	-0.13	-0.260	-0.28
ROA	3.786	0.13	-0.267	-0.01	1.502	0.94	1.098	0.61
LOSS	-5.667	-0.39	-6.810	-0.47	0.390	0.43	0.336	0.37
FIN	16.106	1.34	14.381	1.20	0.421	0.60	0.392	0.57
HHI	0.037	1.31	0.039	1.39	0.001	0.66	0.001	0.76
SIZE	50.396	8.39†	55.067	8.46†	2.362	7.25†	2.554	7.00†
LARGEST	45.538	1.24			3.546	1.60		
SMALL	89.235	3.17†			6.855	4.11†		
INS			6.734	0.17			2.131	0.77
FOR			-112.499	-1.86*			-5.685	-1.60
SIGN	180.451	16.95†	182.403	17.03†	10.456	16.25†	10.590	16.33†
RV	-262.191	-1.33	-288.596	-1.46	-16.441	-1.41	-18.861	-1.61
REC	8.178	0.69	8.010	0.67	0.133	0.19	0.054	0.08
LEV	0.444	1.59	0.438	1.52	0.010	0.72	0.009	0.63
Adjusted R-squared	31.98%		31.79%		27.70%		27.13%	
Number of observations	1,145		1,145		1,145		1,145	

† significant at the 1 percent level

‡ significant at the 5 percent level

* significant at the 10 percent level

We industry-adjust all dependent and independent variables except Herfindahl-Hirschman Index and dichotomous variables by deducting the industry median for the current year. We delete the firm-years in such industry-years that has only one observation. The definitions of variables other than industry adjustment are the same as in Table 2. The industry membership is defined in Panel C of Table 1. T-statistics are based on White (1980) standard errors. Coefficients on industry dummies are suppressed.