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**Narrative analysis of annual reports: A study of communication efficiency**

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### **Abstract**

This paper investigates the quality and efficiency of corporate annual reports disclosures in malevolent environments, by analyzing the annual reports of firms in the Indian automobile industry during the global recession period (2008 through 2012). The study is based on the content analysis of the Management Discussion and Analysis (MD&A) sections of annual reports, as content analysis is a primary tool for studying textual complexity. Using the Flesch Reading Ease formula, we find that the reading ease of annual report texts varies decreases significantly and progressively across the years studied. Thus, in years when the environment is difficult (like a global recession) firms obfuscate their texts, irrespective of their financial performance and characteristics.

**Keywords:** Readability, Annual Report, Accounting Narratives; Communication Efficiency, Environmental Malevolence

## 1. Introduction

Narrative analysis of annual reports is of interest to the accounting literature. Of late, with the push for integrated reporting, it has become important to study not only what is being communicated quantitatively, but also how textual information is being communicated. In other words, apart from the content of the communication, the form of communication is also of interest. Worldwide, regulators emphasize the need to improve corporate reporting disclosures. In spite of this emphasis, texts included in annual reports remain complex, lack clarity, and are difficult to read (Li, 2008; Subramaniam et al., 1993).

Annual reports are the most commonly used media through which firms communicate their past performance, their understanding of the external environment, their strategies and plans for the near and immediate terms, and expectations of future performance. Given that annual reports are vehicles for communicating with the various stakeholders (investors, employees, customers, etc.) a lack of adequate information leads to uncertainty and information asymmetry. It is also important that corporate communication is transparent, simple, and easy to understand by all the various stakeholders. In the absence of high quality, timely, and adequate information about firm performance and strategies, investor risk increases, which may lead to higher costs of capital (Miller and Bahnson, 2002). The need for simplicity is exacerbated in the case of small and retail investors, who are the most affected by such information asymmetry. In contrast, institutional and large investors might have the analytical and conceptual wherewithal to analyze and make sense of complex language and jargon.

On the other hand, firms have incentives to keep their texts complex. Rather than viewing information asymmetry as a consequence of reporting, we discuss a possible conscious attempt at

creating and sustaining information asymmetry by firms, through obfuscation of texts. This obfuscation can serve managers in a variety of ways. First, it helps in hiding poor performance. Use of financial and industry-specific jargon is one of the common forms of obfuscation, as such jargon can help in “sugar-coating” bad news and underplaying poor performance. Second, complex texts reinforce reporting biases, including attribution and self-serving biases. Firms and managers are known to attribute good performance to their effective strategies, while blaming the external (uncontrollable) forces for explaining poor performance (Bettman and Weitz, 1983; Staw et al., 1983). For such attribution biases to be not explicitly visible to the readers, managers can keep the texts complex. Third, complexity of texts could help firms blend forward looking statements about the industry, environment, and their own strategies. The complexity of text might leave the reader with a sense of optimism and hope about the firm performance, where none might actually exist. Even with the presence of disclaimers, complex texts have the potential to mix actual firm strategies with “wishful thinking”.

This paper assesses the impact of external environment on the quality of disclosure. Specifically, we study the readability of corporate annual reports disclosures in malevolent environments. Malevolence refers to the environmental hostility (Khandwalla, 1972), in contrast with munificence (generosity of the environment). This paper operationalizes malevolent environment as the recent global economic recession, which affected a large variety of firms across the globe. The effect of economic recession was felt in terms of declining financial performance of the firms, providing an adequate setting for studying obfuscation of texts.

While most readability studies focus on the relation between financial performance and textual complexity (Smith and Taffler, 1992; Curtis, 1998), we extend the literature by studying the

effect of external environment on this relation. In the light of poor performance as a consequence of malevolent external environment (global economic recession), it is expected that firms in the same industry would perceive the environment similarly; would have similar internal environments; and therefore would respond to the external environment using the same strategies. This response to the external environmental challenges should be an integral part of their annual reports, and be located in the Management Discussion & Analysis (MD&A) section. Thus, we study the complexity of texts in the MD&A sections of annual reports.

We use a longitudinal design to study the impact of how external environment affects the complexity of texts, given that this has been identified as the best methodological approach for studying environmental crises (Schmitt et al. 2010). Unlike Keusch et al. (2012), who study the recent macro-economic recession by focusing on the existence of self-serving bias in European firms on two years (2006, to represent a non-crisis year, and 2008 to represent a crisis year for comparison), this study analyzes several years. Starting from the year 2008, when the economic recession set in, this paper traces textual complexity of MD&A sections over the next five years. The impact of economic recession on the Indian automotive industry was felt for a period of three years, 2009-2011 (both years inclusive), and this study includes a year each on both sides of the recession period. The choice of a year pre- and post-recession impact provides an opportunity to study how quickly firms respond to the changing external environment.

The focus of the study is the Indian automotive industry. By doing a single-industry study we are able to demonstrate the effect of industry variables on firm response to macro-economic phenomena. The Indian automotive industry provides us with a rich context in terms of diversity

of firms, including automobile manufacturers as well as component manufacturers; domestic and multi-national corporations; and stand-alone and firms part of business groups.

This study finds that the relation between external environment and textual complexity is independent of firms' financial performance and characteristics. Thus, irrespective of a firm's financial performance, firms in difficult environments obfuscate their texts, on average. Furthermore, we show that the change in the readability of texts is gradual: it increases during the years of crisis and decreases once the crisis tappers off. This reveals that there is no inertia in communication when there is malevolence in the environment, expanding the findings of Aerts (2001). With this finding, we contribute to organizational communication literature by adding environmental malevolence as a factor in determining textual complexity.

Results also indicate that the MD&As of large firms are easier to read. This is probably because they need to communicate to a variety of stakeholders, operate in international markets, and are typically followed by a number of professional analysts who can understand complex financial language. Thus, firms with high market capitalization have less incentives to obfuscate their texts.

The rest of the paper is structured as follows. We present a brief review of the literature in the next section, followed by the research design. We discuss the methodology and data subsequently, followed by the results section. We conclude with a discussion and policy implications in the final section.

## **2. Previous findings and hypotheses development**

The disclosure of information in annual reports has been studied extensively in accounting. Studies of organizational communication have, for a long time, focused on the effect of organizational performance on the quality and efficiency of organizational communication (Abrahamson and Amir, 1996; Abrahamson and Park, 1994). Jameson (2000) extolls the virtues of linguistic narrative studies and analyzes shareholder reports of equity mutual funds. There are five genres of narrative analyses around annual report texts: subjective analyst ratings, disclosure index studies, thematic content analysis, readability studies, and linguistic studies (Beattie, et al, 2004). While subjective analyst ratings focus on ratings by the analysts on disclosure information sufficiency and quality; disclosure index studies (also known as partial content analysis) focus on studying the presence (or absence of) only those themes that are defined ex ante. Thematic content analysis focuses on uncovering the underlying themes while analyzing the whole text; readability studies focus on the clarity of communication using readability indices; whereas linguistic studies focus on the subtleties of the language used in the communication rather than an one-dimensional evaluation of readability (Beattie et al., 2004).

Studies on attribution of communication have found relations between financial performance and annual reports texts (Abrahamson and Park, 1994). Also known as the “good news, bad news” hypotheses or “accounting bias”, researchers argue that good performance is attributed to the firm and managerial choices, whereas the reason for bad performance is externalized (Aerts, 1994; Aerts, 2001; Bettman and Weitz, 1983; Bradley, 1978; Clatworthy and Jones, 2003; Ingram and Frazier, 1983). For instance, Jones (1988) demonstrated that firms obfuscate their

textual communication in years of poor performance, relative to those years when their performances have been better. Research also suggests that companies that are not performing well may want to hide the poor results and thus may write in a style that is difficult to read (Jones, 1988; Subramanian et al., 1993; Courtis, 2004).

Firms have also been found to conceal negative organizational outcomes from stockholders willfully, by either lower disclosures or through obfuscating their texts (Abrahamson and Park, 1994). Clapham and Schwenk (1991) found that such self-serving attributions may not be entirely willful actions by managers, and they may be present because of poor choice of niches or domains by firms, as well as managers' cognitive biases. Given the negative effects of such self-serving attributions on resource providers (Schwenk, 1990), there can be no explanation of willful attribution to conceal outcomes from shareholders. Salancik and Meindl (1984) study the relationship between causal attributions of firm performance with stability of outcomes (as a proxy for management control). While they find support for the attribution in positive outcomes, management also takes the blame for negative outcomes if their outcomes are unstable, thereby signaling high management control over the external environment.

Narrative analysis studies either focus on the breadth and depth of disclosures (quality), or on the efficiency of disclosures. The focus of quality studies (when the texts supplement the financial and other quantitative information in the company annual reports) is "what is being communicated". Beattie et al. (2004) define quality as including two dimensions – the amount of disclosure and the spread of disclosure. The authors propose measures which include "the actual amount of disclosure, relative to the amount expected", spread of disclosure across topics using concentration measures across main topics, sub-topics, and non-empty sub-topics (Beattie,



et al., 2004). Beretta and Bozzolan (2008) distinguish between quality and quantity of communication, defining richness of communication as including the width of disclosures, plus the depth of disclosures. They create a composite index that considers the quantity of disclosure and the richness of its content. Content analysis of mandatory and voluntary disclosures is the dominant tool for these studies (Abrahamson and Amir, 1996; D'Aveni and McMillian, 1990; McConnell et al., 1986; Patelli and Pedrini, 2013; Tennyson et al., 1990; Smith and Taffler, 1995; Smith and Taffler, 2000; Swales, 1988).

We define efficiency of communication as the relative ease of reading (textual complexity) or, in other words, “how something is being communicated”. For instance, Courtis and Hassan (2002) study differences in the readability of annual reports in different languages (English and Chinese versions in Hong Kong; English and Malay in Malaysia), and find that indigenous language versions are relatively easier to read than their English counterparts. Such studies on the ease of reading use one of several indices to evaluate textual complexity, the most popular of them being the Flesch Reading Ease scale (Flesch, 1948).<sup>1</sup>

### 2.1 Readability studies

Crow (1988) extolls the virtues of “plain English” in organizational communication, as it signals honest and responsive communication. Jones and Shoemaker (1994) reviewed the then literature on content analysis in accounting research, and highlighted the importance of readability research. Their review summarized five basic questions in readability studies: readability of annual reports, differences in readability across sections, differences in readability across types

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<sup>1</sup> The Flesch reading ease scale, when analyzing text passages, considers: (i) average sentence length in words (sl), and (ii) syllables per 100 words (wl). The two figures are used in the formula  $206.835 - 846 \text{ wl} - 1.015 \text{ sl}$ , as suggested in the paper.

of reports, differences in readability over time, and association of readability with other variables. Readability is a function of firm complexity, and is need to reach a wider variety of stakeholders. Using Chairman's Letters, Jones (1988) traces the readability of corporate reporting of a single firm. The paper finds that reporting had become more complex, and readability was reduced over time. Furthermore, listing also affected the ease in readability. Using the Flesch Reading ease formula, Barnett and Loeffler (1979)'s footnote texts have low readability. Furthermore, the authors find that the audit report readability was also low, and that it varied significantly across auditors. The reduction in readability scores can also be attributed to both management and auditors of the firms (Barnett and Leoffler, 1979).

One of the important reasons for textual complexity is poor performance. Several studies have found that poor performance result in textual complexity and obfuscation. Subramanian et al. (1993) find that the annual report of companies with good performance was easier to read than that of poor performing companies, and that managers use annual report as a marketing tool that is amenable to manipulation as it reaches multiple stakeholders. Even the Chairperson's letter becomes difficult to read when performance is poor, which may indicate conscious impression management by firms (Hrasky et al., 2009). Using the Fog index and the length of the annual report Li (2006) shows that managers may be opportunistically structuring annual reports to hide adverse information from investors.

The major focus of readability studies have been towards understanding the relationship between reading ease and firm performance, with size and complexity as control variables. In our study, we study differences in readability in the context of environmental malevolence (economic recession) using a longitudinal sample for firms in the Indian auto and auto-components industry.

## 2.2 Environmental malevolence

Khandwalla (1972) is one of the earliest studies on organizational responses to environmental malevolence. The author enumerates various organizational responses to environmental uncertainty, heterogeneity and malevolence. He defines environmental malevolence (or hostility) as “a condition of perceived threat to the organization’s primary goals” (Khandwalla, 1972: 307). Schmitt et al. (2010) elucidate how organizations develop ambidexterity in times of economic crisis, in the context of the 2008 global recession, through a case example of Samsung Electronics Corporation. Such economic crises could also have an impact on the content and form of organizational communication with its stakeholders. D’Aveni and MacMillan (1990) contrast the contents of letters to shareholders between matched samples of failing and surviving firms, and find support for normative strategy: successful firms focus more on the output environment, whereas failing firms focus more on the internal and input environments, denying the crisis and focusing on the short-term issues. Keusch et al. (2012) also find extensive use of self-serving behavior in times of environmental crisis.

## 2.3. Inertia in communication

Aerts (2001) conducts a longitudinal analysis of annual report texts to study the inertia in attributional behavior, and finds significant consistency across years. Firm reporting practices could have been un-adaptive, either due to embedded routines or formalized procedures; and that stability in attributional content was due to listing status and performance history (Aerts, 2001). Given the inertia in changing the content over years, an environmental crisis is likely to challenge the routines and procedures, and lead to significant changes in the communication styles. Therefore, we hypothesize that as the industry enters into a recession era, and later comes

out of it, the textual complexity of the annual report texts changes accordingly, increasing in the years of the crisis.

*H1: Readability of MD&A narratives continuously changes, over the years 2008 to 2012, decreasing in the crisis years.*

#### 2.4. Firm performance and other control variables

Annual report texts of better performing companies are likely to be easier to read than those that performed poorly (Hrasky et al., 2009; Subramaniam et al., 2003). However, there are several other factors that are associated with disclosures' readability. Size and complexity of firms are two variables that may affect the textual complexity of communication by listed firms (Hrasky et al., 2009). Larger firms are under increased scrutiny by the analysts as well as retail investors, and it would be expected that these companies be more forthcoming in providing information, as well as presenting the data in a simple and transparent style (Rutherford, 2003). Mature (older) firms are more experienced, and are likely to use specialized teams or outsource the preparation of the annual reports (Courtis, 2004). This should make disclosures easier to read. Similarly, companies that are highly diversified (manufacture multiple products and services) can spread their performance risk over a variety of products, and therefore have little incentive to communicate in complex terms (Jones, 1988).

Firms that are largely owned by promoters enjoy significant advantages than those that are held by more dispersed ownership. For instance, firms with concentrated ownership may have representatives of their larger shareowners as operating managers as well, as in the case of most family-owned businesses. Such firms have very little incentive to obfuscate their texts, as their

majority owners (significant stakeholders) are in complete cognizance of the firm performance and outcomes, when compared with firms that have dispersed ownership structures. In fact, Jones (1988) finds that texts become increasingly difficult to read as firms go public. On the other extreme, companies exposed to diverse stakeholders are under higher pressure to make their texts easy to read. For instance, firms operating in international markets have a wide stakeholder base to communicate to, and therefore would be better off communicating in easier language (Courtis and Hassan, 2002).

Therefore, we hypothesize that the readability of annual report texts is associated with a firm's performance, size, age, level of promoter ownership, diversification and internationalization. We state our second hypothesis as follows:

*H2: Readability of MD&A narratives is better for firms that: (i) are high-performing, (ii) are larger, (iii) are older, (iv) have a highly concentrated ownership, (v) are highly diversified, and (vi) are highly internationalized.*

### **3. Research Design**

#### 3.1. Longitudinal design and choice of years

Schmitt et al. (2010) call for studying the impact of environmental crises using longitudinal case studies. In order to separate the effects of environmental malevolence and firm performance on efficiency of communication, this study analyzes texts disclosed by the firms in their annual reports (MD&As), over five years. The years analyzed include the global recession, which affected the performance of most firms in the sample, to reflect environmental malevolence. As

the peak of the recession was in 2008, and it tapered off through the next few years (IMF, 2011), this study analyzes the MD&As of five fiscal years: 2008 through 2012.

D'Aveni and McMillan (1990), as well as Keusch et al. (2012) introduce environmental crisis in their studies of annual report contents. Both these studies use two points of data, to reflect a normal year and a crisis year, and study the differences between the two. This paper expands on these studies' design by studying five years of texts. This allows for the study of any gradual changes that may occur in the texts. Furthermore, while these two studies focus on the content of the texts, this study focuses on the efficiency of communication (textual complexity) across years.

### 3.2. Choice of MD&A texts

Earlier studies on quality of communication focus on texts such as the Chairman's letter to stockholders (Abrahamson and Amir, 1996; Subramanian et al., 1993; Curtis, 2004) and the Management Discussion & Analysis (MD&A - Bowman, 1978; Bowman, 1984; Bryan 1997). This study analyzes the MD&A section of the annual reports because in India the structure and broad contents of the MD&A is mandated by the listing regulation (and every annual report ought to have one), while the Chairman's statement is voluntary. The MD&A texts are required to include both an analysis of the external environment and internal context of the firm such as industry structure and trends, opportunities and threats, segment performance, analysis of financial performance, future outlook, and risks and concerns. (Rajagopalan and Zhang, 2008).

### 3.3. Single industry context

This study analyzes firms from a single industry, in order to effectively separate the effects of environmental malevolence from performance in explaining reading ease of the annual reports texts. Choosing a single industry also ensures that the internal business environment is consistent across firms, in terms of asset intensity, performance parameters, and organizational forms.

The focus of the analysis is the automotive industry, which includes automobile manufacturers and auto-component manufactures. The country of choice is India, as the Indian automotive industry is exposed to the global economic context (our sample firms' exports go as high as 83% of their domestic revenue) and there is a wide variety of firms. The industry comprises domestic firms, joint ventures with foreign automotive groups (from Japan, America, and Europe), and subsidiaries of multinational companies. Moreover, some firms produce mainly for the domestic market, while others use India as an export hub. Finally, in India the industry is open to global competition, with both inward foreign direct investments, and with Indian firms beginning to invest in assets and operations abroad.

### 3.4 Sample and data

Our sample consists of listed automobile and auto components companies in the India's National Stock Exchange. The potential sample includes 139 firms. In order to ensure comparability of the annual reports this study analyzes only the texts of companies with a year-end date of Mar 31. This leads to the loss of 23 firms. We collect financial accounting information from the Prowess Database, from the Center for Monitoring Indian Economy. Prowess is a widely used and well-

validated database for research on Indian companies (e.g: Elango and Pattnaik, 2007; Khanna and Palepu, 2000; Vissa et al., 2010). In order to allow for our study of the evolution of the disclosures we exclude companies that did not have data for the full five years. The final sample consists of 445 observations, covering 89 firms.

Table 1 provides statistics about the sample firms, revealing that there is a lot of variation in the characteristics of the companies included in the sample. First we classify them according to ownership, and define as a domestic firm those which have Indian promoters, as defined in the database. Promoters, in the Indian context, are a group of individuals/family that form the company. This classification divides the firms into 76 domestic companies and 13 foreign companies. Next, we classify the firms by their line of product, and find that 81 companies work in auto-components, while 8 work in automobiles. Given that every company has varying level of exports, we use export intensity (export revenue/total revenue) as a measure of internationalization. We find that only 9 firms are purely serving domestic markets, while the rest have exports ranging as low as below 1 % to as high as 87% in the years under consideration.

INSERT TABLE 1 HERE

#### **4. Methodology**

We use the Flesch readability index for assessing the readability of texts. The Flesch Reading Ease Scale (FLRE) is a widely used measure in research to study the complexity of text (e.g.: Courtis, 1995; Beattie, 2004; Prasad et al., 2009). The readability index is a score measuring the



textual complexity. This score is derived from the number of words in a sentence, and the number of syllables in each of the words of the narrative.

The reading ease is classified from “very difficult” to “very easy”, based on the scores (ranging from 1 to 100). Scores from 1-30 are described as scientific writing, and are the most difficult to read, whereas 30-50 are described as academic writing. At the other end, scores closer to hundred are the easiest to read (Farr et al., 1951). Even though there have been questions on the use of FLRE as a measure to study textual complexity, as it only measures readability rather than understandability or completeness of the text (Hrasky and Smith, 2008), it continues the best available measure to study textual complexity in terms of difficulty and obfuscation (Courtis, 2004; Rutherford, 2003). Given the cross-sectional data, we use a panel data regression to test the hypotheses. The regression model is estimated as below:

$$\text{FLRE} = \alpha + \beta_1 \text{YEAR} + \beta_2 \text{ROE} + \beta_3 \text{MCAP} + \beta_4 \text{AGE} + \beta_5 \text{CONCENT} + \beta_6 \text{DIVER} + \beta_7 \text{INTERN} + \varepsilon \quad (1)$$

The first hypothesis states that the readability of MD&A narratives changes continuously over the years from 2008 to 2012, due to the crisis. In order to test this we include the variable YEAR in our model. Given our expectations, and the fact that higher values of FLRE represent texts that are easier to read, we predict a negative coefficient for this variable. As a robustness check, we run the model with dummy variables for each one of the years (keeping 2008 as the base year) and test the differences between the coefficients.

The second hypothesis states that readability of MD&A narratives is positively associated with the performance of firms, their size, their age, the concentration of ownership, the firms’ diversification and their level of internationalization. We measure the performance of the

company using return on equity (ROE), as it represents the earnings due to the shareholders (e.g.: Smith 2005; Hrasky et al., 2009). ROE is calculated as percentage of profit after tax to the net worth.

The size of the company is measured by the log of its market capitalization (MCAP). The AGE of the firm is measured by the log of the years the firm has been operating at the time of the annual report. Thus, we calculate the difference between the year of incorporation and the year of the annual reports. The variable CONCENT represents the level of concentration of ownership in the firm, and is measured by the proportion of promoter ownership to the total. The variable DIVER represents the complexity of the firm, as is measured by the number of products the firm sells. Finally, variable INTERN measures the proportion of exports to total sales. Given the hypothesis, we expect to find positive coefficients for all these variables.

## **5. Results**

### ***5.1 Descriptive statistics***

Table 2 presents our descriptive statistics, by years. We find that the readability scores are relatively very low (less than 30) in all the years, indicating a scientific level of difficulty in reading of the texts. The maximum score is 53.4, in 2012, and the minimum is 9.6, in 2009. The mean values of FLRE consistently decrease from 2008 (value=28.91) through 2011 (value=26.64), and then increase in 2012 (value= 27.06). A test on the decrease from 2008 to 2011 shows this decrease is statistically significant, at a 5% confidence level. Thus, the difficulty levels in reading persist as the recession continues, and the readability level only improves in 2012, though not significantly ( $t= 0.34$ ,  $p=0.733$ ). Figure 1 depicts the trend of FLRE over the years.

INSERT FIGURE 1 HERE

Analyzing the mean values of ROE one can see that the firms' worse year was 2009, when ROE was just 1.51%. All other years have mean ROE higher than 10%, with the second lowest value was in 2008 (10.53%). Thus, in this specific sector the crisis seems to have started in 2008, had its peak in 2009 and decreased in the following years. The fact that the mean value of FLRE of 2008 is not statistically different from the mean value of 2009 is consistent with the existence of an association between the performance of the firm and the readability of its MD&A.

We find a wide variety in the AGE of firms: our oldest firm is 93 years, while the youngest is just one year old. The mean values of CONCENT indicate that the capital of these firms is not very dispersed, as the promoters own more than half of the capital. However, there is still a fair amount of variation in the concentration of ownership, as the maximum value is 95.38% and the minimum is 22.53%. The mean value of ownership remained fairly stable though our time period, as the mean concentration in 2008 (56.67%) is not statistically different from the mean concentration in 2012 (58.16%). The analysis of DIVER reveals that the number of products produced by a firm ranges from one to a maximum of twenty. Finally, through INTERNAT we see that some firms work exclusively for the domestic market, while there are firms where more than 80% of their sales are exported.

INSERT TABLE 2 HERE

Table 3 presents the correlation matrix amongst the variables, including both Pearson (bottom triangle) and Spearman (upper triangle) correlations. These suggest that the readability of

MD&A narratives continuously decreased over the years analyzed, as the correlation between FLRE and YEAR is negative and statistically significant. Moreover, the level of international sales is positively correlated with the readability of the texts, which is also consistent with our predictions. The other firm-level variables considered in hypothesis 2 are not statistically correlated with the readability of MD&As.

Given that some of the firm-level variables are significantly correlated (although not at high levels), we next perform an analysis of the variance inflation factors of the variables. Untabulated results indicate that none of the VIF values are above two, and the mean value is 1.14, revealing that multicollinearity is not a problem.

INSERT TABLE 3 HERE

### 5.2 Model estimation

The results of estimating equation (1) are provided in Table 4. The first column presents the results of a standard ordinary least squares (OLS) model. Based on the first hypothesis we expect the coefficient of YEAR to be negative. The estimated coefficient is -0.605, and it is statistically significant at a 1% confidence level. This indicates the readability of MD&A narratives continuously decreased over the years analyzed. This result is counter to the argument that the management of firms are concerned about maintaining stability and inertia of readability indices across years (Aerts, 2001). Our findings suggest that when a firm encounters an exceptionally difficult external environment, irrespective of its performance, its annual report texts become difficult to read. Earlier studies had almost exclusively focused on measuring the effect of firm performance on the readability indices, and had found significant effects whilst using cross-

section data (Rutherford, 2003; Courtis, 2004). Salancik and Meindl (1984) use longitudinal data and find a negative association between firm performance and readability indices. We posit that the relationship between the external environmental malevolence and textual obfuscation may be mediated through firm performance, and therefore prior literature, which has only focused on the relationship between firm performance and textual complexity, has found significant results, and call for further studies to evaluate the mediating role of firm performance.

Based on the second hypothesis we expect the coefficients of the next six independent variables to be positive. Three of the coefficients are positive, while the remaining ones are not statistically significant. Thus, we obtain partial support for H2. Our OLS results provide evidence of a positive and significant association between size (MCAP) and readability of the MD&As (FLRE). As the size of the firm increases the firm is under increased analyst and public focus. Therefore, the firms have a significant incentive to keep their texts simple to be able to address the communication needs of a wider variety of stakeholders. The concentration of ownership (CONCENT) is also positively associated with readability (FLRE), which is in line with the agency theory argument; where significant shareholders, also take up executive/ managerial positions in the firm, and therefore, there is no explicit need to obfuscate the texts. Results indicate that firms that have high export intensity tend to keep their texts relatively simple, probably because they have to deal with a wider variety of stakeholders and use MD&A texts as a basis of image building, which is good for obtaining resources, technology, and other complementary items.

Given that we have several observations per firm in our sample we next perform a Hausman test to determine which type of model (random or fixed effects model) is more adequate to our data.

This test results in a chi-square statistic of 8.05, and we fail to reject the null hypothesis of no correlation between unobserved heterogeneity and explanatory variables, at a 5% confidence level. Thus, we conclude that a random effects model is more adequate and presents the result of this estimation in our second column of results, in Table 4. The estimated coefficient for YEAR is negative and statistically significant, as in the OLS estimation. Thus, our findings in what concerns H1 are robust. However, when analyzing the coefficients for the six firm-level variables we find that only MCAP (proxy for size) is statistically significant. Given that the random effects model is more precise than the general OLS, we conclude that size is the only firm-level variable that is associated with readability of texts, in times of crisis.

We next extend our random effects model, in order to assess how the readability changes across the years included in our sample. In this extended model (column RE\_2 of Table 4) we remove the variable YEAR and include indicator variables for the years (except 2008, which serves as a base value, given that it represents the period before the crisis). The results of this estimation indicate that the decrease of readability started in 2010 (the year after the beginning of the crisis), and that readability remained at levels lower than 2008 through 2011 and 2012. Moreover, the value of 2011 is statistically lower than the one of 2010 ( $z=-2.35$ ,  $p\text{-value}=0.019$ ), indicating that a long period of crisis is associated with an increasing obfuscation of texts. A test on the difference of the coefficients of 2012 and 2011 reveal that while the value of the coefficient for 2012 is higher than the value of 2011, this difference is not statistically significant ( $p\text{-value}=0.48$ ). Thus, the level of readability remains constant in the year when the crisis stop. When we test for the joint significance of the year indicator variables, using a Wald test, we obtain a chi-square statistic of 23.50, which is significant at the 1% level. This indicates that there is significant cohort effect, which is consistent with our results for YEAR.

## 6. Conclusion

This study provides significant evidence of the importance of external environment (environmental malevolence) on the readability of annual reports texts, analyzing five years of MD&As. The period covered includes years characterized by global economic recession. Results also indicate the existence of an association between size and readability, possibly due to the need to simplify texts as firms communicate to larger audiences.

By introducing a panel data that combines cross-section and longitudinal data in the study, we establish the primacy of external environment over firm performance in explaining changes in readability indices of annual report texts. Rutherford (2003) concludes that not all poor performing companies obfuscate their texts, and the presence of such complex language may be more a result of what is being communicated than just firm performance. Given the common external environment that is being studied, we control the effect of information content on textual complexity.

Our research has important policy implications.. Unlike in the US, where Securities Exchange Commission has developed “plain English” guidelines to be applied for documents such as Form 10-K which contains the Management’s Discussion and Analysis, these guidelines are particularly missing for emerging market countries such as India. The MD &A provides insights into the company’s present and future performance that is read by variety of investors. If these

reports are difficult to read, retail and small investors would have a tough time deciphering the document leading to asymmetry of information.

One of our study's limitations is the use of a single readability index, the FLRE. Using multiple readability indices, may improve the results (Karlinsky and Koch (1982)), however given the exploratory nature of our study, and the objective of assessing the effect of environmental malevolence on the textual complexity, we use the most commonly used index. Further studies could validate this assertion using multiple indices of readability.



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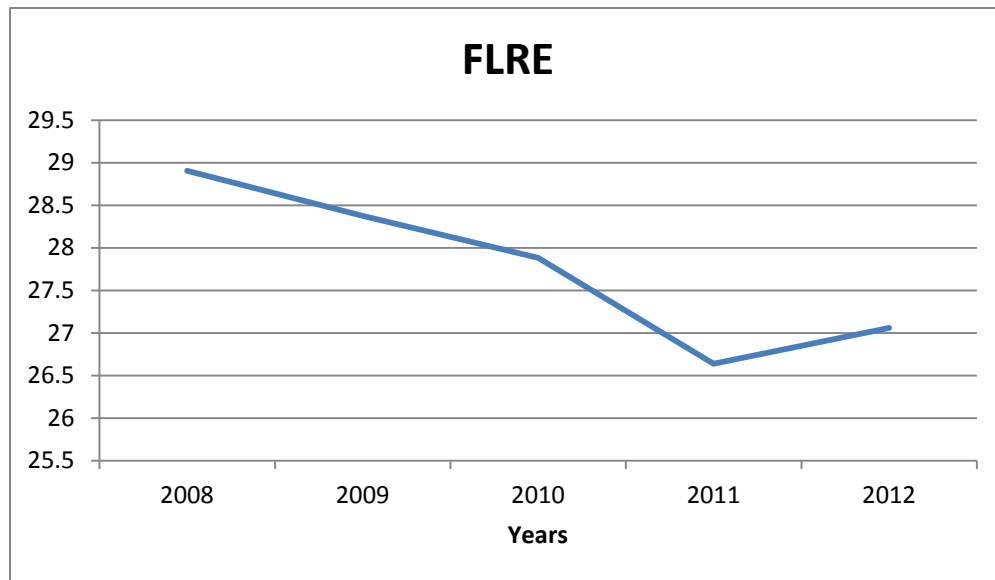
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**Figure 1: Flesch Reading index**





**Table 1: Descriptive statistics on the firms analyzed**

	N
<u>Ownership</u>	
Domestic	76
Foreign	13
<u>Product</u>	
Automobiles	8
Auto-components	81
<u>Export Intensity</u>	
Serving Domestic only	9
Exports and Domestic	80

**Table 2 - Descriptive statistics**

Year	FLRE	ROE	MCAP	AGE	CONCENT	DIVER	INTERN
<i>Mean</i>							
2008	28.91	10.53%	11,751	28.91	56.69%	6.96	11.47%
2009	28.37	1.51%	7,593	28.37	57.25%	6.96	12.89%
2010	27.88	12.64%	20,970	27.88	57.75%	6.93	10.43%
2011	26.64	13.30%	27,840	26.64	58.15%	6.96	11.32%
2012	27.06	13.78%	29,211	27.06	58.16%	6.96	11.81%
<i>Maximum</i>							
2008	45.60	50.85%	240,342	89	95.38%	20	83.79%
2009	47.00	120.98%	223,934	90	95.38%	20	86.19%
2010	45.20	58.06%	409,140	91	95.38%	20	84.09%
2011	42.90	78.90%	671,495	92	95.38%	20	83.80%
2012	53.40	72.10%	742,078	93	95.38%	20	87.80%
<i>Minimum</i>							
2008	14.2	-158.02%	35	1	22.56%	1	0.00%
2009	9.6	-452.76%	35	1	23.41%	1	0.00%
2010	14.7	-35.34%	35	1	25.03%	1	0.00%
2011	14.5	-205.92%	35	1	24.90%	1	0.00%
2012	13.5	-63.58%	35	1	25.03%	1	0.00%

FLRE: Flesch Reading Score; ROE: Return on equity; MCAP: Market capitalization; AGE: Age of the firm; CONCENT: Concentration of ownership; DIVER: Diversity; INTERN: International sales.

**Table 3 - Pearson and Spearman's Correlation Matrix**

	FLRE	ROE	MCAP	AGE	CONCENT	DIVER	INTERN	YEAR
FLRE	1	<b>0.09</b>	0.04	0.05	0.01	-0.05	0.08	<b>-0.13</b>
ROE	0.04	1	<b>0.28</b>	0.02	0.01	0.03	-0.02	0.05
MCAP	0.07	<b>0.16</b>	1	<b>0.30</b>	<b>-0.18</b>	<b>0.27</b>	<b>0.14</b>	<b>0.16</b>
AGE	0.02	<b>-0.12</b>	<b>0.21</b>	1	<b>-0.17</b>	<b>0.23</b>	<b>0.28</b>	<b>0.13</b>
CONCENT	0.07	<b>-0.14</b>	<b>-0.25</b>	<b>-0.13</b>	1	<b>-0.09</b>	<b>-0.23</b>	0.06
DIVER	-0.03	-0.04	<b>0.30</b>	<b>0.24</b>	<b>-0.10</b>	1	0.09	0.00
INTERN	<b>0.12</b>	0.05	0.03	<b>0.14</b>	<b>-0.13</b>	0.01	1	0.00
YEAR	<b>-0.13</b>	0.08	<b>0.13</b>	<b>0.11</b>	0.04	0.00	-0.01	1

Note: correlations that are significant (at a 5% confidence level) are in bold.

**Table 4 – The association of FLRE with YEAR and firm-level variables**

	OLS		RE_1		RE_2	
<b>YEAR</b>	<b>-0.605</b>	<b>***</b>	<b>-0.656</b>	<b>***</b>		
ROE	0.815		0.210		0.274	
MCAP	0.871	**	1.048	*	1.413	**
AGE	0.212		1.074		1.022	
CONCENT	0.051	**	0.036		0.040	
DIVER	-0.822		-0.646		-0.780	
INTERN	5.197	***	1.240		0.789	
<b>Y_2009</b>					<b>-0.087</b>	
<b>Y_2010</b>					<b>-1.167</b>	*
<b>Y_2011</b>					<b>-2.595</b>	***
<b>Y_2012</b>					<b>-2.169</b>	***
Intercept	1,237.04	***	1,340.36	***	22.084	***
Adjusted R <sup>2</sup>	3.48%					
F-statistic	3.237	***				
Chi2			19.914	***	24.366	***

Notes: \*\*\*, \*\* and \* mean the coefficients are statistically significant at 1%, 5% and 10%, respectively

$$\text{FLRE} = \alpha + \beta_1 \text{YEAR} + \beta_2 \text{ROE} + \beta_3 \text{MCAP} + \beta_4 \text{AGE} + \beta_5 \text{CONCENT} + \beta_6 \text{DIVER} + \beta_7 \text{INTERN} + \varepsilon \quad (1)$$