ARE LONGER ANNUAL REPORTS LESS READABLE? EVIDENCE FROM FOREIGN FIRMS LISTED ON THE UNITED STATES STOCK EXCHANGES

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Abstract - This study examines whether longer annual reports are less readable. Using the sample of 20-F forms published by foreign firms listed on the United States Stock Exchanges, we find a significantly negative association between the length of annual reports and readability. This result suggests that longer annual reports are not less readable. The change in writing styles with shorter sentences, which is better complied with regulations of the US Securities and Exchange Commission (SEC) on disclosure, is considered the main reason for longer but more readable annual reports. We also raise awareness when employing the length of annual reports as the proxy of readability in research on the complexity of annual reports.

Keywords - Readability; Annual reports; Length of reports; Fog Index

1. Introduction

The efficient market theory assumes stock prices are substantially affected by the information. Such information is extracted from two main sources, namely private and public information, in which, the primary and cheapest source for users such as investors, regulators, or other users is the information officially published on financial statements of firms. The US Securities and Exchange Commission (SEC) realizes the essential role of annual reports to users and issues a series of regulations and guidelines to orient firms' disclosures. SEC forces firms to disclose meaningful information in understandable ways to the public which helps users fully and clearly understand the firms and judge their investing decisions [1]. Unfortunately, the increase in the complexity of annual reports diminishes the benefits of the cheapest public information. Users spend excessive time and cost on reading and understanding complex information extracted from annual reports [2].

Numerous researchers have shown that annual reports have become extremely long and less readable over time [3, 4, 5, 6, 7, 19]. Cazier and Pfeiffer [8] explained the three main factors for the substantial increase in the length of annual reports. The first reason is that the business environment and operation of firms have become more complex over time. The second reason is redundancy in the SEC and GAAP disclosures. Redundancy means that firms declare the same information in various sections of filings. The last reason is firms' provision of "residual" disclosure. The decline in the readability, as well as the increase in the length of annual reports, causes enormously negative impacts on investors, analysts, and the stock market [4, 7, 9, 10, 11]. Firms, regulators, and users strive to mitigate the shortcoming of poor readability by, for example, disclosing more voluntary information, searching for more information online, or adopting new accounting standards [12, 10]. The SEC has also promulgated regulations and guidelines on using plain English in the disclosures of firms to enhance the readability of annual reports, however, it has not yet improved considerably.

A precise definition and perfect measurement of readability are lacking. The Fog Index and length of the document are the most popular measurements used in research on the readability of annual reports [13]; However, these measurements have received criticism [7, 14, 16]. New measurements of readability are continuously introduced, such as READ_PE [7], the Plain English Index (LM PE Index) [14], and the Bog Index [3]. Although these new measurements focus on plain English in the business context, they have still not been widely used.

Noticeably, earlier research on the readability of annual reports aims at US firms. To our knowledge, this topic for other samples is limited [6, 15]. Bridging the gap in the previous studies, we focus on the annual reports issued by foreign firms listed on the US stock exchanges. These firms operate in different businesses/legal environments and adopt different accounting standards, thereby, we expect to explore the completed picture of the readability of firms' disclosures. We concentrate on 20-F filings rather than the MD&A part of 20-F as Lundholm et al. [6] and standardized filing forms rather than various presentations such as Lang and Stice-Lawrence [15]. Further, our research uses the two most popular measurements, namely the Fog Index and the length of the document. Specially, we test the association between the length and the readability of annual reports in the interaction of other control variables rather than the correlation between two variables.

The presented findings suggest that foreign firms have changed their writing style to using longer reports but shorter sentences to improve the readability of their annual reports, as this approach better complies with Rule 421 of the SEC [26, 27]. We also find a negative association between the length of annual reports and the Fog Index. It means that longer annual reports are easier for readers. Our results are reconfirmed by using the other measurements, the **Flesh-Kincaid and the Flesh Reading Ease** which are popularly used in the United State [10, 20], to test the association between the readability and the length of annual reports. In summary, longer annual reports do not diminish readability thanks to an improvement in writing style, suggesting that researchers should pay more consideration when using the length of annual reports to measure readability, as suggested by Bonsall *et al.* [3], Loughran and McDonald [13].

2. Background and Hypothesis Development

2.1. Definition of readability

Although research on the readability of annual reports has been carried out since the 1970s, different definitions of readability exist, such as the definition of Klare in 1963 [31]; McLaughlin in 1969 [32]; Davison and Kontor in 1982 [33]. Smith and Smith [17] were the first to define readability in an accounting context. According to them, the readability of financial statements serves as "the basis for objectively measuring the comprehension ease level of that set of financial statements" (p. 554). They thus emphasize that information from financial statements should be understandable to target readers, who are at the core of their definition.

However, Smith and Smith's [17] definition is too general since they do not clarify the readers or their expectations. Loughran and McDonald [16] define "readability as the ability of individual investors and analysts to assimilate valuation-relevant information from a financial disclosure" (p. 1649). Compared with the definition of Smith and Smith [17], their definition is less ambiguous since it clarifies the users and their expectations. Notably, both these definitions focus on the readability of annual reports, which differs from readability in other fields because annual reports are typically read by highly educated users who have the relevant background and experience to understand them.

2.2. Measuring the readability of annual reports

Research on the readability of annual reports has bloomed since 2008. However, most researchers use the length of reports and Fog Index as the main measurements of readability.

2.2.1. Length of reports

Length of reports is one of the simplest ways in which to measure the readability of annual reports, as used by Filzen and Schutte [18], You and Zhang [11]. This measurement is identified by the number of words in such reports. It is supposed that the longer annual reports are, the more complex they are since longer reports provide more details to reduce information asymmetry and require investors to spend more time along with costs for reading and analyzing them. Most extant research does not use the length of reports as the main measurement of readability; instead, it uses this method as a comparable measurement [5, 7, 9, 12, 16, 18]. All research has found a dramatic increase in the length of annual reports over time [5, 7, 16, 20].

Measuring the length of reports has received criticism from researchers such as Bonsall et al. [3] and Loughran and McDonald [13]. They assume that this measurement pays more attention to construct rather than readability; therefore, users should pay more consideration when using this method. Some empirical research assumes that longer reports do not mean lower readability, such as Cheung and Lau [12], Lundholm et al. [6]. Unfortunately, those studies do not provide empirical evidence and explain the reason, a gap in the body of knowledge that the present study bridges.

2.2.2. Fox Index

Compared with the length of reports, the Fog Index is more widely used as the main measurement of readability [4, 5, 6, 9] or a comparable proxy [3, 7, 14]. The Fog Index, first launched by Gunning in 1952, is relied on how many educational years readers need to understand the texts. It includes two elements: the sentence length and the percentage of complex words in a document, as follows:

Fog Index = 0.4 * (sentence length + percentage_complex_words)

According to the Fog Index, the level of readability is categorized into five categories: Childish (8–10); Acceptable readability (10–12); Ideal for reading (12–14); Difficult-to-read (14–18); and Unreadable (>18). This index thus focuses on writing styles. This means that writing longer sentences (i.e., more words in a sentence) and using more complex words (two or more syllables) equates to lower readability.

Previous research has found a remarkable increase in the Fog Index over time. For instance, Lehavy et al. [4] report that the Fog Index rose from 19.25 to 19.52 from 1995 to 2006. Similar results were recorded by Bonsall et al. [3], Lee [9], Li [5], Loughran and McDonald [16]. Interestingly, Cheung and Lau [12] found the opposite trend in Australia after the country adopted IFRS, with the authors showing that the Fog Index of the annual reports of Australian firms decreased after adopting IFRS, although the length of reports increased.

Despite the advantages mentioned above, this method has also received criticism. For instance, Loughran and McDonald [16] provide evidence of the irrelevance of the second component of the Fog Index for measuring the readability of annual reports. They assume that the percentage of complex words is inconsistent with the Fog Index and report that 45,000 complex words under the definition of the Fog Index are "simple and common business terms" (p. 1645). Loughran and McDonald [16] assume that identifying complex words built on the number of syllables is unreliable, especially in the business context. Indeed, popular business words contain two or more syllables (e.g., managers, income, dividends), easily understood by users of annual reports who own business backgrounds. Bonsall et al. [3] point out that the Fog Index is too simple and ignores other components of plain English, for instance, the passive voice, legal jargon, and abbreviations.

Flesh-Kincaid and Flesh Reading Ease

Flesh-Kincaid and Flesh Reading Ease: Flesh-Kincaid and Flesh Reading Ease use the same components as the Fog Index (i.e., sentence length and the percentage of complex words), but different formulas for the calculation:

Flesh-Kincaid = (11.8 * syllables per word) + (0.39 * sentence length) – 15.59

Flesh Reading Ease = 206.8 – (1.015 * sentence length – (84.6 * syllables per word)

These measurements are popularly used in America, especially in the military and education. They measure the

readability of reports of students or manuals. Noticeably, the higher Flesh-Kincaid reports are more readable, in contrast, a higher score of Flesh Reading Ease is better for readers. De Franco, Hope, Vyas, & Zhou [20] and Guay *et al.* [10] modified these measurements in different ways by attaching them with the Fog Index to reduce measurement errors. However, those measurements have not yet been widely used in the business context.

2.3. Negative impacts of poor readability

Researchers have historically recognized the negative effects of readability on users [18]. Courtis [21] shows that readability is negatively associated with risks, besides, Subramanian, Insley, and Blackwell [22] point out the negative relationship between readability and firm performance. However, research on the readability of annual reports mushroomed in the late 2000s with Li's [5] significant contributions. Li successfully introduces how to deal with textual analysis for large sample sets as well as recognizes the relationship between the readability of annual reports and firm performance, which is reconfirmed by the research of Aymen, Mhamed, and Badreddine [23].

Additionally, prior research has indicated the harmful impacts of the readability of annual reports on stock markets such as the underreaction of investors [9, 11, 24] or the lack of trading from small investors [25, 11]. To lessen the negative effects of complex reports on users, firms produce more voluntary disclosures [10], more online searching [18], or move to different accounting standards such as the example of Australia choosing to adopt IFRS to enhance the readability of its firms' annual reports [12]. The readability of annual reports also affects analysts' behaviors such as uncertainty in earnings forecasts or complexity in analyst reports [4; 21].

2.4. Hypothesis development

We hypothesize that longer annual reports are less readable since the theory supposes that the more detailed information in such reports demands spending more time and effort reading and analyzing them. This hypothesis is also based on previous findings on readability that show the substantial increase in the length of 10-K filings as well as the Fog Index over time [4, 5, 11, 16]. Most previous research finds a positive correlation between the Fog Index and the length of a document [5, 16]. Such a positive correlation means that longer annual reports are accompanied by a higher Fog Index, which reduces the readability of annual reports. Because of this positive correlation, both the length of reports and the Fog Index are considered to be proxies for the readability of annual reports.

Interestingly, Cheung and Lau [12], Lundholm *et al.* [6] note that the increase in the length of annual reports comes with a fall in the Fog Index. Lang and Stice-Lawrence [15] also report a negative Pearson correlation between the number of words in annual reports and the Fog Index (-0.061). Additionally, Miller [7] reports an increase in the number of words but a fluctuation in the Fog Index and READ_PE of a 10-K sample set. Formally, we raise the hypothesis:

Hypothesis: Longer annual reports are less readable.

To test the hypothesis above, we run the regression as follows:

$$FOG = \beta_0 + \beta_1 LN\_WORDS_{it} + \beta_2\ LN\_SIZE_{it}$$
$$+ \beta_3\ DEBT + \beta_4\ LN\_VOL_{it} + \varepsilon.$$

To measure the length of annual reports (LN_WORDS), we count the number of words in annual reports and take the natural logarithm of this figure. In terms of readability, we use Fog Index, the most common proxy in previous research. We also add three control variables into the regression, including firm size, debt ratio, and volatility of the stock price. Firm size (LN_SIZE) is measured by the market value of equity, expectedly having a positive association with Fog Index. Bigger firms normally disclose more information due to the complexity of business, leading to longer and more complex reports [5, 8]. Similarly, the positive association between volatility and the length of annual reports is expected to record. More information causes uncertainty and volatility in stock prices [6]. Volatility (LN_VOL) is identified by the standard deviation of daily stock returns [29]. In contrast, Debt ratio (DEBT) is equal to total liabilities scaled by total assets, negatively associated with the readability of annual reports. Policymakers and other users require firms financed by debts to declare more information, leading to more complex reports [28].

3. Sample selection

Our study concentrates on the annual reports of foreign firms listed on the US Stock Exchanges. SEC regulates that foreign firms, normally labeled as "foreign private issuers", trade less than 50% of their stocks on the US Stock Exchanges and annually provide their reports in 20-F forms. Using Python, we download all the 20-F filings of foreign firms from EDGAR (Electronic Data Gathering, Analysis, and Retrieval) in the period 2004 to 2013 and get 7,588 observations. We choose filings in text files that are easily analyzed by the Perl language and delete all filings in the finance and insurance sector. Next, we identify the RIC codes of these firms and acquire financial data from Thomson Reuter Datastreams. Then, we remove all missing data. Finally, our sample has 1,243 observations, which relate to firms in eight sectors excepting finance and insurance: Agriculture, forestry, and fishing; Mining; Construction; Manufacturing; Transportation, communication, electric, gas, and sanitary services; Wholesale trade; Retail trade; and Services.

To acquire the length and Fog Index of 20-F forms, we follow the guidelines of Bonsall *et al.* [3], Li [5], Loughran and McDonald [14, 16] to clean the raw data and measure the length of reports, Fog Index, Flesh-Kincaid, and Flesh Reading Ease of 20-F forms.

4. Results and Discussion

4.1. Descriptive statistics and correlation

Table 1 shows that the annual reports of foreign firms listed on the US Stock Exchanges are extremely long and difficult to read. From 2004 to 2013, the average number

of words in 20-F forms is 74,214 words, equivalent to 11.14 of the natural logarithms. The average Fog Index of 20-F forms is 19.93, inferring that the user needs more than 19 education years to read and understand the annual reports of foreign firms listed on the US Stock Exchanges. The unfavorable writing style in 20-F forms triggers the high Fog Index. In detail, each sentence in 20-F forms contains about 24 words on average, and 25% of the words in such forms are considered complex. Writing long sentences and using more frequently complex words breach the SEC's recommendations in communication to users. In particular, the SEC emphasizes that the length of reports is not important. Indeed, the SEC [26; 27] mentions that "clarity, not brevity" is crucial and that "writing a disclosure in plain English can sometimes increase the length of particular sections" (p. 11).

Consistent with our results, Lang and Stice-Lawrence [15] also record the Fog Index at 19.52 for English annual reports in 42 countries globally from 1998 to 2011. Lundholm *et al.* [6] report that the average Fog index of the MD&A part in 20-F forms is 17.54 in the period 2000–to 2012. Notably, Li [5] indicates that the MD&A part is more readable than the rest of the filings.

Table 1. Descriptive Analysis

Variable	N	Mean	Std. Dev	Q1	Median	Q3
LN_WORDS	1,243	11.14	0.42	10.94	11.15	11.36
FOG	1,243	19.93	2.06	18.61	19.56	20.87
LN_SIZE	1,243	7.19	2.53	5.29	7.11	9.25
DEBT	1,243	0.22	0.20	0.04	0.19	0.35
LN_VOL	1,243	-3.60	0.49	-3.96	-3.62	-3.24

As mentioned in Table 1, the average of LN_SIZE is recorded at 7.19. In our sample, the total liabilities are occupied 22.47% of total assets, on average. The mean of volatility is -3.60.

Table 2 illustrates the Pearson correlations among variables. The dependent variable is positively correlated with size, and volatility but negatively correlated with debt ratio and length of annual reports. Especially, these correlation coefficients are not high, therefore, we expect not to be multi-collinearity.

Table 2. Pearson correlation

	(1)	(2)	(3)	(4)	(5)
FOG	1				
LN_WORDS	-0.168	1			
LN_SIZE	0.014	0.285	1		
DEBT	-0.120	0.189	0.046	1	
LN_VOL	0.066	-0.042	-0.552	-0.016	1

The Pearson correlation between the Fog Index and the number of words is negative at nearly 17% but significant at 1%. This result is consistent with that of Lang and Stice-Lawrence [15], Cheung and Lau [12] who show a negative correlation. Lundholm *et al.* [6] also find that the MD&A of foreign firms is significantly longer, but with a lower Fog Index.

4.2. Readability of longer annual reports

Table 3 illustrates the regression results of the association between the length of annual reports and the Fog Index. The first column represents the results without fixed effects, meanwhile, the second, the third, and the last column show the coefficients of regressions with fixed effects. We test the fiscal year fixed effects and industry fixed effects to confirm the regression results.

As mentioned in Table 3, the negative coefficient of LN_WORDS is significant at 99% in all cases. The negative association between LN_WORDS and FOG infers that longer annual reports are lower Fog Index. To put it simply, longer annual reports are more readable. The change in writing style is presumed to explain the decline in the Fog Index when annual reports become longer. In detail, popularly professional words with two or more syllables used in annual reports cause the stability in the percentage of complex words at around 25%; meanwhile, the average words per sentence increases in the first seven years from 22.04 in 2004 to the peak at 25.74 in 2010, and then decreases to 24.23 by 2013. Hence, the decline in the average length per sentence leads to a decrease in the Fog Index for the past three years but increases the length of annual reports. Such a writing style adheres better with Rule 421(d) of the SEC and aids reader understanding, as mentioned by the lower Fog Index [26;27;30].

Table 3. Regression results in readability and Length of annual reports

Independent Variables	Dependent variable (FOG)			
	(1)	(2)	(3)	(4)
Intercept	31.617 (18.97)***	30.932 (13.65)***	30.975 (17.61)***	30.295 (13.10)***
LN_WORDS	-0.921 (-6.36)***	-0.916 (-6.30)***	-1.003 (-6.90)***	-1.009 (-6.90)***
LN_SIZE	0.121 (4.27)***	0.119 (4.00)***	0.114 (3.69)***	0.107 (3.28)***
DEBT	-0.928 (-3.17)***	-1.179 (-3.58)***	-1.021 (-3.54)***	-1.298 (-3.99)***
LN_VOL	0.583 (4.14)***	0.558 (3.94)***	0.423 (2.40)**	0.383 (2.140)**
Industry fixed effects	No	Yes	No	Yes
Year fixed effects	No	No	Yes	Yes
Adjusted R^2	0.05087	0.0812	0.08785	0.1189

Hence, we reject the null hypothesis at the 99% confidence level, inferring that longer reports do not mean they are less readable. Longer reports with shorter sentences are assessed as the friendlier writing style for readers, therefore, the current tendency of the length of annual reports is also a solution for the reduction in the readability of these reports. Additionally, the negative association between the length of annual reports and the Fog Index requires more causation when using the former to measure readability as mentioned in previous research [6, 12, 16].

The signs of control variables follow our expectations as well as previous research. In detail, firm size and volatility are positively associated with Fog Index, in contrast, the negative association between debt ratio and Fog Index is recorded. Including fixed effects, the signs do not change.

4.3. Robustness tests

Table 4 shows the regression results when we use other measurements of readability such as Flesh-Kincaid and Flesh Reading Ease instead of Fog Index. The negative association between Flesh-Kincaid and the length of annual reports is still significant at 99% with both industry and year fixed effects. Flesh Reading Ease is positively associated with the length of annual reports; however, higher Flesh Reading Ease means more readable. The positive coefficient of Flesh Reading Ease infers that longer annual reports cause higher readability. In sum, replacing Fog Index with Flesh-Kincaid or Flesh Reading Ease the inference does not change. Longer annual reports do not mean less readable.

Table 4. Regression results of Flesh Kincaid; Flesh reading Ease and Length of annual reports

Independent Variables	Dependent variable – Flesh Kincaid	Dependent variable – Flesh reading Ease
Intercept	25.189 (11.42)***	1.151 (0.185)
LN_WORDS	-0.915 (-6.56)***	2.431 (6.17)***
LN_SIZE	0.114 (3.64)***	-0.619 (-7.01)***
DEBT	-1.083 (-3.50)***	4.731 (5.414)***
LN_VOL	0.411 (2.41)**	-1.53 (-3.18)***
Industry and Year fixed effects	Yes	Yes
Adjusted R^2	0.1125	0.138

5. Conclusion and implication

Users of annual reports always take advantage of extracting low-cost information from public reports of firms. To satisfy the high information demand of users, the SEC has obliged firms to use plain English in their disclosures since 1998; Nonetheless, the annual reports have still been complicated. Most prior studies recognize that annual reports have become longer and less readable. Our research shows a different opinion. We still report a substantial increase in the length of annual reports but note that readability has not worsened for our sample. Our results propose that foreign firms have changed their writing styles by better adopting the recommendation of the SEC in plain English. They now shorten their sentences, which has reduced the Fog Index or improved the readability irrespective of their dramatic increase in length.

To ensure the transparency of the stock market, the SEC has introduced very specific regulations on information disclosure including the language used in

annual reports of firms. These specific regulations guide firms in disclosing information to the public, but also contribute to increasing the complexity of accounting reports. Therefore, Vietnam should consider the duality of promulgating how the detailed regulations on information disclosures in annual reports of public firms are.

Our research makes remarkable contributions to the research. We widen the sample set to the entire annual reports of foreign firms rather than MD&A, in contrast to Lundholm et al. [6]. Further, we show that although annual reports have lengthened over time, longer annual reports do not necessarily mean lower readability. Hence, we are the first study to explain the reasons for the negative correlation between the length of annual reports and readability. Moreover, we are the first research to provide empirical evidence of the negative association between readability and the length of annual reports and we raise the cautions about using the length of annual reports to measure readability.

However, this research contains some open issues that need to improve in the future. Firstly, our research only answers the question of whether longer annual reports reduce their readability not whether they are more informative. Hence, whether longer annual reports are better from the perspectives of investors remains unclear. Secondly, it would be more valuable if we can directly compare the difference in disclosure between the US firms and the foreign firms. We leave these issues to future work.

TÀI LIỆU THAM KHẢO

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