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Do Linguistic and Accounting Reporting Complexity Affect Audit Fee?

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Abstract

Measuring audit clients' complexity attracts scholars' attention as quantifying linguistic complexity in textual disclosure and accounting reporting complexity in financial statements becomes available with automatic tools. Previous research identifies three categories of complexity measures including operational, linguistic, and accounting reporting complexity, while only operational complexity has been studied in Japanese audit market. This study aims to explore whether auditors in Japan responds to complexity of textual disclosure in annual reports and of financial statement. Using a large sample comprising 14,389 firm-year observations from 2014 to 2021, this paper finds a positive association between linguistic and accounting reporting complexity with audit fees. This result is robust when taking file size as alternative measure of linguistic complexity. In addition, this paper reports a positive relationship between audit fees and linguistic complexity in a special section of annual report, Business Risks. These findings suggest that Japanese auditors increase their audit efforts when their clients are more complex in terms of textual disclosure and financial statements.

Keywords: audit fees, accounting complexity, XBRL, textual disclosure, Japan audit market

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1 Introduction

This paper aims to investigate how the level of various sources of client's complexity affect audit pricing behavior. The traditional empirical research suggests that audit fee is mainly driven by the efforts and risks that auditors take, which could be reflected through the attributes of client's financial reporting system (Simunic, 1980; Yazawa, 2011). Accordingly, prior research usually incorporates operational complexity measures as proxies of the level of client's complexity (Hay, Knechel and Wong, 2006). It is usually assumed that the more complex the client's operation is, the more time and effort is required for auditors to complete audit test and prepare audit report. However, recent studies suggest instead of operational complexity, a more comprehensive measure of complexity should be considered when investigating the determinants of audit fees, since operational complexity reflects only one aspect of audit clients' characteristics. (Hoitash and Hoitash, 2018; Hossain et al., 2019; Blanco et al., 2021; Malik, Shan and Tong, 2022). Following these arguments, this paper highlights two types of complexity measures: (1) linguistic complexity, and (2) accounting reporting complexity in determining audit fees. It is hypothesized that a higher level of linguistic and accounting reporting complexity is associated with higher level of audit fees.

To test hypotheses, this paper uses a large sample of 14,389 firm-year observations from Japanese listed companies over the period 2014-2021. The empirical model in this paper follows the work of Fukukawa (2012) and different complexity measures are replaced and tested in order. Specifically, the linguistic complexity is proxied by length, readability, and file size (Li, 2008; Loughran and Mcdonald, 2014), while accounting reporting complexity is measured by the total numbers of unique monetary XBRL tags used in financial statements (Hoitash and Hoitash, 2018; Jin and Okumura,2022). The results find that both alternative measures have economically and statistically significant effects on audit fees.

This paper extends the current literature in three important ways. First, to the author's best knowledge, the discussion on relationship between narrative disclosure and audit fee is limited in Japan. This study contributes to audit literature by examining the role of linguistic attributes in audit pricing behavior. Second, following the study of Kim and Fukukawa (2013), this paper provide evidence on the importance of business risk disclosure in explaining audit efforts and fees. Third, this paper contributes to studies on accounting reporting complexity in Japan. While Jin and Okumura (2022) finds accounting reporting complexity affects investors' information processing costs and therefore, shapes stock market reaction to earnings announcement, this paper extend the understanding of accounting reporting complexity to the field of auditing. This study

suggests that higher accounting reporting complexity also increases the processing costs and efforts of auditors and audit fee accordingly.

The structure of this paper is organized as follows. Section 2 provides a review on related literature and hypotheses development. Section 3 presents research design, including definition of variables, regression model and sample selection. Then the results are provided in Section 4. Section 5 is about conclusion.

2 Literature Review and Hypotheses Development

Studies on audit fees have demonstrated that client size, complexity, and risk are three leading determinants of audit fees (Simunic, 1980; Yazawa, 2011). The relationship between audit pricing and clint attributes is summarized as formula below (Yazawa, 2011, p. 31):

$$Audit\ Fee = f\{Audit\ Effort(Size,\ Complexity),\ Audit\ Risk(financial\ Risk)\} \quad (1)$$

Specifically, client complexity is widely accepted by previous literature as an important driver of levels of audit fees, since it represents decentralization and diversification of client's business and therefore increases the efforts of auditor (Simunic, 1980). This association between client complexity and audit fee has been demonstrated by extant empirical studies worldwide, including Japan (Hay et al., 2006). To be specific, the results of prior Japanese literature document a positive relationship between complexity of financial reporting entity and audit fees (Yazawa, 2011; Fukukawa, 2012; Takada, 2017). They suggest more complex client requires more labor and procedure for auditors, and thus auditor usually find it more difficult and time-consuming to conduct tests to more complex financial report of its clients.

Previous studies suggest that auditors price their services by analyzing all client-specific information (Simunic, 1980; Hossain et al., 2019; Malik et al., 2022). In recent years, there is increasing number of studies reporting that narrative disclosure also have impact on audit fees, including business risk items disclosed in annual report (Kim and Fukukawa, 2013), disclosure properties such as readability (Hoitash and Hoitash, 2018; Hossain et al., 2019; Blanco et al., 2021), and tones (Greiner, Patelli and Pedrini, 2020; Malik et al., 2022). These findings suggests that narrative disclosure also has impact on audit fees as a source of complexity. In addition, a recent approach proposed by Hoitash and Hoitash (2018) shows a higher level of accounting reporting complexity tends to result in poor reporting quality and ultimately, lead to increases in audit efforts and fees. However, in the studies mentioned above, the measures of client complexity in Japanese audit

market tend to be limited to the proxy of client's operation.

This study relates to previous literature on audit fees by investigating the role of various types of complexity measures on the pricing decision of auditors. First, this study considers how linguistic complexity and accounting reporting complexity affects audit fees in Japan. Li (2008) documents that more lengthy and less readable annual reports signal unfavorable and complex disclosure and poor performance, due to the intension of management to hide adverse information by strategically structuring narrative reports. In terms of audit fees, the textual information should be concerned because (1) compared with numbers, textual disclosure provides forward-looking information on the risks of client's operation (Hossain et al., 2019); (2) textual disclosure is supposed to reveal the communication patterns of the management and other stakeholders, in which auditors may develop an understanding of their clients' performance and risks (Malik et al., 2022). A more complex annual report may require auditors to increase audit efforts or lead to higher audit risk. Therefore, following the formula of Yazawa (2011), the first hypothesis of this paper is as follows:

Hypothesis 1: Linguistic complexity is positively associated with audit fees.

In addition to linguistic complexity, there is increasing evidence indicating that accounting reporting complexity measure also contributes to explaining audit fees. Hoitash and Hoitash (2018) reports more complex financial statement increases the likelihood of misstatements and results in less reliable financial reports. Thus, in order to monitor complex accounting concepts and avoid possible errors in client's annual reports, auditors may increase their efforts, resulting in longer audit lags (Zhou, 2020) and higher audit fees (Hoitash and Hoitash, 2018). In Japan, it is found that higher accounting reporting complexity, measured by accounting concepts in earnings announcement, is associated with higher information processing costs of investors (Jin and Okumura, 2022). However, to the author's best knowledge, there is no evidence showing the association between accounting reporting complexity and audit fees in Japanese context. Thus, this paper presents the second hypothesis as follows:

Hypothesis 2: Accounting reporting complexity is positively associated with audit fees.

3 Research Design

3.1 Measures of Complexity

This study uses three groups of distinct complexity measures, including (1) operational complexity variables for baseline model, (2) linguistic complexity variables to test hypothesis 1 and (3) ac-

counting reporting complexity variables to test hypothesis 2. Specifically, this section mainly elaborates the latter two measures of interests.

Regarding linguistic complexity, it is reported that lengthier and less readable annual reports indicate more complex financial disclosure (Li, 2008; Dyer, Lang and Stice-Lawrence, 2017). Thus, the first proxy, *Length*, the natural log of total number of words in annual report is included. In addition, following the paper of Kim, Yazawa and Ito (2022), this paper measures Japanese readability with the method proposed by Li (2016). The formula of this readability score is provided in Table 1. In contrast with Fog index, the method of Li (2016) assign lower value for more complex texts. In other words, in contrast with other variables, a negative relationship is predicted between this proxy, *Readability,* and audit fees.

Further, as of work of Kim and Fukukawa (2013) suggests a positive relationship between the business risk items and audit efforts, this study attempts to extend this finding by including the natural log of total words in the section of Business Risks in annual report, *Length_Risk*, and its readability, *Readability_Risk*, as two alternative measures for linguistic complexity.

In addition, since there are conflicting views regarding whether traditional readability measures are reliable or not, this paper includes the annual report document file size, *F_Size,* as another alternative proxy for linguistic complexity. This proxy does not require specific knowledge and assumption to interpret the information contained in annual reports, and therefore, is believed free from such biases (Loughran and Mcdonald, 2014).

As for accounting reporting complexity, I define the accounting reporting complexity, *ARC*, using the measure proposed by Hoitash and Hoitash (2018). It is assumed that financial statement become more complex when the number of accounting concepts disclosed in it increases. To be specific, *ARC* is measured by the total number of distinct monetary XBRL tags in financial statements (Hoitash and Hoitash, 2018; Jin and Okumura,2022).

3.2 Empirical Model

In order to test hypotheses in Section 2, this study adopts following regression model, based on the work of Fukukawa (2012):

$$\begin{aligned} lnFEE_{i,t} = {} & \alpha_0 + \sum \beta_k COMPLEX_{i,t,k} + \alpha_1 lnASSETS_{i,t} + \alpha_2 Quick_{i,t} + \alpha_3 ROA_{i,t} \\ & + \alpha_4 DE_{i,t} + \alpha_5 Loss_{i,t} + \alpha_6 Tokyo_{i,t} + \alpha_7 YE_{i,t} + \alpha_8 BIG4_{i,t} + Year_t \\ & + Industry_i \\ & + \varepsilon_{i,t} \end{aligned} \tag{2}$$

Where i and t are Firm and Year subscripts, respectively. $COMPLEX_{i,t,k}$ are the k variables of interests, including linguistic complexity, *Length*, *Readability*, *Length_Risk*, *Readability_Risk*, *F_Size*, and accounting reporting complexity, *ARC*. In addition, to compare with complexity measures in previous studies, $COMPLEX_{i,t,k}$ also includes operational complexity proxies such as *SUBS*, *CATA*, *BUSSEG*, *GEOSEG* (Simunic, 1980; Stanley, 2011; Yazawa, 2011; Kim and Fukukawa, 2013; Takada, 2015). This study adopts control variables for firm size, (*lnASSETS*), and audit risks (*Quick*, *ROA*, *DE* and *LOSS*). In addition, following Fukukawa (2012), a dummy variable indicating if a firm's headquarter is located in Tokyo is included (*Tokyo*), as well as a dummy variable indicating the year-end (*YE*). *BIG4* shows the premium of Big 4 auditors in their compensation (Hu, 2014). This model also considers year and industry fixed effect. The definition of variables used in regression formula (2) is shown in Table 1.

Table 1 Definition of Variables

Variables	Definitions
Dependent Variable	
lnFEE	The natural logarithm of audit fee (in yen)
Complexity Proxies	
SUBS	The square foot of the numbers of subsidiaries
CATA	Current assets divided by total assets
BUSSEG	The natural logarithm of the total numbers of business segments
GEOSEG	The natural logarithm of the total numbers of geographic segments
Length	The natural logarithm of total numbers of words in annual reports
Readability	The measure of readability of all textual sections of annual reports, defined as (number of words per sentence * −0.056 + proportion of kango * −0.126 + proportion of wago * −0.042 + proportion of verbs * −0.145 + proportion of auxiliaries * −0.044 + 11.724), (Li, 2016)
Length_Risk	The natural logarithm of total numbers of words in Business Risk section of annual reports
Readability_Risk	The measure of readability of Business Risk section of annual reports
ARC	The natural log of the total number of distinct monetary XBRL tags in financial statements of the 10-K filings (Hoitash and Hoitash, 2018)
F_Size	The natural logarithm of the size of XBRL file submitted to EDINET, in megabytes
Control Variables	
lnASSETS	The natural logarithm of total assets
Quick	Current assets/current liabilities
ROA	Earnings before interests and taxes/total assets
DE	Long-term liabilities/total assets
Loss	The indicator variable that takes 1 if there is net loss during the last 3-year period, and 0 otherwise
Tokyo	The indicator variable that takes 1 if the firm's headquarter is located in Tokyo, and 0 otherwise
YE	The indicator variable that takes 1 if the end of fiscal year is on 31st March, and 0 otherwise
BIG4	The indicator variable that takes 1 if the auditor is a member of Big4, and 0 otherwise

3.3 Sample Selection

This section provides the sample collection process. First, the XBRL formatted annual reports are collected from eol database. Second, firms' fundamentals and segments data are obtained from NEEDS Financial Quest. Finally, audit-related data, including audit fees and auditor's details, are

obtained from Refinitiv. The final sample consists of 14,389 firm-year observations from 2014 to 2021. Observations are selected from 2014 because textual disclosure is mandated by FSA to be incorporated in XBRL files after the year end of 2013. The sample selection process starts with 20,604 firm-year observations using Japan GAAP and with non-missing financial fundamentals from NEEDS Financial Quest database. Then, 286 observations of financial firms are excluded. Matching with XBRL files for calculating *ARC* and textual features (*Length*, *Readabilty*, *Length_Risk*, *Readability_Risk*) decreased the sample to 16,558. Finally, another 2,169 observations are excluded due to missing audit fee and auditor details in Refinitiv database.

4 Results

4.1 Descriptive Statistics

Table 2 and 3 show the summary statistics and correlation matrix of key variables. Especially, in Table 3, the univariate correlation between *lnFEE* and *Length* is 0.6 and significant in 0.01 significant level, revealing a strong positive association between linguistic complexity with audit fee[1]. These statistics are consistent with prior research (Malik et al., 2022). In addition, the correlation between *Readability* and *lnFEE* is negative, showing more readable annual reports will decrease audit efforts. The correlation coefficients of length and readability in Business Risk are similar to those shown above. These results support the arguments in H1. Moreover, the coefficients of *F_Size* and *ARC* are positive, as predicted in H2.

Table 2 Summary of Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
lnFEE	14,389	17.754	0.840	16.396	20.428
SUBS	14,389	3.773	2.596	1.000	26.420
CATA	14,389	0.569	0.192	0.112	0.946
BUSSEG	14,389	3.093	2.115	0.000	12.000
GEOSEG	14,389	0.505	1.517	0.000	9.000
Length	14,389	10.849	0.223	10.385	11.444
Readability	14,389	0.744	0.610	−1.643	1.810
Length_Risk	14,389	7.273	0.648	5.714	8.740
Readability_Risk	14,389	−0.342	0.593	−1.862	1.592
ARC	14,389	5.042	0.118	4.691	5.288
F_Size	14,389	1.015	0.237	0.531	1.653
lnASSETS	14,389	11.052	1.562	7.466	15.062
Quick	14,389	0.414	0.188	0.050	0.862
ROA	14,389	0.056	0.064	−0.225	0.253
DE	14,389	0.464	0.188	0.098	0.874
Loss	14,389	0.183	0.387	0.000	1.000
Tokyo	14,389	0.521	0.500	0.000	1.000
YE	14,389	0.705	0.456	0.000	1.000
BIG4	14,389	0.754	0.430	0.000	1.000

All continuous variables are winsorized at 1 and 99 percentile level.

[1] To address possible multicollinearity issue, this paper estimates variance inflation factors (VIFs) in all regressions with values about 2. The values are far below the threshold of 10 in previous studies (Hossain et al., 2019)

Table 3 Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) *lnFEE*	1										
(2) *SUBS*	0.76***	1									
(3) *CATA*	−0.19***	−0.20***	1								
(4) *BUSSEG*	0.26***	0.33***	−0.12***	1							
(5) *GEOSEG*	0.13***	0.14***	0.03***	−0.34***	1						
(6) *Length*	0.60***	0.56***	−0.17***	0.28***	0.04***	1					
(7) *Readability*	−0.10***	−0.06***	0.13***	−0.08***	0.11***	−0.13***	1				
(8) *Length_Risk*	0.13***	0.13***	0.10***	0.02***	−0.03***	0.40***	0.08***	1			
(9) *Readability_Risk*	−0.06***	−0.07***	0.07***	−0.08***	0.06***	−0.11***	0.11***	−0.13***	1		
(10) *ARC*	0.43***	0.44***	−0.26***	0.28***	0.05***	0.43***	−0.08***	−0.07***	−0.03***	1	
(11) *F_Size*	0.59***	0.56***	−0.25***	0.30***	0.07***	0.73***	−0.23***	0.09***	−0.09***	0.50***	1

*** represents statistical significance at the 0.01 level.

4.2 Regression Results

Table 4 presents estimation results of audit fee models. Column (1) shows the results of baseline model, without controlling complexity of audit clients. This result is consistent with previous audit studies (e.g. Fukukawa, 2012; Hu, 2014; Takada, 2015). To compare each complexity measure, this study regressed the model with different groups of test variables, including operational complexity proxies in Column (2), length and readability of annual reports in Column (3), length and readability of Business Risks in Column (4), and file size and accounting reporting complexity in Column (5).

Column (3) and (4) present positive association between audit fee and linguistic complexity as suggested in hypothesis 1. First, the coefficients of *Length* and *Length_Risk* are 0.786 and 0.158 respectively. The positive, and economically and statistically significant coefficients indicate that on average, auditors charge higher prices when clients' financial reports are lengthier. It is noted that the association between length and audit fee exhibits larger economic significance, in contrast to operational complexity measures in Column (2). Furthermore, by examining linguistic characteristics of business risk disclosure in Column (4), the results support Kim and Fukukawa's (2013) argument that auditors respond to client's business risk. However, the readability measure, *Readability* and *Readability_Risk*, are either economically, or statistically insignificant. These insignificant coefficients may result from the misspecification of readability measures (Loughran and Mcdonald, 2014), and are in line with the results in Hoitash and Hoitash (2018). Taken together, these results support H1.

Column (5) shows the estimated results for hypothesis 2, in which the coefficients of accounting reporting complexity, *ARC*, is positive and significant as expected. In addition, in response to the criticism against readability measurement, the alternative variable, *F_Size* is found positively asso-

ciated with audit fees. The results in Column (5) strongly support hypothesis 2 and provide further evidence for hypothesis 1, which indicates that auditors require more compensation when processing more complex financial statements.

Table 4 Regression Results

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Model1	Model2	Model3	Model4	Model5
SUBS		0.105***			
		(41.24)			
CATA		0.214***			
		(6.14)			
BUSSEG		0.014***			
		(7.49)			
GEOSEG		0.017***			
		(5.86)			
Length			0.786***		
			(34.32)		
Readability			0.073***		
			(11.89)		
Length_Risk				0.158***	
				(24.62)	
Readability_Risk				−0.004	
				(−0.65)	
ARC					0.250***
					(6.34)
F_Size					0.401***
					(16.97)
lnASSETS	0.458***	0.313***	0.397***	0.451***	0.413***
	(132.26)	(74.91)	(104.60)	(136.05)	(104.31)
Quick	0.245***	−0.031	0.212***	0.170***	0.273***
	(9.71)	(−0.82)	(8.82)	(6.90)	(11.06)
ROA	−0.281***	−0.313***	−0.233***	−0.354***	−0.191***
	(−3.74)	(−4.82)	(−3.24)	(−4.80)	(−2.59)
DE	0.428***	0.249***	0.315***	0.340***	0.350***
	(19.31)	(12.42)	(15.03)	(15.54)	(15.98)
Loss	0.158***	0.116***	0.132***	0.139***	0.158***
	(13.82)	(11.14)	(11.98)	(12.26)	(13.96)
Tokyo	0.153***	0.130***	0.120***	0.146***	0.143***
	(20.37)	(18.67)	(16.62)	(19.92)	(19.22)
YE	−0.072***	−0.038***	−0.062***	−0.056***	−0.074***
	(−8.61)	(−5.10)	(−7.79)	(−6.84)	(−9.07)
BIG4	0.346***	0.345***	0.325***	0.328***	0.351***
	(42.04)	(44.48)	(40.84)	(40.31)	(42.87)
Constant	12.050***	13.304***	4.288***	11.083***	10.906***
	(272.50)	(284.43)	(18.78)	(184.43)	(58.15)
Year & Industry	YES	YES	YES	YES	YES
Observations	14,389	14,389	14,389	14,389	14,389
Adj. R-squared	0.744	0.793	0.768	0.755	0.752

Robust t statistics in Table 4 are calculated from White's (1980) method. *** represent significance at the 0.01 level.

Furthermore, it can be noticed that the changing incremental explanatory power in each model, in which different groups of complexity measures are substituted in order. Compared with the baseline model in Column (1), adding operational complexity proxies in Column (2) still contributes the most explanatory power of 4.9%, followed by linguistic complexity proxies in Column (3) and (4) of 2.4% and 1.1%, and accounting reporting complexity proxies in Column (5) of 0.8%. Howev-

er, given the high adjusted R-squares in audit fee models, this change supports the argument that linguistic complexity and accounting reporting complexity helps to explain changes in audit fees.

5 Conclusion

Recent literature indicates that auditors consider various aspects of their clients' complexity level when pricing their service (Hoitash and Hoitash, 2018; Malik et al., 2022). This paper finds that except traditional proxies of complexity in empirical audit fee models, linguistic and accounting reporting complexity also have a significant explanatory power on audit fee pricing. The findings of this paper highlight the usefulness of linguistic attributes to external stakeholders such as auditors. In addition, this paper also highlights the importance of business risk disclosure in audit pricing, which extends the finding in previous literature (Kim and Fukukawa, 2013). However, this study also has limitations. Firstly, due to the lack of mature measure of Japanese financial text, this paper does not control other properties of narrative disclosure, such as tone, stickiness, etc. Secondly, it is found that readability is not significantly associated with audit fee. This finding may result from the misspecification of readability formula (Loughran and Mcdonald, 2014). To sum up, this paper suggests auditors also respond to level of complexity of textual disclosure and financial statements, and it encourages a more comprehensive measure when considering the impact of clients' complexity in audit fee model for future studies.

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