THE EFFECT OF AUDIT QUALITY ON THE QUALITY OF MANAGEMENT EARNINGS FORECASTS: EVIDENCE FROM JAPAN

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ABSTRACT

In this study, I examine how audit quality (as measured by audit firm size and industry specialization) influences the quality of management earnings forecasts (as measured by forecast bias and accuracy). Specifically, I hypothesize that other factors held constant, firms with higher-quality auditors are associated with higher-quality management earnings forecasts. I test this hypothesis in a unique setting, Japan, where nearly all firms are compelled to provide earnings forecasts. Multivariate analyses provide empirical evidence in support of the hypothesis. In addition, the empirical evidence of a positive relation between audit quality and the quality of management earnings forecasts remains statistically significant and robust under numerous sensitivity tests. This study contributes to the accounting and auditing literature by scrutinizing the effect of audit quality on forecast quality with an improved and more refined research methodology that effectively control for self-selection bias, a common confounding issue in empirical models.

Keywords: Audit Quality, Forecast Accuracy, Forecast Bias, Forecast Quality, Management Earnings Forecasts.

JEL Classification: M00, M40, M41, M42

INTRODUCTION

It is well-established in the literature that audit quality and earnings quality are positively related (Teoh & Wong, 1993; Becker et al., 1998; Francis et al., 1999; Balsam et al., 2003; Kryatova et al., 2019). One reason for this positive relation is that higher-quality auditors are more effective at constraining opportunistic earnings management by their client firms than lower-quality auditors (Becker et al., 1998). However, very little evidence exists on the relation between audit quality and the quality of management earnings forecasts. Davidson & Neu (1993) are among the first to investigate this relation with management earnings forecasts disclosed in initial price offerings (IPOs), wherein the forecasts are audited. Controversially, Davidson & Neu (1993) propose that audit quality can be measured by the extent to which actual earnings depart from forecast earnings, since managers of firms with higher-quality auditors have lower ability to manage earnings to reduce this extent of departure. Later studies have explored the relation between audit quality and the quality of management earnings forecasts with a more refined research design in the same IPO setting. They find that higher audit quality is associated with higher quality of management earnings forecasts (McConomy, 1998; Clarkson, 2000).

However, these studies are limited in terms of external validity because management earnings forecasts are generally not audited. Further, these studies do not make any attempts to control for self-selection bias arising from the provision of management earnings forecasts being voluntary in nature (i.e., managers of firms, in choosing to provide management earnings forecasts, ‘self-select’ themselves into the sample, whereas those managers who do not provide management earnings are not included in the sample). Research on the relation between audit quality and the quality of voluntary disclosures would inevitably encounter the self-selection bias from two possibilities. First, the choice of auditors (i.e., whether to choose a higher-quality or lower-quality auditor) and second, the choice to disclose (i.e., whether to provide a management earnings forecast or not). From an econometric standpoint, the failure to control for self-selection bias can yield inconsistent parameter estimates in the model, thereby producing biased results (Maddala, 1983; 1991).

In this paper, I investigate how audit quality influences the quality of management earnings forecasts in a unique setting, Japan, where the provision of such forecasts is “effectively mandated” (Kato et al., 2009), and where auditors are not required to audit the information disclosed in the forecasts. I argue that audit quality can influence the quality of management earnings forecasts in two ways. First, higher-quality auditors can lead to larger forecast errors (measured by subtracting forecast earnings from actual earnings) by constraining the manager’s ability to manage earnings upward (Davidson & Neu, 1993). Second, higher-quality auditors can lead to smaller forecast errors by providing less noise or bias in the historical earnings, upon which managers use to accurately forecast future earnings (McConomy, 1998; Clarkson, 2000; Behn et al., 2008) Based on these arguments, I hypothesize that firms who hire higher-quality auditors report less upward bias in their earnings forecasts and more accurate earnings forecasts.

I measure audit quality from two perspectives: (1) audit firm size (DeAngelo, 1981), and (2) auditor industry specialization (Balsam et al., 2003). I assume that higher quality management earnings forecasts are those that have less upward bias (signed forecast errors) and are more accurate (absolute forecast errors). I use cross-sectional ordinary least squares (OLS) regression to estimate the model on 16,140 firm-year observations for the period 2000–2010.

Our multivariate results provide empirical evidence in support of the hypotheses. Specifically, I find that firms who recruit a higher-quality auditor (i.e., a Big N or an industry specialist auditor) tend to report less upward bias in their earnings forecasts. I also find that firms who recruit a higher-quality auditor tend to disclose more accurate earnings forecasts. Taken together, these results suggest that higher-quality audits are associated with higher-quality management earnings forecasts. To ensure that these results are reliable and robust, I perform several sensitivity tests. These tests include the use of an alternative, composite measure of auditor industry specialization to capture audit quality, the use of an alternative measure of audit quality, reducing the bias in forecast errors arising from a long forecast horizon, addressing the potential bias in the main results arising from self-selection, the use of auditor switches as an alternative measure of audit quality, and the use of an alternative deflator of the dependent variable. The main results on the positive relation between audit quality and the quality of management earnings forecasts hold even after performing these sensitivity tests.

This study contributes to the accounting and finance literature in three important ways. First, it improves our understanding of the determinants of the management earnings forecast bias and accuracy in a unique institutional setting, where information in the forecast decision is controlled. Research on management earnings forecasts using such an institutional setting is rare, but important (Hirst et al., 2008). Second, this study suggests improvements to the common methodology researchers employ to measure audit quality in Japan. Due to the lack of attention on the role of external auditors in Japan, audit research commonly uses a crude measure (namely, the dichotomous Big N variable) to capture audit quality in Japan. This study proposes the use of auditor industry specialization as an additional measure of audit quality in Japan. To the best of my knowledge, this is among the first study that employs such comprehensive measures to capture audit quality in Japan.

Third, the findings of this study may be of interest to regulators in Japan as well as worldwide. It is generally the belief of the regulators that external auditors do not play an important part in managers' forecasting behavior. This belief is mainly due to the fact that auditors are not required to provide audit-level assurance for the earnings estimates provided in management forecasts. However, there is anecdotal evidence to suggest that auditors provide review-level assurance on the forecasts. This study demonstrates that external auditors does have an influence on managers' forecasting behavior, even though they are not required to provide audit-level assurance on the forecasts. The findings of this study may help inform the regulators that the impact of external auditors is more far reaching than mandatory disclosures, such as financial reports.

LITERATURE REVIEW

Management Earnings Forecasts in Japan

The Financial Instruments and Exchange Act (the FIEA) (previously, the Securities and Exchange Act) prescribes the requirements for the disclosure and financial reporting practices of firms listed on Japanese stock exchanges (Brown & Pinello, 2007). Under the FIEA, firms are required to file annual securities reports (*Yuka Shoken Hokokusho*), which contain detailed financial information about the firm, with the Ministry of Finance within three months of the firms' fiscal year end. In addition, the Timely Disclosure Rules were enacted by Japanese stock exchanges to minimize the time delay arising from filing annual securities reports with the Ministry of Finance (firms usually file these reports with the Ministry of Finance toward the end of three months after the end of the fiscal year) (Kato et al., 2009). This time delay is caused by the reports having to be audited and approved at the shareholder's meeting.[1]

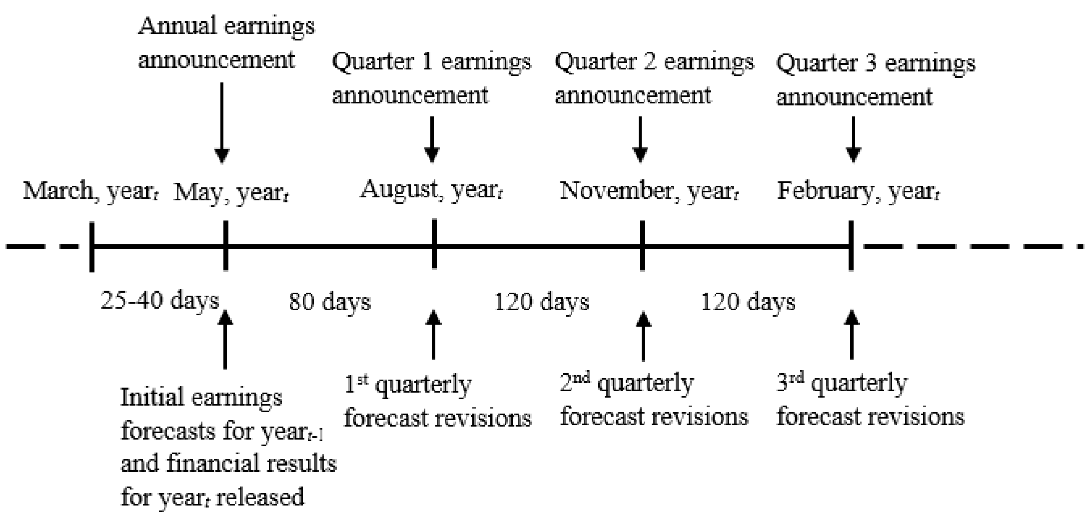

FIGURE 1
TIMELINE FOR MANAGEMENT EARNINGS FORECASTS IN JAPAN

At the annual earnings announcement date, listed firms announce financial results for the fiscal year concurrently with initial forecasts of earnings for the next fiscal year. Interestingly, nearly all Japanese firms are compelled to provide management earnings forecasts, even though there is no statutory requirement on the firms to provide such forecasts in Japan (Herrman et al., 2003; Kato et al., 2009; Saito, & Takeda, 2009). Firms are expected to provide forecasts of sales, ordinary income, earnings per share, and dividends per share. Except for forecasts of dividends per share, which could be in the form of a range, all forecasts are provided in point form. The FIEA requires firms that provide initial forecasts at the annual earnings announcement date to also provide forecast revisions at each quarterly earnings announcement date. Forecast revisions can be provided as either confirmations or when there has been a change in the most recent forecasts (Ota, 2010). Figure 1 provides a summary of the timeline for management earnings forecasts in Japan.

Auditing in Japan

Corporate governance and auditing practice are regulated by the Company Act and the FIEA in Japan. Under these two pieces of legislation, publicly traded firms must engage in two kinds of auditors: (1) corporate statutory auditors (*Kansayaku*), and (2) external auditors (*Kaikei Kansanin*). Corporate statutory auditors, which could be an individual or a committee, are internal to the firms and reside as independent members on the board from the board of directors. These auditors are charged with the conduct of general business audits and attestation of financial statements prior to presenting them to shareholders at annual meetings. Corporate statutory auditors are akin to the audit committee of the board of directors in the US. However, the key difference is that corporate statutory auditors in Japan are employees of the firms. The requirement of firms engaging with external auditors was first implemented in 1949 under the then Securities and Exchange Act (the predecessor of FIEA). External auditors are only allowed to conduct financial audits (Numata & Takeda, 2010). While external auditors do not provide audit-level assurance for management earnings forecasts in Japan, anecdotal evidence seems to suggest that the external auditors do provide review-level assurance for the forecasts by asking the managers for the basis and assumptions used to formulate the forecasts, if the forecasts appear unreasonable.

Around 80% of financial audits in Japan (3,400 publicly traded companies) are carried out by large external audit firms. The remaining financial audits are carried out by small external audit firms and sole practitioners (16.9% and 6.9%, respectively) (JICPA, 2004). Prior to 2006, large external audit firms were Azusa (KPMG), ChuoAoyama (PricewaterhouseCoopers), ShinNihon (Ernst & Young), and Tohmatsu (Deloitte) (collectively known as “the Big 4”). However, ChuoAoyama later collapsed in 2006 after a major accounting scandal in Japan, leaving now only Azusa, ShinNihon, and Tohmatsu – collectively, “the Big 3”. Under Japanese law, international audit firms are not allowed to operate in Japan directly with their own brand identities (Burgstahler & Eames, 2006).

Hypothesis Development

Auditors have a fiduciary duty to ensure the actual earnings disclosed in annual reports are accurate and valid, and to ensure that this duty is fulfilled effectively, auditors act as a deterrent to earnings management (Becker et al., 1998; Kasznik, 1999). However, the ability of auditors to constrain earnings management generally depends upon the quality of the auditors (DeAngelo, 1981; Davidson & Neu, 1993; Becker et al., 1998; Krishnan, 2003). Specifically, higher-quality auditors have been shown to be more effective at deterring questionable earnings management activity than lower-quality auditors (DeFond & Jiambalvo, 1991, 1994; Teoh & Wong, 1993; Dechow et al., 1996; Becker et al., 1998; Francis et al., 1999).

In the context of management earnings forecasts, however, where auditors are not legally required to verify the information managers disclosed in their forecasts, several studies have established a 'second-order' effect of audit quality on the quality of management earnings forecasts. Specifically, audit quality has been established to have a second-order effect on the quality of management earnings forecasts through its direct, 'first-order' effect on earnings management (Davidson & Neu, 1993; Clarkson, 2000; Das et al., 2011). For instance, Davidson & Neu (1993) ascertain that the absolute forecast errors (a measure of forecast accuracy) of firms increases with audit quality. This is because higher-quality auditors have a greater ability to constrain upward earnings management to minimize the forecast errors than lower-quality auditors. McConomy (1998) finds that management earnings forecasts contain less upward bias for firms who engage with a higher-quality auditor, while Clarkson (2000) finds that higher-quality auditors are associated with more accurate management earnings forecasts.

While the literature has shed some light into the relation between audit quality and the quality of management earnings forecasts, the external validity of these studies is limited, given the setting of these studies in which the relation is tested requires auditors to provide audit-level assurance of the forecasts. However, very little evidence exists on the relation between audit quality and the quality of management earnings forecasts in a setting where: (1) the provision of management earnings forecasts is mandatory, and (2) auditors are not legally required to provide an audit-level assurance of the forecasts, so their influence on the forecasts is mainly through their ability to constrain earnings management.

While auditors in Japan are not required to provide an audit-level assurance of management earnings forecasts, audit quality may still have a positive effect on the quality of management earnings forecasts. Specifically, higher-quality audits are associated with higher earnings quality and managers who use the higher-quality historical earnings are expected to have more higher-quality inputs to accurately forecast future earnings, thereby leading to more accurate management earnings forecasts (Behn et al., 2008). Based on these arguments, I formulate the following two hypotheses to test the relation between audit quality and the quality of management earnings forecasts:

H1: *Ceteris paribus, firms who hire higher-quality auditors report less upward bias in their earnings forecasts.*

H2: *Ceteris paribus, firms who hire higher-quality auditors report more accurate earnings forecasts.*

H1 suggests that the coefficient on the construct for higher-quality auditors is expected to be positive[2]*, while H2 predicts a negative coefficient on the construct for higher-quality auditors.*

RESEARCH DESIGN

Data

I collect the data for this study from two databases: (1) Nikkei NEEDS-Financial Quest (NEEDS); and (2) Toyo Keizai Kaisha Shikihou (in Japanese). NEEDS is an electronic database that provide data on management earnings forecasts and financial statement items, such as net sales, net income, total assets, and total liabilities. For external auditors of the firms, I hand collected the data from Toyo Keizai Kaisha Shikihou (the summer edition).[3]

The sample period is between 2000 and 2010. I select this sample because it encompasses a major exogenous shock in Japan, the collapse of PricewaterhouseCoopers (ChuoAoyama). This collapse has restructured the composition of the first-tier accounting, which might have some significant implications on the overall quality of audits in Japan. The implications on the overall quality of audits in Japan may in turn influence the quality of management earnings forecasts and the findings of the Kato et al. (2009) study.[4]

I initially identified 43,600 observations of publicly listed firms, which are listed on the five major stock exchanges in Japan (Tokyo, Nagoya, Osaka, Sapporo, and Fukuoka), JASDAQ and the Hercules market. Consistent with prior studies (Aman, 2011; Muramiya & Takada, 2010; Ota, 2010), I restrict the sample to firms that have a March fiscal year-end.[5] Table 1 provides a summary of the selection of the final sample for the empirical model used to test H1 and H2. The sample selection yields 16,140 firm-year observations.

Table 1
SAMPLE SELECTION

Panel A: Summary of the selection of the final sample (2000-2010)

Firms with the March fiscal year-end		43,600
Less:	Parent-level data	(20,921)
	Insurance, financial services and securities firms	(773)
	Delisted firms, irregular accounting periods, and negative book value of equity	(105)
	Missing forecasts of net income and data errors	(2,785)
Initial sample		19,016
Less:	Observations for the 2000 year	(1,334)
	Insurance, financial services and securities firms	(1,542)
Final sample		16,140

Panel B: Distribution of the initial sample and the final sample

Year	Initial Sample	%	Final Sample	%
2000	1,334	7.02%	n.a.	n.a.
2001	1,343	7.06%	1,249	7.74%
2002	1,561	8.21%	1,478	9.16%
2003	1,626	8.55%	1,529	9.47%
2004	1,694	8.91%	1,573	9.75%
2005	1,751	9.21%	1,616	10.01%
2006	1,832	9.63%	1,668	10.33%
2007	1,900	9.99%	1,707	10.58%
2008	1,977	10.40%	1,767	10.95%
2009	1,998	10.51%	1,778	11.02%
2010	2,000	10.52%	1,775	11.00%
Firm-year obs.	19,016	100.00%	16,140	100.00%

As the handbook does not have auditor information for the delisted firms, these firms are removed from the sample. As lagged variables are used in the main model, firm-year observations for the 2000 year are deleted.

Empirical Model

To test H1 and H2, we use a cross-sectional ordinary least squares (OLS) regression to estimate the following model expressed in Eq. (1):

$$MEFQ_{it} = \beta_0 + \beta_1 AUDQ_{it\text{-}1} + \beta_2 NOA_{it\text{-}1} + \beta_3 DAC_{it} + \beta_4 ROA_{it\text{-}1} + \beta_5 SIZE_{it} + \beta_6 OPTIMISM_{it\text{-}1} + \beta_7 BANKOWN_{it} + \beta_8 FOROWN_{it} + \beta_9 AUDQ{\times}NOA_{i,t\text{-}1} + \beta_{10} NOA{\times}DAC_{i,t\text{-}1} + \beta_{11} OPTIMISM{\times}LAGROA_{it\text{-}1} + \beta_{12} AUDQ{\times}LAGROA_{it\text{-}1} + \beta_{13} OPTIMISM{\times}NOA_{it\text{-}1} + \text{Year Indicators} + \text{Industry Indicators} + \varepsilon_{it} \quad (1)$$

The variables are defined as follows:

MEFQ = (1) *BIAS* calculated by taking the difference between actual, reported earnings and forecast earnings for year *t*, deflated by market value of equity for year *t*-1; and (2) *ACCURACY* is the absolute value of *BIAS*. I separately estimate Eq. (1) using *BIAS* and *ACCURACY* as the dependent variable to test H1 and H2, respectively.

AUDQ = (1) *BIGN* is 1 if the firm hires one of the first-tier accounting firms, 0 otherwise[6]; (2) *ASPEC_SALES* is computed by the ratio of the total sales of each auditor's clients in an industry at year *t*-1 to the total sales of all firms in the industry at year *t*-1 (Balsam et al., 2003); and (3) *ASPEC_CLIENTS* is computed by the ratio of the total number of clients of each auditor in an industry at year *t*-1 to the total number of all clients in the industry at year *t*-1 (Balsam et al., 2003).[7]

NOA = ratio of the beginning balance of net operating assets to net sales for year *t*-1. This variable is included in the model to control for accounting flexibility, which has been shown to affect managers' ability to manage actual earnings to meet forecast earnings (Barton & Simko, 2002; Bartov et al., 2002).

DAC = discretionary accruals estimated using the cross-sectional modified Jones model to capture earnings management for firm *i* (Dechow et al., 1995; Baber et al., 2011).

ROA = the ratio of net income to total assets for year *t*-1 (Kato et al., 2009).

SIZE = natural logarithm of total assets for year *t* (Ota, 2006).

OPTIMISM = 1 if *BIAS* for year *t*-1 is negative, 0 otherwise (Ota, 2006; Kato et al., 2009).

BANKOWN = percentage ownership interest of financial institutions for year *t* (Kato et al., 2009).

FOROWN = percentage ownership interest of foreign institutions for year *t* (Kato et al., 2009).

Year indicators = fiscal year dummy variables.

Industry indicators = industries dummy variables.

Subscripts *i*,*t* indicate firm and fiscal year, respectively.

Hirst et al. (2008) have urged for the need of more research in understanding the effects of interaction terms in empirical models. In the same spirit of Hirst et al. (2008), I include several interaction terms based on prior studies. *AUDQ*×*NOA* and *AUDQ*×*DAC* are included in Eq. (1) because Becker et al. (1998) argue that audit quality varies on the degree of accounting flexibility in the firm. Kato et al. (2009), on the other hand, show that the interaction between prior financial performance (*ROA*) and prior forecast optimism (*OPTIMISM*) of the firm is important determinant of management forecast bias. Based on Kato et al. (2009), I include the interactions *OPTIMISM*×*ROA* *AUDQ*×*ROA* and *OPTIMISM*×*NOA* in the model.

RESULTS

Descriptive Statistics

Table 2 presents descriptive statistics of the variables used in the empirical model to test H1 and H2. Consistent with the literature (Kato et al., 2009), the mean *BIAS* is negative, indicating that the initial management forecasts of earnings are systematically upward biased (or optimistic) on average. Further, the mean *ACCURACY* is 0.065, indicating that actual earnings deviate from forecast earnings by 7% on average. With respect to the independent variables, around 77% of the sample firms hire a Big N auditor.[8] The mean *NOA* suggests that the beginning balance of net operating assets is 3.9% larger than sales at the beginning of the year on average. As for the control variables, the mean (median) *DAC*, *ROA*, and *SIZE* is – 0.001 (– 0.003), 0.015 (0.017), and 11.026 (10.806), respectively. The mean *OPTIMISM* indicates that about 60% of the firms issue optimistic earnings forecasts in the prior year. Consistent with Kato et al. (2009), financial institutions have a greater percentage ownership than foreign institutions in Japan.

Table 2
DESCRIPTIVE STATISTICS OF DEPENDENT AND INDEPENDENT VARIABLES

Variable	N	Mean	Median	SD	Min	Max
Dependent						
BIAS	16,140	– 0.040	– 0.006	0.131	– 0.799	0.193
ACCURACY	16,140	0.065	0.023	0.121	0.000	0.799
Independent						
BIGN	16,140	0.771	1.000	0.420	0.000	1.000
ASPEC_SALES	16,140	0.202	0.183	0.152	0.000	0.573
ASPEC_CLIENTS	16,140	0.178	0.198	0.099	0.002	0.393
NOA	16,140	0.039	– 0.013	0.430	– 1.128	1.833
DAC	16,140	– 0.001	– 0.003	0.084	– 0.240	0.278
ROA	16,140	0.015	0.017	0.044	– 0.182	0.122
SIZE	16,140	11.026	10.806	1.519	8.062	15.374
OPTIMISM	16,140	0.601	1.000	0.490	0.000	1.000
BANKOWN (%)	16,140	23.855	22.134	14.033	0.642	57.861
FOROWN (%)	16,140	8.629	4.519	10.164	0.000	44.240

Table 3
CORRELATION MATRIX

Panel A: Correlations between dependent and independent variables (N = 16,140)

	BIAS		*ACCURACY*	
Variable	Spearman	Pearson	Spearman	Pearson
BIGN	0.038***	0.057***	– 0.041***	– 0.063***
NOA	– 0.045***	– 0.059***	– 0.010	0.040***
DAC	0.054***	0.098***	– 0.055***	– 0.094***
ROA	0.156***	0.252***	– 0.306***	– 0.330***
SIZE	0.144***	0.133***	– 0.225***	– 0.160***
OPTIMISM	– 0.194***	– 0.167***	0.202***	0.177***
BANKOWN	0.125***	0.139***	– 0.199***	– 0.172***
FOROWN	0.177***	0.123***	– 0.254***	– 0.152***

Panel B: Correlations between independent variables (N = 16,140

Variable	*BIGN*	NOA	DAC	ROA	SIZE	OPT	BOWN	FOWN

BIGN		**– 0.024**	0.004	**0.067**	**0.122**	*– 0.020*	**0.080**	**0.107**
NOA	**– 0.028**		**– 0.045**	**– 0.140**	**0.090**	**0.054**	**0.060**	**0.055**
DAC	0.006	**– 0.035**		**0.063**	**0.039**	– 0.003	**0.026**	**0.040**
ROA	**0.079**	**– 0.116**	**0.078**		**0.060**	**– 0.483**	**0.065**	**0.345**
SIZE	**0.133**	**0.099**	**0.041**	**0.108**		**– 0.102**	**0.643**	**0.612**
OPT	*– 0.020*	**0.039**	– 0.007	**– 0.402**	**– 0.105**		**– 0.093**	**– 0.166**
BOWN	**0.085**	0.003	*0.019*	**0.107**	**0.619**	**– 0.088**		**0.440**
FOWN	**0.097**	**0.041**	**0.041**	**0.253**	**0.567**	**– 0.149**	**0.361**	

Outliers at or beyond the 1st and 99th percentiles of the distributions of the continuous variables are winsorized. For Panel A, significant with *p*-values * < 0.10, ** < 0.05, or *** < 0.01. For Panel B, *OPTIMISM*, *BANKOWN*, *FOROWN* are renamed as *OPTIMISM*, *BOWN*, and *FOWN*, respectively, for brevity reason. Correlation in bold is significant at the 1 percent level, correlation in italic typeface is significant at the 5 percent level.

Table 3 reports the correlation matrix for the regression variables in the model expressed in Eq. (1). Panel A shows that audit quality is positively related to *BIAS*, indicating that firms who hire higher-quality auditors report less upward bias in their earnings forecasts. This positive correlation provides preliminary support for H1. Panel A also shows that audit quality is negatively related to *ACCURACY*, indicating that firms who hire higher-quality auditors report more accurate earnings forecasts (i.e., lower magnitude of forecast errors), providing preliminary support for H2.[9]

Regression Results for H1

Table 4
REGRESSION RESULTS FOR H1

	Pred.	(A)		(B)		(C)	
Variable	Sign	Coeff.	*t*-stats	Coeff.	*t*-stats	Coeff.	*t*-stats
Constant		– 0.124	– 4.16***	– 0.123	– 3.93***	– 0.126	– 4.24***
BIGN	+	0.011	2.74***				
ASPEC_SALES	+			0.027	2.22**		
ASPEC_CLIENTS	+					0.046	2.50**
NOA		– 0.014	– 2.05**	– 0.011	– 2.44**	– 0.013	– 2.06**
DAC		0.113	3.05***	0.114	3.04***	0.114	3.05***
ROA		0.410	4.85***	0.309	3.61***	0.382	4.01***
SIZE		0.004	2.11**	0.004	2.10**	0.004	2.15**
OPTIMISM		– 0.032	– 7.54***	– 0.032	– 7.30***	– 0.032	– 7.28***
BANKOWN		0.001	7.77***	0.001	7.85***	0.001	7.74***
FOROWN		– 0.000	0.00	– 0.000	– 0.16	– 0.000	– 0.08
AUDQ×NOA		0.011	1.31	0.027	1.46	0.431	1.39
NOA×DAC		0.097	2.41**	0.098	2.45**	0.097	2.44**
OPTIMISM×ROA		0.530	8.74***	0.530	8.26***	0.528	8.68***
AUDQ×ROA		– 0.314	– 2.83***	– 0.637	– 1.58	– 1.163	– 2.24**
OPTIMISM×NOA		– 0.008	– 1.17*	– 0.008	– 1.82*	– 0.008	– 1.78*
Year dummies		Included		Included		Included	
Industry dummies		Included		Included		Included	
Adjusted R^2 (%)		16.8		16.7		16.8	
F-statistic		38.39***		38.24***		38.35***	
N		16,140		16,140		16,140	

The *t*-statistics are obtained by estimating standard errors from two-way cluster in firm and year (Petersen, 2009). Outliers at or beyond the 1st and 99th percentiles of the distributions of the continuous variables are winsorized. Significant with *p*-values * < 0.10, ** < 0.05, or *** < 0.01.

Table 4 shows the results of the OLS regressions of *BIAS* (as measured by the difference between actual earnings and initial forecast earnings for the year, deflated by lagged market value of equity). Columns (A), (B), and (C) present the results of the OLS regressions of *BIAS* on *BIGN*, *ASPEC_SALES*, and *ASPEC_CLIENTS*, respectively, and the control variables. The adjusted R^2 for all regressions is around 17% and outliers at or beyond the 1st and 99th percentiles of the distributions for the continuous variables are winsorized.

Column (A) shows that *BIGN* is significantly positive ($\beta_1 = 0.011$, $p < 0.01$), suggesting that firms who hire a Big N auditor report less upward bias in their earnings forecasts. Columns (B) and (C) show that *ASPEC_SALES* and *ASPEC_CLIENTS* are significant and positive ($\beta_1 = 0.027$, $p < 0.05$, and $\beta_1 = 0.046$, $p < 0.05$, respectively), indicating that firms who hire an industry specialist auditor report less upward bias in their earnings forecasts. Overall, these results provide strong evidence consistent with H1.

Regression Results for H2

Table 5 reports the results of the OLS regressions of *ACCURACY* (as measured by the absolute value of *BIAS*). Columns (A), (B), and (C) present the results of the OLS regressions of *ACCURACY* on the three proxies for audit quality – *BIGN*, *ASPEC_SALES*, and *ASPEC_CLIENTS*, respectively, along with the control variables. The adjusted R^2 for all regressions is around 21%. outliers at or beyond the 1st and 99th percentiles of the distributions for the continuous variables are winsorized.

Column (A) shows that *BIGN* is significantly negative ($\beta_1 = -0.008$, $p < 0.05$), suggesting that firms who hire a Big N auditor report more accurate earnings forecasts (i.e., the magnitude of forecast errors decreases). Columns (B) and (C) show that *ASPEC_SALES* and *ASPEC_CLIENTS* are significant and negative ($\beta_1 = -0.020$, $p < 0.10$, and $\beta_1 = -0.046$, $p < 0.05$, respectively), indicating that firms who hire an industry specialist auditor report less more accurate earnings forecast. Overall, these results provide strong empirical evidence in support of H2.

Table 5
REGRESSION RESULTS FOR H2

	Pred.	(A)		(B)		(C)	
Variable	Sign	Coeff.	*t*-stats	Coeff.	*t*-stats	Coeff.	*t*-stats
Constant		0.128	5.58***	0.127	5.29***	0.130	5.70***
BIGN	–	– 0.008	2.40**				
ASPEC_SALES	–			– 0.020	– 1.68*		
ASPEC_CLIENTS	–					– 0.037	– 2.23**
NOA		0.014	2.08**	0.010	2.49**	0.012	2.00**
DAC		– 0.090	– 2.58***	– 0.090	– 2.56***	– 0.090	– 2.57***
ROA		– 0.410	– 6.27***	– 0.356	– 4.96***	– 0.423	– 5.39***
SIZE		– 0.004	– 2.97***	– 0.004	– 3.03***	– 0.004	– 3.03***
OPTIMISM		0.025	5.73***	0.024	5.59***	0.024	5.60***
BANKOWN		– 0.001	– 7.34***	– 0.001	– 7.42***	– 0.001	– 7.33***
FOROWN		– 0.000	– 0.66	– 0.000	– 0.47	– 0.000	– 0.57
AUDQ×NOA		– 0.016	– 1.86*	– 0.040	– 2.55**	– 0.059	– 2.03**

NOA×DAC		– 0.106	– 3.01***	– 0.106	– 3.01***	– 0.106	– 3.03***
OPTIMISM×ROA		– 0.619	– 12.28***	– 0.622	– 12.76***	– 0.618	– 12.68***
AUDQ×ROA		0.253	2.93***	0.439	1.40	0.900	2.16**
OPTIMISM×NOA		0.003	0.66	0.004	0.73	0.003	0.66
Year dummies		Included		Included		Included	
Industry dummies		Included		Included		Included	
Adjusted R^2 (%)		20.6		20.5		20.6	
F-statistic		45.26***		45.11***		45.26***	
N		16,140		16,140		16,140	

Notes. The *t*-statistics are obtained by estimating standard errors from two-way cluster in firm and year (Peterson, 2009). Outliers at or beyond the 1st and 99th percentiles of the distributions of the continuous variables are winsorized. Significant with *p*-values * < 0.10, ** < 0.05, or *** < 0.01.

SENSITIVITY AND ADDITIONAL ANALYSES

To ensure the main results are reliable and robust, I perform several sensitivity and additional analyses: (1) the use of a composite measure as an alternative proxy for auditor industry specialization to capture audit quality, (2) the use of an alternative measure of audit quality, (3) shortening the length of the forecast horizon, (4) addressing the potential bias of the main results arising from self-selection, (5) the use of auditor switches as an alternative measure of audit quality, and (6) the use of an alternative deflator of the dependent variable.

Alternative Measure of Auditor Industry Specialization

In the first sensitivity analysis, I follow Mascarenhas et al. (2010) to develop a composite measure of auditor industry specialization. This auditor industry specialization variable consolidates two common approaches that determine the industry specialization of the auditor: (1) auditor-market-share approach, and (2) the auditor-portfolio-share approach. Specifically, the auditor-market-share approach captures "within-industry differentiation across competing auditors" which is derived in the same way as *ASPEC_SALES*. The auditor-portfolio-share approach, on the other hand, captures "within-audit firm differentiation across industries" which is derived as the ratio of the total sales of each auditor's client firms in an industry to the total sales of all client firms of each auditor at the beginning of the year (*PORTFOLIO_SHARES*). Finally, a composite measure (*ASPEC_COMPOSITE*) is derived by the multiplication of *ASPEC_SALES* and *PORTFOLIO_SHARES* for audit firm *i* within each industry-year combination. An indicator variable of auditor industry specialization (*ASPEC_IND*) is created and is coded based on the comparison of *ASPEC_COMPOSITE* with a weighted market share cut-off (*ASPEC_CUTOFF*). *ASPEC_CUTOFF* can be expressed as follows:

$$ASPEC\_CUTOFF_{it\text{-}1} = \text{Min}(ASPEC\_SALES_{it\text{-}1}) \times \text{Exp}(PORTFOLIO\_SHARE_{it\text{-}1})$$

Where Min($ASPEC\_SALES_{it\text{-}1}$) is the minimum market share required for an auditor to be an industry specialist. Exp($PORTFOLIO\_SHARE_{it\text{-}1}$) is the expected auditor portfolio share in an industry if all industries are equally represented in an auditor's portfolio. *AISPEC_CUTOFF* for the period 2000–2006 is 0.0107 (0.30 × 1/28 industries), while for the 2007-2010 period, *ASPEC_CUTOFF* is 0.0143 (0.40 × 1/28 industries). Finally, *ASPEC_IND* is coded 1 if *ASPEC_COMPOSITE* equals or exceeds the corresponding *ASPEC_CUTOFF*, 0 otherwise

(Payne, 2008). I re-estimate Eq. (1) using *ASPEC_IND* as the audit quality variable (*AUDQ*) and *BIAS* as the dependent variable.

Untabulated results show the coefficient on *ASPEC_IND* is positive and significant (coefficient = 0.007, $p < 0.10$), although the significance level is not as strong as the other measures of audit quality. Nevertheless, the results using *ASPEC_IND* continued to provide evidence in support of H1.

Alternative Measure of Auditor Quality

Balsam et al. (2003) argue that there is no single variable that can accurately capture the audit quality construct. To address this measurement issue, I use factor analysis on *BIGN*, *ASPEC_SALES*, *ASPEC_CLIENTS*, and *ASPEC_IND* in this sensitivity analysis. The audit quality latent variable is estimated using principal components factoring (PCF). Standard heuristics (e.g., eigenvalues and Kaiser criterion) suggest the first factor as the measure of audit quality (*AUDQ_PCF*). Next, Eq. (1) is re-specified by substituting *AUDQ* with *AUDQ_PCF* along with *BIAS* used as the dependent variable. Untabulated results show that *AUDQ* is significantly positive (coefficient = 0.005, $p < 0.05$), consistent with H1.

Forecast Horizon

For the main analysis, I use the management earnings forecasts at the beginning of the year. It can be argued that the lower accuracy of management earnings forecasts could merely be due to the lengthy period of time from the beginning to the end of the year, rather than audit quality. Further, the Ministry of Finance prescribes the guidelines for the revisions of management earnings forecasts in Japan. Specifically, firms are required to announce a revised forecast immediately if there is a 'significant' change in previously published forecasts (the "Significance Rule"). Under the Significance Rule, a significant change is defined as being changes in sales estimates of ± 10 percent and/or changes in ordinary income and net income estimates of ± 30 percent. With respect to dividends, the changes in the estimates are ± 20 percent. By complying with the Significance Rule, firms can afford some degree of protection from being held legally accountable for failing to meet their initial forecasts (Ota, 2010).

To address the concerns about the lengthy forecast horizon for the forecasts issued at the beginning of the year and the possible revisions that might have taken place in order for firms to comply with the Significance Rule, I recalculate the dependent variables *BIAS* using the earnings forecasts issued in the last quarter prior to the end of the year. I then re-estimate Eq. (1) using the modified *BIAS* dependent variable. Untabulated results show that *BIGN* and *ASPEC_CLIENTS* remain significantly positive (coefficient = 0.004, $p < 0.01$, and coefficient = 0.016, $p < 0.01$). However, *ASPEC_SALES* is no longer significant.[10]

Self-selection Bias

The main model of Eq. (1) tests whether higher audit quality influences the bias of management earnings forecasts. Using the OLS regression to estimate Eq. (1) may produce unbiased estimators if managers' decision to select a higher-quality auditor is assumed to be exogenous (i.e., strictly one way). However, the literature has argued the decision of the manager to select higher-quality auditors is not exogenous (Fortin & Pittman, 2007; Behn et al., 2008; Li, 2009). From an econometric standpoint, not controlling for this self-selection issue could significantly bias the main results (Maddala, 1983; 1991).

I adopt the Heckman (1979) two-stage treatment effect procedure to control for self-selection bias. I follow Lennox et al. (2012) to develop the first-stage self-selection model, in which the following firm characteristics are included: (1) external financing (*NEWISSUE*), (2) financial leverage (*LEV*), (3) liquidity (*LIQUIDITY*), (4) performance (*ROA*), (5) profitability (*LOSS*), (5) size (*SIZE*), and (6) the lag between fiscal year-end and the audit report date (*TRADINGDAYS*).[11] Given the dependent variable (*BIGN*) is a binary variable, I use a probit regression to estimate the first-stage self-selection model. The resulting parameter estimates from the first-stage selection model are then used to compute the Inverse Mills ratio (*INVERSEMILLS*). Finally, *INVERSEMILLS* is then included in Eq. (1) as a control variable, along with *BIAS* and *ACCURACY* being used separately as the dependent variable.

Untabulated results confirm the presence of self-selection bias when *INVERSEMILLS* is included in regressions of *BIAS* and *ACCURACY* in Eq. (1) (coefficient = – 0.046, $p < 0.05$, and coefficient = 0.049, $p < 0.05$, respectively).[12] Importantly, *BIGN* remains significant at the predicted signs in the regression of *BIAS* and *ACCURACY* after controlling for self-selection bias (coefficient = 0.089, $p < 0.01$, and coefficient = – 0.092, $p < 0.05$, respectively). Overall, the results confirm that the main empirical evidence in support of H1 and H2 is not affected by self-selection bias.

Alternative Measure of Audit Quality by Auditor Switch

In this sensitivity analysis, I re-estimate Eq. (1) using an auditor switch variable (*AUDSWITCH)* as the measure of audit quality. Specifically, *AUDSWITCH* considers two types of auditor switches: (1) *AUDSWITCH1* is a binary variable 1 if the firm changes the auditor irrespective of the quality of the auditor, 0 otherwise, and (2) *AUDSWITCH2* is an ordinal variable that is coded as follows: (i) *AUDSWITCH2* is −1 if the firm changes from a higher to a lower-quality auditor (i.e., from a Big N to a non-Big N), (ii) *AUDSWITCH2* is 0 if the firm remains with the same auditor, and (iii) *AUDSWITCH2* is 1 if the firm changes from a lower to a higher-quality auditor (i.e., from a non-Big N to a Big N). I re-estimate the regression of *BIAS* for Eq. (1) using *AUDSWITCH1* and *AUDSWITCH2* separately, along with the control variables.

Untabulated results show that *AUDSWITCH1* is significantly negative (coefficient = – 0.027, $p < 0.05$), suggesting that firms who change auditors irrespective of the quality of the auditors are associated with more upward bias of management earnings forecasts. However, *AUDSWITCH2* is significantly positive (coefficient = 0.018, $p < 0.01$), suggesting that firms who change from lower to higher-quality auditors (i.e., from a non-Big N to a Big N) are associated with less upward bias of management earnings forecasts, consistent with H1.

Alternative Deflator for the Dependent Variable

Prior studies argue that the choice of deflator for the response variable could have an impact on heteroscedasticity (Easton & Sommers, 2003). Consistent with Kato et al. (2009), lagged total assets ($A_{it\text{-}1}$) are used as the deflator of *BIAS* instead of lagged market value of equity ($MVE_{it\text{-}1}$) for the final robustness test. Untabulated results are materially the same as the main results when lagged total assets are used as the deflator.

CONCLUSION

In this study, I investigate the effect of audit quality on the quality of management earnings forecasts in a unique setting, Japan, where almost all managers are compelled to provide such forecasts. Specifically, I hypothesize that the quality of management earnings forecasts increases with audit quality, all other factors held constant. Multivariate results provide evidence in support of the hypotheses. That is, firms that hire higher-quality auditors (measured by auditor firm size and auditor industry specialization) tend to be associated with less upward biased and more accurate earnings forecasts. These main results remain robust even after performing numerous sensitivity tests.

To the best of my knowledge, this study is among the first to examine how audit quality affects the quality of management earnings forecasts in a setting, where the self-selection bias in voluntary disclosures is effectively controlled. Sensitivity test is also carried out to control for self-selection bias in the choice of auditors. The findings of this study have significant regulatory implications. Specifically, the study may help the regulators to be informed about the role of external auditors in the context of voluntary disclosures, where auditors do not have jurisdiction to provide audit-level assurance for the information of such disclosures. The findings of this study also have practical implications for the users of management earnings forecasts. Specifically, users are able to determine the quality of the management earnings forecasts based on the auditors of the firm. If the firm is audited by higher-quality auditors, then the users may have some assurances that the management earnings forecasts are also of higher quality and they can rely on the information disclosed in the forecasts.

ENDNOTE

1. The Timely Disclosure Rules (the Rules) originated from a club of news reporters at the Tokyo Stock Exchange (TSE) (known as the Kabuto-club) around 1965 (Kato et al., 2009). The main purpose of the Rules is to ensure a timely dissemination of all financial information about firms, and they are designed to curb any possible insider trading practices. In 1989, the Rules were incorporated into the TSE rules. Under the Rules, listed firms are required to provide summarized financial statements (Kessan-Tannsin), which include financial results for the current period (such as, sales, net income, EPS, and dividends per share) and management earnings forecasts for the next period, upon the approval of the board of directors. This information is usually released 25 to 40 trading days after the fiscal year end at the annual earnings announcement (Ota, 2010).
2. Forecast bias is actual earnings minus forecast earnings. If the forecast bias is positive, it implies that the forecasts contained less upward bias (or "pessimistic"), as forecast earnings are lower than actual earnings. If the forecast bias is negative, it implies that the forecasts contained more upward bias (or "optimistic"), as forecast earnings exceed actual earnings. Hence, a predicted positive sign on the coefficient of the audit quality construct implies that firms who hire higher-quality auditors report less upward bias in their earnings forecasts.
3. The database comes in the form of volumes of books accessible from the university library.
4. While the sample period is relevant and insightful, I acknowledge that the sample period is a potential limitation of this study.
5. The majority of Japanese firms have the fiscal year ending in March (75-80%) (Tokoro & Nagata, 2012).
6. Between 2000 and 2006 of the sample period, the first-tier accounting firms known collectively as the Big 4 auditors in Japan were Asahi (KPMG), ChuoAoyama (PriceWaterhouseCoopers), ShinNihon (Ernst & Young), and Tohmatsu (Deloitte). However, a major accounting scandal that led to the collapse of ChuoAoyama in 2007 has resulted in the Big 3 auditors being Asahi, ShinNihon, and Tohmatsu. I code BIGN according to this restructure in the composition of the first-tier accounting firms in Japan.

7. I include a second variable to capture audit quality through industry specialization (ASPEC_CLIENTS) because a limitation in using the sales in ASPEC_SALES is that it is biased toward large clients (Gramling & Stone, 2001; Krishnan, 2001; and Balsam et al., 2003).
8. I perform between-group tests, where the t-test and the Wilcoxon test are used to test whether the mean and median differences, respectively, in BIAS between the higher and lower audit quality samples (as divided by BIGN) are significant, or due to random chance. Untabulated results show that the mean (median) BIAS for the BIGN and non-BIGN subsamples are - 0.036 (- 0.005) and - 0.054 (- 0.009), respectively. Further, the mean (median) BIAS for the BIGN subsample is higher than the non-BIGN subsample. The difference in the mean (median) between the subsamples is -0.018 and is significant at the 1% level using the t-test (the Wilcoxon test). The results also illustrate that the proportion of firms reporting less upward bias in their management earnings forecasts for the BIGN subsample (58.4%) is lower than those of the non-BIGN subsample. While we cannot rely on the results of the univariate tests, these results provide preliminary support for H1.
9. Variance inflation factors (VIFs) are also estimated for each independent variable to check for multicollinearity in the model. Untabulated results show that SIZE has the highest VIF at 2.13, while DAC has the lowest VIF at 1.01. As all the VIFs for the independent variables are lower than the rule of thumb of 10 (O'Brien, 2007), there is no evidence of multicollinearity in the data.
10. I have also recalculated BIAS for the first and second quarter, and re-estimated Eq. (1) based on these dependent variables. For the regression results of first quarter BIAS, all audit quality variables remain significantly positive (BIGN = 0.011, $p < 0.01$; ASPEC_SALES = 0.033, $p < 0.01$; ASPEC_CLIENTS = 0.047, $p < 0.01$). For the regression results of second quarter BIAS, all audit quality variables also remain significantly positive, although the auditor industry specialization variables are less significant (BIGN = 0.002, $p < 0.01$; ASPEC_SALES = 0.013, $p < 0.05$; ASPEC_CLIENTS = 0.020, $p < 0.10$).
11. The variables are defined as follows. NEWISSUE is 1 if a firm's total shares outstanding increases by 10% or paid-in-capital increases by 5%, 0 otherwise; LEV is the ratio of total liabilities to total assets for year t; LIQUIDITY is total current assets divided by total current liabilities for year t; ROA is the ratio of net income to total assets for year t-1; LOSS is 1 if net income for year t-1 is negative, 0 otherwise; SIZE is the natural logarithm of total assets for year t; and TRADINGDAYS is the number of days from the fiscal year-end to the date of the annual earnings announcement.
12. For the regression of BIAS with the inclusion of INVERSEMILLS as a control variable, the adjusted R2, F-statistics, and number of observations are 16.6%, 37.71***, and 16,081, respectively. For the regression of ACCURACY with the inclusion of INVERSEMILLS as a control variable, the adjusted R2, F-statistics, and number of observations are 20.2%, 44.03***, and 16,081, respectively.

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