The Impact of Fair Disclosure Regulation on Analyst Forecasts
Evidence from Japan

Abstract: In September 2016, the Japan Securities Dealers Association introduced guidelines prohibiting analysts from obtaining an earnings preview before earnings official announcement. I analyze how analyst forecasts error and dispersion changed before and after the guidelines were introduced. The results show that analyst forecasts dispersion decreased post the introduction of the guidelines, which suggests that management was less likely to selectively disclose material information. In addition, the results show that analyst forecasts error decreased post the introduction of the guidelines. This suggests that the positive effect of improving the accuracy of management forecasts outweighs the negative effect of decreasing selective disclosure.
Keywords: fair disclosure regulation, analyst forecasts, management forecasts

1. Introduction

In September 2016, the Japan Securities Dealers Association (JSDA) introduced guidelines prohibiting analysts from obtaining an earnings preview before earnings official announcement. This paper investigates the impact of the guidelines on analyst forecasts dispersion and accuracy. There are three reasons to focus on this issue. The first is that global investors have questioned the transparency of Japanese stock markets. In Japan, it was a common practice for analysts to communicate material information to a subset of investors before it was publicly announced (JSDA 2016). Analysts could obtain information through a "preview interview" which allows access to management for the purpose of obtaining settled earnings information. It was difficult for global investors to accept "preview interview"[1] system since it was unique to Japan. As a result, a discussion about the appropriateness of this practice began around 2013 (Okumura et al. 2017). The need for change was also prompted by several securities firms receiving administrative sanctions over the analysts' management of undisclosed material information[2]. The problem was that analysts transmitted material information to

[1] The term "preview interview" means that analysts interview listed firms in order to obtain financial closing information prior to the "silent period" during which listed firms were prohibited from communicating unpublished material information to investors or analysts until four weeks after their earnings announcement.

[2] For an overview of these cases, refer to the following press release by the FSA. "Administrative Disposition against Deutsche Securities Inc." Available at https://www.fsa.go.jp/news/27/syouken/20151215-1.html, "Administrative Disposition against Credit Suisse Securities Inc." Available at https://www.fsa.go.jp/news/27/syouken/20160425-1.html.

a subset of customers and induced them to buy and sell related shares. The Tokyo Stock Exchange imposed a penalty of 60 million yen for infringing trading participant rules and the JSDA imposed a penalty of 30 million yen for violation of rules concerning analyst reporting[3]. Whether such practices have diminished following introduction in Japan of fair disclosure regulation is for global investors.

Second, there is growing interest in fair disclosure regulation[4] in Japan. As a consequence of inappropriate use of information by securities firms, the JSDA introduced "Guidelines for Reporting and Information Transmission to Issuers by Analysts of Association Members" (hereafter "Guidelines") in September 2016. Following this, in April 2018 the Financial Services Agency (FSA) introduced an enforceable "Fair Disclosure Rule" (hereafter "FDR")[5]. Because introduction of the Guidelines is relatively recent in Japan, its economic impact has not been previously examined. This paper focuses whether has the Guidelines changed analyst behavior. Specifically, it examines whether the amount of selective disclosure has decreased and whether the earnings forecast environment has changed post-guidelines.

Third, there is a lack of consistent results for prior studies that have investigated the impact of fair disclosure regulation outside of Japan. The lack of consistent prior results has been attributed to difficulty related to controlling for other events that occurred simultaneously with the introduction of the regulation. In addition, for United States (U.S.) studies on fair disclosure regulation, it is likely that earnings forecasts practices have affected the results. Specifically, U. S. management forecasts are

[3] For the penalties, please refer to the following news sources by Tokyo Stock Exchange and The Japan Securities Dealers Association. "Disposition against Deutsche Securities Inc." Available at https://www.jpx.co.jp/news/1060/20160216-01.html, "Disposition and Recommendation for Association Member" Available at http://www.jsda.or.jp/kyoukaiin/syobun/kyokaiin/files/20160216_PRESS_RELEASE2.pdf.

[4] In this paper, "Fair Disclosure Regulation" means both "Fair Disclosure Rule" (FDR) enforced by Financial Instruments and Exchange Act of the Financial Services Agency in 2018 and "Guidelines for Reporting and Information Transmission to Issuers by Analysts of Association Members" enforced by The Japan Securities Dealers Association in 2016. The same applies to "Regulation Fair Disclosure" (Regulation FD) enforced by SEC.

[5] The "Guidelines for Reporting and Communicating Information to Issuers by Analysts of Association Members" prohibits the following: interviewing listed firms on unpublished material information and transmitting the unpublished information by means other than analyst reports. "Fair Disclosure Rule" forced listed firms to disclose material information simultaneously and publicly once they released the information to a subset of investors or analysts.

voluntarily and firms covered by three or more analysts account for about sixty percent or more of NYSE listed firms. In contrast, for Japanese companies, management forecasts are effectively mandated (Kato et al. 2009) and firms with three or more analysts are only about twenty percent of TSE listed firms[6]. Though prior research suggests that analysts are influenced by management forecasts (Ota 2010), it may be difficult to properly examine the relationship between management forecasts and analyst forecasts in the U.S. due to the voluntary management earnings forecast practice. Therefore, Japan's effective mandatory management forecast arrangements provide a better setting to examine the impact of fair disclosure regulation.

The results of this paper indicate that analyst forecasts dispersion decreased post-Guidelines. This suggests the amount of private information disclosed by managements to analysts decreases and the dependence of analysts on management forecasts increased post-Guidelines. In addition, the findings show that analyst forecast error declined post-Guidelines. Overall, the results suggest the positive effects of increasing management forecasts accuracy outweigh the negative effects of decreasing the amount of private information post-Guidelines.

This paper is organized as follows. Related literature is reviewed in Section 2, and the development of hypotheses is provided in Section 3. Section 4 describes the research design and samples. Section 5 presents and interprets the result of the main analysis. A concluding discussion is presented in Section 6.

2. Prior Literature

Most of the prior research on FDR type regulation has been conducted in the U. S. since the regulation was introduced there in 2000. Securities and Exchange Commission (SEC) concern about selective disclosure of material information by management to analysts lead to introduction of the U.S. Regulation Fair Disclosure (hereafter "Regulation FD") (SEC 2000). Prior U.S. research has analyzed

[6] For each of NYSE listed firms and TSE listed firms, I compiled analyst coverage data as of 2018 obtained from Capital IQ.

whether selective disclosure by management declined post the introduction of Regulation FD. The amount of selective disclosure by management before and after Regulation FD is determined by using analyst forecast dispersion as information asymmetry among analysts is reflected analyst forecasts dispersion (Barron et al. 1998). Pre-Regulation FD, some analysts were able to obtain private information, while others were not. Therefore, if all analysts obtain the same information post-Regulation FD, analyst forecast dispersion should be reduced.

Findings regarding the effect of Regulation FD on analyst forecast dispersion are mixed. Kross and Suk (2012) find that forecasts dispersion declined in tests for a pre-Regulation FD period from fourth quarter 1996 through third quarter 2000 and a post-Regulation FD period from fourth quarter 2000 thorough third quarter 2004. This suggests that analysts are more reliant on general management forecasts as selective disclosure by management decreased after Regulation FD was introduced. In contrast, Agrawal et al. (2006) test a pre- and post-Regulation FD periods from first quarter 1995 through second quarter 2004 and find that forecasts dispersion increased post-Regulation FD. This result indicates that analysts increase their forecast effort to compensate for the reduction of selective disclosure by management.

Forecast accuracy may also be affected by the change in earnings forecasts environment for analysts due to restrictions on selective disclosure by management. The more information sources available to analysts and the higher the accuracy of information, the easier it is for them to accurately forecast earnings. Analysts can use information obtained from management forecasts and other information sources such as customers, suppliers or employees.

On one hand, prior studies suggest it is more difficult for analysts to forecast earnings accurately when the amount of private information obtained from management decreases post-Regulation FD (Agrawal et al. 2006; Keskek et al. 2017). On the other hand, studies show that analyst forecasts accuracy increased post-Regulation FD (Shane et al. 2001; Kross and Suk 2012). In addition, other

studies do not find any change in analyst forecasts accuracy after introduction of Regulation FD (Heflin et al. 2003; Bailey et al. 2003; Francis et al. 2006). These studies suggest that extra analyst effort offsets forecasts error due to the reduction of selective disclosure. Overall, the extant literatures related to the introduction of the U.S. Regulation does not provide a clear picture as to whether the amount of selective disclosure by management decreased or whether the earnings forecasts environment for analysts changed.

3. Hypothesis Development

Most of the prior research on fair disclosure type regulation has been conducted in the U.S., but it has failed to provide consistent results regarding the effect of the regulation on analyst forecasts dispersion and accuracy. There are three possible reasons for the prior mixed results. The first is the possible confounding effect of other events occurring at the same time of the introduction of Regulation FD (Koch et al. 2013). Francis et al. (2006) identify the following events during the post-Regulation FD period (from 2000 through 2002) : the crash of the dot-com bubble, the U. S. economic recession, decimalization, and accounting scandals such as those involving WorldCom and Enron. These events may influence the results of prior studies.

The second reason is possible selection bias related to U.S. managers with high ability having an incentive to disclose management forecasts for the purpose of obtaining private profits. Moreover, the accuracy of forecasts published by such managements are high (Trueman 1986; Baik et al. 2011). In addition, analysts tend to revise their earnings forecasts based on management forecasts when the accuracy is high (Ota 2010). That is, analysts are more likely to rely on higher accuracy management forecasts. It may be difficult to properly examine the relationship between management forecasts and analyst forecasts in the U.S. due to the voluntary management earnings forecast practice.

Third, the variables used in prior analysis are a potential problem. Prior research uses analyst forecasts dispersion to determine if the level of selective disclosure was reduced in the post-Regulation

FD period. However, analyst forecasts dispersion may reflect the dependence of analysts on public information such as management forecasts. Managers in the U.S. have options to increase or decrease the amount of disclosure post-Regulation FD. Along with this, it is expected that the reliance of analysts on management forecasts could change before and after Regulation FD.

Analysts in Japan are likely to rely on management forecasts when they release earnings forecasts (Ota 2007). Because there is little change in the dependence of analysts on management forecasts it is possible to better assess whether the Guidelines affects analyst forecasts dispersion in the Japanese setting.

This paper first tests how analyst forecasts dispersion changed post-Guidelines. The introduction of Guidelines forces analysts to refrain from interviewing management, which is likely to make it difficult for them to utilize unpublished material information in making their forecast. Analysts who can no longer obtain private information become more reliant on public information. Barron et al. (1998), in an analytical study, show that analyst forecasts dispersion is a proxy variable for the amount of private information used in forecasting earnings. They use the uncertainty of information communicated by managements to analysts to account for forecasts dispersion. If the uncertainty of private information is high, analysts tend to rely only on public information. Based on Barron et al. (1998), analyst forecasts dispersion decreases if the quantity of selective disclosure declines and analysts do not collect additional earnings information post-Guidelines[7].

In this paper, the focus is on analyst forecasts released around the announcement of management earnings forecasts. Analysts' forecasts released forty-five days before and after the announcement of

[7] Analytical research by Kotani (2017) suggests that the more analyst coverage, the more motivated analysts are to become free riders post-FDR. That is, analysts may rely more on public information instead of collecting additional information additionally. The Regulations enforce management to disclose material information publicly once they communicate the information to a subset of analysts or investors. If an analyst obtains information from management at high cost, other analysts can get the same information at no cost, which allows analysts to gain high reputation from capital markets while saving the cost of collecting information (Kotani 2017).

the latest management forecasts are collected[8]. The difference is then calculated between analyst forecasts before management forecasts is disclosed and the revised forecast immediately after management forecasts disclosure. Analysis is conducted of this difference before and after the introduction of the Guidelines.

Analysts who were able to obtain unpublished material information in advance could incorporate the information into their earnings forecasts pre-Guidelines. However, this information should not be available post-Guidelines. Therefore, analyst forecasts dispersion before the announcement of management forecasts should increase post-Guidelines. In addition, the reliance of analysts on management forecasts is likely to increase post-Guidelines (Kotani 2017). Analyst forecasts are likely to converge on management forecasts post-Guidelines. For this reason, the difference between the standard deviation of analyst forecasts released after management forecasts and that released before should decrease post-Guidelines. Based on the above expectation, the following hypothesis is tested.

H1: Analysts' forecast dispersion decreases post-Guidelines.

The next hypothesis related to how analyst forecasts accuracy changes before and after Guidelines. Post-Guidelines, analysts are required to refrain from interviewing management in order to obtain unpublished material information. Therefore, it may be difficult for analysts to accurately forecasts earnings post-Guidelines. This should be associated with a decrease in accuracy of analyst forecasts. However, analyst forecasts error may decrease if the accuracy of management forecasts improves and the dependence of analysts on management forecasts is greater. Managers have little incentive to disclose earnings forecasts accurately because they are able to control market expectations through the private channels pre-Guidelines. However, it is difficult for managements to bias earnings

[8] This analysis is based on Kross and Suk (2012). Besides, Nara and Noma (2013) suggest that though analysts are likely to rely on management forecasts until two weeks after the announcement of management forecasts, they collect earnings information additionally four weeks after the release of management forecasts. That is, analyst forecasts released at the latest point before the announcement of management forecasts are more likely to reflect analyst's analysis based on other than management forecasts.

forecasts because such information could lower the credibility of the subsequent disclosure (Hutton and Stocken 2009). Therefore, managements have an incentive to publish accurate earnings forecasts so that they maintain their reputation.

Heflin et al. (2012) find that in the U.S. management forecasts accuracy increased after the introduction of Regulation FD and suggest that managers have an incentive to disclose earnings forecasts conservatively to avoid negative earnings surprises. Ota (2010) shows that analysts tend to revise their earnings forecasts based on management forecasts when the accuracy is high. That is, analysts are more likely to rely on higher accuracy management forecasts. If the positive effects of increasing management forecasts accuracy outweigh the negative effect of decreasing the amount of information analysts obtains, analyst forecasts error should decline post-Guidelines. Based on this discussion, the second hypothesis regarding analyst forecast error is tested.

H2: Analysts' forecasts error decreases post-Guidelines.

4. Research Design

4.1 Empirical Models

The test of H1 is based on the model developed by Kross and Suk (2012). Analysis of the amount of selective disclosure changes before and after Guidelines is conducted analyst forecasts dispersion before and after the management forecasts announcement (see Equation 1 below). This analysis uses management forecasts that were revised immediately before the earnings announcement (hereafter, latest management forecasts). The model uses analyst forecasts that were published before and after forty-five days of the release of the latest management forecasts (Figure 1). Managements do not have enough information to forecast earnings at the beginning of the fiscal year. But latest management forecasts reflect all of the information available to them. Hence, analysis is possible based on the change in management earnings forecast behavior before and after Guidelines.

Management forecasts are obtained from Nikkei NEEDS Financial Quest 2.0, while analyst

forecasts and financial data are obtained from Thomson Reuters I/B/E/S/. Note that *t* is the period when the latest management forecasts were released.

$$\Delta disp_t = \beta_0 + \beta_1 fd + \beta_2 sur_t + \beta_3 car + \beta_4 loss_t + \beta_5 \Delta roa_t + \beta_6 \Delta gdp_t + \beta_7 rd_{t-1} + \beta_8 lmve_t + \beta_9 mfe_t + \beta_{10} naf_t + \varepsilon \quad \cdots (1)$$

$\Delta disp_t$	Analyst forecasts dispersion. |the standard deviation of analyst forecasts published at the earliest time in forty-five days after management forecasts $_t$– the standard deviation of analyst forecasts released at the latest time in forty-five days before management forecasts$_t$|/ share price at the beginning of fiscal year *t.*
fd	Dummy variable on FD. One if latest management forecasts are released in fiscal year 2017 or 2018, zero if they are released in fiscal year 2014 or 2015.
sur_t	|acutual EPS$_t$–analyst forecasts consensus EPS(median) released thirty days before management forecasts$_t$ |/ share price at the beginning of fiscal year *t*.
car	Three-day accumulated abnormal return of announcement of latest management forecasts$_t$.
$loss_t$	Dummy variable that takes a value of one if the actual EPS is the red, and zero otherwise.
Δroa_t	Percentage change in ROA (normal profits/total assets) relative to *t*-1.
Δgdp_t	Percentage change in GDP relative to *t*-1.
rd_{t-1}	R&D expenditure$_{t-1}$/ total assets$_{t-1}$
$lmve_t$	Natural logarithm of market capitalization$_{t-1}$.
mfe_t	Latest management forecast error. |acutual EPS$_t$–latest management forecasts EPS$_t$/share price at the beginning of fiscal year *t*.
naf_t	Natural logarithm of analyst coverage$_t$.

Insert Figure 1

The dependent variable $\Delta disp_t$ is analyst forecasts dispersion, which is calculated as follows: |the standard deviation of analyst forecasts published at the earliest time in forty-five days after management forecasts $_t$– the standard deviation of analyst forecasts released at the latest time in forty-five days before management forecasts$_t$|/ share price at the beginning of fiscal year *t*.

The independent variable is *fd*. H1 predicts that analyst forecasts dispersion after the release of

management forecasts decreases post-Guidelines. Therefore, a negative sign is expected for *fd*.

Hypothesis 2 is also tested using the model developed Kross and Suk (2012) (see Equation (2) below), which focuses on how analyst forecasts error changes before and after the Guidelines.

$$|error_t| = \beta_0 + \beta_1 fd + \beta_2 sur_t + \beta_3 car + \beta_4 loss_t + \beta_5 naf_t + \beta_6 \Delta gdp_t + \beta_7 rd_{t-1} + \beta_8 lmve_t + \beta_9 mfe_t + \beta_{10} naf_t + \varepsilon \quad \cdots (2)$$

$|error_t|$ Analyst forecasts consensus error. |Analyst forecasts consensus EPS (median) released within forty-five after the management forecasts$_t$−acutual EPS$_t$|/share price at the beginning of fiscal year *t*.

$|error_t|$ represents analyst forecasts consensus error for period t. $|error_t|$ is the absolute of the difference between analyst forecasts consensus EPS (median) released within forty-five after the announcement of management forecasts and actual EPS scaled by share price at the beginning of fiscal year *t*. *fd* is variable of interest. Hypothesis 2 predicts management forecasts accuracy improves and reliance of analysts on management forecasts increases post-Guidelines, which results in lower analyst forecasts error. A negative sign is predicted for *fd*.

The same control variables are used in both models. The variable *Sur* measures the surprise in analysts' expectations. It is calculated as the absolute value of the difference between analyst forecasts consensus Earnings Per Share (EPS) (median) released thirty days before the release of management forecasts and actual EPS scaled by share price at the beginning of fiscal year *t*. The more difficult it is to forecast earnings, the greater the surprise component analysts' expectations. *Car* is three-day accumulated abnormal return before the announcement of latest management forecast. *Loss* is dummy variable that takes a value of one if the actual EPS is the negative, and zero otherwise. It is difficult to forecast earnings when performance is weak and the reliance of analysts on management forecasts are less when their accuracy is low (Ota 2010). For the same reason, a control is included for the percentage change in ROA (normal profits/total assets) relative to *t*-1. The variable *⊿gdp* is included to control for

the percentage change in GDP relative to *t*-1. Management forecasts tend to be pessimistic (optimistic) when the economy is rising (failing) (Ota 2006). It is predicted that a higher percentage change in GDP relative to *t*-1 is more likely to bias management forecasts. I also include *rd* (R&D expenditure$_{t-1}$/ total assets$_{t-1}$). Since proprietary cost is high for firms with higher R&D expenditure (Wang 2007), such firms have incentive to disclose biased earnings forecasts. *Lmve* is natural logarithm of market capitalization. Jaggi (1980) suggests that management forecasts accuracy by large firms is higher than small firms. *Mfe* is management forecasts error. Ota (2010) suggests that the management forecasts accuracy affects the reliance of analysts on management forecasts. *Naf* is natural logarithm of analyst coverage. The Guidelines encourages analysts to collect information other than private information for evaluation of firm (JSDA 2016). It is expected that analysts with greater ability to collect earnings information are highly evaluated post-Guidelines and less capable analysts may be excluded. It is expected that analyst forecasts dispersion for firms which experience reduced analyst coverage is less than other firms.

White (1980) heteroscedasticity consistent *t*-statistics are calculated for both models. All continuous variables are winsorized at the 1st and 99th percentile in order to mitigate the influence of outliers.

4.2 Sample and Descriptive Statistics

The sample is collected before and after the implementation of the Guidelines. It includes a pre-Guidelines period from March 2014 through March 2015, and a post-Guidelines period from March 2017 through March 2018. Administrative dispositions for several securities firms that were a trigger for the enforcement of Guidelines occurred from December 2015 to February 2016 (see footnote 3). In addition, Osaki (2017) reveals a decrease in "preview interviews" between October 2015 and March 2016.

The sample is selected as follows (see Table 1): (1) firms listed with first section of TSE except

for them belonging to banks, securities, insurance and other financial businesses (based on Nikkei industry middle classification), (2) firms those fiscal year ends March 31st, (3) firms covered by more than three analysts. Requirement (3) is included to test the effects of Guidelines, which forced analysts to refrain from interviewing management for the purpose of obtaining unpublished material information. Hence, the more analyst coverage, the greater the impact of Guidelines. The final sample is 908 firm-years. Management forecasts are obtained from Nikkei NEEDS Financial Quest 2.0. and analyst forecasts and financial data are obtained from Thomson Reuters I/B/E/S/.

Insert Table 1

Table 2 shows descriptive statistics. The mean of $\Delta disp_t$ which represents the difference between standard deviation of analyst forecasts released before and after management forecasts is 0.001. This indicates analyst forecast dispersion increases after the announcement of management forecasts. Since analysts in Japan tend to revise their forecasts based on management forecasts (Nara and Noma 2013), it is expected that analyst forecasts dispersion will decrease after management forecasts. However, some analysts incorporate unpublished material information into their forecasts at least pre-Guidelines. Therefore, analyst forecasts dispersion after management forecasts may become relatively large.

Insert Table 2

Table 3 displays the Pearson and Spearman correlation of each variable in the test of H1and H2. $\Delta disp_t$ is negatively related to *fd* (Pearson's correlation coefficient=−0.085; Spearman's correlation coefficient=−0.066). This indicates analyst forecasts dispersion decreases post-Guidelines, which is consistent with H1. The variable $|error_t|$ is negatively related to *fd* (Pearson's correlation coefficient= −0.098; Spearman's correlation coefficient=−0.129). This suggests analyst forecasts error declines post-Guidelines, which is consistent with H2.

Insert Table 3

5. Research Results

5.1 Univariate Analyses

Tables 4 and Table 5 report the results of univariate analyses. According to Table 4, *Δdisp* is smaller *fd* equals one, and the difference is statistically significant at the 1% level (difference is −0.001; *t*-value=2.576). This shows a decrease in the dispersion of analyst forecasts post-Guidelines, which is consistent with H1. Table 4 also shows that $|error_t|$ is smaller when *fd* equals one and the difference is statistically significant at the 1% level (difference is −0.041; *t*-value=2.976). This indicates analyst forecasts error declined post-Guidelines, which is consistent with H2. Results of tests of differences in median value reported in Table 5 the same results.

Insert Table 4 and Table 5

5.2 Multivariate Analyses

Table 6 shows the result of multivariate analysis related to H1. As reported in Column (1) of Table 6, the coefficient for *fd* is negative and statistically significant at the 5% level (coefficient=−0.001; *t*-value=−2.01). This shoes the dispersion of analyst forecasts made after management forecasts decreased post-Guidelines, consistent with H1. Table 7 shows the result for the test of H2. Columns (1) and (2) in Table 7 show a negative coefficient for *fd*, which is statistically significant at the 1% level (coefficient=−0.042[−0.035]; *t*-value=−3.37[−2.92]). This shows the error of analyst forecasts revised after management forecasts declined post-Guidelines, which is consistent with H2.

Results for control variables in Table 6 show the coefficient of sur_t is positive and statistically significant at the 1% level (coefficient=0.042; *t*-value=2.46). The coefficient for sur_t should be larger when it is difficult to forecast earnings. Analysts who cover the firms with uncertainty of earnings may

have incentives to rely on private information at least pre-Guidelines. This could lead the increase in analyst forecasts dispersion post-Guidelines. Columns (1) and (2) in Table 7 shows the coefficient of sur_t is positive and statistically significant at the 5% level (coefficient=0.786[0.706]; *t*-value=2.24[1.91]). This result is consistent with more difficult earnings forecasting leading to larger analyst forecasts error. Columns (1) and (2) in Table 7 show the coefficient for *loss* is positive and statistically significant at the 10 (1) % level (coefficient=0.085[0.108]; *t*-value=1.79[2.85]). This shows the error of analyst forecasts for loss-making firms is greater, which is consistent with Ota (2009) who suggests that management forecasts for loss-making firms are biased upward and analysts do not see through the bias. Columns (1) and (2) in Table 7 shows *rd* is negative and statistically significant at the 5% level (coefficient=−0.852;*t*-value=−2.40). A positive relationship is expected between R&D expenditure and analyst forecasts error because firms with high R&D expenditure have high proprietary costs (Wang 2007). However, firms with a lot of proprietary information have incentives to disclose the information through private channel, at least pre-Guidelines (Financial Instruments and Exchange Law Study Group 2018). Hence, analysts previously revised their forecasts based on private information, which may be reflected in the increase in analyst forecasts accuracy.

In summary, the multivariate results show following: (1) the amount of private information by management decreased post-Guidelines, (2) the reliance of analysts on management forecasts increased post-Guidelines, (3) the positive effects of increasing management forecasts accuracy outweigh the negative effects of the reduction in the amount of private information.

Insert Table 6 and Table 7

6. Conclusions

The purpose of this paper is to investigate the impact of Guidelines on analyst's earnings forecast behavior. The results indicate that analyst forecasts dispersion decreased post-Guidelines. This suggests the amount of private information disclosed by managements to analysts decreased and the dependence

of analysts on management forecasts increased post-Guidelines. In addition, the findings show that analyst forecasts error declined post-Guidelines. Overall, the results suggest the positive effects of increasing management forecasts accuracy outweigh the negative effects of decreasing the amount of private information post-Guidelines.

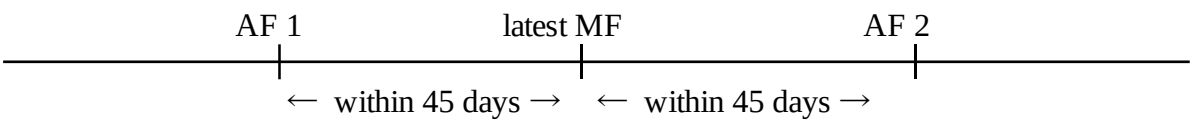
The implications of results are two-fold. First, this paper shows the effectiveness of the Guidelines. The Guidelines was introduced because global investors criticized the practice of management communicating information to a subset of analysts or investors. Moreover, several securities firms received administrative sanctions over the analyst's management of undisclosed material information. This paper provides evidence that the amount of private information disclosed by management decreased post-Guidelines. However, this result is limited because it is not possible to directly observe private information.

Second, this paper confirms the external validity of prior U.S. studies on fair disclosure regulation. The analyses are conducted using the models developed by Kross and Suk (2012). However, Koch et al. (2013) in reviewing related research point out that prior research is affected by uncontrolled confounding events. In addition, management earnings forecast practice in the U. S. makes it difficult to interpret the results of prior studies as being attributable to disclosure regulation. This paper addresses this problem by using Japanese management and analyst forecasts.

The results indicate analyst forecasts accuracy increased post-Guidelines. This result is interpreted as indicating the positive effects of increasing management forecasts outweigh the negative effects of decreasing the amount of private information and increased reliance by analysts on management forecasts post-Guidelines. However, it is possible other factors influence the change in analyst forecasts accuracy before and after Guidelines. That is, if more analysts rely on high ability analysts when they revise their earnings forecasts, then the accuracy of forecasts consensus increases. Whether Japanese analysts become more reliant on high ability analysts post-Guidelines is an issue that can be addressed

in future research.

Figure1 Timing of analyst forecasts



Δdisp=(the standard deviation of AF2− the standard deviation of AF1)/ share price at the begininng of fiscal year *t*

※AF (MF):analyst forecasts (management forecasts)

Table 1 Sample Selection

	Requirements	Firm-year
(1)	firms listed with the first section of TSE except for firms belonging to bank, securities, insurance and other financial businesses (based on Nikkei industry middle classification).	11,168
(2)	firms those fiscal year ends March 31.	7,144
(3)	firms covered with more than three analysts.	1,424
(4)	firms each data required is available.	908

Table 2 Descriptive Statistics (N=908)

Variable	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
$\Delta disp_t$	0.001	0.006	-0.037	0.000	0.000	0.002	0.046
$\|error_t\|$	0.093	0.210	0.000	0.004	0.012	0.044	1.265
fd	0.500	0.500	0	0	0.5[9]	1	1
sur_t	0.020	0.046	0.000	0.003	0.008	0.019	0.466
car	0.001	0.047	-0.127	-0.025	0.001	0.025	0.193
$loss_t$	0.040	0.195	0	0	0	0	1
Δroa_t	0.189	1.281	-5.956	-0.020	0.000	0.213	12.000
Δgdp_t	0.012	0.008	-0.002	0.006	0.015	0.018	0.020
rd_{t-1}	0.012	0.017	0.000	0.000	0.002	0.019	0.089
$lmve_t$	11.527	0.474	10.423	11.204	11.492	11.801	12.998
mfe_t	0.011	0.030	0.000	0.002	0.004	0.010	0.370
naf_t	0.935	0.228	0.477	0.778	0.954	1.114	1.398

[9] I use same firms during each sample period (a pre-Guidelines period from March 2014 through March 2015 and a post-Guidelines period from March 2017 through March 2018). The number of data for *fd*=1(0) is 454 respectively. Though the median of *fd* output by stata 15 is 0.5, *fd* takes only a value of one or zero in the original data.

Table 3 Correlation of H1, H2

	$\Delta disp_t$	$\lvert error_t \rvert$	sur_t	car	$loss_t$	Δroa_t	Δgdp_t	rd_{t-1}	$lmve_t$	mfe_t	naf_t
$\Delta disp_t$	1	0.236	0.375	0.011	0.044	0.016	−0.027	0.015	−0.145	0.078	−0.078
$\lvert error_t \rvert$	0.184	1	0.526	−0.021	0.202	−0.022	0.031	0.020	−0.234	0.299	−0.096
sur_t	0.283	0.347	1	0.067	0.294	0.012	−0.025	0.061	−0.261	0.383	−0.006
car	−0.013	−0.055	−0.003	1	−0.033	0.179	−0.094	−0.016	−0.068	0.039	−0.020
$loss_t$	0.139	0.254	0.525	−0.040	1	−0.101	0	0.003	−0.116	0.078	−0.011
Δroa_t	0.094	−0.084	−0.104	0.057	−0.027	1	−0.292	0.071	−0.028	0.057	0.023
Δgdp_t	−0.029	−0.017	−0.001	−0.068	−0.001	−0.230	1	−0.004	0.057	0.023	0.037
rd_{t-1}	−0.005	−0.059	−0.041	−0.023	−0.029	0.059	−0.007	1	0.004	0.026	0.189
$lmve_t$	−0.111	−0.133	−0.19	−0.070	−0.129	−0.061	0.119	0.088	1	−0.125	0.639
mfe_t	0.128	0.316	0.430	−0.006	0.319	−0.101	0.033	−0.053	−0.098	1	0.064
naf_t	−0.049	−0.010	−0.070	−0.037	−0.022	0.015	0.011	0.209	0.655	−0.027	1

The Pearson's correlation coefficients are shown in lower left, and Spearman's correlation coefficients are shown in upper right.

Table 4 Test of the Difference of Mean

	fd=(0)	fd=(1)	(1) − (0)	*t*-value
$\Delta disp_t$	0.002	0.001	−0.001	2.576***
$\lvert error_t \rvert$	0.114	0.073	−0.041	2.976***

Table 5 Test of the Difference of Median

	fd=(0)	fd=(1)	(1) − (0)	*z*-value
$\Delta disp_t$	0.0004	0.0002	−0.0002	1.998**
$\lvert error_t \rvert$	0.016	0.009	−0.007	3.876***

Table 6 Verification Results (H1)

Dep. Var.: $\Delta disp_t$	Predict Sign	(1)		(2)	
constant	?	0.009	[1.45]	−0.002	[−0.07]
fd	−	−0.001	[−2.01]**	−0.001	[−1.49]
sur_t	+	0.042	[2.46]***	0.041	[1.98]**
car	−	−0.004	[−1.02]	−0.003	[−0.72]
$loss_t$	+	−0.001	[−0.19]	0.000	[0.05]
Δroa_t	−	0.001	[1.01]	0.001	[1.42]
Δgdp_t	+	0.017	[0.60]	0.022	[0.69]
rd_{t-1}	−	0.010	[0.72]	−0.102	[−1.01]
$lmve_t$	−	−0.001	[−1.45]	0.000	[0.07]
mfe_t	+	0.014	[0.85]	0.005	[0.35]
naf_t	−	0.001	[0.89]	0.002	[0.41]
Industry		Yes		No	
Fixed Effects		No		Firm	
N		908		908	
Adj. R2		13.47%			
R2 within				11.02%	
Max VIF		3.59		2.01	

***p<0.01, **p<0.05, *p<0.01. The values in parentheses represent *t*-values.

Table 7 Verification Results (H2)

Dep. Var.: $\lvert error_t \rvert$	Predict Sign	(1)		(2)	
constant	?	0.341	[2.12]**	−0.058	[−0.11]
fd	−	−0.042	[−3.37]***	−0.035	[−2.92]***
sur_t	+	0.786	[2.24]**	0.706	[1.91]**
car	−	−0.170	[−1.26]	0.017	[0.16]
$loss_t$	+	0.085	[1.79]*	0.108	[2.85]***

Δroa_t	+	−0.002	[−0.22]	0.008	[1.44]
Δgdp_t	+	0.435	[0.51]	0.666	[1.49]
rd_{t-1}	−	−0.852	[−2.40]**	3.145	[1.77]*
$lmve_t$	−	−0.028	[−1.74]*	0.009	[0.19]
mfe_t	+	0.465	[1.25]	−0.944	[−3.08]***
naf_t	−	0.004	[0.10]	0.017	[0.29]
Industry		Yes		No	
Fixed Effects		No		Firm	
N		908		908	
Adj. R2		37.82%			
R2 within				15.42%	
Max VIF		3.59		2.01	

***p<0.01, **p<0.05, *p<0.01. The values in parentheses represent *t*-values.

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