APPENDIX A: Variable definitions

| Variables | | Definitions |
|---|---|---|
| $SPREAD_t$ | = | the initial yield spread on the straight bond issued in fiscal year *t*. The spread is the difference between the interest rate on the bond issued by the firm and that on government bonds. |
| $POSFI_{t-1}$ | = | a dummy variable set to "1" if the forecast innovation for year *t*-1 is greater than or equal to zero and "0" otherwise. The forecast innovation for year *t*-1 equals (initial management forecast for year *t* minus actual net income for year *t*-1) / total assets at the end of year *t*-2. |
| *POSFI (with forecast management)* $_t$ | = | a dummy variable set to "1" if *FI* for year *t* is greater than or equal to zero and *NDF* for year *t* is negative, and "0" otherwise. $NDF_t$ = non-discretionary forecasts for year *t*. See APPENDIX B for the detail. |
| *POSFI (without forecast management)* $_t$ | = | a dummy variable set to "1" if *FI* for year *t* is greater than or equal to zero and *NDF* for year *t* is greater than or equal to zero, and "0" otherwise. $NDF_t$ = non-discretionary forecasts for year *t*. See APPENDIX B for the detail. |
| $D_{DISTRESS = k}$ | = | a dummy variable set to "1" if *DISTRESS* is *k* and "0" otherwise (*k* = 0, 1). *DISTRESS* is a dummy variable set to "1" if the fitted value from Ohlson's (1980) bankruptcy prediction model (i.e., O-score) is greater than the median value in year *t*-1 and "0" otherwise. |
| $OSCORE_t$ | = | the fitted value from Ohlson's (1980) bankruptcy prediction model (O-score). |
| $DF_{t-1}$ | = | the discretionary forecasts for year *t*-1. See APPENDIX B for the detail. |
| *Other Earnings Benchmarks* | | |
| $POSES_{t-1}$ | = | a dummy variable set to "1" if the earnings surprise for year *t*-1 is greater than or equal to zero and "0" otherwise. The earnings surprise for year *t*-1 equals (actual net income for year *t*-1 minus latest management forecast for year *t*-1)/total assets at the end of year *t*-2. |
| $POSCROA_{t-1}$ | = | a dummy variable set to "1" if the change in ROA for year *t*-1 is greater than or equal to zero and "0" otherwise. |
| $POSROA_{t-1}$ | = | a dummy variable set to "1" if ROA for year *t*-1 is greater than or equal to zero and "0" otherwise. |
| *Control Variables* | | |
| $DS_{t-1}$ | = | (actual dividends for year *t*-1 – the latest management dividend forecast for year *t*-1)/total assets at the end of year *t*-2. |
| $MARGIN_{t-1}$ | = | operating income for year *t*-1/sales revenue for year *t*-1. |

| | | |
|---|---|---|
| $INCR_{t-1}$ | = | the interest coverage ratio at the end of fiscal year *t*-1. |
| $lnBM_{t-1}$ | = | the natural log of the book-to-market ratio at the end of year *t*-1. |
| $RND_{t-1}$ | = | research and development expense for year *t*-1/total assets at the end of year *t*-2. |
| $STDROA_{t-1}$ | = | the standard deviation of ROA calculated using five years of data from year *t*-5 to *t*-1. |
| $STDRET_{t-1}$ | = | the standard deviation of monthly stock returns during year *t*-1. |
| $lnMV_{t-1}$ | = | the natural log of the market value of equity at the end of fiscal year *t*-1. |
| $LEV_{t-1}$ | = | total liabilities at the end of year t-1/total assets at the end of year *t*-1. |
| $ISSUESIZE_{t}$ | = | the natural log of the bond offering amount. |
| $MATURE_{t}$ | = | the number of years until maturity. |
| $LOSS_{t}$ | = | a dummy variable set to "1" if net income for year *t* is negative and "0" otherwise. |
| $ERROR_{t}$ | = | (actual net income for year *t* minus initial management forecast for year *t*) / total assets at the end of year *t*-1. |
| $\Delta SALE_{t}$ | = | sales revenue for year *t*/sales revenue for year *t*-1. |

APPENDIX B: The measurement of discretionary forecast management

We calculate discretionary forecast management based on Iwasaki et al. (2016), who propose a new method of decomposing forecast innovations into *discretionary* and *non-discretionary* portions. The basic idea behind their method of estimating discretionary forecast management is that non-discretionary management forecasts can be measured using an earnings expectations model based on fundamental analysis. Using this earnings expectations model, Iwasaki et al. (2016) first estimate the expected value of the change in earnings for the next year, corresponding to non-discretionary management forecasts. Then, subtracting non-discretionary forecasts from forecast innovations, they calculate discretionary management forecasts, interpreted as the portion of a management forecast that cannot be explained by the available information (i.e., the portion that may reflect manager bias). Specifically, Iwasaki et al. (2016) estimate discretionary management forecasts using the following three steps.

Step 1: Obtaining the parameter estimates of the earnings expectation model
Using accounting data for the current and previous period, they estimate the following earnings expectations model (A.1) and obtain coefficient estimates:

$$CROA_t = \alpha + \beta_1 CHGROA_{t\text{-}1} + \sum_{k=1}^{9} \beta_k \, AB\ fundamental\ signals_{k,t\text{-}1} + \varepsilon_t \qquad \text{(A.1)}$$

where,

$CROA_t$ = (net income for year $t$ –net income for year $t$-1)/total assets at the end of year $t$-1.

$CHGROA_{t\text{-}1}$ = (net income for year $t$-1 – net income for year $t$-2)/total assets at the end of year $t$-1.

*AB fundamental signals*$_{t\text{-}1}$ = fundamental signals for the current fiscal year $t$ proposed by Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997).

Based on prior studies on earnings persistence and fundamental analysis, model (A.1) assumes that the change in earnings for the current year is a function of 1) the prior period's change in earnings and the 2) prior period's fundamental signals. They include the lagged change in ROA ($CHGROA_{t\text{-}1}$) as an independent variable in accordance with the findings of prior studies on earnings persistence (Brown and Kennelly, 1972; Freeman and Tse, 1989; Bernard and Thomas, 1990). In addition, they include nine fundamental signals as independent variables to improve the model's explanatory power. The fundamental signals include change in inventory ($INV_{t\text{-}1}$), change in accounts receivables ($AR_{t\text{-}1}$), change in capital expenditures ($CAPX_{t\text{-}1}$), change in gross margin ($GM_{t\text{-}1}$), change in selling and administrative expenses ($S\&A_{t\text{-}1}$), change in effective tax rate ($ETR_{t\text{-}1}$), change in total accruals ($CTAC_{t\text{-}1}$), audit qualification dummy ($AQ_{t\text{-}1}$), and change in sales revenue per employee ($LF_{t\text{-}1}$), which are empirically supported by fundamental analysis research (Lev and Thiagarajan, 1993; Abarbanell and Bushee, 1997). Iwasaki et al. (2016) estimate this model (A.1) by year and calculate the parameter estimates for each variable.

Step 2: Estimating non-discretionary forecasts

Iwasaki et al. (2016) calculate the expected value of *CROA* for year $t$+1 ($E_t[CROA_{t+1}]$) using parameter estimates derived from the previous year in model (A.1) and actual data from the current year. The expected value of *CROA* for year $t$+1 ($E_t[CROA_{t+1}]$) corresponds to the non-discretionary portion of management forecasts ($NDF_t$), which is described as model (A.2):

$$NDF_t = \hat{\alpha}_{t-1} + \hat{\beta}_{1t-1} CHGROA_t + \sum^{9} \beta_{kt-1}\, AB\ fundamental\ signals_{k,t} \qquad \text{(A.2)}$$

$k=1$

Step 3: Subtracting non-discretionary forecasts from forecast innovations

Subtracting non-discretionary management forecasts for year $t$ ($NDF_t$) from forecast innovations for year $t$ ($FI_t$), Iwasaki et al. (2016) calculate the discretionary portion of management earnings forecasts for year $t$ ($DF_t$), which is described as model (A.3) below:

$$DF_t = FI_t - NDF_t \quad \text{(A.3)}$$

where, $FI_t$ is measured as the management forecast for year $t$+1 less actual earnings for year $t$. Both $NDF_t$ and $FI_t$ are divided by total assets at the end of year $t$-1. A larger $DF_t$ implies more upward forecast management.