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Mandatory managerial stock ownership plans and quality and credibility of management forecasts

Abstract

Both theory and empirical evidence suggest that increased managerial stock ownership will better align the interests of stockholders and investors, which should lead to better quality financial information and management forecasts. Corporate governance groups recommend ownership requirements for top management and over 400 firms in the S&P 500 have adopted mandatory plans over the last 15 years. The authors find evidence of more informative earnings when firms adopt a target ownership plan relative to the years with no ownership mandate. The authors find that management earnings forecast accuracy improves following the adoption of a target share ownership plan. Finally, the paper finds that the market recognizes the disclosure benefits of target ownership plans and reacts more strongly to surprising management earnings forecasts after adoption.

Keywords: agency theory, compensation, earnings management, ownership structure, unethical financial reporting.

JEL Classification: M49, M52.

Introduction

Much research has documented that managers make unethical financial reporting and disclosure choices to serve their own interests at the expense of the investor (Fields et al., 2001, among others). The consequences include shareholder litigation and a negative price effect due to loss in the credibility in firm disclosures (Lev and Penman, 1990; Skinner, 1997). One feature of the executive compensation contract that is purported to increase executive shareownership is a mandatory or target stock ownership plan, now in place at a majority of large public companies (Ayco, 2008). This study examines whether the adoption of a target ownership plan affects the informativeness of earnings and the accuracy and credibility of management forecasts.

We examine earnings informativeness and management forecasts because management incentives affect their perceived quality and/or credibility (Hutton et al., 2003; Rogers and Stocken, 2005). The incentive alignment view predicts that managers with a greater ownership stake in the firm should have incentives that are more aligned with shareholders and thus engage in less earnings and disclosure manipulation. Also, because investors' reaction to forecast news is partially dependent on the credibility of the forecast (Jennings, 1987), we would expect a stronger market reaction to earnings and management forecasts for firms with a target ownership plan in place.

However, the incentive-alignment effects of increased ownership may not necessarily hold for those managers who are forced to hold an ownership

interest above that consistent with their degree of risk aversion. An unintended negative effect of high managerial ownership is that it exposes managers to more risk relative to diversified shareholders (Ross, 2004). To the extent that managers are undiversified with respect to firm-specific wealth, increasing managerial stock ownership via a mandatory stock ownership policy may induce financial reporting and disclosure behaviors that are not in the best interest of the shareholder. Additionally, share ownership increases the power that managers have over firm operating and board decisions resulting in the entrenchment effect (Morck et al., 1988). As such, the association between target ownership plans and earnings/management forecast quality and credibility is an empirical question.

Each of the 107 firms in our sample has adopted a target ownership plan during the sample period (1995-2008). For each firm in our sample we examine earnings informativeness conditional on target ownership. We find stronger earnings response coefficients for firm-years with target ownership plans. We also examine management forecasts made in the two years prior to the adoption year and the two years after the adoption year. We find that management earnings forecast accuracy and bias improve following the adoption of a target ownership plan. Furthermore, the market recognizes the disclosure benefits of target ownership plans and reacts more strongly to very surprising management earnings forecasts after adoption.

Our paper contributes to the literature in several ways. First, while many of the early studies on the performance effects of managerial ownership (e.g. Morck et al., 1988) treat ownership structure as exogenous, Demsetz and Lehn (1985) argue that ownership structure is endogenously determined in equilibrium. The results of prior studies on the association between firms' performance or reporting

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decisions and managerial ownership may be affected by this endogenous relationship. Consistent with Core and Larcker (2002), we assume that the levels of ownership for firms adopting target ownership guidelines are sub-optimal, and that the association between managerial ownership and disclosure is not in equilibrium. We take advantage of the setting where firms adopt target ownership requirements to mitigate the effects of endogeneity in our study.

Second, we add to the literature on the credibility of management forecasts of earnings. Prior studies have examined the disparate market reaction to management forecasts based on the content and characteristics of the forecasts (Hassell and Jennings, 1986; Pownall et al., 1993; Baginski et al., 1993), other information included with the forecast (Hutton et al., 2003; Chen et al., 2008), and managerial incentives to disclose good or bad news (Sansing, 1992; Williams, 1996). Our study adds to this literature by examining how mandatory stock ownership plans might improve the quality and credibility of management forecasts of earnings.

Third, we add to the literature that examines the effects of target ownership requirements. For example, Core and Larcker (2002) examine the performance consequences of mandatory increases in stock ownership for a sample of 195 firms for the period of 1992-1997. They find that two years after the adoption of a mandatory stock ownership plan, managers significantly increase their ownership in the firm and accounting and stock performance increases. We examine a later time period when a greater percentage of firms adopt mandatory ownership plans. We add to the literature by documenting that the adoption of target ownership plans has a positive impact on the credibility of management forecasts.

Our paper may be of interest to members of compensation committees who design target ownership plans and institutional investors and other constituents who advocate equity ownership by managers as a laudable corporate governance practice to deter unethical behavior. For example, the Business Roundtable Principles of Corporate Governance¹ in 2005 recommends that compensation committees “establish requirements that senior management acquire and hold a meaningful amount of the corporation’s stock”.

The rest of the paper is organized as follows. Section 1 discusses the prior literature and develops the

hypotheses. Section 2 presents the research design and section 3 reports results. The final section concludes.

1. Prior literature and hypothesis development

1.1. Target ownership guidelines. In 1998, the New York Times reported that twenty percent of large U.S. companies had adopted ownership guidelines (Bryant, 1998). More recent data shows that the percentage of firms with formal target ownership policies has increased to around eighty percent and several other companies have stock retention requirements without formal ownership guidelines (Ayco, 2008). Proponents of mandated stock ownership policies argue that as senior managers increase their ownership interest in the firm, they will act in the firm’s best interest. Many corporate governance groups recommend and approve strong ownership targets for senior management. For example, the TIAA-CREF Policy Statement on Corporate Governance states, “Companies should require and specify minimum executive stock ownership requirements for directors and company executives”. Typically, only the top five executive officers and key managers are subject to share ownership requirements. In almost all cases, the required ownership guideline amounts are tiered by position level, with the CEO and sometimes one or two other key executives having the highest ownership requirement. In this study we focus on the CEO, since he dictates the firm’s disclosure policy and issues the earnings forecasts. We also focus on formal ownership plans expressed as a multiple of salary or as a specific number of shares and ignore those firms that recommend stock retention requirements but that do not have a formal ownership plan in place.

1.2. Target ownership guidelines, earnings informativeness, and quality and credibility of management forecasts. The entrenchment hypothesis predicts that as managerial share ownership increases to a critical level, the quality and the credibility of the accounting information is reduced because the manager becomes more entrenched in the firm (Fan and Wong, 2002). Beyond a certain level of ownership, however, the manager benefits less from self interested reporting and disclosure, because he bears a greater cost of the results of poor decision-making. The incentive alignment effect dominates the entrenchment effect and predicts that increasing the manager’s share ownership improves the alignment of interests between the shareholder and the manager (Warfield et al., 1995). The incentive alignment hypothesis predicts that if the firm adopts a target ownership plan that is designed to better align the interests of the manager with those of shareholders, earnings informativeness will improve.

¹ The Business Roundtable is an association of chief executive officers of leading corporations with a combined workforce of more than 10 million employees and \$4 trillion in annual revenues. The organization’s stated purpose is “advocating public policies that foster vigorous economic growth and a dynamic global economy”.

H1: Earnings informativeness is higher for firms that adopt a target share ownership plan.

Management forecasts of earnings are an important disclosure, as evidenced by the well documented market reaction to the release of these forecasts (Penman, 1980; Waymire, 1984; Ajinkya and Gift, 1984). The market reaction to disclosure depends both on the news it contains and on the extent to which the market trusts the information (Jennings, 1987). We define management forecast credibility as the degree to which a forecast is believable to investors (Jennings, 1987; Hutton et al., 2003; Mercer, 2004).

Several studies have examined the relationship between ownership structures and disclosure of management forecasts of earnings and provide conflicting results. These studies do not focus specifically on mandatory ownership. Ruland et al. (1990) find that as inside ownership increases, firms are less likely to provide management forecast of earnings. Conversely, Noe (1995) reports that firms with higher levels of managerial ownership are more likely to issue earnings forecasts prior to sales of shares by insiders. Gelb (2000) finds that the relation between managerial ownership and disclosure depends on the type of disclosure, and that as managerial ownership decreases, firms are more likely to receive higher disclosure ratings from analysts. Eng and Mak (2003) find that lower managerial ownership is associated with increased disclosure. They conclude that managerial ownership is a substitute for disclosure.

One possible reason for the conflicting results from this line of research is that the studies assume that managerial ownership and the quantity and quality of firms' disclosures are exogenously determined. Our research design examines the association between mandatory ownership and disclosure in a setting where the ownership levels are not in equilibrium. If target ownership plans better align the interests of the manager with those of shareholders, we predict that the accuracy and bias of management forecasts will improve.

H2: Management forecast accuracy and bias improve with the adoption of a target share ownership plan.

A larger price change in response to a management earnings forecast implies a larger change in the market's forecast of the present value of the firm's future cash flows (Anilowski et al., 2007). We investigate whether the market will recognize the benefits of mandatory managerial share ownership and lend more credibility to the voluntary disclosure of a management forecast of earnings. We expect investors to believe management forecasts more

after a target ownership plan is in place. If this is the case, we should see a stronger market reaction to management earnings forecasts after adoption of a target ownership plan.

H3: Management forecast credibility increases with the adoption of a target share ownership plan.

2. Research design

2.1. Sample. We identify all firms in the S&P 500 for the year 1995. We collect information on the existence of mandatory managerial ownership guidelines for these firms from 1995 to 2008 by examining firm proxy statements, giving a possible 7,000 firm year observations. We eliminate 114 firms or 1,596 firm-year observations that did not adopt a target ownership plan during this period. Next we obtain management forecasts from the First Call database. We eliminate further 222 firms or 2,603 firm-year observations because of insufficient management forecast data. We also eliminate 57 firms or 798 firm-year observations that suggest a target ownership plan but do not have formal guidelines in place because the CEO incentives would not be as strong for these firms. This leaves 107 firms and 1,498 firm-year observations for H1. Our final sample for the management forecast analyses in H2 and H3 consists of 2,320 management forecasts from 1995-2008 because firms issue multiple forecasts each year. All continuous variables are winsorized at the top and bottom one-percent level. Table 1, Panel A details the sample selection procedure.

Panel B of Table 1 provides some information on the target ownership guidelines imposed by our sample firms and the percentage of firms meeting these guidelines. The mean number of years that executives are allowed to meet the ownership guidelines is 4.5 years with a minimum of 2 and a maximum of 7 years. In the year of plan adoption, forty two percent of firms' CEOs meet the requirement. This percentage increases to sixty-three and seventy-eight percent in the first and second years following the target ownership plan, respectively. In the fifth year after the plan adoption, ninety-five percent of the sample firms have attained the ownership requirement.

Panel C of Table 1 presents the firm-year observations by the number of management forecasts for each year and by the existence of target ownership plans. The data shows the increase in ownership plans from 2002-2008. Before 2005, the majority of management forecasts were issued by firms with no ownership plans. After 2005, however most forecasts were issued by firms with a target ownership plan.

Table 2 presents descriptive statistics of the 2,320 management forecasts and 1,498 firm-year observations used in our analyses, respectively. Firms in our sample are large and have positive operating characteristics, consistent with expectations for S&P 500 firms. Firm-years with target ownership are slightly larger and report better performance as evidenced by higher return on total assets and return on total equity. However, target ownership firms report higher instances of negative earnings. Target firms are also more highly levered and have greater growth opportunities than the firm-year observations without a target ownership

plan. The average management forecast in our sample occurs about 4 months prior to the end of the predicted period. Management forecast error (*MFE*), measured as the forecasted earnings less actual earnings scaled by price, is negative, indicating that our sample exhibits an optimistic bias on average. Management forecast surprise (*MFSUR*), measured as the management earnings forecast less the most recent consensus analyst forecast, is negative on average as well, indicating that there is more bad news in our sample. This is not surprising since it is more costly for management to issue an optimistic forecast.

Table 1. Descriptive statistics of sample firms

Panel A: Sample selection procedure		Firm obs.	Management forecast obs.	Firm-year obs.
Initial sample of S&P 500 firms in 1995		500		7,000
Less: Firms that did not adopt a target ownership plan from 1995-2008		(114)		(1,596)
Less: Firms with insufficient management forecast data in First Call		(222)		(2,603)
Less: Firms with no formal target ownership plans		(57)		(798)
Final sample		107	2320	1498
Panel B: Target ownership requirements for sample firms				
Contractual mean time to meeting ownership requirements		4.5 years		
Contractual minimum time to meeting ownership requirements		2 years		
Contractual maximum time to meeting ownership requirements		7 years		
% of sample firms meeting target in adoption year		42		
% of sample firms meeting target one year after adoption year		63		
% of sample firms meeting target two years after adoption year		78		
% of sample firms meeting target three years after adoption year		81		
% of sample firms meeting target four years after adoption year		89		
% of sample firms meeting target five years after adoption year		95		
Panel C: Sample forecasts by year				
Year	Total number of forecasts	Forecasts where OWN = 1	Forecasts where OWN = 0	
1997	5	0	5	
1998	10	0	10	
1999	13	0	13	
2000	26	4	22	
2001	98	18	80	
2002	256	46	210	
2003	345	61	284	
2004	350	116	234	
2005	423	239	184	
2006	415	319	96	
2007	226	226	0	
2008	153	153	0	
Total	2320	1182	1138	

Table 2. Descriptive statistics

Variable	N	Mean	Median	Standard deviation	Difference in means (p-value)	Difference in medians (p-value)
Absolute management forecast error (<i> MFE </i>)						
<i>OWN</i> > 0	1182	0.002	0.001	0.004	< 0.0001	< 0.0001
<i>OWN</i> = 0	1138	0.002	0.001	0.006		
Full sample	2320	0.002	0.001	0.005		

Table 2 (cont.). Descriptive statistics

Variable		N	Mean	Median	Standard deviation	Difference in means (p-value)	Difference in medians (p-value)
Management forecast error (<i>MFE</i>)							
	<i>OWN</i> > 0	1182	0.001	0.001	0.004	0.1007	0.0032
	<i>OWN</i> = 0	1138	0.000	0.000	0.007		
	Full sample	2320	0.000	0.000	0.006		
Firm size (<i>SIZE</i>)							
	<i>OWN</i> > 0	774	9.337	9.271	1.210	< 0.0001	< 0.0001
	<i>OWN</i> = 0	724	8.816	8.882	1.359		
	Full sample	1498	9.024	9.054	1.326		
Return on assets (<i>ROA</i>)							
	<i>OWN</i> > 0	774	0.090	0.138	0.398	< 0.0001	0.1250
	<i>OWN</i> = 0	724	0.065	0.142	0.500		
	Full sample	1498	0.075	0.140	0.462		
Return on equity (<i>NI</i>)							
	<i>OWN</i> > 0	774	0.030	0.018	0.439	< 0.0001	< 0.0001
	<i>OWN</i> = 0	724	0.021	0.009	0.328		
	Full sample	1498	0.023	0.012	0.390		
Returns (<i>RET</i>)							
	<i>OWN</i> > 0	774	0.010	0.014	0.081	< 0.0001	0.1730
	<i>OWN</i> = 0	724	0.003	0.009	0.105		
	Full sample	1498	0.007	0.013	0.091		
Leverage (<i>LEV</i>)							
	<i>OWN</i> > 0	774	0.265	0.248	0.162	< 0.0001	0.0460
	<i>OWN</i> = 0	724	0.240	0.228	0.178		
	Full sample	1498	0.250	0.241	0.172		
Growth (<i>MTB</i>)							
	<i>OWN</i> > 0	774	3.965	2.745	5.192	< 0.0001	0.1140
	<i>OWN</i> = 0	724	3.585	2.945	5.913		
	Full sample	1498	3.737	2.860	5.638		
Negative earnings (<i>NEGEARN</i>)							
	<i>OWN</i> > 0	1182	0.007	0.000	0.082	< 0.0001	0.0491
	<i>OWN</i> = 0	1138	0.011	0.000	0.102		
	Full sample	2320	0.009	0.000	0.092		
Time to forecast period end (<i>TIME</i>)							
	<i>OWN</i> > 0	1405	126.063	77.000	93.664	< 0.0001	< 0.0001
	<i>OWN</i> = 0	1182	125.920	76.000	93.184		
	Full sample	2320	122.893	75.000	93.219		
Management forecast surprise (<i>MFSUR</i>)							
	<i>OWN</i> > 0	1182	-0.001	0.000	0.005	< 0.0001	0.0888
	<i>OWN</i> = 0	1138	-0.001	0.000	0.005		
	Full sample	2320	-0.001	0.000	0.005		
Absolute value of management forecast surprise (<i> MFSUR </i>)							
	<i>OWN</i> > 0	1182	0.002	0.001	0.004	< 0.0001	0.0049
	<i>OWN</i> = 0	1138	0.002	0.000	0.005		
	Full sample	2320	0.002	0.000	0.005		
Good news forecast (good)							
	<i>OWN</i> > 0	1182	0.363	0.000	0.481	< 0.0001	0.4454
	<i>OWN</i> = 0	1138	0.403	0.000	0.491		
	Full sample	2320	0.383	0.000	0.486		
Cumulative abnormal return (<i>CAR</i>)							
	<i>OWN</i> > 0	1182	0.002	0.004	0.056	< 0.0001	0.4454
	<i>OWN</i> = 0	1138	-0.002	0.001	0.067		
	Full sample	2320	0.000	0.003	0.062		

Note: See Appendix for variable definitions.

2.2. Management forecast credibility measures.

2.2.1. Management forecast bias and accuracy. We test whether the quality of management forecasts improves by examining the accuracy and bias in management forecasts before and after the adoption of a target share ownership plan. Bias is the signed management forecast error (*MFE*), measured as $[(Actual\ EPS_{it} - MF_{it}) / price_i]$ at the beginning of the fiscal year]. Management forecast accuracy is the absolute value of the bias measure ($|MFE| = [(|Actual\ EPS_{it} - MF_{it}|) / price_i]$ at the beginning of the fiscal year). We then rank observations based on the magnitude of the dependent variable and assign each to one of twenty quantiles, where quantile 1 is the lowest (smallest absolute management forecast error) and quantile 20 is the highest (largest absolute management forecast error). We use this method for this test in order to tame the data distributions for the dependent variables¹.

2.2.2. Management forecast credibility measure. We examine the stock price response to management earnings forecasts before and after the adoption of a target share ownership plan to determine whether the market lends added credibility to forecasts made by managers subject to share ownership requirements. Hutton et al. (2003) interpret a difference in management forecast announcement period returns as a difference in the information content of the disclosure, consistent with Pownall et al. (1993). They further interpret smaller cumulative abnormal returns as the market's perception of a less credible forecast. Similarly, we measure $CAR_{(-1, +1)}$ as the three-day cumulative market adjusted stock return around the management earnings forecast issuance date and infer that a stronger market reaction to a forecast indicates stronger market belief in the credibility of the forecast. The market index used is the CRSP NYSE/AMEX/NASDAQ equally weighted market index.

2.3. Research design. To test our first hypothesis, we use the earnings response coefficient (Fan and Wong, 2002). The model base model tested is as follows:

$$RET = \beta_0 + \beta_1 NI + \beta_2 NI \times OWN + \beta_3 NI \times SIZE + \beta_{4NI} \times LEV + \beta_5 NI \times MTB + \beta_6 NI \times NEGEARN + \sum \beta_i INDdum + \sum \beta_i YRDum + \varepsilon, \quad (1)$$

where *RET* is 12-month cumulative raw return ending three months after the fiscal year-end at *t*; *NI* is net income for year *t*, scaled by the market value of equity at the end of *t*-1; *OWN* is a dummy variable that equals 1 if a target ownership plan is in

place for that firm and year, and 0 otherwise; *SIZE* is the natural log of total assets at *t*; *ROA* is a net income at *t* divided by average total assets at *t*; *LEV* a firm leverage at *t*, measured as total liabilities divided by total assets; *MTB* is a year-end stock price multiplied by the number of shares outstanding divided by common stockholders' equity; *NEGEARN* is a dummy variable that equals one if net income is less than zero, and zero otherwise; *INDdum* is industry dummies based on two-digit SIC codes; *YRDum* are year dummies.

A significantly positive coefficient β_2 would indicate that the adoption of target managerial ownership is associated with more informative earnings.

All other variables are as defined above. The *t*-statistics reported are based on standard errors clustered by time and two-digit SIC code.

To test our second set of hypotheses, we estimate the following cross-sectional regressions:

$$MFE = \beta_0 + \beta_1 OWN + \beta_2 MFSUR + \beta_3 OWN \times MFSUR + \beta_4 GOOD + \beta_5 NEGEARN + \beta_6 TIME + \sum \beta_i YRDum + \varepsilon, \quad (2)$$

$$|MFE| = \beta_0 + \beta_1 OWN + \beta_2 |MFSUR| + \beta_3 OWN \times |MFSUR| + \beta_4 GOOD + \beta_5 NEGEARN + \beta_6 TIME + \sum \beta_i YRDum + \varepsilon, \quad (3)$$

where $|MFE|$ is the rank of the absolute value of management forecast error, measured as $[(|Actual\ EPS_{it} - MF_{it}|) / price_i]$ at the beginning of the fiscal year]; *MFE* is the rank of the management forecast error, measured as $[(Actual\ EPS_{it} - MF_{it}) / price_i]$ at the beginning of the fiscal year]; *TIME* is the length of time in days from the management forecast to the actual earnings announcement; *GOOD* is indicator variable coded 1 if *MFSUR* > the most recent consensus analyst earnings forecast prior to the management forecast date and 0 if *MFSUR* < the most recent consensus analyst earnings forecast prior to the management forecast date; $|MFSUR|$ is $|(management\ earnings\ forecast - the\ most\ recent\ consensus\ analyst\ earnings\ forecast\ prior\ to\ the\ management\ forecast\ date) / price_i]$ at the beginning of the fiscal year].

All other variables are as defined above.

We expect the β_1 coefficient to be positive in equation (2) and negative in equation (3). Since the bias in management forecast error (*MFE*) is measured as actual earnings minus the management forecast, a negative value indicates an optimistic forecast while a positive value indicates a pessimistic forecast. We expect forecasts to be less positively biased following the adoption of a target share

¹ There is no significant change in results when continuous independent variables are also ranked and assigned to 20 quantiles in testing hypotheses 2 and 3.

ownership plan, which would be reflected as a positive relation between OWN and MFE . We expect the magnitude of the error ($|MFE|$) to be smaller following the adoption of a target share ownership plan, which would be reflected as a negative relation between OWN and $|MFE|$.

It is also possible that the relation here is indirect. Forecast accuracy and bias may be improved most in situations where they were likely to be very poor. One such case is when the surprise in the management forecast is large. We expect the forecast accuracy and/or bias to be better for surprising management earnings forecasts made after the adoption of a target ownership plan, implying a positive β_3 coefficient in equation (2) and a negative β_3 coefficient in equation (3).

We control for the length of time until the announcement of actual earnings ($TIME$). This will affect both management forecast accuracy and bias since it will be easier to predict the outcome as the date approaches (Lang and Lundholm, 1996). We include good news ($GOOD$) and negative earnings ($NEGEARN$) as controls because good news is inherently less credible than bad (Hutton et al., 2003; Mercer, 2004) and because negative earnings are more difficult to forecast (Brown, 2001). Additionally, Hayn's (1995) finding that earnings are not related to stock returns for loss firms also implies that negative earnings will be less useful for predicting future earnings (Miller, 2005). We also include year dummies ($YRdum$) in each of our regressions to control for differences across the years in our sample. The surprise in the current management forecast ($|MFSUR|$) is included since the size of the forecast surprise is likely to affect all the relations we examine in this study. Surprising management forecasts may be less accurate (Ajinkya et al., 2005).

To test our third hypothesis, we estimate the following cross-sectional regression:

$$\begin{aligned} CAR_{-1,1} = & \beta_0 + \beta_1 OWN + \beta_2 |MFSUR| + \\ & + \beta_3 OWN \times |MFSUR| + \beta_4 GOOD + \\ & + \beta_5 NEGEARN + \beta_6 TIME + \beta_7 MFE + \\ & + \sum \beta_i YRdum + \varepsilon, \end{aligned} \quad (4)$$

where CAR is the market weighted cumulative abnormal return from 1 day before to 1 day after the management earnings forecast release date using the CRSP NYSE/AMEX/NASDAQ equally weighted market index.

We expect the β_1 coefficient to be positive, indicating a stronger market reaction to management forecasts made after the adoption of a target share

ownership plan. Consistent with Hutton et al. (2003), we interpret this as evidence of added credibility of the management forecast when ownership is forcibly increased.

As in H2, it is also possible that the relation here is indirect. Management forecast credibility is likely to improve most in instances where credibility is low to begin with. One such case is when the surprise in the management forecast is large. We expect the magnitude of the market reaction to increase more for surprising management earnings forecasts made after the adoption of a target ownership plan, implying a positive β_3 coefficient in equation (4).

3. Results

3.1. Earnings informativeness. Table 3 reports the results that examine earnings informativeness for firms that adopt a target ownership plan. The table reports results based on standard errors clustered by industry and time. The adjusted R^2 value of the regression is 3.7 percent. The coefficient on net income (NI) of 0.011 is positive and significant with a p -value < 0.001. The coefficient on the test variable ($NI_i \times OWN_i$) is 0.003 with a p -value < 0.001. The result indicates that relative to the time period before the adoption of a target ownership plan, the earnings response coefficient for firms is higher after plan adoption. In sum, the results in Table 3 show that earnings informativeness improves after mandatory ownership plan adoption.

Table 3. Relation between the earnings informativeness and the adoption of a target ownership plan

$$\begin{aligned} RET = & \beta_0 + \beta_1 NI + \beta_2 NI \times OWN + \beta_3 NI \times SIZE + \\ & + \beta_4 NI \times LEV + \beta_5 NI \times MTB + \beta_6 NI \times NEGEARN + \\ & + \sum \beta_i INDdum + \sum \beta_i YRdum + \varepsilon. \end{aligned}$$

Variable	Predicted sign	Coefficient estimate (p-value)
Intercept	+/-	0.012 (0.587)
NI	+	0.011*** (0.000)
$NI \times OWN$	+	0.003*** (0.001)
$I \times SIZE$	+/-	-0.001*** (0.002)
$NI \times LEV$	+/-	0.001 (0.385)
$NI \times MTB$	+/-	0.001*** (0.000)
$NI \times NEGEARN$	+/-	0.007*** (0.005)
N		1498
Adj. R^2		0.037

Notes: ***, **, and * indicate one-tailed statistical significance at the 1%, 5%, and 10% levels, respectively, when predicted sign is either "+" or "-" and two-tailed significance otherwise. See Appendix for variable definitions.

3.2. Management forecast accuracy. Results for H₂ are presented in Tables 4 and 5. This set of hypotheses predicts that management forecast accuracy and bias will improve following the adoption of a target share ownership plan. We find support for both predictions.

Results in Table 4 indicate that surprising management forecasts are less positively biased after a target ownership plan is in place. In Model 1, the insignificant β_1 coefficient reveals no evidence of a direct relation between ownership guidelines and bias in management forecasts. However, in Model 2, the magnitude of the β_3 coefficient, -153.308, multiplied by the average absolute surprise in management forecasts ($|MFSUR|$) of .002 indicates that a management forecast would be ranked .27 “quantiles” lower on the 1-20 scale of management forecast error (MFE) after the adoption of a target ownership plan (i.e. the forecast is less positively biased).

Table 4. Relation between management forecast error and the adoption of a target ownership plan

$$MFE = \beta_0 + \beta_1 OWN + \beta_2 MFSUR + \beta_3 OWN \times MFSUR + \beta_4 GOOD + \beta_5 NEGEARN + \beta_6 TIME + \Sigma \beta_i YRdum + \varepsilon$$

Variable	Predicted sign	Model 1	Model 2
Intercept	+/-	8.318*** (0.000)	8.420*** (0.000)
OWN	+	0.130 (0.660)	0.227 (0.443)
MFSUR	+/-	-89.784*** (0.000)	-153.308*** (0.000)
OWN*MFSUR	+		142.636*** (0.003)
Good	-	0.576 (0.020)	0.551 (0.026)
NEGEARN	-	-2.905** (0.018)	-2.822*** (0.022)
TIME	+/-	0.002 (0.053)	0.002 (0.054)
Yrdum		Included	Included
N		2320	2320
Adj. R ²		0.086	0.089

Notes: ***, **, and * indicate one-tailed statistical significance at the 1%, 5%, and 10% levels, respectively, when predicted sign is either “+” or “-” and two-tailed significance otherwise. This regression is an OLS regression conducted on 20 quantile ranks of the MFE variable. Each firm in the sample has adopted a target ownership plan and has some forecasts that occur before adoption of the plan and some that occur after, eliminating the need for firm-specific controls. See Appendix for variable definitions.

Results in Table 5 reveal lower absolute management forecast error for forecasts made after adoption. The β_1 coefficient on ownership (OWN) is significant both Models 1 and 2. The magnitude of the β_1 in Model 1 indicates that a management forecast would be ranked .98 “quantiles” lower on the 1-20 scale of absolute value of management

forecast error ($|MFE|$) after the adoption of a target ownership plan (i.e. the forecast is more accurate). The insignificant coefficient on the interactive variable (OWN × MFSUR) indicates that this relation does not vary based on forecast surprise.

Table 5. Relation between absolute value of management forecast error and the adoption of a target ownership plan

$$|MFE| = \beta_0 + \beta_1 OWN + \beta_2 |MFSUR| + \beta_3 OWN \times |MFSUR| + \beta_4 GOOD + \beta_5 NEGEARN + \beta_6 TIME + \Sigma \beta_i YRdum + \varepsilon$$

Variable	Predicted sign	Model 1	Model 2
Intercept	+/-	8.334*** (0.000)	8.352*** (0.000)
OWN	-	-0.976*** (0.000)	-0.910*** (0.001)
MFSUR	+	191.336*** (0.000)	210.098*** (0.000)
OWN* MFSUR	-		-42.576 (0.355)
Good	+	0.632*** (0.004)	0.629*** (0.004)
NEGEARN	+	5.384*** (0.000)	5.402*** (0.000)
TIME	+	0.021*** (0.000)	0.021*** (0.000)
N		2320	2320
Adj. R ²		0.223	0.223

Notes: ***, **, and * indicate one-tailed statistical significance at the 1%, 5%, and 10% levels, respectively, when predicted sign is either “+” or “-” and two-tailed significance otherwise. This regression is an OLS regression conducted on 20 quantile ranks of the $|MFE|$ variable. Each firm in the sample has adopted a target ownership plan and has some forecasts that occur before adoption of the plan and some that occur after, eliminating the need for firm-specific controls. See Appendix for variable definitions.

Overall our results support the lower optimism and increased accuracy predicted in H₂. These findings suggest that the reliability of one type of voluntary disclosure, management forecasts, improves when firms adopt a target ownership plan.

3.3. Management forecast credibility. Results for H₃ are presented in Table 6. This hypothesis predicts that the credibility of management forecasts of earnings, as measured by the 3-day cumulative abnormal return surrounding the forecast announcement date, will improve following the adoption of a target share ownership plan. We find support for this hypothesis in instances where the management forecast would lack credibility ex ante due to the magnitude of surprise in the forecast.

There is no direct relation between the adoption of a target share ownership plan and the market reaction to a management forecast (the β_1 coefficient on ownership (OWN) is not significant). However,

Model 2 shows a significantly positive β_3 coefficient (p -value < 0.0001), indicating that the credibility of forecasts that are more surprising to the market is enhanced by the adoption of a target ownership plan.

Table 6. Relation between the market reaction to a management forecast and the adoption of a target ownership plan

$$CAR_{-1,1} = \beta_0 + \beta_1 OWN + \beta_2 |MFSUR| + \beta_3 OWN \times |MFSUR| + \beta_4 GOOD + \beta_5 NEGEARN + \beta_6 TIME + \beta_7 MFE + \sum \beta_i YRdum + \varepsilon$$

Variable	Predicted sign	Model 1	Model 2
Intercept	+/-	-0.014** (0.025)	-0.015** (0.015)
OWN	+	0.001 (0.762)	-0.004 (0.272)
IMFSURI	+/-	-1.632*** (0.000)	-2.940*** (0.000)
OWN*IMFSURI	+		2.969*** (0.000)
Good	+	0.023*** (0.000)	0.023*** (0.000)
NEGEARN	-	-0.038*** (0.005)	-0.039*** (0.003)
TIME	-	0.000* (0.063)	0.000** (0.048)
MFE	-	0.001*** (0.000)	0.001*** (0.000)
N		2320	2320
Adj. R ²		0.083	0.094

Notes: ***, **, and * indicate one-tailed statistical significance at the 1%, 5%, and 10% levels, respectively, when predicted sign is either "+" or "-" and two-tailed significance otherwise. Each firm in the sample has adopted a target ownership plan and has some forecasts that occur before adoption of the plan and some that occur after, eliminating the need for firm-specific controls. See Appendix for variable definitions.

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Conclusions

Our study reveals important benefits for firms adopting a target share ownership plan. No prior research has explored the effects of mandatory share ownership plans on earnings informativeness, management forecast quality and management forecast credibility.

We find support for our first hypothesis that earnings informativeness improves when firms adopt a target ownership plan. We also find support for more accurate and less optimistically biased management forecasts of earnings following the adoption of an ownership plan. These findings may be useful to compensation committees in weighing the costs and benefits of adoption of mandatory share ownership plans.

Finally, we find evidence that the market recognizes the disclosure benefits of target share ownership plans. In the two years following adoption of a plan, we see larger stock returns surrounding the release of surprising management earnings forecasts than in the two year preceding plan adoption. This suggests that firms receive an added benefit of improved credibility of voluntary disclosures when they require mandatory ownership. Furthermore, this may also reduce costs associated with external monitoring that is necessary when a firm is unable to make credible voluntary disclosures.

Our study is limited in several ways. We examine only one type of voluntary disclosure, management forecasts of earnings, and cannot extend our findings to other types of voluntary disclosures. Second, we examine only S&P 500 firms and cannot extend our findings to smaller firms which have different disclosure environments and agency problems.

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Appendix

Table 1. Variable definitions

$ MFE $	The absolute value of management forecast error variable ($ MFE $) is $[(Actual\ EPS_t - MF_t) / price_t \text{ at the beginning of the fiscal year}]$.
MFE	The management forecast error (MFE) is $[(Actual\ EPS_t - MF_t) / price_t \text{ at the beginning of the fiscal year}]$.
CAR	The market weighted cumulative abnormal return from 1 day before to 1 day after the management earnings forecast release date using the CRSP NYSE/AMEX/NASDAQ equally weighted market index.
OWN	A dummy variable equal to 1 if a target ownership plan is in place.
$TIME$	The time to forecast period end ($TIME$) is the length of time in days from the management forecast to the actual earnings announcement.
$NEGEARN$	Negative earnings ($NEGEARN$) is an indicator variable for the sign of earnings, coded 1 for negative earnings values and 0 for nonnegative values.
$MFSUR$	The surprise component of total news in the management earnings forecast ($MFSUR$) is the management earnings forecast less the most recent consensus analyst earnings forecast prior to the management forecast date, scaled by $price_t$ at the beginning of the fiscal year.
$ MFSUR $	The absolute value of the surprise component of total news in the management earnings forecast ($ MFSUR $) is $ (\text{Management earnings forecast} - \text{the most recent consensus analyst earnings forecast prior to the management forecast date}) / price_t \text{ at the beginning of the fiscal year} $.
$GOOD$	Good news ($GOOD$) is an indicator variable coded 1 if $MFSUR >$ the most recent consensus analyst earnings forecast prior to the management forecast date and 0 if $MFSUR <$ the most recent consensus analyst earnings forecast prior to the management forecast date.
$SIZE$	Natural log of total assets at t .
ROA	Net income at t divided by average total assets at t .

Table 1 (cont.). Variable definitions

<i>LEV</i>	Total liabilities at time t divided to total assets at time t .
<i>MTB</i>	Year-end stock price \times shares outstanding divided by common stockholder's equity.
<i>RET</i>	12-month cumulative raw return ending three months after the fiscal year-end.
<i>NI</i>	Net income for year t , scaled by the market value of equity at the end of $t-1$.
<i>VOL</i>	Standard deviation of raw returns for year t .

Note: All continuous variables are winsorized at the 1% level.