

SIMULTANEOUS SIGNALING, INSIDER OWNERSHIP AND EARNINGS MANAGEMENT

MINWOO LEE

ABSTRACT: This study examines the signaling effect of direct disclosure of expected earnings and insider ownership in two aspects: market valuation and signaling cost. Although the disclosure of earnings and insider ownership retention operate as signaling devices, they also have to do with non-signaling aspects. These aspects include earnings management, agency effect, and value effect. In order to distinguish the signaling effects from non-signaling forces, this study analyzes the effects of the variables within a comprehensive framework. The framework also establishes a connection between the cost aspect of signaling and earnings management. The empirical results suggest that the market positively reacts to the earnings forecast disclosure and insider ownership (signaling effect), and the level of earnings forecast substitutes with that of insider ownership (substitution effect). It is also found that earnings forecast disclosure is positively related to the extent of earnings management (signaling cost aspect). The results also show that insider ownership further relates to non-signaling effects: firm value positively affects insider ownership (value effect), but not vice versa. However, the effect of earnings management on insider ownership and the agency effect (insider ownership affects firm value) are not supported.

INTRODUCTION: PRIOR STUDIES AND RESEARCH ISSUES

There exists information asymmetry between a firm and investors: the manager of the firm has private information about the future prospects of the firm (firm value). This information asymmetry gives rise to the adverse selection problem described in Arkerlof (1970) in that all firms are valued at the average firm value. This is because investors do not possess information to distinguish between high and low-value firms. Firms may provide investors with the firm value information. However, since firm value is not directly verifiable, a manager with high firm value faces a problem of how he or she can credibly signal the private information to investors, so that the firm's securities are not undervalued.

Previous literature has proposed several types of mechanisms to signal firm value. Leland and Pyle (1977) suggest, in the initial public offering setting, that entrepreneurs can signal firm value through the retention of a percentage of the firm's ownership. The entrepreneur, who is assumed to be risk-averse, prefers less ownership for a risky (uncertain as to realization of cash flow in the future) project, but he or she is willing to retain some of that risk in order to signal the private information of the firm. They hypothesize that the better his or her firm value is, the larger ownership percentage he or she retains. Downs and Heinkel (1982) provide empirical support to this hypothesis.

Titman and Trueman (1986) and Datar et al. (1991) theoretically model the quality of the auditor or investment banker associated with the firm as a signal for firm value. These signals are considered credible since high quality auditors or investment

bankers are more likely to uncover and disclose adverse information about the firm. Thus, a more credible auditor or investment banker provides investors with more assurance about the disclosed information about the firm. Effectively, they are employed to certify that the issue price is consistent with inside information about future prospects of the firm. This certification hypothesis was empirically supported by Beatty (1989), Krinsky and Rotenberg (1989), Menon and Williams (1991), and Feltham et al (1991).

Signaling theory is based on two fundamental premises: market valuation relevance (the market reacts positively to signals) and the costs of signaling (false signaling faces substantial negative consequences). Existing studies have largely focused on the market valuation relevance of signals. Also, proposed signaling devices in the past literature have been largely limited to exogenous signaling devices, such as auditor or investment banker quality. With exogenous signaling devices, firm value is indirectly implied by a variable which bears no direct relationship to it.

This study focuses on endogenous signaling devices, direct disclosure of firm value as well as insider ownership. The direct disclosure is comparable to a contingent contract, such as a money-back guarantee in the product market, that induces truthful disclosure since the seller will be responsible if the actual quality turns out to be poor compared to the disclosure/advertisement. In the securities market, the manager makes a disclosure about the firm's prospects and investors value the firm based on the disclosure. The firm is penalized (sued or in other ways as discussed in the next section) if the realized value is sufficiently low relative to the disclosure. The credibility of the disclosure is assumed to follow from its cost, the threat of penalty imposition. Hughes (1986) suggests that such contingent contracts are economically efficient because costly exogenous signals are not necessary.

There have been only a few studies that examine the cost aspect of signaling. Since signals are costly, they carry credibility and discriminate higher and lower-value firms (for the lower-value firm, the level of a given signal chosen by the higher-value firm is too costly to choose in order to mimic the higher-value firm). Given that most past studies have dealt with exogenous signals, the cost aspect of signaling has not been the focus of research. Recently, Li and McConomy (2000) empirically examine a signaling model that simultaneously employs multiple signals, earnings forecast disclosure and insider ownership. The simultaneous signaling model is theoretically suggested by Hughes (1986). They argue that managers choose the level of each signal based on the relative costs and benefits associated with the signals and employ the least costly combination of the multiple signals.

PURPOSES OF THIS STUDY AND INTENDED CONTRIBUTIONS

This study examines both the market valuation relevance and cost aspects of signaling. The findings by Li and McConomy (2000) suggest that there is a substitution effect between insider ownership and earnings forecast as firm value signals. However, they do not examine whether the two variables actually possess valuation relevance in the first place. The most critical weakness of existing empirical studies is that they examine only one aspect of signaling. This study examines the relationships between the two variables, and at the same time it also investigates whether the market reacts to the signals (market valuation relevance).

While Li and McConomy deal with the least costly combination of signals, this study additionally explores the possibility that the signaling cost itself can be reduced with the use of earnings management (manipulation). This research examines with a situation where the manager issues an earnings forecast to signal firm value and engages in earnings management. The earnings management literature suggests that forecasting firms systematically manage earnings to move reported income towards the forecasted figure (Sohn 1994, Lee 1998). Therefore, the signaling cost resulting from the disclosure can be reduced by accounting discretion exercised by the manager. The interactions among earnings forecast, insider ownership, and earnings management are explored in this study.

In an effort to provide a comprehensive picture, two additional factors revolving around insider ownership are also considered. While a number of studies have examined the effect of insider ownership as a signal, empirically their findings may be also driven by non-signaling effects. Agency theory suggests that insider ownership is used to reduce agency costs in the firm (Jensen and Meckling 1976, Morck et al. 1988). Also, Cho (1998) and Lee and Cho (2000) empirically confirm, for seasoned and initial public offering firms respectively, that given firm value, the insider ownership level is determined by the manager's desire to keep his or her wealth in the firm in order to maximize the manager's wealth (value effect). The two effects described above pertain to two non-signaling needs. However, existing studies fail to distinguish between signaling and non-signaling effects. This study separates the signaling aspect of insider ownership retention from the non-signaling aspect.

This study intends to contribute to the signaling and earnings forecast literature by presenting a rich and comprehensive picture incorporating the issue of earnings management in the signaling context. The whole picture contains market valuation relevance, signaling cost, earnings management, agency effect, and value effect. Simultaneous signaling with earnings forecast and insider ownership can only be well understood in the whole picture. Therefore, providing the first comprehensive empirical evidence would enhance our understanding of earnings forecasts, insider ownership, and earnings management. Recent corporate failures have forced investors to be wary of untruthful disclosures and potential earnings manipulation. Thus, increasing investor distrust and the paucity of research on this issue also underscore the importance of this study.

The results of this study have potential practical implications. For any investigative groups (auditors, investment bankers, courts, etc.), in investigating whether a disclosed earnings forecast is truthful, it is essential to understand how the manager signals firm value in relation with other factors. This study regarding how disclosures are used by managers and perceived by investors would provide a more reasonable basis for assessing legal liabilities of the manager or related parties like the investment banker and auditor. For investors, the implications of this study are also meaningful as investors try to estimate the true value of the firm. Given that firm value is a function of future earnings, the results may suggest that forecasted earnings should be discounted for possible manipulation.

The remainder of the paper is organized as follows. The next section describes a comprehensive model and presents researchable hypotheses. The ensuing two sections, respectively, present the research methodology and empirical results. The final section

summarizes the results and concludes the paper with a discussion of limitations and future research directions.

THE MODEL AND HYPOTHESES

A MODEL OF SIGNALING BY EARNINGS FORECAST AND EARNINGS MANAGEMENT

A model of signaling-earnings management is presented as the basis for research questions. Consider a single-period world in which a manager of a firm has a risky project that yields random earnings at the end of the period. Assume that only the manager knows the expected value of future earnings. The manager sends signals for firm value by making a disclosure of firm value in the form of earnings forecast and insider ownership simultaneously.

After the forecast has been disclosed, the expected realization of future earnings is revised based on new information available to the manager. This new expectation is not disclosed again in the form of a new forecast. During the period, the manager may engage in earnings management. At the end of the period, actual earnings are realized and reported to the market. Negative consequences will occur if the forecast turns out to be inaccurate (different from the reported earnings). The stages in the signaling process are as follows:

1. The manager observes firm value (the expected value of future earnings).
2. The manager sends signals for firm value using an earnings forecast and insider ownership.
3. Based on new information subsequently available to the manager, the expectation of earnings realization is revised. The manager engages in earnings management to move reported earnings toward the previous forecast. The extent of earnings management is private knowledge for the manager.
4. Actual earnings are realized and reported.
5. If the forecast proves to be ex-post inaccurate, adverse consequences will occur.

MARKET VALUATION RELEVANCE

The earnings forecast carries credibility since it is costly. The market could verify the veracity of a forecast and impose a penalty if the manager is found to have issued an inaccurate forecast. Such signaling costs take several forms. Under the current institutional environment, the forecasting firms are liable for ex-post inaccurate earnings forecasts. A stock price decline associated with a significantly inaccurate forecast may instigate lawsuits.¹ Despite current safe harbor rules, the courts have staunchly maintained that forecasting firms are responsible for ex-post inaccurate forecasts even though the forecasts were made in good faith (Hughes 1986).

Another important form of negative consequences of inaccurate forecasts is detrimental effects on the reputation held by the manager. Balachandran and Sivaramakrishnan (1990) interpret the utility loss from issuing an ex-post inaccurate forecast as a loss in credibility with respect to subsequent forecasts made by the manager. Also, Alrai et al. (1988) show that the market, once conditioned to the accuracy level and precise mode of a forecaster, considers the forecast accuracy in its

interpretation of future forecasts. Inaccurate forecasts damage the manager's reputation for accurately predicting future events. Since these damaging effects are of direct concern to the manager, clearly the manager has an incentive to reduce the above signaling costs. In this situation as described in the model, managers have an incentive to exercise earnings management in order to manipulate (increase or decrease) reported earnings toward the forecasted figure.

Sohn (1993) investigates the impact of inaccurate forecasts on the market valuation of securities. He shows that forecasts that prove to be ex-post in error adversely affect the market prices of securities.

These signaling costs make earnings forecast credible, and therefore the market reacts to the forecast. For insider ownership, the credibility comes from the manager's willingness to forego the benefits of diversification by retaining some ownership in the firm. The manager can hold more shares only when firm value (earnings) is the higher.

Regarding the market valuation relevance of these two signals, Clarkson et al. (1992) find that both variables have a positive impact on the valuation. The first research question is whether the management earnings forecast and insider ownership carry credibility, given that the manager has an opportunity to manage reported earnings ex-post. If the signal has credibility, they are relevant in the market valuation (i.e., positive market reactions to the signals). This question is to be addressed with the following base hypothesis:

H1: The market positively reacts to the management earnings forecast disclosure and insider ownership retention.

COST ASPECT

Prior research has examined the benefit aspect of signaling models by focusing on the valuation impact of signaling devices. Like Li and McConomy (2000), this study examines the cost aspect of signaling with multiple signals, earnings forecast and insider ownership. However, this study investigates the market valuation aspect also at the same time. Also, the valuation and cost aspects are examined within a comprehensive picture including earnings management, value effect, and agency effect (to be discussed below).

Given that there are two signals for one attribute, the manager is likely to signal firm value in an efficient manner with the least costly combination of the signals. In equilibrium, there is trade-off between the signals, such that an increase in one signal results in a decreased need for the other signal (Hughes 1986). This trade-off or substitution effect, is a key empirical implication of simultaneous signaling. As noted by Li and McConomy (2000), the substitution effect cannot be inferred directly from valuation aspect studies. The trade-off between the signals suggests the following hypothesis:

H2: The level of earnings forecast substitutes with that of insider ownership, and vice versa.

Given that both earnings forecast and insider ownership are the signals for future earnings, the signaling costs depend on the actual earnings realization at the end of a given period. The signaling costs (as discussed previously) can be mitigated with

earnings management. It is found that managers engage in earnings management in situations where actual earnings are expected to deviate from their forecasts (Sohn 1994, Lee 1998, Lee 2004).

With the use of earnings management, the manager is able to report earnings that are more consistent with the forecasted figure. Therefore, the signaling costs associated with the higher forecast figure and higher insider ownership level become less costly to the manager. Thus, the manager can use these signals more heavily. The above discussion leads to the following researchable implications:

H3: With other variables being held constant, both the level of earnings forecast and that of insider ownership are positively related to the extent of earnings management.

AGENCY AND VALUE EFFECTS ASSOCIATED WITH INSIDER OWNERSHIP

While insider ownership can be a signal for firm value, there are other effects revolving around insider ownership. Jensen and Meckling (1976) predict that insider ownership affects firm value. They argue that the value of the firm increases as the managers' stake in the firm's future earnings increases because larger managerial equity ownership helps to align the incentives of managers with those of outside shareholders, as managers bear direct wealth consequences from their decisions (agency effect). Morck et al. (1988) empirically confirm the prediction.

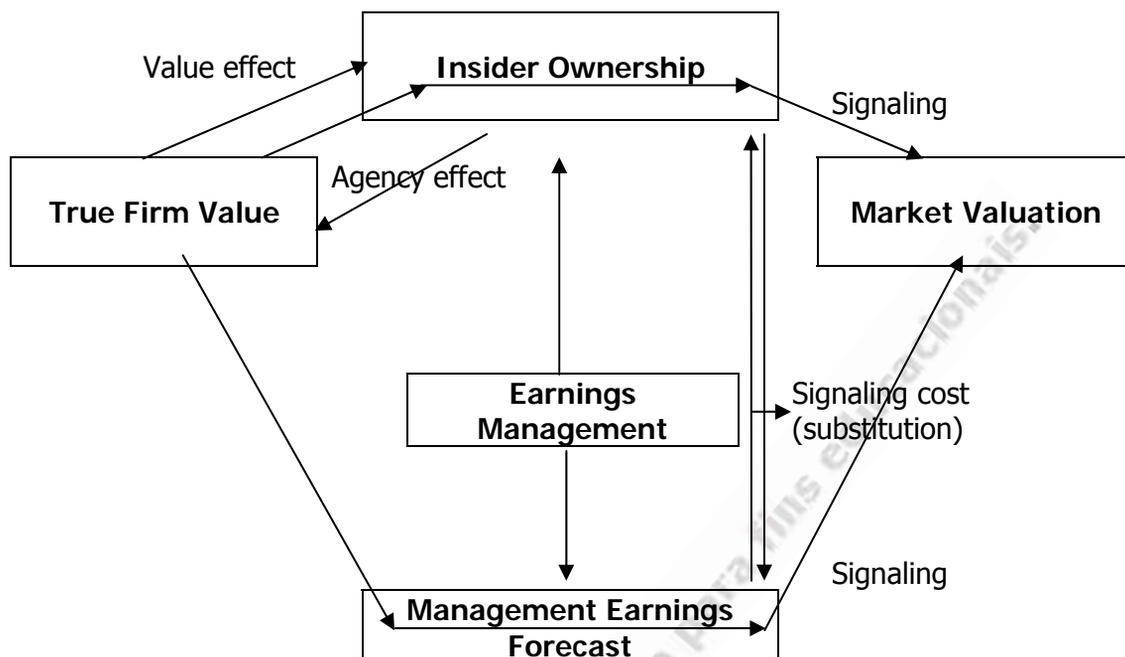
This agency effect must be differentiated from the signaling effect. The agency effect pertains to the effect of insider ownership on firm value. Firm value is different from market valuation, which has to do with the signaling effect. Signaling is a process of revealing firm value for a favorable market valuation. Although closely related to each other, the agency effect has to be analyzed independently from the signaling effect within the common framework. This issue is first raised by Lee and Cho (2000) in the context of initial public offering.

The other effect to be considered is the value effect. Relating to this issue is an important study by Cho (1998). He raises the endogeneity issue of insider ownership, and shows that firm value determines insider ownership, not vice versa. His finding challenges the agency effect (which treats insider ownership as an exogenous variable). His argument is that if firm value is higher, the manager keeps the higher portion of ownership to maximize his or her wealth. The value effect also has to be included in the analysis to distinguish it from the signaling effect.

Taken together, the findings of Cho and the results of previous studies lead to a suspicion that insider ownership and firm value may be interdependent. Therefore, the following predictions are tested for the agency and value effects:

H4: Insider ownership positively affects firm value (agency effect), and vice versa (value effect).

Figure 1
Comprehensive Picture of Simultaneous Signaling,
Insider Ownership and Earnings Management



COMPREHENSIVE PICTURE AND ENDOGENEITY ISSUE

Management earnings forecast and insider ownership can be used as firm value signals. However, a number of relating effects revolve around the two signals (signaling, earnings management, agency, and value effects). Therefore, it is necessary to separate the signaling effect from the other effects in force. This separation can be done only within a comprehensive framework of analysis. Since these effects occur simultaneously, any individual effect can be analyzed within the framework (comprehensive picture). For that reason, a simultaneous equation system is used to include all possible effects and to meaningfully separate the individual effects.

The simultaneous equation system also makes it possible for this study to address efficient signaling by examining the substitution effect between the two firm value signals. An ordinary regression setup would be such that one variable is the dependent variable and the other (independent variable) is treated as exogenously given. To the extent that the other variable (treated as independent in ordinary regression) is endogenously determined, the ordinary regression yields inconsistent coefficients.

In addressing the direction of causality (agency vs. value effects), the simultaneous equation approach takes interdependency (endogeneity and simultaneity) into consideration. This procedure makes it possible to avoid a false attribution of causality and misinterpretation of the relation between the two variables of interest. Figure 1 depicts the effects to be studied in this research. As discussed, the figure

shows links among the signaling effects, the substitution effect, earnings management, the firm value effect and the agency effect.

DATA

SAMPLE SELECTION AND EARNINGS FORECASTS DATA

The sample is to be selected from forecasts included in the Dow Jones News Retrieval Service. To be included in the sample, forecasts should be attributed to corporate officials, and they should be point estimates (rather than range estimates). The sample period is from 1996 to 2000.

MEASUREMENT OF KEY VARIABLES AND DATA SOURCES

Stock prices represent the market valuation. The stock price data of forecasting firms are obtained from the CRSP tapes.

The insider ownership variable is proxied by the percentage of voting stock owned by the company's officers and directors. The ownership information is obtained from *The Value Line Investment Survey*, *Standard and Poor's Corporation Records*, and proxy statements.

The measure of firm value is Tobin's Q, which is defined as the ratio of market value of the firm compared to replacement cost of assets.² The Tobin's Q measure is computed by the algorithm proposed by Lindenberg and Ross (1981).

MEASURE OF EARNINGS MANAGEMENT

Earnings management can be achieved in various ways such as through the use of accruals, changes in accounting methods, and changes in capital structure. The ideal research design would enable the researcher to observe the set of feasible accounting choices available to managers in order to assess whether their ultimate decisions resulted in higher or lower income than would otherwise have been reported. Since the earnings figure that would have been reported without manipulation is not directly observable, a surrogate variable for the extent of income manipulation should be developed.

A number of models for detecting earnings management have been developed. Dechow et al. (1995) evaluate the performance of existing models and conclude that the Jones (1991) model as modified by them exhibits the most power in detecting earnings management. This study uses the modified Jones model to estimate the discretionary accrual.

To measure the extent of income manipulation, discretionary accruals are estimated using the modified Jones model. The discretionary accruals are defined as the estimated error term of the following regression:

$$TA_{jt}/A_{jt-1} = \alpha_j [1/A_{t-1}] + \beta_{1j} [(\Delta RV_t - \Delta REC_t)/A_{t-1}] + \beta_{2j} [PPE_{jt}/A_{jt-1}] + \varepsilon_{jt} \quad (1)$$

where:

TABLE 1
Descriptive Statistics for Regression Equation Coefficients^a
of the Modified Jones Model

Variable	Mean	Std Dev	Median	Min	Q1	Q3	Max
Constant	2.103	12.456	0.412	-13.533	-0.452	5.248	38.631
<i>t</i> -stat.	0.224	0.992	0.234	-2.784	-0.416	1.005	3.426
$\Delta RV - \Delta REC$	0.315	0.162	0.273	-0.624	0.012	0.202	1.246
<i>t</i> -stat.	1.615	1.763	1.425	-2.283	0.248	2.173	9.032
PPE	-0.083	0.203	-0.259	-0.683	-0.173	-0.042	0.482
<i>t</i> -stat.	-1.761	1.992	-1.509	-3.389	-0.480	-0.309	1.990
n	13.70	1.520	12	10	13	15	14
<i>Adj R</i> ²	0.261	0.291	0.298	0.098	0.193	0.538	0.781

^a Statistics shown are those for the estimated coefficients, α_1 s, β_1 s, and β_2 s in equation 1

- TA_{jt} = total accrual in year t for firm j measured as [Δ Current Assets $_{jt}$ – Δ Cash $_{jt}$ – Δ Current Liabilities $_{jt}$ – Depreciation and Amortization Expense $_{jt}$] for changes from year $t-1$ to t or year t for firm j ;
- $A_{j,t-1}$ = total assets in year $t-1$ for firm j ;
- ΔRV_{jt} = revenues in year t less revenues in year $t-1$ for firm j ;
- ΔREC_t = net receivable in year t less net receivable in year $t-1$ for firm j ;
- PPE_{jt} = gross amount of property, plant, and equipment in year t for firm j ;
- ε_{jt} = error term in year t for firm j (interpreted as discretionary accruals);
- $t = 1, 2, \dots, T_j$ (T_j is the last year of time-series of available data), and;
- Δ = Change.

For each firm, the model is estimated using the longest time series of available annual data. Firms that have less than nine observations are deleted from the analysis. The summary statistics of $f_{j,1j}$ and z_{2j} are reported in table 1. As expected, the average estimated coefficient of property, plant and equipment is negative. Property, plant, and equipment is related to an income-decreasing non-discretionary accrual (i.e., depreciation expense). The average estimated coefficient of change in revenue, net of change in accounts receivable, is not as obvious. The modified Jones model enhances the original model by considering that a change in revenue can cause income-increasing changes in accounts receivable (Dechow et al. 1995, 199).³

The test of the hypothesis is performed using estimated errors of the above equation, e_{jt} s. The following procedures are employed for each firm. First, the estimated error for the forecast disclosure year ($t=F$), e_{jF} is computed. Also, an estimated standard deviation, $s(e_{jt})$, is calculated using the time-series $t = 1, \dots, T_j$. Then, the estimated error is scaled by the estimated standard deviation to obtain the following standardized error:

$$V_{jF} = e_{jF} / s(e_{jt}) \quad (2)$$

TABLE 2
Final Sample Size

Management earnings forecasts from the <i>Dow Jones News Retrieval Service</i>	628
Less Missing variables needed to compute firm value	125
Missing stock price or insider ownership information	93
Missing other data for earnings management	<u>87</u>
	305
Final sample size	323

A positive [negative] standardized error, V_{jF} , implies that firm j uses accruals to increase [decrease] reported earnings of year F , for which an earnings forecast has been previously disclosed.

EMPIRICAL SPECIFICATION AND RESULTS

FINAL SAMPLE AND DESCRIPTIVE STATISTICS

The final sample consists of management earnings forecasts collected from the *Dow Jones News Retrieval Service* from 1996 to 2000. Among those 628 forecasts, 125 observations which lack sufficient information needed to compute firm value are eliminated. Additionally, 93 firms are excluded as they have incomplete data on stock prices or inside ownership. The final sample size is further reduced because 87 firms lack the data necessary for the estimation of earnings management. As a result, the final sample contains 323 firms. Table 2 summarizes the elimination process and indicates the final sample size.

For descriptive statistics of the data used in this study, Table 3 provides summary statistics of inside ownership, earnings, Tobin's Q and replacement cost of assets as a size proxy.

SIMULTANEOUS EQUATION REGRESSION ANALYSIS

To address the potential endogeneity issue and analyze the comprehensive relationships among the variables, a simultaneous equation system of inside ownership, earnings forecast, market valuation, and firm value is estimated based on the following equation. The simultaneous equation system is estimated based on the following two-stage least squares (2SLS) method.

$$\begin{aligned}
 MV_j &= f_1 (FCT, OWN, AUD) \\
 FCT_j &= f_2 (Q, OWN, ACC, VOL) \\
 OWN_j &= f_3 (Q, FCT, ACC, VOL, LIQ) \\
 Q_j &= f_4 (OWN, DEBT, ASS)
 \end{aligned} \tag{3}$$

where for firm j :

TABLE 3
Descriptive Statistics

	<u>Mean</u>	<u>Median</u>	<u>Std Dev</u>
Inside Ownership (%)	12.14	4.45	18.10
Earnings (000)	3,549	1,862	16,257
Replacement Cost of Assets (000)	5,459,100	1,985,500	13,511,220
Tobin's Q	1.230	0.975	0.98

- MV* = market price (per share) of stock on the earnings forecast date;
FCT = management earnings forecast in terms of earnings per share;
OWN = inside ownership percentage;
Q = Tobin's Q;
ACC = earnings management measured by discretionary accrual, V_F in equation 2;
AUD = auditor quality, measured based on dichotomous groupings (Big 6 = 1; non-Big 6 = 0);
VOL = standard deviation of changes in profit rate, where profit rate is measured by profit before extraordinary items scaled by replacement cost of assets
LIQ = cash flow (after-tax income + amortization) scaled by replacement cost of assets
DEBT = market value of long-term debt per share, and;
ASS = logarithm of replacement cost of assets.

The equation system is similar to the one used by Cho (1998) and Lee and Cho (2000). This system considers the possible reciprocal relationships between five variables (insider ownership, earnings forecast, market valuation, firm value, and earnings management). The simultaneous equation system is constructed based on the relationships discussed in the second section and depicted in figure 1. Table 4 summarizes the hypotheses to be tested under the simultaneous equation system (equation 3) and the predicted effects.

The equation system also includes several variables to control for possible effects on the dependent variables. In the market valuation equation (f_1), *AUD* (auditor quality) is included to control for its effect on market valuation. Consistent with numerous previous studies, the auditor quality variable is measured based on auditor reputation. Since high-quality (Big 6) auditors provide more assurance to accounting numbers of client firms, the market reacts more favorably to firms associated with these auditors (Datar et al. 1991, Feltham et al. 1991).

TABLE 4
Hypotheses and Predicted Effects in the Simultaneous Equation System

<u>Hypothesis</u>	<u>Effect to be Examined</u>	<u>Equation</u>	<u>Variable</u>	<u>Predicted Sign</u>
H1	Signaling	f_1	FCT	+
	- Market Valuation		OWN	+
H2	Signaling - Cost	f_2	OWN	-
		f_3	FCT	-
H3	Earnings Management	f_2	ACC	+
		f_3	ACC	+
H4	Value Effect	f_3	Q	+
	Agency Effect	f_4	OWN	+

VOL (volatility) is included in the forecast (f_2) and ownership (f_3) equations. In f_2 , it controls for the effect that the manager tends to understate the forecast if the earnings volatility is high (risky). In f_3 , it controls for the possibility that high firm-specific uncertainty affects the level of insider ownership either positively (for monitoring) or negatively (risk-aversion).⁴ Cho (1998) suggests that as volatility increases, the inside ownership level may increase because the uncertainty makes it difficult to monitor the contribution of managers to firm performance. On the other hand, volatility may add to managerial risk-aversion, making managers avoid higher ownership.

Also in f_3 , LIQ (liquidity) is included since high liquidity allows managers to use internal funds and thus affects inside ownership stake.

In the firm value equation (f_4), DEBT (long-term debt) is an instrument to control for the possibility that financial leverage affects firm value (McConnell and Servaes 1995). ASS (assets) are included to control for a potential size effect.⁵ Unobservable intangible assets affect firm value. The ASS variable, which may be correlated with intangible assets (Morck et al. 1988), serves to control for the above effect. Table 5 presents the empirical results based on the 2SLS estimation of the simultaneous regression.

Market valuation. In the first column of the table, the results of the market value regression (f_1) are presented. The results show that both management earnings forecast and insider ownership have positive effects on market valuation. The effects are significant at the 5 and 1 percent levels, respectively. These results confirm the signaling effects of the two variables. Thus, hypothesis 1 is supported. The results are consistent with those reported by Clarkson et al. (1992).

In equations f_2 and f_3 , it is confirmed that firm value also significantly affects earnings forecast and insider ownership, suggesting that, with other things equal, firms with higher firm values issue more favorable earnings predictions and hold a higher level of insider ownership. These positive effects result in greater market valuation. The conformed signaling effects indicate that the two variables have market value relevance.

TABLE 5
Simultaneous Equation (Two-Stage Least Squares Regression) Analysis

<u>Regressor</u>	<u>Equation (Dependent Variable)</u>			
	<u>f₁ (MV)</u>	<u>f₂ (FCT)</u>	<u>f₃ (OWN)</u>	<u>f₄ (Q)</u>
FCT	9.356 (2.291)**		-0.124 (2.016)**	
OWN	4.592 (3.161)***	-7.926 (-2.338)**		0.753 (1.275)
Q		1.132 (2.762)***	0.334 (2.175)**	
ACC	0.033 (1.671)*	1.318 (1.962)**	0.473 (1.016)	
AUD				
VOL		-3.689 (2.173)**	- 0.015 (1.029)	
LIQ			0.084 (1.156)	
DEBT				- 0.052 (-0.937)
ASS				0.871 (3.007)***
<i>Adj R</i> ²	0.082	0.095	0.067	0.059
<i>F</i>	2.207**	3.129***	1.975**	2.132**

(n=323)

t-statistics are in parentheses.

***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively.

Substitution effect. The substitution effect between the two signaling variables is confirmed in the second and third columns of the table. As expected, in the earnings forecast equation (f₂), OWN (insider ownership) is shown to have a significantly negative effect on the earnings forecast disclosure at the 5 percent level. Also, in the insider ownership equation (f₃), the effect of the forecast variable is shown to be significantly negative at the 5 percent level. Thus, it is confirmed that there is tradeoff between insider ownership and management earnings forecast as two competing variables to be used for signaling one attribute, firm value. These results further support the value

relevance of signaling. These results confirm hypothesis 2. The results are consistent with those reported by Li and McConomy (2000).

Earnings management. The effect of earnings management is observed in the results of the earnings forecast equation (f_2) and the insider ownership equation (f_3). The effect of earnings management on earnings forecast is significantly positive in equation f_2 . However, insider ownership is not shown to be significantly affected by earnings management in equation f_3 . Therefore, hypothesis 3 is partly confirmed only for the effect of earnings management on earnings forecast. The results may indicate that firms mitigate signaling costs associated with earnings forecast of a high amount by engaging in earnings management. However, the results suggest that earnings management has little relationship with a larger percentage of insider ownership.

Value and agency effects. The reciprocal relationships between insider ownership and firm value are observed in equations f_3 and f_4 . In the inside ownership regression (f_3), Tobin's Q is shown to be an important determinant of insider ownership. The coefficient of Q is positive at the 5 percent level. The results suggest that managers in firms with higher firm value hold a larger fraction of shares. However, in the firm value regression (f_4), insider ownership is not shown to be a significant factor affecting Tobin's Q. Therefore, the direction of causality between the two variables is such that firm value affects insider ownership, but not vice versa. Therefore, hypothesis 4 is supported only for one direction.

Consistent with Demsetz and Lehn (1985), the results show that inside ownership is endogenously determined. In a previous related study, Morck et al. (1988) treat the insider ownership as exogenously given, and find that insider ownership affects firm value. However, their results are refuted by Cho (1998). Cho also uses a simultaneous equation system to address the direction of causality and finds results that are consistent with those of this study.

In the simultaneous equation analysis, the effects of the control variables are also examined. In equation f_1 , the effect of the auditor quality (control variable) on market valuation is shown positive. However, its effect appears insignificant. Therefore, the effect of the auditor quality is not confirmed. Among other control variables, only VOL (volatility) in equation f_2 and ASS (replacement cost of assets) in equation f_4 are shown to have significant effects. It is shown that volatility negatively affects management earnings forecast. This is because the greater the earnings volatility, the higher is the uncertainty whether the actual earnings figure is realized consistent with the forecast. Due to this risk, firms may not want to inflate their earnings forecast figures. Also, as expected, ASS (replacement cost of assets) has a positive effect on firm value. Other control variables, VOL (volatility) and LIQ (liquidity) in equation f_3 and DEBT (financial leverage) in equation f_4 are all shown to have insignificant effects.

ROBUSTNESS TESTS

Given the empirical results reported in table 5, the robustness of the results from the simultaneous equation regressions is to be examined. One can argue that reported results may be affected by the research methodology employed. As described below, three tests are performed for the robustness of the results.

Model specification. An issue relating to the model specification is addressed. The simultaneous equation model used in this study assumes that the relationships between

insider ownership (OWN) and market valuation (f_1), earnings forecast (f_2), and firm value (f_4) are all linear. In a related study, Cho (1998) and Lee and Cho (2000) use a different specification since insider ownership may affect firm value differently in different ranges. Stulz (1988) argues that insider ownership positively affects firm value at low levels. However, due to the entrenchment effect,⁶ the effect of insider ownership becomes negative at fairly high levels.

Stulz's prediction is empirically supported by Morck et al. (1988) and McConnell and Servaes (1990). Using seasoned firms, both studies find a non-monotonic relation between insider ownership and firm value.

One reason that inside ownership is not shown significant in determining firm value (Tobin's Q) in equation f_4 may be due to a specification problem. For exploring this possibility, the simultaneous equation regression is reestimated with inside ownership entered as three separate independent variables representing three different ranges.

It may be the case that insider ownership has differential effects for the firm value and for other dependent variables as well. To explore this possibility, the insider ownership variable is entered in the equation system 3 as three separate independent variables representing three different ranges. This allows non-monotonicity and sign changes. The three variables are defined as follows:

$$\begin{aligned}
 OWN1 &= a, \text{ if } a < k \\
 &\quad k, \text{ if } a \geq k \\
 OWN2 &= 0, \text{ if } a < k \\
 &\quad a - k, \text{ if } k \leq a \leq m \\
 &\quad m - k, \text{ if } a \geq m \\
 OWN3 &= 0, \text{ if } a < m \\
 &\quad a - m, \text{ if } a \geq m
 \end{aligned} \tag{4}$$

where, a is inside ownership (OWN).

This piecewise regression is useful when different effects of an independent variable are expected in different ranges. Consistent with other studies, in the above equation there are three inside ownership variables representing three different levels of ownership. Morck et al. (1988) use 5 and 25 percent as the breakpoints (k and m in equation 4). The 5 percent represents a focal stake beyond which ownership is no longer negligible and by the Securities and Exchange Commission as a point of mandatory public disclosure of ownership. The breakpoint at 25 percent is considered as the ownership level beyond which a hostile bid for the firm cannot succeed.

With 5 and 25 percents identified as breakpoints, the inside ownership variables take the following values:

$$\begin{aligned}
 OWN1 &= a, \text{ if } a < 5 \\
 &\quad 5, \text{ if } a \geq 5 \\
 OWN2 &= 0, \text{ if } a < 5 \\
 &\quad a - 5, \text{ if } 5 \leq a \leq 25 \\
 &\quad 20, \text{ if } a \geq 25
 \end{aligned}$$

TABLE 6
Simultaneous Equation (Two-Stage Least Squares Regression) Analysis
with Piecewise Linear Specification of Insider Ownership

Equation (Dependent Variable)				
<u>Regressor</u>	<u>f₁ (MV)</u>	<u>f₂ (FCT)</u>	<u>f₃ (OWN)</u>	<u>f₄ (Q)</u>
FCT	10.256 (2.129)**		-0.093 (1.919)**	
OWN1	5.194 (3.292)***	-5.593 (-2.103)**		0.893 (1.530)*
OWN2	3.350 (2.062)**	-3.302 (-1.594)*		0.717 (1.360)*
OWN3	1.204 (1.263)	-4.038 (-1.993)**		0.912 (0.975)
Q		1.451 (3.073)***	0.407 (1.797)*	
ACC		0.985 (2.002)**	0.508 (1.395)	
AUD	0.029 (1.574)*			
VOL		-2.963 (2.085)**	- 0.026 (1.729)*	
LIQ			0.092 (0.938)	
DEBT				- 0.054 (-1.128)
ASS				0.921 (3.110)***
<i>Adj R</i> ²	0.093	0.102	0.070	0.064
<i>F</i>	2.138**	3.082***	2.169**	1.971**

(n=323)

t-statistics are in parentheses.

***, **, and * indicate significance at the 1, 5, and 10 % levels, respectively.

$$OWN3 = \begin{cases} 0, & \text{if } a < 25 \\ a - 25, & \text{if } a \geq 25 \end{cases} \quad (5)$$

The simultaneous equation regression in equation 3 is reestimated with a piecewise specification of the insider ownership variable in order to allow for possible sign changes of slope coefficients of inside ownership. The results are reported in table 6. The results are generally qualitatively identical to the ones reported in table 5.

The results once again show that both management earnings forecast and insider ownership have positive effects on the market valuation in equations f_1 and f_2 . The substitution effect between the two signaling variables are also confirmed in f_2 and f_3 . The same effect of earnings management is observed in f_2 and f_3 as in table 5. Finally, in f_3 and f_4 , the value effect is confirmed, while the agency effect is not supported.

Different breakpoints. It is investigated if the use of different breakpoints affects the results. As noted, the results reported in table 6 are based on a set of breakpoints of 5 and 25 percents. Since there exist no established rules in choosing the breakpoints, this study follows the grid search technique used by Cho (1998). First, starting with 0 percent, the level of inside ownership that produces the most significant slope coefficient on OWN1 in the market valuation regression (f_1) is found. This point is fixed, and the search is continued for the second ownership level that yields the most significant slope coefficients on OWN2 and OWN3. Finally, around these initial two points, an iterated search is conducted for the two levels of ownership that provide the most significant slope coefficients on the three ownership variables simultaneously. Following the procedures, the two breakpoints of 21 and 43 percents are identified. With these breakpoints, the inside ownership variables take the following values:

$$\begin{aligned}
 OWN1 &= a, \text{ if } a < 21 \\
 &21, \text{ if } a \geq 21 \\
 OWN2 &= 0, \text{ if } a < 21 \\
 &a - 21, \text{ if } 21 \leq a \leq 43 \\
 &22, \text{ if } a \geq 43 \\
 OWN3 &= 0, \text{ if } a < 43 \\
 &a - 43, \text{ if } a \geq 43
 \end{aligned} \tag{6}$$

These results are also similar to those reported in table 6. Therefore, the results are not reported. Based on either specification, the market valuation relevance and the substitution effects are confirmed for earnings management and insider ownership. However, for the cost reduction aspect of signaling, earnings management is shown to affect earnings forecast only, not insider ownership. Insider ownership is found to have a non-signaling effect, value effect only. The agency effect is not supported.

Different growth opportunities. An examination is performed on the possibility that the simultaneous regression results are sensitive to different effects of debt on firm value with different growth opportunities. McConnell and Servaes (1995) find that firm value is negatively [positively] related to debt for high [low] growth firms. For exploring this possibility, sample firms are divided into two groups and the simultaneous equation regression is estimated for each group.⁷ The results reveal that the coefficient of the DEBT variable becomes positive but insignificant for the low growth group, while the coefficient remains insignificantly negative in the high growth group. Since, the

regression estimates for all other variables remain qualitatively similar to those reported in tables 4 and 5, the results are not reported.

DISCUSSION AND CONCLUSION

Financial market signaling is a process of revealing the manager's private information about firm value to the market. Since signals are costly to use, they carry credibility. And the market reacts favorably in valuing securities with good signals. The manager of a firm can signal the firm value by using direct disclosure of expected earnings and insider ownership retention simultaneously. This study examines the signaling effect of these two variables in two aspects: market valuation and signaling cost. Based on a comprehensive framework, both signaling and non-signaling effects (value and agency effects) are examined at the same time. Previous studies have examined either the valuation or cost effect, not both. Also, they have not distinguished the signaling and non-signaling aspects.

The empirical results of this study suggest that the market positively reacts to the earnings forecast disclosure and insider ownership (signaling effect), and the level of earnings forecast substitutes with that of insider ownership (substitution effect). The study also finds that only management earnings forecast is positively related to the extent of earnings management (signaling cost aspect). In addition, the results show that insider ownership also possesses non-signaling effects: firm value positively affects insider ownership (value effect), but not vice versa. The insider ownership signaling cost reduction through earnings management is not confirmed. Also, the agency effect (insider ownership positively affects firm value) is not supported.

It is not clear whether inside ownership reduces agency costs. Agency theory suggests that an increase in ownership more closely aligns the managers and shareholders, thereby increasing firm value. In related studies, the empirical results are mixed. The agency effect is reported by Lee and Cho (2000) for initial public offering firms. For seasoned firms, Cho's (1998) finding (inside ownership does not affect firm value) suggests that the effect of insider ownership predicted by the agency theory does not exist. There is no *a priori* reason to believe that agency problems are resolved for initial public offering firms through insider ownership but not for seasoned firms. This issue discussed here could be rigorously addressed in future research.

LIMITATIONS AND POSSIBLE FUTURE EXTENSIONS

Some limitations should be noted for future improvement. Since not all the hypotheses are confirmed in the empirical analysis, one could suspect that the observed relationships among the variables of interest are affected by the research methodology employed. A future research may address the following methodological issues.

It is suggested that forecasting firms systematically engage in earnings management to move reported income towards the forecasted figure. Managers will engage in earnings management to report earnings close to the previous forecast, if actual income is expected to be lower than the forecasted value (bad news). In this situation, signaling costs are reduced by earnings management. However, when actual earnings are expected to exceed the previous forecasted value (good news), it is questionable whether managers will systematically decrease earnings towards the forecasted value.

The asymmetrical situations require the division of the sample into two groups, good news and bad news categories. For each group, the implications of accruals (earnings management) to other variables are to be examined separately. Possibly, the effects of accruals on earnings forecasts and insider ownership are different for different groups.

Also, it is to be investigated if the use of different breakpoints affects the results. As noted, the results reported in table 6 are based on a set of breakpoints (5 and 25 percent) as identified. Using a variety of alternative breakpoints, including ones used in previous studies, the analysis may be repeated to ensure that observed results are not affected by the breakpoints imposed in the estimation.

Finally, in this study the industry effects are not considered. The inclusion of the industry variable would control for industry effects on the interrelationships among these variables. The result showing an insignificant relationship between inside ownership and investment may be changed with the industry variable included. Future research that controls for the industry effects would better examine the relationships among the variables.

NOTES

1. Hughes (1986) examines litigation risk associated with signaling firm value in the context of initial public offerings. Similar risk is faced by seasoned firms also that forecast future earnings.
2. Tobin's Q may proxy for other things such as corporate quality or corporate opportunities (McLaughlin et al. 1996)
3. Still, as Jones (1991, 206-213) recognizes as one of the limitations, income-decreasing changes in working capital (e.g., accounts payable) are not incorporated in the model.
4. Cho (1998) suggests that as volatility increases, the inside ownership level may increase because the uncertainty makes it difficult to monitor the contribution of managers to firm performance. On the other hand, volatility may add to managerial risk-aversion, making managers avoid higher ownership.
5. The replacement cost of assets is used as the proxy for size in Morck et al. (1988) and McConnell and Servaes (1990). In this study, the replacement cost of assets is the denominator of the dependable variable, Tobin's Q. The replacement cost measured with error will create a spurious relationship between firm value and size (Cho 1998). Therefore, the logarithm of the replacement cost is used as the measure of firm size.
6. At high insider ownership levels, an increase in inside ownership makes management more entrenched and less subject to the discipline of the market. Therefore, firm value is reduced.
7. Consistent with the method by McConnell and Servaes (1995), the grouping is performed based on price-to-operating earnings (P/E) ratio. A firm is considered to have a high growth opportunity if the P/E ratio is high.

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