

The Investigation of the Relationship among Analyst Following, Managerial Ownership and Firm Valuation: From the Perspective of Agency Theory

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Abstract: In this study, the relationship among analyst following, managerial ownership and firm valuation is investigated from the perspective of agency theory by using a nonlinear simultaneous equation model. The data from the Taiwan stock market verify the proposed hypotheses with a nonlinear three-stage least-square procedure. The empirical results show that managerial ownership (serving an internal monitoring function) and number of analysts following (serving an external monitoring function) are respectively nonlinear and linear increasing functions of firm valuation, while managerial ownership and analyst following are substitutes in the monitoring of the firm. The results generated from this study support an alignment effect and an entrenchment effect in the relationship between managerial ownership and firm valuation after controlling for the effect of analyst following. Evidence also shows that analyst coverage serves to enhance firm valuation after controlling for the effect of managerial ownership. In addition, a substitution effect between number of analysts following and managerial ownership is found to exist as well as a decreasing marginal value for managerial ownership. It is indicated that both security analysts and managerial ownership serve as monitoring forces in the firm and higher level of monitoring forces, whether internal or external, will enhance firm valuation. The results reveal that the security analysts serve the external monitoring function by reducing the agency cost associated with the separation of ownership and control in the Taiwan stock market.

Key words: Analyst Following, Managerial Ownership, 3SLS, Three-Stage-Least-Square Model

INTRODUCTION

An extensive body of literature has been developed, examining the means of increasing firm valuation by reducing agency costs of the principal-agent problem. One mechanism that has been mentioned is ownership structure. [1] argued that managerial ownership serves to align the interest of managers and outside equityholders, so a positive relationship between managerial ownership and firm valuation is existed. Meanwhile, [2] proposed that there is a managerial entrenchment effect between managerial ownership and firm valuation. The empirical evidence has shown that the managerial ownership structure has played an important role in reducing the agency costs associated with the separation of ownership and control. In recently years, interest has been raised about the role of security analysts in the stock market. Security analysts are among the most important information intermediaries between firms and investors. Many investors rely on the information provided by financial analysts to make their portfolio management. It is clear that financial analysts serve a role as information provider, but the role in monitoring a firm's activities remains to be explored. [1] argued that security analysts play an additional role by monitoring activity when there is an agency relationship problem. Security

analysts who specialize in collecting data and making professional analysis are the major information providers to investors. By monitoring a firm, there is less possibility for managers to capture excessive nonpecuniary benefit from owners and higher possibility for bondholders in their attempt to prevent risk shifting from stockholders to bondholders. Accordingly, monitoring activity can be viewed as an external mechanism for reducing the agency costs rising from the separation of ownership and control.

This study tests empirically the hypotheses that both internal monitoring (managerial ownership) and external monitoring (analyst following) enhance firm valuation. In addition, the relationship among firm valuation, managerial ownership and analyst following is tested whether they are jointly determined. The data from January 1998 to December 2001 in the Taiwan stock market are chosen for this study. The evidence from the Taiwan stock market has verified the four proposed hypotheses by a three-stage least-square model in this study. It is shown that managerial ownership is a nonlinear increasing function of firm valuation whereas the number of analysts following is a linear increasing function of firm valuation. In addition, the substitution effects between the number of analysts following and

managerial ownership have been tested. The results show that a higher level of external monitoring in the form of analyst following will reduce the need for internal monitoring provided by managerial ownership. However, the inverse relation is not significant. The knowledge of the relationship among the managerial ownership, security analyst and firm valuation generated in this study can be used to reduce the agency cost associated with the separation of ownership and control.

HYPOTHESES

To investigate the relationship among the firm valuation (M/B ratio is chosen to denote firm valuation), the number of analysts following a firm (NAF) and the managerial ownership (OWN) in the Taiwan stock market, four primary hypotheses are proposed to test by using a non-linear simultaneous equation model.

Hypothesis 1: The percentage of managerial ownership (serving an internal monitoring function) is a nonlinear increasing function of firm valuation and both are jointly determined.

The percentage of managerial ownership is expected to increase as the firm valuation is enhanced. This is probably because an agency problem always exists in the higher firm-valued company. In order to align the managerial interest with stockholders, managerial ownership serves as an internal monitoring force in a firm. However, the entrenchment effect will lower the firm value due to managers' under-investing or wasting free cash flow when the managerial ownership is over a certain level. Therefore, the percentage of managerial ownership is expected to be a nonlinear increasing determinant of firm valuation. On the other hand, the higher firm-valued company may have higher agency cost associated with the separation of ownership and control. Thus, it is expected that higher firm value will increase the needs of higher managerial ownership.

Hypothesis 2: The number of analysts following a firm (serving an external monitoring function) is a linear increasing function of firm valuation and both are jointly determined.

The security analysts may play an additional role as monitoring a firm's performance. By monitoring a firm, there is less possibility for managers to capture excessive non-pecuniary benefit from owners and higher possibility for bondholders. It can prevent risk shifting from stockholders to bondholders. Accordingly, monitoring activity can be viewed as an external mechanism for reducing the agency costs rising from the separation of ownership and control. On the other hand, the number of analysts following can be viewed as the breadth of investor cognizance of a firm, it is anticipated that higher value of a firm will raise the number of analysts following.

Hypothesis 3: The number of analysts following a firm (serving an external monitoring function) is a function of managerial ownership (serving an internal monitoring function) and both are jointly determined.

The percentage of managerial ownership is an inverse function of the number of equity analysts following a firm. This is because equity analysts serve as a substitute for managerial ownership in monitoring the firm. We contend that agency costs are reduced if a firm has significant monitoring by equity analysts. Consequently, the firm may find it less important to institute policies which motivate managerial ownership.

Hypothesis 4: Analyst following, managerial ownership and firm valuation are jointly determined.

From the results generated in this study, the relationship among analyst following, managerial ownership and firm valuation is expected to generate and verify.

MATERIALS AND METHODS

A sample of firms in the Taiwan Stock Exchange Corporation (TSEC) is chosen to examine the relationship among analyst following, managerial ownership and firm valuation. The corresponding financial data for the studied sample from January 1998 to December 2001 is collected from the Taiwan Economic Journal (TEJ) databases. The Taiwan United Evening Newspaper (UEN) shows the number of analysts following on each Sunday. It is shown that the total number of firms recommended by the analysts during the studied period is 343 firms. The data shows that a high percentage of sample firms followed by financial analysts are electronic companies. This is coincident to the high trading volume concentrated on the electronic companies in the Taiwan stock markets.

A simultaneous equation model with the number of analysts following, managerial ownership and firm valuation determined within the model is developed in this study. The similar simultaneous equation methodology has been employed by a number of previous studies in finance [3,4]. The variables employed in the equation are defined in the Table 1.

To examine the correlations of the number of analysts following (NAF), managerial ownership (OWN) and firm valuation (M/B) with the various parameters, three equations are proposed as followings:

$$NAF = f(OWN(-), OWN2(+), M/B(+), SIZE(+), R\&D(?), VOL(+), 1/PRICE(-), E-DUMMY(?)) \quad (1)$$

$$OWN = f(NAF(-), M/B(+), SIZE(-), VAR(+), DEBT(-), DIVIDENT(-)) \quad (2)$$

$$M/B = f(OWN(+), OWN2(-), NAF(+), R\&D(+), AD(+), DEBT(+), ROA(+)) \quad (3)$$

Number of Analysts Following Equation (NAF): The function of managerial ownership in reducing the agency costs associated with separation of ownership and control has been widely discussed [1,2]. In addition, the security analysts are also reported to use as monitoring managerial performance [3,5]. According to

these studies [3,5], it is indicated that the monitoring activities performed by the security analysts will be helpful in reducing the agency cost associated with the separation of ownership and control. Therefore, the market value of a firm is expected to be positively associated with the number of analyst following that firm.

[3] have argued that both managerial ownership and analyst following enhance firm valuation and they found that there is a diminishing substitution effect between managerial ownership and analyst following. In order to clearly illustrate the decreasing and marginal effects, the square of managerial ownership (OWN2) is also included in the model.

The exogenous variables, including firm size (SIZE), research and development expense (R&D), trading volume (VOL), stock price (1/PRICE) and electronic industry dummy variable (E-DUMMY), are also chosen in the equation. These studies [3,5] have indicated that analyst following is positively associated with firm size, trading volume and negatively associated with stock price. [5] have argued that R&D intensive firms are more likely to be followed by more analysts because those firms are perceived as higher quality firms. On the other hand, [3] contend that the higher R&D firms may reduce the requirement for external monitoring in the form of analyst coverage, which is consistent with the free cash flow hypothesis of [4]. From the agency cost perspective, if research and development serves to lower the level of free cash flow, the R&D-intensive firms may experience less severe agency problems which may result in less analysts following. The study of effect of R&D is not found, so the factor is also included in the model to investigate the influences of the number of analysts following.

The model developed by [6] has revealed that analysts like to follow firms with relatively cheaper prices than those with higher prices. They argue that stock splits reduce the relative share price and further signal a better future for the firm with more analysts following. Finally, the percentage of number of analysts following on the electronic industry is thus increased as compared with the non-electronic industry, so electronic/non-electronic industry dummy variable is also included in the NAF equation.

Managerial Ownership Equation (OWN): [1] have postulated that both managerial ownership and security analyst serve as monitoring forces in the firm. The managerial ownership serves as an internal monitor mechanism and the analyst following plays an external monitoring role to enhance firm value. [3] have argued that a higher level of external monitoring by analysts will reduce the need for internal monitoring provided by managerial ownership. A substitution relation between managerial ownership and analyst following is thus formed. [3] have also found that the substitution effect is decreased when the number of analysts is increased. It is anticipated that higher quality firms, as measured by a higher M/B ratio, inspire higher percentages of managerial ownership for their own self interest.

The exogenous variables in this equation include firm size (SIZE), debt to asset ratio (DEBT), variance of stock return (VAR) and dividend payout ratio (DIVIDEND). Each variable except variance of stock return has been used in the previous equation to model managerial ownership. [7] and [4] have used the managerial ownership of different definitions to test the relation between firm size and managerial ownership. They have found that managerial ownership is negatively related to firm size. [3] have also indicated that firm size has a negative impact on managerial ownership because of managers' wealth constraints preventing them from obtaining a larger percentage of equity when the firm size increases.

External investors or the market is more likely to monitor when a firm has a higher debt. Therefore, debt to asset ratio is expected to be a negative determinant of managerial ownership. According to the free cash flow hypothesis, an increase in the dividend will reduce the need for managerial ownership to control agency problems associated with free cash flow. It is expected that dividend payout ratio is inversely related to the percentage of managerial ownership. A firm with higher variety of stock return may require a higher percentage of managerial ownership because of asymmetric information. Hence, the variance of stock return is also included in the ownership equation.

Firm Value (M/B ratio) Equation: According to the argument of [1] and the finding of [2], managerial ownership is expected to have a nonlinear impact on firm valuation. [8] has predicted that the market value of a firm is positively related to the breadth of investor cognizance. The firm value is likely to be higher, when a firm has higher market recognition. Because the security analyst is one of the major information intermediaries, the breadth of investor cognizance is likely to be positively related to the number of analysts following the firm. Therefore, it is expected that a firm's market value is positively associated with the number of analysts following. It is anticipated that the higher number of analysts following positively cause higher M/B ratio by the intensive external monitoring from the agency problem perspective. Several empirical studies [3,5] have found that there is a positive relationship between firm value and analyst following.

The research and development expense (R&D), advertising expense (AD), debt to asset ratio (DEBT) and return on asset (ROA) variables are included in this equation as the controlled exogenous variables. According to several studies [3,5], advertising expense, profitability and research and development expense are found to have positive impact on firm valuation.

RESULTS AND DISCUSSION

Descriptive Statistics: Table 2 shows that the descriptive statistics of the studied variable in this research. The average percentage of managerial ownership (OWN) in the Taiwan stock market is calculated to be 21.98 %, which is much higher than the one in NYSE (11.63%) [3]. The average number of analysts following a sample firm in Taiwan is 31.46 with

a high variance of 2673.50. Most of the electronic firms in Taiwan often have a greater number of analysts following probably because of the potential growth opportunity. This is coincident to the high trading volume concentrated on the electronic companies in Taiwan stock markets. A maximum following of 369 analysts is for UMC, one of the famous firms of IC production in Taiwan. The descriptive statistics for the other endogenous and exogenous variables are shown in Table 2.

Empirical Results for all Sample Firms: Empirical results have shown that the exogenous variables in the NAF equation, including firm size, stock volume and electronic/non-electronic firm dummy variable, carry the positive and significant estimated correlation with the number of analyst following, as shown in Table 3. It is indicated that an increase in the firm size, firm valuation, or stock volume increases the number of analysts following significantly. It is also noted from NAF equation that the electronic firms also possesses greater number of analysts following. The results generated from the Taiwan stock market are consistent

with the studies of NYSE firms [3,5]. However, the percentage of managerial ownership shows no significant level relationship with the number of analysts following in the Taiwan stock market.

In the managerial ownership (OWN) equation, the testing results show that the dividend payout ratio as well as the firm size is both positive and significant determinants of the managerial ownership. It is found that the larger firm size or higher dividend payout ratio increases the percentage of managerial ownership. In addition, the endogenous variables, including the number of analysts following and the firm valuation, are noted to correlate significantly with the percentage of managerial ownership. The firm value is proportion to the managerial ownership whereas the number of analysts following is inversely correlated with managerial ownership. [3] have indicated that a higher level of external monitoring in the form of analyst coverage will reduce the need for internal monitoring provided by managerial ownership.

Table 1: The Definition of Variables Used in the Model

Variables	Definition
NAF	Number of Analysts Following a Firm
OWN	Percentage of Managerial Ownership Defined to be the Shares Owned by Director Divided by the Total Shares Outstanding
OWN ²	Percentage of Managerial Ownership Squared
M/B	Firm Valuation (Market to Book Ratio): Defined by Market Value of Equity Plus Book Value of Debt Divided by Book Values of Equity and Debt
SIZE	Log of Firm Size Measured by the Book Value of Total Assets (In Thousands of NTD)
R&D	Research and Development Expense Divided by Total Sales
AD	Advertising Expense Divided by Total Sales
VOL	Log of Trading Volume Measured by the Average Daily Dollar Transaction Volume (In Thousands of NTD)
1/PRICE	The Inverse of the Stock Price Per Share (In NTD)
VAR	Variance of Stock Return
DEBT	Total Debt Divided by Total Assets
ROA	Net Income Divided by Total Assets in the Firm
DIVIDEND	Dividend Payout Ratio Measured by Log of 1 Plus Dividend Divided by Earning Per Share
E-DUMMY	If the Firm is in the Electronic Industry, 1; Otherwise, 0

Table 2: The Descriptive Statistics for the Studied Endogenous and Exogenous Variables. (The Total Sample Size is 343)

Variable	Mean	Variance	Minimum	Maximum
OWN (%)	21.9844	166.5894	2.9150	72.0625
NAF	31.4606	2673.5006	1.0000	369.0000
M/B RATIO	2.0951	3.0746	0.3547	12.8413
R&D	2.0861	18.5308	0.0000	55.4495
AD	0.6287	2.2388	0.0000	17.7426
SIZE	15.9921	1.2759	13.6131	19.9590
VOL	8.0166	1.1707	5.3590	11.0706
1/PRICE	0.0600	0.0040	0.0044	0.6176
VAR	10.8464	12.3346	3.0248	25.0795
DEBT	0.4066	0.0219	0.1029	0.9815
ROA	0.6980	0.2314	0.0583	3.3245
DIVIDEND	7.8699	22.3358	0.0000	16.0084

Table 3: The Nonlinear 3SLS (Three-Stage Least-Square) Model of the Number of Analysts Following, Managerial Ownership and Firm Valuation for all Sample Firms in Taiwan (Sample Size: 343)

Variables	Number of Analyst Following (NAF)	Managerial Ownership (OWN)	Firm Valuation (M/B)
Intercept	-447.74***	-49.24 ***	-2.6063
Managerial Ownership(OWN)	3.3055	--	0.3697 ***
Square of Managerial Ownership (OWN2)	-0.0726	--	-0.0056 ***
Number of Analysts Following the Firm (NAF)	--	-0.1896 ***	0.0099 ***
Firm Value (M/B)	17.746 ***	4.5913 ***	--
Firm Size (SIZE)	16.917***	3.7701***	--
R&D Expense (R&D)	0.8616	--	0.078***
Advertising Expense (AD)	--	--	-0.1507 *
Stock Volume (VOL)	18.952 ***	--	--
1/stock price (1/PRICE)	16.574	--	--
Variance of Stock Return(VAR)	--	0.0610	--
Debt Ratio (DEBT)	--	1.2069	-0.6261
Return of Asset (ROA)	--	--	0.091
Dividend Payout Ratio (DIVIDENT)	--	0.7918***	--
E-dummy	19.834***	--	--
System R ²	62.24%	62.24%	62.24%

The Symbols ***, ** and * represent the significance levels at 1, 5 and 10%, respectively

Moreover, the magnitude of this substitution effect will decrease when the number of analysts following increases. The empirical results generated from the Taiwan stock market show that a greater number of analysts following results in forming the perfect external monitoring force, further reducing the percentage of managerial ownership (OWN equation). Thus, an increase in the number of analysts following decreases the percentage of managerial ownership, as shown in NAF equation. However, the inverse relation of ownership to the number of analysts following is not significant. In addition, Table 3 also shows that an increase in firm valuation enhances the percentage of managerial ownership, supporting Hypothesis 1 in this study.

In the firm valuation (M/B) equation, R&D and advertising expenses are both significantly correlated with firm valuation. It is found that firm valuation is enhanced with increasing R&D expense and decreasing advertising expense. The endogenous variables, the managerial ownership and the number of analysts following, are both significant determinants of firm valuation. Low-level of managerial ownership serves to align the interests of management and outside equityholders such that a positive relationship exists between managerial ownership and firm valuation. However, the entrenchment effect leads to a negative relationship between managerial ownership and firm valuation at the high-level of managerial ownership.

The results shown in Table 3 indicate that the firm valuation is a nonlinear increasing function of the managerial ownership. These results support the alignment effect and entrenchment effect in conventional finance theory and can be used to support the Hypothesis 1 in this study. In addition, the number of analysts following is found to be proportional to firm valuation and both are jointly determined. It is inferred that Hypothesis 2 in this study is supported.

From the above results and discussion, the relationship among the number of analysts following, the managerial ownership and the firm valuation in the Taiwan stock market can be generated, as shown in Fig. 1. As can be seen, firm valuation and managerial ownership are significantly correlated and jointly determined. The same phenomenon is also noted in the relationship between the number of analysts following and firm valuation. However, ownership is noted as an inverse function of number of analysts following. Such results are not sufficient to confirm the influence of managerial ownership on the number of analysts following. The results shown in Fig. 1 indicate that a lower level of managerial ownership or an increase in firm valuation will increase the number of analysts following a firm in the Taiwan stock market. However, there is no sufficient evidence to conclude that the number of analysts following, managerial ownership and firm valuation are jointly determined in the Taiwan stock market.

Table 4: The Nonlinear 3SLS (Three-Stage Least-Square) Model of Number of Analysts Following, Managerial Ownership and Firm Valuation in for Electronic Firms in Taiwan (Sample Size: 139)

Variables	Number of Analyst Following (NAF)	Managerial Ownership (OWN)	Firm Valuation (M/B)
Intercept	-411.04 ***	-32.56	-5.117**
Managerial ownership(OWN)	-1.9197	--	0.5404 ***
Square of managerial ownership (OWN2)	-0.0020	--	-0.0064*
Number of analysts following the firm (NAF)	--	-0.1212 ***	0.0206***
Firm value (M/B)	20.768 ***	4.5969 ***	--
Firm size (SIZE)	10.247	2.5632 *	--
R&D expense (R&D)	0.8991	--	0.0143
Advertising expense (AD)	--	--	-0.0924
Stock volume (VOL)	31.658 ***	--	--
1/stock price (1/PRICE)	136.87	--	--
Variance of stock return(VAR)	--	0.4213	--
Debt ratio (DEBT)	--	6.8825	-1.9281
Return of asset (ROA)	--	--	0.4575
Dividend payout ratio (DIVIDENT)	--	-0.1672	--
System R ²	95.07 %	95.07 %	95.07 %

The symbols ***, ** and * represent the significance levels at 1, 5 and 10%, respectively

Empirical Results for Electronic Firms: Table 4 shows the nonlinear 3SLS (three-stage least-square) model of number of analysts following, managerial ownership and firm valuation for the Taiwan electronic firms. The results shown in Table 4 are found to be slightly different from the data for all sample firms (Table 3). It is also noted that the value of the system

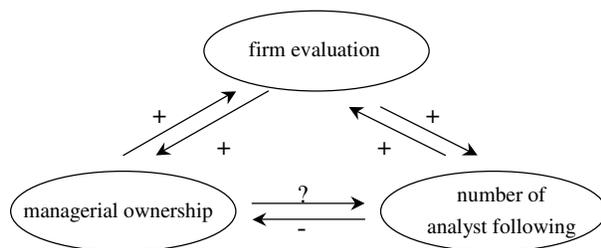


Fig. 1: Graphical Representations of the Relationships Between Firm Valuation / Managerial Ownership, Firm Valuation / Number Of Analysts Following and Managerial Ownership / Number of Analyst Following

R² for electronic firms is 95.07%, much higher than the value for all sample firms (62.24%). It is inferred that the model is more suitable for the Taiwan electronic firms than for all sample firms.

The stock volume is found to be significantly correlated with the number of analysts following. [8] has indicated that if a firm is recognized as a good firm by the investors, the investors will like to buy the stock of the firm. The stock price and the firm valuation are correspondingly enhanced, further attracting the analysts following. Thus, an increase in the stock volume is noted to increase the number of analysts following.

On the other hand, the correlation of firm size with the number of analysts following for the electronic firms is different from the all sample firms. It shows a non-significant relationship with the number of analysts following for the electronic firms. Previous experience has shown that R&D and customer demand are the key factors to increase the profit of the electronic firms. It is different from the conventional firm in that firm size is one of the important parameters to enhance profit or attract stock investors. Good R&D and other performances are the more important factors to decide the profit than the firm size. Thus, firm size shows no significant effect on the number of analysts following. For the endogenous variables, as with all the sample firms, only firm valuation is noted to be correlated significantly with the number of analysts following.

In the managerial ownership (OWN) equation, all exogenous variables, except firm size, show a non-significant relationship with the managerial ownership. The result in Table 4 shows that the percentage of managerial ownership is increased with the increase in the firm size. The results contradict previous findings, which indicate that size is negatively related to managerial ownership because wealth constraints prevent managers from obtaining a large percentage of equity when firm size increases. For the endogenous variables, as expected, the number of analysts following and the managerial ownership have significant substitution effects. When firm valuation is increased, the managerial ownership is also noted to increase for electronic firms.

In the firm valuation (M/B) equation, it is found that firm valuation is proportional to managerial ownership

(OWN). However, Table 4 also shows that an increase in the firm valuation decreases the square of managerial ownership (OWN^2). It is inferred that an increase in the firm valuation initially increases the managerial ownership and then decreases the managerial ownership. It supports the proposed alignment and entrenchment effects from the conventional finance theory. Moreover, firm valuation is also a function of the number of analysts following for the Taiwan electronic firms and all exogenous variables show non-significant effects on firm valuation.

According to the results generated from a nonlinear 3SLS model, the relationship shown in Fig. 1 is also found to exist for the Taiwan electronic firms. This created relationship also supports the proposed Hypotheses 1 & 2 and part of Hypothesis 3, whereas Hypothesis 4 is partially supported.

Empirical Results from Non-Electronic Firms: The nonlinear three-stage least-square model is also used to study the 204 non-electronic firms in Taiwan. A lower value of the system R^2 in the model is found, indicating that the simultaneous equation model used can not accurately reveal the correlation of number of analysts following, firm valuation and managerial ownership in the Taiwan stock market. This is probably because of the rapid growth for the electronic firms. Many investors and analysts are attracted by the high “expected” or “potential” profit for the electronic firms. It will lead to a cash flow from the non-electronic stock and reduce the accuracy of the parameters or indicators for the non-electronic firms. Thus, it is difficult for the simultaneous equation model to create the relationship for the non-electronic firms in the Taiwan stock market.

CONCLUSION

The relationship among the managerial ownership, firm valuation and number of analysts following in the Taiwan stock market has been studied by using a nonlinear three-stage-least-square method in this research. The generated results are used to verify the four proposed hypotheses in this study. It is shown that managerial ownership is a nonlinear increasing function of firm valuation while the number of analysts following is a linear increasing function of firm valuation. In addition, the results show that a higher level of external monitoring in the form of analysts following will significantly reduce the need for internal monitoring provided by managerial ownership. However, the inverse relation is not significant. The evidence has also shown strong correlations among the endogenous variables. However, there is no sufficient evidence to conclude that the number of analysts following, managerial ownership and firm valuation are jointly determined.

The jointly determined relationship among the number of analysts following, managerial ownership and firm

valuation for the Taiwan stock market is noted to agree with those for NYSE [3]. This finding implies that security analysts in some sense play an additional role in monitoring a firm. Their effort will enhance firm valuation by lowering agency costs. Evidence also shows that the analysts have a stronger incentive to follow stocks of high firm valuation, so this causes managers to align their interests with equityholders in order to maximize the firm valuation.

The results for the Taiwan electronic firms are found to be similar with all the sample firms. However, the simultaneous equation model can not accurately reveal the correlation between number of analysts following, firm valuation and managerial ownership for non-electronic firms in Taiwan. This is probably because lots of investors and analysts are attracted by the high “expected” or “potential” profit for the electronic firms. It will lead to the significant decrease in the trade volume of the non-electronic stock and may probably influence the accuracy of the parameters or indicators for the non-electronic firms. Thus, it is difficult to capture the relationship for the non-electronic firms in the Taiwan stock market by using the simultaneous equation model.

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