

# Effects of Managerial Incentives on Earnings Management

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**Abstract.** By using the managers' total wealth data for samples of firms listed in Taiwan, this study investigates the effects of the equity incentives on managers' earnings management and insider trading behavior. The empirical evidence shows that managers with high equity incentives are more active in manipulating reported earnings. The high equity incentives arising from the manager's potential total wealth are closely tied to the value of the stocks and options owned. We also find that managers with high equity incentives are likely to become actively involving in making insider trading in the next period.

**Keywords:** Equity Incentives, Earnings Management, Discretionary Accruals, Insider Trading.

## 1. Introduction

In order to remedy the principal-agent problem, there are many mechanisms that through compensation policies to provide incentives to managers that include performance-based bonuses and salary revisions, stock options and dismissal decisions [1]. Jensen [2] suggests that this equity-based exposure might motivate managers to manage their earnings in order to increase the short-term stock price, even if they have to lie. Although managerial ownership and equity-based compensation are designed to help align the decisions of managers with the interests of shareholders [3], these over-valued elements may provide managers with incentives to misprice firms' earnings and lead to agency problems.

Thus, this paper seeks to determine whether managers in Taiwan are still influenced by the stock prices and whether they engage in earnings manipulation for their own benefit. Prior studies suggest that managers manage earnings during periods when they or their firms (in which they play the role of insiders) are selling shares to capital markets [4]. The exposure of the managers' wealth leads them to care about the short-run stock price and might motivate managers to engage in earnings manipulation. By extending the study of Cheng and Warfield [5], we first examine whether equity incentives have effects on the next period's insider trading. Next, we add earnings management proxy variables to investigate the association between earnings management and future managers' insider trading.

This study investigates the variants of the Jones [6] model and finds a significantly higher incidence of earnings management for firms with higher managers' equity incentives. In other words, we find evidence that those whose total compensation is more sensitive to their respective firms' increased stock prices are more incentivized. After controlling for other potential firms' characteristics, we conclude that our findings are still consistent with the earnings manipulation induced by managers' incentives. As expected, this paper also finds that the higher equity incentives have significantly higher levels of insider trading. By contrast, this study does not find such evidence for managers with high equity incentives sell more shares after engaging in income-increasing earnings manipulation.

## 2. Hypotheses Development

The compensation contract has long been designed to remedy the conflict between shareholders and managers. Prior studies that extend the research on stock-based earnings management find evidence that managers might be able to take advantage of the capital markets as well [7]-[10]. Cheng and Warfield [5] note that managers with high equity incentives are more likely to engage in earnings management. Bergstresser and Philippon [11] provide evidence that the use of abnormal accruals to manage reported

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earnings is more pronounced in firms where the managers' potential total compensation is more closely tied to the value of stock and option holdings. Therefore, the more sensitive that the managers' wealth is to stock price changes, the more that reported earnings are manipulated. Managers who care about the incentives generated by short-term stock price changes are expected to engage in earnings management. Thus, we construct our first hypothesis as follows:

H1: The degree of earnings management is positively associated with the managers' equity incentives.

Prior studies indicate that insiders are better informed and trade profitably in the shares of their firms [5], [11]-[13]. Park and Park [14] employ a two-stage least squares approach to test the causal relationship between discretionary accruals and insider selling and suggest that managers are also likely to actively engage in accruals management prior to insider selling. Cheng and Warfield [5] show that managers with higher equity incentives are more likely to sell shares, and such trading behaviour motivates managers to care about the short-term stock price and to manipulate earnings before engaging in insider trading. To sum up, insiders are more informed in the capital markets and have more incentives to engage in earnings management to take advantage of increased stock prices. Managers will manipulate reported earnings based on their exposure levels to sell off their partial shares in the future. Since proxy insider trading by managers' applications for and transactions in selling shares<sup>2</sup>, we establish our second hypothesis as follows:

H2: The incidence of insider trading is positively associated with the managers' equity incentives.

### 3. Data and Measures

The sample firms employed in this study include firms listed on the Taiwan Stock Exchange (TSE) and in the Over-The-Counter (OTC) market. The compensation data are retrieved from the Taiwan Economic Journal (TEJ) database. The sample period used to test H1 extended from 1997 to 2007. After deleting firms with missing data in the TEJ database and observations in the process of estimating earnings management proxies, our final sample consists of 4,570 firm-year observations. Accounting and other financial data are also retrieved from the TEJ database. The data used to test H2 are also retrieved from TEJ database. Due to the feasibility of the database, the sample period used to test H2 extends from 2000 to 2007. The selection procedures yield a final sample of 462 firm-year observations. To reduce the influence of outlier observations, all of the variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile levels.

To measure the managers' equity incentives and test H1, we use INCRA as a proxy. Consistent with previous studies [11], [15]-[19], we use the absolute value of the firm's discretionary accruals proxy from the cross-sectional model to measure earnings management. Since the purpose of this study is to measure the magnitude and not the direction of earnings management, we use the absolute value proxy to capture the combined effect of income-increasing and income-decreasing earnings management. Following Bergstresser and Philippon [11], we first compute ONEPCT to measure the change in the dollar value of the managers' stock and options holdings for a one-percentage-point change in the stock prices. Then we use ONEPCT to measure the equity incentives proxy INCRA. INCRA is computed as the ratio of the managers' dollar change in stock and options holdings to total compensation. Based on previous studies [20], we employ the absolute value of discretionary accruals as the proxy for earnings management estimated from the Jones [6] model, Dechow et al. [20] model, and Kasznik [21] model, respectively. Therefore, we utilize DAJ, DAMJ, and DAKA as proxies to measure the degree of managerial earnings management. We employ  $TRA_{it+1}$  to measure the managers' insider trading during the next period to test H2. In addition,  $TRA_{it+1}$  are calculated as TRAMV or TRAOR. TRAMV is the dollar value of the managers' trading and TRAOR represents the trading shares scaled by the firm's total ending outstanding shares.

Based on the existing literature, a number of firm-specific control variables included in the models. Specifically, we use: (a) the natural logarithm of the firm's total assets SIZE to control for firm size; (b) the book value of debt plus the market value of equity divided by lagged total assets MB as a proxy for investment opportunities; (c) the leverage LEV measured as total debt divided by lagged total assets; (d) OCF, which is the ratio of cash flow from operations to lagged total assets; (e) the total accruals deflated by lagged total assets TACC to proxy for the impact of total accruals; (f) the stakeholders' implicit claims, which we proxy by the labor intensity INC is calculated as one minus the ratio of the gross PPE to lagged

total assets; and (g) the prior annual return rate on investment RET is included in our study. Definitions of all the variables are summarized in Table 1.

#### 4. Empirical Analysis

A total of 4,570 and 462 firm-year observations, respectively, are included in our sample to test H1 and H2. Table 1 provides the definitions and descriptive statistics of related variables for managers' equity incentive measures. The absolute value of discretionary accruals estimated from our three models on average equals 0.07. The mean ratio of the managers' equity incentives is 0.053. The average values of firm size and leverage are 6.631 and 0.444, respectively. The mean of the total accruals is -0.009. The mean of the book-to-market ratio is 0.845, and the mean of the stakeholders' implicit claims is 0.718.

Table 1: Descriptive statistics (N=4,570)

Variables	Definitions	Mean	Median	Std Dev.	Minimum	Maximum
INCRA	equity incentives	0.053	0.019	0.094	0.000	0.584
SIZE	natural logarithm of total assets	6.631	6.576	0.560	5.559	8.163
LEV	total debt to lagged total assets	0.444	0.427	0.204	0.081	1.127
OCF	operating cash flow to lagged total assets	0.064	0.059	0.115	-0.335	0.412
TACC	total accruals to lagged total assets	-0.009	-0.017	0.109	-0.280	0.372
BM	the book-to-market ratio of stockholders equity	0.845	0.731	0.521	0.136	2.990
INC	labor intensity, equal to 1 minus the ratio of gross PPE to lagged total assets	0.718	0.790	0.240	0.053	0.992
DAJ	absolute value of discretionary accruals from Jones model	0.069	0.047	0.070	0.001	0.367
DAMJ	absolute value of discretionary accruals from modified Jones model	0.070	0.048	0.071	0.001	0.377
DAKA	absolute value of discretionary accruals from Kasznik model	0.066	0.045	0.067	0.000	0.342

The table consists of 4,570 firm-year observations during the period 1997-2007.

Table 2: The Relationship between Equity Incentives and Earnings Management

$EM_{it} = a_0 + a_1 INCRA_{it} + a_2 SIZE_{it} + a_3 LEV_{it} + a_4 OCF_{it} + a_5 TACC_{it} + a_6 BM_{it} + a_7 INC_{it} + \varepsilon_{it}$			
Independent Variable	Dependent Variable (EM)		
	DAJ	DAMJ	DAKA
INTERCEPT	0.127(9.836) <sup>***</sup>	0.132(10.071) <sup>***</sup>	0.136(10.933) <sup>***</sup>
INCRA	0.020(1.865) <sup>*</sup>	0.021(1.979) <sup>**</sup>	0.018(1.735) <sup>*</sup>
SIZE	-0.015(-7.980) <sup>***</sup>	-0.015(-8.233) <sup>***</sup>	-0.017(-9.434) <sup>***</sup>
LEV	0.061(11.712) <sup>***</sup>	0.062(11.705) <sup>***</sup>	0.059(11.753) <sup>***</sup>
OCF	0.044(4.499) <sup>***</sup>	0.043(4.257) <sup>***</sup>	0.044(4.662) <sup>***</sup>
TACC	0.067(6.899) <sup>***</sup>	0.071(7.140) <sup>***</sup>	0.065(6.952) <sup>***</sup>
BM	-0.015(-7.259) <sup>***</sup>	-0.015(-7.183) <sup>***</sup>	-0.013(-6.454) <sup>***</sup>
INC	0.028(6.488) <sup>***</sup>	0.029(6.577) <sup>***</sup>	0.029(6.963) <sup>***</sup>
N	4570	4570	4570
Adj R <sup>2</sup>	9.8%	10%	10.1%
F Value	71.887 <sup>***</sup>	73.513 <sup>***</sup>	74.497 <sup>***</sup>

Robust t-statistics are in parentheses. The symbols \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Table 1.

The primary objective of our study is to test the relationship between managers' equity incentives and earnings management (DAJ, DAMJ, and DAKA). The results are presented in Table 2. We present the findings of the three different regressions. As shown in the three columns, the results are robust to our three alternative methodologies. The managers' equity incentives coefficients in the three empirical models are all positive and significant at the 1%, 5% and 10% levels, respectively. These findings are consistent with those of previous studies [5], [22] in that there is a strong relationship between the managers' equity incentives and earnings manipulation. Regarding the control variables, the results indicate that firms that are large in size and use the book-to-market ratio are less likely to report large discretionary accruals. The results also suggest that firms with higher leverage, operating cash flow, total accruals, and stakeholders' implicit claims are more likely to manipulate earnings. Overall, the results in Table 2 provide evidence for H1.

The results for H2 are shown in Table 3. The main effects of equity incentives INCRA are all significant and positive at the 1% level in the regression models. The results in Table 3 show that managers with high equity incentives are more likely to trade shares in the next year. Regarding the control variables, both of the coefficients of SIZE and BM are negatively associated with insider trading, indicating that firms that are large in size with high growth opportunities transfer fewer shares. The positive coefficient of the stock annual return rate is consistent with managers transferring more shares after price increases. The results in Table 3 suggest that equity incentives cause managers' wealth to be sensitive to firms' stock prices and higher the stock prices, the more shares that are traded. In sum, H2 is supported based on the results in Table 3.

Table 3: Relationship between and Equity Incentives and Managers' Insider Tradings

$TRA_{it+1} = a_0 + a_1 INCRA_{it} + a_2 SIZE_{it} + a_3 OCF_{it} + a_4 BM_{it} + a_5 RET_{it} + \varepsilon_{it}$		
Independent Variable	Dependent Variable $TRA_{it+1}$	
	TRAMV	TRAOR
INTERCEPT	0.034(8.127) ***	0.022(8.413) ***
INCRA	0.010(3.090) ***	0.009(4.297) ***
SIZE	-0.004(-6.971) ***	-0.003(-7.621) ***
OCF	0.005(1.743) *	-0.002(-0.934)
BM	-0.004(-4.454) ***	0.000(-0.630)
RET	0.000(2.165) **	0.000(1.725) *
N	462	462
Adj R2	14.2%	13.4%
F Value	16.273 ***	15.322 ***

TRAMV is the dollar value of the managers' trading and TRAOR is the trading shares scaled by the firm's total ending outstanding shares. RET is the prior annual return rate on investment. Robust t-statistics are in parentheses. The symbols \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Table 1.

## 5. Conclusions

In addition to assessing the relationship between managers' equity incentives and earnings management, our study also tests the relationship between managers' equity incentives and insider trading in the future. We find evidence that the more incentivized managers are more likely to engage in higher levels of earnings management. Our findings suggest that equity-based compensation can help align the decisions of managers with the interests of shareholders; however, the mechanism also has side effects and creates incentives for managers to misprice firms' earnings. This study also suggests that the companies should take this problem into consideration in the design of managers' compensation contracts.

This study goes on to document that the higher equity incentives also lead to higher insider transfers in the future. Our study suggests that the investors in the capital markets can take advantage of insider transfer information in making their investment portfolio decisions. The main limitation of this study is that the data on stock options in the annual statements of Taiwanese listed firms are only available from 2005 onwards. In addition, the data regarding the exercising of the stock options are not available. At the same time, the numbers of insiders' purchasing and selling shares are also not available. It is recommended that future studies focus on the stock options issues of Taiwan listed firms.

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