Managerial ownership, audit quality, and earnings management

Shwu-Jen You*, Yann-Ching Tsai** and Yi-Mien Lin***

Separation of ownership and control induces agency problems. The contracts written to restrict manager’s self-serving behavior often incorporate accounting-based constraints, which arouses managers’ motivation to manage reported accounting numbers to either alleviate constraints or capitalize on available incentives. Theory predicts that increased managerial ownership can reduce managers’ exploitation of accounting numbers. Another factor able to constrain earnings management is the quality of the external auditor. This study provides empirical evidence regarding the relation between managerial ownership, earnings management, and audit quality in Taiwan. We find managerial ownership and audit quality are both inversely associated with abnormal accruals. Managerial ownership, however, is not found to be associated with stock returns. Furthermore, we document evidence that stock market reacts negatively to abnormal accruals and positively to audit quality.

Keywords: Managerial ownership, Audit quality, Discretionary accruals, Earnings management.

1. Introduction

Separation of equity ownership from control of corporate decisions induces agency problems. Jensen and Meckling [26] define an agency relationship as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf, which involves delegating some authority to the agent. The agency problem arises when a manager owns less than the total equity of the firm. This fractional ownership can lead the managers to work less strenuously and to acquire more perquisites than if they had to bear all of the costs. The contracts written to restrict managers’ self-serving behavior when ownership and control are distinct often contain accounting-based constraints. The existence of accounting-based contractual constraints stimulates managers to exploit

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We would like to thank the editor and the anonymous reviewers for their useful comments on this paper.
the opportunity available in the selection and application of accounting procedures to either alleviate constraints or benefit from available incentives. Elitzur and Yaari [14] propose that management manipulate earnings through the selection and change of accounting procedures. Lewellen, Park, and Ro [34] find evidence that, in the reports on common stock return performance, managers tend to choose comparative stock return indices that have displayed relatively poor performance, and thereby cast a more favorable light on their own firm’s returns.

A considerable number of studies have examined management’s motivation to “adjust” earnings, and relatively little work has examined factors that constrain earnings management. In Jensen and Meckling’s [26] framework, management ownership can reduce agency costs by aligning the interests of a firm’s management with its shareholders. Haugen and Senbet [18] also argue that monitoring and contractual constraints are ways to reduce agency costs, but increase in managerial holdings of common stock is even more helpful in alleviating agency problems. This convergence-of-interest theory implies that managers will exploit more their discretion in accounting choice when their ownership decreases. In other words, managerial ownership acts as a constraining factor that limit management’s manipulation of accounting numbers.

The quality of the external auditor can be another constraining factor. Watts and Zimmerman [38] show that auditing is a valuable form of monitoring used by firms to reduce agency costs. The value of auditing arises, in part, because auditing reduces the misreporting of financial information. The value of auditing on constraining managerial discretion, however, is expected to vary with the quality of the auditor. Becker et al. [5] and Heninger [20] report evidence consistent with the external auditor acting as a constraint on earnings management, with the effectiveness of the constraint depending on audit quality. Based on the literature of agency cost and earnings management, the main purpose of this paper is to test empirically the constraint effect of managerial ownership and audit quality in the Taiwan stock market.

As security prices reflect the discounted value of future cash flows, the price reactions to a financial report depend on the quality of the information in the report. Holthausen and Verrecchia [23, 24]’s theoretical model indicates that the market reacts more to information of higher quality. Managerial ownership, earnings manipulation, and audit quality are all factors affecting
the quality of the reported accounting numbers. This paper is therefore also
aimed to understand the incremental information content of managerial own-
ership, earnings manipulation, and audit quality in the price-earnings rela-
tionships.

The reported accounting numbers are measured either on the accrual
basis or on the cash basis. Although accrual-based measurement involves
much choice and discretion, it contains more relevant information than cash-
based measurement. Indeed, it is argued that accrual basis accounting pro-
vides more precise measures of economic performance and financial
position. Hence, accounting earnings are measured on the accrual basis
according to the generally accepted accounting principles. Nevertheless, the
judgement and discretion involved in the process of accrual-based
measurement offer the management opportunities to manipulate the reported
numbers. With their comparative advantage of information, the management
is able to purposely select accounting methods to report a predetermined
earnings number. Whether the management uses the discretionary accounts
as a tool in earnings manipulation has been widely studied. Therefore, we
adopt discretionary accruals as the proxy for earnings management and use
the Jones model as well as the modified Jones model in the estimation of
discretionary accruals.

Consistent with theory and prior research, we document evidence of a
negative relation between managerial ownership and absolute discretion ary
accruals, suggesting reduced earnings quality with low managerial own-
ership. Moreover, the finding of an inverse association between earnings man-
agement and audit quality indicates that other than increased managerial
ownership, the quality of the external auditor can be one effective force in
restricting managers’ manipulation of accounting numbers. With regard to
the information content of managerial ownership in the price-earnings rela-
tionships, we do not find evidence supportive of the conjecture that the level
of managerial ownership is an additional source of information for investors.
Nevertheless, we document evidence consistent with the two hypotheses re-
garding the impact of abnormal accruals and audit quality on the price-
earnings relationships. Specifically, stock market reacts positively to audit
quality but negatively to earnings management. The evidence implies that
investors in the Taiwan’s stock market assimilate the information of earnings
management and audit quality in their response to the reported number of
accounting earnings.

The paper is organized as follows. Section 2 states the hypotheses to be tested. Section 3 describes the sample selection process, the definition of each variable and the empirical models. Results of the empirical tests are presented in Section 4. Section 5 concludes.

2. The Research Hypotheses

Five testable hypotheses are developed from literature on agency cost and on managerial manipulation of accounting numbers.

Hypothesis 1: The level of managerial ownership is systematically associated with the market’s reaction to earnings.

Empirical research on the returns-earnings relationships reveal that prices act as if accounting earnings are an important source of information, but only one of many sources. Leland and Pyle’s [33] information transmission model suggests that, due to information asymmetry, when managers expect higher future cash flows, they have more incentives to increase their stock holdings. Therefore, managerial ownership can be one of the several signals that provide information about the true value of the firm. It implies that an increase in managerial ownership can be a positive signal to the outside shareholders. Hughes [25] extends Leland and Pyle’s model and provides a formal analysis of the problem of managerial perquisite-taking behavior. He concludes that the increase in managerial ownership conveys a signal of less perquisites and hence a higher value of the firm. Baker and Wruck [3] argue that increased managerial ownership can counterbalance incentive to conserve cash at the expense of value maximization in highly leveraged transactions.

The above agency cost literature suggests a positive relationship between managerial ownership and the stock returns in conjunction with earnings information. The earnings manipulation literature suggests the same relationship. Lower managerial ownership is associated with both increased accounting-based contractual constraints and consequent greater managerial motivation to either relax restrictions or benefit from incentives. Given manager’s latitude in applying accepted accounting procedures, the manager-determined accounting numbers are not necessarily the most relevant in conveying the economic status of the firm. It follows that if increases in
accounting-based constraints for firms with low managerial ownership impair the faithful determination of accounting numbers, then the price reactions to earnings is positively associated with the level of managerial ownership. Warfield, Wild, and Wild [39] report evidence consistent with this argument that managerial ownership is positively related to earnings explanatory power for returns and negatively related to accounting accrual adjustments.

An alternative supposition exists in the managerial entrenchment literature. This line of literature argue that market discipline, for example, the managerial labor market [15], the product market [17], and the market for corporate control [27], may still force a manager toward value maximization when he owns only a small stake. In contrast, a manager who owns a substantial fraction of the firm’s equity may have enough voting power or influence to pursue his preference for non-value-maximizing behavior with little threat of being replaced through either a hostile takeover or a proxy fight. Denis et al. [11] find managers get entrenched at higher ownership levels since these managers experience lower turnover. Which supposition conforms more to the reality in the Taiwan’s stock market depends on empirical evidence.

**Hypothesis 2: The magnitude of earnings management is systematically associated with managerial ownership.**

Watts and Zimmerman’s [37] theoretical model indicates that the contractual constraints with earnings-based bonus plans provide incentives for managers to report accounting numbers, which maximize their short-term bonus compensation. Earlier research emphasizes managers’ motivation in choosing accounting techniques to increase current earnings and, therefore, to maximize their short-term bonuses. Healy [19] models the earnings-management behavior of a single manager with additional proposition that each manager makes either income increasing or decreasing discretionary accruals based on the bonus-related incentives. Consistent with his proposition, he reports evidence that when income before discretionary accruals is sufficiently below the lower bound or above the upper bound, managers would make income-decreasing discretionary accruals. And when earnings before discretionary accruals fall between the upper and lower bounds, the manager would make income-increasing discretionary accruals. Holthausen, Larcker, and Sloan [22] find the same income-decreasing behavior when managers reach their maximum bonus level. However, contrary to Healy, they find no
evidence that managers make income-decreasing discretionary accruals when earnings are below the lower bound. Guidry, Leone, and Rock [16] conduct analysis using business unit-level data and report evidence corroborating Healy’s findings.

Ball [4] argues that owners do not wish to eliminate all accounting discretion, as managers are likely to possess a comparative advantage in choosing an efficient set of accounting methods. The inverse relationship between accounting-based constraints and managerial ownership leads to the supposition that the magnitude of accounting adjustments is inversely related to ownership if managers’ accounting choices are not entirely constrained within the contractual provisions.

**Hypothesis 3:** The magnitude of earnings management is systematically associated with audit quality.

Auditing reduces information asymmetries between managers and stockholders by allowing outsiders to verify the validity of financial statements and thus is a valuable method of monitoring used by firms to reduce agency costs [38]. Hirst [21] finds that auditors are sensitive to earnings management and tend to concentrate on managerial incentives to overstate earnings. Kinney and Martin [31] review nine studies and conclude that auditing reduces upward bias in preaudit earnings and net assets. While auditing is valuable in controlling managerial discretion, its effectiveness is expected to vary with the quality of the audit firm. DeAngelo [9] defines audit quality as the joint probability of detecting and reporting financial statement errors. In comparison with low-quality auditors, high-quality auditors are more likely to detect and report errors and irregularities. Thus, a high-quality auditor acts as an effective deterrent to earnings manipulation because management’s reputation is likely to be damaged and firm value reduced if misreporting is detected and revealed.

DeAngelo [9] demonstrates analytically that larger audit firms have greater incentives to detect and reveal management misreporting. Dopuch and Simunic’s [12] model also suggests that audit firm size is a proxy for audit quality. Because Big Six firms are the largest audit firms in the U.S.A., they are the most common proxy for audit quality. Jiambalvo [28] finds that auditor-client disagreements resulting from incentives to manage earnings are more likely to occur when firms have Big Six auditors. Becker et al. [5]
report that firms with non-Big Six auditors report significantly greater discretionary accruals and have larger variation in discretionary accruals compared to firms with Big Six auditors. This paper uses the Big Five audit firms in Taiwan as the proxy for audit quality to study the relationship between earnings management and audit quality.

**Hypothesis 4:** The magnitude of discretionary accounting accruals is systematically associated with the market’s reaction to earnings.

The variation in the quality of financial information yields certain predictable behavior in users’ assimilation of the information. Holthausen and Verrecchia [23, 24] integrate the market’s reaction to information along with the quality of that information in their economic models, which predict earnings reports of higher quality yield greater stock price reactions. Choi and Salamon [7] use discretionary accruals as the proxy for the quality of earnings reports and document a positive relation between the magnitude of market’s reaction to earnings and earnings quality. As larger discretionary accruals imply more earnings manipulation and, hence, lower quality of the reported earnings, an inverse relation between discretionary accruals and stock returns is expected.

**Hypothesis 5:** Audit quality is systematically associated with the market’s reaction to earnings.

The effectiveness of auditing in constraining managerial discretion relies on audit quality and the quality of reported accounting numbers depends on if they reflect the economic reality of the firm. Following the inverse relation between the magnitude of earnings management and audit quality proposed in Hypothesis 3 and the inverse relation between returns and earnings management proposed in Hypothesis 4, we hypothesize a positive association of audit quality with stock returns. As the formation of audit committee can enhance earnings quality through the committee’s effective oversight of the financial reporting process, Wild [40] uses it as the proxy for audit quality and documents a significant increase in the market’s reaction to earnings reports subsequent to the formation of audit committee. We will still use the Big Five audit firms in Taiwan as the proxy for audit quality to test the relation between audit quality and stock returns.
3. Research Design

3.1 Sample Selection

We use the sample in Taiwan to study the relation between managerial ownership, accounting choices, and audit quality over the period of 1991-2000. To be included in the sample, companies must meet the following selection criteria:

(1) Companies should be publicly listed in the Taiwan Stock Exchange with complete information of managerial ownership, stock price, and financial statements for the period of 1991-2000.

(2) Firms in the banking and insurance industry are excluded because of the different industry characteristics.

(3) Firms ever going through consolidation, bankruptcy, or reorganization in the period of 1991-2000 are excluded to avoid biased results due to the effect of these events on the ownership and financial decisions.

(4) Firms changing trading methods during 1987-1997 are also excluded from samples.

These criteria yield 2030 firm-year observations, drawn from 393 corporations. All the data needed are collected from the prospectus of each company and the financial database of Taiwan Economic Journal.

Kim and Lyn [29] defined managerial ownership over 25% as high insider ownership firms and less than 5% as low insider ownership firms. Considering the ownership structure in Taiwan, where many firms are managed by members of the founding family, we also use 25% as the dividing point to classify firms as management-controlled or owner-controlled. Table 1 indicates the structure of ownership in each industry. As shown, owner-

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1 Managerial ownership is the total ownership of principal owners (individuals who hold at least 10% outstanding common stock), managers, directors, and supervisors.

2 All companies are classified into six trades according to the “Standard Classification of Trades of the Republic of China”, published by Executive Yuan: (1) Food. (2) Textiles. (3) Lithification: including Plastics, Chemical, and Rubber. (4) Construction: including Cement, Glass and Ceramics, and Construction. (5) Electric & Machinery: including Electric, Machinery, Appliance & Cable, Electron, Steel & Iron, and Automobile. (6) Others: including
ship structure varies across industries. In the industries of food, textiles, construction, electronic and machinery, there are more observations of managerial ownership less than 25% in the full period as well as in the two sub-periods. In contrast, more observations of owner-controlled firms appear in the industries of lithification and others.

Table 1 Ownership Structure in Each Industry

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Industries</td>
<td>Managerial Ownership &gt; 25%</td>
<td>Managerial Ownership &lt; 25%</td>
<td>Managerial Ownership &gt; 25%</td>
</tr>
<tr>
<td>Food</td>
<td>24 (2.57%)</td>
<td>48 (5.15%)</td>
<td>19 (1.72%)</td>
</tr>
<tr>
<td>Textiles</td>
<td>91 (9.77%)</td>
<td>98 (10.53%)</td>
<td>65 (5.91%)</td>
</tr>
<tr>
<td>Lithification</td>
<td>86 (9.24%)</td>
<td>59 (6.33%)</td>
<td>73 (6.44%)</td>
</tr>
<tr>
<td>Construction</td>
<td>47 (5.05%)</td>
<td>64 (6.87%)</td>
<td>33 (3.00%)</td>
</tr>
<tr>
<td>Electric &amp; Machinery</td>
<td>97 (10.42%)</td>
<td>132 (14.17%)</td>
<td>185 (16.83%)</td>
</tr>
<tr>
<td>Others</td>
<td>118 (12.67%)</td>
<td>67 (7.19%)</td>
<td>147 (13.38%)</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>463 (49.73%)</td>
<td>468 (50.26%)</td>
<td>568 (51.68%)</td>
</tr>
<tr>
<td>Total Observations</td>
<td>931</td>
<td>1099</td>
<td>2030</td>
</tr>
</tbody>
</table>

Managerial ownership is measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors. Figures in parentheses are the percentages of observations for that period.

3.2 Approach to testing

The purpose of our analysis is to understand the explanatory power of managerial ownership for stock returns and earnings management as well as the constraint effect of audit quality. Managerial ownership is, of course, not the sole determinant of stock returns or earnings management. In fact, managers’ incentives in the selection and reporting of accounting numbers are affected by several factors. Contracting theory maintains that managers con-
duct self-interest activities within the permission of both the contracts and accepted accounting procedures. Political process theory argues that ownership structure is endogenous to the formation of the economic entity and therefore can be used with other factors in the prediction of manager’s accounting choices. Zimmerman [41] bases his arguments on political process theory and points out that firm size and risk are determinants of accounting numbers. Zmijewski and Hagerman [42] also suggest that large firms are more politically sensitive and thus have greater incentives to exploit the latitude in accounting to reduce political costs. As these costs vary with risk, high-risk firms are more likely to exploit the latitude.

On the other hand, Kim and Sorensen [30] investigate the relations between debt agency costs and leverage policy and find that firms with less diverse ownership structure have higher leverage. Agrawal and Nagarajan [2] document higher managerial ownership in total equity firms and conclude that managerial ownership is negatively related to leverage. Sweeney [36] presents evidence that managers under greater constraints of debt covenants are more likely to exploit the latitude in accounting choice. Firm valuation model demonstrates that firms with better growth opportunities can attract more investors and therefore have higher stock returns. However, high-growth firms also provide managers more opportunities to manage earnings and have more accrual adjustments. Easton and Zmijewski [13] and Lipe [35] report that both growth opportunities and earnings variability can affect the informativeness of earnings. To better isolate the role of managerial ownership, we consider these 5 additional variables in our analysis: firm size, risk, leverage, growth, and earnings variance.

Our analyses rely on pooled cross-sectional regression model. To test Hypothesis 1, the following model is used:

\[
R_{i,t} = a_0 + a_1 \cdot E_{i,t} + a_2 \cdot OWN_{i,t} + a_3 \cdot SIZE_{i,t} + a_4 \cdot RISK_{i,t} + a_5 \cdot DEBT_{i,t} + a_6 \cdot GROWTH_{i,t} + a_7 \cdot VAR_{i,t} + e_{i,t}
\] (1)

where

- \(R_{i,t}\): The return of firm \(i\) for annual period \(t\), measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-
end\(^3\).

\( E_{it} \): The earnings-per-share at the end of period \( t \) deflated by the price-per-share at the end of period \( t-1 \) (\( P_{i,t-1} \)).

\( OWN_{it} \): The percentage of managerial ownership in the firm\(^4\).

\( SIZE_{it} \): The natural logarithm of a firm’s market value of equity.

\( RISK_{it} \): Each firm’s systematic risk, measured by the market model beta. Estimates for each firm are obtained using the most recent 250 days’ stock returns prior to the test period.

\( DEBT_{it} \): The firm’s ratio of total debt to total assets.

\( GROWTH_{it} \): Measured as market value of equity scaled by book value.

\( VAR_{it} \): The standard deviation of earnings for the sixteen quarters prior to period \( t \) deflated by the price-per-share at the end of period \( t-1 \) (\( P_{i,t-1} \)).

To test Hypotheses 2 and 3, the following multivariate regression model is formulated:

\[
/ACC_{it}/ = b_0 + b_1 \cdot OWN_{it} + b_2 \cdot SIZE_{it} + b_3 \cdot RISK_{it} + b_4 \cdot DEBT_{it} + b_5 \cdot GROWTH_{it} + b_6 \cdot VAR_{it} + b_7 \cdot AQ_{it} + \epsilon_{it}
\]  

(2)

where \( /ACC/ \) is the absolute abnormal (discretionary) accruals, serving to measure the extent to which managers knowingly pursue certain techniques to adjust reported accounting numbers. Since our hypothesis does not depend on the direction of the accruals, but on the magnitude of the accrual

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\(^3\) This measurement period approximately corresponds to the time between earnings announcements. All analyses are repeated for variations in beginning and ending points for the stock return measurement period. The results of these additional analyses are qualitatively identical to those reported.

\(^4\) Agrawal and Mandelker [1] classified the authorities concerned into Top Manager, Two Top Managers and All Officers and Directors, and found that all officers and Directors have significant influence over corporate operations. Therefore, we estimate ownership as the percentage of equity shares held: 1. by the authorities concerned, consisting of principal owners, officers, directors, and supervisors. 2. by directors, supervisors and managers. 3. by managers, and 4. by chief executive officer (CEO), respectively.
adjustments, we use the absolute value of the abnormal accrual (|ACC|) in our analysis. The abnormal accruals (ACC) is measured as the current-period total accruals (AC) less the expected normal accruals (E(AC)), scaled by lagged total assets ($A_{t-1}$):

$$ACC_{it} = [AC_{it} - E(AC_{it})] / A_{t-1}$$  \hspace{1cm} (3)

As reported earnings consist of cash flows from operations and accounting adjustments called accruals, total accruals by definition are the difference between cash flows from operations and reported operating income. Equivalently,

$$AC_{it} = [\text{cash flows from operations}] - [\text{reported operating income}]$$

$$= [\Delta \text{Accounts Receivable}_{it} + \Delta \text{Inventories}_{it} + \Delta \text{Other Current Assets}_{it}] - [\Delta \text{Current Liabilities}_{it}] - [\text{Depreciation} + \text{Amortization Expense}_{it}]$$  \hspace{1cm} (4)

where the change ($\Delta$) is the difference between years $t$ and $t - 1$.

Total accruals can further be split into discretionary and nondiscretionary accruals (denoted by E(AC)) and managers’ earnings manipulation is reflected in discretionary accruals. Equation (3) is thus used to measure the magnitude of manager’s earnings management.

Attempting to find a best model fitting to the economic environment of Taiwan, we use two different estimates of expected normal accruals (nondiscretionary accruals) based on the Jones expectation model of accounting accruals, and a modified version of the Jones model implemented by Dechow, Sloan, and Sweeney [10]. The Jones expectation model can be expressed as:

$$AC_{it} / A_{t-1} = \alpha_t (1 / A_{t-1}) + \beta_t [\Delta \text{Revenue}_{it} / A_{t-1}]$$

$$+ \beta_{t2} [(\text{Property}_{it} + \text{Plant}_{it} + \text{Equipment}_{it}) / A_{t-1}]$$

$$+ \epsilon_{it}$$  \hspace{1cm} (5)

Dechow, Sloan, and Sweeney [10] modify the Jones model by ex-

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5 In the Jones model, change in revenues is used to control for the economic environment of the firm. Gross property, plant and equipment are included to control for the portion of total accruals related to nondiscretionary depreciation expense.
cluding the change in accounts receivable from nondiscretionary accruals:

\[
\frac{AC_{i,t}}{A_{i,t-1}} = \alpha_t\left(\frac{1}{A_{i,t-1}}\right) + \beta_t\left(\Delta\text{Revenue}_{i,t} - \Delta\text{Receivable}_{i,t}\right) + \beta_2\left(\frac{\Delta\text{Property}_{i,t}}{A_{i,t-1}} + \Delta\text{Plant}_{i,t} + \Delta\text{Equipment}_{i,t}\right) + \varepsilon_{i,t} \tag{6}
\]

These two expectation models are estimated using the longest time series of observation available prior to year t-1 for each firm. The Jones expected normal accruals (E(JAC)) is then calculated by multiplying the estimated coefficients and the variables of \(\Delta\text{Revenue}_{i,t}, \Delta\text{Property}_{i,t}, \Delta\text{Plant}_{i,t},\) and \(\Delta\text{Equipment}_{i,t}\) of the test period. Similar calculation applies to the expected normal accruals of modified Jones model (E(MJAC)). The two estimates of expected normal accrual result into two estimates of scaled absolute abnormal accrual: JACC (absolute scaled value of the abnormal accrual of Jones’ model) and MJACC (absolute scaled value of the abnormal accrual of the modified Jones model).

Furthermore, to test the effect of audit quality on managers’ earnings manipulation as proposed in Hypothesis 3, we use the Big Five auditors as the proxy for audit quality. In Equation (2), AQ is the dummy variable for audit quality; that is, AQ equals to 1 for firms with Big Five auditors, and 0.

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6 The Jones model assumes revenues as nondiscretionary accruals. However, reported revenues may be affected to some extent by manager’s attempts to manage reported earnings. Dechow, Sloan and Sweeney [10] exclude the change in accounts receivable from nondiscretionary accruals in the modified version of Jones model to better capture managers’ manipulation behavior.

7 Ordinary expectation model is used to obtain estimates \(a, b_1, b_2\) of \(\alpha, \beta_1, \beta_2\), respectively. This model assumes the relation between nondiscretionary accruals and the explanatory variables are stationary. The prediction error is defined as:

\[
\varepsilon_{i,t} = \frac{AC_{i,t}}{A_{i,t-1}} - \left(\frac{1}{A_{i,t-1}}\right) + \beta_1\left(\Delta\text{Revenue}_{i,t} + \Delta\text{Property}_{i,t} + \Delta\text{Plant}_{i,t} + \Delta\text{Equipment}_{i,t}\right)
\]

where \(t\) denotes the prediction year, and \(\varepsilon_{i,t}\) represents the level of discretionary accruals at time \(t\), that is, JACC = \(\sqrt{\varepsilon_{i,t}}\).

8 The Big Five audit firms in Taiwan during the research period were Arthur Andersen (勤業), KPMG(安侯), Pricewaterhouse Coopers (資誠), Deloitte & Touche (眾信), Ernst & Young (致遠). In 2002, Deloitte & Touche merged with Andersen, and BDO (立本) became one of the Big Five in Taiwan.
otherwise.

To test Hypotheses 4 and 5, we extend Eq. (1) by including the variables of abnormal accruals and audit quality:

\[
R_{it} = a_0 + a_1 \cdot E_{it} + a_2 \cdot OWN_{it} + a_3 \cdot SIZE_{it} + a_4 \cdot RISK_{it} \\
+ a_5 \cdot DEBT_{it} + a_6 \cdot GROWTH_{it} + a_7 \cdot VAR_{it} + a_8 \cdot ACC_{it} + \varepsilon_{it}
\]

(7)

4. Empirical Results

A preliminary examination of the Pearson correlation matrix, presented in Table 2, shows that the correlations between returns (R), earnings (E), growth opportunity (GROWTH) and audit quality (AQ) are significantly positive. As for the correlation between returns and ownership (OWN), it is also positive but not significant. On the other hand, the correlation between ownership and the abnormal accruals is significantly negative regardless of whether the abnormal accruals are estimated based on the Jones model (JACC) or the modified Jones model (MJACC). Similarly, the correlation between audit quality and abnormal accruals is significantly negative irrespective of the model adopted. Whether these relations sustain when factors are considered jointly calls for further analysis.

We further use pooled cross-sectional multivariate regression model to test our hypotheses. To test for multicollinearity, the problem of unstable and inaccurate estimates of regression coefficients due to highly correlated explanatory variables, the variance-inflation factor (VIF) is used. In addition, White’s heteroskedasticity test is applied to examine if the residuals are both homoskedastic and independent of the regressors. The statistics of these diagnostic tests reported in all tables indicates that all the regression models

\[
VIF(\hat{\beta}) = \frac{1}{(1 - R^2)}
\]

Usually VIF=10 is taken as the critical point for detecting multicollinearity. If VIF>10, then there is multicolinearity among the explanatory variables, which may cause the standard errors of the estimated regression coefficients to be very high.

10 The statistic of White’s test has an asymptotic \(\chi^2\) distribution. A non-significant test statistic is supporting the hypothesis of homoskedastic errors.
Stock returns (R) are measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-end. Earnings (E) is the earnings-per-share at the end of period t deflated by the price-per-share at the end of period t-1 (P_{t-1}). Firm size (SIZE) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk (RISK) is measured by the market model beta and leverage (DEBT) is a firm’s ratio of total debt to total assets. Growth opportunity (GROWTH) is measured as market value of equity scaled by book value. Variability of earnings (VAR) is calculated by the standard deviation of earnings for the sixteen quarters prior to period t deflated by the price-per-share at the end of period t-1 (P_{t-1}). JACC and MJACC are the absolute scaled abnormal accruals based on the Jones model and the modified Jones model, respectively. Audit quality (AQ) is an indicator, equal to 1 for firms with Big Five auditors, and 0 otherwise. P-value is presented in parentheses.

4.1 The incremental information content of managerial ownership in the price-earnings relationships

The first hypothesis predicts that the level of managerial ownership is an additional source of information for investors. As managerial ownership is not the sole determinant in the price-earnings relationships, to better un-

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**Table 2 Pearson Correlation Matrix**

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>E</th>
<th>OWN</th>
<th>SIZE</th>
<th>RISK</th>
<th>DEBT</th>
<th>GROWTH</th>
<th>JACC</th>
<th>MJACC</th>
<th>AQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>1.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>E</td>
<td>0.2108 (0.0001)</td>
<td>1.0000 (0.0000)</td>
<td>0.1271 (0.0001)</td>
<td>0.1257 (0.0001)</td>
<td>0.4271 (0.0001)</td>
<td>0.4701 (0.0001)</td>
<td>0.3459 (0.0000)</td>
<td>0.1055 (0.0001)</td>
<td>0.1100 (0.0000)</td>
<td>0.1045 (0.0000)</td>
</tr>
<tr>
<td>OWN</td>
<td>0.0409 (0.0642)</td>
<td>0.1271 (0.0001)</td>
<td>1.0000 (0.0000)</td>
<td>0.0509 (0.0001)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
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<tr>
<td>SIZE</td>
<td>-0.0409 (0.0642)</td>
<td>0.0409 (0.0642)</td>
<td>-0.0409 (0.0642)</td>
<td>1.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
<td>0.0000 (0.0000)</td>
</tr>
<tr>
<td>RISK</td>
<td>-0.1055 (0.0001)</td>
<td>-0.1055 (0.0001)</td>
<td>-0.1055 (0.0001)</td>
<td>-0.1055 (0.0001)</td>
<td>1.0000 (0.0000)</td>
<td>0.3459 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
</tr>
<tr>
<td>DEBT</td>
<td>0.0514 (0.0200)</td>
<td>0.0514 (0.0200)</td>
<td>0.0514 (0.0200)</td>
<td>0.0514 (0.0200)</td>
<td>0.0514 (0.0200)</td>
<td>1.0000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.1037 (0.0001)</td>
<td>0.1037 (0.0001)</td>
<td>0.1037 (0.0001)</td>
<td>0.1037 (0.0001)</td>
<td>0.1037 (0.0001)</td>
<td>0.1037 (0.0001)</td>
<td>1.0000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
</tr>
<tr>
<td>VAR</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>-0.0689 (0.0429)</td>
<td>1.0000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
</tr>
<tr>
<td>JACC</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>-0.0705 (0.0014)</td>
<td>1.0000 (0.0000)</td>
<td>0.1000 (0.0000)</td>
</tr>
<tr>
<td>MJACC</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>-0.0622 (0.0049)</td>
<td>1.0000 (0.0000)</td>
</tr>
<tr>
<td>AQ</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
<td>-0.0777 (0.0003)</td>
</tr>
</tbody>
</table>
derstand the incremental information effect of managerial ownership, we consider additional factors in the regression models: firm size, systematic risk, leverage, growth opportunities, and earnings variability. To examine if the measurement of ownership would affect the test results, we adopt four different measures. Specifically, ownership is measured as the percentage of equity held: (1) by professional managers, (2) by CEO, (3) by directors, supervisors, and officers, and (4) by principal owners (individuals who hold at least 10% of outstanding common stocks), officers, directors, and supervisors. The estimated coefficient on earnings in panel A, B, C, D of Table 3 is significantly greater than zero (in panel A, \( a_1 = 1.5809, p\text{-value}=0.0001 \); in panel B, \( a_1 = 0.7585, p\text{-value}=0.0001 \); in panel C, \( a_1 = 1.6641, p\text{-value}=0.0001 \); in panel D, \( a_1 = 1.6661, p\text{-value}=0.0001 \)). Obviously, the Taiwan’s stock market reacts positively to accounting numbers. Nevertheless, the coefficient on ownership is not significantly different from zero across the four measures of ownership, indicating no significant explanatory power of ownership for returns\(^{11}\). Although inconsistent with the prediction of Hypothesis 1, this result is congruent with previous studies using data in the Taiwan’s stock market. For example, Chou, Chang, and Ho [8] and Chen [6] also do not find a significant relationship between managerial ownership and stock returns.

The coefficients of other variables are consistent with theoretical expectations or prior research. Specifically, the market reaction to earnings is significantly positively related to growth opportunities and leverage, but negatively related to size, systematic risk and earnings variability.

\(^{11}\) We further divide the sample into three groups according to the level of ownership: ownership less than 5%, between 5% and 25%, and larger than 25%. Again, no significant relationship between ownership and stock returns is found for any of these groups.
Table 3  The Effect of Accounting Earnings, Ownership and Other Variables on Stock Returns in the Full Period

<table>
<thead>
<tr>
<th>Panel</th>
<th>Ownership measured as the percentage of equity shares held by professional managers.</th>
<th>Ownership measured as the percentage of equity shares held by CEO.</th>
<th>Ownership measured as the percentage of equity shares held by directors, supervisors and managers</th>
<th>Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model: ( R_{it} = a_0 + a_1 \cdot E_{it} + a_2 \cdot OWN_{it} + a_3 \cdot SIZE_{it} + a_4 \cdot RISK_{it} + a_5 \cdot DEBT_{it} + a_6 \cdot GROWTH_{it} + a_7 \cdot VAR_{it} + \epsilon_{it} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( a_0 )</td>
<td>( a_1 )</td>
<td>( a_2 )</td>
<td>( a_3 )</td>
</tr>
<tr>
<td>Panel A</td>
<td>0.3715</td>
<td>1.5809</td>
<td>-0.0115</td>
<td>-0.0155</td>
</tr>
<tr>
<td>Panel B</td>
<td>0.3635</td>
<td>0.7585</td>
<td>-0.0001</td>
<td>-0.1324</td>
</tr>
<tr>
<td>Panel C</td>
<td>0.3976</td>
<td>1.6641</td>
<td>0.0006</td>
<td>-0.0154</td>
</tr>
<tr>
<td>Panel D</td>
<td>0.4184</td>
<td>1.6661</td>
<td>0.0002</td>
<td>-0.0159</td>
</tr>
</tbody>
</table>

Stock returns \( (R) \) are measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-end. Earnings \( (E) \) is the earnings-per-share at the end of period \( t \) deflated by the price-per-share at the end of period \( t-1 \) \((P_{it})\) and managerial ownership \( (OWN) \) has four different measures. Firm size \( (SIZE) \) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk \( (RISK) \) is measured by the market model beta and leverage \( (DEBT) \) is a firm’s ratio of total debt to total assets. Growth opportunity \( (GROWTH) \) is measured as market value of equity scaled by book value. Variability of earnings \( (VAR) \) is calculated by the standard deviation of earnings for the sixteen quarters prior to period \( t \) deflated by the price-per-share at the end of period \( t-1 \). P-value and VIF are presented in parentheses and brackets, respectively. \( R^2 \) refers to adjusted \( R^2 \) and \( \chi^2 \) is from White’s heteroskedasticity test.
Table 4  The Effect of Accounting Earnings, Ownership and Other Variables on Stock Returns in Two Sub-periods

| Model: $R_{ij} = a_0 + a_1 \cdot E_{ij} + a_2 \cdot OWN_{ij} + a_3 \cdot SIZE_{ij} + a_4 \cdot RISK_{ij} + a_5 \cdot DEBT_{ij} + a_6 \cdot GROWTH_{ij} + a_7 \cdot VAR_{ij} + \epsilon_{ij}$ |
|---|---|---|---|---|---|---|---|---|
| $a_0$ | $a_1$ | $a_2$ | $a_3$ | $a_4$ | $a_5$ | $a_6$ | $a_7$ | $N$ | $R^2$ | $F$ | $\chi^2$ |
| Panel A: Ownership measured as the percentage of equity shares held by professional managers. |
| 1.1632 | 0.365 | 0.0099 | 0.0534 | 0.5528 | 0.6413 | 0.0270 | -0.8916 | 0.0161 | 0.0021 | 0.0558 | 540 | 0.2460 | 26.162 | 0.0001 |
| Panel B: Ownership measured as the percentage of equity shares held by CEO. |
| 0.9244 | 2.6937 | 0.0009 | 0.0333 | 0.2415 | 0.2833 | 0.0690 | -0.3332 | 0.1412 | 0.0161 | 0.0353 | 820 | 0.1687 | 31.653 | 0.0001 |
| Panel C: Ownership measured as the percent of equity shares held by directors, supervisors, and managers. |
| 0.6904 | 2.8197 | 0.0015 | 0.0376 | 0.5182 | 0.4128 | 0.0374 | -0.5204 | 0.4113 | 0.0001 | 0.0453 | 845 | 0.2013 | 18.543 | 0.0001 |
| Panel D: Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors. |
| 0.6731 | 2.8232 | 0.0011 | 0.0374 | 0.5169 | 0.4154 | 0.0368 | -0.5226 | 0.4113 | 0.0001 | 0.0453 | 843 | 0.2002 | 18.290 | 0.0001 |
| Period: 1997-2000 |
| Panel A: Ownership measured as the percentage of equity shares held by professional managers. |
| 0.9524 | 2.6937 | 0.0009 | 0.0333 | 0.2415 | 0.2833 | 0.0690 | -0.3332 | 0.1412 | 0.0161 | 0.0353 | 820 | 0.1687 | 31.653 | 0.0001 |
| Panel B: Ownership measured as the percentage of equity shares held by CEO. |
| 0.3973 | 0.6867 | 0.0020 | 0.0169 | 0.0303 | 0.0373 | 0.0475 | -1.1631 | 0.0001 | 0.0001 | 0.1521 | 736 | 0.1573 | 30.309 | 0.0001 |
| Panel C: Ownership measured as the percent of equity shares held by directors, supervisors, and managers. |
| 0.9571 | 0.6867 | 0.0020 | 0.0169 | 0.0303 | 0.0373 | 0.0475 | -1.1631 | 0.0001 | 0.0001 | 0.1521 | 736 | 0.1573 | 30.309 | 0.0001 |
| Panel D: Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors. |
| 0.6904 | 2.8197 | 0.0015 | 0.0376 | 0.5182 | 0.4128 | 0.0374 | -0.5204 | 0.4113 | 0.0001 | 0.0453 | 845 | 0.2013 | 18.543 | 0.0001 |
Stock returns \((R)\) are measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-end. Earnings \((E)\) is the earnings-per-share at the end of period \(t\) deflated by the price-per-share at the end of period \(t-1\) \((P_{\text{t-1}})\) and managerial ownership \((OWN)\) has four different measures. Firm size \((SIZE)\) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk \((RISK)\) is measured by the market model beta and leverage \((DEBT)\) is a firm’s ratio of total debt to total assets. Growth opportunity \((GROWTH)\) is measured as market value of equity scaled by book value. Variability of earnings \((VAR)\) is calculated by the standard deviation of earnings for the sixteen quarters prior to period \(t\) deflated by the price-per-share at the end of period \(t-1\). P-value and VIF are presented in parentheses and brackets, respectively. \(R^2\) refers to adjusted \(R^2\) and \(\bar{R}^2\) is from White’s heteroskedasticity test.
To check on the sensitivity of results to different time period, we further split the full period into two sub-periods: pre Asian financial crisis, 1991-1996, and post Asian Financial crisis, 1997-2000. The results presented in Table 4 show that managerial ownership and stock returns are also not significantly related across the two sub-periods. The impacts of size, systematic risk, and earnings variability on the earnings-return relation in the two sub-periods also remain the same. The estimated coefficient on leverage, however, is not consistent. For the pre Asian financial crisis period, it is significantly positive whereas it is not significantly different from zero for the post Asian financial crisis period. In sum, the relationship between stock returns, accounting earnings, managerial ownership, and other variables are generally robust to different test period.

4.2 The effect of ownership on managers’ adjustments of accounting accruals

The inverse relationship between accounting-based constraints and managerial ownership yields the second hypothesis that the magnitude of earnings adjustments is inversely associated with managerial ownership. To test this hypothesis, the magnitude of discretionary accrual adjustments is used to measure the extent to which managers manipulate reported accounting numbers. We use both the Jones expectation model and a modified version of the Jones model in the estimate of discretionary accounting accruals. As explained in Section 3.2, ownership is definitely not the only variable affecting managers’ accounting choices and thus other variables identified by theoretical considerations are included in the regression analysis. The results based on the Jones model and on the modified Jones model are presented in Tables 5 and 6, respectively. The estimated coefficient on the ownership variable is significantly negative in the four panels of Table 5 (in panel A, $b_1 = -0.0112$, p-value=0.0684; in panel B, $b_1 = -0.0100$, p-value=.0654; in panel C, $b_1 = -0.0108$, p-value=.0598; in panel D, $b_1 = -0.0152$, p-value=.049), indicating higher absolute abnormal accruals when managerial ownership is low. The negative association between managerial ownership and absolute abnormal accruals remains unchanged, as shown in Table 6, when the modified Jones model is used. This evidence of an inverse relationship between ownership and absolute abnormal accruals is consistent with Warfield, Wild, and Wild’s [39] finding\(^{12}\).

The significantly negative coefficient on the firm size and systematic

risk variables (SIZE and RISK, respectively) across the four panels in Table 5 and Table 6 reveal more manipulation of accounting numbers for firms of smaller size or with lower systematic risk. Leverage (DEBT) is also a significant determinant of abnormal accounting accruals, but with positive effects. Earnings variability (VAR), however, does not show consistent impact; only in panel B, C, D of Table 5 is the estimated coefficient significantly greater than zero whereas in panel A of Table 5 and the four panels of Table 6 the coefficient is not significantly different from zero.

The important aspect of the regression results is that, irrespective of whether the Jones model or the modified Jones model is used, the inverse relation between ownership and absolute accruals sustains in light of other determinants and is robust to the measurement of ownership.

4.3 The effect of audit quality on managers’ adjustments of accounting accruals

Auditing reduces information asymmetries between managers and stockholders by allowing outsiders to verify the validity of the reported accounting numbers. The effectiveness of auditing and its ability to constrain manager’s behavior of earnings management, however, depend on the quality of the auditor. It yields the hypothesis that earnings management is greater in firms with lower-quality auditors than in firms with higher-quality auditors. Following the theoretical and empirical support for a quality differentiation with audit firm size, we use the Big Five audit firms in Taiwan as the proxy for audit quality to test the hypothesis. In panel B, C, D of both Table 5 and Table 6, the estimated coefficient on the dummy variable for audit quality (AQ) is significantly less than zero. The evidence indicates that, after controlling for the joint effects of other determinants of abnormal accruals, the negative impact of audit quality is still significant. That is, consistent with Becker, et al. [5], lower audit quality is found to be associated with more accounting discretion. Moreover, the inverse relation between audit quality and earnings management is robust to the estimate of abnormal accruals.

4.4 The explanatory power of abnormal accruals for returns

Economic theory predicts that the magnitude of the market’s reaction to earnings is a nondecreasing function of earnings quality. Since managers’ manipulation of accounting numbers through the adjustments in discretionary accruals yields earnings reports of inferior quality, an inverse relation between abnormal accruals and stock returns is expected. As specified in Eq.
Table 5  The Effect of Ownership on Abnormal Accruals Based on the Jones Model

| Model: | τACC_j = b_0 + b_1 \cdot OWN_j + b_2 \cdot SIZE_j + b_3 \cdot RISK_j + b_4 \cdot DEBT_j + b_5 \cdot GROWTH + b_6 \cdot VAR_j + b_7 \cdot AQ_j + \epsilon_j |
|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------|
|        | b_0  | b_1  | b_2  | b_3  | b_4  | b_5  | b_6  | b_7  | N   | R^2  | F       | \chi^2 |
| Panel A: Ownership measured as the percentage of equity shares held by professional managers. | 0.2881 | -0.0112 | -0.0095 | -0.0211 | 0.1289 | -0.0036 | -0.0196 | -0.0074 | 1274 | 0.0621 | 22.692 | 52.184 |
| Panel B: Ownership measured as the percentage of equity shares held by CEO. | 0.2954 | -0.0100 | -0.0100 | -0.0357 | 0.1027 | -0.0014 | 0.0666 | -0.0148 | 1947 | 0.0750 | 19.455 | 56.125 |
| Panel C: Ownership measured as the percentage of equity shares held by directors, supervisors, and managers. | 0.2701 | -0.0108 | -0.0097 | -0.0248 | 0.0880 | 0.0014 | 0.0649 | -0.0148 | 1992 | 0.0705 | 18.588 | 57.921 |
| Panel D: Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors. | 0.2637 | -0.0152 | -0.0097 | -0.0226 | 0.0871 | 0.0016 | 0.0681 | -0.0149 | 1992 | 0.0715 | 18.421 | 54.734 |

Absolute abnormal accounting accruals (τACC_j) are estimated based on the Jones model. Managerial ownership (OWN) has four different measures. Firm size (SIZE) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk (RISK) is measured by the market model beta and leverage (DEBT) is a firm’s ratio of total debt to total assets. Growth opportunity (GROWTH) is measured as market value of equity scaled by book value. Variability of earnings (VAR) is calculated by the standard deviation of earnings for the sixteen quarters prior to period t deflated by the price-per-share at the end of period t-1. Audit quality (AQ) is an indicator, equal to 1 for firms with Big Five auditors, and 0, otherwise. P-value and VIF are presented in parentheses and brackets, respectively. R^2 refers to adjusted R^2 and \chi^2 is from White’s heteroskedasticity test.
### Table 6  The Effect of Ownership on Abnormal Accruals based on the Modified Jones Model

<table>
<thead>
<tr>
<th>Model:</th>
<th>$\left[ \frac{\text{ACC}<em>{it} - \text{ACC}</em>{it-1}}{\text{SIZE}<em>{it-1}} \right] = b_0 + b_1 \cdot \text{OWN}</em>{it} + b_2 \cdot \text{SIZE}<em>{it} + b_3 \cdot \text{RISK}</em>{it} + b_4 \cdot \text{DEBT}<em>{it} + b_5 \cdot \text{GROWTH}</em>{it} + b_6 \cdot \text{VAR}<em>{it} + b_7 \cdot \text{AQ}</em>{it} + \epsilon_{it} $</th>
</tr>
</thead>
<tbody>
<tr>
<td>$b_1$</td>
<td>$b_2$</td>
</tr>
<tr>
<td>-0.2745</td>
<td>-0.0114</td>
</tr>
<tr>
<td>(0.0035)</td>
<td>(0.0674)</td>
</tr>
<tr>
<td>1.2565</td>
<td>1.3095</td>
</tr>
</tbody>
</table>

Panel A: Ownership measured as the percentage of equity shares held by professional managers.

Panel B: Ownership measured as the percentage of equity shares held by CEO.

Panel C: Ownership measured as the percentage of equity shares held by directors, supervisors, and managers.

Panel D: Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors.

Absolute abnormal accounting accruals ($\left| \text{ACC}_{it} \right|$) are estimated based on the modified Jones model. Managerial ownership (OWN) has four different measures. Firm size (SIZE) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk (RISK) is measured by the market model beta and leverage (DEBT) is a firm’s ratio of total debt to total assets. Growth opportunity (GROWTH) is measured as market value of equity scaled by book value. Variability of earnings (VAR) is calculated by the standard deviation of earnings for the sixteen quarters prior to period t deflated by the price-per-share at the end of period t-1. Audit quality (AQ) is an indicator, equal to 1 for firms with Big Five auditors, and 0 otherwise. P-value and VIF are presented in parentheses and brackets, respectively. $R^2$ refers to adjusted $R^2$ and $\chi^2$ is from White’s heteroskedasticity test.
(7), we test the impact of abnormal accruals jointly with other determinants of returns. The regression results with abnormal accruals measured according to the Jones model and the modified Jones model are reported in Tables 7 and 8, respectively. As shown, across the four panels in Table 7 and Panels B, C, and D of Table 8, the estimated coefficient on the abnormal accruals variable (/ACC/) is significantly less than zero. This finding is supportive of the hypothesis of an inverse association between abnormal accruals and stock returns. Obviously, investors are attentive to the magnitude of discretionary accruals when they evaluate earnings quality.

4.5 The explanatory power of audit quality for returns

Higher-quality auditors are more likely to detect and object to questionable accounting practices and, therefore, can enhance the quality of reported earnings. It follows that audit quality is expected to be positively associated with returns. To examine this relation, the Big Five auditors in Taiwan are still used as the proxy for audit quality. As reported in Table 7 and Table 8, the regression results for Eq. (7) show that the estimated coefficient on the audit quality variable is significantly greater than zero irrespective of the estimate of abnormal accruals and the measurement of ownership. Consistent with our hypothesis, the evidence indicates positive impact of audit quality on returns; that is, the market reacts positively to the quality of a firm’s auditor.

5. Summary and Conclusions

Separation of ownership and control induces agency problems. The contracts written to restrict manager’s self-serving behavior when ownership and control are distinct often incorporate accounting-based constraints. The existence of accounting-based contractual constraints stimulates managers’ motivation to manage reported accounting numbers to either alleviate constraints or benefit from available incentives. The convergence-of-interest theory implies that increased managerial ownership can reduce managers’ exploitation of accounting numbers. Another factor able to constrain earnings management is the quality of the external auditor. This study investigates the reality in the Taiwan stock market regarding the relation between managerial ownership, earnings management, and audit quality.
Table 7  The Effect of Abnormal Accruals and Audit Quality on Stock Returns Based on the Jones Model

<table>
<thead>
<tr>
<th>Model:</th>
<th>( R_{it} = a_0 + a_1 \cdot E_{it} + a_2 \cdot \text{OWN}<em>{it} + a_3 \cdot \text{SIZE}</em>{it} + a_4 \cdot \text{RISK}<em>{it} + a_5 \cdot \text{DEBT}</em>{it} + a_6 \cdot \text{GROWTH}<em>{it} + a_7 \cdot \text{VAR}</em>{it} + a_8 \cdot \text{ACC}<em>{it} + a_9 \cdot \text{AQ}</em>{it} + \epsilon_{it} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( a_0 )</td>
<td>0.4815</td>
</tr>
<tr>
<td>( a_1 )</td>
<td>1.5991</td>
</tr>
<tr>
<td>( a_2 )</td>
<td>0.0124</td>
</tr>
<tr>
<td>( a_3 )</td>
<td>0.3313</td>
</tr>
<tr>
<td>( a_4 )</td>
<td>0.2571</td>
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<tr>
<td>( a_5 )</td>
<td>0.0783</td>
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<td>( a_6 )</td>
<td>0.2941</td>
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<tr>
<td>( a_7 )</td>
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<tr>
<td>( a_8 )</td>
<td>0.1084</td>
</tr>
<tr>
<td>( a_9 )</td>
<td>0.1068</td>
</tr>
<tr>
<td>( N )</td>
<td>1273</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.3876</td>
</tr>
<tr>
<td>( F )</td>
<td>58.795</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>0.532</td>
</tr>
</tbody>
</table>

Panel A: Ownership measured as the percentage of equity shares held by professional managers.

Panel B: Ownership measured as the percentage of equity shares held by CEO.

Panel C: Ownership measured as the percentage of equity shares held by directors, supervisors, and managers.

Panel D: Ownership measured as the percentage of equity shares held by principal owners, officers, directors, and supervisors.

Stock returns \( (R) \) are measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-end. Earnings \( (E) \) is the earnings-per-share at the end of period \( t \) deflated by the price-per-share at the end of period \( t-1 \) \( (P_{t-1}) \) and managerial ownership \( (OWN) \) has four different measures. Firm size \( (SIZE) \) is measured by the natural logarithm of a firm’s market value of equity. Systematic risk \( (RISK) \) is measured by the market model beta and leverage \( (DEBT) \) is a firm’s ratio of total debt to total assets. Growth opportunity \( (GROWTH) \) is measured as market value of equity scaled by book value. Variability of earnings \( (VAR) \) is calculated by the standard deviation of earnings for the sixteen quarters prior to period \( t \) deflated by the price-per-share at the end of period \( t-1 \). Absolute abnormal accounting accruals \( (\text{ACC}_{it}) \) are estimated based on the Jones model. Audit quality \( (AQ) \) is an indicator, equal to 1 for firms with Big Five auditors, and 0, otherwise. P-value and VIF are presented in parentheses and brackets, respectively. \( R^2 \) refers to adjusted \( R^2 \) and \( \chi^2 \) is from White’s heteroskedasticity test.
Table 8  The Effect of Abnormal Accruals and Audit Quality on Stock Returns Based on the Modified Jones Model

| Model: $R_{jt} = a_0 + a_1 \cdot E_{jt} + a_2 \cdot OWN_{jt} + a_3 \cdot SIZE_{jt} + a_4 \cdot RISK_{jt} + a_5 \cdot DEBT_{jt} + a_6 \cdot GROWTH_{jt} + a_7 \cdot VAR_{jt} + a_8 \cdot AQ_{jt} + a_9 \cdot E_{jt} + \epsilon_{jt}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| $a_0$ | $a_1$ | $a_2$ | $a_3$ | $a_4$ | $a_5$ | $a_6$ | $a_7$ | $a_8$ | $a_9$ | $N$ | $R^2$ | $F$ | $\chi^2$ |
| Panel A : Ownership measured as the percentage of equity shares held by professional manager. | | | | | | | | | | | | | |
| 0.4441 | 1.0007 | 0.0124 | -0.0212 | -0.2004 | 0.2588 | 0.0903 | 1.1222 | 0.1487 | 0.1089 | 1273 | 0.1582 | 34.118 | (0.0001) | 57.45 |
| Panel B : Ownership measured as the percentage of equity shares held by CEO. | | | | | | | | | | | | | |
| 0.4146 | 0.7344 | 0.0004 | -0.0178 | -0.1557 | 0.1189 | 0.0444 | 0.7119 | 0.1176 | 0.0996 | 1954 | 0.1125 | 26.412 | (0.0001) | 60.552 |
| Panel C : Ownership measured as the percentage of equity shares held by directors, supervisors and managers. | | | | | | | | | | | | | |
| 0.4396 | 1.6923 | 0.0005 | -0.0195 | -0.1830 | 0.1503 | 0.0382 | 0.7207 | 0.2998 | 0.0884 | 1992 | 0.1513 | 32.279 | (0.0001) | 59.287 |
| Panel D : Ownership measured as the percentage of equity shares held by principal owners, officers, directors and supervisors. | | | | | | | | | | | | | |
| 0.4549 | 1.6938 | 0.0001 | -0.0199 | -0.1833 | 0.1499 | 0.0387 | 0.7136 | 0.2996 | 0.0889 | 1992 | 0.1501 | 31.358 | (0.0001) | 58.285 |

Stock returns ($R$) are measured for the twelve-month period extending from eight months prior to fiscal year-end through four months after fiscal year-end. Earnings ($E$) is the earnings-per-share at the end of period $t$ deflated by the price-per-share at the end of period $t$. Earnings ($E$) is measured by the natural logarithm of a firm's market value of equity. Firm size ($SIZE$) is measured by the natural logarithm of a firm's market value of equity. Systematic risk ($RISK$) is measured by the market model beta and leverage ($DEBT$) is a firm's ratio of total debt to total assets. Growth opportunity ($GROWTH$) is measured as market value of equity scaled by book value. Variability of earnings ($VAR$) is calculated by the standard deviation of earnings for the sixteen quarters prior to period $t$ deflated by the price-per-share at the end of period $t$. Absolute abnormal accounting accruals ($\epsilon_{jt}$) are estimated based on the modified Jones model. Audit quality ($AQ$) is an indicator, equal to 1 for firms with Big Five auditors, and 0, otherwise. $p$-value and VIF are presented in parentheses and brackets, respectively. $R^2$ refers to adjusted $R^2$ and $\chi^2$ is from White's heteroskedasticity test.
With regard to the information content of managerial ownership in the price-earnings relationships, we do not find evidence supportive of the conjecture that the level of managerial ownership is an additional source of information for investors. Although inconsistent with the prediction of Hypothesis 1, this result is congruent with previous studies using data in the Taiwan’s stock market. The hypothesis of an inverse relation between ownership and earnings management, through adjustments in discretionary accruals, is supported. Evidence of the inverse relation between ownership and earnings management suggests reduced earnings quality with low managerial ownership. Moreover, the finding of an inverse association between earnings management and audit quality indicates that other than increased managerial ownership, the quality of the external auditor can be one effective force in restricting managers’ manipulation of accounting numbers. The two hypotheses regarding the impact of abnormal accruals and audit quality on the price-earnings relationships are also supported. Specifically, stock market reacts negatively to abnormal accruals and positively to audit quality. The evidence implies that investors in the Taiwan’s stock market assimilate the information of earnings management and audit quality in their response to the reported number of accounting earnings.

Our results add to the literature on ownership and audit quality by demonstrating a relation between ownership and earnings management and between audit quality and earnings management. Future research can further refine and test other contracting factors in conjunction with managerial ownership and audit quality. In addition, as price change reflects only the investors’ average expectations and the individual response to information is revealed in the trading volume, future research can also investigate the relation between trading volume, ownership and accounting choices to better understand investors’ reaction to information.

References


