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LETTER FROM THE EDITORS

Welcome to the *Academy of Accounting and Financial Studies Journal,* an official journal of the Allied Academies, Inc., a non profit association of scholars whose purpose is to encourage and support the advancement and exchange of knowledge, understanding and teaching throughout the world. The *AAFSJ* is a principal vehicle for achieving the objectives of the organization. The editorial mission of this journal is to publish empirical and theoretical manuscripts which advance the disciplines of accounting and finance.

Dr. Michael Grayson, Jackson State University, is the Accountancy Editor and Dr. Denise Woodbury, Southern Utah University, is the Finance Editor. Their joint mission is to make the *AAFSJ* better known and more widely read.

As has been the case with the previous issues of the *AAFSJ*, the articles contained in this volume have been double blind refereed. The acceptance rate for manuscripts in this issue, 25%, conforms to our editorial policies.

The Editors work to foster a supportive, mentoring effort on the part of the referees which will result in encouraging and supporting writers. They will continue to welcome different viewpoints because in differences we find learning; in differences we develop understanding; in differences we gain knowledge and in differences we develop the discipline into a more comprehensive, less esoteric, and dynamic metier.

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STOCK MARKET REACTIONS TO FIRST-TIME EMPLOYEE STOCK OWNERSHIP PLAN ADOPTIONS

John E. Cresson, Southeastern Louisiana University

ABSTRACT

This study analyzes the stockholders' wealth effects of firms that are associated with the establishment of first-time ESOPs. Changes in motivation, tax liabilities, and the probability of a takeover may explain these wealth effects. Previous studies that address the effects to stockholders of firms that establish ESOPs have led researchers to contradictory conclusions. This study differs from previous papers in a number of ways. The sample of firms is collected from the Dow Jones News Retrieval Service database. Since the date and the time of each announcement are known, a one-day event window is analyzed. This leads to more powerful tests. Also, firms that announce the expansion of an existing ESOP or the establishment of an additional ESOP are not included in my sample. Only first-time ESOP announcements are analyzed. I find that stockholders earn positive and significant abnormal returns on the event day. However, there are significant, negative abnormal returns several days following the event day. Most of the negative returns are explained by other significant announcements. I find a positive, significant relationship between abnormal returns and ESOP ownership. Also, firms with takeover pressures within a year prior to the ESOP announcement earn negative abnormal returns.

INTRODUCTION

In the early 1970s, the United States Congress passed legislation to alleviate the economic distress of slow productivity growth and eliminate the existing dense concentration of corporate stock ownership. With the passage of the Employee Retirement Income Security Act (ERISA) of 1974, a plan was created that allows employees to become owners of their firms through Employee Stock Ownership Plans (ESOPs). Since then, the number of firms adopting ESOPs has grown rapidly. Pugh, Jahera, and Oswald (2005) note that ESOPs have been popular in the United States since the late 1980s. Possible reasons for this influx of ESOPs include income tax shields, incentive alignment, hostile takeover deterrence, capital acquisition, and pension plan replacement. In this paper, I study the shareholder wealth effects associated with the announcement of first-time ESOP adoptions.

Previous studies of firms adopting ESOPs document conflicting evidence. (Pugh, Jahera-Oswald (2005), Park-Song (1995), and Chaplinsky-Niehaus (1994) also note that prior research on ESOPs has produced inconsistent results.) The United States General Accounting Office analyzes

firms that establish ESOPs and concludes that ESOPs broaden stock ownership and provide an alternative means to finance capital growth. However, their evidence is not consistent with improved productivity by the sponsoring firms or high degrees of employee control over or participation in corporate management. Ducy, Iqbal, and Akhigbe (1997) do not find that a firm experiences improved performance after the establishment of an ESOP. Park and Song, however, find that a firm's performance significantly increases after establishing or expanding an ESOP. Iqbal and Hamid (2001) note that employee ownership by itself may not lead to an improvement in firm performance. They argue that ownership has value when there are significant stock price changes. Chang (1990), Muhtaseb and Philippatos (1990), and Gordon and Pound (1990) analyze the wealth effects on firms that establish or expand ESOPs. Chang, and Muhtaseb and Philippatos find significant increases in stockholder wealth, while Gordon and Pound find no significant change in stockholder wealth. For firms subject to takeover pressures, Gordon and Pound (1990) and Chang (1990) find significant negative effects on share prices while Muhtaseb and Philippatos (1990) and Chaplinsky and Niehaus (1994) find insignificant effects.

This study differs from previous papers in a couple of ways. First, I collect my sample from the Dow Jones News Retrieval Service database. Since the date and the time of each announcement are known, a one-day event window is analyzed. This leads to more powerful tests than those used in the previous ESOP studies which analyze the traditional two-day event window. (Brown and Warner (1985) find that the power of the test decreases as the event window increases. The Chaplinsky-Niehaus (1994), Gordon –Pound, and Muhtaseb-Philippatos studies are examples of papers that employee the two-day event window. Some researchers even employee event windows which are longer than two days. For example, Ducy, Iqbal, and Akhigbe use a five-day event window). Second, unlike other studies, I exclude firms that announce the expansion of an existing ESOP or the establishment of an additional ESOP. (Park and Song, and Chaplinsky and Niehaus (1994), among others, analyze firms that establish new ESOPs or expand existing ESOPS). Only first-time ESOP announcements are analyzed.

BACKGROUND

Corporations form ESOPs on behalf of their employees to invest primarily in employer securities. An ESOP provides plan participants with retirement benefits and an opportunity to obtain ownership in their employers. Although an ESOP is a form of a pension plan, there are characteristics which differentiate it from other pension funds. While certain defined contribution plans may invest in employer securities, only ESOPs are designed to invest primarily in the securities of the sponsoring company. An ESOP may borrow money from a trust fund established by the firm to purchase company stock for employees in the open market or from the firm. As the loan is paid from ongoing operations, shares are allocated to employees' individual investment accounts. The ESOP participants vote the allocated shares, and the trustee votes the unallocated

shares. Employers contribute cash or company stock to a plan trust, which allocates these contributions to the accounts of individual participating employees. Employees receive partial or full distributions of the assets from their accounts when they retire or leave the firm or when other events occur, as specified in the plan.

The goals of ESOPs, as intended by the United States Government, are to broaden the ownership of corporate stock by transferring stock ownership to employees, provide a mechanism for financing capital growth, and promote improvements in productivity and profitability in sponsoring firms. (The United States General Accounting Office, 1987, p. 4.) ESOPs are recognized under ERISA as a way to promote employee ownership, and more than twenty pieces of federal legislation have been enacted to encourage their adoption.

A firm gets more tax benefits from an ESOP than it does from any other pension plan. The 1984 Tax Act added incentives to encourage the establishment of ESOPs. A corporation could deduct dividends paid on ESOP stock, provided that the dividends were paid to employees. The 1986 Tax Act increased the tax benefits. Dividends used to repay principal or interest on the ESOP loan used to acquire employer securities became deductible. Under the 1989 Tax Act, only loans to ESOPs that own a majority of the firm allow the lender to exclude from income 50% of the interest received on an ESOP loan.

EFFECTS OF ESOPS ON FIRM VALUE

Jensen and Mecking's (1976) principal-agent theory can be applied to ESOPs. Bruner (1988) believes that ESOPs may provide a sense of ownership and monetary rewards that stimulate employee effort and more closely align the interests of workers with those of the traditional equity owners. Therefore, agency costs should be reduced since the new employee-owners provide additional monitoring of the managers' actions and overall productivity should increase. Chang (1990) mentions that ownership interests could motivate employees by aligning their interests with those of shareholders. Also, since ESOPs are subject to special tax treatments not available to other employee compensation plans, they should enhance shareholder wealth.

Muhtaseb and Philippatos (1990) note that ESOPs are used in response to potential hostile takeovers to enhance management welfare. ESOP requirements imposed by law allow management an additional degree of freedom. The management of the company decides upon the creation of an ESOP and in many cases the courses of action taken by the trustees of the ESOP. Thus, ESOPs represent a powerful entrenching tool which protects managers from the discipline of the managerial labor market. Thus, the establishment of an ESOP could reduce shareholder value.

DATA AND METHODOLOGY

The data and methodology used to test the wealth effects on stockholders of firms associated with the establishment of first-time ESOPs are now introduced. To test the hypotheses, common stock returns of firms that establish ESOPs are analyzed. Thus, a data base is compiled consisting of these firms. The sample firms are collected from the Dow Jones News Retrieval Service database extending over an eleven year period. Of the original 1700 articles associated with ESOPs, only announcements of firms establishing first-time ESOPs are retained. If previous announcements are suspected, even though they can not be located, that observation is not included in the sample. This screening process leads to a sample of 308 observations. Of these observations, only the publicly-traded NYSE and AMEX firms listed on the Center for Research in Security Prices daily file are retained. The final sample consists of 135 firms.

The effect of the announcement of a firm adopting an ESOP on the common stock price is analyzed using the standard event-study method that adjusts for heteroskedasticity. The market model procedure outlined by Dodd and Warner (1983) is employed to estimate the abnormal returns. Previous studies that analyze the effect that events have on common stock prices use *The Wall Street Journal* as the information source. A two-day event window is analyzed since it is not certain when the market receives the news -- the day on which the announcement appears in *The Wall Street Journal* or the previous day. This uncertainty is reduced when the Dow Jones News Retrieval Service is the information source since the date and time of each announcement in my sample are given. In this study, a more powerful test is conducted by analyzing a one-day event window. Since the market closes at 4 P.M. Eastern Standard Time, the event day is the date given by the Dow Jones News Retrieval Service if the announcement occurs before 4 P.M. Eastern Standard Time, and the event day is the next trading day after the date given by the Dow Jones News Retrieval Service if the announcement occurs after 4 P. M. EST.

Under the theory of capital market efficiency, all relevant information is fully reflected in security prices. If markets are at least semi-strong form efficient and the announcement of the establishment of an ESOP is new and relevant information, then there should be a change in stock price. In this study, I hypothesize the effects on corporations' common stock prices when they announce the establishment of ESOPs. These hypotheses are tested under the assumption that markets are semi-strong form efficient. Each hypothesis is a joint test of two hypotheses: capital markets are semi-strong form efficient and the announcements of firms establishing ESOPs affect stock prices.

The Dodd-Warner method of calculating abnormal returns is now presented. Abnormal returns are calculated assuming that daily common stock returns can be described by the market model:

$$R_{i,t} = a_i + b_i R_{m,t} + e_{i,t} \qquad \textit{Formula (1)}$$

where: $R_{i,t}$ is the daily rate of return for firm i at time t, $R_{m,t}$ is the daily rate of return on the value-weighted CRSP market index at time t, a_i and b_i are simple linear regression model parameters for firm i, and $e_{i,t}$ is the simple linear regression model stochastic disturbance term.

The market model parameters are estimated over a 150-day "pre-event period" before the announcement date. Using ordinary least squares estimates, a_i and b_i, of the market-model parameters, firm i's abnormal return (AR) on event day t is

$$AR_{i,t} = R_{i,t} - (a_i + b_i R_{m,t}). \qquad \textit{Formula (2)}$$

For a sample of N firms, the average announcement return (AAR) is

$$AAR_{i,t} = (\text{Sum } AR_{i,t}) / N. \qquad \textit{Formula (3)}$$

A z-statistic is calculated to determine the statistical significance of the one-day event window abnormal return. First, each firm's abnormal return is divided by the estimated forecast standard deviation of the abnormal return, resulting in a standardized abnormal return (SAR)

$$SAR_{i,t} = AR_{i,t} / \text{Square root } (\text{Var } (AR_{i,t})). \qquad \textit{Formula (4)}$$

The z-statistic is

$$Z = (\text{Sum } SAR_{i,t}) / \text{Square root } (N). \qquad \textit{Formula (5)}$$

where N is the number of firms. Assuming that the standardized abnormal returns are independent across firms, Z is approximately unit normally distributed under the null hypothesis that the average announcement effect is zero.

ANALYSIS AND RESULTS

This section presents the results of the hypotheses tested. ESOPs are associated with special tax treatments not available to other employee compensation plans. Also, they may increase employee motivation and may more closely align the interests of workers with stockholders. (Consistent with this, Wruck (1989) finds that private block placements significantly increase the market value of the corporation because of increased ownership concentration and improved monitoring.) Therefore, firms that establish ESOPs increase their value, resulting in stockholders earning positive abnormal returns. Chang (1990), Muhtaseb and Philippatos (1990) find support for this hypothesis while Gordon and Pound (1990) do not.

The testable implication is that the event-period abnormal return to stockholders of firms that announce the establishment of ESOPs is greater than 0. Statisticians would argue that a one-tailed test should be used instead of a two-tailed test since the value increasing hypothesis predicts positive abnormal returns. A one-tailed test, which uses one side of the distribution, is appropriate when the researcher has priors, as I do. However, the one-tailed test is appropriate only when the investigator knows enough about the circumstances to be certain that if the abnormal returns are not equal to zero, then they are greater than zero. (See Snedecor and Cochran.) I can not make this claim. I hypothesize that the abnormal returns are positive, but I am not certain that they are not negative. Therefore, a two-tailed test is incorporated to recognize any significantly negative abnormal returns that may occur. The two-tailed test is used throughout this paper.

Table 1, presents the average abnormal returns for ten days before the ESOP announcement (day -10) through ten days after the ESOP announcement (day +10). The Dodd-Warner test statistic is presented in Panel A and the proportion test statistic is in Panel B. The proportion test compares the actual percentage with the expected proportion of 50 percent of positive abnormal returns. If there is no stock price reaction, then one half of the abnormal returns should be positive and one half should be negative. Under the null hypothesis, the proportion of increases is 50% when the sample is randomly selected. The proportion test statistic for more than thirty observations is

$$Z = (p - .50) \;/\; \text{Square root } ((p \times q) / n) \qquad \text{Formula (6)}$$

where p is the obtained proportion of increases, q is the obtained proportion of decreases, and n is the number of observations.

Table 1: Average Abnormal Returns of All Firms That Establish Esops	
Panel A: Average abnormal returns. (n = 135)	
Day	Returns
-10	.000775
-9	.002111
-8	-.00553
-7	.000476
-6	.003354
-5	-.00086
-4	.003949(.82489)
-3	-.00226(-.8432)
-2	-.00058(-1.579)
-1	.00091(2.01935)

Table 1: Average Abnormal Returns of All Firms That Establish Esops	
Panel A: Average abnormal returns. (n = 135)	
Day	Returns
0	.005785(3.9787)
+1	.002251(.12501)
+2	-.00352(-3.208)
+3	-.00308(-2.289)
+4	-.00488(-3.052)
+5	.003602
+6	-.00375
+7	.002654
+8	.000026
+9	-.00098
+10	.005068
Panel B: Number of positive and negative abnormal returns.	
+ returns / - returns	Proportion test statistic
80/55	2.189528
Average abnormal returns of firms associated with the establishment of first-time ESOPs for days -10 through +10 are presented in Panel A. Abnormal return z-statistics are in parentheses. Panel B presents the number of firms with positive abnormal returns and the number with negative abnormal returns on the event day. Day 0 is the event day.	

The average abnormal return on the event day is positive and significantly different from zero. The Proportion test statistic is 2.1895. Thus, as hypothesized, stockholders of firms associated with the establishment of first-time ESOPs earn positive and significant abnormal returns on the event day. However, on the day before the event day, there is a significant, positive abnormal return, and for several days following the announcement, there are significant, negative abnormal returns. The cumulative abnormal returns (CARs) from the event day through day +4 are presented in Table 2. The significant negative abnormal returns earned several days after the event day lead to negative CARs.

Table 2: Cumulative Average Abnormal Returns	
Cumulative abnormal returns	-.003444
Cumulative abnormal return test statistic	-1.99135
Proportion test statistic	-.603275
This table presents the cumulative average abnormal returns over the five days from the event through day +4.	

There are two explanations for these results. One explanation is the positive abnormal return on day -1 occurs because information is "leaked" before the event day, and the significant abnormal returns after the announcement result because investors overreact to ESOP announcements. Another explanation is that there are other significant announcements on these days. Therefore, I check the Dow Jones News Retrieval Service database for any other news releases on the days that have significant abnormal returns. If a firm has any news release on any of these days, it is thrown out of the sample. The event day abnormal return for the clean sample, presented in Table 3, is still positive and significant, while the abnormal returns for days -1, +3 and +4 are not significantly different from zero. The significant abnormal return on day +2 cannot be explained by news releases from my data source. This may occur because there are other news releases that are not included in the Dow Jones News Retrieval Service database, or it is a statistical result. The Proportion test statistic of 2.2263 is also statistically significant. The CARs and the Proportion test statistic for this clean sample, as presented in Table 4, are not significantly different from zero.

In conclusion, there are significantly positive abnormal returns on the event day for both samples. There are, at best, insignificant CARs from the event day through day +4; and at worst, significant negative CARs from the event days through day +4, depending on the sample analyzed.

Table 3: Average Abnormal Returns of Firms with No Additional News on Days -1, 0, +2, +3, +4

Panel A: Average abnormal returns. (n=44)

Day	Returns
-10	-.00095
-9	.001035
-8	-.00789
-7	.000597
-6	.0006786
-5	-.00328
-4	.00383(.67228)
-3	.00085(.39791)
-2	.00005(.53312)
-1	.00041(1.5204)
0	.00339(2.5693)
+1	.00035(-.1479)
+2	-.0011(-2.042)
+3	-.0034(-1.306)
+4	.00294(.83481)

Table 3: Average Abnormal Returns of Firms with No Additional News on Days -1, 0, +2, +3, +4	
Panel A: Average abnormal returns. (n=44)	
Day	Returns
+5	.001641
+6	.001069
+7	.004215
+8	.001457
+9	-.00091
+10	.005249
Panel B: Number of positive and negative abnormal returns.	
positive returns /negative returns	Proportion test statistic
29/15	2.226279
The average abnormal returns of firms with no other news on days -1, 0, +2, +3, +4 that are associated with the establishment of first-time ESOPs are in Panel A. The abnormal return z-statistics are in parentheses. Panel B presents the number of positive and the number of negative abnormal returns on the event day	

Table 4: Cumulative Average Abnormal Returns	
Cumulative abnormal returns	.002131
Cumulative abnormal return test statistic	-.06823
Proportion positive returns test statistic	-1.2264
This table presents the cumulative average abnormal returns over the five days from the event day through day +4.	

If ESOPs increase employee motivation and more closely align the interest of workers with stockholders, then the event day abnormal returns should be positively correlated with the percentage of the firm that will be held by the ESOP. I want to determine the relationship between abnormal returns and the percentage of ESOP ownership. This can be done by regressing the percentage of ESOP ownership on the event day abnormal return. Table 5 shows that there is a positive, significant relationship between abnormal returns and the percentage of ESOP ownership.

Table 5: ESOP Ownership and Abnormal Returns			
df	Const	Coeff	Test statistic
45	-.0027	.0022	2.8991

This table presents a regression to determine the relationship between abnormal returns and the percentage of ownership of the firm held by the ESOP as revealed on the event day. The event day abnormal return is regressed on the percentage of ESOP ownership.

An ESOP used to stifle unwanted takeover bids decreases the probability of a takeover to such an extent that shareholder wealth decreases. ESOP participants may use their voting power to protect their salaries rather than maximize the value of the firm. Thus, if the value-reducing effects associated with a takeover outweigh the benefits of the ESOP, then ESOPs established as takeover defenses reduce stockholder value. ESOPs that are not established for the purpose of averting a takeover increase stockholder value because of the motivational benefits, tax benefits and the reduction in agency costs. In short, ESOPs established as takeover defenses reduce stockholders' value, and all others increase stockholders' value. Gordon and Pound (1990), and Chang (1990) provide evidence consistent with this hypothesis while Muhtaseb and Philippatos (1990), and Chaplinsky and Niehaus (1994) do not. Chaplinsky and Niehaus note that while previous studies report negative stock price reactions to defensive ESOP announcements, their results from a larger sample, do not. However, my sample size of defensive ESOP announcements is larger than their sample size.

My data is partitioned into subsamples of firms that have takeover pressures and those that do not have any takeover pressures. A firm has "takeover pressures" if any information was revealed within one year prior to the ESOP announcement that would lead investors to believe that the ESOP was established as a takeover defense. A firm is considered having takeover pressures if one of the following eight announcements was made: 1) there is speculation that the firm may be acquired, or is a good takeover target; 2) an outside party tries to get control; 3) an outside party reveals a significant percentage of ownership; 4) a shareholders' rights plan is established to protect the firm against takeovers; 5) an outside party is thinking about taking control; 6) an investor buys a significant percentage of the firm to protect it from a hostile takeover; 7) the firm adopts a takeover strategy; and 8) shareholders approve anti-takeover measures. This information is collected in two steps. First, *The Wall Street Journal Index* is searched for news of a takeover for each sample firm. Second, the Dow Jones News Retrieval Service is used to collect all announcements that have the key words "takeover" or "take-over" or "take over" for each sample firm within one year prior to the event day. More than 54% of the firms have takeover pressures within one year prior to the ESOP announcement.

The results are presented in Table 6. The firms associated with a takeover have negative abnormal returns. (Chaplinsky and Niehaus note that while previous studies report negative stock price reactions to defensive ESOP announcements, their results, from a larger sample, do not.

However, my sample size of defensive ESOP announcements is larger than their sample size. Thus, sample size should not drive significance.) The negative abnormal returns from Table 1 for several days after the event day may be explained by investors overreacting to the ESOP announcement. If investors overreact to news, takeover firms should earn positive abnormal returns following the ESOP announcement. From Table 7, there is no evidence that investors overreact.

Table 6: Takeover Effects	
Number of observations	73
Abnormal return on Event Day	-.00337
This table introduces the event day abnormal returns of firms associated with a takeover within one year prior to the ESOP announcement.	

Table 7 : Average Abnormal Returns for Takeover Firms	
Panel A: Average abnormal returns.	
Day	Returns
event day	-.00337
+1	.003198
+2	-.00497
+3	-.00111
+4	-.00565
Panel B: Cumulative abnormal returns.	
Cumulative abnormal returns	-.01192
positive returns / negative returns	38/35
Proportion test statistic	.351420
Panel A presents the average abnormal returns of takeover firms associated with the establishment of first-time ESOPs for the event day through day +4. Tests of significance of cumulative abnormal returns over the five days from the event day through day +4 are listed in Panel B.	

CONCLUSIONS

The number of firms adopting Employee Stock Ownership Plans has grown rapidly, thereby generating interest in this area. This study analyzes the stockholders' wealth effects of firms that are associated with the establishment of ESOPs. There are numerous ways the establishment of an

ESOP may affect stockholders: 1) ESOPs are associated with special tax treatments not available to other employee compensation plans. 2) ESOPs may increase employee motivation and more closely align the interests of workers with stockholders. 3) An ESOP used to veto unwanted takeover bids may decrease the probability of a takeover to such an extent that shareholder wealth decreases.

Previous studies that address the effects to stockholders of firms that establish ESOPs have led researchers to contradictory conclusions. This study differs from previous papers in a number of ways. The sample of firms is collected from the Dow Jones News Retrieval Service database. Since the date and the time of each announcement are known, a one-day event window is analyzed. This leads to more powerful tests than those used in the previous ESOP studies, which analyze the traditional two-day event window. Also, firms that announce the expansion of an existing ESOP or the establishment of an additional ESOP are not included in my sample, as they are in other studies' samples. Only first-time ESOP announcements are analyzed.

I find that stockholders of firms associated with the adoption of first-time ESOPs earn positive and significant abnormal returns on the event day. However, there are significant, negative abnormal returns several days following the event day. Most of these negative returns are explained by other significant announcements on those days. Depending on the sample analyzed, at best, there are insignificant CARs from the event day through day +4; and at worst, there are significant, negative CARs from the event day through day +4. I find a positive, significant relationship between abnormal returns and ESOP ownership. Firms with takeover pressures within a year prior to the ESOP announcement earn negative abnormal returns.

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THE IMPACT DETECTION RISK HAS ON TAX COMPLIANCE: AN ALTERNATIVE VIEW

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ABSTRACT

Utilizing the uniqueness of the State of Ohio's tax reporting requirements, this paper uses survey data and a within subjects methodology to examine the impact detection risk, both actual and perceived, has on taxpayer compliance. This research design provides the opportunity to evaluate the impact of detection risk for actual taxpayers facing the detection risk of an actual taxing authority for two different taxes with significantly different detection risks. The within subjects methodology also allows for the isolation of detection risk since all other factors are constant.

Consistent with prior research, our study provides evidence that the detection of tax underreporting and the associated penalties do affect taxpayer compliance, however, our results also provide evidence that the magnitude of the effect of detection risk may not be great. Alternative factors are suggested that may have a greater role inducing taxpayer compliance

INTRODUCTION

Taxpayers that underreport their tax liability can be classified into two categories. The first category, the one that dominates tax research, is the willful evasion of tax. The second, not totally independent of the first category, are the taxpayers who failed to understand the tax law and have reported their tax liability to the best of their ability. Regardless of the reason, taxing authorities can learn how to increase tax revenues by obtaining a better understanding of the factors that affect tax under reporting.

Research on the evasion of taxes began with the general model created by Allingham and Sandmo (1972). It suggests that taxpayers report income in a manner that maximizes their expected utility of net wealth. The amount of income reported is a function of the probability of audit and the severity of penalties imposed. The bulk of theoretical and analytical literature on tax compliance consists of extensions and refinements of these ideas. There are many ambiguous findings; the central theory continues to be robust: an increase in the probability of detection or in the penalty rate will increase compliance.

Tax research that has focused on the willful evasion of tax can be segregated into four categories. The first two are factors affecting the taxpayer that are correlated with tax evasion, the characteristics of the tax and the characteristics of the taxpayer. The third and fourth categories

examine the effect of the probabilities of detection of the tax evasion and the associated penalties have on the incidence of tax evasion.

Tax research, examining the effect the characteristics of the tax on the level of tax evasion, has had mixed results. The research has provided evidence that tax evasion increased with tax rates (Clotfelter 1983; Pommerenhe & Frey 1993) and decreased with tax rates (Alm et al 1993; Feinstein 1991). Although each of these studies supports their conclusions with well developed theory, the most plausible explanation of these contradictory results may be that unidentified factors may be the cause. The socio-economic characteristics of the taxpayers, the probability of detection, the associated penalties for non compliance, and the taxpayer's perceived opportunity for tax evasion may provide additional insight into the incidence of tax evasion.

Researchers have also evaluated the correlation between certain social factors and taxpayer compliance. They have found evidence that tax evasion is more common among men and in married households but declines with age (Clotfelter1983; Feinstein 1991). Occupation is also a factor. Andreoni et al. (1998) finds tax evasion most prevalent in car dealers, store and restaurant owners; it is least prevalent in persons engaged in agriculture, finance, and insurance. Sheffrin and Triest (1992) provide evidence that individuals who possess more negative attitudes about government and have less faith in the honesty of people have a higher incidence of evasion.

Although there is some evidence to the contrary (Yitzhaki 1974), it is generally believed that tax evasion increases with income (Clotfelter 1983; Pommerenhe and Frey 1992; Joulfaian & Rider 1996). The results of this research may be better explained not by the increase in income but the opportunity for higher income individuals to evade. Higher income individuals may have more non-wage income and may be more likely to itemize their deductions. Robben, Webley, Weigel, et al. (1990) in a rather sophisticated experimental study involving subjects in the United States, Spain, Sweden and Belgium, found that individuals who had more opportunity for evasion (had more itemized deductions or more cash income) complied less with the tax laws. Klepper, Mazur and Nagin (1991) provide additional evidence that opportunity is correlated with evasion. In a study of the effect of tax practitioners on tax compliance, they find that tax compliance increases with unambiguously defined items such as wages and decreases with more ambiguously defined items such as employee business expenses. Wages do not offer the same opportunity for aggressive reporting as do business expenses. Erard (1993) further supports the theory of a correlation between the opportunity for evasion and the act itself. He finds that tax compliance is not dependent on the level of income but rather on the source of the income. Business, farm, rental, or royalty income had the highest levels of non-compliance. These sources of income represent those areas where income is least likely to be reported to the taxing authority by an independent third party and thus provide the greatest opportunity for under reporting.

A large body of research that examines the effects of audit probabilities and penalties consistently finds that they positively affect compliance. The magnitude of the effect audit probabilities and penalties have on tax compliance is debatable. In studies using IRS TCMP data,

Witte and Woodbury (1985) and Dubin, Graetz, and Wild (1990) find audit probability exerts a large positive effect on tax compliance. Using similar or the same data, Dubin and Wilde (1988) and Beron, Tauchen and Witte (1992) only find only a modest positive effect on compliance. It appears that the results of these studies depend largely on the proxy used for audit probability. The effects of audit probability may only have impact if taxpayers view the experience negatively. Long and Swartz (1987) find that taxpayers that were audited in one period were only marginally more compliant in a subsequent period. Erard (1992) does not find any association between a prior audit and increased compliance. These results are supported by Hessing, Elffers, Robben, and Webley (1992) that find no difference in taxpayers' beliefs of the probability of detection of tax evasion between those taxpayers who had corrections made to their tax returns and those who had not. The differences in these results may best be explained by a study by Sheffrin and Triest (1992) who find evidence that those who perceive a higher probability of detection report significantly less evasion. Thus perceived probability of detection rather than the actual probability of detection may be the determining factor in increasing tax compliance.

Tax compliance may also be affected by the use of tax practitioners. Klepper, Mazur and Nagin (1991) find evidence that tax practitioners increase compliance for they reduce error but decrease compliance by decreasing the perceived chances of audit and penalty and by delivering aggressive yet legal tax advice. Erard (1993) provides additional evidence relating to compliance and the use of tax professionals relating to the self selection between professionally prepared and self prepared returns. Erard finds that level of income is not the determining factor, but rather the source of that income. Taxpayers with business, farm, rental, or royalty income are more likely to employ tax practitioners. This group is also associated with higher non-compliance. The most significant finding of Erard, however, may be that those taxpayers that used lawyers or certified public accountants had a higher level of non-compliance than those using other tax preparers.

Tax research that differentiates between willful evasion of tax and error on the part of the taxpayer is almost non-existent. Some studies that have addressed the effect of the complexity of tax law on tax compliance have found that tax complexity maximizes revenue and compliance with the tax laws (Scothmer and Slemrod 1989). Krause (2000) to the contrary, finds that complex and ambiguous laws cause compliance to suffer. Complexity undermines the ability to differentiate between willful evasion and error.

This paper is important because it attempts to build on and resolve some of the conflicting results that precede it while exploiting a real world situation. Although the issues of tax compliance have been visited many times before, they are as yet far from being resolved. Slemrod has written extensively over the years as to what constitutes a "good tax". One of the elements of a good tax is certainty of audit (Slemrod and Bakija 2004). Governments continue to write tax laws which are not auditable. This paper demonstrates that audit certainty generates greater reported compliance.

MOTIVATION

This paper examines compliance with the laws associated with two sources of revenue for the State of Ohio, the personal income tax and the use tax. The personal income tax is the primary source of revenue for the State of Ohio. The tax is based on the individual's income reported on their federal income tax return with a few minor adjustments. It is a progressive tax where the top marginal rate in 2003 was 7.5 percent. A second major source of revenue for the state of Ohio and many of its municipalities is its sales and use tax system. The income tax system accounted for 40.6 percent of all state revenues in fiscal year 2003 and the sales and use taxes provided 32.9 percent. In dollars that is $8,256,500,000 and $6,701,400,000 respectively. Sales of tangible personal property to consumers are subject to sales tax starting at a state mandated rate of 6 percent. It may range as high as 7.5 percent depending on the county in which the sale was consummated. Certain items including food are exempt from the tax. The State of Ohio demanding that out of state vendors collect sales tax on transactions with its citizens is considered a restriction of interstate trade and is thus unconstitutional unless the seller has nexus in the State of Ohio. Therefore, Ohio has enacted use tax laws. Simply stated, use tax should be paid by the citizens of the State of Ohio on any items subject to sales tax purchased outside the state where sales tax was not collected. The purpose of the use tax is to retain the integrity of the sales tax in this era of catalogue and internet sales. It is an effort to both raise additional revenue and to level the playing field between cyber and brick and mortar vendors.

Statistics relating to the number of tax returns that are audited at the federal and state levels are quite misleading. Even though the actual rate of formal audits by the federal government is about 1 percent, all wages, interest, dividend income, mortgage interest and most charitable contributions are verified electronically from information provided by third parties. That information is then provided to the State of Ohio and is the basis for their verification of the income reported on its citizen's Ohio tax return. For a majority of the survey respondents, their primary source of income is their wages from the University and is subject to this verification process. There is no discretion in reporting this income, the wages of their spouses, or their interest and dividend income.

The use tax situation is quite different. First, the State of Ohio does not have the ability to easily verify whether the base for the use tax reported by its citizens is accurate. To properly identify underreporting they have two options. They can audit individuals, but that is very costly and may not yield positive net revenue. The alternative is to collect sales information from the tens of thousands of vendors in this country that engage in interstate trade, but that is not practical. Unlike the income tax, the actual detection risk associated with use tax is quite low. Because both taxes are paid simultaneously and on the same form, we are presented an excellent opportunity to examine comparative compliance.

RESEARCH METHOD

This study uses a survey to evaluate tax compliance in a within subjects framework. The survey was designed with four components. The first component gathers information regarding the respondent's perception of his/her knowledge of income tax laws, his/her perceived compliance with those laws, and the perceived detection and penalty risks associated with non compliance. The second component is very similar to the first but deals with a use tax rather than an income tax. The third component provides self reported proxies for the individual's attitudes. The final component provides demographic data. The survey consists of 25 questions. Most questions employ a five point Likert scale with a sixth option of answering "I do not know". A copy of the instrument used is available on request.

The survey was distributed to all 4,400 employees at the authors' University. Although this population does not represent the general population of taxpayers, for it is skewed to the more highly educated, it does give us a broad cross section of the population, from the person that cuts the grass to the President of the University. The survey was distributed in March in order to coincide with the respondent's tax reporting requirements. A total of 1,063 usable responses, which represents a 24 percent response rate, were received and analyzed.

There is a body of literature dealing with taxpayer perceptions of fairness, exemplified by Warwick (1994). The findings of this body of work implies that expressing reasons for a given tax or tax change will make taxpayers view the change more favorably. Note: none of the literature takes the next logical step to determine whether or not having more positive perceptions about a tax will actually affect compliance. With regard to the Ohio use tax, the legislature couched its passage in terms of fairness. The government was trying to protect the viability of the state sales tax and the in state brick and mortar businesses collecting that tax. Because of this reason, no questions regarding fairness were included in the survey out of fear of confounding the results. If any bias is present it should be in favor of compliance with the use tax because of the issue of fairness. Why should someone with Internet access and a credit card receive substantial discounts over those less privileged?

We have taken constructs from a variety of papers and included them in our survey as controls. The authors chose to use a regression analysis rather than path analysis because of the issue of participation in the survey. The respondents were not compensated for their time. It was felt that if the survey were of a length to permit path analysis, response would have been poor.

Table 1 provides simple statistics of the demographics of the population. Our population has a diverse age, is well educated, has above average family income, are 60 percent female, 89 percent have filed tax returns in Ohio for more than five years, 69 percent for more than ten years, two thirds are married and 57 percent prepare their own tax returns. Although our sample may not represent the general population of the State of Ohio, it is quite diverse.

Table 1: Simple Statistics of the Demographics of the Population						
Age						
Did Not Report	Under 25	25 to 35	36-55	46-55	56-65	Over 65
6	90	244	229	314	156	24
Level of Education						
Did Not Report	Did Not Complete High School	High School	Bachelor Degree	Post Graduate Degree		
20	2	190	270	581		
Income						
Did not Report	Less Than $25,000	$25,000 - $39,999	$40,000 - $59,999	$60,000 - $79,000	$80,000 $99,999	Over $100,000
39	122	161	199	204	148	190
Sex						
Did Not Report	Male	Female				
35	388	640				
Years Tax Paying Resident in the State of Ohio						
Did not Report	0-1	2-4	5-9	10 and Over		
6	81	114	129	733		
Married or Living as Married						
Did Not Report	Married	Single				
8	713	342				
Self Prepared Tax Return						
Did Not Report	Yes	No				
16	587	460				

Table 2 provides simple statistics of the respondent's reported compliance with the income and use tax laws. Reported compliance with the income tax laws was high. Ninety-three percent of the respondents replied that they reported all of their income, 2 percent were neutral or did not know, and only 5 percent replied that they did not report all of their income. Reported compliance was significantly less for the use tax than the income tax. Only 53 percent of respondents replied that

they complied with the use tax laws compared to 93 percent reported compliance for the income tax. This evaluation provides us with a test of proportions, which is significant at $p < .01$, generating a $z = 26.7$. Thirty-nine percent of the respondents replied that they did not know whether they complied with the use tax laws or were neutral and 8 percent replied they did not comply with the use tax laws compared with 5 percent for the income tax laws. A test of the proportion is significant at $p < .01$ generating a $z = 3.961$. Significantly fewer participants report noncompliance with the income tax laws than reported noncompliance with the use tax. It is also noteworthy that only seven individuals, less than 1 percent replied that they did not comply with both the use tax and income tax laws.

Table 2: Simple Statistics for Reported Compliance with Tax Laws

	I report all my sources of income on my federal income tax return		I comply with the Use Tax laws of the State of Ohio to the best of my ability	
	Count	Percent	Count	Percent
No report	2	1		
Strongly disagree	32	3.0%	49	4.6%
Mildly disagree	18	1.7%	38	3.6%
Neutral	15	1.4%	89	8.4%
Do not know	5	0.5%	329	31.0%
Mildly agree	111	10.5%	212	20.0%
Strongly agree	880	82.9%	345	32.4%
Total	1,063	100.0%	1063	100.0%

The actual opportunity to evade tax within the income and use tax systems is quite different. A majority of a most respondent's income is verified with third parties while little or none of the respondents' use tax base is verified. Although 60 percent more people indicated that they did willfully evaded the use tax than the income tax, this increase represents only three percent of the respondents. These results are consistent with prior research that shows that evasion increases with opportunity, however, significant differences in opportunity to evade did not result in large numbers of reported willful evasion. It is noteworthy that 30 percent of the respondents did not know whether or not they had complied with the use tax while only five percent of the income tax filers reported similar uncertainty.

Our study consists of simple statistics relating to tax compliance and a regression analysis. The regression model uses tax compliance as a dependent variable. Separate regressions are run for the income tax, IREPORT, and use tax, UCOMPLY compliance. The dependent variables are the

responses to the questions: "I report all my sources of income on my federal income tax return" and "I comply with the Use Tax laws of the State of Ohio to the best of my ability" respectively, measured on a five point Likert scale

The independent variables for the model fall into three categories, the perceptions of the taxpayer that affect tax compliance, the characteristics of the taxpayer, and demographic data.

Consistent with Sheffrin and Triest (1992) we test the relationship between taxpayer compliance and the taxpayers' perception of their detection risk (ICATCH, UCATCH) and the magnitude of the associated penalties (IPENATLY, UPENALTY) for non-compliance. Taxpayers' perceptions of their detection risk and the severity of the associated penalties vary by taxpayer, but those perceptions are much more important than real probabilities, for it is their perceptions to which they are reacting. Also included is a measure of the taxpayers' perception of their level of knowledge of the tax laws (IKNOW, UKNOW) and whether their tax return is professionally prepared (PREPARED). Professional preparers improve basic compliance while aiding tax avoidance with complex fact patterns.

Three characteristics of the taxpayer are also evaluated. Moral character is evaluated with questions of the respondent as to whether they consider themselves to be honest (HONEST) and whether they view themselves as being law abiding (LAWABID). The second characteristic of the taxpayer evaluated is their belief of their role in society. Hanno and Violette (1996) demonstrate that compliance differences can result from beliefs about the importance of fulfilling personal moral and civic obligations. In addition to questions regarding honesty, they found that a positive attitude toward volunteer activities also correlated with high tax compliance. We evaluate this characteristic by questioning whether volunteering contributes to society (VOLUNTER). Finally, two variables are used to evaluate the respondents' views on the role of government in society. Each respondent is asked whether we rely too much on volunteers (RELYVOL) and whether they approve of a larger role for government (LARGEGOV).

Consistent with prior research, demographic data was employed as control variables. They include age (AGE), level of education (EDUCATION), level of income (INCOME), sex (SEX), years they have filed Ohio tax returns (YEARS), and marital status (MARSTAT). Thus the two models estimated are:

Model 1 to estimate the regression for income tax

$$\begin{aligned} \text{IREPORT} = {} & \beta_{0+} \beta_1 \text{IKNOW} + \beta_2 \text{ICATCH} + \beta_3 \text{IPENALTY } \beta_4 \text{HONEST} + \\ & \beta_5 \text{LAWABID} + \beta_6 \text{VOLUNTER} + \beta_7 \text{RELYVOL} + \beta_8 \text{LARGEGOV} + \\ & \beta_9 \text{AGE} + \beta_{10} \text{EDUCATION} + \beta_{11} \text{INCOME} + \beta_{12} \text{SEX} + \beta_{13} \text{YEARS} + \\ & \beta_{14} \text{MARSTAT} + \beta_{15} \text{PREPARED} + \epsilon\ \delta \end{aligned}$$

Model 2 to estimate the regression for use tax

$$\begin{aligned} UCOMPLY = {} & \delta_{0+}\delta_1 UKNOW + \delta_2 UCATCH + \delta_3 UPENALTY + \delta_4 HONEST + \\ & \delta_5 LAWABID + \delta_6 VOLUNTER + \delta_7 RELYVOL + \delta_8 LARGEGOV + \\ & \delta_9 AGE + \delta_{10} EDUCATION + \delta_{11} INCOME + \delta_{12} SEX + \delta_{13} YEARS + \\ & \delta_{14} MARSTAT + \delta_{15} PREPARED + \epsilon \end{aligned}$$

Traditional tax theory (Allingham and Sandmo 1972) concludes that compliance with tax laws is dependent on the taxpayer's detection risk and the associated penalties. In reality, the detection risk for most of the survey participants is relatively constant within the income tax and use tax categories but diametrically different between those two categories. The income tax receives a 100 percent audit of almost all income sources and most of the largest deductions. The use tax is largely unauditable. The penalties for the underreporting of tax liability are constant for all participants and within and between the income tax and use tax categories. However, for this study, the actual detection risk and the associated penalties are not significant in our analysis of results. In this study, perception is reality. This study measures perceived compliance based on perceived detection risk and the perceived penalties associated with non-compliance. People respond to what they believe is true rather than stated policy or actual circumstances.

Table 3 presents the results of the regression analysis for income reporting and Table 4 illustrates the findings for the use tax. These results can be summarized as follows. Our survey respondents replied that their level of compliance with the income tax laws resulted from their perceived detection risk (ICAUGHT, p-value = .0186), and their perceptions of the penalties for underreporting of income (IPENALTY, p-value = .0047). Similarly, our survey respondents replied that their level of compliances with the use tax laws is based on their perceived detection risk associated with not properly reporting their out of state purchases (p-value = .0001), and their perception of the penalties associated with the underreporting of the corresponding tax (p-value = .0001). The results of both of these regressions are consistent with the findings of Sheffrin and Triest (1992). It is the underlying data that provides greater insight into tax compliance, however.

Table 3: Regression Results for Income Tax Model

Dependent Variable IREPORT

Variable	Parameter Estimate	White's t-statistic	p-value
Intercept	1.71754	3.41	0.0007
IKNOW	0.02660	1.17	0.2417
ICATCH	-0.06798	-2.36	0.0186
IPENALTY	0.09066	2.83	0.0047
HONEST*	0.50843	6.17	0.0001

Table 3: Regression Results for Income Tax Model			
Dependent Variable IREPORT			
Variable	Parameter Estimate	White's t-statistic	p-value
LAWABID*	0.02282	1.73	0.0424
VOLUNTER*	0.01322	0.39	0.3499
RELYVOL*	-0.04050	-1.82	0.0696
LARGEGOV*	0.03297	1.56	0.0599
AGE	0.07531	3.21	0.0014
EDUCATION	0.02389	0.61	0.5450
INCOME	0.02362	1.36	0.1738
SEX	0.08551	1.48	0.1386
YEARS	-0.05929	-1.79	0.0730
MARSTAT	0.00043	0.01	0.9945
PREPARED	0.00262	0.05	0.9611

Where all the variables other than the demographic data and the preparer are the responses to the survey questions measured on a five point Likert Scale:
IREPORT (Dependent Variable) - I report all my sources of income on my federal income tax return.
IKNOW - I understand the Income Tax Laws of the State of Ohio.
ICATCH - It is nearly impossible for the State of Ohio to detect the underreporting of income by its citizens.
IPENALTY - The penalties for the underreporting of income on my Ohio Income Tax Return are significant.
HONEST - I feel I am generally an honest person.
LAWABID- I feel I am a law-abiding person.
VOLUNTER - Doing volunteer work is good because it contributes to society.
RELYVOL - As a society, we rely too much on volunteers.
LARGEGOV - I approve of a larger role for government.
AGE – The age of the respondent.
EDUCATION – The level of education of the respondent.
INCOME – The family income for the respondent.
SEX – The sex of the respondent.
YEARS – The number of years the respondent filed an Ohio State Tax Form.
MARSTAT – The marital status of the respondent.
PREPARED - Do you or your spouse prepare your own Ohio State Income Tax Return?

Table 4: Regression Results for Use Tax Model			
Dependent Variable UCOMPLY			
Variable	Parameter Estimate	t-statistic	p-value
Intercept	0.1608	0.74	0.4589
UKNOW	0.0839	2.94	0.0034
UCATCH	-0.1667	-4.04	0.0001
UPENALTY	0.4026	7.68	0.0001
HONEST*	0.1516	2.82	0.0025
LAWABID*	0.0566	3.00	0.0014
VOLUNTER*	0.2632	6.85	0.0001
RELYVOL*	-0.0259	-0.88	0.1895
LARGEGOV*	-0.0462	-1.66	0.0486
AGE	-0.0160	-0.52	0.6044
EDUCATION	0.0945	1.95	0.0510
INCOME	-0.0598	-2.24	0.0252
SEX	0.0103	1.45	0.1482
YEARS	0.0749	1.82	0.0687
MARSTAT	-0.0001	-0.01	0.9986
PREPARED	0.1005	1.47	0.1427

Where all the variables other than the demographic data and the preparer are the responses to the survey questions measured on a five point Likert Scale:
UCOMPL (Dependent variable) - I comply with the Use Tax laws of the State of Ohio to the best of my ability.
UKNOW - I understand the Use Tax laws of the State of Ohio.
UCATCH - It is nearly impossible for the State of Ohio to detect the underpayment of Use Tax by its citizens.
UPENALTY - The penalties for the underpayment of Use Tax my Ohio Income Tax Return are significant
HONEST - I feel I am generally an honest person.
LAWABID- I feel I am a law-abiding person.
VOLUNTER - Doing volunteer work is good because it contributes to society.
RELYVOL - As a society, we rely too much on volunteers.
LARGEGOV - I approve of a larger role for government.
AGE – The age of the respondent.
EDUCATION – The level of education of the respondent.
INCOME – The family income for the respondent.
SEX – The sex of the respondent.
YEARS – The number of years the respondent filed an Ohio State Tax Form.
MARSTAT – The marital status of the respondent.
PREPARED - Do you or your spouse prepare your own Ohio State Income Tax Return?

Table 5 presents simple statistics for the respondent's perception of detection risk. The results show significant differences in the respondent's perception of detection risk between those who reported they complied with the tax laws and those who did not. Thirty six percent of those persons who reported they complied with the income tax reporting requirements believed that underreporting of income would be detected while only 17 percent of persons who did not comply with the provisions believed the state could detect underreporting. Similarly, 25 percents of those persons who reported they complied with the use tax believe underreporting of out of state sales would be detected while only 14 percent of non-compliers believed their underreporting would be detected. These statistics are consistent with the regression results. But this table presents a much more interesting result. Forty-eight percent of persons who reported they did not comply with the income tax and 35 percent of persons who reported they did not comply with the use tax either did not have an opinion or did not know whether the state could detect their underreporting. Similarly, 48 percent of persons who complied with the income tax reporting requirements and 55 percent of those respondents who complied with the use tax laws reported the same lack of knowledge of their detection risk. In summary, only 34 percent, 358 of 1,063 (13 percent, 137 of 1,063) of respondents report both compliance with the income reporting (use tax law) and a belief that underreporting will be detected. Although compliance is positively correlated with the level of detection risk, the level of detection risk perceived by the respondents is not sufficient to ensure compliance with the tax laws for most of the respondents.

Table 5: Simple Statistics for the Respondent's Perceptions of Detection Risk*

	Survey Respondents Who Report							
	Non-compliance with Income Tax		Non-Compliance with Use Tax		Compliance with Income Tax		Compliance with Use Tax	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
No report	0		0		2		1	
Strongly disagree	3	5.8%	3	3.4%	133	13.5%	47	8.3%
Mildly disagree	6	11.5%	9	10.2%	225	22.7%	90	16.2%
Neutral	5	9.6%	11	12.5%	98	9.9%	44	7.9%
Do not know	20	38.5%	20	22.7%	377	38.1%	260	46.7%
Mildly agree	14	26.9%	21	23.9%	134	13.6%	81	14.6%
Strongly agree	4	7.7%	24	27.3%	22	2.2%	35	6.3%
Total	52	100.0%	88	100.0%	991	100.0%	557	100.0%

* Note that the survey questions relating to detection risk are in negative form, therefore, strongly disagree means a high level of perceived detection risk, etc.

1. It is nearly impossible for the State of Ohio to detect the under-reporting of income by its citizens.
2. It is nearly impossible for the State of Ohio to detect the under payment of Use tax by its citizens.

Detection of the underreporting of tax is not a deterrent to such actions unless the individual incurs some negative consequence as a result of the detection greater than the payment of the underreported tax. Table 6 summarizes the responses for the respondent's perceptions of the severity of penalties imposed by the State for the underreporting of tax. Only 23 percent (11 percent) of respondents who reported non-compliance with the income reporting (use tax laws) believe penalties for underreporting are significant. Conversely, only 16 percent (27 percent) of those who reported compliance with the income reporting (use tax laws) believe penalties for underreporting are significant. But penalties are not imposed unless the underreporting of tax is detected. Table 7 presents results for respondents who perceive both detection risk and significant penalties. Only 8 percent (2 percent) of those reporting non-compliance and 23 percent (14 percent) of respondents reporting compliance with the income reporting (use tax) believe the state can detect their underreporting and that the penalties for such actions are significant.

Table 6: Simple Statistics for the Respondent's Perceptions of Penalties for Under-reporting

	Survey Respondents Who Report							
	Non-compliance with Income Tax		Non-Compliance with Use Tax		Compliance with Income Tax		Compliance with Use Tax	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
No report	0		0		2		4	
Strongly disagree	5	9.6%	11	12.5%	133	13.4%	5	0.9%
Mildly disagree	5	9.6%	9	10.2%	225	22.8%	17	3.1%
Neutral	4	7.7%	13	14.8%	98	9.9%	57	10.3%
Do not know	26	50.0%	45	51.1%	377	38.2%	323	58.4%
Mildly agree	7	13.5%	8	9.1%	134	13.5%	95	17.2%
Strongly agree	5	9.6%	2	2.3%	22	2.2%	56	10.1%
Total	52	100.0%	88	100.0%	991	100.0%	557	100.0%

Table 7: Simple Statistics for the Respondent's Who Report Perceptions of Both Detection Risk and Significant Penalties

Survey Respondents Who Report							
Non-compliance with Income Tax		Non-Compliance with Use Tax		Compliance with Income Tax		Compliance with Use Tax	
Count	Percent	Count	Percent	Count	Percent	Count	Percent
4	7.7%	2	2.3%	224	22.8%	77	13.9%

The information presented above shows that even though the regression analysis provides evidence that increased detection risk and the associated penalties increases compliance with tax laws, the magnitude of the impact they have on compliance may not be significant. Further evidence of this phenomenon is provided by the level of reported non-compliance with the income and use taxes. As discussed earlier, significant measures are taken to ensure Ohio's citizens properly report their income properly for income tax purposes. There is no similar measure undertaken for use tax. Despite this difference in detection risk reported, non-compliance is 5 percent for income reporting and only 8 percent for use tax. At relatively low levels of actual detection risk, high levels of compliance are generated for the use tax.

Although compliance with tax laws is dependent on the taxpayer's perception of the probability of detection if they do not comply, other factors such as the taxpayer's moral structure, their view of the role of society, and their views on government may be the taxpayer's primary motivation for compliance (Hanno and Violette 1996). It may also be dependent on differences in demographics. Table 3 and Table 4 present the regression analysis that includes the proxies for these characteristics and demographics for income reporting and use tax respectively.

Moral character may be quite critical to tax compliance where compliance with the tax cannot be easily verified by the taxing authority. The results of the regression analysis find that reported compliance is dependent on the reported honesty (HONESTY) of the taxpayer (p-value = .0001, .0025) and whether they believe they are law abiding (LAWABID) or not (p-value = .0424, .0014) for income reporting and use tax respectively. These results provide evidence that people comply with the tax law because they believe it is the right thing to do.

People's view of their role in society may also play a critical part in taxpayer compliance. The role of volunteers (VOLUNTER) was used as a proxy. There are two interpretations available for this question. The first interpretation is that the respondent feels the need to help other people in our society. This need can be met by volunteering but can also be met by the government. Therefore the respondent complies with the tax law because the State performs a function that results in the betterment of society. Thus the sign for VOLUNTER should be positive. The alternative interpretation is that the private sector is much better at providing services to those in need than the government. Using this interpretation, the sign of VOLUNTER should be negative. The results of the regression analysis provide some evidence that reported compliance is dependent on the respondent's need to help other people. The coefficient of VOLUNTER was positive and significant at a .0001 level of significance for use tax and not significant at any level for income reporting.

Two proxies were included in the survey to measure the respondents' view of the role of government. The first question asks whether we rely too much on volunteers (RELYVOL). A positive coefficient for RELYVOL may be interpreted as our society relies too much on volunteers to meet the needs of society and some other group should be performing the work, potentially the government. Thus the respondent complies with the tax laws in order that government can fulfill its role. A negative coefficient may be interpreted that people do not comply with the tax laws for they

believe that some of the functions performed by the government should be performed by volunteers. A negative coefficient may also be interpreted as the respondent complies with tax laws but also believes in an increased role of volunteers in meeting the needs of society. The results are inconclusive. The coefficient of RELYVOL is negative and approaches significance at a p = .0696 level for income reporting and is not significant at any level for use tax.

The second question asks whether the respondent approves of a larger role for government. A positive coefficient is expected for those who believe in a larger role of government should be willing to pay for it. The coefficient of LARGEGOV is positive and approaches significance at a .0599 and a .0486 level of significance for income reporting and use tax respectively. These results provide evidence that there is a positive correlation between persons who believe in a larger role for government and tax compliance. It should be noted that this result may be driven by the nature of the sample population which is exclusively government employees.

Demographics of the taxpayer may also play a role in tax compliance. Six demographic classes were collected from each respondent: age, education, income, sex, years filing an Ohio Tax form, and marital status. Arguments can be made for the direction of the correlation for each of these demographic classes so no signs are predicted. The results of the regression analysis are presented in Tables 3 and 4. For the income reporting only AGE was significant (p-value = .0014). This result can be interpreted that older taxpayers were more likely to comply with the income reporting requirements than younger taxpayers. For use tax, only INCOME was significant (p-value = .0252). The negative coefficient may be interpreted as the higher the taxpayer's income the less likely he/she is to comply with the use tax laws. The coefficient of EDUCATION is positive and approaches significance at a .0510 level. This result provides limited evidence that compliance with the use tax laws is positively correlated with the level of education received.

Thirty-nine percent of the respondents reported that they did not know whether or not they had complied with the use tax. Forty-seven percent of the respondents did not know whether or not they had paid the use tax. The bulk of these respondents had reported using third party preparers. Their inability to recall whether or not they had paid the use tax may be a function of relying on experts for compliance. Eliminating the respondents that indicated "I do not know." on these two parameters reduces the sample to n = 496. Rerunning both models one and two with the smaller sample does not alter the findings illustrated earlier.

Table 8: Regression Results for Use Tax Model			
Variable	Parameter Estimate	t-statistic	p-value
Intercept	0.4821	0.98	0.3291
IREPORT	0.0143	0.35	0.7290
UKNOW	0.0710	2.58	0.0103
UCATCH	-0.1629	-4.00	0.0001
UPENALTY	0.3869	7.37	0.0001
HONEST*	0.1286	2.27	0.0240
LAWABID*	0.0632	3.28	0.0012
VOLUNTER*	0.2565	6.83	0.0001
RELYVOL*	-0.0176	-0.62	0.5371
LARGEGOV*	-0.0470	-1.74	0.0834
AGE	-0.0138	-0.46	0.6482
EDUCATION	0.1137	2.40	0.0516
INCOME	-0.0501	-1.92	0.0552
SEX	0.0797	1.15	0.2511
YEARS	0.0707	1.75	0.0803
MARSTAT	-0.0208	0.26	0.7940
PREPARE	0.1229	1.84	0.0670

Where all the variables other than the demographic data and the preparer are the responses to the survey questions measured on a five point Likert Scale:
UCOMPL (Dependent variable) - I comply with the Use Tax laws of the State of Ohio to the best of my ability.
IREPORT (Dependent Variable) - I report all my sources of income on my federal income tax return.
UKNOW - I understand the Use Tax laws of the State of Ohio.
UCATCH - It is nearly impossible for the State of Ohio to detect the underpayment of Use Tax by its citizens.
UPENALTY - The penalties for the underpayment of Use Tax my Ohio Income Tax Return are significant
HONEST - I feel I am generally an honest person.
LAWABID- I feel I am a law-abiding person.
VOLUNTER - Doing volunteer work is good because it contributes to society.
RELYVOL - As a society, we rely too much on volunteers.
LARGEGOV - I approve of a larger role for government.
AGE – The age of the respondent.
EDUCATION – The level of education of the respondent.
INCOME – The family income for the respondent.
SEX – The sex of the respondent.
YEARS – The number of years the respondent filed an Ohio State Tax Form.
MARSTAT – The marital status of the respondent.
PREPARED - Do you or your spouse prepare your own Ohio State Income Tax Return?

We also had some concern that the use tax results were simply the halo effect of responses made with regard to the income tax. Model 2 was modified to include IREPORT as one of the independent variables. While the addition of a variable changed coefficients and their t scores, none were moved sufficiently to alter their significance or lack thereof. The variable IREPORT displayed a coefficient of .01431, p = .729 (See Table 8). No statistically significant correlation was found between use tax compliance and income tax compliance.

CONCLUSION

Traditional tax theory concludes that taxpayers comply with tax laws because of their fear that under reporting of their tax will be detected by the taxing authority and they will have to pay significant penalties as a result. Consistent with prior research, this paper provides evidence supporting this theory, however, the results question the magnitude of the impact that a taxpayer's detection risk has on taxpayer compliance. Using a within subjects methodology, taxpayers that faced significantly different levels of detection risk, both actual and perceived, for two different taxes generally did not take advantage of the lower levels of detection risk. The reported non-compliance with the two taxes only increased from 5 percent of the population for the income tax to 8 percent of the population for the use tax even though significant differences existed in the level of detection risk, both perceived and actual. Other results also question the impact of detection risk. Only one third of all persons reporting compliance with either of the tax laws indicated they believed the taxing authority could detect tax underreporting. In addition, a third of those reporting non-compliance indicated they did not know whether the taxing authority could detect their underreporting. Thus for a significant portion of the population, detection risk affected neither compliance nor non-compliance.

The paper examines other factors that may affect taxpayer compliance. We find evidence that compliance with tax laws is affected by the moral character of the taxpayer, his/her view of the role he/she plays in society, and his/her views on the role of government. We also find some evidence that demographic information such as age, education, and income play a role in the taxpayer's compliance with tax law.

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THE EFFECT OF THE FIRM'S MONOPOLY POWER ON THE EARNINGS RESPONSE COEFFICIENT

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ABSTRACT

The purpose of this study is to provide further evidence on the determinants of the earnings response coefficient (ERC). More specifically, we have attempted to examine the 'monopoly power' of a firm as an additional factor affecting the ERC.

Using a firm valuation model that explicitly incorporates the degree of monopoly power in its product markets (Thomadakis, 1976; Subrahmanyan and Thomadakis, 1980), we demonstrate that the ERC is positively related to the firm's monopoly power.

This theoretical prediction is empirically examined using a sample of 144 Korean firms listed in the Korean Stock Exchange during the period extending from 1986 to 1992. The sample firm's monopoly power is measured by whether or not the firm is designated as a market-dominant enterprise by the Korean Fair Trade Commission according to the Monopoly Regulation and Fair Trade Act. Such designation implies that the firm has a monopoly power.

The empirical results are generally consistent with the theoretical prediction. Specifically, the ERC is higher for the designated firms than for the non-designated firms. This result is robust across different methods.

INTRODUCTION

The determinant of cross-sectional and/or inter-temporal variations of the earnings response coefficient (hereafter, ERC in short) has been investigated in quite a few previous studies (e.g., Kormendi and Lipe, 1987; Collins and Kothari, 1989; Easton and Zmijewski, 1989; Dhaliwal, Lee and Fargher, 1991; Dhaliwal and Reynolds, 1994; Ahmed, 1994; Kallapur, 1994; Choi and Jeter, 1992; Biddle and Seow, 1991; Teets, 1992; Collins and Salatka, 1993; Bandyopadbyay, 1994). The determinants of the ERC identified in previous studies are characteristics of the firm's earnings generating process, systematic risk of common stock, firm size, the default risk, growth opportunity, cost structure, dividend payout ratio, audit opinion, industry, and interest rates. However, the effect of a firm's monopoly power on the ERC has not been extensively investigated, so far. Thus, the purpose of this study is to examine the effect of a firm's monopoly power on the ERC using Korean capital market data.

Using a firm valuation model that explicitly incorporates the degree of monopoly power in its product markets (Thomadakis, 1976; Subrahmanyan and Thomadakis, 1980), we demonstrate that the ERC is positively related to the firm's monopoly power. This theoretical prediction is empirically tested by comparing ERC's between the firms designated as market-dominant enterprises by the *Monopoly Regulation and Fair Trade Act* and the other firms. To the extent that designation as a market-dominant enterprise is an appropriate proxy for the degree of monopoly power, we expect the ERC's of the designated firms to be higher than those of the non-designated firms.

The remainder of this paper is organized as follows. In the next section, we derive the theoretical relationship between the firm's monopoly power and the ERC within the framework of a firm valuation model developed by Thomadakis (1976), Subrahmanyan and Thomadakis (1980), and Ahmed (1994). Section three contains our research hypothesis and research methodology. Section four describes sample selection procedure and descriptive statistics for the variables used. The empirical results are presented in section five. A summary of the results and some suggestions for future research appear in final section.

MONOPOLY POWER AND EARNINGS RESPONSE COEFFICIENT

A firm valuation model based on cash flow has been used in many previous ERC literature such as Kormendi and Lipe (1987), Collins and Kothari (1989), Dhaliwal, Lee and Fargher (1991), and Dhaliwal and Reynolds (1994). On the other hand, Thomadakis (1976) and Subrahmanyan and Thomadakis (1980) developed a model that incorporates the degree of monopoly power in the valuation of a firm. By combining these two valuation approaches, we develop a valuation model that describes a functional relationship between the monopoly power and the ERC.

To simplify the analysis, we make the following assumptions:

Assumption1: The demand function faced by the firm is

$$p_t = a_t q_t^{-n}$$

Where p = the price of a unit of product in period t;

q = the quantity of output chosen by a firm in period t;

a = a random variable representing the uncertainty concerning the demand function. Its mean,

variance and covariance are constant through time;

n = the measure of a firm's monopoly power, $0 \leq n \leq 1$.

From *Assumption 1*, the marginal revenue (MR) is (1-n) aq^{-n} and the average revenue (AR) is aq^{-n}. Therefore, the firm is in a perfect competition when n=0 and hence MR=AR= p, while the firm is in a monopolistic position when n>0. Also, since n is the inverse of the elasticity of demand, the demand becomes more inelastic as n increases. Therefore, n is reliable measure of a firm's monopoly power. This is also evident from the fact that Lerner's index, a popular measure of the monopoly power, is usually defined as 1/(1-n).

Assumption 2: The cost function for the firm is

$$TC_t = c_t q_t$$

Where TC= the total cost;
c= the operating cost per unit of output in period t.c is invariant to the level of output, and its mean, variance and covariance are also constant through time.

Assumption 3: As a discount rate for the capitalization of a firm's future cash flow, a single period CAPM is applicable to each period. Also, it is assumed that the market parameters in the CAPM (risk-free rate, market returns, and systematic risk) are exogeneous and constant through time. Thus, the risk-adjusted expected return for a firm in period t (K_t) is:

$$K_t = R_f + \beta[E(R_m) - R_f]$$

Where β = the systematic risk of the firm;
R_f = the risk-free interest rate;
R_m = the rate of return on market portfolio.

Using the above assumptions, a firm valuation model is developed in a two period world (Thomadakis, 1976). The firm's problem is to choose its output level that maximizes the present value of its future cash flows. In a two period world, the sequence of events is as follows:

> At the beginning of the first period (t=0), the firm chooses the optimal level of output (Q) for the first period based on expectation about future cash flows (i.e., prices and costs). At the end of the first period (t=1), prices and operating costs for the first period are realized. The firm revises its expectations about period 2 cash flows and chooses the optimal quantity for period 2 based on the revised

expectations. The firm is liquidated at the end of the second period. Under this setting, the firm's value at time 0 (V_0) can be described as follow.

$$V_0 = k_1 Q_1 + \frac{nE_0(p_1Q_1 - c_1Q_1)}{1+K_1} + \frac{nE_0(p_2Q_2 - c_2Q_2)}{(1+K_1)(1+K_2)} \quad \text{.....(1)}$$

Where p_t = the price of a unit of product in period t;
Q_t = the quantity of output chosen by a firm in period t;
K_t = the risk-adjusted expected return for a firm in period t;
k_1 = the actual risk-adjusted return for a firm in period 1;
n = the measure of a firm's monopoly power, $0 \leq n \leq 1$.

Abnormal returns or excess returns for the first period (AR_1) are computed by the difference between realized returns (R_1) and expected returns (ER_1) as follows:

$$AR_1 = R_1 - ER_1 = \frac{V_1 - V_0 + D_1}{V_0} - \frac{E_0(V_1) - V_0}{V_0}$$

Where D_1 = the dividend paid to stockholders after deducting investments for the second period from the realized cash flows in period one.

Two additional assumptions regarding the firm's earnings generating process are made to develop a model for abnormal returns. First, cash flows to the firm and accounting earnings (X_t) are identical (i.e., $X_t = p_tq_t - c_tq_t$). Second, the firm's earnings have time-series characteristics described by the following model:

$$E_1(X_2) - E_0(X_2) = \lambda [X_1 - E_0(X_1)]$$

Where λ = the extent to which the current period's earnings shock affects the revisions in expectations of future earnings, usually referred to as persistent coefficient. The sign and value of λ will depend on the time-series properties of the firm's earnings.

It can be shown that λ is a function of time-series model parameters even when earnings generating process is specified by a general ARIMA(pdq) model (Collins and Kothari, 1989).

Then Abnormal returns or excess returns for the first period (AR_1) can be described as follow:

$$AR_1 = \left[1 + \frac{n\lambda}{1 + R_f + \beta[E(R_m) - R_f]}\right] \frac{X_1 - E_0(X_1)}{V_0} \quad \text{.....(2)}$$

It is obvious from equation (2) that the impact of β, λ, $E(R_m)$-R_f, and n on the ERC (the bracket term) are, ceteris paribus:

$$\frac{\partial ERC}{\partial \beta} < 0, \frac{\partial ERC}{\partial \lambda} > 0, \frac{\partial ERC}{\partial [E(R_m) - R_f]} < 0, \frac{\partial ERC}{\partial n} > 0$$

The first three results reveal that, if other factors be constant, the ERC is negatively related to both the systematic risk of the firm (β) and the market risk premium ($E(R_m)$-R_f), but positively related to the persistence coefficient (λ). Previous studies such as Kormendi and Lipe (1987), Easton and Zmizewski (1989), and Collins and Kothari (1989) provide empirical evidence consistent with these predictions. The fourth comparative static result indicates that the ERC is a positive function of the firm's monopoly power (n) in its product markets.

HYPOTHESIS AND RESEARCH DESIGN

Hypothesis

The research question addressed in this study is whether there is an association between firm's monopoly power and the ERC. The analytical results in the preceding section suggest, among other things, that the a firm's monopoly power is positively related to the ERC.

As a surrogate for the firm's monopoly power, the firm's designation as a market-dominant enterprise by the *Monopoly Regulation and Fair Trade Act* is used. According to the *Monopoly Regulation and Fair Trade Act*, the *Korea Fair Trade Commission* designates and notifies market-dominant enterprises at the beginning of each year. A firm with its annual domestic sales exceeding 100 billion won is designated as a marker-dominant enterprise if its market share is over 50% or 75% (combined with up to 3 other designated firms) in a same or similar industry. If a firm is designated as such, the firm (hereafter, designated firm) has a higher degree of monopoly power relative to other firms that are not designated (hereafter, non-designated firms).

A testable hypothesis for the positive relationship between the ERC and the firm's monopoly power derived herefrom would be,

Hypothesis: Earnings response coefficients of designated firms are higher than those of non-designated firms.

Measurement of Variables

Under an assumption that earnings are described by the random walk with a drift model. Expected earnings, *E(X)*, can be written as follows:

$$E_{t-1}(X_t) = X_{t-1} + \delta_t$$

Where X_t = the earnings at time t;
δ = a drift term obtained by averaging earnings changes for the 5 previous years.

Unexpected earnings (*UE*), excess of actual earnings over expected earnings, can be described as follow:

$$UE_{it} = \frac{X_{it} - (X_{it-1} + \delta_{it})}{P_{it-1}}$$

Where P_{it-1} = the market value of the equity of firm i at the beginning of period *t* (stock price times number of shares outstanding).

Expected earnings as well as stock price are often used as a deflator. Stock price is chosen because it was shown to be a theoretically superior deflator (Christie (1987)) and has been used in a number of previous studies (e.g., Easton and Zmizewski (1989), Collins and Kothari (1989)). To avoid the problem of extreme values, observations with $|UE|$>200% are truncated to ±200%.

The systematic risk (BETA) of firm i in time *t*, β_{it}, is obtained by estimating the following market model:

$$R_{itj} = \alpha_{it} + \beta_{it} R_{mtj} + \varepsilon_{itj} \quad \text{.....(3)}$$

Where R_{itj} = the rate of return on firm *i* during month *j* in year *t*;
R_{mtj} = the rate of return on market portfolio during month *j* in year *t*;
α_{it}, β_{it} = the intercept and the slope coefficient, respectively, from the market model.

The above model is estimated using four years (48 months) of monthly return data up to 3 months after the beginning of a fiscal year. If less than 24 monthly returns were available, the firm-month observation is excluded from the analysis.

The estimated parameters, α_{it} and β_{it}, from the market model (3) are used to calculate monthly abnormal returns (AR) as follows:

$$AR_{itj} = R_{itj} - (\alpha_{it} + \beta_{it} R_{mtj})$$

Where *i* = the firm index;
t = the year index;
j = the month index.

The monthly abnormal returns are then cumulated over twelve months up to the three months after the end of the fiscal year to get cumulative abnormal returns (CAR):

$$CAR_{it} = \sum_{j=4}^{15} AR_{itj}$$

Where CAR_{it} = the cumulative abnormal returns for firm *i* in year *t*;
AR_{itj} = the abnormal returns of firm i for the j_{th} month of year *t*.

To test the hypothesis that ERC's of designated firms be higher than those of non-designated firms, we estimated the following regression model:

$$CAR_{it} = a + bUE_{it} + \phi D_{it} UE_{it} + e_{it} \quad \text{.....(4)}$$

Where UE_{it} = the unexpected earnings for firm *i* in year *t*,
D_{it} = the dummy variable which takes a value of one if firm *i* is designated as a market-dominant enterprise ('designated firm') in year *t*, and zero if otherwise.

Test for any significant difference in ERC's between the designated firms and the non-designated firms is equivalent to testing the significance of the estimated coefficient ϕ in the regression model (4). Thus, our hypothesis can be formally stated as:

$$Ho: \ \phi = 0, \quad Ha: \ \phi > 0$$

SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

The sample firms examined in this study are Korean firms listed on the Korean Stock Exchange as of December 31, 1992. To be included in the sample, the firm must satisfy the following criteria: (1) Sufficient accounting data including net income and equity are available over the study period (1981-1992); (2) Monthly security returns data are available from January 1981 to December 1992; (3) Firms in banking and finance industry are excluded. Criteria (1) and (2) are imposed to ensure the data availability of accounting earnings and returns data enough to carry out empirical analyses. The firms in banking and finance industry are excluded because they tend to have different characteristics from the other firms. The above selection criteria yielded a sample of 144 firms. The number of firms designated as market-dominant enterprises by the *KFTC* varies over time. For example, 181 firms were designated in 1981 while 209 firms were designated in 1992.

The breakdown of sample firms by industry is shown in Table 1. The sample consists of 14 industries and there are some clustering in particular industries. For example, designated firms in foods & beverage do have 29% market share, while those in textile industries have 14.5% market share. On the other hand, the medical products industry appears to be very competitive in the sense that only 1 out of the total 17 sample firms is designated. In general, designated sample firms consist of large firms with a relatively long history and hence there may be a potential problem of survivorship bias.

Table 1: Industry Classification of Sample Firms

Industry	Category					
	Designated Firms		Non-designated Firms		Total Firms	
	N	%	N	%	N	%
Foods and Beverage	18	29.0	6	7.3	24	16.7
Textiles	9	14.5	11	13.4	20	13.8
Pulp, Paper and Paper Products	1	1.6	5	6.1	6	4.2
Chemicals & Chemical Products	6	9.7	11	13.4	17	11.8

Table 1: Industry Classification of Sample Firms

Industry	Category					
	Designated Firms		Non-designated Firms		Total Firms	
	N	%	N	%	N	%
Medical Products	1	1.6	16	19.5	17	11.8
Rubber Plastic Products	4	6.5	1	1.2	5	3.5
Non-metalic Mineral Products	5	8.1	9	11.0	14	9.7
Basic Metals	2	3.2	9	11.0	11	7.6
Fabricated Metal Products	1	1.6	4	4.9	5	3.5
Machinery and Equipment	5	8.1	1	1.2	6	4.2
Radio, TV and Communication Equipment	3	4.8	7	8.5	10	6.9
Electrical Machinery and Apparatus	3	4.8	0	0.0	3	2.1
Motor Vehicles and Trailers	3	4.8	2	2.5	5	3.5
Medical, Precision &Optical Instruments, Watches	1	11.6	0	0.0	1	0.7
Total	62	100.0	82	100.0	144	100.0

Table 2 provides descriptive statistics for selected variables of the sample firms. Also reported are Wilcoxon rank test statistics for the differences in these variables between designated firms and non-designated firms. Selected variables include unexpected earnings (UE), cumulative abnormal returns (CAR), systematic risk (BETA), growth as measured by the ratio of market value to book value of equity (GROWTH), leverage as measured by the ration of total liabilities to total asset (LEVG), Tobin's Q ratio (QRATIO), return on asset (ROA), return on equity (ROE) and firm size as measured by the market value of equity (SIZE).

As expected, the average firm size of the designated firms is much greater than that of the non-designated firms: i.e., 2,366 billion Won for the designated firms ($1.57 billion at the exchange rate of 1500 Won per dollar as of August, 2004), while 528 billion Won ($0.35 billion) for the non-designated firms. This difference is statistically significant at less than 0.01 confidence level.

There is no significant difference in UE and CAR between the two groups. However, mean (median) systematic risk (BETA) of the designated firms is 0.816 (0.801), which is much smaller than that of the non-designated firms. These differences are consistent with the theoretical prediction that monopoly power is negatively correlated with firm's systematic risk (Subrahmanyan and Thomadakis, 1980).

The median ROA and ROE are statistically significantly greater for the non-designated firms, which appears to be contrary to our expectation from a monopoly gain perspective. On the other hand, QRATIO of the designated firms are significantly greater than that of the non-designated

firms. Higher QRATIO for the designated firms implies that the designation as a market dominant enterprise is recognized as having monopoly power in that product markets.

Table 2: Descriptive Statistics of Selected Variables[1]

	Category							
Variable	Designated Firms			Non-designated Firms				
	Mean	S.D.	Median	Mean	S.D.	Median	Wilcoxon Z-value[11]	Significance (p-value)
UE [2]	-0.001	0.131	0.001	-0.002	0.196	0.002	0.542	0.5871
CAR [3]	0.061	0.362	0.058	0.057	0.424	0.045	0.535	0.5922
BETA [4]	0.816	0.239	0.801	0.936	0.282	0.935	-7.483	0.0001
GROWTH [5]	2.381	3.601	1.241	1.925	3.051	1.001	5.036	0.0001
LEVG [6]	0.706	0.120	0.723	0.646	0.135	0.660	7.759	0.0001
QRATIO [7]	1.356	0.945	1.051	1.268	0.884	1.000	4.557	0.0001
ROA [8]	0.023	0.022	0.017	0.030	0.029	0.024	-4.334	0.0001
ROE [9]	0.076	0.056	0.068	0.083	0.186	0.073	-1.072	0.2833
SIZE [10]	236.59	558.53	75.24	52.78	84.90	26.59	12.519	0.0001

1 Total 1,064 observations were used for 144 sample firms during 7 years (1986-1992)
2 Cumulative abnormal returns are cumulated over 12 months form April to March of the year t + 1
3 Unexpected earnings as measured by subtracting expected earnings described by the random walk with drift model from actual earnings, and then deflated by total market value of equity at the beginning of the fiscal period..
4 Systematic risk of common stock, estimated from market model.
5 Growth as measured by the ratio of market value to book value of equity.
6 Leverage as measured by the ratio of total liabilities to total assets.
7 Tobin Q ratio = (Total Liabilities + Market value of equity) / Total assets
8 Return on total assets = Net Income / Total Assets
9 Return on equity = Net Income / Equity
10 Firm size is measured by the market value of equity (10 billion won).
11 Wilcoxon signed ranks tests statistics

EMPIRICAL RESULTS

Table 3 presents the results from estimations of equation (4). We estimate equation (4) for the designated firms and the non-designated firms, as well as total sample. The results are reported for two types of samples, one for the total sample (Sample A) and the other for the reduced-sample (Sample B) excluding those firms that changed their designation status. Overall results are consistent with the theoretical prediction.

Table 3: Effects of Monopoly Power on the ERC

$$CAR_{it} = a + bUE_{it} + \phi D_{it}UE_{it} + e_{it}$$

Panel A: Sample A (including firms that changed their designation status)

Independent Variables	Expected Sign	Designated Firms	Non-designated Firms	Total Sample Firms
Intercept	?	-0.177 ** (5.340)	-0.142 ** (5.109)	-0.156 ** (7.303)
UE	+	1.159 ** (3.708)	0.408 * (2.397)	0.418 ** (2.510)
D*UE	+			0.744 * (2.023)
R^2 (%)		5.35	1.50	2.91

Panel B: Sample B (excluding firms that changed their designation status)

Independent Variables	Expected Sign	Designated Firms	Non-designated Firms	Total Sample Firms
Intercept	?	-0.206 ** (5.599)	-0.124 ** (4.144)	-0.155 ** (7.303)
UE	+	1.406 ** (2.473)	0.437 ** (2.400)	0.461 ** (2.510)
D*UE	+			0.764 + (1.273)
R^2 (%)		3.06	1.82	2.14

1 D_{it} is a dummy variable which takes a value of one if firm i for the year t belongs to designated firms, and zero if firm i belongs to non-designated firms

2 t-values are in parenthesis.
+ : Significant at $\alpha = 0.10$; * : Significant at $\alpha = 0.05$; ** : Significant at $\alpha = 0.01$.

Panel A of Table 3 shows the results for the total sample (Sample A). The ERC for the designated firms is 1.159, while that of non-designated firms is 0.408. The regression coefficient (ϕ) of $D_{it}UE_{it}$ in equation (4) are positive as predicted and statistically different from zero at the significance level of 0.05, supporting the Hypothesis.

Sample A may have some estimation bias because the number of the 'designated firms' is not symmetrical with that of the 'non-designated firms' each year. Thus, we delete those firms that changed their designation status during the test period and hold only those firms that consistently keep designated or non-designated status over the whole test period. The results are shown in Panel B, which are quite consistent with the results in Panel A.

Overall, these results lend empirical support to our maintained hypothesis that the ERC is a positive function of a firm's monopoly power measured by the designation as a market dominant enterprise.

In general, the above results support our hypothesis. However, the empirical estimation procedure might include the following potential problems. First, the firm size of the two sample groups is significantly different from each other, which may contaminate the estimation results. Secondly, different industry distributions of the two groups may also contaminate the estimation results. To resolve these potential problems, matched-paired sample based on firm size and industry is used. Industry is classified based on the classification by the *Korean Listed Companies Association*, while firm size is measured as the market value of equity. Through this procedure, 48 matched paired sample firms (total 96 firms) are selected.

Table 4 provides the estimation results of equation (4) for the matched paired sample. For the sample A including those firms who changed their designation status, the regression coefficient (ϕ) is statistically significantly positive at the significant level 0.05 as predicted. The results for sample B excluding those firms who changed their designation status are similar to those for sample A (panel B). Overall, the results for the matched paired sample also support the hypothesis that the ERC is a positive function of a firm's monopoly power.

Table 4: Effect of Monopoly Power on the ERC: Matched Paired Sample based on Firm Size and Industry

$$CAR_{it} = a + bUE_{it} + \phi D_{it}UE_{it} + e_{it}$$

Panel A: Sample A (including firms that changed their designation status)

Independent Variables	Expected Sign	Designated Firms	Non-designated Firms	Total Sample Firms
Intercept	?	-0.191 ** (5.063)	-0.226 ** (5.339)	-0.208 ** (7.362)
UE	+	1.182 ** (3.551)	0.279 (0.886)	0.261 (0.879)
D*UE	+			0.947 * (2.073)
R^2 (%)		6.25	0.41	3.20

Panel B: Sample B (excluding firms that changed their designation status)

Independent Variables	Expected Sign	Designated Firms	Non-designated Firms	Total Sample Firms
Intercept	?	-0.188 ** (4.406)	-0.144 ** (3.109)	-0.165 ** (5.256)
UE	+	1.565 ** (2.593)	0.099 (0.289)	0.122 (0.375)
D*UE	+			1.362 ** (1.942)
R^2 (%)		4.78	0.06	2.08

Table 4: Effect of Monopoly Power on the ERC: Matched Paired Sample based on Firm Size and Industry

$$CAR_{it} = a + bUE_{it} + \phi D_{it}UE_{it} + e_{it}$$

1 D_{it} is a dummy variable which takes a value of one if firm i for the year t belongs to designated firms, and zero if firm i belongs to non-designated firms.

2 t-values are in parenthesis.
+ : Significant at α = 0.10; * : Significant at α = 0.05; ** : Significant at α = 0.01.

The variables, RISK and GROWTH, have been shown to affect ERC's in the previous literature (e.g., Easton and Zmijewski, 1989 and Collins and Kothari, 1989). Thus, our findings in the previous section may be due to systematic differences between these two groups in the variables that affect the ERC's. In an attempt to investigate this possibility, we estimated the following regression model:

$$CAR_{it} = b_0 + [b_1 + b_2 RISK_{it} + b_3 GROW_{it} + \phi D_{it}] * UE_{it} + e_{it} \ldots\ldots\ldots (5)$$

where $RISK_{it}$ = 1 if the systematic risk of common stock (BETA) for firm *i* in year *t* is above the sample median, and 0 if otherwise,

$GROW_{it}$= 1 if growth rate (GROWTH) for firm *i* in year *t* is above the sample median, and 0 if otherwise.

In equation (5), the coefficient b_1 of UE is predicted to be positive as a measure of usefulness of accounting earnings information. The b_2 and b_3 are predicted to be negative and positive, respectively.

Table 5 provides the empirical results for both total sample and matched paired sample. Each sample includes two different groups: one group includes those firms that changed their designation status while the other group does not include those firms that changed their designation status. Overall, the coefficients on RISK and GROW have their predicted signs. Furthermore, the coefficient b_2 of RISK is statistically significant at the significance level of 0.05.

Table 5: Effect of Monopoly Power on the ERC: After controlling for Systematic Risk and Growth

$$CAR_{it} = b_0 [b_1 + b_2 RISK_{it} + b_3 GROW_{it} + \phi D_{it}] * UE_{it} + e_{it}$$

1. Total Sample

Independent Variables	Expected Sign	Sample A	Sample B
Intercept	?	-0.160 (7.469) **	-0.158 (6.796) **
UE	+	0.723 (3.044) **	0.866 (3.439) **
RISK*UE	-	-0.699 (2.107) *	-0.853 (2.340) **

Table 5: Effect of Monopoly Power on the ERC: After controlling for Systematic Risk and Growth

$$CAR_{it} = b_0 [b_1 + b_2 RISK_{it} + b_3 GROW_{it} + \phi D_{it}] * UE_{it} + e_{it}$$

GROW*UE	+	0.236 (0.617)	0.055 (0.138)
D*UE	+	0.508 (1.308) +	0.589 (0.977)
R^2 (%)		3.60	3.29
2. Matched Paired Sample			
Independent Variables	Expected Sign	Sample A	Sample B
Intercept	?	-0.211 (7.514) **	-0.164 (5.217) **
UE	+	0.834 (2.111) **	0.581 (1.339) +
RISK*UE	-	-1.265 (2.453) **	-0.989 (1.667) *
GROW*UE	+	2.468 (2.261) *	0.320 (0.231)
D*UE	+	0.372 (0.747)	1.105 (1.538) +
R^2 (%)		5.75	3.12

1 $RISK_{it}$ = 1 if the systematic risk of common stock for firm i in year t is above sample median, and 0 otherwise

2 $GROW_{it}$= 1 if growth (ratio of market value to book value of equity) for firm i in year t is above sample median, and 0 otherwise.

3 t-value is in parenthesis
+ : Significant at α = 0.10, two tailed test
* : Significant at α = 0.05, two tailed test
** : Significant at α = 0.01, two tailed test

As expected, the estimate of the coefficient ϕ on D_{it}*UE_{it} are positive, which is similar to earlier results. The coefficients are statistically significant at the 0.10 significance level for sample A of total sample and sample B of matched-paired sample.

CONCLUSIONS

The purpose of this paper is to provide further evidence on the factors that affect the coefficient relating unexpected earnings and abnormal stock returns, viz., the ERC. In particular, this study examines whether a firm's monopoly power has a systematic impact on the ERC. From analytical results, we derive a theoretical prediction that the ERC is a positive function of the firm's monopoly power in its product markets.

Using a sample of 144 Korean firms listed in the Korean Stock Exchange during the period from1986 to 1992, we empirically test this theoretical prediction. A firm's monopoly power is measured by whether or not the firm is designated as a market-dominant enterprise by the Monopoly Regulation and Fair Trade Act.

The empirical results are generally consistent with the theoretical prediction. Specifically, the ERC is higher for the designated firms than for the non-designated firms. This result is robust across different methods and samples. The results from this study may provide additional insights into the effect of the monopoly power on the ERC and the economic effect of the monopoly regulation policy in Korea.

One related issues left for future research is a time-series approach that examines the direction of changes in ERC's associated with shifts in the firm's monopoly power would provide meaningful results. For example, we can compare the ERC's over time using a sample of firms that are newly designated as a market-dominant enterprise or de-listed from the designation.

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TESTS OF TECHNICAL TRADING RULES IN THE ASIAN-PACIFIC EQUITY MARKETS: A BOOTSTRAP APPROACH

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ABSTRACT

This study examines the effectiveness of nine technical trading rules in eight Asian-Pacific equity markets for periods ranging from January 1987 to November 2005. The annualized returns from each trading rule are compared to a naive buy-and-hold strategy to determine profitability. The TSEC, Straits Times, Hang Seng, Jakarta, KOSPI and the BSE emerge as equity markets where technical trading rules may be profitable. There is no evidence of profitability for the other two markets, the Nikkei and the All Ordinaries. Disregarding statistical significance, the results reveal that 56 out of the 72 (77.8 per cent) trading rule variants tested on all data sets were profitable after accounting for transaction costs. The results are important because they provide investors with information about the Asian-Pacific equity markets that can be used to determine optimal asset allocations and to further diversify portfolios.

INTRODUCTION

Technical analysis is considered to be one of the earliest forms of investment analysis with its origins dating back to the 1800s. It was one of the first forms of investment analysis mainly because stock prices and volume levels have been publicly available prior to other types of financial information. Technical analysts search the past prices of a time series for recognizable patterns that have the ability to predict future price movements and earn abnormal returns. Various trading rules and indicators have been developed based on each identifiable pattern. The belief that historical data can be used to identify patterns that predict security movements violates the random walk hypothesis and the weak form of market efficiency. According to efficient market theorists, technical analysis will not be able to generate abnormal returns in an efficient market. However, the relatively new and emerging equity markets in the Asian-Pacific region have not been tested extensively to determine whether various types of technical trading rules can be used to earn abnormal returns.

There have been a number of studies conducted on trading rules in the North American equity markets. Alexander (1964) and Fama and Blume (1966) were two of the first to test technical trading rules in the United States. Both of these studies suggest that excess returns could not be realized by making investment decisions based on the movements of certain sizes after adjusting for transaction costs. The number of influential studies that support trading rules grew in the 1990s. Some of these studies include Jegadeesh and Titman (1993), Blume, Easley, and O'Hara (1994), Chan, Jagadeesh, and Lakonishok (1996), Lo and MacKinlay (1997), Grundy and Martin (1998), and Rouwenhorst (1998). Studies that signify the informational content of technical trading rules

and patterns include Lo, Mamaysky and Wang (2000), Brock, LeBaron and Lakonishok (1992), Gençay (1999), Lisi and Medio (1997), and Allen and Karjalainen (1999).

There have been a limited number of studies conducted on technical trading rules in the Asian-Pacific markets. Bessembinder and Chan (1995) were the amongst the first to report that moving averages and the trading range break-out rule are useful for forecasting index returns for a group of Asian stock markets. Los (2001) argues that Asian stock markets exhibit strong price trend behaviour and suggests that trading rules with first order Markov filters can be used to profitability exploit trends. Ratner and Leal (1999) tested variable moving average rules in Latin America and Asia and found Taiwan and Thailand as the only two profitable markets.

The purpose of this study is to examine the profitability of various technical trading rules in a number of Asian-Pacific equity markets. Profitability is defined as the ability to earn annualized returns in excess of the buy-and-hold trading strategy. The statistical significance (p-value) of the returns is assessed through a bootstrap simulation. In addition, the robustness of the results is tested through sub-period analysis.

Nine technical trading rules are employed in an attempt to exploit trends in the series of returns from eight Asian-Pacific equity markets. The results demonstrate, on average, that superior profits (after trading costs) can be achieved by technical trading rules over the buy-and-hold trading strategy in certain countries, mainly Bombay, Hong Kong, Indonesia, Korea, Singapore, and Taiwan. Disregarding statistical significance, 56 of the 72 (77.8 per cent) technical trading rules were able earn excess returns, consistent with the findings of Brock, LeBaron and Lakonishok (1992) (referred to as BLL from hereon in) on the Dow Jones Industrial Average and Ratner and Leal (1999) in the emerging markets. Furthermore, 80 per cent of all buy signals were able to correctly predict price movements at the one- and ten-day lag, suggesting that trading rules generate relevant market timing information.

This study differs from the current literature because it provides a more comprehensive test of technical trading rules on the Asian-Pacific equity markets. No other study comprehensively tests as many trading rules on such a large number of equity markets: nine variants of three trading rules (moving average, trading range break-outs and filter rules) on eight Asian-Pacific equity markets. This study also offers more recent data and a different methodology than the two prior studies that focused on the Asian-Pacific markets (Bessembinder and Chan (1995) and Los (2001)). As such, this study contributes to the overall understanding of the efficiency and price behaviour of these markets. An understanding of the Asian-Pacific equity markets is important as they are quickly developing into a very significant portion of the global equity market.

The remainder of the paper is organized as follows. The next section describes the trading rule strategies. Section 3 described the data. Section 4 explains the methodology. Section 5 presents the results. Conclusions and recommendations for future research in Section 6.

TRADING RULES

Trading rules can be grouped into three classes: market structure, market sentiment, and flow of funds. This study tests the most common market structure trading rules. The three rules tested are moving average cross-over rules, filter rules (momentum strategies) and trading range break-out

rules. BLL discuss the potential biases that can arise from identifying and testing patterns in security returns in the same dataset. As such, the same trading rules as BLL along with three common filter rules are tested. This will help reduce the possibility of data snooping as the datasets are not searched for successful trading rules ex-post. Testing the trading rules on subsets for robustness also mitigates the effects of data mining on the overall conclusions.

A moving average cross-over (MAC-O) rule compares a short moving average to a long moving average. The MAC-O rule tries to identify a change in a trend. There are two categories of the MAC-O rule: variable length moving average (VMA) and fixed length moving average (FMA). The FMA stresses that the returns for a few days following the crossing of the moving averages should be abnormal. The VMA generates a buy (sell) signal whenever the short moving average is above (below) the long moving average. This study tests the VMA rule based on the following buy and sell signals:

$$\frac{\sum_{s=1}^{S} R_{i,t}}{S} > \frac{\sum_{l=1}^{L} R_{i,t-1}}{L} = Buy, \qquad \text{Formula (1)}$$

$$\frac{\sum_{s=1}^{S} R_{i,t}}{S} < \frac{\sum_{l=1}^{L} R_{i,t-1}}{L} = Sell, \qquad \text{Formula (2)}$$

where $R_{i,t}$ is the log return given the short period of S (one or five days), and $R_{i,t-1}$ is the log return over the long period L (50, 150 or 200 days). These are the same buy and sell signal used by Ratner and Leal (1999) and various other researchers. The following short, long combinations will be used to test the VMA: (1, 50), (1, 200) and (5, 150).

Filter rules generate buy and sell signals based on the following logic: Buy when the price rises by *f* per cent above the most recent trough and sell when the price falls *f* per cent below its most recent peak. The filter size (*f*) is the parameter that defines a filter rule. This study tests the filter rule based on three parameters: one-per cent, two-per cent, and five-per cent.

The trading range break-out (TRB-O) rule, also referred to as resistance and support levels, generates a buy signal when the price breaks-out above the resistance level and a sell signal when the price breaks below the support level. The resistance level is defined as the local maximum, and the support level is defined as the local minimum (BLL). At the resistance (support) level, intuition would suggest that many investors are willing to sell (buy). The selling (buying) pressure will create resistance (support) against the price rising (falling) above the peak (trough) level. The TRB-O rule is examined by calculating the local maximum and minimum based on 50, 150 and 200 days as defined in Formula 3.

$$\begin{aligned} Pos_{t+1} &= \text{Buy}, \quad \text{if } P_t > Max\ \{P_{t-1}, P_{t-2}, \ldots, P_{t-n}\} \\ Pos_{t+1} &= Pos_t, \quad \text{if } P_t > Min\{P_{t-1}, P_{t-2}, \ldots, P_{t-n}\} \quad P_t \quad Max\ \{P_{t-1}, P_{t-2}, \ldots, P_{t-n}\} \\ Pos_{t+1} &= \text{Sell}, \quad \text{if } P_t < Min\{P_{t-1}, P_{t-2}, \ldots, P_{t-n}\} \end{aligned} \qquad \text{Formula (3)}$$

where P_t is the stock price at time t.

DATA DESCRIPTION

The technical trading rules are tested on eight Asian-Pacific equity markets, including the more highly developed Nikkei and Hang Seng markets. The data sets of the eight equity markets tested are described in Table 1.

Table 1 – Data Set Descriptions

Country	Index Name	n	Currency	Skewness	Kurtosis	Period Tested
Australia	All Ordinaries	5395	Australian Dollar	0.3643	-0.7093	01/08/87 – 01/11/05
India	Bombay Stock Exchange (BSE)	2083	Indian Ruppe	1.1715	0.8579	01/01/97 – 01/11/05
Indonesia	Jakarta	2030	Indonesian Rupiah	1.1862	0.4010	01/01/97 – 01/11/05
Korea	Korea Composite Stock Price Index (KOSPI)	2067	Korean Won	0.1090	-0.1778	01/01/97 – 01/11/05
Japan	Nikkei	2846	Japanese Yen	0.1202	-1.1654	01/01/95 – 01/11/05
Hong Kong	Hang Seng	2196	Hong Kong Dollar	0.2264	-0.6968	01/01/95 – 01/11/05
Singapore	Straits Times	4479	Singapore Dollar	-0.1558	-1.0480	01/12/87 – 01/11/05
Taiwan	Taiwan Stock Exchange (TSEC)	2067	Taiwan Dollar	0.4970	-0.5101	01/01/97 – 01/11/05

The trading rules can be calculated at various data frequencies. Investors can use high-frequency data, such as intra-day, or longer horizons, such as weekly or yearly, when using the trading rules. The frequency selected by a technical investor depends on many different factors and personal preferences. This research study utilizes daily closing prices for the stock market indices over a minimum of seven years. A seven-year period provides a sufficient number of daily observations to allow for the formation, recurrence and investigation of the technical trading rules. The daily returns are calculated as the holding period return of each day as follows:

$$r_t = \log (p_t) - \log (p_{t-1}) \qquad \text{Formula (4)}$$

where p_t denotes the market price.

METHODOLOGY

Trading Rule Profitability

The profitability of the trading rules is determined by comparing the returns generated by the trading signals to the buy-and-hold strategy returns. The methodology relies on this relatively simple technique for analyzing the profitability of the trading rules because of the possible problems related to non-linear models such as computational expensiveness, overfitting, data snooping and difficulties interpreting the results. See White (2005) for a thorough discussion of these issues. As such, the returns are subject to sophisticated tests of significance. The returns from the buy-and-hold strategy are calculated by investing in the security at the beginning of the data set, given the trading rule parameters, and holding the security until the end of the data set. For example, no trading signal can be generated until the 50th day with a 1-day, 50-day MAC-O rule. Therefore, the buy-and-hold returns will be calculated commencing the 50th trading day.

The trading rule returns are also calculated in a relatively simple manner. The returns resulting from the MAC-O rules are based on the variable moving average signals. More precisely, when a buy signal is triggered as per Formula 1, the investor will take a long position, and returns will be calculated at the market rate. When a sell signal is triggered as per Formula 2, the investor is out of the market and returns will be based on a notional interest rate (3 per cent APR or 0.0089 daily EAR). A nominal interest rate is used because the data sets are not adjusted for inflation.

The returns resulting from the filter rule and TBR-O rule are calculated in a slightly different manner. At the beginning of the trading period, the investor will be short and earn the notional interest rate. To minimize the measurement error due to non-synchronous trading made evident by Scholes and Williams (1977) the investor will be long the market one day after the trading signal is generated. Therefore, once a buy signal is generated, the investor will be long on the following day, and returns will be calculated based on the market returns. Finally, if the investor is long (short), and a buy (sell) signal is generated, the position is carried forward.

Similar to Gencay (1998b), the returns generated from the trading rules are adjusted for transaction costs. Both the bid-ask spread and brokerage trading costs are included into the total transaction cost. The bid-ask spread for an exchange traded fund of the index is used as a proxy for the actual index. The return will be adjusted downward by 0.99859 when a trade is triggered. This adjustment factor approximates the average transaction costs for these securities. See Ratner and Leal (1999) for a summary of transaction costs in Asian equity markets.

The significance of the results is tested by using the bootstrap approach developed by Levich and Thomas (1993). This approach, first, observes the data set of closing prices, with the sample size denoted by $N+1$ that corresponds to a set of N returns. The m^{th} ($m=1,\ldots,M$) permutation of these N returns ($M=N!$) is related to a unique profit measure ($X[m, r]$) for the r^{th} trading rule variant ($r=1,\ldots,R$) used in this study. Thus, for each variable, a new series can be generated by randomly reshuffling the returns of the original series.

From the sequence of M returns, the starting and ending points of the randomly generated time series are fixed at their original values. This maintains the distributional properties of the original data. However, the time series properties are random. In this bootstrapping simulation one

can thus generate one of the various notional paths that the returns could have taken from time *t* (starting day) to time *t+n* (ending day). The notional paths are generated fifty times for each data set. Technical trading rules are then applied to each of the fifty random series and the profits *X*[*m, r*] are measured. This process generates an empirical distribution of the profits. The profits calculated on the original data sets are then compared to the profits from the randomly generated data sets. A simulated p-value is produced by computing the proportion of returns generated from the simulated series that is greater than the return computed with the actual series.

The null and alternative hypotheses are given by:

H_0: the trading rules provide no useful information.
H_1: the trading rules provide useful information.

Robustness testing will be performed to mitigate the effects of data mining and to further analyze the significance of the trading rule profits. To test the returns for robustness, returns will be calculated on three sub-periods of the original data. The sub-periods are determined by arbitrarily dividing the data sets into thirds and then testing for structural breaks between the subsets. The Chow Test is used to test for structural breaks. The subsets will be used to test for robustness if the parameters of each subset are determined to be non-stationary. Three new subsets are selected and re-tested if the parameters of the subsets are constant.

The returns from each trading rule and the buy-and-hold strategy, along with the Sharpe ratio, are computed for each sub-period. Consistent excess returns and stable Sharpe ratios across the sub-periods are associated with robust returns.

Sign Prediction Ability of Trading Rules

The effectiveness of the trading signal's ability to predict future price movements in the equity markets given a one-day and ten-day lag is also tested. A one-day and ten-day lag is utilized because one lag provides a measure of immediate effectiveness (one-day), while the other is a more flexible measure (ten-day). This is similar to the BLL evaluation methodology.

Assuming a trading signal is generated at time t, the one-day lag is defined as the log return at time t+1. The ten-day lag is defined as the holding period return for the ten days immediately following time t. As such, a buy signal is correct if the one or ten day holding period return following the signal is positive. A sell signal is correct if the one or ten day holding period return following the signal is negative. For example, the one-day lag return is calculated as follows: if a trading rule generates a buy signal for a security on June 1st, the signal will be deemed to be correct if the price increases in the following day, June 2nd. Conversely, a sell signal is correct if the price of the security decreases the day following a trade signal. Based on this rational, a predictive value (PV from hereon in) can be calculated. The PV is calculated as follows:

$$(CS_t) / (CS_t + IS_t) \qquad \text{Formula (5)}$$

where CS_t denotes the number of correct buy signals give the time lag (t) and IS_t denotes the number of incorrect buy signals given the time lag (t). The PV measure is used extensively in laboratory tests for medical research studies; however, it is an applicable measure for the purposes of this study as well.

Along with the predictive values for each buy and sell signal, the binomial probability distribution (BPD) will be used to calculate the probability of the PV occurring by chance. The BPD probability will be presented so that it can be interpreted similar to a p-value. The BPD is used for events with dichotomous results, where the probability of success is constant for each trial, and trials are independent. The signals tested meet these requirements.

The effectiveness of the trading rule sign prediction ability will also be tested by analyzing the aggregate average daily returns that follow a signal. Naturally, it is expected that a large and positive daily return will follow a buy signal, and a small or negative return will follow a sell signal. The significance of the returns will be determined by testing for a significant difference between returns following the buy and sell (buy-sell) signals. The trading rules can forecast future movements of security returns if the difference between the buy-sell returns is positive and significant. The t-stat will be calculated as follows:

$$\frac{\mu_b - \mu_s}{\sqrt{(\sigma_b^2 / \eta_b) + (\sigma_s^2 / \eta_s)}}, \qquad \text{Formula (6)}$$

Refer to BLL for a detailed discussion of the t-test methodology. Note that this test statistic does not always conform to the student distribution. However, an approximation for the degrees of freedom was developed by Satterthwhaite (1946). If the number of observations is sufficiently large, this test statistic will converge to a standard normal distribution and the t-table critical values can be used.

EMPIRICAL RESULTS

Profitability of Trading Rules

The profitability of the technical trading rules is presented in Table 2. The resulting p-values from the bootstrapping simulation are also presented in Table 2. If the original return has a rank of 100, then the return was the highest of any of the randomly generated returns, and has a corresponding p-value of 0.00. A rank of fifty reveals that half of the randomly generated returns were greater than the original return, resulting in a p-value of 0.50.

Table 2 – Profitability of Technical Trading Rules (Panel A)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1 / 50**	**1 / 200**	**5 / 150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
Annual Return	13.2	8.1	9.7	13.2	9.9	6.0	10.4	6.4	4.7
Buy & Hold Return	11.3	10.5	11.1	11.4	11.4	11.4	11.3	11.1	10.5
Over / (Under) Performance	**1.8**	(2.3)	(1.4)	**1.8**	(1.5)	(5.4)	(0.9)	(4.8)	(5.8)
No. of Trades	291	120	78	1116	494	57	454	303	257
p-value	0.00*	0.21	0.24	0.00*	0.06	0.54	0.16	0.75	0.89
BSE (N = 2083)									
Annual Return	22.0	12.4	17.1	13.0	9.4	3.6	20.4	7.7	21.7
Buy & Hold Return	9.8	11	14.5	8.0	8	8.0	9.8	14.5	11.1
Over / (Under) Performance	**12.2**	**1.5**	**2.6**	**5.0**	**1.4**	(4.4)	**10.6**	(6.9)	**10.5**
No. of Trades	87	48	23	659	442	123	169	96	82
p-value	0.01*	0.17	0.29	0.01*	0.11	0.54	0.06	0.63	0.02*
Jakarta (N =2030)									
Annual Return	38.2	20.6	11.0	59.2	10.2	24.2	13.4	15.3	8.3
Buy & Hold Return	5.7	11.3	8.8	0.6	0.6	0.6	5.7	8.8	10.9
Over / (Under) Performance	**32.6**	**9.3**	**2.2**	**58.6**	**9.6**	**23.6**	**7.7**	**6.5**	(2.5)
No. of Trades	77	31	28	585	395	153	152	8.3	72
p-value	0.03*	0.12	0.32	0.00*	0.03*	0.01*	0.18	0.11	0.50
KOSPI (N = 2067)									
Annual Return	28.7	25.0	33.7	6.9	(21.0)	6.5	17.6	7.6	6.3
Buy & Hold Return	1.2	14.1	10.2	(0.8)	(0.8)	(0.8)	1.2	10.2	14.3
Over / (Under) Performance	**27.5**	**10.9**	**23.5**	**7.7**	(20.2)	**7.3**	**16.4**	(2.6)	(8.1)
No. of Trades	97	35	19	722	560	223	189	110	97
p-value	0.00*	0.06	0.01*	0.02*	0.91	0.18	0.07	0.51	0.68

* Significant p-values at the 5% level.
Note that Table 2 presents the number of trades as opposed to signals. The number of trades is more relevant because transaction costs are a function of trades, not signals. As noted in the Section 4, the number of signals does not represent the number of trades because if an investor is long (short) in the market, no trade is triggered if a long (short) signal is generated.

The technical trading rules performed best on the Strait Times and TSEC markets as all nine variants generated returns in excess of the naive buy-and-hold trading strategy. The trading rule performed the worst on the All Ordinaries data set as only two of the nine trading rules generated excess returns. Overall, 56 of the 72 (77.8 per cent) trading rule variants tested on all data sets were

able to earn excess returns. The bootstrapping simulations reveal only 27 of the 56 (47.4 per cent) excess returns are statistically significant at the five per cent level of significance

Table 2 – Profitability of Technical Trading Rules (Panel B)

	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1 / 50**	**1 / 200**	**5 / 150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
Nikkei (N = 2846)									
Annual Return	(1.1)	4.6	8.8	(16.1)	(9.0)	(10.4)	(2.0)	5.3	2.9
Buy & Hold Return	(4.8)	(6.1)	(5.0)	(7.0)	(7.0)	(7.0)	(4.8)	(5.0)	(6.1)
Over / (Under) Performance	**3.8**	**10.7**	**13.8**	(9.2)	(2.0)	(3.4)	**2.0**	**10.3**	**9.0**
No. of Trades	199	54	27	894	543	107	247	140	127
p-value	0.31	0.12	0.04*	0.71	0.60	0.95	0.62	0.12	0.17
Hang Seng (N = 2792)									
Annual Return	10.0	10.5	7.3	9.5	(1.3)	7.6	7.8	6.2	10.1
Buy & Hold Return	2.5	0.7	1.7	3.3	3.3	3.3	2.5	1.7	0.7
Over / (Under) Performance	**7.5**	**9.8**	**5.5**	**6.1**	(4.7)	**4.2**	**5.3**	**4.5**	**9.4**
No. of Trades	162	46	42	809	520	145	237	126	112
p-value	0.00*	0.04*	0.12	0.00*	0.43	0.23	0.12	0.16	0.05*
Straits Times (N =4479)									
Annual Return	12.4	8.9	11.5	17.1	8.9	7.2	14.1	8.5	4.7
Buy & Hold Return	4.6	3.9	3.2	5.6	5.6	5.6	4.6	3.2	4.0
Over / (Under) Performance	**7.8**	**5.0**	**8.3**	**11.5**	**3.3**	**1.6**	**9.5**	**5.3**	**0.7**
No. of Trades	268	112	58	1068	621	143	312	182	163
p-value	0.00*	0.01*	0.00*	0.00*	0.001*	0.07	0.00*	0.04*	0.26
TSEC (N =2067)									
Annual Return	14.4	0.3	(3.5)	(0.3)	(3.9)	3.3	3.2	2.7	(8.4)
Buy & Hold Return	(11.6)	(10.5)	(11.5)	(11.5)	(4.5)	(11.5)	(11.6)	(11.5)	(10.5)
Over / (Under) Performance	**26.0**	**10.8**	**8.1**	**11.3**	**7.7**	**14.9**	**14.9**	**8.9**	**2.1**
No. of Trades	85	63	38	678	464	132	179	90	73
p-value	0.01*	0.14	0.29	0.00*	0.07	0.05*	0.08	0.27	0.63

* Significant p-values at the 5% level. Note that Table 2 presents the number of trades as opposed to signals. The number of trades is more relevant because transaction costs are a function of trades, not signals. As noted in the Section 4, the number of signals does not represent the number of trades because if an investor is long (short) in the market, no trade is triggered if a long (short) signal is generated.

In general, the MAC-O trading rules performed the best of the three rules as 22 of the 24 (91.7 per cent) tests generated excess returns, twelve of which were significant at five per cent. More specifically, the MAC-O (1, 50) trading rule performed the best as all nine variants tested outperformed the buy-and-hold trading strategy in all nine Asian-Pacific markets. The MAC-O (1, 50) earned excess returns in the range of 1.8 to 32.6 per cent per annum. The MAC-O (1, 200) trading rule also earned excess of returns ranging from 1.5 to 10.9 per cent per annum for eight of the nine markets; excess returns were not available only on the All Ordinaries market index.

The filter rules earned excess returns for 17 of the 24 (70.8 per cent) variants tested, however only 11 of the 24 filter rules were significant at five per cent level of significance. None of the filter rules (one, two, or five per cent) were able to generate excess returns on the Nikkei, and only the one-per cent filter rule was able to beat the buy-and-hold trading strategy on the All Ordinaries. However, the filter rules performed well on the remaining market indices as 16 of the 18 earned excess returns.

The TRB-O rules also beat the market in 17 of the 24 (70.8 per cent) variants tested, but only four of the TRB-O rules were significant. The TRB-O (50 days) was able to beat the market in 7 of the 8 variants tested. None of the TRB-O rules were able to earn excess returns on the All Ordinaries, and only the TRB-O (50 days) was able to beat the market on the BSE. However, the TRB-O generated excess returns in 16 of the 18 variants tested.

In general, the results suggest that trading rules based on short-term momentum are better at generating statistically significant excess returns. Excluding the Nikkei, both the MAC-O (1, 50) and the one per cent filter rule consistently provide statistically significant excess returns. The 50-day TRB-O rule is also the most profitable of all three TRB-O variants. The bootstrapping simulation provides some support against the weak form of the EMH revealing that the MAC-O (1, 50) and the one per cent filter rule consistently generate significant excess returns.

Similar to Gençay (1998a), the trading rules were tested for robustness on sub-periods. Table 3 present the returns for the sub-periods, along with the Sharpe Ratio for each period.

Table 3 – Profitability of Technical Trading Rules on Sub-Periods (Panel A)

	Excess Return	Sharpe Ratio	Excess Return	Sharpe Ratio	Excess Return	Sharpe Ratio
	All Ordinaries					
	03/08/1984 - 27/08/1991		28/08/1991 - 28/10/1998		29/10/1998 - 30/11/2005	
Trading Rule						
MA (1, 50)	12.7	0.0911	(2.0)	0.0362	(3.8)	0.0399
MA (1, 200)	1.8	0.0293	(3.3)	0.0281	(5.0)	0.0294
MA (1, 150)	5.1	0.0411	(4.7)	0.0223	(3.7)	0.0358
Filter Rule (1%)	12.9	0.0909	(2.7)	0.0329	(9.1)	0.0137
Filter Rule (2%)	3.2	0.0625	(3.8)	0.0262	(3.8)	0.0397
Filter Rule (5%)	(2.1)	0.0446	(4.8)	0.0207	(3.7)	0.0405

Table 3 – Profitability of Technical Trading Rules on Sub-Periods (Panel A)							
		Excess Return	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**
	TRB-O (50 days)	7.4	0.0730	(5.2)	0.0203	(4.1)	0.0383
	TRB-O (150 days)	(0.6)	0.0288	(7.5)	0.0091	(5.6)	0.0259
	TRB-O (200 days)	(6.3)	0.0102	(6.4)	0.0126	(4.6)	0.0294
		Jakarta					
		01/07/1997 - 21/03/2000		**22/03/2000 - 18/02/2003**		**19/02/2003 - 30/11/2005**	
Trading Rule							
	MA (1, 50)	63.1	0.0654	33.2	0.0374	(11.6)	0.1265
	MA (1, 200)	2.1	0.0046	24.8	0.0163	(11.1)	0.1049
	MA (1, 150)	(8.2)	-0.0256	21.5	0.0043	(18.4)	0.0975
	Filter Rule (1%)	133.0*	0.1177	29.1*	0.0226	8.8*	0.1705
	Filter Rule (2%)	31.6	0.0130	12.1	-0.0259	(32.7)	0.0802
	Filter Rule (5%)	33.5	0.0145	36.8	0.0415	(17.3)	0.1061
	TRB-O (50 days)	13.1	0.0015	26.7	0.0185	(32.0)	0.0845
	TRB-O (150 days)	17.6	0.0193	11.7	-0.0271	(15.7)	0.0976
	TRB-O (200 days)	6.8	0.0112	(1.8)	-0.0646	(14.2)	0.0977
		BSE					
		01/07/1997 - 02/05/2000		**03/05/2000 - 04/03/2003**		**05/03/2003 - 0/11/2005**	
Trading Rule							
	MA (1, 50)	11.2*	0.0185	13.3*	-0.0135	9.2*	0.1512
	MA (1, 200)	3.3	0.0037	3.4	-0.0712	(5.1)	0.0199
	MA (1, 150)	(4.2)	0.0128	11.5	-0.0246	(6.7)	0.1099
	Filter Rule (1%)	5.3	-0.0111	14.5	-0.0072	(12.9)	0.1166
	Filter Rule (2%)	(2.7)	-0.0206	15.6	-0.0037	(16.0)	0.1087
	Filter Rule (5%)	(3.0)	-0.0191	21.8	-0.0137	(45.4)	0.0441
	TRB-O (50 days)	22.7*	0.0395	5.3*	-0.0375	1.6*	0.1312
	TRB-O (150 days)	(19.7)	-0.0139	10.0	-0.0302	(20.4)	0.0770
	TRB-O (200 days)	8.4	0.0147	18.6	0.0116	(2.4)	0.0979
		KOSPI					
		01/07/1997 - 18/04/2000		**19/04/2000 - 20/02/2003**		**20/02/2003 - 30/11/2005**	
Trading Rule							
	MA (1, 50)	63.9	0.0559	25.3	0.0124	(10.4)	0.0770
	MA (1, 200)	26.3	0.0596	21.0	0.0041	(14.9)	0.0662
	MA (1, 150)	37.9	0.0577	33.2	0.0337	(3.5)	0.0878

Table 3 – Profitability of Technical Trading Rules on Sub-Periods (Panel A)							
		Excess Return	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**
	Filter Rule (1%)	27.6	0.0133	11.5	-0.0142	(25.4)	0.0479
	Filter Rule (2%)	(26.9)	-0.0781	1.8	-0.0335	(38.5)	0.0162
	Filter Rule (5%)	40.1	0.0279	(2.2)	-0.0427	(20.4)	0.0623
	TRB-O (50 days)	45.7	0.0404	5.6	-0.0299	(2.0)	0.0881
	TRB-O (150 days)	9.7	0.0277	5.5	-0.0297	(25.1)	0.0437
	TRB-O (200 days)	(26.4)	0.0083	17.2	-0.0049	(29.9)	0.0346
		Chow Test (p-value) for all structural break between Sub-period 1 & 2: 0.000					
		Chow Test (p-value) for all structural break between Sub-period 2 & 3: 0.000					
* Signifies positive returns across all three sub-periods							

Table 3 – Profitability of Technical Trading Rules on Sub-Periods (Panel B)							
		Excess Return	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**
		Nikkei					
		04/01/1995 - 20/08/1998		**21/08/1998 - 10/04/2002**		**11/04/2002 - 20/11/2005**	
Trading Rule							
	MA (1, 50)	5.8*	-0.0012	10.0*	-0.0146	8.7*	0.0095
	MA (1, 200)	9.0	-0.0079	22.4	0.0247	(1.1)	0.0222
	MA (1, 150)	8.5*	0.0052	22.5*	0.0230	8.8*	0.0503
	Filter Rule (1%)	(10.0)	-0.0724	(8.9)	-0.0722	(8.7)	0.0000
	Filter Rule (2%)	0.0	-0.0377	(2.5)	-0.0485	(4.1)	0.0146
	Filter Rule (5%)	2.1	-0.0311	(3.0)	-0.0539	(10.7)	-0.0065
	TRB-O (50 days)	(3.3)	-0.0347	7.9	-0.0229	3.3	0.0409
	TRB-O (150 days)	12.4*	0.0226	16.8*	0.0058	1.2*	0.0247
	TRB-O (200 days)	13.9	0.0146	15.1	-0.0001	(3.0)	0.0147
		Straits Times					
		28/12/1987 - 10/01/1994		**11/01/1994 - 24/12/1999**		**25/12/1999 - 30/11/2005**	
Trading							
	MA (1, 50)	6.1	0.0950	18.0	0.0431	(0.4)	-0.0165
	MA (1, 200)	(7.3)	0.0502	12.4	0.0289	6.7	0.0099
	MA (1, 150)	(3.3)	0.0569	14.8	0.0347	10.8	0.0267
	Filter Rule (1%)	0.4*	0.0843	27.0*	0.0627	6.1*	0.0068

Table 3 – Profitability of Technical Trading Rules on Sub-Periods (Panel B)							
		Excess Return	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**	**Excess Return**	**Sharpe Ratio**
	Filter Rule (2%)	0.7*	0.0810	5.4*	0.0072	2.3*	-0.0060
	Filter Rule (5%)	(8.2)	0.0520	15.0	0.0285	(3.2)	-0.0231
	TRB-O (50 days)	1.4*	0.0843	12.1*	0.0278	13.4*	0.0368
	TRB-O (150 days)	(6.4)	0.0423	14.2	0.0358	5.8	0.0059
	TRB-O (200 days)	(13.6)	0.0313	9.0	0.0218	3.2	-0.0032
		Hang Seng					
		03/01/1995 - 25/09/1998		**26/09/1998 - 5/03/2002**		**26/03/2002 - 30/11/2005**	
Trading Rule							
	MA (1, 50)	15.9*	0.0139	3.8*	0.0286	2.1*	0.0364
	MA (1, 200)	26.4*	0.0198	1.6*	0.0236	4.0*	0.0428
	MA (1, 150)	22.2	0.0170	(4.6)	0.0114	2.2	0.0377
	Filter Rule (1%)	30.5	0.0446	(6.2)	0.0082	(4.6)	0.0121
	Filter Rule (2%)	(3.5)	-0.0268	(9.7)	0.0008	(0.9)	0.0257
	Filter Rule (5%)	(2.0)	-0.0234	22.8	0.0618	(4.9)	0.0106
	TRB-O (50 days)	19.8	0.0241	(6.3)	0.0077	3.1	0.0430
	TRB-O (150 days)	21.9	0.0175	(1.9)	0.0161	(3.9)	0.0148
	TRB-O (200 days)	25.3	0.0155	(2.6)	0.0149	8.1	0.0536
		TSEC					
		02/07/1997 - 03/05/2000		**04/05/2000 - 27/02/2003**		**27/02/2003 - 30/11/2005**	
Trading Rule							
	MA (1, 50)	20.9	0.0277	51.5	0.0425	(0.2)	0.0470
	MA (1, 200)	10.5	0.0121	29.6	-0.0137	(13.5)	0.0044
	MA (1, 150)	(4.0)	-0.0312	35.0	0.0031	(14.6)	0.0011
	Filter Rule (1%)	29.3	0.0428	15.9	-0.0418	(13.6)	0.0040
	Filter Rule (2%)	12.5	0.0063	15.6	-0.0424	(8.9)	0.0188
	Filter Rule (5%)	22.5	0.0278	23.1	-0.0241	(5.0)	0.0313
	TRB-O (50 days)	10.2	0.0008	34.1	0.0001	(5.4)	0.0312
	TRB-O (150 days)	16.0	0.0146	23.0	-0.0230	(16.0)	-0.0032
	TRB-O (200 days)	9.4	0.0096	13.1	-0.094	(18.4)	-0.0097
		Chow Test (p-value) for all structural break between Sub-period 1 & 2: 0.000					
		Chow Test (p-value) for all structural break between Sub-period 2 & 3: 0.000					
* Signifies positive returns across all three sub-periods.							

The sub-period analysis suggests that the returns from technical trading rules are not robust. Overall, 11 of the 72 (15.3 per cent) trading rules tested have positive returns in all three sub-periods. Furthermore, the Sharpe Ratio is not stable and frequently changes across sub-periods that exhibit consistent excess returns. The most robust returns were generated from the MAC-O (1, 50) as three of the eight returns were robust. However, inconsistent return/risk ratios across sub-periods are in line with prior studies. Dooley and Shafer (1983) suggest that the inconsistent return/risk ratios across sub-periods suggest that the returns earned by the profitable technical trading rules over the entire period are risky.

Sign Prediction Ability of Trading Rules

Aside from profitability, this study also seeks to determine the sign prediction ability of the technical trading rules. Sign prediction ability refers to whether the trading rules generate correct buy or sell signals. The PV of each trading signal given a one- and ten-day lag is presented in Table 4. Note that, Table 2 and Table 3 present the results of the VMA from a profitability standpoint, while the sign prediction ability tests are of the FMA.

Table 4 - Sign Prediction Ability (Panel A - one-day lag)

	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
Buy Signal – Predictive Value	57.5	56.7	52.5	60.9	61.8	63.3	56.5	54.6	56.5
BPD probability of result	0.0409*	0.1831	0.4373	0.0000*	0.0000*	0.3506	0.0104*	0.0816	0.0323*
Sell Signal – Predictive Value	50.7	43.3	37.5	51.7	47.9	55.6	56.1	61.1	62.8
BPD probability of result	0.4670	0.8775	0.9597	0.2284	0.7544	0.1002	0.1033	0.0668	0.0631
BSE (N = 2083)									
Buy Signal – Predictive Value	64.4	45.8	66.7	59.2	57.9	59.0	63.1	66.7	65.6
BPD probability of result	0.0362*	0.7294	0.1938	0.0004*	0.0093*	0.1000	0.0038*	0.0026*	0.0084*
Sell Signal – Predictive Value	65.9	54.2	45.5	54.1	51.2	48.4	63.8	57.1	55.6
BPD probability of result	0.0244*	0.4194	0.7256	0.0804*	0.3905	0.6482	0.0240*	0.3318	0.4073
Jakarta (N =2030)									
Buy Signal – Predictive Value	69.2	62.5	42.9	56.7	61.3	58.2	65.6	69.4	67.2
BPD probability of result	0.0119*	0.2272	0.7880	0.0111*	0.0009*	0.0883	0.0014*	0.0016*	0.0060*
Sell Signal – Predictive Value	47.4	66.7	71.4	60.4	55.6	64.9	51.8	57.1	50.0
BPD probability of result	0.6864	0.2272	0.0898	0.0003*	0.0667	0.0070*	0.4469	0.3318	0.6047

Table 4 - Sign Prediction Ability (Panel A - one-day lag)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
KOSPI (N = 2067)									
Buy Signal – Predictive Value	57.1	61.1	70.0	58.1	56.6	64.8	51.6	52.4	52.1
BPD probability of result	0.1958	0.2403	0.1719	0.0012*	0.0145*	0.0013*	0.3930	0.3703	0.4063
Sell Signal – Predictive Value	52.1	35.3	66.7	52.5	53.3	54.8	54.5	40.7	40.0
BPD probability of result	0.4427	0.9283	0.2539	0.1838	0.1513	0.1756	0.2693	0.8761	0.8852
Nikkei (N = 2846)									
Buy Signal – Predictive Value	43.7	33.3	28.6	45.5	44.4	43.1	46.6	48.2	48.0
BPD probability of result	0.9163	0.9739	0.9713	0.9753	09710	0.8688	0.8070	0.6677	0.6778
Sell Signal – Predictive Value	49.0	25.9	46.2	46.4	44.4	32.8	43.0	49.1	50.0
BPD probability of result	0.6167	0.9970	0.7095	0.9406	0.9633	0.9973	0.9445	0.6061	0.5551
Hang Seng (N = 2792)									
Buy Signal – Predictive Value	47.6	47.8	38.1	52.5	56.3	46.8	56.0	55.2	54.4
BPD probability of result	0.3703	0.6612	0.9054	0.1654	0.0204*	0.7528	0.0888	0.1956	0.2499
Sell Signal – Predictive Value	47.6	34.8	33.3	50.9	47.7	48.6	50.0	46.2	45.5
BPD probability of result	0.7094	0.9534	0.9608	0.3825	0.7917	0.6380	0.5406	0.7388	0.7566
Straits Times (N =4479)									
Buy Signal – Predictive Value	58.2	48.2	58.6	54.2	56.1	59.3	61.8	57.7	58.0
BPD probability of result	0.0346	0.6556	0.2291	0.0262*	0.0153*	0.0526	0.0008*	0.0521	0.0539
Sell Signal – Predictive Value	50.0	57.1	51.7	56.9	56.4	56.5	63.5	69.5	62.7
BPD probability of result	0.5344	0.1748	0.5000	0.0009*	0.0144*	0.1871	0.0016*	0.0019*	0.0460*
TSEC (N =2067)									
Buy Signal – Predictive Value	48.8	50.0 7	57.9	48.2	48.7	48.4	51.7	61.5	62.8
BPD probability of result	0.6196	0.5700	0.3238	0.0296*	0.6770	0.6482	0.4152	0.0632	0.0631
Sell Signal – Predictive Value	69.0	51.6	36.8	55.4	50.9	58.6	50.0	47.4	50.0 7
BPD probability of result	0.0098*	0.5000	0.9165	0.7719	0.4220	0.0941	05414	0.6864	0.5722
* Significant BPD probability at the 5% level									

Table 4 – Sign Prediction Ability (Panel B – ten-day lag)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
Buy Signal – Predictive Value	60.3	61.7	47.5	62.2	59.7	73.3	63.1	63.5	64.0
BPD probability of result	0.0080*	0.0462*	0.6821	0.0000*	0.0006*	0.9739	0.0000*	0.0000*	0.0000*
Sell Signal – Predictive Value	53.4	45.0	42.5	48.8	45.0	33.3	48.8	55.6	53.5
BPD probability of result	0.2282	0.8169	0.8659	0.7302	0.9352	0.0081*	0.6407	0.2383	0.3804
BSE (N = 2083)									
Buy Signal – Predictive Value	53.3	29.2	83.3	55.0	55.6	63.3	67.3	64.9	65.1
BPD probability of result	0.3830	0.9887	0.0193*	0.0367*	0.0051*	0.0259*	0.0003*	0.0070*	0.0113*
Sell Signal – Predictive Value	59.1	62.5	45.5	47.8	50.5	50.0	46. 6	38.1	38.9
BPD probability of result	0.1456	0.1537	0.7256	0.8006	0.4722	0.5505	0.7441	0.9054	0.8811
Jakarta (N =2030)									
Buy Signal – Predictive Value	67.6	46.7	57.1	56.6	58.4	59.5	60.4	56.5	53.4
BPD probability of result	0.0235*	0.6964	0.3953	0.0126*	0.0112*	0.0573	0.0260*	0.1871	0.3470
Sell Signal – Predictive Value	54.1	53.3	28.6	52.9	50.5	45.9	51.8	76.2	64.3
BPD probability of result	0.3714	0.5000	0.2120	0.1842	0.4715	0.7920	0.4469	0.0133*	0.2120
KOSPI (N = 2067)									
Buy Signal – Predictive Value	52.1	66.7	60.0	55.2	55.7	58.3	62.0	61.7	58.6
BPD probability of result	0.1264	0.1189	0.3770	0.0262*	0.0294*	0.0507*	0.0053*	0.0224*	0.0941
Sell Signal – Predictive Value	52.1	47.1	55.6	47.2	48.0	50.4	51.5	29.6	24.0
BPD probability of result	0.4427	0.6855	0.5000	0.8678	07670	0.5000	0.4511	0.9904	0.9980
Nikkei (N = 2846)									
Buy Signal – Predictive Value	47.6	48.1	64.3	49.6	50.6	60.0	58.3	58.3	58.1
BPD probability of result	0.5781	0.6494	0.2120	0.5925	0.4513	0.1013	0.0413*	0.0778	0.1003
Sell Signal – Predictive Value	52.9	59.3	61.5	50.7	48.4	34.5	44.7	52.7	50.0
BPD probability of result	0.3104	0.2210	0.2905	0.4077	0.7246	0.9940	0.8884	0.3939	0.5551
Hang Seng (N = 2792)									
Buy Signal – Predictive Value	56.8	65.2	57.1	53.1	55.4	55.8	56.0	59.8	59.5
BPD probability of result	0.1332	0.1050	0.3318	0.1118	0.0403*	0.1810	0.0888	0.0428*	0.0573
Sell Signal – Predictive Value	47.6	56.5	47.6	47.8	46.1	51.4	52.1	48.7	48.5
BPD probability of result	0.7094	0.3388	0.6682	0.8283	0.9054	0.4531	0.3798	0.6254	0.6358
Straits Times (N =4479)									
Buy Signal – Predictive Value	47.7	42.9	51.7	54.7	53.5	67.4	54.8	52.8	54.5
BPD probability of result	0.7287	0.8856	0.5000	0.0140*	0.1111	0.0008*	0.1062	0.2943	0.1976
Sell Signal – Predictive Value	51.1	51.8	62.1	49.4	46.9	40.3	50.8	49.2	47.1
BPD probability of result	0.4312	0.4469	0.1325	0.6208	0.8747	0.9510	0.4645	0.6026	0.7121

Table 4 – Sign Prediction Ability (Panel B – ten-day lag)										
		MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index		**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
TSEC (N =2067)										
	Buy Signal – Predictive Value	65.1	56.7	38.9	49.9	51.3	61.3	55.8	50.0	55.8
	BPD probability of result	0.0330*	0.2923	0.8811	0.2706	0.3714	0.0490*	0.1659	0.5551	0.2712
	Sell Signal – Predictive Value	57.1	43.3	36.8	51.9	53.9	54.3	46.7	50.0	46.7
	BPD probability of result	0.2204	0.4278	0.9165	0.5426	0.1322	0.2752	0.9860	0.5643	0.7077
* Significant BPD probability at the 5% level.										

In total, 288 trading signals were investigated: [9 trading rules x 2 (buy and sell signals) x 2 (lag-one and lag-ten) x 8 data sets]. Overall, 183 of 288 (63.5 per cent) rules yielded a PV greater than 50 per cent. The buy signals were correct more often than the sell signals as 110 of the 144 (76.3 per cent) PVs of the buy signals were greater than 50 per cent, while 73 of the 144 (50.7 per cent) PVs for the sell signals were correct greater than 50 per cent. However, 50 per cent is not a high benchmark for a PV. The precision of each signal can be paralleled to tossing a coin. Like a coin, the signal can either be correct or incorrect. Therefore, 50 per cent can be easily obtained by chance. The BPD was used to assess the probabilities of each correct percentage occurring by chance. Table 3 presents the BPD probability of the result that can be interpreted in a similar fashion a p-value. Based on a five per cent level of significance, 68 of the 288 (23.6 per cent) signals provided relevant information regarding future price movements.

The aggregate daily returns that follow the buy and sell signals and the Buy-Sell t-stat are presented in Table 5 (one-day lag in Panel A and ten-day lag in Panel B). The daily returns following the signals should provide the same conclusion regarding the informational content of trading rule signals as the PV analysis.

Table 5: Sign Prediction Ability (Panel A – one-day lag)										
		MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index		**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)										
Daily Ave. % Return after Signal (Lag 1)										
	Buy Signal	0.0006	0.0020	0.0005	0.0022	0.0031	-0.0014	0.0014	0.0012	0.0013
	Sell Signal	0.0000	0.0008	0.0006	-0.0007	-0.0017	-0.0125	-0.0053	-0.0040	-0.0044
	Buy-Sell t-stat	0.4888	0.7572	-0.0552	5.4119*	1.9464	0.9240	2.5672*	2.1105*	1.9397

Table 5: Sign Prediction Ability (Panel A – one-day lag)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
BSE (N = 2083)									
Buy Signal	0.0039	-0.0019	0.0003	0.0013	0.0022	0.0033	0.0035	0.0044	0.0037
Sell Signal	-0.0071	-0.0060	-0.0019	-0.0022	-0.0022	-0.0029	-0.0080	0.0001	-0.0040
Buy-Sell t-stat	3.2468*	0.5971	0.2729	2.6735*	2.6783*	1.4259	3.4970*	0.6865	1.3630
Jakarta (N =2030)									
Buy Signal	0.0072	0.0081	-0.0022	0.0005	0.0059	0.0079	0.0050	0.0066	0.0049
Sell Signal	0.0000	0.0023	-0.0130	-0.0059	-0.0044	-0.0084	-0.0005	-0.0048	0.0002
Buy-Sell t-stat	1.9924*	0.8866	0.9871	6.8629*	4.9677*	3.9906*	1.5182	2.2995*	2.2112*
KOSPI (N = 2067)									
Buy Signal	0.0064	-0.0036	0,0130	0.0029	0.0020	0.0080	0.0009	0.0022	-0.0000
Sell Signal	-0.0027	0.0015	-0.0082	-0.0029	-0.0033	-0.0051	-0.0050	0.0074	0.0085
Buy-Sell t-stat	2.2761*	-0.8318	1.7506	3.1819*	2.5313*	3.4929*	1.3296	-0.7881	-1.2650
Nikkei (N = 2846)									
Buy Signal	-0.0003	-0.0049	0.0006	-0.0008	-0.0008	-0.0007	0.0003	0.0003	0.0003
Sell Signal	0.0000	0.0065	-0.0009	-0.0001	0.0010	0.0063	0.0008	0.0004	0.0008
Buy-Sell t-stat	-0.1664	-4.1577	0.2398	-0.6461	-1.4785	-1.8289	-0.2414	-0.0373	-0.1796
Hang Seng (N = 2792)									
Buy Signal	0.0009	-0.0023	-0.0029	0.0025	0.0041	0.0002	0.0031	0.0031	0.0029
Sell Signal	-0.0011	-0.0001	0.0028	-0.0018	-0.0020	-0.0035	0.0003	0.0025	0.0035
Buy-Sell t-stat	0.9181	-0.4610	-1.6292	3.4883*	3.4178*	0.9075	0.9652	0.08636	-0.0779
Straits Times (N =4479)									
Buy Signal	0.0023	-0.0029	0.0018	0.0017	0.0024	0.0055	0.0035	0.0033	0.0033
Sell Signal	-0.0005	-0.0026	-0.0047	-0.0027	-0.0025	-0.0038	-0.0044	-0.0067	-0.0053
Buy-Sell t-stat	1.9645*	-0.1287	1.9659*	5.5074*	3.8112*	2.6567*	4.7639*	3.9465*	3.1754*
TSEC (N =2067)									
Buy Signal	0.0019	0.0025	0.0035	0.0003	0.0005	0.0026	-0.0003	0.0006	0.0008
Sell Signal	-0.0066	-0.0008	0.0014	-0.0015	-0.0017	-0.0045	-0.0003	-0.0003	-0.0031
Buy-Sell t-stat	3.3046*	0.7497	0.4027	1.3831	1.3933	2.1690*	-0.0090	0.2170	0.8538
The t-stat critical values are as follows: 1.645 at 0.10 $\acute{\alpha}$, 1.96 at the 0.05 $\acute{\alpha}$, and 2.576 at the $\acute{\alpha}$. * Significant p-values at the 5% level.									

Table 5 – Sign Prediction Ability (Panel B – ten-day lag)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
Daily Ave. % Return after Signal (Lag 10)									
Buy Signal	0.0048	0.0044	0.0010	0.0065	0.0091	0.0108	0.0059	0.0059	0.0064
Sell Signal	-0.0028	0.0016	-0.0051	-0.0001	-0.0005	-0.0063	-0.0046	-0.0049	-0.0003
Buy-Sell t-stat	1.5349	0.6576	0.7946	2.9349*	1.2567	0.7188	2.2001*	7.5027*	1.0402
BSE (N = 2083)									
Buy Signal	-0.0039	-0.0300	0.0079	0.0039	0.0029	0.0058	0.0126	0.0127	0.0128
Sell Signal	-0.0218	-0.0298	-0.0154	-0.0016	-0.0052	-0.0045	-0.0035	0.0103	0.0099
Buy-Sell t-stat	1.3394	-0.0112	0.9041	1.2741	1.9049	0.9388	2.0400*	0.1630	0.1741
Jakarta (N =2030)									
Buy Signal	0.0287	-0.0046	0.0016	0.0073	0.0088	0.0162	0.0132	0.0077	0.0061
Sell Signal	-0.0062	-0.0141	-0.0071	-0.0075	-0.0050	0.0038	-0.0177	-0.0480	-0.0399
Buy-Sell t-stat	2.2836*	0.4720	1.0526	2.5903*	1.8548	0.9788	2.7074*	3.1290*	1.9925*
KOSPI (N = 2067)									
Buy Signal	0.0063	0.0116	0.0156	0.0005	0.0018	0.0117	0.0056	0.0057	0.0013
Sell Signal	-0.0121	-0.0100	-0.0009	-0.0024	0.0013	-0.0003	0.0058	0.0454	0.053
Buy-Sell t-stat	1.2038	0.9851	0.5593	0.5175	0.0830	1.1708	-0.0236	-2.5633	-3.3048
Nikkei (N = 2846)									
Buy Signal	-0.0010	-0.0064	0.0163	-0.0030	-0.0016	0.0070	-0.0007	-0.0039	-0.0033
Sell Signal	-0.0021	-0.0071	-0.0096	-0.0010	0.0027	0.0200	0.0070	-0.0007	0.0015
Buy-Sell t-stat	0.1995	0.0829	1.9132	-0.7013	-1.1342	-1.5784	-1.4223	-0.3925	-0.5577
Hang Seng (N = 2792)									
Buy Signal	0.0013	0.0033	0.0044	0.0040	0.0058	0.0046	0.0042	0.0056	0.0062
Sell Signal	-0.0019	-0.0190	-0.0057	0.0030	0.0037	0.0008	0.0033	0.0116	0.0133
Buy-Sell t-stat	0.3594	0.9797	0.6309	0.2415	0.3407	0.3327	0.1142	-0.5158	-0.4985
Straits Times (N =4479)									
Buy Signal	-0.0038	0.0050	0.0063	0.0059	0.0066	0.0168	0.0091	0.0065	0.0082
Sell Signal	-0.0045	0.0043	-0.0100	-0.0013	0.0000	0.0079	-0.0072	-0.0056	-0.0029
Buy-Sell t-stat	0.1585	0.1056	1.7652	2.4111*	1.5404	0.8592	2.7428*	1.3438	1.1579

Table 5 – Sign Prediction Ability (Panel B – ten-day lag)									
	MA Cross-Over Rule Short (days) / Long (days)			Filter Rule (in %)			Trading Range Break-Out (days of local max/min)		
Market Index	**1/50**	**1/200**	**5/150**	**1%**	**2%**	**5%**	**50**	**150**	**200**
All Ordinaries (N = 5395)									
TSEC (N =2067)									
Buy Signal	0.0132	-0.0035	0.0046	-0.0009	-0.0027	0.0117	0.0060	0.0005	0.0048
Sell Signal	-0.0048	-0.0012	0.0154	-0.0050	-0.0052	-0.0002	-0.0008	0.0028	-0.0034
Buy-Sell t-stat	1.8162	-0.1616	-0.5341	0.8791	0.4409	1.0968	0.8330	0.2449	0.5145
The t-stat critical values are: 1.645 at 0.10 α, 1.96 at the 0.05 α, and 2.576 at the α. * Significant p-values at the 5% level.									

The returns following a buy signal were positive in 58 of 72 (80.0 per cent) of cases and the returns after a sell signal were negative in 50 of the 72 (69.4 per cent) cases given a one-day lag. At the ten-day lag, the returns following a buy signal were positive in 58 of 72 (80.0 per cent) of cases and the returns after a sell signal were negative in 47 of the 72 (65.2 per cent) cases. The results are negatively affected by the Nikkei as 6 of the 18 (33.3 per cent) returns following a buy signal were positive and 7 of the 18 (38.9 per cent) returns following a sell signal were negative. The fact that the trading rules performed the worst on the Nikkei and Hang Seng was expected as they are likely the most efficient and developed Asian-Pacific market tested in this study.

The daily returns can also be compared to the results of the BLL study on the Dow Jones Industrial Average. Table 5 reveals that positive returns follow buy signals at both the one- or ten-day lag on a consistent basis (80 per cent). However, negative returns do not follow a sell signal as consistently as the buy signal at either the one- or ten-day lag. These results are similar to what was found in the U.S. markets by BLL. It appears that more relevant trading information is generated from the buy signals as opposed to the sell signals.

The daily returns corroborate the evidence presented in Table 2 and Table 3. Technical trading rules can provide information that is relevant for timing entry and exit points in certain Asia-Pacific equity markets (sign prediction ability), thus potentially leading to abnormal returns that are in excess of what would be realized through the naïve buy-and-hold trading strategy. In general, these results are similar to what was discovered by Ratner and Leal (1999) and Bessembinder and Chan (1995).

CONCLUSIONS AND DISCUSSION

An empirical study was conducted to determine if technical trading rules are profitable in the Asian-Pacific equity markets. Profitability was defined as returns in excess of the buy-and-hold trading strategy after accounting for transaction costs. Nine technical trading rules were tested on eight Asian-Pacific equity markets. The results demonstrate, on average, that profits (after estimated trading costs) can be earned by technical trading rules in certain countries, mainly Bombay, Hong

Kong, Indonesia, Korea, Singapore, and Taiwan. The results also suggest that buy signals can provide relevant trading information. Based on these results, and similar findings by Bessembinder and Chan (1995) and Ratner and Leal (1999), Bessembinder and Chan (1998) suggest that even if an investor cannot earn a profit after adjusting for transaction costs, a Bayesian investor could alter his asset allocation in response to this information. Therefore, the results of this study may have significant economic implications.

This study differs from the current literature because it provides a more comprehensive test of technical trading rules on the Asian-Pacific equity markets with more recent data and a different methodology. As such, this study contributes to the overall understanding of the efficiency and price behaviour of the Asian-Pacific equity markets. The results of this study are consistent with the reasoning that some of the Asian-Pacific equity markets were informationally inefficient, at least over the period analyzed, as the trading rules were able to earn profits and generate relevant trading information. However, like Bessembinder and Chan (1995), an alternative explanation maybe that the results are sensitive to the round trip transaction cost.

Further research should be conducted to explore the relationship between technical trading rules and market microstructure and order flows. Microstructure can possibly be used as a tool to explain the profitability and predictability of trading rules and market movements. The trading signals generated from the Asian-Pacific markets can also be further processed by applying a combined signal approach (Lento and Gradojevic 2006). Future studies can also explore the investment behaviour of different cultures (i.e. North American, European, and Asian) and the returns to technical trading rules in each respective equity market (i.e. if Asian investors believe more in technical analysis than Europeans do, returns to technical trading rules may be greater in Asian equity markets).

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CALL FOR GREATER ACCOUNTABILITY WITHIN THE U.S. NONPROFIT SECTOR

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ABSTRACT

The U.S. Senate Finance Committee has announced plans to analyze the activities of nonprofit organizations. This analysis is in response to documented incidents of unethical behavior and fiscal mismanagement. As a result, the nonprofit sector has been inundated with calls for greater accountability and ethics among management and employees.

The purpose of this paper is to initiate discussion within the public sector concerning the documented cases of fiscal mismanagement. Incidents of potential corporate malfeasance have raised concern over the applicability of governance reforms within the nonprofit sector, such as the Sarbanes-Oxley Act of 2002. This paper also discusses how certain provisions of the Act may restore confidence in the nonprofit sector as well as improve corporate governance. Awareness of alternative strategies to restore confidence and improve corporate governance within the nonprofit sector is timely for both researchers and management.

INTRODUCTION

According to the American Association of Fundraising Counsel (AAFC), contributions to U.S. nonprofit organizations in 2003 totaled more than $240.7 billion and are estimated to be 2.2 percent of the gross domestic product (AAFC, 2004). Bradley and colleagues in the May 2003 issue of *Harvard Business Review* argue that there is concern that nonprofit organizations do not use charitable dollars as efficiently as possible to advance their charitable mission (Bradley, Jansen, & Silverman, 2003). This potential lack of efficient flow of funds contributes to the need to examine accountability within nonprofit governance. An examination of nonprofit governance is relevant and timely due to the recent calls by Federal and state regulators to analyze the activities of nonprofit organizations within the United States.

The Senate Finance Committee has raised questions concerning improved corporate governance and accountability within the nonprofit sector. According to Senator Chuck Grassley, it is important for charities to "keep their trust with the American people" (U.S. Senate Committee on Finance, 2004), and many of the problems within nonprofit organizations are based upon poor governance or "failure to abide to best practices". Senator Grassley further argues that the Committee must concentrate on "more general reforms to address recurrent problems in the nonprofit sector" (U.S. Senate Committee on Finance, 2004). The Independent Sector, a coalition of nonprofits and corporations serving to strengthen nonprofit initiatives, commissioned the Panel on the Nonprofit Sector to investigate strategies to improve the oversight and governance of charitable organizations.

The Panel was created in order to provide guidance on increased accountability, governance, and ethical conduct within the industry. The Panel calls on nonprofit organizations to implement measures to improve their governance and financial disclosure methods.

Calls for greater accountability within the nonprofit sector have occurred in response to several documented cases of fiscal mismanagement. One of the more prominent cases of fiscal mismanagement emerged amid disclosure of the William Aramony scandal within the United Way (Kolb, 1999). More recently, Oral Suer, former chief executive of the United Way of the National Capital Area, was sentenced to 27 months in prison for his role in a financial scandal involving the charity (Markon, 2004). Gibelman and Gelman (2001) document numerous scandals within the nonprofit sector reported in the press during the period 1992 through 2000. The United Way, Red Cross and New Era Philanthropy are several of the more highly publicized nonprofit scandals involving fiscal mismanagement in the United States. As a result of financial corruption within nonprofit organizations, calls for greater accountability and ethics among boards of directors, members of management, and employees have increased.

This paper discusses the existence of fiscal mismanagement within the nonprofit sector and the empirical research addressing ethical behavior in the nonprofit sector. Documented cases of fiscal mismanagement have raised concern over the applicability of governance reforms within the nonprofit sector, such as the Sarbanes-Oxley Act of 2002. Provisions of the Sarbanes-Oxley Act are discussed, in conjunction the specific provisions that may assist in increasing accountability within the nonprofit sector. Members of nonprofit management must be aware of the potential impact of the Sarbanes-Oxley Act and how provisions may restore confidence and improve corporate governance. Empirical researchers may also gain from an understanding of the influence of the Act on the sector, which may lead to increased investigation of the relationship between the Act and corporate governance structures.

FISCAL MISMANAGEMENT

Incidents of fiscal mismanagement that occur within the nonprofit sector are highly scrutinized within the public press. Oftentimes this scrutiny is based on several misconceptions of the industry. Contrary to public perception, nonprofit organizations are allowed to earn a "profit" that is comparable to that of for-profit organizations (Hopkins, 1998). According to Hopkins (1998) nonprofit organizations are legally allowed to generate a profit - what is termed the entity level profit. However, a nonprofit organization may not generate an “ownership level” profit (Hopkins, 1998). Nonprofit organizations are incorporated at the state level and are prohibited from distributing their profits to those who control the organization (i.e., board of directors or officers) (Hopkins, 1998). This inability to pass any earned profit to officers for their private benefit is a key distinction between nonprofit and for-profit organizations (Hopkins, 1998; Gentry & Penrod, 2000).

Many nonprofit organizations also have tax-exempt status at the Federal level. The Internal Revenue Service (IRS) grants tax-exempt status to organizations with certain characteristics. These characteristics include (but are not limited to): a) the organization serves a common good, b) the organization is not a for-profit entity, c) the net earnings of the organization do not benefit the owners, and d) the organization does not exert political influence (Internal Revenue Code Section

501(c)(3)). Nonprofit organizations that seek to devote its profits to benefit community needs are deemed worthy of their preferential tax treatment.

Due to their foundation in community service, nonprofit organizations are often seen as "heroes" to American society. Many philanthropic organizations provide for the needy, feed the hungry, provide disaster relief, and care for sick children. Due to the public's awareness of such organizations as the United Way and Girl Scouts, the nonprofit sector has an image based on upright and reputable ideals. Public persona often attaches an untarnished, ethically centered structure to the nonprofit sector. This perception may not completely conform to reality, considering media attention given to any act of possible corporate misuse of funds. The public's tendency to hold nonprofit organizations to higher standards than other types of organizations drives the need to examine whether this perception conforms to reality. Public perception also leads donors and other nonprofit supporters to believe these organizations should not be involved in unethical behavior.

The reality, however, concerning ethical behavior within certain nonprofits is somewhat different. Incidents such as the misuse of funds by executives of the United Way and confusion over plans devised by the American Red Cross to allocate September 11th funds have heightened an awareness of ethical dilemmas within nonprofit organizations. Understanding the role of ethical behavior and its impact on a nonprofit is important because these organizations rely almost exclusively on their reputations to acquire support. Indeed, as the aftermath of the aforementioned examples indicate, the suspicion of unethical behavior could result in a loss in public confidence, reductions in donations, and calls for more oversight and accountability. Gibelman and Gelman (2001) report nonprofit managers engaged in embezzlement, fraud, theft, conspiracy, and misappropriation of funds. Nonprofit executives committing these crimes include chief executive officers (CEOs), chief financial officers (CFOs), chairmen, treasurers, and board members. As evidenced by examples of corporate corruption in the nonprofit sector, Cedzo (1993) points out:

> "whereas business for years has been the bad guy in terms of the public's acceptance of the credibility of its actions, education and the nonprofits have been ranked with apple pie and motherhood. That's no longer true." (p. 18)

Considering documented cases of fiscal mismanagement among nonprofits, it is evident why calls for greater accountability within the sector have been made by government agencies. Evidence of corruption within the sector has also led researchers to investigate various aspects of ethical behavior among nonprofit management. In order to determine whether the perception of a 'wholesome and pure' nonprofit organizational environment is substantiated, research has examined aspects of the sector's ethical climate (Deshpande, 1996; Agarwal & Malloy, 1999; Malloy & Agarwal, 2001; Brower & Shrader, 2000). These studies relied on Victor and Cullen's (1987, 1988) ethical climate conceptual framework in the for-profit sector, yet extended the framework to the nonprofit setting. Deshpande (1996) argues a nonprofit organization can have numerous types of ethical climates. Overall, research suggests that a unique perspective of ethical climate exists in the nonprofit setting, and operates under a different framework in comparison to for-profit institutions. Agarwal and Malloy (1999) found two distinct climates merging from nonprofit organizations – individual caring and social caring. Malloy and Agarwal (2001) report the for-profit ethical climate

may not systematically apply to the nonprofit sector, arguing a unique perspective of ethical climate exists in the nonprofit setting. They conclude that further research is needed to examine factors that influence ethical climate in the nonprofit setting. They propose that both individual and organizational-specific factors influence the ethical environment of a nonprofit institution. Some of these factors include gender, age, size of the organization, and length of service. They further add that factors influencing ethical climate "cannot be transferred and accepted implicitly from research dealing with the for-profit sector" (p. 43).

Brower and Shrader (2000) compared the ethical climates of nonprofit and for-profit organizations. Their findings indicate that for-profit organizations exhibit higher levels of egoism than nonprofit organizations, while nonprofit organizations exhibit higher benevolence factors. These results tend to follow the general cultural assumption that nonprofit organizations serve a common good for the public's benefit, whereas for-profit organizations focus on maximizing profits for their shareholders. Due to documented cases of fiscal mismanagement, research has also examined moral and ethical reasoning within the nonprofit sector. Brower and Shrader (2000) did not find significant differences between the moral reasoning of subjects serving on nonprofit boards versus those serving on for-profit boards. Ethics research must be expanded within the nonprofit setting in order to more fully understand the relationship between improved corporate governance and organizational performance.

Jurkiewicz and Massey (1998, 173) report nonprofit executives are seen as "moral symbols of the organization's standards and values". The challenge faced by nonprofit managers to operate as moral role models is reinforced by a disturbing statistic that over 80 percent of nonprofit executives encounter ethical dilemmas on the job (Menzel, 1997). The apparent frequency with which employees face ethical dilemmas drives the need to examine ethical behavior within the nonprofit setting, in addition to investigating steps that may help alleviate some of the ethical dilemmas faced by these organizations. Jeavons (1994) points out that the vitality of the sector depends on its ability to maintain and uphold societal expectations, particularly through adhering to high ethical standards established by public donors (Jeavons, 1994).

The examination of ethical behavior within the nonprofit sector will continue to be important to both management and governmental agencies. Calls for more accountability within the sector have increased due to documented cases of fiscal mismanagement. Greater accountability of management and boards of directors will increase the confidence of potential donors. Additional research in the area of ethical behavior within the nonprofit sector is needed in order to understand the impact of possible changes in corporate governance structures. Furthermore, more research is needed in the area of ethics and business structure (Ayres & Ghosh, 1999).

CORPORATE GOVERNANCE

Corporate governance issues are important to the nonprofit sector, despite its philanthropic mission. In general, nonprofit organizations historically embrace values that advocate meeting client needs (Alexander & Weiner, 1998; Green & Griesinger, 1996). These values include philanthropy, volunteerism and independence. Some argue that increased financial pressure and competition for services have increased the need for nonprofits to consider adoption of management and governing

practices similar to those found in the for-profit sector. Prior research within the healthcare industry suggests that traditional governance is antiquated considering the increase in competition and regulatory constraints (Alexander & Weiner, 1998; Kovner, 1990; Delbecq & Gill, 1988).

In order to remain competitive, nonprofit organizations may need to move away from the philanthropic governance model and more towards a corporate governance model (Alexander & Weiner, 1998). This type of move may be more applicable to larger US nonprofits, as smaller organizations tend to be staffed by volunteers and may not have access to capital needed for such a transition in governance structure. Table 1 provides an overview of characteristic differences between a philanthropic governance model and a corporate governance model.

Research indicates that each model "reflects distinctly different values and organizing principles" (Alexander & Weiner, 1998, 225). Community participation and stewardship is valued under the philanthropic model, while the corporate model emphasizes competitive positioning and strategy development. Furthermore, the philanthropic model includes informal management accountability to the board, a lack of compensation for board service, and an emphasis on asset and mission preservation. The corporate model emphasizes small board size, active management participation, compensating board members, and an emphasis on strategic and entrepreneurial activity. There is little evidence of nonprofit organizations formally adopting corporate governance models, possibly due to the numerous simultaneous changes in board structure that are necessary.

Table 1: Characteristics of the Philanthropic and Corporate Governance Models

Philanthropic Model	Corporate Model
Large board size	Small board size
Separation of management and governance	Formal management accountability to board
No compensation for board service	Compensation for board service
Emphasis on asset and mission preservation	Emphasis on Strategic and Entrepreneurial Activity

Source: Alexander, Morlock & Gifford (1988); Alexander & Weiner (1998)

One alternative governance model that has received limited empirical investigation is the policy governance model developed by Carver (1990). This model emphasizes board of director involvement in leading the organization through policies in four areas – ends policies, governance process policies, board-staff linkage policies and executive limitations policies (Carver & Carver, 1996; Carver, 1997). Nobbie and Brudney (2003) were the first to systematically examine the policy governance model. They determined the policy governance model encourages the board to participate in a deliberative process in order to examine the purpose of an organization and its system of governance.

Limited research has been conducted concerning the governance of nonprofit organizations (Dyl, Frant, & Stephenson, 1996; Eldenburg, Hermalin, Weisbach, & Wosinska, 2000; Nobbie & Brudney, 2003; Helmig, Jegers, & Lapsley, 2004). Helmig et al. (2004) argue that a sound corporate governance policy requires "balancing all relevant stakes and objectives" of the organization (p. 103).

Related to the issue of organizational objectives is the concept of efficiency within the nonprofit sector. Callen, Klein, & Tinkelman (2003) empirically test the relationship between efficiency within nonprofit organizations and board composition. Their results indicate donors monitor the operations of major nonprofit entities, and penalize the organization for administrative inefficiency. Donors' examination of organizational efficiency has contributed to the increasing number of government agencies investigating nonprofit organizations serving the public.

MEASURES TO INCREASE ACCOUNTABILITY

Discussions concerning the relationship between corporate governance within nonprofit organizations and fiscal mismanagement are timely and relevant to researchers. Federal investigations of nonprofit organizations have sparked an increased interest in studying policy issues within the sector. In response to the US Senate Finance Committee, the Panel on the Nonprofit Sector released its interim report that addresses ways to strengthen operations of charitable organizations (Panel on the Nonprofit Sector, 2005). The Panel focused on four areas – (1) voluntary actions to improve ethical conduct and governance, (2) methods to increase transparency of operations, (3) legislative measures to ensure funds are used for charitable purposes and (4) stronger legislative enforcement measures.

The Panel's Interim Report heavily focuses on issues of transparency and corporate governance. The Panel urges nonprofit organizations to fully disclose accurate financial statements and have larger organizations undergo annual financial audits by independent accountants. Even before the issuance of the Panel's Interim Report, nonprofit executives were also scrutinizing the calls for greater accountability. The public accounting firm, Grant Thornton LLP, surveyed over 300 nonprofit executives to determine the level of knowledge and interest in the Sarbanes-Oxley Act (SOX) and its impact on the nonprofit sector. Results of the survey indicate twenty percent of respondents have already made changes to their governance policies as a result of the Act (Grant Thornton, 2003). Some question the relevance of SOX to the nonprofit sector, since the Act required significant changes for publicly traded companies. The increased need for donor funding, community support, and public confidence allow certain provisions of SOX to greatly benefit the sector. Discussions of increased accountability and transparency within the sector are timely, considering oversight agencies such as the Independent Sector and BoardSource (formerly the National Center for Nonprofit Boards) have mentioned the importance of SOX to the nonprofit sector (BoardSource & Independent Sector, 2003). These oversight agencies recommend that nonprofit organizations attempt to "voluntarily incorporate certain provisions of the Act that make good governance sense" (BoardSource & Independent Sector, 2003). McDowell (2004) argues that certain aspects of the Sarbanes-Oxley Act may give rise to "new standards of 'best practices' for nonprofit corporate governance" (McDowell, 2004, 8).

States agencies are responding to the need for greater accountability within the nonprofit sector by adopting legislation similar to SOX. For example, California recently passed a law, the Nonprofit Integrity Act of 2004 (SB 1262), which imposes numerous regulations on the industry. Some of these regulations include the need for financial audits, audit committees and public

disclosure of audited financial statements (Silk & Fei, 2004). New York's Attorney General is also calling for revisions to the state's corporate accountability laws, with the aim to protect donors.

OVERVIEW OF SARBANES-OXLEY

Some consider Sarbanes-Oxley the most sweeping corporate reform legislation since the Securities and Exchange Acts of 1933 and 1934. The overall purpose of the Act is to establish stricter guidelines and standards to enhance corporate governance and internal controls. Many public companies have revised their accounting practices, restructured boards of directors and updated ethical guidelines in response to the need for increased accountability (Francis-Smith, 2004).

Despite its lack of specific applicability to the nonprofit sector, many provisions are easily transferable to the sector, given their general focus on corporate accountability. The nucleus of the Act focuses on fiscal responsibility and transparent reporting. Provisions of the Act that refine corporate governance structures may greatly benefit the nonprofit sector. Corporate accountability to donors, funding agencies, and volunteers are critical for the continued growth of the sector. Oversight agencies, such as the Independent Sector and BoardSource, argue that:

> "because directors have a fiduciary responsibility as well as a moral obligation to protect their organization's valuable resources, it is imperative that they take a proactive stance in the areas of financial reporting and auditing practices" (Hechinger, 2003)

This paper discusses specific provisions of the Sarbanes-Oxley Act that may have the greatest impact on improving corporate governance within the sector. These provisions include (a) audit committees (b) whistleblower protection provisions (c) certification of financial information by senior management, and (d) disclosure of an organizational code of ethics. These provisions, if adopted, may signal that corporate accountability is important to all levels of management.

Audit Committees

Many of today's nonprofits operate without separate audit committees due to the organization's size (Persaud & Mason, 2000). The New York State Attorney General has proposed a requirement mandating nonprofits to establish audit committees in order to improve accountability (Cotton, 2003). Although nonprofit executive boards often operate under the notion that the audit committee is an excusable expense, the nonprofit organization represents a type of environment that is openly susceptible to fraud. Owen and Smock (2003, 5) highlight several factors that make nonprofits vulnerable to fraud:

> *a significant amount of cash donations*
> *heavy reliance on volunteers to perform important tasks*
> *limited supervisory or investigative resources*
> *unpaid boards of directors with little or no financial expertise.*

A primary responsibility of the audit committee is choosing the external auditor, but some nonprofits mistakenly have the tendency to allow management to select the outside auditors. Because of the unique structure of nonprofits that increases their vulnerability to fraud, it becomes increasingly important that an audit committee be created to serve as the liaison between the board and the external auditor. The establishment of audit committees is not merely a reaction to corporate crime but also a response to the changing business environment. These changes have resulted in the donor community scrutinizing program activities, investing decisions, and financial reporting practices more closely than in the past. According to the Grant Thornton survey of nonprofit executives, of the twenty percent that have initiated changes in governance in response to Sarbanes-Oxley, sixteen percent created an audit committee charter (Grant Thornton, 2003).

Whistleblower Protection

The audit committee, in conjunction with the board of directors, will play an important role in ensuring that an organization has appropriate policies such that employees are able to report suspected fraud to either upper-level management or the board. The Act creates significant employment-related protections for whistleblowers (Public Law 107-204 Section 806). Adoption of this provision by nonprofit organizations may assist employees by allowing them to feel shielded when reporting unethical activities. Under these provisions, the organization may not 'discharge, suspend or harass' employees that report any form of corporate wrongdoing (Public Law 107-204 Section 806(1)(1)). According to BoardSource, this provision will allow organizations to establish written policies that are "vigorously enforced" and will further send the message that "misconduct is not tolerated" (BoardSource & Independent Sector, 2003, 9).

Encouragement of an ethical work environment within a nonprofit may also signal the entity's commitment to its charitable purpose, and thereby impact donor funding from both individuals and corporations. The need for establishing whistleblower protection is essential in order to deter fraud within the sector. Furthermore, the existence of current whistleblower policies is lacking, as eighty-two percent of Grant Thornton survey respondents do not have a policy currently in place (Grant Thornton, 2003).

Certification of Financial Statements

The need for external funding requires nonprofit organizations to report its financial condition accurately. Individuals, corporate donors, and oversight agencies continue to demand accurate financial statements and tax returns, particularly in the wake of documented corruption in the sector. Research has documented that nonprofit financial statement information impacts donor decision-making concerning charitable contributions (Parsons, 2003; Gordon & Khumawala, 1999). Certifying the content of financial statements is of major importance to the sector, as the Panel's Interim Report urges organizations to timely report and file financial information with government agencies (Panel on Nonprofit Sector, 2005).

Certification of financial statements encourages management to be held accountable to donors and oversight agencies. Accurate financial information permits donors to compare entities and make

informed decisions. An organization that provides full disclosure of all material aspects of its financial condition may obtain a competitive advantage with donors. This competitive advantage may also lead to increased public confidence in management and increased donations. Maintaining donor confidence is critical since considerable amounts of funding is based on the programs offered by the organization. Hodes (2000) notes that the primary source of revenue for many nonprofits is the revenue generated from the programs and activities operated in support of the organization's tax-exempt purpose. Given that program revenue is largely contingent upon whether the nonprofit organization is operating efficiently, effectively, and ethically, management and those serving the industry must continue to maintain accurate fiscal disclosures. Adoption of this provision is a cost-effective strategy for management to rebuild public trust within the nonprofit sector.

Code of Ethics

Considering the existence and extent of corporate mismanagement within the nonprofit sector, the need for a more ethical work environment is evident. The Sarbanes-Oxley Act requires organizations to disclose the existence of a code of ethics for financial officers. A code of ethics must promote "honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest" (Public Law 107-204 Section 406). A nonprofit organization establishing a code of ethics signals a strong message regarding both its internal and external values. Developing and enforcing ethical codes of conduct for employees may help re-establish some credibility to the sector's image. This provision may also serve as a measure to increase public confidence through disclosure of the firm's attempt to provide an ethical work environment.

Nonprofit organizations must also reevaluate their governance structure in order to be proactive in their commitment to a strong ethical culture. Ethical behavior has become important to donors and oversight agencies, as well as the accounting profession. Disclosure and adoption of codes of ethical conduct should help increase public confidence in the organization. Nonprofit organizations that adopt and implement an organizational code of ethics may also view it as an opportunity to obtain a competitive advantage. Nonprofits heavily rely on donor funding, and providing potential donors with evidence they have met certain ethical standards may increase the opportunity to receive funding. This strategy is also a cost-effective way to address conflicts of interest within the organization.

Competitive advantage is also supplied when nonprofit organizations disclose their ethics codes. Oversight agencies, such as the Better Business Bureau (BBB) Wise Giving Alliance, evaluate and compare organizations on numerous measures of performance and accountability. Disclosure concerning the adoption of a code of ethics will allow organizations to disclose to these agencies the importance of an ethical work environment. Larger nonprofits may further seek to develop an ethics committee in order to assist the development of a code of ethics. This committee may be composed of members from all levels within the entity, as well as respected advisors from outside the organization. Smaller organizations can seek to use volunteers to serve on the ethics committee. These volunteers can consist of current employees as well as outside consultants. Use of volunteers may also be critical to establishing confidence in the sector, considering budgetary constraints faced by numerous nonprofit organizations. Regardless of the size of the organization, the ethics committee

should have the charge to develop the code of ethics and support the development and maintenance of the code. These steps may help maintain, and in some cases, rebuild the public's confidence in the nonprofit sector, and help alleviate some forms of corporate mismanagement. A movement toward establishing a more ethical environment has occurred, since seventeen percent of the Grant Thornton survey respondents have written a code of ethics statements in response to the Sarbanes-Oxley Act (Grant Thornton, 2003).

CONCLUDING REMARKS

Supporters of the nonprofit sector encourage nonprofit organizations to adopt regulations of the Sarbanes-Oxley Act in order to have similar standards as those in the for-profit sector (O'Hare, 2002; Silk, 2002; Tate, 2002). Regulatory agencies will continue to monitor corporate governance and accountability issues within the nonprofit sector. Attention to this issue has received national attention in wake of the highly publicized cases of fiscal mismanagement. Perceived corporate malfeasance may continue as long as nonprofit managers ignore calls for greater accountability in the sector.

Empirical research in this area is needed in order to examine the effect of improved corporate accountability on donor funding. This form of research is timely and practical for the nonprofit sector, particularly in the wake of economical downturns that have negatively impacted fundraising. Furthermore, empirical research is needed to investigate the relationship between improved corporate governance and public perception of the sector. Empirical evidence of improved confidence and donor support of the sector may further encourage nonprofits to adopt provisions of the Sarbanes-Oxley Act. Successful adoption of certain provisions may boost donor confidence in financial disclosures, thus leading to stronger support in the form of funding and increased volunteer hours.

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CPA FIRMS OFFERING OF FORENSIC SERVICES SURPRISINGLY CONSISTENT OVER TIME: ARE CPA'S MISSING OUT ON A FORENSIC ACCOUNTING GOLD RUSH?

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ABSTRACT

This paper presents data generally indicating that, over the seven-year period 1998 through 2004, Certified Public Accountant (CPA) firms' offering of forensic accounting services didn't change very much at all. While a few fluctuations (up and down) of the percentages of firms offering forensic services between years were noted, overall it appears that (1) about the same percentage of CPA firms offered such services in 2004 compared with 1998 and (2) no meaningful changes have occurred during the seven-year period in the types of firms offering such services, for example, in 2004, as in 1998, only around 10 percent of the smallest CPA firms offered forensic services compared with around 42 percent of the largest CPA firms. The apparent lack of growth in forensic services provided by CPA firms is quite surprising considering that demand for such services has likely increased in recent years. Possible implications: If there really is more forensic business out there now than a few years ago, then it appears, based on the survey data, that professionals other that CPAs are capturing much or most of the new business. If this is the case, perhaps it is because many CPA's don't find such work profitable; or, perhaps many CPAs do not seek such work because of inadequate training/education in forensic techniques; or, perhaps, "forensic specialists" are sought after by the market to a greater extent than 'traditional' CPA's that offer forensic accounting as one of many public accounting services. This paper presents the results of national surveys of CPA firms over a seven year period indicating the extent to which such firms offer forensic services and also discusses several possible implications of the data.

INTRODUCTION AND BACKGROUND

Forensic accounting may involve the application of special research and investigative skills in accounting, auditing, finance, quantitative methods, and law in order to collect, analyze, and evaluate evidential matter, and to interpret and communicate results that may be used in legal proceedings or in dispute resolution. (AICPA, 2004). One would think that demand for such services would be increasing in light of recent events such as Enron, Worldcom, Arthur Andersen, and the many other high-profile business-fraud failures, bankruptcies, litigation, the media attention devoted

to business fraud, recent legislation (Sarbanes-Oxley), the accounting profession's explosion of attention to all issues fraud related, and the dollar magnitude of operational fraud in the United States.

Consider the following examples that support an expectation of increased demand for forensic services. According to the Association of Certified Fraud Examiners (ACFE), in 2003 an estimated $660 billion was lost by corporations to fraud (ACFE, 2004). And in 2005, ACFE membership increased by almost 15 percent to over 35,000 members (ACFE, 2006). In a recent national survey of U.S. corporations, 39 percent of organizations responding indicated they have considered the need for a forensic accountant while 28 percent said they already sought help from a forensic accountant (Kessler). A 2004 survey of 100 of the largest CPA firms in the United States reported that 60 percent of the firms indicated an increase in their forensics/fraud business (Accounting Today, 2004).

Also, because Statement on Auditing Standards (SAS) No. 99, Consideration of Fraud in a Financial Statement Audit (AICPA, 2002) requires independent auditors to expand procedures directed at fraud detection and the identification of fraud risk factors it would seem reasonable to expect increased demand for forensic accounting services. For example, SAS No. 99 includes the suggestion that an "auditor may respond to an identified risk of material misstatement due to fraud by assigning forensic specialists." (AICPA, 2002). In addition, many of the suggested procedures in SAS No. 99 are forensic in nature. Certain procedures presume the possibility of dishonesty at various levels of management, including override of internal controls, falsification of documents, and collusion. Examples include in-depth, interviews of personnel, surprise recounts of inventory items, and special investigative analysis of accounts not ordinarily performed. (AICPA, 2002). Additionally, with the Sarbanes-Oxley Act's new reporting and controls certifications requirements, corporations may be compelled to increase the level of internal investigations which may necessitate the hiring of forensic accountants. (SOX, 2002).

The potential significance of forensic accounting is perhaps best described by Neal Batson, the former United States Department of Justice Examiner assigned to investigate the Enron Corporation scandal, who stated, "There has been no other time in the legal and accounting professions when it has been more important for the two to work together." (Batson). In light of the increased attention on forensic accounting issues, it is judicious to expect that demand for such services has increased in recent years. Further, it seems reasonable to expect that Certified Public Accountants (CPAs) would be likely to experience an increase in the performance of such services. However, this paper presents survey evidence to the contrary of such an expectation, namely, survey data indicate that CPA firms located in the United States don't appear to be doing any more forensic accounting work now that they did in years before Enron, Worldcom, the Sarbanes-Oxley Act, and SAS No. 99. Thus, it appears that many CPA's may be missing out on what could be described as a forensic accounting services gold rush.

METHODOLOGY AND DATA ANALYSIS

The study is based on data gathered by the Texas Society of CPAs (TSCPA) and American Institute of CPAs (AICPA). The TSCPA conducted annual management of accounting practice (MAP) surveys of CPA firms located in the United States through the year 2000. Beginning with 2001 the survey was performed by the AICPA. The annual survey is directed to CPA firms that are

included in the state CPA society's membership. Because of the lengthiness of the survey, it is not practical to reproduce it as an appendix to this article. Readers interested in obtaining a copy of the survey questionnaire may do so by contacting the AICPA. One section of the survey asks respondents to indicate whether or not forensic accounting services are offered.

This study presents national average results of the survey for the years 1998 through 2004. Survey data are reported in several categories including overall aggregate averages, averages by form of organization, sole practitioner or multi-owner firms, and averages by the firm annual net fee revenues. Survey data represent a particular firm's most recent fiscal year. For example, the 2004 MAP survey includes data for the fiscal year ending on December 31, 2003.

The methodology has two minor limitations. Because of changes made to the questionnaire format by the AICPA, data classifications for 2003 and 2004 are not consistent with the classifications for the years 1998 through 2002. Another limitation is that certain data related to multiple-owner CPA firms for 2001 were unavailable. Still, the methodology employed does provide useful data regarding CPA firms' offering of forensic accounting services for the seven-year period under study.

This section presents data related to all CPA firms responding to the national survey for the years 1998-2004. The 1998 questionnaire was the first survey to gather data regarding forensic services. The data were aggregated for all firms and the percentage of firms that indicated that forensic accounting services are provided is reported. As noted in Table 1, there has been very little change in the percentage of firms offering forensic services. From 1998 through 2004, the overall percentage of CPA firms offering forensic accounting services has ranged from a low of 19.3 percent in 2001 to a high of 25.2 percent in 2002. From 1998 through 2004 (except for 2001) the percentage of firms offering forensic services remained consistently in the range of 22-25 percent. The average for the seven-year period, 23.5 percent, and the percentage for 2004, 23.9 percent, are not much different than the amount for 1998, 23.0 percent. To summarize, in 2004, like in 1998, less than one-quarter of CPA firms offered forensic services, or, in other words, in 2004 approximately 76 percent of CPA firms did not provide forensic services.

Table 1: Number and Percentage of Firms Offering Forensic Accounting Services

	1998	1999	2000	2001	2002	2003	2004	Total
Respondents	1,554	1,484	1,021	1,031	2,397	3,052	2,363	12,902
Number offering	357	331	240	199	575	769	565	3,036
Percentage offering	23.0	22.3	23.5	19.3	24.0	25.2	23.9	23.53

Tables 2 and 3 present data regarding forensic accounting service, categorized and reported by firm size, as measured by annual net fee revenue, for the years 1998 through 2004. Also reported in Table 3 are data by sole practitioner (SP) and multiple-owner (MO) firms including weighted-average rates for the years 1998-2002.

Table 2: Percentage of Firms Offering Forensic Accounting Services by Firm Net Fee Revenues						
	Annual Net Fee Revenues					
	Under	$150K to	$300K to	$550K to	$1mill to	Over
Year	$150K	$300K	$550K	1 mill	2 mill	$2mill
2004	13.2	15.0	13.9	22.0	26.3	42.9
2003	16.8	15.5	17.3	22.3	30.7	46.4

Table 3: Percentage of Firms Offering Forensic Accounting Services by Firm Ownership and by Firm Net Fee Revenues: 1998-2002								
	Annual Net Fee Revenues							
	Sole Practitioner (SP)				Multi Owner (MO)			
	Under	$100K to	Over	SP	Under	$400K to	Over	MO
Year	$100K	$200K	$200K	Total	$400K	$1mill	$1mill	Total
Avg.	9.8	11.6	20.3	14.8	14.5	25.9	43.2	34.4
2002	12.0	14.0	24.0	16.8	18.0	28.0	47.0	31.0
2001	8.4	8.5	16.9	12.7	*	*	*	25.8
2000	10.6	8.8	21.2	14.6	16.1	26.9	42.7	42.7
1999	8.6	12.7	17.6	14.0	11.1	23.5	41.1	41.1
1998	9.4	14.1	21.8	15.9	12.8	25.6	42.0	31.3
* Percentages by net fee revenue were not made available by the survey vendor for Multi Owner firms for 2001.								

The data in Tables 2 and 3 generally support two findings. First, even when the data are examined at a greater level of detail, that is, by different firm sizes and different ownership characteristics, it appears that forensic services offerings in 2004 are about the same as that noted in 1998. Second, larger firms are more likely to offer forensic services compared with smaller firms. For example, as noted in Table 3, in 1998, 14.1 percent of SP firms earning $100K-$200K provided forensic services compared with 14.0 percent in 2002. For 2004, firms with net fee revenue of $150-$300K had a rate of 15.0 percent (Table 2). For MO firms in the '$400K-$1,000K' category, in 1998 the rate was 25.6 percent and in 2002 the rate was 28.0 percent. For 2004, firms with net fee revenue of $550-$1,000K had a rate of 22.0 percent (Table 2). The weighted-average rates for SP firms were 15.9 percent in 1998 and 16.8 percent in 2002; for MO firms, 31.3 percent in 1998 compared with 31.0 percent in 2002. For MO firms in the 'Over 1,000K' category, in 1998 the rate was 42.0 percent and in 2004 the rate was computed as 35.2 percent (the weighted average rate of 35.2 percent is not reported in Table 2; it is the weighted-average rate corresponding to firms with net fees revenue greater than $1 million.) The data suggest that in most classifications, forensic services rates in 2004 are about the same as or lower than rates in 1999.

As noted earlier, the data also suggest that forensic accounting services are more likely to be offered by large firms and that this industry characteristic has remained fairly constant over the period 1998-2004. For example, per table 2, in 1998, SP firms with revenue under $100K had a rate of 9.4 percent compared with 42.0 percent for MO firms with revenues over $1,000K. Per Table 3, in 2004, the rate was 13.2 percent for firms with revenue less than $150K and 42.9 percent for firm with revenues over $2,000K. In very general terms, the data indicate that things have stayed about the same over the period 1998-2004, that is, in 2004, as in 1998, only about 10-20 percent of the "smaller" CPA firms offered forensic services compared with approximately 40-45 percent of "larger" CPA firms.

IMPLICATIONS

The results suggested by the data do not appear to not make much sense if, in fact, demand for forensic services has increased over the last few years. Adding to the puzzle is the growing availability in recent years of professional organizations offering support, training, etc. in the area of forensic accounting. One would speculate a growth in demand for forensic services would likely have provided attractive financial incentives and opportunities for CPA practitioners to enter this service area. Further, the explosion in training, CPE, and other support services provided by relatively new organizations such as the Association of Certified Fraud Examiners and the Forensic Accountants Society of North America, for example, would lead one to expect an increase in forensic services provided by sole practitioners who now have the necessary resources to competently practice in the area of forensic accounting. But the data do not support these expectations.

For example, in Table 2, in all categories, the percentage offering forensic services in 2004 was less than the rates noted in 2003. The most significant decline of the categories compared, a 19.7 percent rate of decline (-19.7 = 17.3-13.9/17.3), was reported for CPA firms with net fee revenue of $300,001-$550,000 annually. Again, these findings were unexpected.

One possible explanation for the findings may be due to an increase in forensic services provided by dedicated forensic specialists-- individuals with backgrounds in law enforcement, attorneys, special investigators, etc., and possibly accountants that work outside of the traditional public accounting firm environment. Rather than being employed by CPA firms, such individuals may be employed by law firms, financial organizations, insurance companies, and government agencies like the Federal Bureau of Investigation and Internal Revenue Service. In other words, "mainstream" CPA's may be failing to make meaningful entry into the forensic services marketplace because it is being captured (dominated) by forensics specialists like, for example, Certified Fraud Examiners, that may make forensic work the brunt of their practice, shunning traditional public accounting services like tax, client write-up, and financial statement preparation. Or it seems reasonable that certain professionals may have much greater expertise in forensic services and therefore are more likely to secure forensic work compared with a CPA with lesser qualifications in forensic accounting. Consider an example of a forensic professional who was a former police detective/investigator with actual field experience in evidence gathering techniques and providing courtroom testimony compared with a traditionally educated CPA that may have completed a Continuing Professional Education (CPE) course related to forensic services but has little or no

related work experience. It is easy to understand how an individual seeking forensic services may, in this particular example, prefer the former detective to the CPA.

Another possible explanation of the results is that many CPA's don't find such work profitable or believe it is too costly to gain entry into the market. For example, it is not uncommon for a single CPE course related to forensic accounting to cost several thousands of dollars. This may offer some explanation of why larger firms, with larger budgets for training expenses, are more likely to offer forensic services compared with small CPA firms with limited funds for training.

Or, perhaps one reason why some CPAs are not doing more forensic work is because they believe that they lack appropriate college coursework in forensic accounting. Forensic accounting, while gaining some attention in recent years as a possible course subject on some college campuses, is still not a part of the accounting curriculum required by most universities. For example, according to the American College of Forensic Examiners, less than 20 American colleges and universities offer courses in forensic accounting (Vogt, 2003).

CONCLUSION

This study indicates no significant changes in the provision of forensic accounting services provided by CPA firms over the period 1998 through 2003, with a somewhat small overall decrease from 2003 to 2004. It is uncertain whether the decline from 2003 to 2004 will continue or is merely an isolated downward fluctuation in the percentage of CPA firms offering forensic accounting services. Further, larger CPA firms continue to be the primary providers of forensic accounting services. Research is needed to investigate the extent of growth of forensic accounting services and the growth in demand for such services. It would also be interesting to investigate the provision of forensic accounting services provided by professional organizations other than CPA firms, like attorneys, investigators, and security firms. Additionally, research is needed regarding the types of forensic services being offered by CPAs, such as a study of what comprises the forensic accounting services offered by national public accounting firms. Finally, research is needed regarding the costs, benefits, and profits associated with offering forensic accounting services.

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COMPANY CHARACTERISTICS AND THE USE OF SFAS NO. 143 TO EFFECT EARNINGS MANAGEMENT

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ABSTRACT

Because of the great subjectivity required in determining the fair value of an asset retirement obligation (ARO) and its subsequent accretion expense under SFAS No. 143, a new opportunity exists for managing earnings. Prior research provides evidence that earnings management is related to company characteristics, such as leverage, firm size, and operating performance. For a sample of oil, gas, and energy companies, the current study tests for possible relationships between these characteristics and the propensity for companies to manage earnings via the level of accretion expense recorded. Results suggest that earnings management exists in the application of SFAS No. 143 and, more importantly, that earnings management is closely related to company size and operating performance. Larger, more profitable entities tend to record much less accretion expense than do their smaller, less profitable counterparts.

INTRODUCTION

A company manages its employees to ensure efficient production of output; similarly, a firm manages its cash flows to make sure an adequate cash balance is available to cover operating costs. Such actions are normal, and management's ability would be questioned if they were not practiced. Managing earnings, though, represents quite a different story and connotes manipulation. Watts and Zimmerman (1986) provide an explanation through positive accounting theory (PAT) for understanding earnings management. PAT purports that managers' accounting policy choices may be affected by written contracts, such as bonus compensation agreements and debt covenants, and the unwritten political costs hypothesis.

Earnings management can be accomplished because the determination of accrual earnings under GAAP is subject to numerous estimates and judgments in accounting policy choice. Statement of Financial Accounting Standards (SFAS) No. 143, *Accounting for Asset Retirement Obligations*, presents an opportunity for managing earnings through the subjectivity it requires in determining the fair value of obligations associated with the retirement of tangible long-lived assets. The assumptions made in applying SFAS No. 143 affect not only asset and liability values on the balance sheet but also expenses on the income statement.

Previous research (Hunt, 1985; Elliott & Shaw, 1988; Aharony et al., 1993; Sweeney, 1994; Porcano, 1997; Visvanathan, 1998) presents evidence that company characteristics (e.g., leverage,

firm size, and operating performance) may be associated with the incidence or likelihood of earnings management. Examining this association provides a means of ascertaining the presence of earnings management in relation to specific events or transactions. The current study examines these company characteristics to determine if earnings management exists relative to the accrual of accretion expense under SFAS No. 143 for a sample of publicly-traded companies operating in the oil, gas, and energy industry.

LITERATURE REVIEW

The literature is reviewed from two perspectives. First, the earnings management literature is reviewed; then, information on SFAS No. 143 is examined. Earnings management involves deliberate actions taken within GAAP to bring about desired earnings outcomes. Jackson and Pitman (2001, p. 39) note that it represents the "purposeful intervention in the financial reporting process with the intent of obtaining personal gain." Even though U.S. GAAP is rules driven, wide latitude exists in its application, and many subjective judgments and assumptions must be made in determining accrual-based earnings. It is precisely this subjectivity in applying GAAP that allows earnings management to flourish (Brown, 1999).

Many reasons exist concerning why companies practice earnings management. For example, several studies suggest that firms manage income to meet earnings expectations or forecasts by analysts (e.g., see Degeorge et al., 1999; Payne & Robb, 2000; Jordan & Clark, 2003). They do so because companies that meet or exceed earnings expectations enjoy higher stock prices and price-earnings ratios relative to firms that fail to meet their expectations (Glaum et al., 2004). Research also indicates that managers manipulate earnings to increase their own wealth through bonus schemes tied to earnings (e.g., see Healy, 1985; Watts & Zimmerman, 1986; Guidry et al., 1999). Similarly, earnings management occurs as managers seek to enhance share-price performance because of the resultant benefit accruing to them from their stock-based compensation packages (Brown & Higgins, 2001).

In addition, research suggests that company characteristics may be related to the likelihood or level of earnings management undertaken. For example, firms that are highly debt leveraged appear more likely to manage earnings than companies with low levels of debt due to their higher probability of financial distress or because they are closer to violating debt covenant restrictions (e.g., see Hunt, 1985; Elliott & Shaw, 1988; Aharony et al., 1993; Sweeney, 1994; Porcano, 1997; Visvanathan, 1998). Company size has also been linked to the propensity to manage earnings. As an example, Penno and Simon (1986) indicate that publicly-traded firms are more likely to use liberal accounting policies than are privately-held companies. On the other hand, Aharony et al. (1993) provide evidence that earnings management is more pronounced among smaller companies than it is with larger firms. Glaum et al. (2004) imply that the relationship between firm size and the inclination to manage earnings may be muddied because of the different reasons firms engage in earnings management.

For example, Watts and Zimmerman (1986) assert that larger firms with high profits draw political scrutiny where the public fears that a company may develop monopoly power to charge exuberant prices. As such, these large firms may be more likely than small firms to engage in earnings

management designed to lower earnings and, thus, decrease the probability of public scrutiny. On the other hand, Glaum et al. (2004) note that smaller firms might be more prone to manage earnings because raising capital is generally more difficult for them than it is for larger companies. Thus, it may be more important for smaller companies to employ capital-market-directed earnings management. However, Glaum et al. (2004) surmise that international companies may have more opportunity to manage earnings than smaller national firms simply because the larger firms are affected by more complex transactions requiring subjective judgments than are smaller companies.

Another company characteristic identified in the literature as being associated with earnings management is operating performance. Yoon and Miller (2002) note that when operating performance is poor firms tend to select strategies that enhance earnings. They also found that when operating performance is extremely bad some companies take big baths because of their already depressed earnings; on the other hand, some firms performing exceptionally well also choose income-decreasing procedures to smooth earnings.

Peek (2004) noticed similar results related to discretionary provisions or expenses. More specifically, when experiencing current earnings increases, firms recognize larger than normal provisions to smooth earnings. If income is relatively low in the immediate period, firms will record unexpectedly large provisions, presumably because there would be minimal negative repercussions from reducing current earnings further. Bauman et al. (2001) examined discretionary adjustments associated with the valuation allowance for deferred tax assets and found that companies with negative earnings tend to book large income-decreasing adjustments to the valuation allowance.

The above studies provide ample evidence that earnings management exists and that its likelihood of occurrence may be related to specific firm characteristics (i.e., leverage, company size, and operating performance). As Glaum et al. (2004) note, the move by the FASB in the last several years toward fair value reporting has increased the opportunities for earnings management because of the great subjectivity involved in determining fair value. SFAS No. 143, a relatively new standard effective in 2003, continues this transition to fair value reporting and, as such, may allow additional opportunities for earnings management. Under SFAS No. 143, an entity must recognize an asset retirement obligation (ARO) for a tangible long-lived asset at the time an event legally binding the company occurs (e.g., the construction of an off-shore oil rig). The obligation must be recorded at its estimated fair value, which is the amount it would take to settle the liability in a current transaction between willing parties in an active market.

The ARO is recorded as a liability with an offsetting debit to the asset account that requires future removal. Of course, this increases yearly depreciation expense on the asset. In addition, accretion expense (i.e., interest) must be accrued annually on the obligation as it grows over the asset's life. The annual accretion expense is determined using the interest method, and each company uses its own subjectively determined credit-adjusted risk-free rate in applying the interest method.

The subjectivity required in accounting for AROs under SFAS No. 143 sets the stage for the current study of earnings management. More specifically, the present research examines whether earnings management appears to be occurring in the application of this new standard.

METHODOLOGY

To ascertain whether earnings management may be occurring in relation to the application of SFAS No. 143, financial statement data were collected for a sample of 65 randomly selected publicly-traded oil, gas, and energy companies for 2002 and 2003. Only companies impacted by SFAS No. 143 were included in the sample. This time period was chosen because 2003 represents the implementation year for the standard. Data were obtained from the companies' 10-k reports filed with the SEC and made available on its electronic database (i.e., EDGAR). Oil, gas, and energy firms were selected for study because companies in this industry typically own assets (e.g., oil refineries, oil rigs, power plants, etc.) that create legal obligations regarding their removal.

As noted previously, determining the value of an ARO involves significant judgment by management and accountants. The amount recorded for an ARO in the current period impacts both depreciation expense and accretion expense for several years to come. Thus, a low estimate of the fair value of an ARO means future expenses will be lower as well. In addition, a company wanting to hold expenses down could choose a low discount rate to apply to the ARO balance in determining the annual accretion expense adjustment.

It is virtually impossible to ascertain whether earnings management occurs on a company-specific basis because doing so would entail knowing the state of mind of firm management. To determine the existence of earnings management, the actions of several companies must be examined to evaluate the presence of any patterns or relationships among the companies. To do so, the sample of firms was investigated along the three characteristics that prior research suggested are related to earnings management (i.e., leverage, company size, and operating performance). For each characteristic, the sample of companies was split into two subsets based on the level of that characteristic. The ARO balance and the amount of accretion expense in relation to both sales and operating income were then compared between the two groups using statistical tests.

As mentioned earlier, accretion expense is a function of the subjectively determined ARO and a company's own uniquely determined discount rate and is a primary means by which SFAS No. 143 affects earnings. The absence of any discernible pattern between the two subsamples of companies in the amount of accretion expense accrued suggests that the earnings effect of SFAS No. 143 does not differ between the groups with respect to the characteristic being examined. This situation would indicate that earnings management is not present. However, if a difference between the groups is noted in the level of accretion expense recorded, anecdotal evidence exists suggesting the presence of earnings management.

RESULTS

Table 1 provides descriptive statistics for selected variables for the entire sample of 65 companies. Even though all companies are publicly traded, their size differs widely as 2003 year-end total assets ranged from $52.4 million to $74.54 billion, respectively, between the 10th percentile and 90th percentile. The amount of 2003 accretion expense also varies considerably, ranging from .32% of income to 16.96% of income between the 10th and 90th percentiles, respectively.

Table 1: Descriptive Statistics on Selected Attributes for the Entire Sample			
Attribute	10th percentile	Median	90th percentile
2003 year-end total assets	$52.4 mill.	$3,309 mill.	$74,540 mill.
2003 accretion expense	$.077 mill.	$4.51 mill.	$118.2 mill.
2003 ARO balance to total assets	.24%	2.40%	7.44%
2003 accretion expense to sales	.05%	.40%	2.01%
2003 accretion expense to income before accretion expense	.32%	2.85%	16.96%
2003 accretion expense to ARO balance	3.86%	5.79%	8.95%

Perhaps the most interesting finding in Table 1 is the wide range in the ratio of 2003 accretion expense to the ARO balance for the companies in the sample. This ratio represents an approximation of the credit-adjusted risk-free rated used by the firms in determining the amounts for their accretion expense accruals. This ratio ranges from 3.86% to 8.95%, respectively, between the 10th and 90th percentiles.

Table 2 shows information for the groups of companies segregated by the level of leverage employed. Leverage is measured by the 2003 year-end debt ratio (i.e., total liabilities to total assets). The sample of 65 companies is divided into a high-leverage group and a low-leverage group. The high-leverage subsample contains the 33 firms with the largest debt ratios, while the low-leverage group comprises the 32 companies with the smallest debt ratios.

For each group, medians are provided for three variables or ratios. Medians are examined as the summary measures for the groups rather than means because means can be unduly influenced by a few extreme values, especially with relatively small sample sizes like the ones used here. Medians are much less affected by these outlying values and, thus, are frequently considered more representative of a group than are means. The first variable examined is the ratio of the 2003 year-end ARO balance to total assets. This ratio measures the relative importance of this new obligation for the companies in the two subsamples. Notice in Table 2 that the median ARO to total assets ratio differs very little between the high-leverage and low-leverage companies, and this difference is statistically insignificant (i.e., alpha = .4300). This suggests that both groups of companies experienced roughly the same balance sheet effect from adopting SFAS No. 143.

The more interesting question, however, concerns the difference between the two groups of companies in relation to the earnings effect of implementing SFAS No. 143. The second and third variables in Table 2 provide information on this earnings effect. The second variable is the median ratio of the 2003 accretion expense to sales, and the third variable measures the median ratio of the 2003 accretion expense to operating income before the accretion expense. Dividing accretion expense by sales and income normalizes the expense for the size of a company and provides two measures of the magnitude of the expense that are comparable among different sized companies.

Table 2: Information for Companies Separated by Leverage			
Ratio	Median for high-leverage companies	Median for low-leverage companies	Alpha level*
2003 ARO balance to			
total assets	2.32%	2.58%	.4300
2003 accretion expense to sales	.44%	.22%	.2291
2003 accretion expense to operating income before accretion expense	2.78%	3.06%	.5000
*Alpha level provides the statistical significance of a one sample median test comparing the values for the firms in the low-leverage group to the median for the high-leverage group.			

If earnings management exists with respect to the leverage characteristic, one would expect companies in the high-leverage group to have recorded significantly less accretion expense relative to firms in the low-leverage group. This did not occur, however, as Table 2 reveals that the median ratio of accretion expense to sales differed between the high-leverage and low-leverage groups at a statistically insignificant level (i.e., alpha = .2291). Likewise, the median ratio of accretion expense to income differed between the groups at a statistically insignificant level (i.e., alpha = .5000). When leverage is the company characteristic under examination, it appears that earnings management did not occur with respect to SFAS No. 143.

The second firm characteristic tested in relation to the presence of earnings management is company size. The literature suggests that earnings management may be related to firm size, but no consensus exists on the direction of this relationship. To evaluate the company size characteristic, the sample of 65 firms was divided into two subsamples based on total assets as the measure of firm size. One subsample contains the 33 largest companies, and the other group comprises the 32 smallest companies. For these two groups separated by company size, Table 3 provides medians for the same three variables examined in Table 2 for leverage (i.e., 2003 year-end ARO balance to total assets, 2003 accretion expense to sales, and 2003 accretion expense to operating income before accretion expense).

Table 3: Information for Companies Separated by Size			
Ratio	Median for large companies	Median for small companies	Alpha level*
2003 ARO balance to total assets	2.25%	2.57%	.2434
2003 accretion expense to sales	.19%	.61%	.0019
2003 accretion expense to operating income before accretion expense	2.24%	4.28%	.0925
*Alpha level provides the statistical significance of a one sample median test comparing the values for the small firms to the median for the group of large firms.			

Table 3 reveals that the balance sheet effect of adopting SFAS No. 143 was very similar between the groups of large and small companies. In particular, the median ratios of the 2003 year-end ARO balance to total assets for large and small firms were 2.25% and 2.57%, respectively. These medians differed at a statistically insignificant level (i.e., alpha = .2434). Thus, there appears to be little variation in the financial consequences of SFAS No. 143 between large and small companies, at least with respect to the balance sheet.

On the other hand, the earnings effect from the 2003 accretion expense differs markedly between the groups of large and small firms. For example, the median ratios of accretion expense to sales for the large and small companies were .19% and .61%, respectively; these medians differed at a statistically significant level (i.e., alpha = .0019). The ratio of accretion expense to income demonstrated a similar pattern between the two groups of firms, with the median ratio for the large firms of 2.24% equal to half the median amount for the small companies of 4.28%. Using a traditional .10 level as the cutoff measure for statistical significance, these medians also differed at a statistically significant level (i.e., alpha = .0925).

In summary, the ARO balance, normalized for company size, differs very little between the groups of large and small firms. Intuitively, then, one might expect the normalized accretion expense to be roughly equal between the two groups as well. However, this did not occur as the large firms recorded a much lower amount of accretion expense in 2003 relative to the small firms. How could accretion expense, which is based on the ARO balance, be so markedly different between the two groups of firms? This is possible because accretion expense is also affected by factors other than the size of the ARO balance.

As an example, assume two companies recently commissioned identical oil rigs and that each company determines the current value (i.e., cost) of removing its respective oil rig is $1,000,000. This represents the beginning balance of the ARO for each firm. However, this ARO balance will grow at different rates depending on the interest rate used to compute annual accretion expense. Assume one company chooses a discount rate of 5%, while the other company uses an 8% rate. The former company would record accretion expense in year one of $50,000 (i.e., $1,000,000 X .05), while the latter firm would report a year-one expense of $80,000 (i.e., $1,000,000 X .08). The discrepancy between the companies in annual accretion expense would become more pronounced over time as the ARO balance for the company using a higher interest rate grows at a faster pace than does the ARO balance for the firm applying a lower rate.

Only 15 companies in the sample disclosed the specific interest rates used in determining accretion expense; thus, a meaningful comparison could not be made between the groups of large firms and small firms along the lines of actual interest rates. However, for these 15 firms, wide latitude existed in their subjectively determined interest rates, which ranged from 5% to 25%, with most of them falling between 5% and 12%. Even though very few firms disclosed the actual rates used to compute accretion expense, a simple surrogate measure could be determined for each company as the ratio of the amount of accretion expense accrued to the balance in the ARO liability account. This represents a fairly accurate estimate of the true, but unknown, discount rate.

The median ratio of accretion expense to the ARO balance for the groups of large and small companies was 5.38% and 6.24%, respectively. These medians differed at a statistically significant level (alpha = .0081). The larger companies, overall, clearly adopted lower discount rates that did

the smaller companies. This helps explain how the larger firms may have been able to accrue lower amounts of accretion expense relative to the smaller companies, despite the fact that little difference existed between the large and small firms in the comparative balances of their ARO liabilities.

It is, of course, entirely possible that the larger companies were justified in selecting lower discount rates than their smaller counterparts. SFAS No. 143 states that the discount rate chosen to accrue accretion expense is the risk-free interest rate adjusted upward for the credit risk of an individual company. Thus, a company with a lower credit risk would be expected to choose a lower discount rate than a company with a higher credit risk. The credit risk of a company would generally be related to, among other things, the firm's debt leverage. All other factors held constant, a more highly leveraged company would be a greater credit risk than would a firm with less debt leverage. The medians for the 2002 year-end debt ratios (i.e., total liabilities to total assets) for the groups of large firms and small firms were 62.33% and 52.36%, respectively. The medians differed at a statistically significant level (i.e., alpha = .0003). These debt ratios certainly do not seem to justify the discrepancies noted above in the discount rates chosen by the groups of large and small firms. Quite the contrary, the debt ratios suggest that the larger, more highly debt leveraged firms should have selected higher discount rates than their smaller, less leveraged counterparts. This is exactly the opposite of what occurred in reality.

The discrepancy in the accretion expense between the groups of large and small firms does not prove definitively that earnings management existed with respect to the accrual of accretion expense, but it provides anecdotal evidence that such is the case. These results provide no clear indication of which group managed earnings. Perhaps the group of large firms held down the accretion expense in an attempt to increase earnings. Managers of larger companies may be under more pressure to produce strong earnings figures or meet earnings forecasts than are managers of smaller firms.

The third firm characteristic examined for the possible presence of earnings management is operating performance. Prior research (e.g., Yoon & Miller, 2002; Peek, 2004) suggests that firms experiencing low earnings may select strategies to increase income, while companies with extremely poor earnings tend to recognize larger than normal reductions in income (Watts & Zimmerman, 1986). To evaluate the effect, if any, operating performance has on the propensity of firms to manage earnings via SFAS No. 143, the sample of 65 companies was segregated into two groups based on the firms' respective return on assets (ROA). ROA was determined as 2003 income from operations to average total assets and represents a widely-used measure of operating performance. The 33 companies with the highest 2003 ROAs comprise one group; the other group contains the 32 firms with the lowest 2003 ROAs.

In evaluating the two groups of companies separated by ROA (i.e., operating performance), it became apparent that a strong relationship existed between company size and operating performance. For example, when examining company size as it relates to earnings management under SFAS No. 143, it was noted that the group of large firms enjoyed a median 2003 ROA of 6.02% compared to a median ROA of only 3.12% for the group of small firms. These medians differed at a statistically significant level (i.e., alpha = .0175). Similarly, when examining potential earnings management and its possible association with operating performance, it became apparent that the group of firms with high ROAs was comprised of relatively large companies (i.e., the median total

assets for firms in this group was $6.52 billion). This is approximately six times the size of the companies in the low-ROA group, which had median total assets of $1.16 billion. These medians differed at a statistically significant level (i.e., alpha = .0035).

Not surprisingly, then, the comparison between the high-ROA and low-ROA groups resulted in similar findings to the analysis of the large and small companies presented earlier. More specifically, the high-ROA and low-ROA groups exhibited almost no difference in the relative balances of their ARO liabilities; the median ratios of the 2003 ARO balance to total assets for the two groups were 2.40% and 2.43%, respectively. The medians differed at a statistically insignificant level (i.e., alpha = .5700). On the other hand, the median ratios of 2003 accretion expense to sales for the high-ROA and low-ROA groups of .22% and .60%, respectively, differed greatly (i.e., alpha = .0610).

Clearly, company size and operating performance seem to be positively related. Larger companies generate higher earnings performance measures than do smaller firms. Although an intriguing finding, this result alone provides no necessary link between these two company characteristics and earnings management. It might be that larger companies are simply better managed than smaller firms and through economies of scale have become more efficient in producing and delivering their products. However, when the level of accretion expense is factored into the mix, compelling evidence of earnings management surfaces. In particular, the larger, more profitable companies accrued a much lower amount of accretion expense in 2003 than did their smaller, less profitable counterparts. It appears that larger companies have achieved greater profitability than smaller firms, at least partly, because of the lower amounts the big firms recorded for the subjectively determined accretion expense.

CONCLUSION

SFAS No. 143, with its subjectively determined accretion expense, provided a new opportunity for managers to manipulate earnings. Prior research suggests that earnings management may be related to certain company characteristics (i.e., leverage, firm size, and operating performance). The current study tests for the presence of earnings management via SFAS No. 143 in relation to these firm characteristics. Based on a sample of publicly-traded oil, gas, and energy companies, the study's results indicate that no association exists between the propensity to manage earnings and a company's leverage position, at least when accretion expense represents the means of effecting earnings management.

On the other hand, marked relationships were noted between the amount of accretion expense recorded and both company size and operating performance. Larger, more profitable companies accrued a disproportionately lower amount of accretion expense than did smaller, less profitable firms. It is, of course, feasible that some phenomenon other than earnings management caused this discrepancy between the companies in the level of accretion expense reported. However, given that the ARO balance was roughly the same for all groups of firms, regardless of the company characteristic examined, there exists no *a priori* reason to believe that accretion expense should have differed among the groups. The fact that it did provides strong anecdotal evidence that earnings were managed through the recording of accretion expense under SFAS No. 143.

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WAS THE ACCOUNTING PROFESSION REALLY THAT BAD?

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ABSTRACT

To gain insight into the extent of malpractice in the State of California prior to the Passage of Sarbanes-Oxley, we examined the nature and magnitude of complains filed with the California Board of Accountancy (CBA) against both licensed and unlicensed accountants during the fiscal years 2000, 2001, and 2002. The CBA currently licenses and regulates over 73,000 licenses, with 1,431 complaints filed during the period reviewed.

Disciplinary actions were taken against 283 different licensees for the three fiscal years reviewed. SEC issues were involved in 19 cases, theft or embezzlement 46 cases, public accounting malpractice 146 cases, improper retention of client records 11 cases, cheating on the CPA examination 9 cases, and miscellaneous other 52 cases.

Over half of the complaints involved public accounting issues. Audit related complaints accounted for 48%, tax related complaints 36%, and compilations or reviews accounted for 16% of the complaints. These statistics were in line with the experience of the AICPA Professional Liability program.

Within the above sections, the paper contains specifics with regards to the most common problems identified as a result of this work. While a number of interesting facts were discovered, one item of particularly interest was the significant number of claims that involved non-profit organizations. CBA administrators do not believe there is any greater tendency for non profit reporting versus for profit reporting, thus appearing to indicate this is just an area that has a greater possibility of accounting malpractice.

INTRODUCTION

In an attempt to restore public trust in the accounting profession and investor confidence in the financial markets, Congress enacted the Public Company Accounting Reform and Investor Protection Act of 2002, better known as the Sarbanes-Oxley Act (SOX). Prior to the enactment of this legislation, there was a perceived crisis in the credibility of the auditing profession given the newsworthy scandals such as Enron, WorldCom, and Global Crossing. Tax preparers also fall prey to the media attacks as evidenced by a *USA Today* front page headline, "Many Burned by Inept or Crooked Tax Preparers" (McCoy, 2006).

To gain insight into the extent of malpractice in the State of California prior to SOX, we examined the nature and the magnitude of complaints filed with the California Board of Accountancy (CBA) against both licensed/unlicensed accountants during the fiscal years-ended 2000 through 2002. In addition, we reviewed the corresponding disciplinary actions taken by the CBA related to these complaints.

BACKGROUND OF THE CBA

The CBA currently licenses and regulates more than 73,000 licensees, the largest group of licensed accounting professionals in the nation, including individual Certified Public Accountants (CPAs) and Public Accountants (PAs). The CBA's stated mission is to "protect the public welfare, particularly consumers, by ensuring that only qualified persons and firms are licensed to practice public accountancy and that appropriate standards of competency and practice, including ethics, objectivity and independence are established and enforced." As part of this mission, the CBA is responsible for initiating and investigating complaints against individuals practicing public accounting in California.

When the CBA receives a complaint, an investigation is usually conducted by their Enforcement Division. The Enforcement Division is staffed by professional investigative CPAs holding strong backgrounds in accounting practices and professional standards. In addition to investigating complaints, the Enforcement Division also provides testimony at administrative hearings and monitors compliance of those accountants placed on probation. Following an investigation by the Enforcement Division, and subsequent administrative hearings, the CBA has the option of revoking or suspending the individual's license or placing the CPA/PA on probation. If probation is violated, the CBA has the option of revoking probation and implementing the disciplinary action that was originally stayed.

STUDY RESULTS

Nature of Complaints Filed

During the fiscal years-ended 2000, 2001, and 2002, the CBA received 510, 409, and 492 complaints, respectively. The table below lists the number of cases that were closed by the CBA without a formal hearing. At the end of this study, 88 investigations still remained open ("The Risk Management Resource", 2003). As the table below indicates, the number of complaints filed represents a very small percentage (less than 1 percent) of licensees in the state.

For these three fiscal years, we reviewed the nature of complaints and disciplinary actions taken against 283 different individual licensees. The nature of the complaints examined covered a broad range of areas including: SEC regulations, embezzlement, malpractice, improper retention of client records and cheating on the CPA examination. The breakdown of the nature of the complaint filed is summarized in the table below:

Descriptive Statistics of Complaints Filed with CBA		Y/E	
	2000	2001	2002
Number of complaints filed	510	409	492
Percentage of total licensees	.69%	.56%	.67%
Number of cases closed with no formal hearing	360	305	295

Description of the Complaint	# of Cases	% of Total
Issues with SEC regulations	19	6.7%
Stealing assets or embezzling funds	46	16.3%
Public accounting malpractice	146	51.6%
Improper retention of client records	11	3.8%
Cheating on CPA exam	9	3.1%
Other	52	18.3%
TOTAL	283	100%

Of the individuals in the sample who had actions taken against them, 6.7% had issues involving Securities and Exchange regulations. The most common problems identified in these complaints with accountants in private practice were inflating earnings, providing false and or misleading information and improper revenue recognition. For accountants in public practice, the most common problems were gross negligence in the conduct of the audit and the lack of independence. The lack of independence is cause for concern, because the ethical topic is covered in an introductory auditing course and the subject is still stressed in continuing education courses. Another potential cause for concern was the finding that of the 283 individuals who received disciplinary action, 16.3%, had been involved with either stealing assets or embezzling funds. Examples of such activities included: embezzling school funds in the amount of $47,000 while acting as a volunteer (3 complaints involved the actions of volunteers); stealing $800,000 of a client's funds; getting a client to invest $500,000 in a phony real estate project, in which the accountant received the entire investment funds; stealing $860,000 of church funds; stealing credit cards and cash from other firm partners; and fraudulently billing Medicare. Money laundering and securities fraud was also committed in a number of cases.

Over half of the complaints involved public accounting issues. Auditing related complaints accounted for 48%, tax related complaints accounted for 36%, and compilations or reviews complaints accounted for 16% of the cases reviewed. These statistics are consistent with the experience of AICPA Professional Liability program, which reported that audits continue to be the highest area for malpractice claims under its program, both in terms of claim frequency (how often

a claim occurs per revenue dollar) and in claim severity (the average cost per claim) ("Update", 2003).

Descriptions of the complaints filed in each of the accounting functions are outlined below:

AUDITING

Gross negligence in the performance of audits
Failure to comply with GAAS
Failure to comply with GAAP

TAX

Late filing of tax returns
Failure to file tax returns
Omitting substantial amounts of known taxable income
Taking incorrect tax deductions
Preparing false or fraudulent tax returns
Preparing 2 sets of tax return to mislead a 3rd party
Backdating supporting documents

COMPILATION AND REVIEWS

Gross negligence, fraud
Failure to include all applicable financial statements
Lack of independence

The most common problems in the audit area were gross negligence in the performance of audits, failure to comply with GAAS (Generally Accepted Accounting Standards) or failure to follow GAAP (Generally Accepted Accounting Principles). Within the audit area, a significant number of the disciplinary actions were related to non-profit audits. Twenty-seven of the seventy-six audit related cases, involved audits of non-profit organizations such as school districts, city or county government, homeowners associations, HUD, student loan programs, retirement plans, and foundations. One of the CBA's chief investigators was of the opinion that non-profit entities were no more likely than any other group to file complaints. He added that the IRS and FTB rarely reported such information to the CBA.

Within the tax area, there were several common problems as noted in the aforementioned categories of complaints. The following three examples will serve to illustrate the nature of tax related complaints. In one case, the tax preparer failed to take a stepped up basis for an inherited asset and failed to take a deduction for the estate taxes paid on income with respect to a decedent. In a second case, a tax preparer incorrectly advised a client to purchase a home for their son, to avoid paying capital gains tax on the sale of their personal residence. In a third case, a tax preparer failed to claim

a state tax credit on an estate tax return. Based on previous findings, these cases reflect problems that are quite common among tax professionals (Donnelly, O'Callaghan, Walker, 1999).

With respect to compilation and reviews, in some cases it could not be determined whether or not the deficiency was for compiled or reviewed statements. Based on the information available, at least nine of the twenty-four complaints involved review work. As noted above, gross negligence, fraud, failure to include all applicable financial statements, and lack of independence (a requirement for a review report) were among the most common problems in this area.

Another common complaint involved the improper retention of client records, which according to Rule 501 is a discreditable act. A client has a right to demand return of their documents, at any time they choose. However, some accountants are under the false impression that they can hold the client records hostage, usually demanding payment for services before the documents will be returned. Nothing could be further from the truth. The accountant only has the right to retain his/her work product.

While not a major cause for CBA actions, nine of the cases involved cheating on the CPA examination. In most cases the individuals were caught during the examination. Unbelievably, one individual was caught cheating on three different occasions and another was caught cheating twice. In other cases, the CBA identified the cheating as a result of their statistical evaluation of examination results.

Disciplinary Actions by the CBA

Given the severity of many of these complaints, one would expect harsh penalties imposed by the CBA. On the contrary, of the 283 individuals who had disciplinary action taken against them, only 183 lost their license. Loss of license, the most severe disciplinary action, represented only .25% of the total licensees in California over a three year period. With the exception of fraud and embezzlement cases, the CBA had an apparent tendency to grant licensees a second chance to redeem themselves. For example, seventeen individuals simply had their licenses suspended, despite multiple complaints and/or violations of the terms of their probation. Of course, an exception to the CBA's apparent disciplinary laxity was the revocation of Arthur Andersen's license as the result of their involvement with the Enron scandal. However, in a number of cases, one could question why more licenses were not suspended. Clearly the CBA will only take away an accountant's ability to earn a living as a last resort, when the actions of that individual indicate a stricter penalty may be warranted.

CONCLUSION

When one considers the number of licensed accounting professionals in California, the total number of complaints filed during these three years is relatively small. Even if one factors in a number for additional complaints that weren't filed for various reasons, we conclude the number of complaints filed with CBA and the number of resulting disciplinary actions taken by CBA appears inconsequential. Contrary to what many politicians and media pundits have led the public to believe, the accounting profession, at least in California, was really not that "bad" at the time SOX was enacted.

By no means does this conclusion suggest that SOX was unwarranted. SOX brings a wake up call to the accounting profession. The intent of the legislation is to help recapture the public trust that was lost during the financial markets bubble. We believe additional steps are needed at the state level in order to restore confidence in the profession. Another issue that needs to be addressed is whether or not there is a tendency by state boards of accountancy, such as the CBA, to minimize their disciplinary actions against individual practitioners and firms, who have not exhibited the highest levels of ethical behavior and professional competency. The old adage "actions speak louder than words" is most appropriate, given the public's current perception of the profession. If the public believes that accounting professionals can get away with financial murder, without being held accountable and appropriately reprimanded, then not only will the lost trust never be regained, but the possibility of further Congressional legislation becomes ever more likely.

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THE RETURNS TO HOMEOWNERSHIP: AN MSA LEVEL ANALYSIS

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ABSTRACT

This paper examines the returns to homeowners across 208 Metropolitan Statistical Areas (MSAs) over the period 1989 to 1999. We find a significant difference in returns to homeowners across MSAs, with the highest returns in the North Central United States and the lowest returns in New England and the Middle Atlantic states. We also find income growth and the percentage of renters in the MSA impact the returns to homeowners.

INTRODUCTION

Single-family housing-- by virtue of its sheer size—represents one of the most significant individual investment categories for the U.S. economy. Its overall importance has been amply demonstrated recently as the housing sector has come across as a rare bright spot in our current economic downturn. Approximately two thirds of U.S. households participate in this sector. For most homeowners, the housing investment is their largest single investment. Therefore, the importance of the housing sector to individuals cannot be overstated.

Previous research in this area has focused on risk and return in the housing market. Articles in the popular press have analyzed the rent versus buy decision in a general framework (Fortune, 1994). Using the example of a hypothetical $100,000 home and a number of assumptions with regard to rate of price appreciation, holding periods and tax treatment, Peach (1988) demonstrates that most homeowners can expect a relatively good return on their investment over the years. A number of studies have utilized nationwide data and a number of others have focused on regional market data. Using data for four large metropolitan areas, Case and Shiller (1990) demonstrate that price changes are a function of factors such as construction costs and changes in adult population. Crone and Voith (1999) examine the risk-return relationship in a single market using a very comprehensive database that extends over twenty years. In an effort to fully comprehend all segments of this market, Pollakowski, Stegman, and Rohe (1991) concentrate their efforts on the low-medium end of the income scale. Nationwide and/or regional studies have given us very valuable preliminary insights on returns to homeownership and how they compare with other asset classes.

Almost all studies in this area indicate a strong need for us to better understand the variations across different markets. Returns on housing investments vary considerably across cities. Chinloy and Cho (1997), for example, find the correlation between returns on housing in different cities can be very low or negative. Each Metropolitan Statistical Area (MSA) has unique characteristics that impact the returns to homeowners. Factors like the MSA's population growth, the growth of the labor

market in the MSA, the supply of rental property, and the level of new housing construction vary across different markets. Additional factors that influence the price levels and appreciation rates of homes in an area, including property and income tax rates, also have distinctive local or statewide characteristics. These significant differences in economic and demographic characteristics and the low correlation of housing returns across cities point to the need for analysis at the MSA level. A recent study by Jud and Winkler (2002) uses MSA level data to investigate the factors that impact real housing price appreciation. They find population growth, real changes in income, construction costs, and interest rates influence real housing price appreciation.

This study extends the work of Jud and Winkler (2002) by measuring the returns to homeownership for 208 MSA's in the United States from 1989 to 1999. One factor that influences the returns to homeowners is home price appreciation. Jud and Winker (2002) show that home price appreciation varies greatly across MSA's. Other factors that influence returns to homeownership include real estate taxes, maintenance and insurance costs, state and local income taxes (through the use of itemized deductions), and the difference between homeownership costs and the cost to rent. The next section of the paper discusses the data and methodology. The final section presents some preliminary findings.

DATA AND METHODOLOGY FOR RETURN CALCULATIONS

The median home price for 1989 for each MSA and the home price index published by the Office of Federal Housing Enterprise Oversight (OFHEO) are used to estimate changes in the market value of the median residence over the ten year period. The analysis assumes a home is purchased at the median home price with a 20 percent downpayment and a 30 year mortgage. The initial interest rate on the mortgage is 10.13 percent. This is the average 30 year conventional loan rate for 1989. The analysis assumes the loan is refinanced in January 1993 at a rate of 8.022 percent. Refinancing the loan at that time is rational given the interest rate changes and assumed holding period. We estimate real estate taxes based on the property tax rate for each MSA. Annual property insurance and maintenance costs are assumed to be 1.5 percent of the market value of the property. The median rent in 1989 and the fair market rent for a three bedroom dwelling in 1999 are used to construct the average rent variable over the ten year period.

We calculate the cash flows associated with purchasing and holding the median home in each MSA over the ten year holding period. The initial investment is the 20 percent downpayment. The annual cash flows are the annual costs of homeownership minus the average rent for the MSA. The annual costs of homeownership include the principal and interest payments on the loan, real estate taxes, property insurance, and maintenance costs. We also estimate the tax benefits of owning a home in the MSA using state and local income tax data, the annual interest paid on the loan, and the estimated real estate taxes. The tax benefits are estimated for investors in the 15 percent, 28 percent and 36 percent marginal tax brackets.

The terminal cash flow is from the sale of the property. The analysis assumes the home is sold at the end of the ten year period. The net sales proceeds are estimated as the market value of the property in 1999 minus six percent selling costs.

Three internal rate of return calculations are performed for each MSA. The first calculation assumes the homeowner will receive no tax benefits. The second calculation assumes the homeowner has a marginal tax rate of 15 percent. The third and fourth calculations assume the homeowner's marginal tax rates are 28 percent and 36 percent, respectively.

STATISTICAL TESTS

After calculating the returns for the 208 MSA's in the sample, we employ an ordinary least squares (OLS) regression model to determine which factors influence housing returns. Any factors used in the computation of the return are omitted from the regression model. Our model includes five dummy variables to reflect regional differences in home prices. Previous research indicates there should be differences in home price appreciation for different regions of the country. While our research is focused on returns to the housing investment, not just home price appreciation, it is important to allow for regional differences.

The regions are divided based on regions set by the U.S. Census Bureau. Region 1 is comprised of New England and the Middle Atlantic states. Region 2 comprises the Middle Atlantic states. Region 3 includes states in the South Central U.S., while Region 4 is comprised of states in the North Central U.S. Region 5 is comprised of states in the Mountain region. Region 6 is the Pacific region. In the statistical analysis, the Pacific region is used as the default region. Therefore, the parameter estimates for each region compares the return in that region to the return in the Pacific region. Table 1 lists the states that are included in each region.

Table 1: States Included in Each Region

Region	States
1	Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
2	Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
3	Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas
4	Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Ohio, South Dakota, Wisconsin
5	Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Wyoming
6	Alaska, California, Hawaii, Oregon, Washington

We also include the change in income from 1989 to 1999. Homebuyers in areas with significant income growth are more likely to bid up the price of homes and increase the returns to existing homeowners. This is partly due to homeowners' desire to sell their homes to purchase larger (and more expensive) homes. Significant income growth also makes it possible for families to move from renters to homeownership.

The percentage of occupied homes that are rented is also included in our model. The higher the percentage of renters, the lower the demand for owner-occupied housing. Less demand for

owner-occupied housing should result in slower home price appreciation and lower returns to housing investments. Finally, we include the percentage of homes that are vacant. A higher percentage of vacant homes indicates a higher supply of housing. Therefore, higher vacancy percentages should be associated with lower returns on housing investments.

FINDINGS

Without considering the tax benefits of homeownership, the highest returns are earned by homeowners in Duluth, Minnesota (15.26 percent), followed by Salem, Oregon (14.32 percent) and the Salt Lake City-Ogden, Utah MSA (14.06 percent). Homeowners in the Connecticut and New Hampshire areas earn the lowest returns. The MSA's with the lowest returns are Hartford-New Britain-Middletown, Connecticut (-41.11 percent), New Haven-Meriden, Connecticut (-29.0 percent), and Waterbury, Connecticut (-27.16 percent).

When the tax benefits of homeownership are considered, the rankings change slightly. For taxpayers in the 36 percent marginal tax bracket, the highest returns are earned in Portland, Oregon (16.99 percent), Salem, Oregon (16.78 percent) and Eugene-Springfield Oregon (16.37 percent). The MSA's with the lowest tax-adjusted returns are Hartford-New Britain-Middletown, Connecticut (-30.33 percent), New Haven, Meriden, Connecticut (-20.67 percent) and Waterbury, Connecticut (-20.44 percent).

The effect of the tax deductibility of interest expense on the returns varied widely across MSA's. Homeowners in 17 of the MSA's in the sample received no tax benefits from homeownership. This is largely due to the modest home prices in these MSAs. However, it is also due to lower than average state and local income taxes. Nine of these MSA's are in Texas and three are in Tennessee. Neither of these states has a state income tax.

The results of our regression model are shown in Table 2. The parameter estimates on the region dummy variables represents the difference in returns between the region in question and the Pacific region. There is a significant difference in returns to housing investments across geographic regions. Returns on housing are significantly lower in the New England and Middle Atlantic states than in any other region of the country. The highest returns are in the North Central region of the U.S. Interestingly, the closest returns to the Pacific region are in the Middle Atlantic region. The Middle Atlantic region is the only region with an insignificant dummy variable, indicating that returns in the Middle Atlantic region are not significantly different from returns in the Pacific region. The other regional dummy variables are significant at the .05 level or below.

We also find that income growth is positively related to returns to housing investments. The parameter estimate on income growth is positive and significant at the .0001 level. This indicates that MSA's experiencing positive income growth are more likely to experience positive returns to housing. In areas with strong income growth, the demand for housing is higher, leading to higher returns for existing homeowners. As income grows, more renters become homeowners and existing homeowners look to move into higher quality residences.

Table 2: Regression Results			
Variable	Parameter Estimate	t-Statistic	P-value
Intercept	-0.79405	-0.20	0.8454
Region 1	-10.31105	-6.28	<.0001
Region 2	1.13345	0.75	0.4562
Region 3	3.71512	2.56	0.0112
Region 4	4.12398	2.85	0.0048
Region 5	3.74611	2.04	0.0424
Income Growth	0.31719	5.84	<.0001
Percent Renters	-0.32417	-4.43	<.0001
Percent Vacant	0.02022	0.16	0.8715

The percent of properties that are vacant does not provide any additional insight into the returns on housing investments. The percent of properties that are renter occupied is negatively related to the returns to housing investments (significant at the .0001 level). As stated earlier, a higher concentration of rental properties provide a larger inventory of properties that can be acquired without purchasing a home. In this case, it is more likely that individuals will choose to rent rather than own their own homes.

CONCLUSIONS

Our findings are consistent with the findings of Chinloy and Cho (1997) and Jud and Winkler (2002). Returns to housing investments vary greatly across MSAs. We also find returns are correlated within particular regions of the country, with the lowest returns in the New England and the Middle Atlantic states and the highest returns in the North Central U.S. Demographic factors such as the percentage of renters and the income growth in an MSA influence the returns to homeowners.

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PREDICTING DOWNGRADES OF A.M. BEST'S RATINGS FOR PROPERTY AND CASUALTY INSURANCE COMPANIES

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ABSTRACT

With intense competition among property and casualty insurance companies and tougher standards for ratings by A. M. Best Company, property and casualty insurers are very concerned with maintaining the current ratings since downgrades will affect insurer's ability to retain and attract new business. A. M. Best Company groups insurers receiving a letter grade rating into two distinct groups, "secure" and "vulnerable." Occasionally, A. M. Best Company uses quantitative and qualitative information in a confidential analysis process to downgrade previously assigned ratings from secure to vulnerable.

Using a matching sample of insurers whose rating is downgraded to vulnerable as compared to insurers whose rating remains secure, have the same organizational form and are of similar size, we analyze the level of firms' financial ratios prior to a downgrade to predict subsequent downgrades. This study differs from previous research in the focus on the secure and vulnerable ratings. Our results indicate that the complicated and vague process of downgrading a secure rating to a vulnerable rating can often be predicted with a simple model and a small set of ratios that can be calculated from readily available information.

INTRODUCTION

Insurance companies are closely watched by several ratings agencies. The ratings provide an opinion on the financial position of the insurer including its operating performance and its ability to meet its obligations to its policyholders. These obligations often follow the payment for services by several years. With these staggered obligations, the performance of an insurance company is not transparent to policyholders. Understanding the solvency of insurers goes beyond the mere collection of financial data, it requires analysis of existing conditions and anticipation of future obligations. In the preface of the Key Rating Guide published by A. M. Best agency, the rating procedure is explained in terms of general quantitative and qualitative characteristics considered, but not the specific performance expected to maintain a rating. Given the nature of the insurance industry, there is a need for expert opinions about the solvency of insurance companies.

The incentives of consumers to inform themselves about the financial condition of insurance companies may be reduced by the existence of state guaranty funds which compensate policyholders

of an insolvent company. However, the compensation is often delayed and incomplete due to specified state limits. Policyholders may benefit if they can anticipate rating downgrades.

Additionally, as insurance companies operate in a competitive, yet regulated industry, the issuing of a rating may affect the position of the insurance company in several ways. The change in a rating may attract the scrutiny of regulatory agencies whose actions may restrict the operations of the insurance company. Also, in a financial service industry, where the quality of the service sold is not immediately apparent, the publicity associated with the issuance of a rating downgrade may alter a firm's competitive position in the industry. For these reasons, insurance ratings are as important to insurance companies as to policy holders.

The ratings are voluntary and in the past insurer rating agencies have been criticized for assigning inflated ratings. However this situation is changing. Until the 1980's, one rating agency, A.M. Best, had a monopoly on ratings. Since then, other agencies with experience rating debt securities have begun rating insurance companies. These agencies include Standard & Poors, Moody's and Duff & Phelps. With increased competition in the issuance of ratings, it may be anticipated that the ratings will more accurately reflect the ability of insurance companies to meet their obligations. The failure of highly rated life insurance companies, such as Executive Life Insurance and Mutual Benefit Life Insurance Companies, generated heavy criticism of the leading rating agencies by the insurance press. Similarly, several property and liability insurers assigned a high rating have failed in 1984 and 1985. These bankruptcies of very prominent insurance companies raised several questions about the motivations and methods of the rating agency. Bouzouita and Young (1998) show that, after controlling for firms financial condition, the 1990 expansion of rating categories by A. M. Best Company also raised the standards of performance for each level of rating category. As rating agencies compete to issue the most reliable ratings; it becomes tougher for insurance companies to maintain their current ratings.

The structure of the ratings varies among rating agencies so ratings are not directly comparable. For a complete description of methods and procedures used by those rating agencies, see Klein (1992). A. M. Best Company, the largest rater of insurance companies, rates the financial strength of insurers on a scale ranging from A++(superior) to D (below minimum). For smaller or newer companies, rather than receiving a letter rating, A. M. Best assigns a numerical financial performance rating (FPR) from nine to one. In addition, there are several non-rated categories due to lack of sufficient data or major change in operation and/or ownership. Also, A.M. Best groups insurers receiving a letter grade into two distinct groups "secure" and "vulnerable". The secure category includes insurers with letter ratings of A++ through B+ and FPR rating of nine through five. The vulnerable category consists of all other rated companies. If a certain company receives a vulnerable rating, then that signifies poor performance and increased likelihood of insolvency. Occasionally, A. M. Best upgrades or downgrades previously assigned ratings. Policyholders, agents and brokers are not only interested in the level of the ratings but also in the ability of the insurer to maintain that rating. Improving or at least maintaining the current ratings will be of interest to insurers since downgrades will affect insurer's ability to retain and attract new business. The objective of this study is to examine the changes in the ratings, specifically the downfall from the secure to the vulnerable group.

RELATED LITERATURE

A pioneer paper by Harmelink (1974) examines the change in Best's ratings. This study uses multivariate discriminant analysis (MDA) to predict the maintenance or decline of A or A+ ratings. The seven independent variables that account for profitability, leverage and operation performance, successfully discriminate between downgraded companies and companies that maintained their ratings with predictability power of 78 percent in the year prior to the downgrade. However, the predictability of the model decreases with the number of years preceding the year of downgrade. The data used in the study is for the period 1965-1970.

A second study that looks at the changes of Best's ratings, from a capital markets perspective, Singh and Power (1992) examine the effect of Best's downgrades and upgrades on the stock prices of publicly traded insurance companies. The authors find that neither upgrades or downgrades have a significant impact on stock prices. Since few insurers are publicly held, the capital market approach excludes the majority of insurance companies.

Epermanis and Harrington (2000) analyze premium growth surrounding Best's ratings changes during 1992-1996. They find a significantly lower revenue growth for insurers that experienced rating downgrades in the year of and the year after the downgrades for a sample of property and liability insurance companies.

Several studies in the insurance literature use the ratings as one of the predictor variables of solvency. Ambrose and Seward (1988) and Ambrose and Carroll (1994) find that including A.M. Best's ratings significantly improved the predictability power of the models that distinguish between solvent and insolvent insurers. Pottier (1998), using a sample of life insurance companies, finds that Best's ratings, rating changes and assets have a comparable predictive power of insolvency to financial ratios. Moreover, the study shows that adverse rating changes provide early warning of insurer insolvency.

The limited number of studies that have examined the changes in Best's ratings do not specifically address the classification of secure and vulnerable companies and are based on much earlier data periods that may not be relevant to consumers, insurance companies and policymakers concerned with the solvency of the insurance industry for the twenty-first century. This paper uses recent data and takes a different approach in predicting when A. M. Best Company will downgrade ratings of some property and casualty insurers.

DATA AND METHODOLOGY

The data for this study are collected from two sources. Best's Key Rating Guide reports the ratings of property-liability insurers. The first step of the data collection process resulted in 144 companies whose ratings were downgraded placing them in the vulnerable category over the twelve-year period of 1992 through 2003. The sample is then matched with 144 companies whose ratings remained unchanged, controlling for size measured with admitted assets and organizational form. The financial information was collected from the financial statements filed with National Association of Insurance Commissioners for each of the preceding years from 1991 through 2002.

In this paper, it is hypothesized that A.M. Best's ratings, being a surrogate for solvency, are determined by the financial and operating performance of the company. The variables of interest are based on the number and type of variables commonly used in insurance solvency literature. The focus of this paper is to predict the downgrades in the ratings and not the level of ratings. The model has the following form:

$$\Delta R = f(ROA, NPW/S, DEBT, LIQ, GSURP, GNPW, REINS, LINE, AFF)$$

Where

ΔR	= change in ratings, a binary variable equal to 1 if the company was downgraded, 0 if the company maintained its rating.
ROA	= return on assets, net income and unrealized capital gains to admitted assets.
NPW/S	= insurance leverage, net premiums written to policyholders' surplus.
DEBT	= debt ratio, total liabilities to total assets.
LIQ	= quick liquidity, cash and short term investments to total liabilities.
GSURP	= growth in policyholders' surplus.
GNPW	= growth in net premiums written.
REINS	= proportion of reinsurance premiums recoverable to surplus.
LINE	= proportion of premiums written in long tail lines.
AFF	= an indicator variable = 1 if the company is a member of group and zero otherwise

The independent variables used in the model capture both the financial and operating performance of the company in terms of profitability, leverage, and liquidity. Profitability (ROA), measured by the ratio of net income to total assets, reflects the ability of management to maintain strong operation.

Insurance leverage (NPW/S) measures the ability of the insurer to write new business without jeopardizing the financial strength of the company. Insurance companies' liabilities are largely contingent obligations to their policyholders. High levels of leverage would adversely affect the ratings. A second measure of leverage used is the ratio of total debt to assets (DEBT). Insurance companies should be able to meet their financial obligations as they come due. Therefore, a high level of financial leverage increases the probability of default to policyholders. Liquidity (LIQ) is measured by the quick liquidity ratio, which is the ratio of cash and short-term investment to total liabilities. Excessive liquidity reduces the overall rate of return on invested assets.

Growth in surplus (GSURP) is used to measure the safety net against unfavorable fluctuations in the underwriting experience of the insurer. Companies that experience decrease in surplus are more likely to be downgraded. A second measure of growth (GNPW), growth in net premiums written is included. A rapid growth in the volume of premiums written, without an adequate increase in surplus, may increase the probability of default and the likelihood of a downgrade.

The quality of reinsurance program has an effect on the rating of the company. We include the proportion of reinsurance premiums recoverable to surplus (REINS) as a proxy for the adequacy

of such a program. A high ratio may indicate that the primary insurer is having difficulty collecting from its insurer and therefore would have an adverse effect on the company's rating.

The composition of the book of business (LINE) is measured by the proportion of net premiums written in the long-tail lines to total net premiums written. The larger the proportion of premiums written in these lines the riskier the insurance portfolio.

Some insurance companies are members of a group under common management. The variable affiliation (AFF) is included to account for group membership. Group members may benefit from the expertise of the parent company in terms of investment advice, claim settlement, and underwriting.

The model is estimated using the maximum likelihood probit estimation technique since the dependent variable is a binary variable that equals one if the company was downgraded from the "secure" to "vulnerable" category and zero for the matching company that maintained its rating. We also report results using OLS.

EMPIRICAL RESULTS

The variables used in this study are described in Table I. This table shows that downgraded companies have a much lower return on assets with an average loss of –3.79 percent than the match sample which has an average rate of return of 1.94 percent. Also, the insuance leverage, which is the ratio of net premiums written to surplus, is much higher for downgraded companies than for matching companies. Downgraded insurers have a decrease in surplus while the matching sample companies have a fifty percent increase in their surplus. Downgraded companies have a much higher reinsurance coverable ratio than the matching companies.

Table II shows the results of four models using OLS and probit in panel 1 and panel 2 respectively to determine the factors that predict the downgrade of Best's rating from the secure to the vulnerable category. Given that the dependent variable is a binary variable, the probit analysis is appropriate, but the OLS regression model is a common type of analysis that is easy to interpret.

The first and the third columns of Table II report the results from an OLS model and a probit model, each model using four explanatory variables, namely return on assets, insurance leverage, debt ratio, and liquidity. In both models, all four variables are statistically significant. In the OLS model, the *t*-statistics reported are adjusted for heteroscedasticity using White's method. The two estimation procedures yield fairly similar results.

Then, in the second and forth columns of Table II, the results are given from an OLS model and a probit model using nine explanatory variables, which include the original four variables with the addition of growth in surplus, growth in net premiums written, reinsurance recoverable, line of business and affiliation. In both models, the debt ratio is no longer significant and, in the OLS model, growth in surplus becomes significant. Including a larger number of explanatory variables does not significantly alter the results. In the OLS analysis, expanding the number of variables decreases the adjusted coefficient of determination.

Table III shows the percent of observations correctly classified by each model. The OLS and probit models have about the same predictability. The four models correctly classify over 70 percent of the observations. The expanded models slightly improve the proportion correctly predicted.

However, the complexity of interpreting the additional ratios does not justify the slight increase in the predictability. Therefore, the four-variable model is preferable.

SUMMARY AND CONCLUSION

Our results indicate that the complicated and vague process of downgrading a secure rating to a vulnerable rating can be predicted with a small set of ratios that can be calculated from readily available information in a simple model. The significant characteristics relate to profitability, insurance and financial leverage, and liquidity. These findings are consistent with solvency studies in the insurance industry; these studies show that a small number of financial ratios are good predictors of insolvency.

The implications of this study are three-fold. First, these company-specific factors that are found to be significant in predicting a downgrade could be used to help improve the understanding of insurance companies' business risk by consumers, agents, and regulators. Second, the significance of these variables makes the rating agencies role more prominent in the absence of external market influences such as stock price performance given that few property and casualty insurance companies are publicly traded. Third, the results could be used by insurance companies to engage in risk management ex ante to avoid experiencing a downgrade. Companies that face financial distress may face discipline by customers, reinsurers, and investors.

Table 1: Descriptive Statistics

Variable	Downgraded Insurers Mean (N=144)	Matching Insurers Mean (N=144)
Return On Assets	-0.0379 (SD=0.0899)	0.0194 (SD=0.0588)
NPW to Surplus	1.5169 (SD=3.6851)	1.1555 (SD=1.0134)
Debt Ratio	0.6645 (SD=0.1911)	0.5615 (SD=0.1965)
Quick Liquidity	0.5551 (SD=0.8568)	0.5865 (SD=0.9432)
Growth in Surplus	-0.0729 (SD=4.2406)	0.5008 (SD=0.3639)
Growth in NPW	0.1890 (SD=0.5769)	0.1828 (SD=0.6813)
Reins. Recoverable	1.7528 (SD=2.2885)	0.9033 (SD=1.4968)
Line of Business	0.4745 (SD=4520)	0.4735 (SD=0.3709)
Affiliation	0.6527 (SD=0.4777)	0.6319 (SD=0.4839)

Table 2: Change In Ratings From Secure To Vulnerable				
VARIABLES	OLS	OLS	Probit	Probit
	Model 1	Model 2	Model 1	Model 2
Intercept	0.1678* (1.69)	0.1698* (1.66)	-0.9808*** (-3.14)	-1.0121** (-2.79)
Return On Assets	-2.0631*** (-5.52)	-1.9600*** (-5.08)	-6.4585*** (-4.98)	-5.5308*** (-3.84)
NPW To Surplus	0.0319*** (5.11)	0.0276** (3.48)	0.1039** (2.50)	0.0919** (2.27)
Debt Ratio	0.2837* (1.82)	0.2601 (1.62)	0.8316* (1.78)	0.7779 (1.62)
Quick Liquidity	0.0081*** (3.26)	0.0085*** (3.45)	0.0240*** (3.52)	0.0264*** (3.74)
Growth in Surplus		-0.0082*** (-3.36)		-0.3074 (-1.15)
Growth in NPW		-0.0003 (-0.76)		-0.0007 (-0.53)
Reins Recoverable		0.0008 (1.31)		0.0002 (1.28)
Line of Business		-0.0002 (-0.29)		-0.0006 (-0.28)
Affiliation		0.053 (0.98)		0.1797 (1.01)
Adjusted R^2	0.1853	0.1808		
Chi-Squared		63.97		69.30
*** Statistically Significant @ 1%, ** Statistically Significant @ 5%, * Statistically Significant @ 10%				

Table 3: Classification of Observations							
	OLS MODEL 1			PROBIT MODEL 1			
	Predicted			Predicted			
Actual	0	1	TOTAL	Actual	0	1	TOTAL
0	112	32	144	0	105	39	144
1	49	95	144	1	47	97	144
TOTAL	161	127	288	TOTAL	152	136	288
PERCENT CORRECT			71.87%	PERCENT CORRECT			70.13%
0 refers to no change in rating and 1 refers to a downgrade from secure to vulnerable.							

Table 3: Classification of Observations							
	OLS MODEL 2			PROBIT MODEL 2			
	Predicted			Predicted			
Actual	0	1	TOTAL	Actual	0	1	TOTAL
0	109	35	144	0	104	40	144
1	43	101	144	1	42	102	144
TOTAL	152	136	288	TOTAL	146	142	288
PERCENT CORRECT			72.91%	PERCENT CORRECT			71.52%
0 refers to no change in rating and 1 refers to a downgrade from secure to vulnerable.							

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