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VOLUNTARY DISCLOSURES AND EARNINGS SURPRISES: THE CASE OF HIGH-TECH FIRMS IN PERIODS OF BAD ECONOMIC NEWS

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ABSTRACT

In this study, I examine the voluntary disclosure behavior of high-tech firms experiencing bad economic news. I create a sample of 100 randomly-selected firm-quarters with negative returns—but not necessarily negative earnings surprises. I find that: (i) the unconditional relation between earnings surprises and voluntary disclosures is non-existent in this setting where negative stock returns are controlled for, but (ii) firms with negative earnings surprises make forward-looking statements with more negative information content—but only when conditioned on firm size or growth opportunities. Sample selection procedures can therefore affect inferences drawn from voluntary disclosure behavior documented in extant studies. Conditional analysis reveals how the earnings-disclosure relation cross-sectionally varies with firms' economic characteristics.

JEL: M40, D82

KEYWORDS: Voluntary disclosures, earnings surprise, bad economic news, litigation risk

INTRODUCTION

In this study, I examine the voluntary disclosure behavior of firms with bad economic news. The goal of the study is two-fold. First, I examine the relation between voluntary disclosures and earnings surprise—but do so only after explicitly controlling for negative stock returns. Controlling for negative returns is particularly important for studies that examine bad news disclosures because they are a necessary condition of Rule 10b-5 litigation. Other studies fail to control for this, and may suffer from a correlated omitted variables problem; such studies may therefore draw incorrect inferences about the earnings-disclosure relation, or find results that are inconsistent with litigation predictions. My second goal is to examine the cross-sectional determinants of the earnings-disclosure relation. That is, does the earnings-disclosure relation systematically vary across different economic settings? For instance, a firm with relatively high growth opportunities may exhibit an earnings-disclosure relation that is quite different from that of a firm with relatively low growth opportunities. This conditional analysis provides a deeper understanding to our current knowledge of how earnings surprises affect voluntary disclosure behavior, and sheds light on why prior studies may find conflicting results.

I randomly select 100 firm-quarters in high-tech industries that experience negative market-adjusted returns during the quarter. Because I do not impose requirements on earnings, the firms do not necessarily exhibit a negative earnings surprise. I collect the voluntary disclosures made during the quarter for each of these firms, and then examine the possible sources of variation in the number and information content of these disclosures. I estimate a model of voluntary disclosures regressed on earnings surprise—and interactions of the surprise with economic characteristics. I find the following results. First, I find that earnings surprises are not related to the *number of disclosures* in any meaningful manner. Second, related to the interaction terms, I find that firms with more negative earnings surprises make *forward-looking statements with more negative information content*—but only when conditioned on firm size or growth opportunities. That is, negative earnings surprises have an impact on the disclosure decision, but only for firms that are large in size or have high growth opportunities. Conversely, negative earnings surprises do not seem to affect disclosure behavior for firms that are small in size or have low growth opportunities.

Since unconditional earnings surprises are found to have no relation to information content, this result highlights the importance of the conditional analysis.

One empirical result that consistently emerges from my analysis is the absence of an unconditional relation between earnings surprise and voluntary disclosure behavior. This is most consistent with the findings of Lang and Lundholm (1993) and less consistent with the findings of, e.g., Skinner (1994) or Miller (2002). Specifically, Lang and Lundholm find a positive relation between earnings and disclosure quality, but find that this relation ceases to exist when stock returns are subsequently controlled for—perhaps because “returns capture the relevant information in earnings.” In this study, the sample requirement of negative stock returns likely has a similar effect on the unconditional earnings-disclosure relation. This highlights the importance of avoiding earnings-based metrics in the sample selection procedure, and how this issue can have a nontrivial impact on the inferences that are drawn from certain disclosure studies. It also sheds light on one possible reason why prior studies like Francis et al. (1994) and Skinner (1997) find control firms with negative earnings surprises that do not make voluntary disclosures in the manner that litigation-risk-based hypotheses would predict—the negative earnings surprises may not translate into comparable stock price declines, which is a necessary condition for Rule 10b-5 litigation. The results in this study therefore suggest that future research on the earnings-disclosure relation should control for stock returns, and explicitly consider how the earnings-disclosure relation may cross-sectionally vary across firms. Results in this study should, however, be interpreted with caution because, given the industry membership and negative stock returns requirements I impose on my sample, the disclosure behavior I document may not be generalizable to the broader universe of firms.

The paper proceeds as follows. In the next section, I review the relevant literature. Next, I discuss the sample selection process and research design. The following section presents empirical results. Lastly, I discuss conclusions and caveats.

LITERATURE REVIEW

In this study, I examine the relation between voluntary disclosures and earnings surprise for firms experiencing bad economic news. A large number of studies investigate the voluntary disclosure behavior of firms that experience bad economic news (e.g., Skinner, 1994, 1997; Francis et al., 1994; Kasznik and Lev, 1995; Aboody and Kasznik, 2000). The most prominent economic force examined in extant literature is litigation risk under SEC Rule 10b-5 (e.g., Trueman, 1997; Johnson et al., 2000), which states that it is unlawful for a firm to make an “untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements [previously] made... not misleading.” Because managers have an asymmetric loss function, when they possess “sufficiently bad” news, they have an incentive to ex post voluntarily disclose the bad news in a timely manner to reduce expected litigation costs. Timely, curative disclosures (i.e., those that exhibit negative information content) reduce expected litigation costs because such disclosures counter allegations that the news was not released in a timely manner, and also reduce the class period and class size of potential lawsuits.

Anecdotal evidence suggests that many Rule 10b-5 lawsuits are triggered by negative earnings surprises, so many disclosure studies use earnings surprise as a proxy for litigation risk and examine whether such earnings surprises are related to different levels of disclosure. Most disclosure studies therefore use earnings surprise as a proxy for litigation risk and examine whether negative earnings surprises are related to higher levels of disclosure. For instance, both Skinner (1994) and Kasznik and Lev (1995) find that firms with bad earnings surprises are at least twice as likely to provide voluntary, preemptive disclosures than those with good earnings surprises. This suggests that bad earnings surprises increase expected litigation costs (relative to good earnings surprises), and that firms increase preemptive disclosures to reduce such costs. However, other studies like Francis et al. (1994) find that for the majority of 10b-5 lawsuit firms, preemptive disclosures are not the panacea for litigation, but rather, the precipitating factor

for it. Meanwhile, virtually all of the control firms in their sample (“at-risk” of litigation, but not sued) make no preemptive disclosures—though the at-risk firms exhibit a much more severe earnings decline (similarly, Skinner, 1997). Since preemptive disclosures should reduce litigation risk, not be the precipitous factor for such lawsuits, these studies are inconsistent with the notion that negative earnings surprises increase litigation risk. Moreover, there are other studies that find a positive earnings-disclosure relation because earnings surprises are considered good news (e.g., Miller, 2002) and fit into the typical motivation for the disclosure of good news (e.g., Verrecchia, 1983; Dye, 1985). And yet others find no relation (e.g., Lang and Lundholm, 1993).

One possible explanation for these conflicting results is that, because of the noise and bias in GAAP, a negative earnings surprise does not necessarily suggest a short-term price decline (e.g., Kinney et al., 2002). This is a non-trivial point when considering bad news disclosures because the short-term price decline is a necessary condition for Rule 10b-5 litigation (e.g., Jones and Weingram, 1996), which is the main motivation for bad news disclosures. Thus, if short-term price declines are not explicitly considered in research design, we may draw incorrect inferences about the relation between earnings surprises and voluntary disclosures. For instance, if firms with negative earnings surprises have *positive* market reactions, concluding that the disclosures of such firms are due to concerns of litigation risk becomes tenuous. After all, the disclosure incentives for firms with good economic news are significantly different from those with bad economic news. For instance, one first-order incentive for good-news firms to make disclosures is to reduce the cost of capital (Botosan, 1997). However, this is unlikely to be the primary incentive for bad-news firms. How might this noise and bias in earnings-based metrics affect inferences? Figure 1 presents a simple illustration.

Figure 1: Relation between Earnings Surprises and Stock Price Changes

	Stock price decline	Stock price incline
Negative earnings surprise	1	2
Positive earnings surprise	3	4

When a sample is selected based upon earnings surprise, the implicit intent is that this procedure closely matches price movements. For instance, Francis et al. (1994) construct an “at-risk” control sample of firms with earnings declines of 20% or greater; this implicitly proxies for short-term price declines (and therefore litigation risk), represented in Cell 1 of Figure 1. However, because of noise and bias in GAAP, a portion of the at-risk sample likely also belongs to Cell 2—indeed, 43% of the firms do in studies like Kinney et al. (2002). If true, then comparing the disclosures of firms subject to 10b-5 litigation (all from Cell 1) to those of at-risk firms (from both Cells 1 and 2) can be problematic. If earnings surprises do accurately proxy for price movements: Is it negative earnings surprises per se that increase expected litigation costs, or the underlying price declines that earnings merely proxy for that increase these costs? This is a critical issue because the disclosure incentives for firms with good economic news (Cell 2, typically related to first-order concerns of valuation) are significantly different from those with bad economic news (Cell 1, typically related to concerns of litigation risk). There is evidence of this issue arising in the Francis et al. study. They find that at-risk firms experience an average earnings decline 50% more severe than litigation firms—yet at-risk firms experience a price decline that is 44% less severe than litigation firms. That is, the earnings-decline screen for at-risk firms does not seem to have translated into comparable price declines. Indeed, 87% of the at-risk firms do not make preemptive disclosures, behaving as if they do not experience bad news at all. Francis et al. conclude that “conditions other than poor earnings and the way these earnings are disclosed are necessary to link adverse earnings news and litigation”. I posit that the missing link is comparable short-term price declines. It is only after short-term price declines are controlled for that we can make accurate inferences about the effect of negative (or positive) earnings surprises on voluntary disclosure behavior.

Given this discussion, one unique aspect of the current study is that I choose to define bad economic news using negative *stock returns* in lieu of negative *earnings surprise*. This difference in sample selection has important implications for how we view the bad news disclosure behavior documented in extant studies, and it creates at least four methodological advantages. First and foremost, as discussed above, choosing a sample based upon negative stock returns avoids having to choose one based upon earnings surprise—a metric that contains noise and bias and therefore distorts the measurement of economic news. Second, negative returns is a necessary condition for Rule 10b-5 litigation, which is the primary economic force behind bad news disclosures documented in prior studies. Third, it allows for within-sample variation of the earnings surprise metric, which allows for a more careful examination of the precise relation between earnings surprise and disclosures documented in prior studies. Lastly, it is a more comprehensive measure of bad economic news than accounting-based metrics.

Though the relation between earnings surprise and voluntary disclosures is a well-researched topic in accounting, understanding the precise relation is an elusive goal. Some studies find a negative relation (e.g., Skinner, 1994), while others find a positive relation (e.g., Miller, 2002), and yet others find no relation (e.g., Lang and Lundholm, 1993). These contradictory results suggest that the earnings-disclosure relation may *systematically vary* according to economic forces. For instance, a firm with relatively high litigation risk may exhibit an earnings-disclosure relation that is quite different from that of a firm with relatively low litigation risk. To examine these types of *conditional* earnings-disclosure relations, I interact earnings surprises with several firm characteristics, such as firm size, litigation risk, and growth opportunities. This conditional analysis provides a richer texture and deeper understanding to our current knowledge of how earnings surprises affect voluntary disclosure behavior. The results of my conditional analysis will reveal the specific conditions under which the earnings-disclosure relation is most likely to exist. In doing so, the analysis will provide a plausible explanation for why there are three sets of conflicting results regarding the (unconditional) earnings-disclosure relation. For instance, it is possible that the three sets of studies find conflicting results because the firms in each of the studies vary in size, growth opportunities, etc. Therefore, the results from this study may provide some guidance to future researchers about the types of firm characteristics that can affect the earnings-disclosure relation.

SAMPLE SELECTION

I limit my investigation to three high-tech industries: biotechnology (SIC codes 2833-2836), computer hardware (3570-3577), and computer software (7371-7379) (e.g., Francis et al., 1994; Johnson et al., 2000). Untabulated results reveal that the litigation frequency rates for these industry populations (per Stanford Securities Class Action Clearinghouse) are 1.1%, 2.54%, and 2.44%, respectively; the frequency rate for the population of all firms is 0.82%. High-tech firms exhibit a relatively low level of financial statement informativeness (e.g., Amir and Lev, 1996). This is because high-tech firms possess a relatively high level of growth opportunities, and private information about such growth are relatively difficult to convey through the traditional financial reporting model. If managers desire to communicate this private information to market participants, to the extent that they face a decision in doing so through financial statement information versus voluntary disclosures, this lower level of financial statement informativeness creates a relatively more important role for voluntary disclosures. Moreover, high-tech firms are disproportionately accused of inadequate voluntary disclosures, as is evidenced by the relative frequency of Rule 10b-5 lawsuit filings (e.g., Grundfest and Perino, 1997).

For the 1996-2001 period, there are 21,938 firm-quarter observations with available daily CRSP and Compustat data in these industries. I define economic news with respect to stock returns. I limit the investigation to only firms experiencing bad economic news, and therefore delete quarterly observations with positive returns, as well as observations with negative returns that outperform market returns. (Quarterly returns are from the daily CRSP files and are cumulated starting $t+3$ after prior-quarter earnings announcement to day $t+3$ of current earnings announcement.) I delete firms larger (smaller) than

\$10 billion (\$100 million) in market capitalization, as well as firms with stock price less than \$3. This results in 5,228 observations. I randomly select 100 firm-quarter observations that have available analyst forecast data on I/B/E/S. Because I do not impose requirements on earnings, the firms do not necessarily exhibit a negative earnings surprise.

RESEARCH DESIGN

The empirical model is designed to examine the possible sources of variation in the voluntary disclosure behavior of the high-tech, bad economic news firms of my sample. Of particular interest is how this earnings-disclosure relation systematically varies with other economic forces. To examine these types of conditional relations, I interact earnings surprises with each of the other independent variables.

$$\begin{aligned} \text{DISCLOSE} = & \alpha & + \beta_1 \text{SURPRISE}_{\text{NEG}} & + \beta_2 \text{SURPRISE}_{\text{POS}} & (1) \\ & + \beta_3 \text{LITIG} & + \beta_4 \text{SURPRISE}_{\text{NEG}} * \text{LITIG} & + \beta_5 \text{SURPRISE}_{\text{POS}} * \text{LITIG} \\ & + \beta_6 \text{SIZE} & + \beta_7 \text{SURPRISE}_{\text{NEG}} * \text{SIZE} & + \beta_8 \text{SURPRISE}_{\text{POS}} * \text{SIZE} \\ & + \beta_9 \text{GROWTH} & + \beta_{10} \text{SURPRISE}_{\text{NEG}} * \text{GROWTH} & + \beta_{11} \text{SURPRISE}_{\text{POS}} * \text{GROWTH} \\ & + \beta_{12} \text{EQUITY} & + \beta_{13} \text{SURPRISE}_{\text{NEG}} * \text{EQUITY} & + \beta_{14} \text{SURPRISE}_{\text{POS}} * \text{EQUITY} \\ & + \beta_{15} \text{STDEBT} & + \beta_{19} \text{SURPRISE}_{\text{NEG}} * \text{STDEBT} & + \beta_{20} \text{SURPRISE}_{\text{POS}} * \text{STDEBT} + \varepsilon \end{aligned}$$

Brief variable definitions follow. DISCLOSE is one of several measures of voluntary disclosures for the firm (discussed in detail below). SURPRISE is I/B/E/S analyst consensus forecast errors, scaled by prior-quarter total assets per share. NEG and POS subscripts are used to bifurcate SURPRISE; variables simply take on the value of earnings surprise when negative and positive, respectively, and zero otherwise. LITIG is the estimated probability of 10b-5 litigation, using a probit model motivated from prior studies (e.g., Jones and Weingram, 1996; Johnson et al., 2000), and litigation data culled from the Stanford Securities Class Action Clearinghouse database. SIZE is prior-quarter market value of equity. GROWTH is prior-quarter market-to-book ratio. EQUITY is the change in one-year ahead contributed capital (common stock + capital surplus), scaled by prior-quarter total assets. STDEBT is defined as prior-quarter total current liabilities scaled by prior-quarter total assets.

As mentioned above, DISCLOSE is one of several measures of voluntary disclosures that I hand-collected. For each of the 100 firm-quarter observations, I collect all voluntary disclosures made by the firm during the quarter of negative stock returns from Factiva (PR Newswire, BusinessWire, Dow Jones News Service, and Wall Street Journal). This search is not limited to preannouncements and forecasts. I assume that these press-release disclosures are representative of firms' overall disclosure policies. From these disclosures, I create two types of dependent variables: NUMBER and CAR. The NUMBER of voluntary disclosures is defined as the simple count or number of disclosures made during the quarter of negative returns. The CAR of voluntary disclosures is defined as the combined-window returns associated with all of the disclosures tabulated in NUMBER. For each of the voluntary disclosures made during the quarter, I calculate the three-day value-weight market-adjusted returns surrounding the disclosure date. I then aggregate the returns from all the disclosures into one summary statistic, CAR. Following other empirical studies (e.g., Miller, 2002), voluntary disclosures are also categorized into one of two categories: (i) earnings/sales preannouncements or forecasts, referred to as *forward-looking statements* (or *FLS*), and (ii) all other types of disclosures, broadly referred to as *other disclosures*. This process creates six variables as potential dependent variables: NUMBER_{TOTAL}, NUMBER_{FLS}, NUMBER_{OTHER}, CAR_{TOTAL}, CAR_{FLS}, and CAR_{OTHER}.

I briefly discuss motivations and predictions for each of the independent variables. Making ex ante predictions about the effect of earnings surprises, SURPRISE, on disclosure decisions is difficult because there are three conflicting sets of studies. First, some studies find a negative relation between earnings

surprises and disclosure behavior (e.g., Skinner, 1994; Kasznik and Lev, 1995; Grundfest and Perino, 1997). This negative relation is typically posited to exist due to litigation concerns arising from SEC Rule 10b-5: firms with negative earnings surprises face higher expected litigation costs and therefore make voluntary disclosures to reduce such costs. Other studies find a positive relation between earnings surprises and disclosure behavior. If managers prefer high current firm value, firms with relatively good economic news make more disclosures to increase firm valuation, while firms with relatively bad economic news remain silent to avoid firm devaluation (e.g., Verrecchia, 1983; Dye, 1985). Lastly, some studies find that no empirical relation exists between earnings surprises and disclosure behavior. Lang and Lundholm (1993) find preliminary evidence of a positive relation between earnings surprises and disclosure quality—however, when stock returns are subsequently controlled for, this positive relation ceases to exist. The authors conclude that this relation ceases to exist because “returns capture the relevant information in earnings.” This finding is particularly relevant in the context of the current study because my sample selection process imposes stock returns requirements on the sample.

Disclosure-related litigation risk, LITIG, is mainly determined by SEC Rule 10b-5 and the Private Securities Litigation Reform Act of 1995. Firms with higher LITIG are more likely to make voluntary disclosures to reduce expected litigation costs (e.g., Trueman, 1997; Johnson et al., 2000). For firm size, SIZE, larger (smaller) firms tend to have higher (lower) disclosure quality and make more (less) voluntary disclosures (e.g., Lang and Lundholm, 1993). Firms with relatively high levels of growth opportunities, GROWTH, face higher levels of information asymmetries with market participants (Healy and Palepu, 2001), and also find it more difficult to convey their private information through the traditional financial reporting model and therefore use voluntary disclosures. Firms that anticipate issuing additional equity, EQUITY, as a means of external financing have the incentive to make voluntary disclosures because such disclosures reduce information asymmetries between the firm and market participants, and therefore reduce the cost of capital (e.g., Myers and Majluf, 1984; Lang and Lundholm, 1993). Firms with high levels of current liabilities, STDEBT, face non-trivial liquidity concerns—and the attendant costs of renegotiating with suppliers and short-term creditors can adversely impact production and/or financing decisions (e.g., Bowen et al., 1995). To mitigate such costs, firms may make voluntary disclosures to signal to their suppliers/creditors that they are forthcoming about bad news.

EMPIRICAL RESULTS

Table 1: Descriptive Statistics

	Mean	5%	25%	50%	75%	95%
NUMBER _{TOTAL}	8.05	1	3	7	11	19.5
NUMBER _{FLS}	0.62	0	0	0	1	3
NUMBER _{OTHER}	7.43	1	3	6	11	18.5
CAR _{TOTAL}	-0.106	-0.495	-0.226	-0.072	0.020	0.215
CAR _{FLS}	-0.054	-0.332	-0.051	0.000	0.000	0.112
CAR _{OTHER}	-0.048	-0.369	-0.153	-0.037	0.054	0.247
SURPRISE	-0.005	-0.076	-0.012	0.000	0.003	0.031
NI	-0.048	-0.239	-0.069	-0.011	0.018	0.047
SIZE (\$million)	616.3	122.5	210.4	379.2	757.4	2213.9
GROWTH	7.41	1.24	2.66	4.23	7.88	28.00
LITIG	0.021	0.000	0.002	0.007	0.015	0.043
EQUITY	0.274	-0.014	0.007	0.039	0.191	1.280
STDEBT	0.211	0.042	0.135	0.181	0.260	0.447

This table presents descriptive statistics for the sample, comprised of 100 randomly selected firm-quarters in high-tech industries during the 1995-2001 period.

Table 1 presents descriptive statistics. NUMBER_{TOTAL} is the simple count of total disclosures made during the quarter of negative returns. Each of these variables is also disaggregated into *forward looking*

statements and *other disclosures*, which I denote using subscripts: $NUMBER_{FLS}$ and $NUMBER_{OTHER}$. The mean (median) quarterly $NUMBER_{TOTAL}$ for the sample is 8.1 (7.0). The mean (median) $NUMBER_{FLS}$ for the sample is 0.6 (0.0). The mean (median) $NUMBER_{OTHER}$ is 7.4 (6.0). These descriptive statistics highlight the unique nature of the sample and their high level of voluntary disclosures. CAR_{TOTAL} is the combined-window market-adjusted returns associated with all of the disclosures tabulated in $NUMBER_{TOTAL}$. CAR is similarly disaggregated into the combined-window returns for *forward looking statements* and *other disclosures*: CAR_{FLS} and CAR_{OTHER} . The mean (median) CAR_{TOTAL} for the sample is -0.106 (-0.072). The CAR_{TOTAL} for the 75th percentile firm is +0.020, which implies that the firm makes disclosures with cumulatively positive information content. Therefore, despite a negative-returns quarter overall, the firm contributed to the overall information environment by providing positive information to the market. The mean (median) CAR_{FLS} for the sample is -0.054 (0.000; because the median firm does not make an *FLS* disclosure). Because my sample selection procedure does not preclude positive earnings surprises, some firms exhibit positive CAR_{FLS} (untabulated). The mean (median) CAR_{OTHER} is -0.048 (-0.037). On average, firms' voluntary disclosures provide negative information to market participants.

The mean (median) firm size, $SIZE$, is \$616.3 (\$379.2) million. The mean (median) analyst following is 4 (3). So it is clear that, due to sample selection requirements, firms in the sample are relatively small. The mean (median) market-to-book ratio, $GROWTH$, is 7.41 (4.23). The mean (median) analyst forecast error, $SURPRISE$, for the sample is -0.005 (0.000). Because a negative earnings surprise requirement is not imposed on the sample, a non-trivial number of firms exhibit positive $SURPRISE$. The mean (median) seasonally-adjusted earnings change, DNI , is -0.030 (-0.010).

Table 2 presents Pearson and Spearman correlations (above and below the diagonal, respectively). $NUMBER_{FLS}$ and $NUMBER_{OTHER}$ are positively correlated ($\rho=0.250$), suggesting that *forward-looking statements* and *other disclosures* are complementary mechanisms. However, CAR_{FLS} and CAR_{OTHER} are negatively correlated ($\rho=-0.220$), perhaps suggesting that the information content in one does not necessarily buttress the other, but rather, attempts to counteract the other. Unlike prior studies that select their samples based upon earnings surprise, $SURPRISE$ is not correlated with the number of disclosures that managers make, as is evident in the insignificant correlations for $NUMBER_{FLS}$ and $NUMBER_{OTHER}$. $SURPRISE$ is, of course, positively correlated with CAR_{FLS} ($\rho=0.174$). However, it is not significantly correlated with CAR_{OTHER} .

Table 2: Pearson (Spearman) Correlations

	NUMBER <i>FLS</i>	NUMBER <i>OTHER</i>	NUMBER <i>TOTAL</i>	CAR <i>FLS</i>	CAR <i>OTHER</i>	CAR <i>TOTAL</i>	SURPRISE
$NUMBER_{FLS}$		0.250	0.402	-0.411	0.024	-0.332	-0.129
$NUMBER_{OTHER}$	0.182		0.987	-0.038	-0.428	-0.409	-0.039
$NUMBER_{TOTAL}$	0.325	0.985		-0.104	-0.401	-0.442	-0.058
CAR_{FLS}	-0.537	0.004	-0.077		-0.220	0.582	0.174
CAR_{OTHER}	-0.004	-0.398	-0.385	-0.203		0.646	-0.071
CAR_{TOTAL}	-0.416	-0.416	-0.462	0.473	0.663		0.070
$SURPRISE$	-0.314	-0.023	-0.060	0.337	-0.164	0.145	

This table presents Pearson (Spearman) correlations, presented above (below) the diagonal. Bold text represents statistical significance at the 5% level.

In Table 3, I present results for how $NUMBER_{TOTAL}$ cross-sectionally varies. I discuss results for Model 3, which is the full model that includes interaction terms. Earnings surprises, $SURPRISE$, are not significantly related to $NUMBER_{TOTAL}$. This result is inconsistent with prior studies that typically find negative earnings surprises are related to a higher level of disclosures (e.g., Skinner, 1994). One interpretation of this null result (consistent with Lang and Lundholm, 1993) is that, once negative stock returns are controlled for, earnings surprises have no incremental impact on disclosure behavior.

Furthermore, when SURPRISE is interacted with each of the economic forces, these interaction terms are not significant either, suggesting that the relation between SURPRISE and NUMBER_{TOTAL} does not seem to systematically vary by these other variables.

Table 3: Total Number of Voluntary Disclosures

	Model (1)			Model (2)			Model (3)		
	Parameter	t-stat		Parameter	t-stat		Parameter	t-stat	
Intercept	8.303	12.37	***	-16.15	-2.47	**	-105.9	-3.31	***
SURPRISE _{NEG}	6.386	0.37		1.650	0.09		-776.0	-1.00	
SURPRISE _{POS}	-17.53	-1.09		-48.87	-2.55	**	734.4	1.54	
LITIG				34.41	1.82	*	319.4	3.06	***
SIZE				2.100	3.18	***	2.091	2.38	**
GROWTH				-0.116	-1.62		-0.081	-0.47	
EQUITY				-0.119	-0.15		-0.585	-0.39	
STDEBT				9.837	2.14	**	12.37	2.12	**
SURPRISE _{NEG} *LITIG							2256.3	1.04	
SURPRISE _{NEG} *SIZE							13.87	0.51	
SURPRISE _{NEG} *GROWTH							-0.230	-0.11	
SURPRISE _{NEG} *EQUITY							64.29	0.42	
SURPRISE _{NEG} *STDEBT							-51.15	-0.14	
SURPRISE _{POS} *LITIG							-971.0	-1.19	
SURPRISE _{POS} *SIZE							-72.23	-0.62	
SURPRISE _{POS} *GROWTH							0.497	0.03	
SURPRISE _{POS} *EQUITY							0.920	0.01	
SURPRISE _{POS} *STDEBT							-75.43	-0.18	
Adj R ²	-0.008			0.138			0.142		

This table presents results for NUMBER_{TOTAL} (total number of disclosures) regressed on SURPRISE_{NEG}, SURPRISE_{POS}, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

Table 4: Number of Forward-Looking Statements of Voluntary Disclosures

	Model (1)			Model (2)			Model (3)		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
Intercept	0.621	5.60	***	-1.307	-1.17		-3.387	-0.60	
SURPRISE _{NEG}	-1.841	-0.64		-3.704	-1.22		-172.4	-1.26	
SURPRISE _{POS}	-2.839	-1.07		-3.967	-1.21		6.857	0.08	
LITIG				0.061	0.02		4.549	0.25	
SIZE				0.329	2.90	***	0.398	2.56	**
GROWTH				-0.026	-2.10	**	-0.004	-0.12	
EQUITY				-0.019	-0.14		-0.152	-0.57	
STDEBT				0.534	0.68		0.918	0.89	
SURPRISE _{NEG} *LITIG							392.9	1.03	
SURPRISE _{NEG} *SIZE							4.277	0.89	
SURPRISE _{NEG} *GROWTH							0.234	0.64	
SURPRISE _{NEG} *EQUITY							27.91	1.03	
SURPRISE _{NEG} *STDEBT							46.88	0.74	
SURPRISE _{POS} *LITIG							10.07	0.07	
SURPRISE _{POS} *SIZE							1.465	0.07	
SURPRISE _{POS} *GROWTH							-1.715	-0.65	
SURPRISE _{POS} *EQUITY							6.538	0.41	
SURPRISE _{POS} *STDEBT							-55.68	-0.75	
Adj R ²	-0.003			0.073			0.022		

This table presents results for NUMBER_{FLS} (number of forward-looking statements) regressed on SURPRISE_{NEG}, SURPRISE_{POS}, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

There is evidence that LITIG is positively related to NUMBER_{TOTAL} (319.4, t=3.06). Firms with higher levels of litigation risk may make more voluntary disclosures to reduce the expected costs of litigation. Also, SIZE is positively related to NUMBER_{TOTAL} (2.091, t=2.38). Larger firms may make more disclosures because it is less costly for them to do so, and may further reduce expected litigation costs (related to firm size). Lastly, STDEBT is positively related to NUMBER_{TOTAL} (12.37, t=2.12). One interpretation of this result is that firms with high short-term debt or current liabilities may make more preemptive, voluntary disclosures to appease the concerns of suppliers/creditors.

Table 5: Number of Other Voluntary Disclosures

	Model (1)			Model (2)			Model (3)		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
Intercept	7.682	12.09	***	-14.84	-2.37	**	-102.5	-3.34	***
SURPRISE _{NEG}	8.227	0.50		5.354	0.32		-603.6	-0.81	
SURPRISE _{POS}	-14.69	-0.97		-44.91	-2.44	**	727.6	1.60	
LITIG				34.35	1.89	*	314.8	3.15	***
SIZE				1.771	2.80	***	1.692	2.01	**
GROWTH				-0.090	-1.31		-0.077	-0.47	
EQUITY				-0.100	-0.13		-0.433	-0.30	
STDEBT				9.303	2.11	**	11.46	2.05	**
SURPRISE _{NEG} *LITIG							1863.4	0.90	
SURPRISE _{NEG} *SIZE							9.592	0.37	
SURPRISE _{NEG} *GROWTH							-0.464	-0.23	
SURPRISE _{NEG} *EQUITY							36.38	0.25	
SURPRISE _{NEG} *STDEBT							-98.03	-0.28	
SURPRISE _{POS} *LITIG							-981.1	-1.25	
SURPRISE _{POS} *SIZE							-73.70	-0.66	
SURPRISE _{POS} *GROWTH							2.212	0.15	
SURPRISE _{POS} *EQUITY							-5.618	-0.06	
SURPRISE _{POS} *STDEBT							-19.76	-0.05	
Adj R ²	-0.009			0.113			0.120		

This table presents results for NUMBER_{OTHER} (number of other disclosures) regressed on SURPRISE_{NEG}, SURPRISE_{POS}, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

Table 4 presents results for when the dependent variable is NUMBER_{FLS}. Table 5 presents results when the dependent variable is NUMBER_{OTHER}. Results suggest that the positive relations between LITIG, SIZE, and STDEBT and disclosures documented in Table 3 mainly stem from their relation with NUMBER_{OTHER}.

In Tables 6 through 8, I present results for the CAR of disclosures. The NUMBER of disclosures is arguably meaningless if such disclosures do not provide any information content to market participants. Table 6 presents results for CAR_{TOTAL}, the cumulative information content of all voluntary disclosures tabulated in NUMBER_{TOTAL}. I discuss results for Model 3, which is the full model that includes interaction terms. Much like the results for NUMBER in Table 3, unconditional SURPRISE is not significantly related to CAR_{TOTAL}. This result is inconsistent with the prediction that firms with negative earnings surprises make “curative” disclosures with negative information to mitigate expected litigation costs. Similar to Lang and Lundholm (1993) perhaps (unconditional) earnings surprises have no incremental impact on disclosure behavior once negative stock returns are controlled for.

Several interesting results emerge, however, when SURPRISE is interacted with other firm characteristics. Specifically, although unconditional SURPRISE is not related to disclosures, when conditioned on certain firm characteristics, it is related to disclosures. First, the positive coefficient for the SIZE*SURPRISE_{NEG} interaction term (1.843, t=2.29) suggests that larger firms with more SURPRISE_{NEG} make disclosures with more negative information content. This is consistent with SIZE being a proxy for

additional expected litigation costs. Perhaps larger firms with more negative earnings surprises make more negative-content disclosures to reduce such costs (though similar results do not seem to hold for the LITIG interaction term).

Table 6: Abnormal Returns for All Voluntary Disclosures

	Model (1)			Model (2)			Model (3)		
	Parameter	t-stat		Parameter	t-stat		Parameter	t-stat	
Intercept	-0.096	-4.32	***	0.621	2.81	***	4.140	4.35	***
SURPRISE _{NEG}	0.643	1.11		0.549	0.91		35.84	1.56	
SURPRISE _{POS}	-0.074	-0.14		0.851	1.31		-29.40	-1.08	
LITIG				-1.004	-1.56		-12.41	-4.00	***
SIZE				-0.059	-2.65	***	-0.024	-0.92	
GROWTH				0.001	0.46		-0.019	-3.63	***
EQUITY				0.019	0.70		0.155	3.47	***
STDEBT				-0.316	-2.03	**	-0.589	-3.41	***
SURPRISE _{NEG} *LITIG							-130.5	-1.03	
SURPRISE _{NEG} *SIZE							1.843	2.29	**
SURPRISE _{NEG} *GROWTH							-0.254	-4.12	***
SURPRISE _{NEG} *EQUITY							1.109	0.24	
SURPRISE _{NEG} *STDEBT							-9.374	-0.88	
SURPRISE _{POS} *LITIG							10.20	0.42	
SURPRISE _{POS} *SIZE							2.718	0.79	
SURPRISE _{POS} *GROWTH							0.986	2.22	**
SURPRISE _{POS} *EQUITY							-4.049	-1.50	
SURPRISE _{POS} *STDEBT							27.91	1.23	
Adj R ²	-0.008			0.095			0.310		

This table presents results for CAR_{TOTAL} (abnormal returns for all disclosures) regressed on $SURPRISE_{NEG}$, $SURPRISE_{POS}$, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

Table 7: Abnormal Returns for All Forward-Looking Statements of Voluntary Disclosures

	Model (1)			Model (2)			Model (3)		
	Parameter	t-stat		Parameter	t-stat		Parameter	t-stat	
Intercept	-0.046	-2.78	***	0.093	0.53		0.695	0.82	
SURPRISE _{NEG}	0.761	1.77	*	0.869	1.84	*	27.01	1.32	
SURPRISE _{POS}	0.244	0.62		0.521	1.02		6.898	0.55	
LITIG				-0.252	-0.50		-2.378	-0.86	
SIZE				-0.006	-0.36		0.017	0.74	
GROWTH				0.002	1.04		-0.011	-2.34	**
EQUITY				0.004	0.18		0.092	2.31	**
STDEBT				-0.176	-1.43		-0.235	-1.53	
SURPRISE _{NEG} *LITIG							-93.33	-1.63	
SURPRISE _{NEG} *SIZE							1.129	1.58	
SURPRISE _{NEG} *GROWTH							-0.174	-3.18	***
SURPRISE _{NEG} *EQUITY							-0.852	-0.21	
SURPRISE _{NEG} *STDEBT							-4.481	-0.47	
SURPRISE _{POS} *LITIG							-1.540	-0.07	
SURPRISE _{POS} *SIZE							-2.071	-0.68	
SURPRISE _{POS} *GROWTH							0.711	1.81	*
SURPRISE _{POS} *EQUITY							-4.288	-1.78	*
SURPRISE _{POS} *STDEBT							18.22	1.64	
Adj R ²	0.018			0.009			0.041		

This table presents results for CAR_{FLS} (abnormal returns for all forward-looking statements) regressed on $SURPRISE_{NEG}$, $SURPRISE_{POS}$, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

Second, the negative coefficient for the $GROWTH * SURPRISE_{NEG}$ interaction term (-0.254, $t=4.12$) suggests that *higher-growth firms* with more $SURPRISE_{NEG}$ make disclosures with more *positive* information content. One interpretation of this result is that, because high-growth firms in the high-tech industry have more complex business processes and higher information asymmetries, managers may expend more effort at providing elaboration and explanation to clarify possible concerns, which the market then interprets positively. Moreover, results in Table 7 suggest that this result arises from CAR_{FLS} , the information content of *forward-looking statements*. Also, the positive coefficient for $GROWTH * SURPRISE_{POS}$ (0.986, $t=2.22$) in Table 6 suggests that higher-growth firms with more *positive* earnings surprises *also* make disclosures with more positive information content. Thus, higher-growth firms seem to expend efforts at providing positive information content as their earnings surprises become more significant—regardless of the direction of the surprise. Note that the unconditional $GROWTH$ variable is significantly negative, which counteracts the effect of the two interaction terms discussed above.

Table 8: Abnormal Returns for All Other Voluntary Disclosures

	Model (1)		Model (2)		Model (3)	
	Parameter	t-stat	Parameter	t-stat	Parameter	t-stat
Intercept	-0.047	-2.30 **	0.547	2.68 ***	3.338	3.56 ***
$SURPRISE_{NEG}$	-0.116	-0.22	-0.332	-0.60	3.870	0.17
$SURPRISE_{POS}$	-0.340	-0.70	0.294	0.49	-35.55	-1.55
LITIG			-0.711	-1.20	-9.647	-3.15 ***
SIZE			-0.057	-2.77 ***	-0.041	-1.61
GROWTH			-0.001	-0.45	-0.009	-1.85 *
EQUITY			0.015	0.59	0.072	1.63
STDEBT			-0.147	-1.02	-0.366	-2.15 **
$SURPRISE_{NEG} * LITIG$					-27.36	-0.43
$SURPRISE_{NEG} * SIZE$					1.017	1.28
$SURPRISE_{NEG} * GROWTH$					-0.096	-1.59
$SURPRISE_{NEG} * EQUITY$					2.724	0.61
$SURPRISE_{NEG} * STDEBT$					-4.369	-0.41
$SURPRISE_{POS} * LITIG$					7.869	0.33
$SURPRISE_{POS} * SIZE$					4.716	1.39
$SURPRISE_{POS} * GROWTH$					0.369	0.84
$SURPRISE_{POS} * EQUITY$					-0.181	-0.07
$SURPRISE_{POS} * STDEBT$					12.16	0.99
Adj R ²	-0.015		0.070		0.184	

This table presents results for CAR_{OTHER} (abnormal returns for all other disclosures) regressed on $SURPRISE_{NEG}$, $SURPRISE_{POS}$, and interaction terms with LITIG, SIZE, GROWTH, EQUITY, STDEBT. ***, **, * represents statistical significance at the 1%, 5%, 10% level.

Regarding the standalone firm characteristics in Table 6, both LITIG and STDEBT are significantly negative. Firms with higher levels of litigation risk may make disclosures with more negative information content to reduce expected costs of litigation. Firms with higher levels of current liabilities make disclosures with more negative information content, perhaps to appease the concerns of short-term creditors and thus reduce the costs of renegotiating with suppliers. Table 8 suggests that both are achieved through *other disclosures*. Lastly, EQUITY is significantly positive, suggesting that firms with imminent equity issuances provide disclosures with positive information content, perhaps to lower the cost of capital; Table 7 suggests that this is achieved through *forward-looking statements*.

Several other untabulated robustness tests are performed to provide further context to the main results. These other tests do not qualitatively change the empirical results discussed above. First, I use seasonally-adjusted earnings changes as an alternative measure for earnings SURPRISE. Results are qualitatively unchanged (though a bit weaker in statistical significance). Second, I include several additional control variables to the main model. I include QTRRET (contemporaneous quarterly market-adjusted stock

returns; for the NUMBER test only) and CORR (correlation of earnings with returns in the past five years); results are qualitatively unchanged. CORR is marginally negative in the CAR tests (-0.198, $p=0.076$), suggesting that voluntary disclosures and (the informativeness of) earnings serve complementary roles. I also include ANALYST (number of analyst following), LTD (prior-quarter long-term debt), and OPTIONS (dummy variable for option grants to the CEO during the negative-returns quarter or up to ten days after the quarter). Results are qualitatively unchanged.

SUMMARY AND CONCLUSIONS

In this study, I examine the relation between earnings surprises and voluntary disclosures for a sample of firms that experience bad economic news. For my sample of 100 randomly-selected high-tech firm-quarters with negative returns, I find that: (i) earnings surprises are not related to the number of disclosures in any manner, (ii) firms with negative earnings surprises make *forward-looking statements with more negative information content*—but only when conditioned on firm size or growth opportunities, and (iii) the unconditional relation between earnings surprise and voluntary disclosure behavior is non-existent in this setting where negative stock returns are controlled for.

I make two contributions to the literature. First, the results highlight the importance of avoiding earnings-based metrics in the sample selection procedure. Selecting a sample based upon negative returns in lieu of negative earnings has important implications on the inferences that are drawn from prior disclosure behavior studies. Second, the results highlight the importance of how a conditional analysis provides us with a deeper understanding of how the earnings-disclosure relation exists under certain economic scenarios (e.g., firms with high growth opportunities), while it does not exist for others. The results also provide a plausible explanation for why there are three sets of conflicting results regarding the earnings-disclosure relation (some finding a positive relation, others a negative relation, and yet others no relation at all). However, because of the small sample size, caution is warranted in generalizing the results to the broader universe of firms.

REFERENCES

- Amir, E., B. Lev (1996) “Value-relevance of nonfinancial information: The wireless communications industry,” *Journal of Accounting and Economics* 22, 3-30
- Botosan, C. (1997) “Disclosure level and the cost of equity capital,” *Accounting Review* 72, 323-49
- Bowen, R., DuCharme, L., Shore, D. (1995) “Stakeholders’ implicit claims and accounting method choice,” *Journal of Accounting and Economics*
- Dye, R. (1985) “Disclosure of nonproprietary information,” *Journal of Accounting Research* 23, 123-145
- Easton, P., Harris, T., Ohlson, J. (1992) “Aggregate accounting earnings can explain most of security returns: The case of long return intervals,” *Journal of Accounting and Economics* 15: 2,3, 119-143
- Francis, J., Philbrick, D., Schipper, K. (1994) “Shareholder litigation and corporate disclosures,” *Journal of Accounting Research* 32, 137-65
- Grundfest, J., Perino, M. (1997) “Ten things we know and ten things we don’t know about the Private Securities Litigation Reform Act of 1995,” Joint written testimony before the Subcommittee on Securities of the Committee on Banking, Housing, and Urban Affairs; United States Senate
- Healy, P., Palepu, K. (2001) “Information asymmetry, corporate disclosure, and the capital markets: A

- review of the empirical disclosure literature,” *Journal of Accounting and Economics* 31, 405-440
- Johnson, M., Kasznik, R., Nelson, K. (2000) “Shareholder wealth effects of the Private Securities Litigation Reform Act of 1995,” *Review of Accounting Studies* 5, 217-33
- Jones, C., Weingram, S. (1996) “The determinants of 10b-5 litigation risk,” Working paper, George Washington University
- Kasznik, R., B. Lev (1995) “To warn or not to warn: Management disclosures in the face of an earnings surprise,” *Accounting Review* 70, 113-34
- Kinney, W., Burgstahler, D., Martin, R. (2002) “Earnings surprise ‘materiality’ as measured by stock returns,” *Journal of Accounting Research* 40, 1297-1329
- Lang, M., Lundholm, R. (1993) “Cross-sectional determinants of analysts ratings of corporate disclosures,” *Journal of Accounting Research* 31, 246-71
- Miller, G. (2002) “Earnings performance and discretionary disclosure,” *Journal of Accounting Research* 40, 173-204
- Myers, S., Majluf, N. (1984) “Corporate financing and investment decisions when firms have information that investors do not have,” *Journal of Financial Economics* 13, 187-221
- Skinner, D. (1994) “Why firms voluntarily disclose bad news,” *Journal of Accounting Research*, 38-60
- Skinner, D. (1997) “Earnings disclosures and stockholder lawsuits,” *Journal of Accounting and Economics* 23
- Trueman, B. (1997) “Managerial disclosures and shareholder litigation,” *Review of Accounting Studies* 1, 181-99
- Verrecchia, R. (1983) “Discretionary disclosure,” *Journal of Accounting and Economics* 5, 365-80

BIOGRAPHY

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INFORMATION CONTENT AND INTRA-INDUSTRY EFFECT OF STOCK SPLITS: EVIDENCE FROM INDONESIA

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ABSTRACT

This study examines the information content of stock split announcements. It is hypothesized that there are abnormal returns around the stock split announcement dates. Negative AARs are found before and after the announcement. The negative reaction after the stock split announcement suggests that a stock split may be deemed bad news. This finding does not support the signaling hypothesis which suggests that stocks splits function as management's signals of good future prospect. When splitting the data by the growth level of the firm, we find that the stock prices growing firms and non growing firms react differently to a stock split announcement. An intra-industry examination shows negative AAR substantiating the contagion effect that the price of non-splitting firms in the same industry also react to the split announcement. This implies that a stock split is not a firm-specific event, but it also influences the industry.

JEL: G14, G15

KEYWORDS: stock split, intra-industry effect, liquidity and signaling hypothesis, contagion effect.

INTRODUCTION

In an efficient market, new information is quickly reflected in securities prices. The market will process information that is relevant and then evaluate stock prices based on the information. One piece of information to which investors usually pay attention is a stock split. A stock split is a company action to add outstanding shares and give them to stockholders by splitting an outstanding stock into certain multiples (such as two, three, or more) (Brigham and Daves 2004). A company that announces a stock split tries to convey good information on firm value to the market.

Several previous studies reveal that the market reacts positively to a stock split announcement. This positive reaction is indicated by the prevalence of positive abnormal returns around the announcement date. Fama, Fisher, Jensen, and Roll (1969, in Fama 1970), Grinblatt, Masulis, and Titman (1984), Lakonishok and Lev (1987), Asquith, Healy, and Palepu (1989), McNichols and Dravis (1990), and Desai and Jain (1997) find abnormal returns around the stock split announcement date. The positive reaction is explained by two hypotheses: (1) information content hypothesis and trading range hypothesis (Grinblatt et al. 1984). The information content hypothesis predicts that investors positively react to a stock split since the event indicates an increase in cash dividends or earnings in the future. Meanwhile, the trading range hypothesis suggests that a company splits its stocks to improve trade liquidity by moving its stock price into an optimum trading range. This explanation is supported by the opinion that companies conducting stock splits will be attract investors due to their lower stock prices.

Companies in a particular industry tend to be affected by announcements of other companies in the same industry. This effect is known as the intra-industry effect, which is a transfer of information from the company announcing an event (reporter) to other companies in the same industry that do not report any event (non-reporter). This information transfer manifests itself b significant abnormal returns on other

companies in the same industry. The reaction to a company's announcement can impact, either positively or negatively, non-reporting companies within the same industry.

For companies that do not announce a stock split (non-splitting firms), the direction of stock price depends on whether the information contains a net contagion effect or a competitive effect (Asquith et al. 1989). If the non-splitting firms' stock price reacts in the same direction, it means there is a contagion effect; otherwise, it is considered a competitive effect. A significant change in the non-splitting firms' stock price may imply that a stock split announcement is not only a specific company's event, but it also influences the industry. On the other hand, insignificant stock price reactions may indicate that the stock split announcement only provides firm-specific information. In addition, the stock split announcement may have an intra-industry effect, but the contagion effect is offset by the competitive effect on other companies within the industry.

Setiawan and Hartono (2002) utilized the investment opportunity set (IOS) to proxy for company's prospects. The IOS is estimated using market-to-book (M/B) ratio to represent company characteristic as a growing or non-growing company. The IOS also indicates the growth of firm equity. A company is categorized as growing company if its M/B ratio is higher than one; otherwise, it is classified as a non-growing company. Setiawan and Hartono (2002) divided their sample into two groups: (1) growing firms and (2) non-growing firms. The logic is that if the market is smart, it will only react positively to company actions made by growing firms whereas the actions of non-growing firms will not entice a reaction or could result in a negative reaction. They find that the Indonesian Stock Exchange is relatively efficient informationally but has yet to be decisionally efficient. This decisional inefficiency appears from the wrong reactions. The market is inclined to react positively to dividend-increase announcements made by non-growing firms. Theoretically, the market should have penalized these firms since they increase dividend payment despite the fact that they may not be capable of generating cash flows and maintaining the dividend level in the future.

Motivated by mixed empirical evidence from previous research, this study has the following objectives: (1) to examine the information content of stock split announcements by categorizing company characteristic into growing and non-growing firms and (2) to test the intra-industry effect of stock split announcements made by both growing firms and non-growing firms. This is done by examining the extent to which the abnormal returns of splitting firms have an influence on the abnormal returns of non-splitting firms within the same industry.

More specifically, this paper addresses the following research questions: (1) is there any market reaction to stock split announcements shown by abnormal returns? (2) is there a difference in market reaction between announcements made by growing firms and those made by non-growing firms? (3) is there any intra-industry effect on non-splitting firms when stock split announcements are made? (4) is there any intra-industry effect when either growing firms or non-growing firms announce stock splits? and (5) do abnormal returns and growth of companies conducting stock splits influence abnormal returns on firms not announcing stock splits in the same industry?

The remainder of this paper is organized as follows. In the next section we discuss the relevant literature and develop our testable hypotheses. Next, we discuss the data and methodology used in the paper. The following section is presents the empirical results. The paper closes with some concluding comments.

LITERATURE REVIEW AND HYPOTHESES

A stock split is a form of information provided or strategy devised by a firm to increase the number of shares outstanding. The main rationale behind a stock split is to decrease the stock price without any impact on its balance sheet. A stock split is commonly conducted when the stock price is considered too

high such that the ability and willingness of investors to trade the stock deteriorate. Hence, a stock split is an effort by management to manage the optimum level of stock price.

McGough (1993) argues that benefits expected from conducting a stock split are to: (1) decrease the stock price to attract investors and improve liquidity, (2) enhance the marketability and market efficiency, (3) change the investors' preferences from odd lots to round lots, and (4) give a strong signal to the market that management is optimistic about the company's future growth. However, some academics and practitioners warn that stock splits may not increase value for the following reasons: (1) the future stock price range has to be decided with caution such that the firm will not be an acquisition target, (2) the current stock price may be insufficient to warrant a stock split decision, (3) the stock price upon a stock split could position the firm at the lower level in the industry, (4) the increase in the number of shareholders may lead to increased expenses, and (5) the cost of conducting a stock split is considerable (McGough 1993).

In general, a stock split would benefit the firm if its stock price is relatively high compared to peers within the same industry. The stock price is to be maintained at an optimum range based on price movement estimates. Accordingly, management basically tries to avoid a stock price that is too high or too low in comparison with competitors in the industry. If the stock price is too low, it may destroy value and company image and will send the wrong signal to the market. On the other hand, too high a stock price will hinder investors' interests in purchasing the stock such that stock trading liquidity impoverishes (McGough 1993). According to Baker and Powell (1993), the motivations to conduct stock splits can be divided into a liquidity hypothesis and signaling hypothesis. The liquidity hypothesis argues that the motivation of management to conduct a stock split is to improve its stock trading liquidity. Meanwhile, the signaling hypothesis argues that although a stock split announcement does not affect the firm's assets and operations, the announcement per se will increase firm value as investors interpret the announcement as a positive signal about the firm's future prospects.

Empirical research on stock splits has been widely conducted. Pilotte (1997) reports positive abnormal returns on the announcement date. Ikenberry et al. (1996) also find evidence of positive abnormal returns for splitting firms, indicating that the market considers a stock split announcement good news. A study by Fatmawati (1999) on Indonesian firms shows that stock splits have information contents and the market interprets the announcements as a positive signal about firm performance. However, stock split announcements are not always received positively. Reborado (2003) conducts research on companies doing stock splits in Spain in the period of 1998-1999. The result shows that a negative abnormal return, rejecting the signaling hypothesis. Similarly, Kurniawati (2001) documents a negative influence of stock splits on stock prices.

This research tries to analyze this issue more in depth by dividing the firms along their growth patterns. Specifically, firms categorized as growing and non-growing are compared. This purports to observe the impact of different characteristics of companies conducting stock splits. The following hypotheses are then examined:

H1: There are abnormal returns around stock split announcement dates for splitting firms.

H2: There are abnormal returns around stock split announcement dates for growing splitting firms.

H3: There are abnormal returns around stock split announcement date for non-growing splitting firms.

H4: There is a difference in abnormal returns between growing splitting firms and non-growing splitting firms around stock split announcement dates.

Intra-industry effect appears when a company announces information and that information influences other companies' stock prices within the same industry. Various studies on information transfer have proved that an event announcement by a reporter will have an impact on stock price of non-reporting

firms within the same industry. For non-splitting firms, the direction of stock price movement depends on whether the information has net contagion effect or competitive effect (Asquith et al. 1989). If the stock prices of non-splitting firms reacts in the same direction as those of splitting firms, the contagion effect prevails. Otherwise, it is known as a competitive effect. Previous research shows mixed finding on this issue. Asquith et al. (1989) find that positive information conveyed through stock splits leads to significant increases in stock prices of non-splitting firms. Meanwhile, Lang and Stulz (1992) report that in a concentrated industry, a particular event may trigger a change in competition within the industry. Hence, an event announcement by a firm would result in the opposite effect on the stock prices of other firms in the industry. This reaction is called competitive effect. Akhigbe and Madura (1996) find that the existence of contagion effects and competitive effects is influenced by industry characteristics (cash flow, leverage, change opportunity, and monopolistic power). Their research documents that the contagion effect is more likely for non-splitting firms that have high growth opportunities and high leverage whereas a competitive effect is more likely to appear when splitting firms have a high monopolistic power. In this study, the following hypotheses are to be tested:

H5: Stock split announcements result in abnormal returns for non-splitting firms within the same industry.

H6: Stock split announcements by growing firms result in abnormal returns for non-splitting firms within the same industry.

H7: Stock split announcements by non-growing firms result in abnormal returns for non-splitting firms within the same industry.

RESEARCH METHOD

In this section we discuss the research methodology. The discussion is divided into three sections. In the first section we discuss the data sources and sample. In the second section the research variables are identified. In the third section the analysis methods are presented.

Data Sources and Sample

Data used are secondary data collected from: (1) Center for Business and Economic Database of Faculty of Economics and Business, Universitas Gadjah Mada. Information on stock prices, stock returns, Jakarta composite index, daily abnormal returns, corporate actions, stock split dates were obtained from this source; (2) Indonesian Capital Market Directory from 2000 to 2007 was used to identify companies conducting stock splits, their announcement dates, industry categories, outstanding shares, and book values of equity; and (3) Indonesian Stock Exchange (ISX). This study observes stock split announcements in the period of 2000-2006.

The sample employed includes companies that announced stock splits from 2000 to 2006 and all other companies in the same industries. The sample is divided into two groups: (1) splitting firms and (2) non-splitting firms. The splitting firms are further categorized into: (1) growing splitting firms and (2) non-growing splitting firms. We exclude from the sample firms that announced other events or corporate actions such as earnings, mergers and acquisitions, dividends, and right issues. Based on the criteria, 69 companies are included in the sample for splitting firms, comprising 46 growing splitting firms and 23 non-growing splitting firms. There are 526 companies for the sample of non-splitting firms. Table 1 describes the sample distributions of splitting and non-splitting firms.

Research Variables

This study is focused on abnormal returns on splitting and non-splitting firms within the industry to observe intra-industry effects. Hence, several measures are used in this study, and described as follows:

Abnormal return is defined as the difference between realized return and expected return. Abnormal return in this study is calculated using the market-adjusted model, which assumes that the best estimator of stock return is the market return on that day. The ISX is considered a developing capital market with a thin trading problem where some stocks are inactively traded. The window period in this study follows numerous previous studies, which are from t-10 to t-1 for the pre-stock split period and from t+1 to t+10 for the post-stock split period. This method is applied both to splitting firms and non-splitting firms. Steps taken are as follows:

Table 1: Sample Distributions of Splitting and Non-Splitting Firms

Year	Initial Sample	Final Sample	Sample Not Used
Panel A: Splitting Firms			
2000	20	16	1 stock dividend 3 incomplete data
2001	14	12	2 cash dividends
2002	11	9	2 cash dividends
2003	8	5	1 share bonus 1 dividend bonus 1 incomplete data
2004	15	14	1 right issue
2005	7	5	1 incomplete data 1 cash dividend
2006	9	8	1 incomplete data
Total	84	69	
Panel B: Non-Splitting Firms			
2000	120	108	9 cash dividends 3 share bonus
2001	102	96	5 cash dividends 1 right issue
2002	85	74	8 cash dividends 1 right issue 2 reverse stock splits
2003	51	49	1 stock dividend 1 reverse stock split
2004	105	102	1 cash dividend 1 reverse stock split 1 incomplete data
2005	46	44	2 cash dividends
2006	57	53	2 cash dividends 2 reverse stock split
Total	566	526	

Panel A shows sample distribution of splitting firms whereas Panel B shows sample distribution of non-splitting firms.

Step 1 Calculate stock return:

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \quad (1)$$

where:

$R_{i,t}$ = return on stock i on day t

$P_{i,t}$ = price of stock i on day t

$P_{i,t-1}$ = price of stock i on day t-1

In order to calculate the return when a stock split takes place, an adjustment should be made to take into consideration the decrease in stock price due to the split. The adjusted return is:

$$R_{i,t} = \frac{(P_{i,t} \times SF) - P_{i,t-1}}{P_{i,t-1}} \quad (2)$$

where SF = split factor

Step 2 Calculate market return:

$$R_{m,t} = \frac{JCI_t - JCI_{t-1}}{JCI_{t-1}} \quad (3)$$

where:

$R_{m,t}$ = market return on day t
 JCI_t = Jakarta composite index on day t
 JCI_{t-1} = Jakarta composite index on day t-1

Step 3 Calculate abnormal return using the market-adjusted model:

$$AR_{i,t} = R_{i,t} - R_{m,t} \quad (4)$$

where:

$AR_{i,t}$ = abnormal return on stock i on day t
 $R_{i,t}$ = return on stock i on day t
 $R_{m,t}$ = market return on day t

Step 4 Compute the Market-to-book (M/B) ratio

M/B ratio is used as a proxy for the characteristic of growing versus non-growing firm.

$$M/B = \frac{\text{Outstanding shares} \times \text{Closing stock price}}{\text{Total equity}} \quad (5)$$

The difference between market value and book value of equity indicates a company's investment opportunities. Companies with M/B ratio higher than one (high investment opportunity) are categorized as growing firms. Firms with M/B ratio is less than one (low investment opportunity) are classified as non-growing.

Analysis Methods

The data analysis methods employed in this research are basically divided into two main approaches: (1) the examinations of hypotheses one to four are conducted using an event study approach with the market-adjusted model. A t-test is utilized to test their significances. (2) the influence of firm characteristic (growing or non-growing firm) proxied by market-to-book value of equity is analyzed using ordinary least squares regression. Analysis methods are formulated as follows:

Calculate daily average abnormal return (AAR) on all stocks observed during the event period:

$$AAR_{N,t} = \frac{\sum_{i=1}^N AR_{i,t}}{N} \quad (6)$$

where:

$AAR_{N,t}$ = average abnormal return on all stocks on day t
 $AR_{i,t}$ = abnormal return on stock i on day t
 N = number of stocks in the subsample

Calculate cumulative average abnormal return (CAAR):

$$CAAR_{t-x,t} = \sum_{x=10}^{t-1} AAR_{N,t} \quad (7)$$

where:

$CAAR_{t-x,t}$ = cumulative average abnormal return from day t-x to day t

Calculate standard error of estimate:

$$SEE_t = \sqrt{\frac{\sum_{i=1}^k (AR_{i,t} - \overline{AR}_{i,t})^2}{N-1}} \times \frac{1}{\sqrt{N}} \quad (8)$$

where:

SEE_t = standard error of estimate on day t

$AR_{i,t}$ = abnormal return on stock i on day t

$\overline{AR}_{i,t}$ = abnormal return on k-stocks on day t

N = number of stocks in the subsample

Calculate t-statistic:

$$t - statistic = \frac{AAR_{N,t}}{SEE_t} \quad (9)$$

where:

$AAR_{N,t}$ = average abnormal return on all stocks on day t

SEE_t = standard error of estimate on day t

RESULTS AND ANALYSIS

This study firstly examines the information content of stock split announcements. It is hypothesized that there are abnormal returns around the stock split announcement dates. In order to test this hypothesis, average abnormal returns (AARs) are calculated in every event period from all stocks in the sample that announce stock splits. A t-test, is used to determine whether AAR in every event period is significantly different from zero. Positive abnormal returns indicate good news and negative ones represent bad news. We use a significance level (alpha) of five percent.

Table 2 shows that days t-5, t+1, t+2, t+3, t+4, t+5, t+6, t+8, t+10 have negative AARs, indicating that investors earn stock returns lower than expected. However, only negative AARs on days t-8, t-7, t+5, and t+6 are statistically significant where three of them (t-7, t+5, and t+6) are negatively significant. On the announcement day, the market reacts positively with an AAR of 0.005058696, but it is not significant.

Table 2: One Sample t-test on Splitting Firms' AARs

Day	AAR	CAAR	Day	AAR	CAAR
t-10	0.0019	0.0019	t+1	-0.0224	0.0472
t-9	0.0083	0.0103	t+2	-0.0017	0.0455
t-8	0.0125***	0.0228	t+3	-0.0068	0.0386
t-7	0.0144***	0.0373	t+4	-0.0040	0.0345
t-6	0.00003	0.0373	t+5	-0.0108**	0.0237
t-5	-0.0143	0.0230	t+6	-0.0136***	0.0100
t-4	0.0058	0.0289	t+7	0.0001	0.0102
t-3	0.0171	0.0460	t+8	-0.0067	0.0035
t-2	0.0152	0.0613	t+9	0.0004	0.0039
t-1	0.0033	0.0646	t+10	-0.0264	-0.0225
t-0	0.0050	0.0697			

*significant at 10% level, **significant at 5% level, ***significant at 1% level. Table 2 shows splitting firms' average abnormal returns (AARs) and cumulative AARs where $AAR_{N,t} = \frac{\sum_{i=1}^N AR_{i,t}}{N}$ and $CAAR_{t-x,t} = \sum_{x=10}^{t-1} AAR_{N,t}$

The negative reaction in the wake of stock split announcements (days t+5 and t+6) suggests that a stock split may be considered bad news. This is probably impacted by a large change in stock price after the split, and investors feel uncertain about the company's prospects in the future. This finding does not substantiate the signaling hypothesis that stocks splits function as management's signals of good future prospects. The evidence also shows that the market has reacted on days t-8 and t-7 before the stock split; nevertheless, the significant reaction disappears after t-7. The market is considered quick in collecting and reacting to new information, and able to capitalize on it.

Subsequently, we examine the information content of stock split announcements made by growing firms. In order to conduct this test, AARs of 46 growing firms that announce stock splits are calculated in every event period. Using t-test, this study identifies whether AAR in every event period is significantly different from zero. Table 3 Panel A shows the evidence of this test.

Table 3: One Sample t-tests on Growing and Non-Growing Splitting Firms' AARs

Day	Panel A: Growing Splitting Firms		Panel B: Non-Growing Splitting Firms	
	AAR	CAAR	AAR	CAAR
t-10	0.0029	0.0029	-0.00006	-0.00006
t-9	0.0071	0.0101	0.0107	0.0106
t-8	0.0137	0.0239	0.0100	0.0206
t-7	0.0113**	0.0352	0.0207	0.0414
t-6	-0.0001	0.0350	0.0004	0.0419
t-5	-0.0203	0.0147	-0.0023	0.0396
t-4	0.0005	0.0152	0.0166	0.0562
t-3	0.0272	0.0424	-0.0030	0.0531
t-2	0.0132	0.0556	0.0193	0.0725
t-1	0.0009	0.0566	0.0082	0.0807
t-0	0.0007	0.0573	0.0136	0.0944
t+1	-0.0124	0.0448	-0.0423	0.0520
t+2	-0.0052	0.0396	0.0053	0.0574
t+3	-0.0063	0.0333	-0.0080	0.0493
t+4	-0.0028	0.0304	-0.0066	0.0427
t+5	-0.0101**	0.0203	-0.0120	0.0306
t+6	-0.0106***	0.0097	-0.0198	0.0108
t+7	0.0001	0.0098	0.0003	0.0111
t+8	-0.0079	0.0019	-0.0043	0.0067
t+9	-0.0035	-0.0016	0.0082	0.0149
t+10	-0.0378	-0.0394	-0.0037	0.0112

*significant at 10% level, **significant at 5% level, ***significant at 1% level, Panel A of Table 3 shows growing splitting firms' AARs and CAARs while Panel B of Table 3 shows growing splitting firms' AARs and CAARs; $AAR_{N,t} = \frac{\sum_{i=1}^N AR_{i,t}}{N}$ and $CAAR_{t-x,t} = \sum_{x=10}^{t-1} AAR_{N,t}$

The result is not much different from that of splitting firms as a whole. The table above shows that negative AARs are noticed on days t-5, t-6, t+1, t+2, t+3, t+4, t+5, t+6, t+8, t+9, and t+10. However, only days t+5 and t+6 show significantly negative AARs. These significant AARs indicate that stock split announcements convey information. On the announcement date, the market reacts positively with an AAR of 0.000758913, but this is insignificant. Negative reaction on consecutive days after the split announcement implies that stock splits may be considered bad news by the market. Again, this finding does not corroborate the signaling hypothesis. Furthermore, this evidence indicates that although investors on the Indonesian Stock Exchange are quick in finding new information, they are not so smart with respect to making decisions based on the information. The split announcement made by growing firms should have been received positively by the investors. Hence, they do not pay attention to the characteristic of a company announcing the stock split.

The third test is conducted on non-growing firms that announce stock splits. Twenty-three stocks of non-growing companies in the sample are used to calculate an AAR in each event period. Table 3 Panel B shows that days t-10, t-5, t-3, t+1, t+3, t+4, t+5, t+6, t+8, and t+10 have negative AARs, but these are not significant. It means that there is no information content in stock split announcements made by non-

growing firms. On the announcement day, the market reacts positively with an AAR of 0.013658261, but this is insignificant. This finding basically supports the theory that a stock split entails costs such that only companies with good prospects have a willingness to bear the costs (Copeland, Weston, and Shastri 2005). On the other hand, companies with no good prospect may try to convey an invalid signal through a stock split, but this signal will not result in a reaction if market participants are well informed.

Next, we wish to test whether there is a difference in reaction between stock split announcements made by growing companies and those made by non-growing firms. Event periods observed are from t-0 to t+3. The result of this testing is not significant, meaning that there is no difference in cumulative abnormal returns around stock split announcement days between splits made by growing firms and those made by non-growing firms. This is in line with the findings shown in Table 3 that stock split announcements made by both growing and non-growing firms trigger the same reaction, a negative reaction. Again, this finding also indicates the tendency of the market to analyze information without relating the information to the characteristic of company. Subsequently, we want to see if there is an intra-industry information impact on non-splitting firms as a result of a stock split announcement. For this, AARs on the non-splitting firms are calculated around stock split announcement dates for every event period. The result is shown in Table 4 below.

Table 4: AARs on Non-splitting Firms around Stock Split Announcement Dates

Day	AAR	Day	AAR
t-10	-0.0007	t+1	-0.0065**
t-9	0.0016	t+2	0.0013
t-8	-0.0002	t+3	-0.0030
t-7	0.0023	t+4	0.0003
t-6	-0.0026	t+5	-0.0000
t-5	-0.0003	t+6	-0.0024
t-4	0.0023	t+7	0.0001
t-3	-0.0019	t+8	-0.0000
t-2	-0.0011	t+9	-0.0008
t-1	0.0020	t+10	-0.0018
t-0	-0.0042		

*significant at 10% level, **significant at 5% level, ***significant at 1% level. Table 2 shows non-splitting firms' AARs around stock split announcement dates where $AAR_{N,t} = \frac{\sum_{i=1}^N AR_{i,t}}{N}$

Table 4 shows that after the stock split announcement, there is one day found with significant AAR, which is day t+1, and the AAR is negative. The negative AAR substantiates the contagion effect, suggesting that the reaction of non-splitting firms is in the same direction with that of splitting firms. This evidence is possibly led by homogeneity of companies within the same industry such that information released by a company in a particular direction will be responded in the same direction by other companies in the industry. Besides, the significant AAR also shows that stock split is not only a firm-specific event, but it also influences the industry. The intra-industry effect can also be separated into: (1) intra-industry effect of growing splitting firms on non-splitting firms and (2) intra-industry effect of non-growing splitting firms on non-splitting firms.

Table 5 Panel A depicts that AARs are significantly negative on the stock split announcement date and one day after the announcement. This also supports the contagion effect where the reaction takes place in the same direction between growing firms that announce stock splits and other non-splitting companies in the same industry. Meanwhile, Table 5 Panel B depicts the test results on intra-industry effect of stock split announcements made by non-growing firms on non-splitting firms in the same industry. The only significant reaction happens on day t+6 with an AAR of -0.00496. The reaction on other days is not significant. Recall from Table 3 Panel B that all AARs for every event period around stock split announcements made by non-growing firms are not significant. Hence, Table 5 Panel B basically corresponds with Table 3 Panel B in which reaction in the same direction is observed between non-

growing splitting firms and non-splitting firms. Both earn insignificant AARs, showing a contagion effect.

Table 5: AARs on Non-splitting Firms around Stock Split Announcement Dates Made by Growing and Non-Growing Splitting Firms

	Panel A: Split Announcements Made by Growing Firms	Panel B: Split Announcements Made by Non-Growing Firms
Day	AAR	AAR
t-10	-0.0014	0.00450
t-9	-0.0004	0.00244
t-8	0.0012	-0.00027
t-7	0.0010	0.00190
t-6	-0.0011	-0.00299
t-5	-0.0021	0.00340
t-4	0.0034	0.00384
t-3	-0.0018	-0.00411
t-2	-0.0009	0.00243
t-1	0.0051	0.00135
t-0	-0.0048**	-0.00346
t+1	-0.0060**	-0.00344
t+2	0.0022	0.00422
t+3	-0.0001	-0.00316
t+4	0.0003	-0.00331
t+5	-0.0000	-0.00050
t+6	-0.0016	-0.00496**
t+7	-0.0037	0.00349
t+8	-0.0003	0.00194
t+9	-0.0026	-0.00111
t+10	-0.0050	-0.00034

*significant at 10% level, **significant at 5% level, ***significant at 1% level. Panel A of Table 5 shows non-splitting firms' AARs around stock split announcement dates made by growing splitting firms while Panel B of Table 5 shows non-splitting firms' AARs around stock split announcement dates made by non-growing splitting firms; $AAR_{N,t} = \frac{\sum_{i=1}^N AR_{i,t}}{N}$

Finally, in order to further analyze the intra-industry effect, we regress the cumulative abnormal returns on non-splitting firms (CARNS) on the cumulative abnormal returns on splitting firms (CARS) for days or periods when market reaction is significant and market-to-book (M/B) of splitting firms. This test is conducted on all companies, both growing and non-growing firms. The regression model is as follows:

$$CARNS = \alpha_0 + \beta_1 CARS + \beta_2 M/B + \epsilon \quad (10)$$

CARS is defined as the cumulative abnormal returns on splitting firms around stock split announcement dates. CARNS is the cumulative abnormal returns on non-splitting firms in the same industry around stock split announcement dates made by splitting firms. The event periods or days used in the regression are only dates with significant AARs on splitting firms (days t-8, t-7, t+5, and t+6). M/B ratio of splitting firms is a proxy for company growth.

Since the data are not stationary, a smoothing process is conducted by calculating the first differences. The result indicates that the coefficient on CARS is positive (0.171409) and significant. It means that abnormal returns on splitting firms influence abnormal returns on non-splitting firms in the same direction. Overall, this finding is led by the contagion effect and the homogeneity of companies in the same industry. However, M/B ratio has no significant relationship with CARNS, again supporting the above conclusion that company characteristics are neglected by the market in analyzing the stock split event.

CONCLUSION

This study examines the information content of stock split announcements. It is hypothesized that there are abnormal returns around stock split announcement dates. Significantly negative AARs are found on days t-8, t-7, t+5, and t+6. The negative reaction in the wake of stock split announcement (days t+5 and t+6) suggests that a stock split may be considered bad news. This is probably impacted by a large change in stock price after the split, and investors feel uncertain about the company's prospect in the future. This finding does not substantiate the signaling hypothesis that stocks splits function as management's signal of good future prospect. The evidence also shows that the market has reacted on days t-8 and t-7 before the stock split; nevertheless, the significant reaction disappears after t-7. The market is considered quick in collecting and reacting to new information, and able to capitalize on it.

For growing firms, the result is not much different from the full sample of splitting firms. Only days t+5 and t+6 show significantly negative AARs. This evidence indicates that although investors on the Indonesian Stock Exchange are quick in finding new information, they are not so smart with respect to making decisions based on the information. The split announcement made by growing firms should have resulted in a positive response by investors. Hence, they do not pay attention to the characteristic of company announcing the stock split. For the test on non-growing firms, days t-10, t-5, t-3, t+1, t+3, t+4, t+5, t+6, t+8, and t+10 have negative AARs, but these are not significant. It means that there is no information content in stock split announcements made by non-growing firms.

The examination of the intra-industry effect shows that after the stock split announcement, there is one day found with significant AAR, which is day t+1, and the AAR is negative. The negative AAR substantiates the contagion effect, suggesting that the reaction of non-splitting firms is in the same direction with that of splitting firms. This evidence is possibly led by homogeneity of companies within the same industry such that information released by a company in a particular direction will be responded in the same direction by other companies in the industry. Besides, the significant AAR also shows that stock splits are not only a firm-specific event, but it also influences the industry. Finally, the regression of the cumulative abnormal returns on non-splitting firms (CARNS) on the cumulative abnormal returns on splitting firms (CARS) for days or periods when market reaction is significant and market-to-book (M/B) of splitting firms finds that the coefficient on CARS is positive (0.171409) and significant. It means that abnormal returns on splitting firms influence abnormal returns on non-splitting firms in the same direction. Overall, this finding is led by the contagion effect and the homogeneity of companies in the same industry. However, M/B ratio has no significant relationship with CARNS, again supporting the above discussion that company characteristic are neglected by the market in analyzing the stock split event.

This research has several limitations. This study only uses an event study approach, which observes the market reaction around stock split announcements, without paying attention to the market reaction or firm performance before and after the stock splits. In addition, this study only emphasizes information content by observing abnormal returns around stock split announcements, but puts less emphasis on liquidity aspects. Moreover, this study only employs company growth to divide the sample of firms announcing stock splits. We suggest that subsequent researchers on this issue improve the following aspects. First, firm performance before and after the stock split announcements could be used to see the effect of the announcements. Second, future research could harness other approaches to calculate the abnormal return. Third, future studies could conduct research on the liquidity aspect behind the stock split announcements. Fourth, the classification of firm characteristic may use proxies other than firm growth merely based on market to book value of equity, such as size or other measures.

REFERENCES

- Akhigbe, A., S. Borde, and A. Whyte. 2003. Does an industry effect exist for initial public offering (IPOs)? *Financial Review* 38.
- Asquith, P., P. Healy, and K. Palepu. 1989. Earnings and stock splits, *Accounting Review* 64, p. 387-403.
- Baker, H. dan G. Powell. 1993. Further evidence on managerial motives for stock splits, *Quarterly Journal of Business and Economics* 22, p. 83-102.
- Brigham, E. F. and P. R. Daves. 2004. *Intermediate financial management*, 8th ed. Ohio: South-Western Publishing.
- Copeland, T., J. Weston, and K. Shastri. 2005. *Financial theory and corporate policy*, 4th ed. Boston: Pearson Education.
- Desai, H. and P. Jain. 1997. Long-run common stock return following stock splits and reverse splits, *Journal of Business* 70, p. 409-433.
- Fama, E. 1970. Efficient capital markets: A review of theory and empirical work, *Journal of Finance* 25, p. 383-417.
- Fatmawati. 1999. The influence of stock splits on stock liquidity measured by bid-ask spread on Jakarta Stock Exchange, Unpublished thesis, Universitas Gadjah Mada.
- Grinblatt, M., R. Masulis, and S. Titman. 1984. The valuation effect of stock split and stock dividend, *Journal of Financial Economics* 13, p. 461-490.
- Kurniawati, I. 2001. Analysis of information content using beta correction and the differences in beta around stock splits on JSX, Unpublished thesis, Universitas Gadjah Mada.
- Lang, H. and R. Stulz. 1992. Contagion and competitive intra-industry effect of bankruptcy announcement, *Journal of Financial Economics* 32, p. 45-60.
- Lakonishok, J. and B. Lev. 1987. The market reaction to stock split: Why, who, and when, *Journal of Finance* 42, p. 913-932.
- Ikenberry, D., G. Rawkins, and E. Stice. 1996. What do stock split really signal? *Journal of Financial and Quantitative Analysis* 31, p. 357-375.
- McGough, E. 1993. Anatomy of a stock split, *Management Accounting* 75 (3): p. 58-61.
- McNichols, M. and A. Dravis. 1990. Stock dividends, stock splits, and signaling. *Journal of Finance* 45, p. 857-879.
- Pilotte, E. 1997. The wealth and earnings implications of stock splits by non-dividend paying firms, *Quarterly Journal of Business and Economics* 36, p. 81-96.
- Reboredo, J. 2003. How is the market reaction to stock split? *Applied Financial Economics* 13, p. 361-368.

Setiawan, S. and J. Hartono. 2002. The test on semistrong form of decisional market efficiency: Analysis of dividend-increase announcement, Indonesian Accounting Association National Conference Proceeding.

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DYNAMIC ASSET ALLOCATION USING A COMBINED CRITERIA DECISION SYSTEM

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ABSTRACT

In this paper we examine the predictability of asset returns by developing an approach that combines quantitative methods of forecasting, based on technical analysis. As an innovation we introduce a multiple criteria decision system making simultaneous use of trend indicators and other confirming indicators. By combining trend indicators with confirming indicators it is possible to build a superior technical trading strategy that captures a more comprehensive aspect of predictability in past prices. This study also proposes a test for weak form efficiency based on a combining approach. Previous approaches typically make inferences based on the empirical results of testing only one class of technical rules. Applying the combining criteria decision system the evidence suggests that the strategies proposed here have predictive ability on a data sample based on three European stocks Index Markets. Our results rejects the null hypothesis that the returns earned from applying trading rules are equal to those achieved from a naive buy and hold strategy, even after deducting transaction costs. Evidence also suggests that oscillators capture some aspect of predictability in past prices that moving averages do not detect.

JEL: G12: G14

KEYWORDS: Technical Analysis, Market Timing, Efficient Market Hypothesis

INTRODUCTION

Technical analysis involves the prediction of asset price movements from inductive analysis of past movements, using either qualitative methods, quantitative methods or a combination of both. Qualitative methods include recognizing certain visual patterns in the data. Quantitative techniques involve analyzing moving averages and oscillators. Pring (2002), a leading technical analyst, provides a more specific definition: “The technical approach to investment is essentially a reflection of the idea that prices move in trends determined by the changing attitudes of investors toward various economic, monetary, political, and psychological forces”. Despite its widespread acceptance and adoption by practitioners, Malkiel (1981) described technical analysis as an “anathema to the academic world”. This is due to its conflict with market efficiency, one of the central pillars of academic finance. Jensen (1978) developed a detailed definition: ‘A market is efficient about information set θt if it is impossible to make economic profits by trading assuming information set θt ’. In an efficient market, prices reflect information to the point where the potential risk-adjusted excess returns of acting on information do not exceed the cost of doing so. Jensen’s definition implies that market efficiency may be tested by considering the net profits and risk of trading strategies based on information set θt .

The remainder of the paper is organized as follows. In the next section we discuss the relevant literature. Sections that discuss the data and methodology used in the study follow. Next, the empirical results are presented. The paper closes with some concluding comments.

LITERATURE REVIEW

Early academic studies of technical analysis by Alexander (1964) find that transaction costs erode technical analysis profitability. This finding, which is consistent with market efficiency, resulted in few further technical analysis studies over the next twenty years. In the 1990s, with easy accessibility to

financial data banks and greater computer power, came a thorough demonstration of the benefits of technical trading rules, and thus many researchers studied the possibility of forecasting financial asset returns. There has been a growing recognition that the introduction of nonlinearities in the modelling approach could allow one to explain certain price movements that seemed previously random. Our skeletal literature review focuses on papers published since the turn of the century. Although the impact of single technical trading rules over major financial markets worldwide has been studied extensively, combined technical trading systems have rarely received enough attention. Fang and Xu (2003), explore predictability of asset returns by developing an approach that combines technical analysis and conventional time series forecasts. They find technical trading rules and time series forecasts capture different aspects of market predictability. The former identifies periods to be in the market when returns are positive and the latter identifies periods to be out when returns are negative. Applied to daily Dow Jones Averages over the first 100 years, the combined strategies outperform both technical trading rules and time series forecasts. Nontrivial low-order serial correlations in returns can largely explain the predictability. Chen and Li (2003) use daily stock prices and the trading volume of 39 constituent companies in the Shenzhen Stock Exchange Index to examine the usefulness of technical analysis. It finds weak evidence to support the view that traders or technical analysts can learn more about the future pattern of returns by actively using volume, in conjunction with returns, than those who only watch price movements. In the article of Rogovska-Ischuk (2006), the author offers a new classification of technical methods, which includes a synergic approach as one of the forecasting instruments. In the paper there is a choice of the most effective methods for every pair, and suggests a way of using the synergic approach with classical methods. Marshall and Cahan (2005), examines trading strategies for predicting stock price movements by applying a combination of technical analysis and time series forecasts to the five Asian-Pacific stock markets of Australia, Indonesia, Japan, Malaysia and Singapore. Evidences shows how technical analysis may be improved by incorporating forecasting approaches. Fock, Klein, and Zwergel (2005) put one very popular charting technique, the "candlestick" method, to the test. They start by developing specific criteria for a set of basic candlestick patterns, and then measure predictive performance with intraday data from two major futures, the DAX stock index contract, and the Bund interest rate future.

The authors find no evidence of predictive ability from candlestick patterns alone, or in combination with other common technical indicators, like momentum. However more attention in the literature, also in 2000s, has been paid to single rule approaches. The study of Mitra (2002) employs the Simple Moving Average (SMA) and the Displaced Moving Average (DMA) trading rules to test the weak form efficiency of the Indian equity markets. Results provide sufficient evidence the DMA indicator is a successful trading rule that created profitable signals even after adjusting for transaction and other costs. The purpose of the Park and Irwin (2007) paper is to review the evidence on the profitability of technical analysis. The empirical literature is classified into two groups, 'early' and 'modern' studies, according to the characteristics of testing procedures. Early studies point out that technical trading strategies are profitable in foreign exchange markets and futures markets, but not in stock markets. Modern studies show that technical trading strategies consistently generate economic profits in various speculative markets at least until the early 1990s. Among 95 modern studies, 56 studies find positive results of technical trading strategies, 20 studies earn negative results, and 19 studies suggest mixed results. Atmeh and Dobbs (2006) study how moving average trading rules performing in an emerging market context, namely that of the Jordanian stock market.

The conditional returns of buy or sell signals from actual data are examined for a range of trading rules. These are compared with conditional returns from simulated series generated by a set of models (random walk with a drift, AR(1), and GARCH-(M)). The empirical results show that technical trading rules can help to predict market movements, and there is some evidence that (short) rules may be profitable after allowing for transactions costs. Glezakos and Mylonas (2003) explores the forecast power of technical analysis in the equity markets by applying simple technical trading rules to the Athens General Index and

DAX. The results produce evidence that technical analysis is a valuable investment tool even after deducting transaction costs, especially in Athens Stock Exchange. Reitz (2006) provides a possible explanation for the Technical Analysis puzzle that goes beyond the standard self-fulfilling prophecy argument. If at least some of the asset price fundamentals are not currently observable, the oscillator model is able to infer regime shifts in the stochastic process of these variables through past asset prices. From this view, technical analysis can be interpreted as a cheap proxy for Bayesian learning.

In this paper we research whether by combining some typical technical rules named “oscillators” with moving averages; a superior technical trading strategy can be developed. In this way the use of so called confirming indicators, from oscillators, significantly improves forecast power and should make it possible to more effectively capture the information content in past prices. If the hypothesis is true, technical analysis should enable a trader to earn profits larger than those that come from a naïve buy and hold strategy. The remainder of the paper is organized as follows: data employed in this study and methodology is presented in Section 2 where outlines the technical trading rules. These rules also form the basis of the test for weak form efficiency (*EMH*). Section 3 reports and compares the empirical results of testing the different technical trading strategies for three European Stock Index and Section 4 closes the paper.

METHODOLOGY

This paper mainly distinguishes itself from previous studies, in the literature, in the following aspect. Most empirical work has studied technical approaches in isolation. This is not satisfactory because, as shown in this study, different technical trading rules are able to identify different predictable items. Literature and heuristic evidence shows that market action reflects its behaviour in two ways: trending and trading. A trending market refers to the presence of a strong price trend while in trading range markets; the price is going nowhere. During a period of time when the market is in a strong trend, tools like moving averages give a clue for timing to produce a market order. Another widely used technical tool is the class of indicators, or so called oscillator rules which range from overbought to oversold territory, they do not provide much evidence of a trending market while they are useful for large in trading range markets. These arguments suggest to us that technical trading rules, and particularly moving average and oscillator, are asymmetric in the opposite directions during trending and trading periods providing striking evidence of their complementary properties.

Since this study is based on joint use of different technical analysis approaches, we focus on the most commonly used basic trading strategy employed by technical analysts – a combination of moving averages and oscillators. By combining trend indicators with confirming indicators that are also based on the detection of trends in past prices, it is possible to build a superior technical trading strategy that captures a more comprehensive aspect of predictability in past prices. According to authors of popular practitioner guides to technical analysis such as Patel (2000), Bail (2005) and Nison (2005), most technical analysts use at least one momentum indicator when trading. In this study we have applied a strategy involving the following indicators: RSI, Stochastic, ADX, MACD and Price Oscillator. A simple moving average rule would signal an imminent break in trend, or the emergence of a new trend, when the moving average is crossed by the spot price or by a shorter moving average. Thus, an imminent upward break in trend for the stock price, p_t , might be signalled by a short moving average of length $m > 1$, $MA_t(m)$, intersecting from below a longer moving average of length $n > m$, $MA_t(n)$, that is:

$$MA_t(j) = \frac{1}{j} \sum_{i=0}^{j-1} p_{t-i}, j = m, n \quad (1)$$

Conversely, a downward break in trend would be signalled by the short moving average crossing the long moving average from above. Indicators of this kind will be profitable in markets showing definite trends and so they are generically known as “trend following” or “momentum” indicators.

The following describes the way in which the MA rules emit buy and sell signals. A buy (sell) signal is emitted when the SMA_t intersects the LMA_t from below (above):

$$b_t : SMA_t > LMA_t \quad \text{and} \quad SMA_{t-1} < LMA_{t-1} \tag{2}$$

$$s_t : SMA_t < LMA_t \quad \text{and} \quad SMA_{t-1} > LMA_{t-1} \tag{3}$$

For the cross signal, as per previous studies in literature, we use the 1-day moving average (the raw price). The calculation of the $RSI_{t,p}$ at time t of period p uses only closing prices and is the ratio of up-closes, U_i , to down-closes, D_i , over the time period selected. This computation expresses itself as an oscillator that has a range of 0 to 100. The calculation starts by defining an index set $I_{t,p} = \{i : t - p \leq i \leq t\}$ allowed by defining the up-closes and down-closes:

$$U_i = \begin{cases} C_i - C_{i-1} & \text{if } C_i > C_{i-1} \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad D_i = \begin{cases} C_{i-1} - C_i & \text{if } C_{i-1} > C_i \\ 0 & \text{otherwise} \end{cases} \tag{4}$$

for any $i \in I_{t,p}$ and C_i is the closing price for period i . The next step is to define:

$$\overline{U}_{t,p} = \text{Average of } U_i \text{ over } I_{t,p} \quad \text{and} \quad \overline{D}_{t,p} = \text{Average of } D_i \text{ over } I_{t,p} \tag{5}$$

and after that the relative strength (RS) and the RSI at time t for period p is given as follows:

$$RS_{t,p} = \frac{\overline{U}_{t,p}}{\overline{D}_{t,p}} \quad \text{and} \quad RSI_{t,p} = 100 - \frac{100}{1 + RS_{t,p}} \tag{6}$$

The RSI thus attempts to measure the strength of “up movements” relative to the strength of “down movements”, and is normalized to lie between 0 and 100; common values at which a particular stock is believed to have been overbought (signalling an imminent downward correction which could be associated with a sell signal) or oversold (signalling an imminent upward correction which could be associated with a buy signal) are 70 and 30, respectively (see, e.g. Henderson, 2002). Developed by Gerald Appel, Moving Average Convergence/Divergence ($MACD$) is one of the simplest and most reliable indicators available. These lagging indicators are turned into a momentum oscillator by subtracting the longer moving average from the shorter moving average. The resulting plot forms a line that swings above and below zero, without any upper or lower limits. The most popular formula for the “standard” $MACD$ (*differential line*) is the difference between a security's 26-day and 12-day Exponential Moving Averages (EMA):

$$DL_t = EMA_{12,t} - EMA_{26,t} \tag{7}$$

Where:

$EMA_{12,t}$ = exponential moving average with time span of 12 period;
 $EMA_{26,t}$ = exponential moving average with time span of 26 period.

Usually, a 9-day EMA of MACD is plotted alongside to act as a trigger line. The most common signal for MACD is the moving average crossover. A Bearish Moving Average Crossover occurs when MACD declines below its 9-day EMA. A Bullish Moving Average Crossover occurs when MACD moves above its 9-day EMA, or trigger line.

The Price Oscillator is an indicator based on the difference between two moving averages, and is expressed as either in absolute terms

$$PO_t = MAf_t - MAS_t \quad \text{or, as a percentage: } PO_t = [(MAf_t - MAS_t) / MAf_t] \times 100 \quad (8)$$

Where: $PO_t = Price\ oscillator$, $MAf_t = fast\ moving\ average$, $MAS_t = long\ moving\ average$.

The DMI, Directional Movement Index, is a trend following system. Wilder (1978) defines directional movement as the largest part of the current trading range that is outside the previous trading range. From a mathematical view, it is the largest value of the following differences: $High_t - High_{t-1}$ or $Low_t - Low_{t-1}$. This is only true when the current low is less than the previous low, or the current high exceeds the previous high. Please note that both of these conditions do not have to be met, only one. It is the largest portion of the trading range outside the previous trading range. You must first estimate the directional movement, DM, for the current trading interval. Directional movement can be up, down or zero. When used with the up and down directional indicator values ($dm+$) and ($dm-$), the DMI is an exact trading system.

State with $t-1$ and t two sequential temporal units, we have defined before:

Positive Directional Movement ($dm+$) for which $(H_t - H_{t-1}) > 0$ and $(L_t - L_{t-1}) \geq 0$;

in this case we have: $dm_t = (H_t - H_{t-1})$ and $dm_t = 0$

-Negative Directional Movement ($dm-$) for which $(H_t - H_{t-1}) \leq 0$ and $(L_t - L_{t-1}) < 0$;

in this case we have: $dm_t = |L_t - L_{t-1}|$ and $dm_t = 0$

- Zero Directional Movement for which $(H_t - H_{t-1}) \leq 0$ and $(L_t - L_{t-1}) \geq 0$

in this case we have: $dm_t = dm_t = 0$

- Double Directional Movement for which $(H_t - H_{t-1}) > 0$ e $(L_t - L_{t-1}) < 0$ in this case we have:

$(H_t - H_{t-1}) > |L_t - L_{t-1}| \rightarrow dm_t^+ = (H_t - H_{t-1})$ and $dm_t = 0$

$(H_t - H_{t-1}) < |L_t - L_{t-1}| \rightarrow dm_t^- = |L_t - L_{t-1}|$ and $dm_t = 0$

Wilder (1978) the DMI creator states that for an average process, based on a 14 time span, of the previous amounts we get two variables:

$$DM_{14+n}^+ = \frac{\sum_{i=1}^{14} dm_i^+}{14} \quad \text{and} \quad DM_{14+n}^- = \frac{\sum_{i=1}^{14} dm_i^-}{14} \quad (9)$$

This is the same span Wilder used on daily data. His logic for using this value is that it represented an average half-cycle period. After epoch for $t=14$ $DM+$ and $DM-$ values are calculated by:

$$DM_{14+n}^+ = \frac{1}{14} \left[\left(\frac{13}{14} \right)^n \sum_{i=1}^{14} dm_i^+ + \sum_{j=1}^{14} \left(\frac{13}{14} \right)^{n-j} dm_{14+j}^+ \right] \quad \text{and} \quad DM_{14+n}^- = \frac{1}{14} \left[\left(\frac{13}{14} \right)^n \sum_{i=1}^{14} dm_i^- + \sum_{j=1}^{14} \left(\frac{13}{14} \right)^{n-j} dm_{14+j}^- \right] \quad (10)$$

Wilder (1978) prefers to use an accumulation technique rather than computing a pure moving average. The next step in setting the DMI is to calculate the true range. According to the author, the true range is the largest value of the following equations:

$$tr_t = \text{Max}[(H_t - L_t), |C_{t-1} - H_t|, |C_{t-1} - L_t|] \quad (11)$$

Following Wilder (1978) a synthetic measure becomes true:

$$TR_{14} = \frac{\sum_{i=1}^{14} tr_i}{14} \quad \text{and} \quad TR_{14+n} = \frac{1}{14} \left[\left(\frac{13}{14}\right)^n \sum_{i=1}^{14} tr_i + \sum_{j=1}^{14} \left(\frac{13}{14}\right)^{n-j} tr_{14+j} \right] \quad (12)$$

Once the average values are determined it is possible to estimate the directional indicator. Again, it can either be up or down, depending on the directional movement:

$$DI_{14}^+ = \left[(DM_{14}^+) (TR_{14})^{-1} \right] 100 \quad \text{and} \quad DI_{14}^- = \left[(DM_{14}^-) (TR_{14})^{-1} \right] 100 \quad (13)$$

And for $t > 14$ we have:

$$DI_{14+n}^+ = \left[(DM_{14+n}^+) (TR_{14+n})^{-1} \right] 100 \quad \text{and} \quad DI_{14+n}^- = \left[(DM_{14+n}^-) (TR_{14+n})^{-1} \right] 100 \quad (14)$$

Once the amounts above have been estimated the DX or directional movement index is calculated. Again the absolute value of this difference is used. This value is always a percentage. The formula is:

$$DX_{14+n} = \left[\left| (DI_{14+n}^+ - DI_{14+n}^-) (DI_{14+n}^+ + DI_{14+n}^-)^{-1} \right| \right] 100 \quad (15)$$

The DX is always a value between 0 and 100. Wilder (1978) was not comfortable using just the directional movement index. It could become volatile during periods of extreme price movement, especially when markets rise and fall quickly. Again, he carries out his accumulated moving average technique to smooth the DX. The result is the ADX or average directional movement index.

The stochastic oscillator compares the closing price to the price range for the price range (high minus low) for the window period. To compose the stochastic oscillator, the following variables are first defined; $CL_t = P_t - \min(P_{t-1}, P_{t-2}, \dots, P_{t-m})$ measures the difference between two values, the latest closing price and the lowest observed price over the window period, m , $HL_t = \max(P_{t-1}, P_{t-2}, \dots, P_{t-m}) - \min(P_{t-1}, P_{t-2}, \dots, P_{t-m})$ computes the difference between the highest closing price and the lowest observed price over the window period and $K_t = \frac{CL_t}{HL_t} \cdot 100$ which is simply

the ratio of the latest closing range to the most recent trading range. To determine if an asset price is going down, K_t is compared against a signal line, D_t , which is simply a moving average of K_t : Practitioners view D_t as the signal line that separates ‘overbought’ and ‘oversold’ levels. A security is said to be overbought (oversold) when buying (selling) pressure increases its price to a high (low), which is expected to reverse soon. When the oscillator K_t rises above (falls below) D_t , technical traders believe that demand for the asset is increasing (decreasing) as the asset has moved from an oversold (overbought) to an overbought (oversold) position and a buy (sell) signal is then emitted. Therefore, the stochastic

oscillator confirms a buy (sell) signal when K_t is above (below) D_t . Focusing on primary target of this study a trading strategy based on both trend and oscillators then emit buy and sell signals as follows:

$$b_t : SMA_t > LMA_t \quad \text{and} \quad O_t = 1 \tag{16}$$

$$s_t : SMA_t < LMA_t \quad \text{and} \quad O_t = -1 \tag{17}$$

where:

$$O_t = \begin{cases} 1 \rightarrow \text{oscillator buy signal} \\ 0 \rightarrow \text{oscillator neutral signal} \\ -1 \rightarrow \text{oscillator sell signal} \end{cases}$$

Following the emission of a buy (sell) signal, the buy (sell) position is then maintained until the two indicators emit a sell (buy) signal or inconsistent signals. In system (16)-(17) buy and sell signals for oscillators are producing according to entry method proper of each indicator. Specifically, the following moving averages were tested: 3, 5 and 9-day simple MAs matching to short-term, 21 days for medium-term and 55 days for long-term. Oscillator time span for short strategy are 3, 5 and 9 days, 14 and 21 days for both medium and long term. The profitability of technical trading rules depends on the trading strategy and, in particular, on what position the trader should take when the rule emits buy and sell signals. For each strategy ($X(bs)$), we estimate the daily return and then subtract from it the daily return from the buy-and-hold strategy to get the daily difference return. The null and alternative hypotheses are the following:

$$H_0 : X(bs) - X(bh) = 0 \quad \text{and} \quad H_A : X(bs) - X(bh) \neq 0 \tag{18}$$

where $X(bh)$ is the mean return for the buy-and-hold strategy. The test statistic for the mean buy returns over the mean buy-and-hold strategy is:

$$t = \frac{X(bs) - X(bh)}{\sqrt{\frac{Var(bs)}{N_{bs}} + \frac{Var(bh)}{N_h}}} \tag{19}$$

where $Var(bs)$ and $Var(bh)$ are the variance of combined rules system and buy-and-hold returns respectively. We have considered round-trip transaction costs as a measure of 0,0019 for every trading signal. Besides, a strategy return higher than the return of the BH policy suggests market inefficiency in the weak form. All results presented in this paper are based on tests conducted on the assumption that if a particular rule has given a signal and the holding period has not expired, then any following signals are ignored.

DATA

Daily price data for a sample of equity of Mibtel Index, Mib30 Index, Eurostoxx50 Index for the 1/1/2000–23/03/2007 period is used in this study. Open, high, low and close data that has been adjusted for capital structure changes are utilized. All data are sourced from Bloomberg. The reference data sample is identified as follows: (1) 7 stock (Alleanza, Alitalia, Capitalia, Enel, Fiat, Mediobanca, Pirelli) drawn by Mib 30 Index, that is Italian Blue Chips Index; (2) 7 stocks (Aedes, Brioschi, Cam-Fin,

Marzotto, Snai, Unipol, Zucchi) extract from Mibtel Index that is *Borsa Italiana* Stock Market index; (3) 7 stocks (Allied Irish Banks, Bbva, Deutsch Telekom, France Telecom, Iberia, Nokia, Telefonica) are drawn from Eurostoxx 50 Stock Index that is Europe's leading Blue-chip index for the Euro zone. To understand quickly and describe our sets of data some descriptive statistics are presented in Table 1.

Table1: Descriptive Statistics

	EX50	MIBTEL	SPMIB40
Mean	0.0002	0.0006	0.0005
Median	0.0020	0.0033	0.0026
Maximum	0.1456	0.1948	0.2136
Minimum	-0.1057	-0.1283	-0.1367
Std. Dev.	0.0289	0.0251	0.0272
Skewness	0.0386	0.3393	0.4337
Kurtosis	5.1603	14.7510	15.1037
Jarque-Bera	73.5973	2182.1010	2319.2280
Probability	0.0000	0.0000	0.0000
Sum	0.0728	0.2264	0.1941
Sum Sq. Dev.	0.3142	0.2381	0.2794
Observations	378	378	378

Table1 shows Stock Market Index main descriptive statistics for all sample periods.

EMPIRICAL RESULTS

This section reports the results of applying the previous technical trading strategies to European stock market data. To decide if the combined criteria's approach to technical analysis captures the information content in past prices more effectively, we perform two technical trading strategies. We compare: (a) simple trading rules working alone with a Moving average (MA) trading signal method and (b) MA rules with confirming oscillators. Table 2 reports the empirical results, for all sample period, by applying the previous simple trading strategies on the stock markets (Mib30, Mibtel and Eurostoxx50). In Table2 column % profit reports the proportion of returns following both buy and sell signals performing the simple trading rules that are greater than zero. The column % over performance reports the proportion of simple trading rules that lead to over performance relative to a naïve buy and hold investment strategy. The column % t-test reports the proportion of trading rules with returns that are greater than a buy and hold strategy zero and that are statistically significant. The last column reports the best rules label. Results from combining the different strategies, compared by holding period, are reported in Tables 4 and 5.

From Table 2, France Telecom appears as the stock showing more evident signs of inefficiency in weak form. That's because high is excess return with respect to a BH strategy, then we have Deuschth Telecom and Nokia, all of them pertinent to Ex50 Index. This evidence is confirmed also by *t-test* results. Italian stocks: Mediobanca, Aedes, Marzotto and Snai appear on the contrary more efficient, since mean return conditional on trading rules are lower than the unconditional BH mean return. Wanting to make a first summary analysis, we can look at Table 3 which shows that for each of the 21 stocks taken into account, results show at least one profitable trading rule, and at least one is able to produce *overperformances* versus a buy and hold strategy; in the same way at least one t-test is significant. This suggests, based on the empirical test of the generation of excess return, we should reject the hypothesis of weak-form market efficiency. An analysis reveals that for the basket Mib30 basket, on average 50% of the strategies were profitable; 40% of them *over performed*, but in reality only 19% of them assure some signs of market inefficiency. For the equity in the Mibtel basket, around half (52%) of the strategies applied to such titles allow profit making; 27% allow the realization of positive *overperformances*, but among these, those that make a profit from market inefficiency are just 21%.

Table 2: Simple Trading Rules Average Results

Stock	Return	Return Bh	Excess Return	Average Return	Average Return Bh	Variance	Variance Bh	T Test	N° Trades	Sharpe
Alitalia	-17.15	-27.08	9.93	-0.15	-0.01	0.39	0.05	-0.97	90	-0.81
Alleanza	5.81	25.06	-19.25	0.04	0.05	0.54	0.00	-0.88	77	-0.04
Capitalia	2.75	34.33	-31.58	0.01	0.00	0.14	0.01	0.31	100	-1.70
Enel	-14.02	4.74	-18.76	-0.02	0.00	0.39	0.01	-0.68	82	-0.58
Fiat	8.81	-30.50	39.31	0.15	-0.03	0.68	0.16	1.21	43	0.54
Mediobanca	43.14	119.48	-76.34	0.26	-0.01	0.82	0.04	4.61	89	0.29
Pirelli	1.31	3.93	-2.62	0.00	0.00	0.03	0.00	0.27	104	-5.95
Aedes	12.57	66.93	-54.36	0.11	0.00	0.05	0.01	2.23	101	1.19
Brioschi	3.14	4.25	-1.11	0.02	0.00	0.02	0.00	1.05	104	-3.30
Cam-fin	-0.62	10.93	-11.55	0.01	0.00	0.05	0.00	0.27	99	-0.67
Marzotto	3.93	29.98	-26.05	0.03	0.00	0.06	0.00	1.30	109	-0.10
Snai	33.57	58.84	-25.27	-0.05	-0.02	0.32	0.33	-0.01	89	-0.86
Unipol	-2.29	12.27	-14.56	0.03	0.00	0.14	0.00	-0.05	113	-0.36
Zucchi	-13.66	-7.84	-5.82	-0.02	0.01	0.05	0.01	-1.59	100	-1.66
Allied Irish Banks	3.63	122.59	-88.96	0.54	0.00	0.57	0.07	3.79	44	1.07
Bbva	8.05	42.23	-24.18	0.15	0.01	0.12	0.04	2.42	31	0.26
Deuscth Telekom	7.07	-595.87	612.94	0.35	-0.04	0.37	0.06	3.18	12	2.49
France Telecom	5.40	-952.67	1008.07	1.27	-0.04	1.19	0.32	3.62	19	1.74
Iberia	8.51	25.68	-17.17	0.10	0.00	0.03	0.00	3.04	60	3.17
Nokia	4.39	-297.39	311.78	0.92	-0.03	1.53	0.05	2.45	6	0.29
Telefonica	2.22	-94.19	106.41	0.17	-0.01	0.33	0.08	0.43	27	-0.18

Table 2 shows empirical results on average, for all sample periods, by applying the simple, not considered in conjunction between them, trading strategies to the stock markets (Mib30, Mibtel and Eurostoxx50). First column, after stock name, report trading strategies return, the second the buy and hold return, the third the difference between strategies and buy and hold return, column from 4 to 7 show average and variance of trading and buy and hold return. Last 3 columns report statistical significance test, number of trades and sharpe ratio considering on average all results.

Table 3: Simple Trading Rules Results – All Sample % Results

Stock	% Profitable Rules	% Excess Return Rules	% Significant Excess Return Rules	Best Rule
Alitalia	0.32	0.68	0.07	RSI5
Alleanza	0.57	0.14	0.04	RSI21
Capitalia	0.46	0.18	0.29	MA21
Enel	0.29	0.18	0.11	ADX21
Fiat	0.50	0.96	0.21	RSI21
Mediobanca	0.75	0.14	0.50	MACD21
Pirelli	0.61	0.50	0.11	MACD21
Average	0.50	0.40	0.19	
Aedes	0.61	0.04	0.46	ADX9
Brioschi	0.86	0.54	0.18	MACD5
Cam-Fin	0.43	0.18	0.11	RSI21
Marzotto	0.50	0.04	0.25	MACD5
Snai	0.57	0.50	0.39	MA21
Unipol	0.46	0.11	0.04	RSI21
Zucchi	0.21	0.50	0.07	MACD9
Average	0.52	0.27	0.21	
Allied Irish Banks	0.79	0.07	0.68	Rsi21
Bbva	0.71	0.21	0.68	ADX5
Deuscth Telekom	0.61	1.00	0.57	Rsi21
France Telecom	0.82	1.00	0.75	Rsi21
Iberia	0.79	0.21	0.57	RSI21
Nokia	0.75	1.00	0.54	RSI9
Telefonica	0.68	1.00	0.54	ADX9
Average	0.73	0.64	0.62	

Table 3 shows the percentage of profitable rules, of rules that earned excess return and those of which t-test reject null hypothesis of equality between rules return and Buy and Hold strategy. Best simple rules for all stocks are also shown. Column % Profitable Rules reports the proportion of returns following both buy and sell signals performing the simple trading rules that are greater than zero. The column % excess returns rules (over performing rules) reports the proportion of simple trading rules that conduct to an over performing respect to a naïve buy and hold investment strategy. The column % Significant Excess Return Rules reports the proportion of trading rules which return performance which are greater than buy and hold strategy zero and that are statistical significance. Last column report the best rules label.

The securities from the European basket allow the creation of profits in 73% of cases, of *overperformances* in 64% of cases, and assure that these possibilities are real in 62% of cases. Observation shows much higher percentages, compared to the Mib30 and Mibtel indices, which suggests the shares from Ex50 show, during the period considered, signs of inefficiency greater than those that are found in the Italian market. This is mainly because of the worse trend of European Stock Market. To summarize, making a comparison between Index Stock Markets it could be noted (Table 3) that, on average, Italian stock's mean returns conditional on simple trading rules signals are positive even though not enough to exceed a BH strategy. Indeed excess returns are not positive and *t-statistic* reveal average out at a not statistically significance. By contrast in the European market, given that BH strategies on average perform poorly, making heavily negative percentage profits, even small profit percentages are enough to produce even high *overperformances*; the *t-test* is significant in confirmation. Weak-form market efficiency hypothesizes that investors cannot drive profits above a buy-and-hold policy using any trading rule that depends only on past market information such as prices. Our results cast doubts on weak-form market efficiency and support the notion of moving average trading rules, exploiting substantial information to predict stock price changes. Following this point Neftci (1991) demonstrated technical trading rules can only be exploited usefully if the underlying process is nonlinear. Indeed, results in Fernandez-Rodriguez et al. (2003) suggested the data used in this paper display nonlinear dependencies.

So we can say as a first conclusion that, assuming the sample analyzed the Italian market appears, on average, is more efficient than the European. An important point, even if partial and based on sample, is given to the "best rule" (that is the most *over performing*) because it was found that 38% of the best rules is found with an RSI of 21 days. It is of some interest to note temporal span of the best rule, is different for the 3 markets. Evidences show a tendency to the index Mib30 of 21 periods, and lower (where there are more periods 5 and 9 present) than for the other two. To summarize, the weight of the evidence now suggests that excess returns have been available to technical foreign exchange traders over long periods. There is no guarantee, of course, that technical rules will continue to generate excess returns in the future; the excess returns may be bid away by market participants. Indeed, this may already be occurring. Once the significance of the returns produced by the trading rules is verified, we can approach the main purpose of our article that consists in applying joint trading rules moving averages and oscillators to examine whether improvements are earned.

Looking at the results in Table 3, stocks with best positive tracking errors are Fiat and Alitalia. For Fiat the combined rules trading system excess return is lower than simple rules profit, but for Alitalia a drastic increase is reached in the second approach. For Alitalia in fact the average excess return passes from 9.93 gained with the simple strategy to 23.68 undertaken with the combined strategy. Also for Zucchi, the use of strategies involving the joint use of moving averages and oscillators improves the result. In fact performance passes from negative excess return (achieved with strategies that involve use of a single indicator) to positive excess return. As for the shares belonging to the European basket, the most inefficient is France Telecom, as indicated also by the simple test. With the combined test the extra return is much higher, so it is possible to understand that the combined strategy has allowed an improvement performance relative to the simple strategy. Concerning the analysis between baskets: keeping distinct the time horizon where the combined strategies are performed, it can be seen from Table 3 that the shares listed on the Italian market are on average profitable. Indeed we refer to small profits that do not allow one to exceed those recorded with the B & H strategy, so do not make extra profits, which is confirmed by the evidence that significant values of *t-test* do not appear. Even the shares in the basket Eurostoxx50 present very low profits that, however, compared with those (even lower) made with a BH strategy, allow the production of excess return. This extra performance is confirmed with a significant *t-test* rejecting the null hypothesis of equality to zero. Looking at Table 5, we can see that on average, for the securities belonging to the Mib30 basket, the trading rule based on the joint moving average and oscillators related to the short term can make profits in 40% of cases, more than in medium (32%) and long term (22%).

These rules are also on average more *over performing* in the short (22%) compared to medium (17%) and the long period (14%). But in the short-term the t-test is, on average, significant only in 10% of cases. We can note the presence of many more significant *t-test* values in relation to medium-term (19%). In the same way we see a similar greater number of improvements of the simple strategy against the combined (14% of cases, compared with an average improvement of 10% in the short-term and 5% in long). From Table 5 concerning securities in the Mibtel basket, there are a larger number of examples of short term profits (43%) compared to the average (29%) and the long term period (25%). Excess returns are achieved more in the medium-term than in the short and long, in confirmation that there are corresponding percentages of significant tests. The greater number of improvements in *performance* by the joint strategy is realized in the medium-term. From Table 5, in relation to European shares it is clear that there are more opportunities to profit in the short term, but unlike in the Italian case, the largest number of *overperformances* reveals themselves in the short-term. Always in short-term we see the greatest number of "improvements" achieved by combined strategies. In summary the most important result shows that on average, without distinction of basket of provenance, the joint rules allow the avoidance of false signals (*whipshaw*). These weak market orders adversely affect the *performance* of a security, and allow an improvement over the *buy* and *hold* strategy. Moreover, the Mib30 shares registering the highest number of improvements by using a combined strategy compared to a single strategy are Capitalia for the short-term, Alliance for the medium and Alitalia for the long. The share in the Mibtel basket that allows for the greatest number of "best performances" is Aedes, across all the time periods. Across the Eurostoxx50 basket the share with the highest number of improvements is BBVA.

Table 4: Combined Trading Rules Results on Average - Mib 30 Sample

Stock	Time Span	Return	Return Bh	Excess Return	Average Return	Average Return Bh	Variance	Variance Bh	T Test	N° Trades	Sharpe
Mib30 Sample											
Alitalia	Short Term	1.17	-27.08	28.25	-0.02	-0.01	0.65	0.05	0.07	50	-0.10
	Medium Term	-6.89	-27.08	20.19	-0.05	-0.01	0.13	0.05	-1.24	8	-1.03
	Long Term	-4.47	-27.08	22.61	-0.08	-0.01	0.15	0.05	-1.76	5	-2.08
Alleanza	Short Term	11.39	25.06	-13.67	0.07	0.05	0.38	0.00	0.27	31	0.37
	Medium Term	6.88	25.06	-18.18	0.14	0.05	0.01	0.00	2.42	3	5.42
	Long Term	1.94	25.06	-23.12	0.02	0.05	0.01	0.00	-0.26	2	-1.07
Capitalia	Short Term	-8.03	34.33	-42.36	0.00	0.00	0.15	0.04	-0.15	58	-1.14
	Medium Term	4.97	34.33	-29.36	0.05	0.00	0.02	0.01	1.23	8	-1.25
	Long Term	-1.22	34.33	-35.55	-0.01	0.00	0.02	0.01	-0.30	4	-3.36
Enel	Short Term	-17.38	4.74	-22.12	-0.04	0.00	0.18	0.01	-1.64	39	-1.67
	Medium Term	-3.90	4.74	-8.64	-0.01	0.00	0.08	0.01	-0.20	6	-0.28
	Long Term	-2.72	4.74	-7.46	-0.03	0.00	0.07	0.01	-0.64	3	-1.42
Fiat	Short Term	0.50	-30.50	31.00	0.02	-0.03	0.65	0.16	0.35	22	0.02
	Medium Term	-0.58	-30.50	29.92	0.00	-0.03	0.12	0.16	0.14	2	-0.38
	Long Term	-0.22	-30.50	30.28	0.00	-0.03	0.11	0.16	0.18	2	-0.82
Mediobanca	Short Term	16.06	119.48	-103.42	0.02	-0.01	0.45	0.04	0.55	38	-0.09
	Medium Term	13.22	119.48	-106.26	0.12	-0.01	0.11	0.04	1.47	2	0.81
	Long Term	0.09	119.48	-119.39	-0.01	-0.01	0.17	0.04	-0.11	2	-1.09
Pirelli	Short Term	0.76	3.93	-3.17	0.00	0.00	0.01	0.00	0.32	53	-2.08
	Medium Term	-0.14	3.93	-4.07	0.00	0.00	0.00	0.00	-0.06	7	-41.00
	Long Term	-0.21	3.93	-4.14	0.00	0.00	0.00	0.00	-0.34	3	-86.08
Mibtel Sample											
Aedes	Short Term	-8.26	66.93	-75.19	-0.02	0.00	0.04	0.01	-1.14	56	-1.29
	Medium Term	0.29	66.93	-66.64	0.05	0.00	0.02	0.01	1.76	7	1.64
	Long Term	7.18	66.93	-59.75	0.13	0.00	0.01	0.01	1.08	4	-42.71
Brioschi	Short Term	2.19	4.25	-2.06	0.00	0.00	0.00	0.00	1.38	54	-15.98
	Medium Term	1.31	4.25	-2.94	0.01	0.00	0.00	0.00	2.16	7	-94.41
	Long Term	0.35	4.25	-3.90	0.00	0.00	0.00	0.00	0.70	4	299.11
Cam-Fin	Short Term	1.25	10.93	-9.68	0.00	0.00	0.04	0.00	-0.07	58	-0.83
	Medium Term	-0.75	10.93	-11.68	0.00	0.00	0.00	0.00	-0.19	11	-5.96
	Long Term	1.01	10.93	-9.92	0.00	0.00	0.00	0.00	0.01	6	-15.56

Stock	Time Span	Return	Return Bh	Excess Return	Average Return	Average Return Bh	Variance	Variance Bh	T Test	N° Trades	Sharpe
Marzotto	Short Term	0.07	29.98	-29.91	0.00	0.00	0.04	0.00	0.06	52	-1.17
	Medium Term	1.36	29.98	-28.62	0.05	0.00	0.01	0.00	2.56	9	-3.83
	Long Term	-1.07	29.98	-31.05	0.00	0.00	0.01	0.00	-0.48	7	-14.53
Snai	Short Term	0.85	58.84	-57.99	0.00	-0.02	0.43	0.04	0.37	51	0.06
	Medium Term	15.84	58.84	-43.00	0.13	-0.02	0.10	0.04	2.44	12	1.45
	Long Term	10.22	58.84	-48.62	0.03	-0.02	0.07	0.04	1.75	7	0.48
Unipol	Short Term	-5.51	12.27	-17.78	-0.01	0.00	0.10	0.00	-0.40	52	-0.47
	Medium Term	-0.88	12.27	-13.15	-0.02	0.00	0.01	0.00	-1.09	12	-8.28
	Long Term	-1.47	12.27	-13.74	-0.02	0.00	0.01	0.00	-1.03	7	-18.85
Zucchi	Short Term	-2.54	-7.84	5.30	0.00	0.01	0.05	0.01	-0.21	53	0.01
	Medium Term	-2.51	-7.84	5.33	-0.02	0.01	0.01	0.01	-1.05	10	-6.12
	Long Term	-5.41	-7.84	2.43	-0.05	0.01	0.01	0.01	-2.30	6	-9.44
Ex50 Sample											
Allied Irish Banks	Short Term	-0.38	122.59	-122.97	-0.05	0.00	0.05	0.07	-0.10	-4	-3.98
	Medium Term	-1.30	122.59	-123.89	-0.03	0.00	0.01	0.07	-2.11	-21	-20.67
	Long Term	0.00	122.59	-122.59	0.00	0.00	0.00	0.07	0.00	0	0.00
Bbva	Short Term	9.96	42.23	-32.27	0.11	0.01	0.19	0.04	1.92	1	0.57
	Medium Term	1.00	42.23	-41.23	0.07	0.01	0.03	0.04	1.26	0	0.41
	Long Term	4.63	42.23	-37.60	-0.04	0.01	0.02	0.04	-0.77	-5	-4.55
Deuscth Telekom	Short Term	3.19	-595.87	599.06	0.21	-0.04	0.29	0.06	1.80	2	2.39
	Medium Term	4.03	-595.87	599.90	1.27	-0.04	0.04	0.06	17.05	21	21.35
	Long Term	0.00	-595.87	595.87	0.00	-0.04	0.00	0.06	0.00	0	0.00
France Telecom	Short Term	10.56	-952.67	963.23	0.59	-0.04	0.98	0.32	3.64	1	0.61
	Medium Term	0.00	-952.67	952.67	0.00	-0.04	0.00	0.32	0.00	0	0.00
	Long Term	0.00	-952.67	952.67	0.00	-0.04	0.00	0.32	0.00	0	0.00
Iberia	Short Term	-2.18	25.68	-27.86	0.00	0.00	0.03	0.00	0.21	-1	-1.04
	Medium Term	0.94	25.68	-24.74	0.02	0.00	0.00	0.00	1.07	-24	-23.71
	Long Term	1.41	25.68	-24.27	0.08	0.00	0.00	0.00	3.39	-14	-13.80
Nokia	Short Term	0.53	-297.39	297.92	0.05	-0.03	0.10	0.05	0.65	0	0.31
	Medium Term	4.38	-297.39	301.77	0.14	-0.03	0.03	0.05	2.86	7	6.77
	Long Term	0.00	-297.39	297.39	0.00	-0.03	0.00	0.05	0.00	0	0.00
Telefonica	Short Term	0.51	-94.19	94.70	0.01	-0.01	0.06	0.08	-0.12	-2	-1.72
	Medium Term	-1.66	-94.19	92.53	-0.03	-0.01	0.06	0.08	-0.12	0	-0.13
	Long Term	-1.44	-94.19	92.75	-0.06	-0.01	0.06	0.08	-0.91	0	0.05

Table 4 shows the results on average and according holding period (partitioned in short, medium and long term) for the joint strategy for Mib30, Mibtel and Eurostoxx50sample. The first column, after stock name, reports holding period used to form the time span of each strategy, second column exhibits the trading strategies return, the third the buy and hold return, the fourth the difference between strategies and buy and hold return, columns 5 to 8 show average and variance of trading and buy and hold return. The last 3 columns report statistical significance test, number of trades and Sharpe ratio considering on average for all results.

Table 5: MA-Oscillators Trading Rules Results – All Sample & All Holding Period – Synthesis

Equity	Time Span	% Profitable Rules	% Excess Return Rules	% Significantly Excess Return Rules	% Improvement	Best Rule
Aedes	Short Term	0.06	0	0.16	0.16	Stoc5, Ma9
	Medium Term	0.63	0	0.33	0.33	Adx21, Ma21
	Long Term	0.44	0.11	0.44	0.44	Po14-21, Ma55
Brioschi	Short Term	0.88	0.16	0.16	0.16	Adx5, Ma5
	Medium Term	0.63	0.13	0.44	0	Adx14, Ma21
	Long Term	0.67	0	0.11	0	Macd21, Ma55
Cam-Fin	Short Term	0.50	0.19	0.09	0.09	Adx5, Ma9
	Medium Term	0.11	0.11	0.11	0.11	Po14-21, Ma21
	Long Term	0.33	0	0.22	0.22	Po14-21, Ma55
Marzotto	Short Term	0.47	0	0.06	0.06	Stoc5, Ma9
	Medium Term	0.44	0	0.33	0.33	Macd21, Ma21
	Long Term	0.11	0	0.33	0.11	Macd21, Ma55
Snai	Short Term	0.53	0.00	0.16	0.06	Adx9, Ma9
	Medium Term	0.60	0.20	0.33	0.22	Stoc21, Ma21
	Long Term	0.44	0.11	0.22	0.22	Stoc14, Ma55
Unipol	Short Term	0.13	0	0	0	-
	Medium Term	0.11	0	0.33	0.33	Stoc21, Ma21
	Long Term	0.22	0	0.11	0.11	Po14-21, Ma55

Equity	Time Span	% Profitable Rules	% Excess Return Rules	% Significantly Excess Return Rules	% Improvement	Best Rule
Zucchi	Short Term	0.50	0.63	0.44	0.16	Rsi9,Ma9
	Medium Term	0.11	0.89	0.33	0.22	Stoc14,Ma21
	Long Term	0.00	0.67	0.33	0	Stoc14,Ma55
Average	Short Term	0.43	0.14	0.13	0.08	
Average	Medium Term	0.29	0.19	0.27	0.17	
Average	Long Term	0.25	0.11	0.19	0.10	
Alitalia	Short Term	0.31	0.94	0.13	0.13	Rsi9,Ma5
	Medium Term	0.00	1	0.33	0.33	Po14-21,Ma21
	Long Term	0.00	1	0.44	0.44	Po14-21,Ma55
Alleanza	Short Term	0.91	0.19	0.09	0.09	Macd5,Ma9
	Medium Term	0.70	0.10	0.44	0	Macd21,Ma21
	Long Term	0.33	0	0.33	0	Macd21,Ma55
Capitalia	Short Term	0.28	0.09	0.19	0.19	Macd5,Ma9
	Medium Term	0.44	0.11	0.44	0.11	Macd21,Ma21
	Long Term	0.33	0	0.22	0.00	Macd14,Ma55
Enel	Short Term	0.00	0	0.16	0.16	Rsi3,Ma5
	Medium Term	0.22	0	0.11	0.11	Macd21,Ma21
	Long Term	0.00	0	0.00	0.00	-
Fiat	Short Term	0.50	1.00	0.06	0.06	Rsi9,Ma5
	Medium Term	0.22	1.00	0	0	-
	Long Term	0.33	1.00	0.22	0.11	Macd21,Ma55
Mediobanca	Short Term	0.63	0	0.13	0.13	Stoc9,Ma9
	Medium Term	0.38	0	0.33	0.33	Stoc21,Ma21
	Long Term	0.33	0	0	0	-
Pirelli	Short Term	0.50	0.25	0.09	0.09	Rsi5,Ma9
	Medium Term	0.25	0	0	0	-
	Long Term	0.22	0	0	0	-
Average	Short Term	0.40	0.22	0.10	0.10	
Average	Medium Term	0.32	0.17	0.19	0.14	
Average	Long Term	0.22	0.14	0.11	0.05	
Allied Irish Banks	Short Term	0.25	0	0.38	0.34	Po5-9,Ma5
	Medium Term	0	0	0.11	0.11	Adx14,Ma21
	Long Term	0	0	0	0	-
Bbva	Short Term	0.72	0.06	0.63	0.50	Macd5,Ma3
	Medium Term	0.22	0	0.11	0.11	Stoc14,Ma21
	Long Term	0.11	0.11	0	0	-
Deuscth Telekom	Short Term	0.50	1.00	0.09	0.09	Rsi9,Ma9
	Medium Term	0.33	1.00	0.11	0.11	Stoc21,Ma21
	Long Term	0	1.00	0.22	0.22	-
France Telecom	Short Term	0.59	1.00	0.38	0.38	Stoc5,Ma9
	Medium Term	0	1.00	0	0	-
	Long Term	0	1.00	0	0	-
Iberia	Short Term	0.28	0.00	0.06	0.03	Po5-9,Ma9
	Medium Term	0.56	0.00	0.33	0.11	Macd21,Ma21
	Long Term	0	0.00	0.56	0.11	Adx21,Ma55
Nokia	Short Term	0.22	1.00	0.13	0.13	Macd5,Ma3
	Medium Term	0	1.00	0	0	Macd21,Ma21
	Long Term	0	1.00	0	0	-
Telefonica	Short Term	0.47	1.00	0.31	0.28	Po5-9,Ma9
	Medium Term	0.11	1.00	0.22	0.11	Po14-21,Ma21
	Long Term	0	1.00	0.00	0.00	-
Average	Short Term	0.40	0.58	0.23	0.20	
Average	Medium Term	0.21	0.57	0.14	0.10	
Average	Long Term	0.08	0.59	0.11	0.05	

The first column, after stock name, reports the holding period used to form the time span for each strategy. Column % Profitable Rules column % excess returns rules (over performing rules) and column % Significantly Excess Return Rules are the same as for figure 2. The fifth column shows the percentage of improvement with regard to simple strategy achieved performing a combined strategy.

Another result worth noting is that in the Italian market, on average, greater improvements come from combined strategies in the medium-term, whereas in the European market more improvements from joint

strategies come in the short-term. Either way, in the long run there are few improvements. Indeed, an element to note is that for many shares (7 in Europe and 4 in Italy) in the long run you cannot get the improvements with a combined strategy versus a strategy that based on a moving average. This leads us to infer that for the European market in the long-term it is cheaper to use a trading strategy based on a simple moving average. This is easily inferred from the fact the false trading signals are related to volatility, which affects more in the short-term. Indeed it could be sufficient to extend the span of the moving averages to reduce volatility and therefore misleading signals. Considering all samples, the evidence suggests that trend indicators, when applied in isolation, have some predictive ability. When Moving Averages–Oscillators rules are applied jointly, however, the Oscillator component filters out weak signals emitted by the MA rules inducing neutral days where investors are recommended to ‘wait-and-see’. These results therefore suggest the simultaneous use of MA and OS indicators leads to improved forecast power because of the ability to catch the information content in past prices more effectively. In general, one can assume that by combining oscillators with moving averages, a superior technical trading strategy is developed. It is thus not surprising that most financial firms do have their own trading team that relies heavily on technical analysis.

CONCLUSION

This paper mainly distinguishes itself from previous studies in the literature in the following aspect. Most empirical work has studied technical approaches in isolation. This is ultimately not satisfactory because, as shown in this, study, different technical trading rules are able to identify different predictable items. Following this thinking, the primary purpose of this paper is to show how one can develop trading strategies which combine different technical analysis approaches. Applied daily to three European Stock Indexes over the 2000–2007 period, we got a set of combined strategies to outperform both simple technical trading rules and the naïve buy and hold strategy even after accounting for transaction cost. In general, one can infer from the results that technical indicators can play a useful role in the timing of stock market entry and exits. It is thus not surprising that most member firms have their own trading teams that rely heavily on technical analysis. The technical analyst’s approach, on the other hand, typically involves the simultaneous use of trend indicators and other confirming indicators because trend indicators alone do not capture the information content in past prices. Those arguments suggest to us that technical trading rules, and particularly moving average and oscillators, are asymmetric in the opposite directions during trending and trading periods, providing striking evidence of their complementary properties. This evidence enables us to construct a superior technical trading strategy that captures a more comprehensive aspect of predictability in past prices. To summarize we conclude that the use of confirming indicators in a moving average signal system significantly improves forecast power. As a second goal of our research we found evidence of inefficiency signs in some European Stock Markets.

REFERENCES

- Alexander, S. (1964) “Price movements in speculative markets: trend or random walks”, in, *The Random Character of Stock Market Prices*, P. Cootner (ed.), MIT Press, Cambridge, MA.
- Atmeh, M. A., Dobbs I. (2006), “Technical Analysis and the Stochastic Properties of the Jordanian Stock Market Index Return”, *Studies in Economics and Finance*, v. 23, Iss. 2, pp. 119-40.
- Bail, M. (2005) “The stochastic oscillator: technical Tuesday with mark bail”. *Penny Sleuth*, 2006. Moving Average Comparison”, *International Journal of Business*, v. 8, Iss. 3, pp. 267-84.
- Chen, K.; Li, X., (2003), “Is Technical Analysis Useful for Stock Traders in China? Evidence from the SZSE Component A-Share Index”, *Pacific Economic Review*, v. 11, Iss. 4, pp. 477-88.

Fock H.; Klein C.; Zwergel B. (2005), "Performance of Candlestick Analysis on Intraday Futures Data", *The Journal of Derivatives*.

Fang, Y.; Xu, D. (2003), "The Predictability of Asset Returns: An Approach Combining Technical Analysis and Time Series Forecasts", *International Journal of Forecasting*, v. 19, Iss. 3, pp. 369-85.

Fernandez-Rodriguez, F.; Sosvilla-Rivero, S.; Andrada-Felix, J., (2003), "Technical Analysis in Foreign Exchange Markets: Evidence from the EMS", *Applied Financial Economics*, v. 13, Iss. 2, pp. 113-22.

Glezakos, M.; Mylonas, P., (2003), "Technical Analysis Seems to Be a Valuable Investment Tool in the Athens and Frankfurt Stock Exchanges", *European Research Studies*, v. 6, Iss. 1-2, pp. 169-92.

Henderson, C. (2002), "*Currency Strategy: The Practitioner's Guide to Currency Investing, Hedging and Forecasting*", John Wiley and Sons Ed..

Jensen, M. C. (1978), "Some Anomalous Evidence Regarding Market Efficiency." *Journal of Financial Economics*, pp 695-101.

Malkiel, B.G.(1981), "*A Random Walk Down Wall Street*", W. W. Norton and Company Ed.

Marshall, Ben R.; Cahan, (2005), "Does Intraday Technical Analysis in the U.S. Equity Market Have Value?", *Journal of Empirical Finance*, v. 15, Iss. 2, pp. 199-210.

Mitra, S., (2002), "Profiting from Technical Analysis in Indian Stock Market", *Finance India*, v. 16, Iss. 1, pp. 109-20.

Neftci S., (1991), "Naïve Trading Rules in Financial Markets and Wiener-Kolmogorov Prediction Theory: A Study of "Technical Analysis", *Journal of Business*, v. 64, Iss.4, p.594-71.

Nison, S. (2005), "East Meets West-Candlesticks and Oscillators". *Smart Trade Digest*. 2006.

Park, C.; Irwin, S. (2007), "What Do We Know about the Profitability of Technical Analysis?", *Journal of Economic Surveys*, v. 21, Iss. 4, pp. 786-826.

Patel, A. (2000), *Trading Online*, 2nd edn, Pearson Education Ltd, London.

Pring, M. (2002), "The Successful Investor's Guide to Spotting Investment Trends and Turning Points", McGraw-Hill Companies.

Reitz, S., (2006), "On the Predictive Content of Technical Analysis", *North American Journal of Economics and Finance*, v. 17, Iss. 2, pp. 121-37.

Rogovska-Ischuk, I. (2006), "Practical Aspects of Technical Analysis at the Forex Market", *Journal of European Economy*, v. 5, Iss. 3, pp. 317-27

Wilder W. (1978), "New concepts in technical trading systems", Trend Research Ed.

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INVESTOR PERCEPTION OF INFORMATION DISCLOSED IN FINANCIAL REPORTS OF PALESTINE SECURITIES EXCHANGE LISTED COMPANIES

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ABSTRACT

The primary objective of this study is to investigate the perception of users regarding the availability, adequacy, and usefulness of information disclosed in the financial reports of companies listed on the Palestine Securities Exchange (PSE). A survey methodology was utilized involving a selected sample of information users, i.e., individual and institutional investors, analysts, academics, and intermediaries. Results of the study demonstrated that users perceive reported information as neither adequate nor relevant to investment decisions. In particular, reported information was insufficient, as listed companies did not comply with the minimum disclosure requirements of international standards. This unfavorable perception, along with poor credibility and bad timeliness of the disclosures, has prevented information from being impounded into stock prices. The study presented a number of recommendations that may be helpful in improving the efficiency of the PSE, which in turn will contribute to the Palestinian economy as a whole.

JEL: G11; G14; G15

KEYWORDS: Information Disclosure, Market Efficiency, Financial Statements, Information Usefulness.

INTRODUCTION

Information disclosure is essential for the effective operation of securities markets. In a market where resources are not fully allocated, capital providers need to seek good opportunities to realize added capital values, while capital operators hope to attract enough capital for operations to make profits. Once the two strike a deal, information disclosure is necessary to reduce information asymmetry between investors and management. Information is considered as a communication tool between all efficient market partners (Freedman and Stagliano, 2002). The primary objective of capital market research has been to assess whether accounting data provide value-relevant information to investors, which is incremental to all other sources of publicly available information. The information content of accounting numbers is inferred from the variability of stock prices and from changes in the volume of security trades during a short time period when these data are publicly released. However, in the Arab region there is a little empirical evidence on how financial statement users assess risk. Schrand and Elliott (1998) noted, because most extant research focuses on effects of risk, not on how investors assess risk, the studies provide little explicit guidance about which disclosures can aid investors in assessing risk.

Availability, adequacy, and timeliness of relevant information about marketable securities are important for both pricing efficiency and market confidence. If investors are to make sound judgments about the value of securities, they must be fully informed of relevant facts. Since information disclosure is essential for the effective operation of the efficient securities markets, the regulators are increasingly concerned about the quality of both the financial and non-financial information disclosure of firms. For example, in the year 2000, the International Organization of Securities Commissions (IOSCO) adopted the International disclosure standard for cross-border offerings and initial listings.

A number of theoretical arguments support rejection of the efficient market hypothesis in many emerging markets. This is particularly true in thinly traded markets where the low level of competition and the subsequent dominance of some players may allow individual traders to set stock prices at levels significantly different from their intrinsic value. In addition, El-Erian and Kumar (1995), and Mobarek and Keasey (2000) suggested that a number of structural and institutional specificities such as the fragmentation of capital markets and the presence of political and economic uncertainties, may account for departure from efficiency. Scarcity of corporate information, the lack of auditing experience, and the weaknesses of regulations and disclosure requirements lead to truncated fundamental information.

The Palestinian economy is a unique case, where there are limited resources and poor quality of small and medium family enterprises. Therefore, the need of an efficient capital market to attract foreign capitals, to gather the Palestinian savings, and to help local and foreign investors in making investment decisions in Palestine is an important matter. In 1995, Palestine Securities Exchange (PSE) was established with a total capital of JD2 million (USD2.8 million) as a private sector entity. The PSE commenced trading activities in February 1997 with eight listed companies. Currently, there are thirty-seven listed companies from variety of sectors, pharmaceuticals, utilities, telecommunications, and financial services, with total market capitalization of USD2.1 billion as of December 31 2008 (www.p-s-e.com). In February 2005, The Palestinian Authority established the Palestinian Capital Market Authority (PCMA), according to the Securities Law number 12 for year 2004. The PCMA is the sole legal entity that is in charge of monitoring the trading activities at the PSE as well as the conduct of the listed companies and the brokerage member firms.

PSE operations are critical to the success of the country's economic development. Given the dispersal of the Palestinians and the concentration of personal wealth abroad, Palestine has a special and urgent need for an effective intermediary to facilitate the repatriation of long-term investment capital to the economy. Due to the inability of Palestinian expatriates to actively manage or monitor their potential equity investments in Palestine, they require a vehicle for passive investments, namely the public shareholding companies. The Palestinian economy needs to encourage the formation of such companies in order to broaden their ownership base and to make them truly public in line with global practices. The establishment of PSE has provided public shareholding companies with new opportunities of financing at a time when the banking credit offered to the private sector in Palestine was low. Thus, the need to establish a well-regulated capital market with strong and effective intermediaries may lead to increasing the total equity capital available for each individual project and in the economy as a whole.

The primary objective of this study is to assess the extent that users perceive information disclosed in the financial reports by companies listed at the PSE as available, adequate, and useful to their investment decisions. Furthermore, this study examines whether multi-groups of investors have the same investment decision criteria within the different characteristics (qualification, experience, industry, and amount of money invested).

The remainder of this paper is organized as follows, section 2 reviews the previous studies that examine the relationship between accounting information and capital markets, including research that has been conducted in other countries of the world. Section 3 presents the methodology and data utilized in this study including the sample specifications in order to test the hypotheses. Section 4 describes and discusses the results of testing the hypotheses. Section 5 summarizes the results and draws some conclusions and recommendations.

LITERATURE REVIEW

Since the pioneering work of Ball and Brown (1968), the relationship between accounting information and capital markets has attracted considerable attention. The interest for this subject is legitimate, given

the objective of financial reporting that accounting figures are aimed at providing investors with useful information for their investment decisions. In capital markets, financial information is supposed to facilitate the prediction of firms' future cash flows and help investors assess future securities' risk and returns. On this subject, three types of research are successively considered. Studies of the market reaction to the release of new accounting information that analyze the stock price impact of accounting disclosures in order to determine whether these are useful to market participants. Studies of the long-term association between stock returns and accounting numbers, which examine the extent to which the information conveyed by accounting figures is consistent with that reflected in stock prices. Complementary studies devoted to the use of accounting data by investors and to the influence of market considerations on accounting choices (Al-Mubarak, 1997).

Financial reporting usefulness has been one of the most important research areas in accounting. Since the seminal study of Ball and Brown (1968), extant accounting literature has well documented the usefulness of accounting earnings, book value and other items in the financial reports both in the U.S. as well as internationally [Graham and King (2000), Chen (2001)]. While most of these studies provide evidence that annual report is an important source of information, they also show a low association between accounting numbers and stock prices or returns. Some recent studies even report a decreasing trend in the value-relevance of financial statement information in the U.S. over the past decades (Francis and Schipper, 1999). Many prior studies empirically establish the usefulness of financial reports or other financial information by the statistical association between the financial information and stock prices or returns. Hodge (2003) suggests that a survey-based research can complement the archival-based research in that it gathers data on a multitude of individual beliefs and practices to provide the underlying reasons for investors' behavior.

The disclosure of relevant corporate information is an essential element of a market-based monitoring of companies. Disclosure and transparency induce corporations to better protect investors, and thereby enhance investors' confidence in capital markets. For disclosure to be meaningful, it should be timely, accurate, and informative. In relation to the reliability of disclosed information, companies must adopt internationally recognized accounting and auditing standards, and assure the independence of the audit process. Timely disclosure of accurate information on important firm-related matters is crucial for the protection of shareholders' rights for two main reasons. First, shareholders need to have access to information about important matters to make decisions that are in their interest. Second, information disclosure is crucial in preventing managers and dominant shareholders from engaging in activities that are illegal or are detrimental to minority shareholders. Corporate disclosure has evolved from being solely focused on financial information excerpted predominantly from a firm's financial statements. Today, corporate disclosure is utilized as a strategic tool in risk assessment and the value creation process. The emergence of comprehensive disclosure strategies that encompass all aspects of a firm's performance has resulted in the broadening of both the scope and scale of the information released by firms. Disclosure strategies, including economic, social and environmental information, are now a key component of many firms' investor communication programs (Richardson and Welker, 2001). This evolution in corporate practices appears to be well founded, since empirical findings suggest that an open disclosure policy provides many benefits to a firm, e.g., a lower cost of capital (Botosan and Harris, 2000). Environmental reporting typically occupies a prominent place within the scope of a firm's disclosure strategy (Cormier and Magnan, 1999).

In the Arab countries, many studies deal with this issue. In Jordan, Abu-Nassar and Rutherford (1996) undertook a study to discover the view of external users of annual corporate reports. They targeted different groups of external users, namely individual shareholders, institutional shareholders, bank loan officers, stockbrokers, and academics. They found out that bank loan officers were the heaviest users of the annual reports in Jordan, while individual shareholders and academics were found to be the least. They also found the income statement and balance sheet to be the most widely read parts of the annual

corporate report by all users. In Saudi Arabia, Al-Mubarak (1997) confirms that the annual corporate report is the primary source of corporate information and his findings are in line with those found in developed countries. Abdelsalam (1990) reports that the vast majority of respondents indicate that investors read the annual reports and that the profit and loss statement was the most important part of the annual report. Within the Palestinian context of literature, few studies addressed this issue. Al-Gareh (2001) tested empirically the PSE daily price index by using multivariate methodology and found out that the market is weakly efficient. Al-Fayyoubi (2003) tested the informational efficiency by analyzing the relationship between trading volume and stock-price volatility. The paper demonstrated that the price volatility is not explained directly by the flow of information, and Mixture of Distributions Hypothesis (MDH) is not relevant in the PSE. The results provided that investors in the PSE should pay more attention to the fundamental (financial) information in order to improve the rationality of the decision making process. Abdelkarim & Shahin (2007) and Abuzarour (2005) used the variance ratio test, developed by Lo and Mackinlay in 1988, and the nonparametric run test, to examine the PSE efficiency and the results provided further evidence that the PSE is weakly efficient.

In the context of Palestine, market inefficiency and corporate governance were identified as the main reasons for PSE being a shallow market and the main obstacles for PSE capitalization growth (MAS 2004). Financial disclosure procedures are weak; there is low public awareness about securities, poor investment culture, and poor accounting and auditing procedures. All these factors have negatively affected the performance of the PSE in terms of depth, liquidity, volatility, and trading volume (Jafary & Makhool, 2004). However, there are no studies that investigate the investors' perception towards information usefulness. Because little is known about the stock price behavior in this market, the aim of the study is to survey investor's perceptions of financial information disclosure. This can be achieved by assessing the perception of users towards the availability, adequacy and usefulness of relevant information disclosed by companies listed at PSE.

Study Hypotheses

Our study aims to assess the availability, adequacy, and the perceived usefulness of information for investment decisions. To facilitate our analysis, the following hypotheses were developed and are stated in their null forms as follow:

H01: Users perceive the information disclosed in the financial reports of the companies listed at the PSE as available, adequate, and useful.

H02: There are no statistical significant differences among the multi users' perception of information.

DATA AND METHODOLOGY

A questionnaire survey was designed where respondents were asked to determine the degree of importance of each information item using Likert-type five scales, where (1) referred to strongly disagree, and (5) to strongly agree, and tested statistically to fulfill our research objective, see appendix. In order to form a list of the information potentially used by financial statements' users, an extensive review of relevant literature was undertaken, E.g. Taylor (1965), Epstein and Pava (1993), Abu-Nassar and Rutherford (1996), Ba-owaidan, M. (1994), Bartlett and Chandler (1997), Mangena, M. and Kinman (2003). Drawing on the literature and considering the Palestinian environment, ten companies, listed at PSE as institutional investors and information providers, and five groups as external users of corporate interim reports were identified, individual investors, institutional investors, stock brokers, academics, and creditors (bank loan officers). The target groups were asked to indicate their opinion, using a five-point scale, on items of very important to not at all important or strongly agree to strongly disagree. Before distribution, the questionnaire was pretested during a pilot interview with individuals comprising both

academics and practitioners. All of our pilot interviewees either researched this area to some extent or were aware of the financial reporting practices of Palestinian companies. Each was asked to respond critically on any aspect of the design of the questionnaire. Their comments were incorporated in the final version of the questionnaire distributed to the sample.

Descriptive Statistics of the Sample

The sample contains, all seven stockbrokers in Palestine, bank loan officers, and academics concerned with this issue, in addition a random sample of individual and institutional investors. The sample size was 250 respondents, see Table 1.

Table 1: Groups and Questionnaire Response Rates

Subject-groups	Distributed	Received	Response-Rate
Individual investors	180	124	69%
Institutional investors	30	25	83%
Bank loan officers	20	14	70%
Stock Brokers	7	7	100%
Academics	13	10	77%
Total response rate	250	180	72%

This table shows the five groups of the survey sample and the response rate of each group.

Part one of the questionnaire, as demonstrated in Table 2, asked the respondents to provide information concerning their qualification, experience, primary industry focus, and amount of money invested, in order to help in the analysis of the questionnaire responses. Results reveal that users groups hold at least a professional qualification, with 4.44% of PhD degree, 7.78% of Masters Degree, 36.68% of first degree, and 51.1% other professional qualification. In terms of experience, 4.44% had less than one year experience, 38.90% had 1-5 years of experience, 42.20% had 6-10 years of experience in investment analysis, and 14.46% of the investment analysts indicated that they had more than 10 years of investment analysis experience. With respect to industry focus, 56% indicated that they have invested in a number of industry sectors. The majority were interested in investing in PALTEL as a telecommunication sector, and PADICO as an investment sector, which are the most actively traded companies at PSE. In terms of the amount of money invested, 10% are not investing at all, 15% are investing less than USD10,000, 21.11% are investing between USD(10,000-24,999), 22.22% between USD(25,000-49,999), 14.44% between USD(50,000-99,999), and 17.23% invested more than USD100,000. Finally, only 21% of investors were now interested to increase their amount of money invested. In fact, this opinion reflects the risks associated with the existence of political and economic conditions in Palestine.

The risk and return attitude of the sample, part two of the questionnaire in Table 3 below, shows that investors pay more attention to the speculative gains as their first goal; investment opportunities, because of the limit of other investment opportunities in Palestine, as their second goal, steady income as the third goal, and safety of capital as the last. When attention is turned to the kind of analysis they use, the political analysis was the only significant tool as calculated by the Kruskal-Wallis significant level *KWLS* (0.032). Other analysis tools were ranked as follow: no analysis just imitating other investors, technical, fundamental, macroeconomic, and statistical analysis was the last. Results indicate that many investors do not know any kind of analysis; rather they just imitate other investors. This indicates that many investors in the market are of a poor investment culture. Information users mentioned that corporate financial reports and the PSE market statistics are the most significant sources of information for their investment decisions. Other sources are ranked as direct information from the company, market rumors, investors own analysis, advice of specialists, and finally advice of stockbrokers. Results indicate that investors in the market rely heavily on direct information from the companies' management and rumors. This means that poor quality of investment decisions, especially in financial analysis, does exist in the Palestinian environment.

Table 2: Sample Description

<i>Kind of users</i>	Number of Observations	Percentage (%) of Total Sample
Individual investor	124	68.88%
Institutional investor	25	13.89%
Creditors (bank loan officers).	14	7.78%
Stockbrokers	7	3.90%
Academics	10	5.55%
Total	180	100%
<i>Users by Qualification</i>		
PhD degree	8	4.44%
Masters degree	14	7.78%
BA, First degree	66	36.68%
Professional qualification	92	51.10%
Total	180	100%
<i>Users by Experience</i>		
Less than 1 year	8	4.44%
1-5 Years	70	38.90%
6-10 Years	76	42.20%
Above 10 Years	26	14.46%
Total	180	100%
<i>Investors by Industry Focus</i>		
Telecommunications	108	66.60%
Insurance companies	36	22.22%
Banks	58	35.80%
Investment Management Companies	126	77.78%
Services	88	54.32%
Industrial	102	62.96%
Total = 180		
<i>A amount of Money Invested in USD</i>		
Nothing	18	10.00%
Less than 10,000	27	15.00%
Between 10,000 – 24,999	38	21.11%
Between 25,000 – 49,999	40	22.22%
Between 50,000 – 99,999	26	14.44%
More than 100,000	31	17.23%
Total	180	100%

This table shows sample description in terms of qualification, experience, primary industry focus, and amount of money invested.

Survey Statistical Tests

Univariate analysis symbolizes the procedure of considering variables individually, the main objective of univariate analysis is to summarize the data in a form permitting the reader to gain a feeling of the distribution of data over the possible range. When the question is about ranking something, such as the importance of the different sections in corporate interim reports, Kendal's coefficient of concordance for each group of respondents and for the sample as a whole is calculated. This coefficient, known as W , quantifies the amount of agreement among the group members regarding their evaluation of a set of items (Huck and Cormier, 1996). The value of the coefficient, known as W , varies from zero where no agreement among the respondents to one where there is total consensus among the respondents.

Bivariate and multivariate analysis used to test whether there is a significant statistical difference between different user groups, as the number of groups in this research is five. Therefore, these groups can be analyzed in pairs or collectively. The groups are independent of each other and their perceptions were measured on an ordinal scale. In addition, since there are more than two independent groups, the appropriate non-parametric statistical test could be used is the Kruskal-Wallis, namely the one-way analysis of variance by ranks, commonly called the Kruskal-Wallis H test. The rejection of the null hypothesis means that there is a significant difference between at least one pair of the groups considered

in the test. This test, however, cannot determine which pair, or pairs, of groups have the significant differences. To do that a *post hoc* analysis needs to be performed in each pair of groups.

Table 3: Sample Description

Item	Mean	Standard Deviation	Overall Rank	KWSL Sig.
Investors Goals				
Safety of Capital	2.65	0.31	4	0.112
Steady income	4.02	0.38	3	0.060
Speculative gains	4.42	0.36	1	0.375
Investment opportunity	4.15	0.38	2	0.115
Kind of Analysis				
Political analysis	4.80	0.32	1	0.032**
Macroeconomic analysis	3.38	0.34	4	0.805
Technical analysis	4.04	0.38	2	0.745
Fundamental (Financial) analysis	3.18	0.49	5	0.640
Statistical analysis	2.15	0.68	6	0.980
No Analysis, imitation other investors	3.47	0.62	3	0.375
Sources of information				
PSE Market statistics	4.15	0.44	2	0.355
Corporate financial reports	4.22	0.28	1	0.048**
Advice of investment services (Specialists).	2.81	0.82	6	0.320
Advice of stockbrokers	2.18	0.92	7	0.940
Direct information from the company	4.02	0.73	3	0.116
Investors own analysis	3.61	0.62	5	0.380
Market rumors, and adages	3.86	0.68	4	0.872

*This table shows the investment goals, the kind of analysis that investors consider when making investment decisions and the sources of information. ** indicates significance at the 5 percent level.*

RESULTS

Assessing the Availability, Adequacy, and Usefulness of Information Disclosure

Results of testing H01, as restated below, are presented.

H01: Users perceive the information disclosed in the financial reports of the companies listed at the PSE as available, adequate, and useful.

This study aims to assess whether investors in the PSE market perceive the financial information disclosure as relevant for their investment decision process. Results, which are outlined in Table 4, show that when asking the external users of information about the readership of the corporate financial reports, users attached a higher level of importance to the profit and loss statement, balance sheet, cash flow statement, statement of shareholders equity, management commentary, and footnotes to the financial statements. Auditor's report was the only insignificant report. These results are consistent with the results of previous studies, especially in the Arab region. Financial statements are considered as the main simple source of information that external users evaluate and use to make informed investment decisions. According to the quality of information, all users considered the timeliness and availability of information as important. They also considered other quality items such as adequacy, credibility, relevancy, and understandability important for their investment decisions. Information users evaluated the company's level of disclosure as poor and weak. These results reflect the inadequacy of the information quantity and quality that companies listed at the PSE usually disclose. Companies should comply with the minimum international disclosure requirements and timeliness of the disclosure process.

Table 4: Users' Perception of Information

Readership of the corporate reports	Mean	Standard Deviation	Overall Rank	KWSL Sig.
Balance sheet	4.58	0.49	2	0.000**
Profit and loss statement	4.72	0.38	1	0.000**
Cash flow statement	4.12	0.62	3	0.040**
Footnotes to the financial statements	3.08	0.92	6	0.121
Statement of shareholders equity	3.34	0.68	4	0.121
Management commentary	3.18	0.72	5	0.140
Auditors report	2.82	1.12	7	0.460
Information quality				
Timeliness	2.32	0.31	1	0.042**
Availability of specific information	2.88	0.38	2	0.056
Understandability	3.88	0.52	6	0.496
Credibility	3.35	0.24	4	0.225
Adequacy	3.02	0.38	3	0.186
Relevancy	3.40	0.36	5	0.325
Level of disclosure by companies				
In Management Commentary Section	3.22	0.76	4	0.640
In Income Statement section	4.23	0.58	1	0.211
In Balance Sheet Section	4.18	0.72	2	0.221
In Cash Flow Statement Section	3.62	0.52	3	0.240
In Segmental Information Section	3.08	0.84	5	0.860
In Accounting Policies and Notes	2.14	0.74	6	0.822

*This table shows users perception of the information disclosed in the financial reports of the companies listed at the PSE as available, adequate, and useful. ** indicates significance at the 5 percent level.*

When external users were asked about the level of information contained in the financial statements that companies disclosed results show that information users considered the income statement, balance sheet, and cash flow statements sections as adequate with a mean > 3, although KWSL value was not Significant for all sections of the financial statements, see Table 4. This reflects that the users considered the level of information disclosed by companies is not adequate in quality. Meanwhile, users hope to have additional relevant and sufficient information by companies to help them in making informed investment decisions.

In Table 5, the respondents were asked to indicate the degree of usefulness of selected information. Comparison between companies, primary information for investment decision, evaluating company's performance over time, monitoring their investment, predicting earning per share and liquidity were the most useful information. Another important point to note is that investors considered information related to risk, and investment opportunity, as the most important of non-traditional financial information. Competition position, industrial sector sustainability, and corporate strategy were important items of non-financial information. A list of items required by the International Financial Reporting Standards and from the relevant previous studies that are expected to appear in the financial reports of any Palestinian company formed a part of the questionnaire. The respondents were then invited to express the degree of importance they attach to each of these items using a Likert-type scale, where (1) referred to not important, and (5), to very important. The results within all financial reports' users were also summarized in Table 5. Net income, share price growth, net cash flow, sales revenue amount, and amount of current liabilities were the most important items that user's perceive. Finally, all investors deemed that more quantity and quality of items disclosed by listed companies could create fair stock price value.

Assessing Multi Users' Perception of Information Using the Differential Analysis

Results of testing H02, as restated below, are presented.

H02: There are no statistical significant differences among the multi users' perception of information.

In order to examine whether the perceptions of multi-users on the importance of the information disclosed in the financial reports differ with qualification, experience, industry focus, and amount of money invested, the Kruskal-Wallis test (non-parametric statistic) was conducted. Table 6 below reports the results of the tests on the importance of the different parts of the interim reports. The results suggest that there are significant differences on the ratings of items of disclosure based on the qualifications and experience of the users for income statement, balance sheet, and cash flow statement (at the 5% significance level). However, there are no significant differences for segmental information, management commentary and accounting policies and notes, suggesting that the level of qualification and experience of the users does not lead to differences in the perception of these items. It is difficult to speculate why the qualification and experience of the users lead to differences in the perception of the importance on the balance sheet and cash flow statement. However, a possible explanation could be the field in which an individual user qualified. For example, an investment user who holds finance and/or accounting qualification could perceive information differently from one with an engineering qualification. Chang et al. (1983) grouped the respondents into those with training in finance and accounting and those with no such training and found differences in the way the two groups perceived the annual report. In respect to industry focus and amount of money invested, no significant differences were found concerning the importance of the different parts of the financial reports, although there is little impact within investors amount of money invested. These results suggest that both variables have little or no impact on the perceived importance of the items disclosed in the financial reports. Results for the industry focus might be affected by the large representation of investors who focus on various industries.

Table 5: Users' Perception on Usefulness of Disclosed Information

Usefulness of information	Mean	Std. Dev.	Ovrl. Rnk.	KWSL Sig.
Panel A: Non Financial Statement Information				
Primary information for investment decision	4.13	0.42	2	0.236
Monitor their investment	3.86	0.64	4	0.374
Earnings per share Prediction	3.61	0.79	5	0.905
Assessing liquidity of the company	3.07	0.86	6	0.100
Future dividend Prediction	3.04	0.97	7	0.960
Evaluating performance over the time	4.08	0.80	3	0.152
Comparison between companies	4.46	0.28	1	0.025**
Importance of Non Traditional Information				
Information Related to Risk	4.62	0.24	1	0.045**
Business opportunity	4.32	0.32	2	0.428
Social Responsibility Information	2.38	0.62	4	0.488
Market regulation	3.16	0.35	3	0.820
Importance of Non Financial Information				
Execution of Corporate Strategy	4.63	1.02	3	
Corporate product or service Creation	4.52	0.84	5	
Kind of management, especially directors	4.46	0.62	6	
Customer Satisfaction	4.32	0.75	9	
Indication of employee morale and Satisfaction	3.56	0.98	14	
Quality of Processes	4.24	0.78	10	
Environmental & Social Policies	4.20	0.68	11	
Industrial sector Sustainability	4.72	0.71	2	
Organizational and functional structure	4.08	0.88	13	
Corporate governance	4.39	0.80	8	
Company profile	3.16	0.84	15	
Competitor Position	4.78	0.68	1	
Quality of Published Materials	4.46	0.82	6	
Voluntary disclosure	4.60	0.80	4	
Disclosure by the website	4.12	0.72	12	

Table 5: Users' Perception on Usefulness of Disclosed Information (Continued)

Usefulness of information	Mean	Std. Dev.	Ovrl. Rnk.	KWSL Sig.
Panel B: Financial Reports, Items				
Net cash flow	4.63	0.86	3	
Gross and disaggregated value of current liabilities	4.48	0.79	5	
Gross and disaggregated amount of shareholders equity	3.98	1.04	16	
Capital structure	3.98	0.86	16	
Share price growth	4.60	0.70	2	
Strategies of Profit	3.36	1.17	28	
Current research and development expenditure	3.14	0.87	36	
Sales revenue amount	4.61	0.66	4	
Dividend per share for the period	3.34	1.07	29	
Sales growth expected	3.88	0.97	18	
Gross and disaggregated value of current assets	3.88	0.82	18	
Discussion of results with reasons for changes	3.28	0.84	30	
Number and amount of authorized and issued shares	3.22	1.27	33	
Overall financing costs	3.28	0.69	30	
Net assets book value	3.26	0.84	32	
Money resources and uses	3.86	0.80	20	
Description of the company main product or services	3.85	1.04	21	
Inventories value and method used to determine the cost of (e.g. LIFO, FIFO)	2.92	0.95	40	
Working capital Expenditure last five year	3.75	1.02	22	
Discussion of Increase or decrease of Expenditure	4.20	0.86	8	
Discussion of Increase or decrease of revenues	4.24	0.69	7	
Expenditure on advertising and publicity for the past years	3.06	1.02	39	
Discussion of financial strength of the company	3.68	1.10	23	
Breakdown of borrowings (e.g. lending institution, date of maturity, security)	3.18	1.07	34	
Information relating to investments (e.g. names, percentage, ownership)	4.28	0.81	6	
Summary of net sales for at least the most recent five years	4.20	0.64	8	
Current market value of quoted investments	4.15	0.82	10	
Revenue recognition method	3.66	0.87	24	
Future economic outlook of the company	3.60	0.93	25	
Breakdown of revenue by product line, class of customer and geographical location	4.14	0.79	11	
Expenditure on human resources (e.g. training, welfare facilities)	3.08	0.72	38	
Basis of accounting methods used, and any change	3.12	1.08	37	
Discussion of the major factors likely influence following year's results	3.54	0.94	26	
Analysis of sales revenue and earnings attributable to foreign operations	4.11	0.63	12	
Information relating to subsidiaries (e.g. names, addresses, percentage ownership)	4.08	0.95	13	
Forecast of following year's profits	3.50	1.03	27	
Number and type of ordinary shareholders (e.g. institutions, individuals)	4.03	0.75	15	
Information relating to past five balance sheet events	4.07	0.91	14	
Net income	4.70	0.65	1	
Total public and management expenditure	3.15	0.99	35	

This table shows the users' perception on usefulness of the various disclosed information and other items required by IFRS.

*** indicates significance at the 5 percent level.*

Summary of Results

In comparison with previous research efforts elsewhere in the Arab region, the study findings were similar to the findings of Ba-owaidan (1994) and Abdelsalam (1990), whose surveys were based in Saudi Arabia. It is also consistent with the findings of Abu-Nassar and Rutherford (1996) who surveyed multiple groups of users of Jordanian annual corporate reports.

This study found that the income statement, balance sheet, and the cash flow statement, are the most important sections of the financial reports to most of the user groups. The auditor report and accounting policies were found to be the least popular. Unlike user groups in the developed economies, the Palestinian user groups obtain information directly from the company and place some importance on the market rumors and adages. The study found out that analysts rank the income statement, balance sheet and Cash Flow Statement as the most highly important sections of financial reports. In addition, the financial statements section was ranked somewhat higher than other sections like the auditor report. Indeed, it seems that analysts are particularly interested in delving behind the balance sheet numbers,

since they rank management's discussion of both changes in capital structure and balance sheet position higher than any other balance sheet figures themselves. The auditor report and accounting policies are ranked very low in importance. This is indicative of perhaps a relatively greater concern by analysts with relevance of financial information than with reliability. The results indicate that there were variations in the perceptions of information users of the importance of disclosure items. Statistical tests indicate that the level of education and experience seem to cause differences in the perceived importance of items in the profit and loss statement, balance sheet, and cash flow statement.

Table 6: Kruskal-Wallis Tests of Kind of Disclosure within Users

Parts of Financial Reports	Qualification Chi Square	Experience Chi Square	Industry Chi Square	Amount of Money Chi Square
Management Commentary Section	4.602	1.642	1.236	4.635
Items in Income Statement section	10.860**	8.280**	4.670	6.232
Items in Balance Sheet Section	10.532**	8.015**	3.432	6.144
Items in Cash Flow Statement	8.016**	3.420	2.640	4.882
Segmental Information Section	4.820	2.325	1.115	2.760
Accounting policies and Notes	3.624	0.885	0.685	1.516

This table shows the results of Kruskal-Wallis Test that examines whether the perceptions of multi-users on the importance of the information disclosed in the financial reports differ with qualification, experience, industry focus, and amount of money invested.

*** indicates significance at the 5 percent level.*

The analysts and academics revealed that external users of corporate information in Palestine prefer to extract information from rumors, and directly from the company, whether it is through published annual financial reports, or through direct contact with the company itself. This reflects both the nature of Palestinian business and Palestinian social environment, where companies are mainly limited to family and small population. This is expected to develop a close relationship between companies and investors.

The user groups considered timeliness, availability, and credibility of relevant information as the most important features of corporate information. The users however attached less importance to independent verification, as it is considered as contributing features to the usefulness of corporate information. As far as the issue of credibility and importance of different parts of the corporate annual report are concerned, the respondents made it clear that they had full confidence in all sections contained in the financial report. They believe that financial statements are the most credible and important part of the report. This result might reflect the Arab culture in general. Although they may not rely on financial statements when making their investment decisions, financial statements are regarded sufficient in formulating their decisions about a company. The investors also revealed that the corporate financial reports are useful in making informed decisions about companies and assist in evaluating corporate performance. The information users, however, indicate that current information published by Palestinian companies is insufficient to assess risk, estimate corporate performance and conduct comparisons between firms.

Respondents attached a high degree of importance to all disclosure items expected to be reported in the financial reports under the IFRS and the PSE disclosure requirements, with more emphasis placed on performance items. They also viewed the list of voluntary disclosure items presented in the questionnaire as being important. A high degree of importance was attached to disclosure items such as earnings per share, investments opportunities, and performance. Despite of financial reports low quality, it can be drawn from this study that all information users do find information items disclosed in financial reports as useful for their investment decision-making process. In addition, the most important items were found in the profit and loss statement, balance sheet, and cash flow statement.

CONCLUDING COMMENTS

The main purpose of this study is to provide empirical evidence on the availability, adequacy, and usefulness of the various aspects of corporate information to users. Consequently, five user groups were surveyed: individual and institutional investors, bank credit officers, academics, and stock market brokers. A questionnaire was forwarded to 250 information users selected from Multi groups; one hundred and eighty usable responses were received, representing a response rate of 72%.

Judged by the expressed needs of users, the overall level of disclosure by Palestinian companies was found to be little, poor in availability and quality. The information user groups had similar overall needs, although a number of significant differences at the level of individual items and pairings of groups are identified. There is a significance differences between the kind of information perceived and the user's qualifications and experience.

Full continuous voluntary disclosure of all pertinent and material information is required for investors to evaluate securities' efficiency; especially there is a weakness in investment and analysis culture. In particular, relevant information was insufficient, as companies did not comply with information quality requirements in their reports, beside the problem of reliability and timeliness of information. Investor's rely on the market rumors, leading to a lag in information being impounded into prices. There were restrictions on the repatriation of capital, which may have deterred foreign participation. Thus, it contributed to illiquidity and low volume of trading. Moreover, there were no restrictions on insider trading which affects the market confidence.

Despite the impressive growth of the PSE in recent years, it has not yet, offered a real investment or finance option in the Palestinian economy. Evidently, only two companies, PADICO and PALTEL, take hold of more than 60% of the whole market trading capitalization, and about six companies of 37 listed in the PSE are involved in active trading. Here are some recommended actions that can be taken to enhance the efficiency of the PSE and to ensure its contribution to the development of the Palestinian economy. Firstly, for disclosure to be meaningful, it should be timely, relevant and reliable. This will enhance investment decisions, protect investors from detriment of insider information, and decrease the effect of market rumors. This leads to the increase of the overall market confidence. Secondly, Improving disclosure and corporate governance requirements by the Palestinian Capital Market Authority and strictly enforcing compliance of listed companies with these requirements. Thirdly, improving investment culture and analyzing process for traders and brokers via education, training, and public awareness. Finally, Palestinian Capital Market Authority must accelerate the process of issuing by-laws and regulations that are necessary to organize and monitor the activities of the market as well as the financial intermediaries and companies listed at the PSE.

These are the policy actions that could improve the role of the PSE and improve its efficiency. However, these actions might not be as effective as it is hoped for, as far as the political and economic instability continue to prevail in the Palestinian Territories.

Overall, the corporate disclosure process is a complex one. Many parties affect, and are affected by, this process. Therefore, continuous research efforts are needed to enhance such a process. A natural extension to this study would be an exploration of the specific informational needs of the external users of corporate information. In addition, a further research is warranted to examine current corporate reporting and disclosure practices whether such practices meet the users' demand.

APPENDIX: QUESTIONNAIRE

Dear Respondents: Thank you for your willingness to join this survey. Please respond to all the questions in this questionnaire. We understand that the interpretation of the questionnaire and the responding to the questionnaire require a high level of professional judgment. Please check (√) the appropriate parentheses or express the extent to which you agree or disagree on the given statement by choosing (circling) one of the following: (Y+) strongly agree, (Y) agree (O) neither agrees nor disagrees (or no opinion), (N) disagree; (N+) strongly disagree.

No.	Question	Mark (√)				
Q 1	Kind of Information Users You Are					
1	Individual investor					
2	Institutional investor					
3	Creditors; (Bank loan officers)					
4	Stock brokers					
5	Financial analysts					
6	Academics					
Q 2	Information Users by Qualification					
1	PhD					
2	Masters Degree					
3	First degree					
4	Professional qualification					
5	Other					
Q 3	Information Users By Experience (Number of years)					
1	Less than 1 year					
2	1-5 Years					
3	6-10 Years					
4	Above 10 Years					
Q 4	Information Users by Industry Focus					
1	Telecommunications					
2	Insurance companies					
3	Banks					
4	Investment Management Companies					
5	Pharmaceuticals					
6	Services					
7	Industrial					
Q5	Investors By Amount of Money Invested (USD)					
1	Nothing					
2	Less than 10,000					
3	Between 10,000 – 24,999					
4	Between 25,000 – 49,999					
5	Between 50,000 – 99,999					
6	More than 100,000					
Q6	Investors Goals	Y +	Y	O	N	N +
1	Safety of capital					
2	Steady income					
3	Speculative gains					
4	Investment opportunity					
Q7	Kind of Analysis usefulness to predict future stock value					
1	Political analysis					
2	Macroeconomic analysis					
3	Technical analysis					
4	Fundamental (Financial) analysis					
5	Statistical analysis					
6	No Analysis, Imitation other investors					
Q 8	Users View towards various sources of information					
1	PSE Market statistics					
2	Corporate financial reports					
3	Advice of investment services (Specialists)					
4	Advice of stockbrokers					
5	Direct information from the company					
6	Investors own analysis					
7	Market rumors, and adages					

Q 9	Users Readership of the corporate reports					
1	Balance sheet					
2	Profit and loss statement					
3	Cash flow statement					
4	Footnotes to the financial statements					
5	Statement of shareholders equity					
6	Management commentary					
7	Auditors report					
Q 10	User's evaluating of the of corporate disclosure quality					
1	Timeliness					
2	Availability of specific information					
3	Understandability					
4	Credibility	Y +	Y	O	N	N +
5	Easy access to sources of information					
6	independent verification					
Q 11	Level of disclosure by companies					
1	In Management Commentary Section					
2	In Income Statement section					
3	In Balance Sheet Section					
4	In Cash Flow Statement Section					
5	In Segmental Information Section					
6	In Accounting Policies and Notes					
Q 12	Users view about usefulness of information					
1	Provide primary information to investors to help them in making investment decisions					
2	Provide information to help investors to monitor their investment					
3	To predict expected income and earnings per share					
4	To help investors in assessing liquidity of the company					
5	To predict future dividend of the company					
6	To evaluate company's performance over time					
7	To make comparison between companies performance					
Q 13	Importance of Non Traditional Information					
1	Information Related to Risk					
2	Business opportunity					
3	Social Responsibility Information					
4	Market regulation					
Q 14	Importance of Non Financial Information					
1	Execution of Corporate Strategy					
2	Corporate product or service Creation					
3	Kind of management, especially directors					
4	Customer Satisfaction					
5	Indication of employee morale and Satisfaction					
6	Quality of Processes					
7	Environmental & Social Policies					
8	Industrial sector Sustainability					
9	Organizational and functional structure					
10	Corporate governance					
11	Company profile					
12	Competitor Position					
13	Quality of Published Materials					
14	Voluntary disclosure					
15	Disclosure by the website					
Q 15	Usefulness of Financial Reports, Items					
1	Net cash flow					
2	Gross and disaggregated value of current liabilities					
3	Gross and disaggregated amount of shareholders equity					
4	Capital structure					
5	Share price growth					
6	Strategies of Profit					
7	Current research and development expenditure					
8	Sales revenue amount					
9	Dividend per share for the period					
10	Sales growth expected					
11	Gross and disaggregated value of current assets					
12	Discussion of results with reasons for changes					

13	Number and amount of authorized and issued shares					
14	Overall financing costs					
15	Net assets book value					
16	Money resources and uses					
17	Description of the company main product or services					
18	Inventories value and method used to determine the cost of (e.g. LIFO, FIFO)					
19	Working capital Expenditure last five year					
20	Discussion of Increase or decrease of Expenditure					
21	Discussion of Increase or decrease of revenues					
22	Expenditure on advertising and publicity for the past years					
23	Discussion of financial strength of the company					
24	Breakdown of borrowings (e.g. lending institution, date of maturity, security)					
25	Information relating to investments (e.g. names, percentage, ownership)					
26	Summary of net sales for at least the most recent five years	Y +	Y	O	N	N +
27	Current market value of quoted investments					
28	Revenue recognition method					
29	Future economic outlook of the company					
30	Breakdown of sales revenue by major product line, class of customer and geographical location					
31	Expenditure on human resources (e.g. training, welfare facilities)					
32	Basis of accounting methods used, and any change					
33	Discussion of the major factors likely influence following year's results					
34	Analysis of sales revenue and earnings attributable to foreign operations					
35	Information relating to subsidiaries (e.g. names, addresses, percentage ownership)					
36	Forecast of following year's profits					
37	Number and type of ordinary shareholders (e.g. institutions, individuals)					
38	Information relating to past five balance sheet events					
39	Net income					
40	Total public and management expenditure					

REFERENCES

Abdelsalam, M. (1990). The Use of Corporate Financial Reports by Investors in Saudi Arabia. *Advances in International Accounting*, 3, 25-39.

Abdelkarim N. & Y. Shahin (2009). The Relationship between Corporate Governance and Performance of the Palestinian Firms: An Empirical Study. *International Journal of Business and Finance Research*, Vol 3, No 2.

Abdelkarim, N., & Shahin, Y. (2007). Empirical Testing of the Informational Efficiency of Palestine Securities Exchange. *Working paper*.

Abu-Nassar, M., & Rutherford, B.A. (1996). External Users of Financial Reports in Less Developed Countries: The Case of Jordan. *British Accounting Review*, 28, 73-87.

Abuzarour, B. (2005). The Effect of Infrequent Trading on Market Efficiency: The Case of the Middle East Stock Markets. *Working Paper*, Department of Business Administration, Patra University Campus, Greece.

Al-fayyoumi, N. (2003). Information Arrival, Trading Volume and Price Variability: An Applied Study on the Palestinian Securities Exchange. *Yarmouk University Journal*, ISSN: 1023-0165.

Al-Gareh, B. (2001). *Stock Price Behavior in Emerging Markets: An Empirical Study on Palestine Securities Exchange*. Unpublished master dissertation, Jordanian University, Jordan.

Al-Mubarak, F. (1997). *The Usefulness of Corporate Annual Reports to Investment Analysts in Saudi Arabia*. Unpublished doctoral dissertation, University of Newcastle, Newcastle.

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*, 6, 159-178.

Ba-owaidan, M. (1994). *The Contribution of Accounting Information to Investor Decisions in the Saudi Stock Market*. Unpublished doctoral dissertation, University of Hull, Hull.

Bartlett, S., & Chandler, R. (1997). The Private Shareholder and Corporate Report. *British Accounting Review*, 29(3), 245-261.

Botosan, C., & Harris, M. (2000). The Cross-Sectional Determinants of Disclosure Timeliness: An Examination of Quarterly Segment Disclosures. *Journal of Accounting Research*, Autumn, 524-554.

Chang, L.S., Most, K.S. & Brain, C.W. (1983). The Utility of Annual Reports: An International Study. *Journal of International Business Studies*, 14(1), 63-84.

Chen, J.P., Chen, S., & Su, X. (2001). Is Accounting Information Value-Relevant in the Emerging Chinese Stock Market?. *Journal of International Accounting Auditing & Taxation*, 10, 1-22.

Cormier, D., & Magnan, M. (1999). Corporate Environmental Disclosure Strategies: Determinants, Costs and Benefits. *Journal of Accounting, Auditing and Finance*, 14(3), 429-451.

El-Erian, M.A., & Kumar M.S. (1995). *Emerging Equity Markets in Middle Eastern Countries*. Paper presented at the World Bank Conference on the stock markets, corporate finance, and economic growth.

El Jafary, & Makhool, (2004). The Palestinian Service Sector: Current Situation and Potential Role in Economic Development. Palestine Economic Policy Research Institute- MAS, Ramallah, Palestine.

Epstein, M.J., & Pava, M.L. (1993). *The Shareholder's Use of Annual Corporate Reports*. JAI Press, Greenwich.

Francis, J., & Schipper, K. (1999). Have Financial Statements Lost their Relevance?. *Journal of Accounting Research*, 37(2), 319-352.

Freedman, M., & Stagliano, A.J. (2002). Environmental Disclosure by Companies Involved in Initial Public Offerings. *Accounting, auditing and Accountability Journal*, 15(1), 94-105.

Graham, R.C., & King, R.D. (2000). Accounting Practices and the Market Valuation of Accounting Numbers: Evidence from Indonesia, Korea, Malaysia, the Philippines, Taiwan, and Thailand. *International Journal of Accounting*, 35(4).

Hodge, F.D. (2003). Investors' Perceptions of Earnings Quality, Auditor Independence, and the Usefulness of Audited Financial Information. *Accounting Horizons*, 17, 37-48.

Huck, S.W., & Cormier, W.H. (1996). *Reading Statistics and Research*. New York, NY: Harper Collins College Publishers.

Schrand, C., & Elliott, J. (1998). Risk and Financial Reporting: A summary of the discussion at the 1997 AAA/FASB conference. *Accounting Horizons*, 12 (September), 271-282.

Mangena, M., & Kinman, R. (2003, April). *Determinants of the quantity of information disclosed in interim reports: UK evidence*. Paper presented to the BAA Conference, Weston Conference Centre, Manchester.

Mobarek, A., & Keasey, K. (2000, May). *Weak-form Market Efficiency of an Emerging Market: Evidence from Dhaka Stock Market of Bangladesh*. Paper presented at ENBS conference, Oslo, 1-30.

Palestine Securities Exchange Law No. -13- of 2004.

Palestine Stock Exchange PSE published reports, and web site WWW.P-S-E.COM

Richardson, A., & Welker, M. (2001). Social Disclosure, Financial Disclosure and the Cost of Capital. *Accounting, Organizations and Society*, 26, 597-616.

Taylor, R.G. (1965). A Look at Published Interim Reports. *Accounting Review*, January.

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EVIDENCE ON AUDITORS USE OF BUSINESS CONTINUITY MODELS AS AN ANALYTICAL PROCEDURE

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ABSTRACT

Auditors expressing unqualified audit opinions and asserting going concern for companies that subsequently fail is regarded as audit failure and results in considerable disapproval of the auditing profession. Prior research has suggested that corporate failure models, as an analytical procedure, improve the accuracy of auditors' assessments of going concern. This study utilizes a survey to examine the practical efficacy of such models within the audit decision framework. It is found that corporate failure models facilitate the formation of more appropriate going concern opinions and increase judgment consensus.

JEL: M41, M42.

Keywords: Going concern opinions, audit judgment, corporate failure models

INTRODUCTION

The issuance of clean audit reports to companies that subsequently fail leads to the loss of confidence in the statutory audit function (Venuti, 2004; Bellovary et al., 2006). This often results in significant costs to both auditors and investors. Prior research that compares the outcomes of various bankruptcy models with auditors' reports issued prior to bankruptcy filings indicate that such models significantly outperform auditors' opinions issued to failed companies (Mutchler et al., 1997; Kleinman and Anandarajan, 1999). This suggests that corporate failure models may have a valuable role as a substantive analytical procedure that can assist auditors in forming more appropriate going concern opinions.

This study examines the practical efficacy and usefulness of corporate failure models for assessing going concern. Given the high cost associated with misclassifying failing clients (Kaminski et al., 2004; Nogler, 2004; Hensher and Jones, 2007), this study provides greater insights into the practical value of using corporate failure models for assessing going concern.

The study uses a survey instrument containing an experimental case to assess the contribution of a corporate failure model in auditors' going concern judgment. The results indicate that corporate failure models are highly effective in assisting auditors to mitigate the effects of human information processing limitations, thereby facilitating the formation of more appropriate audit opinions.

The remainder of the article is structured as follows: The next section examined the extant literature in the area. Section three describes the research objectives and hypothesis, followed by a description of the research design in section four. Section five presents and discusses the results of the study, while section six concludes the paper with research limitations and opportunities for further research.

LITERATURE REVIEW

As the going concern concept is a central postulate on which financial reporting is based, an accurate assessment of going concern status is critical to expressing an opinion on whether the financial statements

are presented fairly, as a going concern, (Asare, 1990; Boritz, 1991; Wolk et al., 1992; Carmichael and Pany, 1993; Constantinides, 2002; Carcello et al., 2003). The external audit function as the principal means of adding credibility to financial statements only prevails if it consistently reaches accurate assessments of the fair presentation of clients' financial statements (Flint, 1988; Asare, 1990; Weil, 2001; Geiger et al., 2005).

Prior research shows that auditors in many jurisdictions do not always arrive at what may be, in hindsight, an appropriate audit opinion (Casterella et al., 2000; Herbohn et al., 2007). Auditors appear to have a bias towards not qualifying failing clients, with typically 20 to 95 percent of bankrupt companies receiving unqualified audit reports (LaSalle and Anandarajan, 1996; Matsumura et al., 1997; Rama et al., 1997; Geiger et al., 1998; Casterella et al., 2000; Weil, 2001; Dunn et al., 2002; Weiss, 2002). Taffler and Citron (1988) show that only 20 percent of UK failed companies received going concern qualifications before being declared bankrupt. In New Zealand, only 28 percent of failed companies received appropriate audit qualifications (Van Peurse and Pratt, 2002). Furthermore, in Belgium, fewer than 26 percent of bankrupt companies received audit qualifications (Vanstraelen, 1999). Qualifying the financial statements of a going concern can also be costly, although it is more infrequent than un-qualifying failed companies (Hill et al., 1996; Geiger et al., 2005; Myers et al., 2008). From the auditors' perspective, the issuance of an incorrect audit opinion may result in expensive litigation, loss of audit fee, and damage to professional reputation (Grant et al., 1998; Dunn et al., 2002; Geiger et al., 2005). Consequently, the economic and social costs of an audit failure can be substantial, as evidenced by the widely publicized failures of Enron and WorldCom in the US (Bellovary et al., 2006; Hensher et al., 2007; Herborn et al., 2007).

Even though current auditing standards require an explicit assessment of clients' going concern status, there has been little change to the number of clients failing soon after receiving unqualified audit reports (Weil, 2001; Bellovary et al., 2006). The continued going concern misclassifications suggest that auditors have difficulty in forming appropriate going concern opinion. This may be attributed to the complexities in processing relevant and irrelevant information (Pany and Carmichael, 1993; Etheridge et al., 2000; Arnold et al., 2001; Windor, 2002; Constantinides, 2002; Ashton and Kennedy, 2002; Dunn et al., 2002; Guiral and Esteo, 2006). This is further confounded by the unstructured manner in which going concern appraisals are made where auditors use completely subjective evaluation methods (Williams, 1984; Grant et al., 1998; Arnold et al., 2001; Bellovary et al., 2006).

In this context, bankruptcy prediction research indicates that objective corporate failure models are generally more accurate than going concern audit opinions in discriminating between failed and un-failed companies (Pany and Whittington, 2001; Sharma and Sidhu, 2001; Dunn et al., 2002; Hensher and Jones, 2007). Although these inferences are only drawn from a priori research without investigating the value and applicability of corporate failure models in practice, they suggest that such models may have a valuable role within the audit decision process as an analytical procedure that can aid in assessing going concern (Carmichael and Pany, 1993; Koh, 1999; Pany and Whittington, 2001; Chung et al., 2008).

Furthermore, the link between going concern and bankruptcy is recognized in the auditing literature (Blocher and Loebbecke, 1993; Koh and Brown, 1991; Foster et al., 1998; Loftus and Miller 2000; Constantinides, 2002; Kuruppu et al., 2003). In particular, the literature identifies the probability of bankruptcy as the main determinant of the qualified going concern opinion (Seipel and Tunnell, 1995; Dunn et al., 2002), with a number of prior studies showing that a positive relationship exists between the probability of bankruptcy and the issuance of qualified audit opinions (Seipel and Tunnell, 1995; Raganandan and Rama, 1995; Carcello et al., 2003). Companies with high probabilities of bankruptcy receive more qualified audit opinions compared to companies with low probabilities of bankruptcy (Peel, 1989; McKeown et al., 1991; Citron and Taffler, 1992; Carcello et al., 2003). Consequently, these findings support and justify the possible use of statistical corporate failure models as an analytical

procedure for assessing going concern, in light of the high costs associated with going concern misclassification (Asare, 1990; Louwers, 1998; Cho and Lew, 2000; Dunn et al., 2002; Constantinides, 2002; Lowe et al., 2002; Kaminsky et al., 2004).

However, the efficacy of bankruptcy prediction models as an analytical procedure in the context of assessing going concern in practice has not been examined. The current study addresses this gap by examining the practical efficacy and usefulness of corporate failure models for assessing going concern. The research objective and hypotheses for the research are described next.

RESEARCH OBJECTIVE, HYPOTHESIS AND DESIGN

Analytical procedures such as corporate failure models can assist auditors in mitigating and overcoming some of the issues associated with human information processing limitations that make arriving at an appropriate audit opinion difficult (Kaminsky et al., 2004). Such techniques would assist auditors in focusing on evidence that is more relevant to the decision at hand, thereby improving audit efficiency and effectiveness (Constantinides, 2002; Kaminsky et al., 2004). The main objective of this study is therefore to examine the practical efficacy of corporate failure models as an analytical procedure for moderating human information processing limitations, thereby assisting auditors to form more appropriate going concern opinions. The latter research objective can be stated as the following singular hypothesis:

H₁: Auditors' assessment of going concern with the assistance of a corporate failure model is not different to judgments made without the assistance of a model.

Hypothesis 1 specifically examines the practical efficacy and value of corporate failure models in assisting auditors to form appropriate going concern opinions, by minimizing human information processing limitations, and reducing some of the subjectivity involved in the going concern assessment. It is expected that auditors who use the input from the corporate failure model while exercising professional judgment will exhibit a more appropriate perception of an entity's going concern status compared to auditors who form the assessment without the use of the model. The research design used to address the above hypothesis is discussed next.

A survey with a case study component was developed due to the experimental nature of this study, and is available from the author on request. The questionnaire was divided into two sections. The first section of the questionnaire gathered general demographic data about the respondents. Section two of the survey questionnaire consisted of the profiles of three companies, one of which was a failed company. For each company, the financial statements of the current and the previous accounting periods were provided, together with both contrary and mitigating factors, and other information which may or may not have a bearing on the going concern assessment. These were presented as a proxy to imitate human information processing limitations.

The three companies in the case study were carefully selected so that each company's going concern status was not obvious (Shelton, 1999; Tucker et al., 2003). The respondents had to form professional opinions regarding going concern status from the information provided in the case, which simulates auditors' going concern assessments in real situations. To assess the impact of the availability of information regarding corporate failure model on the accuracy of going concern assessments, two versions of the survey questionnaire were developed. The first version of the questionnaire also provided the respondents with the predictions from the corporate failure model as to the likelihood of each of the companies failing together with information regarding the nature of the corporate failure model, and its level of accuracy in predicting failed and non failed companies. The respondents were requested to examine the information given in each profile and to assess each company's going concern status on a 7-

point semantic deferential scale anchored between “going concern” and “failed company”. The second version of the survey was identical to the first, but it did not require the use of the corporate failure model. The failure model used in this study was obtained from Kuruppu et al., (2003), who developed a model that discriminated between failed companies and ‘marginal’ non-failed companies in New Zealand, where this study was conducted. This model was developed from Multiple Discriminant Analysis employing the Wilks’ lambda stepwise method. Utilizing a sample of 135 public companies with an initial set of sixty three plausible variables, the final model was reduced to twelve variables. The tolerances at the final step of variable entry were all above 0.001, which showed that the variables in the discriminant function were not highly correlated with other variables in the function. Furthermore, the Lachenbruch cross validation procedure indicated that the model was 92 percent accurate in discriminating between the two groups of companies, which was also reaffirmed with the *Press Q* statistic for the model.

The survey was posted to 700 auditors, half of whom received the survey instrument incorporating the model. Completed responses from 156 participants (22%) were received. This response rate compares favorably with other research conducted with less complex survey instruments, which have achieved response rates ranging from 14 to 22 percent (Elias and Johnston, 2001; Constantinides, 2002). Furthermore, tests showed no evidence of non-response bias. An independent-sample t-test and the cross-tabulation procedure using the asymptotic significance and Somer’s D statistics were used to test the hypothesis.

RESULTS

The survey includes the profiles of three companies, *A*, *B* and *C*. An analysis of the respondents’ demographic characteristics is first presented in Table 1. It shows that approximately a third of the respondents in the survey are from Big Four firms, with the remainder being from local or national audit firms. About twenty six percent of the respondents had between 6-10 years of auditing experience, with the majority of fifty seven percent having more than 10 years of auditing experience. A t-test for the Equality of Means indicated no significant differences between the perceptions of auditors across Big Four and non- Big Four firms, and the perceptions of auditors who had previously used corporate failure models and those who did not. The majority of the respondents (92%) have not previously used a corporate failure model for assessing going concern.

The first company in the survey, Company *A*, was a going concern and the appropriate responses were expected to lie to the lower side of the seven point scale, which denote that the presented profile is consistent with that of a going concern. Descriptive statistics categorized by model used are shown in Table 2. The descriptive statistics show that the mean response for the going concern assessment without the model was 3.78, while the mean for auditors who made use of the model was 2.00. Both groups of auditors generally made the inference that the profile of Company *A* was that of a going concern, although auditors using the model were more disposed to forming a judgment that the company was a going concern. Furthermore, the standard deviation of the responses was significantly less with the use of the model compared to opinions formed without the model. This indicates more consistency in the expressed opinions as a result of using the corporate failure model.

As Company *B* was not a going concern, the appropriate responses were expected to be on the higher side of the seven-point scale. Table 2 show that for Company *B*, the mean response of auditors who did not use the corporate failure model was 3.15, indicating that they were more disposed towards forming an opinion that the company was a going concern. On the other hand, auditors utilizing the corporate failure model had a mean response of 5.02. The latter more appropriately reflects the going concern status for Company *B* as a non going concern.

Table 1: Respondents' Demographic Attributes

Panel A: Level of Auditing Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	25	16.0	16.8	16.8
	6-10 years	39	25.0	26.2	43.0
	More than 10 years	85	54.5	57.0	100.0
	Total	149	95.5	100.0	
Missing		7	4.5		
Total		156	100.0		
Panel B: Familiarity with Corporate Failure Models					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	115	73.7	74.2	74.2
	Yes	40	25.6	25.8	100.0
	Total	155	99.4	100.0	
Missing		1	0.6		
Total		156	100.0		
Panel C: Regularity of Corporate Failure Model Use for Assessing Going Concern					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regularly Used	2	1.3	1.3	1.3
	2	2	1.3	1.3	2.6
	3	2	1.3	1.3	3.9
	4	2	1.3	1.3	5.2
	5	1	0.6	0.6	5.8
	6	3	1.9	1.9	7.7
	Not Used	143	91.7	92.3	100.0
	Total	155	99.4	100.0	
Missing		1	0.6		
Total		156	100.0		
Panel D: Audit Firm Characteristics					
	Big Four firm	48			
	Local or National firm	108			

This table shows descriptive statistics for the respondents. All respondents were chartered accountants in public practice.

Table 2: Descriptive Statistics for Going Concern Assessments

Model Use	Company Profile				
			A	B	C
			Statistic	Statistic	Statistic
Without bankruptcy Model	Mean		3.78	3.15	4.61
	95% Confidence Interval	Lower Bound	3.30	2.86	4.30
		Upper Bound	4.25	3.43	4.92
	Standard Deviation		1.945	1.171	1.279
With bankruptcy Model	Mean		2.00	5.02	3.18
	95% Confidence Interval	Lower Bound	1.82	4.69	2.87
		Upper Bound	2.18	5.36	3.49
	Standard Deviation		0.866	1.557	0.866

This table shows the descriptive statistics of auditors' perceptions about the three companies' going concern status with and without the use of the model.

However, the small but nevertheless higher variability of opinions from auditors using the corporate failure model for Company B has to be considered from the context of the overall accuracy that was derived from using it. Consequently, even though the variability is higher (1.557 to 1.171), auditors using the model were far more accurate in appropriately forming an opinion that Company B represents the profile of a non going concern. This also indicates that auditors continue to exercise professional judgment when using predictions from corporate failure models, rather than simply relegating

professional judgment to a somewhat secondary role in the light of other contrary and mitigating information that may be relevant to the going concern assessment.

For Company *C*, which was a going concern, the descriptive statistics in Table 2 show that going concern assessments made without the assistance of the corporate failure model have a mean response of 4.61. As a result, the responses for this group of auditors were biased to the higher side of the scale, indicating perceptions that the profile of Company *C* was more likely to be that of a non-going concern. In contrast, going concern assessments made with the assistance of the corporate failure model have a mean response of 3.18. This is less than the mid-point on the scale, indicating the greater perceived likelihood that Company *C* is a going concern. Moreover, the standard deviation for the responses also illustrates that auditors making use of the model have lower variability for the expressed opinion that Company *C* was a going concern. Table 3 provides further analysis of the effect of the corporate failure model on the going concern opinion, where it shows a cross-tabulation of the audit judgments for the three companies, with and without the model.

Table 3: Cross-tabulation of Responses by Model Use

Response on 7-point scale		Company A			Company B			Company C		
		Model Used		Total	Model Used		Total	Model Used		Total
		No	Yes		No	Yes		No	Yes	Total
1 GC	No.	12	24	36	1	3	4		8	8
	% WMU	17.9%	27.0%	23.1%	1.5%	3.5%	2.6%		9.0%	5.1%
2	No	12	49	61	18	5	23	4	24	28
	% WMU	17.9%	55.1%	39.1%	26.9%	5.8%	15.0%	6.0%	27.0%	17.9%
3	No	6	9	15	33	7	40	8	29	37
	% WMU	9.0%	10.1%	9.6%	49.3%	8.1%	26.1%	11.9%	32.6%	23.7%
4	No	4	6	10	4	11	15	18	10	28
	% WMU	6.0%	6.7%	6.4%	6.0%	12.8%	9.8%	26.9%	11.2%	17.9%
5	No	17	1	18	8	16	24	23	10	33
	% WMU	25.4%	1.1%	11.5%	11.9%	18.6%	15.7%	34.3%	11.2%	21.2%
6	No	14		14	2	34	36	8	6	14
	% WMU	20.9%		9.0%	3.0%	39.5%	23.5%	11.9%	6.7%	9.0%
7 FC	No	2		2	1	10	11	6	2	8
	% WMU	3.0%		1.3%	1.5%	11.6%	7.2%	9.0%	2.2%	5.1%
Total	Count	67	89	156	67	86	153	67	89	156
	% WMU	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pearson Chi-Square (Asymptotic Sig.)		0.000***			0.000***			0.000***		

Table 3 shows a cross-tabulation of the audit judgments for the three companies, made with and without the model. GC, FC and WMU denote going concern, failed company and within model used respectively. *** denote significance at the 1 percent level.

For Company *A*, 27% of auditors using the model in the going concern assessment recognized it as a going concern, with a further 55.1% also indicating that it has a very strong likelihood of being a going concern, which is the appropriate response for this profile. A higher response on the second rank also indicates that the respondents did not select responses based entirely on the model. On the other hand,

only 17.9% each of auditors who made the going concern assessment without the model appropriately indicated the first two scale ranks as being the more suitable indicator of the company's going concern status, which is significantly less than for auditors who utilized the model. The total of 35.8% for auditors who selected the first two scale ranks without using the model contrasts with 82.1% for auditors who used the model.

The cross-tabulation also indicates significant misclassification errors for auditors making the assessment without the model. About 25% and 21% of auditors incorrectly formed assessments that Company *A* was a failed company, by indicating responses on points five and six of the scale respectively, when only 1.1% of the respondents using the model indicated that the profile was of a failed company, by marking on point five of the scale. The asymptotic significance level of the Pearson Chi-Square statistics further indicate that the going concern opinions formed with and without the assistance of the corporate failure model were significantly different. A similar analysis of responses regarding Companies *B* and *C* further indicates that going concern assessments with and without corporate failure models were significantly different.

Although both the descriptive statistics and the cross-tabulation procedure for the three companies indicate significant differences in auditors' judgments made with the assistance of the corporate failure model, which also illustrated Type 1 errors, an independent sample t-test was further conducted to conclusively examine the statistical significance of these differences (Rodeghier, 1996). The results of this procedure are presented in Table 4. They indicate that there are significant differences in going concern judgment made with and without the corporate failure model, which reaffirms the former results.

Table 4: Independent Samples T-Test

Company	F- value	Sig. of F	Mean Difference	t	Sig. (2-tailed)
A	111.479	0.000	-1.78	-7.670	0.000***
B	7.714	0.006	1.87	8.208	0.000***
C	0.768	0.382	-1.43	-6.376	0.000***

Table 4 presents the results of the independent samples t-test to that further examines differences in going concern assessments made with and without the model. *** denote significance at the 1 percent level.

The next section provides a summary of the main findings and concludes the paper with opportunities for further research.

SUMMARY AND CONCLUSION

This study examined the value and efficacy of corporate failure models in assisting auditors to form more accurate going concern opinions by minimizing human information processing limitations. A case study methodology was used as a proxy for the auditors' decision making environment. The results indicate that the use of the corporate failure model was effective as a means of mitigating human information processing limitations and consequently forming more appropriate conclusions of clients' financial condition, which precursor the issuance of appropriate going concern opinions. Since the issuance of unqualified audit reports to failed clients is generally perceived to be synonymous with audit failures, the routine application of corporate failure models within the audit decision process will have substantial benefits for the profession in its role of adding credibility to financial statements. It would be an effective means of minimizing the audit expectations gap through the issuance of more appropriate audit opinions.

The results further indicate that the application of corporate failure models for assessing going concern does not lead to the relegation of professional judgment to a somewhat secondary level within the audit decision process. On the contrary, only a minority of respondents suggested, by selecting the endpoints of the scale, that the model's prediction was the only factor influencing their chosen going concern opinion.

The majority of the respondent auditors effectively used the contribution of the corporate failure model together with other pertinent information to form the going concern opinion. This would minimize the concern that any explicit recognition of the efficacy of suitable corporate failure models in auditing standards, as opposed to the ambiguous guidance at present, would lower the significance of professional judgment in the assessment process. As the results show, auditors would use the relevant contribution of the corporate failure model in conjunction with other information to exercise audit judgment.

As with all experimental research of this nature, this study is limited by the fact that it was not applied in an actual audit engagement. This may be considered to be a limitation in that it was not possible to observe the efficacy of the model during an actual audit process, which would have been the ideal context on which to base statistical inferences. Nevertheless, the case study experiment was a realistic proxy, and it effectively captured the influences of human information processing limitations present within the audit decision framework. Accordingly, the conclusions formed are valid. An attractive area for future research would be to examine the interest among financial statement users and the profession of explicitly having a statement about clients' going concern status in the audit report. With the demonstrated capability of suitable corporate failure models to assess impending failure with a high degree of accuracy, auditors' on their part would not be accepting any more responsibility, and hence liability, than is currently required by law or current auditing standards. On the contrary, they will be making a clearer statement of clients' future viability, and hence the appropriateness of the financial statements. A change in reporting format in this manner would not require additional resources, but it is likely that it may have a positive influence on the auditors' function in society of adding credibility to financial statements. Consequently, this remains a stimulating area for further research.

REFERENCES

- AASB. 2002. AUS 708 Going Concern. Australian Accounting Research Foundation, Melbourne.
- AICPA. 1988. SAS 59: The Auditor's Consideration of an Entity's Ability to Continue as a Going Concern. American Institute of Certified Public Accountants, New York.
- APB. 1994. SAS 130: The Going Concern Basis in Financial Statements. Auditing Practices Board, London.
- Arnold, V., P. A. Collier, S. A. Leech, and S. G. Sutton. 2001. The Impact of Political Pressure on Novice Decision Makers: Are Auditors Qualified to Make Going Concern Judgements? *Critical Perspectives on Accounting* 12: 323-38.
- Arnold, V., and D. E. Edwards. 1993. Going Concern Evaluation: Factors Affecting Decisions. *The CPA Journal* October: 58-60.
- Asare, S. K. 1992. The Auditor's Going Concern Decision: Interaction of Task Variables and the Sequential Processing of Evidence. *The Accounting Review* 67, no. 2: 379-93.
- . 1990. The Auditor's Going-Concern Decision: A Review and Implications for Future Research. *Journal of Accounting Literature* 9: 39-64.
- Ashton, R. H., and J. Kennedy. 2002. Eliminating Recency with Self-review: The Case of Auditors' Going Concern Judgements. *Journal of Behavioural Decision Making* July: 223-240.

- Bellovary, J., Giacomino, D., and D. Akers. 2006. Weighing the Public Interest: Is the Going Concern Opinion Still Relevant? *CPA Journal*: Available at: www.nysscpa.org/cpajournal/2006/106/essentials/p16.htm
- Blocher, E., and J. K. Loebbecke. 1993. Research in Analytical Procedures: Implications for Establishing and Implementing Auditing Standards. *The Expectations Gap Standards: Progress, Implementation Issues and Research Opportunities*, 177-226. New York: AICPA.
- Boritz, J. E. 1991. Going...Going...Gone! *CA Magazine* April: 22-29.
- Carcello, J. V., D. R. Hermansn and T. L. Neal. 2003. Auditing Reporting Behaviour when GAAS Lack Specificity: the Case of SAS No. 59. *Journal of Accounting and Public Policy* 22: 63-81.
- Carmichael, D. R., and K. Pany. 1993. Reporting on Uncertainties, Including Going Concern. *The Expectations Gap Standards: Progress Implementation Issues, Research Opportunities.*, 35-58. New York: AICPA.
- Casterella, J. R., B. L. Lewis, and P. L. Walker. 2000. Modelling the Audit Opinions Issued to Bankrupt Companies: A Two-stage Empirical Analysis. *Decision Sciences* 31, no. 2: 204-229.
- Casterella, J. R., B. L. Lewis, and P. L. Walker. 1999. Why Do Bankrupt Companies Receive Unmodified Audit Opinions? *Research in Accounting Regulation* 13: 169-77.
- Cho, S., and A. Y. Lew. 2000. Analytical Review Applications among Large Audit Firms in Hong Kong. *Managerial Auditing Journal* 15, no. 8: 431-38.
- Chung, K., S.Tan and D. Holdsworth. 2008. Insolvency Prediction Model Using Multivariate Discriminant Analysis and Artificial Neural Network for the Finance Industry in New Zealand. *International Journal of Business and Management* 3, no.1: 19-28.
- Constantinides, S. 2002. Auditors', Bankers' and Insolvency Practitioners' "Going Concern" Opinion Logit Model. *Managerial Auditing Journal* 17, no. 8: 487-501.
- Dunn, K. A., C. E. L. Tan, and E. K. Venuti. 2002. Audit Firm Characteristics and Type Two Errors in the Going Concern Opinion. *Asia-Pacific Journal of Accounting & Economics* 9: 39-69.
- Elias, R. Z., and J G. Johnston. 2001. Is There Incremental Information Content in the Going Concern Explanatory Paragraph? *Advances in Accounting* 18: 105-17.
- Etheridge, H. L., R. S. Sriram, and Y. K. Hsu. 2000. A Comparison of Selected Artificial Neural Networks that Help Auditors Evaluate Client Financial Viability. *Decision Sciences* 31, no. 2: 531-50.
- Flint, D 1988. *Philosophy and Principles of Auditing*: An Introduction. London: Macmillan Education.
- Foster, B. P., T. J. Ward, and J. Woodroof. 1998. An Analysis of the Usefulness of Debt Defaults and Going Concern Opinions in Bankruptcy Risk Assessment. *Journal of Accounting, Auditing & Finance* 13, no. 3: 351-67.
- Geiger, M., K. Raghunandan, and D. Rama. 1998. Costs Associated with Going Concern Modified Audit Opinions: An Analysis of Auditor Changes, Subsequent Opinions, and Client Failures. *Advances in Accounting* 16: 117-39.

- . 1998. Going-concern Audit Report Recipients Before and After SAS No. 59. *The National Public Accountant* 43, no. 8: 24-25.
- . 2005. Recent Changes in the Association between Bankruptcies and Prior Audit Opinions. *Auditing: A Journal of Practice & Theory* 24: 21-35.
- Grant, C. T., S. W. Wheeler, and C. S. Ciccotello. 1998. Predicting Financial Distress: Audit Classification in a Litigious Environment. *Advances in Accounting* 16: 163-93.
- Guiral, A., and F. Esteo. 2006. Are Spanish Auditors Sceptical in Going Concern Evaluations? *Managerial Auditing Journal* 21, no. 6: 598-620.
- Hensher, D.A., and S. Jones. 2007. Forecasting Corporate Bankruptcy: Optimising the Performance of the Mixed Logit Model. *ABACUS* 43, no. 3: 241-264.
- Herbohn, K., V. Rangunathan, and R. Garsden. 2007. The Horse has Bolted: Revisiting the Market Reaction to Going Concern Modifications of Audit Reports. *Accounting and Finance* 47: 473-493.
- Hill, N. T., S. E. Perry, and S. Andes. 1996. Evaluating Firms in Financial Distress: An Event History Analysis. *Journal of Applied Business Research* 12, no. 3: 60-71.
- Institute of Chartered Accountants of New Zealand. 1998. New Zealand Codified Auditing Standards and Audit Guidance Statements. ICANZ: Wellington.
- International Federation of Accountants (IFAC). 1999. International Statement on Auditing 570 Going Concern. *IFAC Handbook Technical Pronouncements*. IFAC: New York.
- Kaminski, K. A., T. S. Wetzel, and L. Guan. 2004. Can Financial Ratios Detect Fraudulent Financial Reporting? *Managerial Auditing Journal* 19, no. 1: 15-28.
- Kleinman, G., and A. Anandarajan. 1999. The Usefulness of Off-balance Sheet Variables as Predictors of Auditors' Going Concern Opinions: An Empirical Analysis. *Managerial Auditing Journal* 14, no. 6: 269-72.
- Koh, H. C., and R. M. Brown. 1991. Probit Predictions of Going and Non-going Concerns. *Managerial Auditing Journal* 6, no. 3: 18-23.
- Koh, H. C., and S. S. Tan. 1999. A Neural Network Approach to the Prediction of Going Concern Status. *Accounting and Business Research* 29, no. 3: 211-16.
- Kuruppu, N., L. Laswad, and P. Oyelere. 2003. The Efficacy of Liquidation and Bankruptcy Prediction Models for Assessing Going Concern. *Managerial Auditing Journal* 18, no. 6: 577-90.
- LaSalle, R. E., A. Anandarajan, and A. F. Miller. 1996. Going Concern Uncertainties: Disclaimer of Opinion versus Unqualified Opinion with Modified Wording. *Auditing* 15, no. 2: 29-44.
- Loftus, J. A., and M. Miller. 2000. International Developments on Reporting Going Concern Uncertainties and Financial Vulnerability. *Advances in International Accounting* 13: 23-57.
- Louwers, T. J. 1998. The Relation between Going-Concern Opinions and the Auditor's Loss Function. *Journal of Accounting Research* 36, no. 1: 143-56.

- Louwers, T. J., F. M. Messina, and M. D. Richard. 1999. The Auditor's Going Concern Disclosure as a Self-Fulfilling Prophecy: A Discrete Time Survival Analysis. *Decision Sciences* 30, no. 3: 808-24.
- Lowe, D., P. Reckers, and S. Whitecotton. 2002. The Effects of Decision Aid Use and Reliability on Jurors' Evaluations of Auditor Liability. *Accounting Review* 77, no. 1: 185-202.
- Matsumura, E. M., K. R. Subramanyam, and R. R. Tucker. 1997. Strategic Auditor Behaviour and Going Concern Decisions. *Journal of Business Finance & Accounting* 24, no. 6: 727-58.
- McKeown, J. C., J. F. Mutchler, and W. Hopwood. 1991. Towards an Explanation of Auditor Failure to Modify the Audit Opinions of Bankrupt Companies. *Auditing: A Journal of Practice & Theory* 10, no. Supplement: 1-13.
- Mutchler, J. F., W. Hopwood, and J. M. McKeown. 1997. The Influence of Contrary Information and Mitigating Factors on Audit Opinion Decisions on Bankrupt Companies. *Journal of Accounting Research* 35, no. 2: 295-310.
- Myers, L. A., J. Schmidt and M. Wilkins. 2008. Have Auditors become Too Conservative? Evidence from Going Concern Opinions. Available at: www.ssrn.com/abstract=1081991
- Nogler, G. E. 2004. Long-term Effects of the Going Concern Opinion. *Managerial Auditing Journal* 19, no. 5: 681-688.
- Pany, K. J., and O. R. Whittington. 2001. Research Implications of the Auditing Standard Board's Current Agenda. *Accounting Horizons* 15, no. 4: 401-11.
- Rama, D., K. Raghunandan, and M. Geiger. 1997. The Association between Audit Reports and Bankruptcies: Further Evidence. *Advances in Accounting* 15: 1-15.
- Rodeghier, M. 1996. *Surveys with Confidence: A Practical Guide to Survey Research Using SPSS*. Chicago: SPSS.
- Seipel, C., and L. Tunnell. 1995. An Empirical Investigation into the Relationship between "Subject To" Going Concern Opinions and Risk Shifts. *American Business Review* 13, no. 2: 1-5.
- Sharma, D. S., and J. Sidhu. 2001. Professionalism vs. Commercialism: The Association between Non-Audit Services (NAS) and Audit Independence. *Journal of Business Finance & Accounting* 28, no. 5 & 6: 595-629.
- Sharma, D. S., and P. A. Stevenson. 1997. The Impact of Impending Corporate Failure on the Incidence and Magnitude of Discretionary Accounting Policy Changes. *British Accounting Review* 29: 129-53.
- Shelton, S. W. 1999. The Effect of Experience on the use of Irrelevant Evidence in Auditor Judgement. *The Accounting Review* 74, no. 2: 217-24.
- Tucker, R. R., E. M. Matsumura and K. R. Subramanyam. 2003. Going Concern Judgements: An Experimental Test of the Self-fulfilling Prophecy and Forecast Accuracy. *Journal of Accounting and Public Policy* 22: 401-432.
- Van Peurse, K. A., and M. J. Pratt. 2002. A New Zealand Failure Prediction Model: Development and International Implications. *Advances in International Accounting* 15: 229-47.

Vanstraelen, A. 1999. The Auditor's Going Concern Opinion Decision: A Pilot Study. *International Journal of Auditing* 3: 41-57.

Venuti, A. 2004. The Going Concern Assumption Revisited: Assessing A Company's Future Viability. *CPA Journal* 74: 40-43.

Weil, J. 2001. Going Concerns: Did Accountants Fail to Flag Problems at Dot-com Casualties? *Wall Street Journal* 9 February.

Williams, H. J. 1984. Practitioners' Perspectives on Going-Concern Issues. *The CPA Journal* 54, no. 12: 12-19.

Windsor, C. A. 2002. Auditors' Predisposition to Provide Fair Judgments: Australian Evidence of Auditors' Level of Moral Reasoning. *Australian Accounting Review* 12, no. 2: 51-57.

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STOCK PRICE REACTIONS TO THE CANADIAN LIFETIME CAPITAL GAINS EXEMPTION

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ABSTRACT

This study examines abnormal stock return around the announcement of the Lifetime Capital Gains Exemption (LCGE) in the Canadian federal tax system. The revised code, adopted May 23, 1985 provided individual taxpayers with a cumulative tax exemption for capital gains, up to a lifetime limit of \$500,000. The empirical result, using TSX daily stock return data, indicate that around the announcement, especially before the announcement, abnormal stock returns are negatively associated with the interaction of dividend yields and individual shareholdings. This finding suggests that the stock market anticipated the capital gains tax change. The level of individual shareholding, which proxies for whether the marginal shareholders are individual shareholders are taken into account because the LCGE was only applied to individual shareholders.

JEL: M41

KEYWORDS: lifetime capital gains exemption, abnormal return, individual shareholding.

INTRODUCTION AND LITERATURE REVIEW

There has been a great deal of financial, economic, and accounting literature that analyses whether or not personal tax changes on dividends or capital gains affect stock prices (Akindayomi and Warsame 2007, Ayers et al. 2006, 2002, Cook 2006, Lin and Zeng 2005, Blouin et al. 2003, Bell and Jenkinson 2002, Lang and Shackelford 2000, McKenzie and Thompson 1995, Jang 1994, Amoako-Adu et al. 1992, Bolster and Janjigian 1991, among many others). This study extends this literature by examining the stock price reaction around the announcement of the lifetime capital gains exemption (LCGE) in Canada on May 23, 1985. It is motivated by the following considerations.

First, the increases/decreases in capital gains tax rates over the past twenty years were applied to all taxpayers in Canada. When changes in capital gains tax rates are applied equally to individuals and other entities, such as institutions or corporations, the status of marginal shareholders is irrelevant and there is no need to separate individual shareholders from institutional or corporate shareholders. This study considers the tax status of the marginal shareholders because the exemption was only applicable to individuals in 1985.

Second, the tax treatment of capital gains in Canada is quite different from its treatment in the U.S. In Canada, taxable capital gains are subject to the same tax rates as other regular income. However, that portion of capital gains that is to be included into income and taxed, i.e., taxable capital gains, has changed over time; currently one-half of capital gains are included into income and are taxed. Hence, in Canada, changes in capital gains taxes, typically result in a change in the tax base of capital gains. In the U.S., capital gains are not only subject to a different tax rate from other regular income (such as salary income and interest income), but capital gains realized from long-term investments are taxed at a different rate than those capital gains realized from short-term investments. As such, in the U.S., changes in capital gains tax typically result in a change of the capital gains tax rate; for example, the Taxpayer Relief Act of 1997 reduced the capital gains tax rate from 28% to 20%. While the reduction in capital gains tax rate is interesting, this study seeks to investigate if shareholders react to a reduction in the tax base of capital gains.

Third, Ayer et al. (2002) argue that a potential weakness of long-window return studies is that the results are

susceptible to confounding factors such as risk or earning persistence. Short-window studies around tax changes thereby minimize the effects of non-tax factors. In the U.S., the announcement day and the effective day of a tax change are different because the announced tax change can be amended or even vetoed before it becomes law. Existing studies on market reaction to changes in capital gains tax usually examine reactions around the passage of a tax change from the announcement day to the effective day. It may last one or more months (e.g., Ayers et al. 2006, and Lang and Shackelford 2000). It is generally difficult to isolate tax effects from other effects if the event window is long. On the other hand, in Canada, once the federal budget is announced, the tax changes take effect immediately, except in those rare cases when a minority government has its budget defeated in the House of Commons. Therefore, in Canada it is easier to narrow the event window around the announcement to mitigate non-tax effects.

The remainder of this paper proceeds thus. First, it describes the LCGE and other relevant tax rules. It also reviews the literature relevant to this study. In section three, the methodology and hypothesis are developed. The regression model, data collection and variable measurement are outlined. In section four, the test results are presented. Finally, the conclusion is provided in section five.

BACKGROUND AND LITERATURE

There are two ways by which the shareholders receive and are taxed on the returns to stocks: dividends and capital gains (including those realized from share repurchases). The different effective tax rates on dividends and capital gains not only affect shareholders' trading behavior, but also stock prices. Tax rules on capital gains have changed over time in Canada. There was no tax for capital gains before 1972. Since 1972, capital gains have been taxed on realization. From 1972 to 1987, one-half of capital gains were taxable, and one-half of capital losses were deductible against taxable capital gains. In 1988 and 1989, the partial rate was increased to two-thirds. From 1989 to February 2000, the partial rate became three-quarters. From March 2000 to October 18, 2000, the partial rate was reduced to two-third. Finally, this rate was reduced to one-half.

To encourage risk-taking and investment in businesses, the federal government introduced a \$500,000 cumulative LCGE for all individual taxpayers in Canada in the May 1985 budget. The exemption was applied to the gains from all capital property of individuals that were realized after 1984. The exemption was phased in over six years: the exemption had a cumulative limit of \$20,000 of capital gains in 1985, rising to \$50,000 of capital gains in 1986, \$100,000 in 1987, \$200,000 in 1988, \$300,000 in 1989 and \$500,000 in 1990 and subsequent taxation years (Budget papers, 1985).

In 1987, the exemption was extended to corporations. In 1989, the exemption was reduced to \$100,000. Until the 1992 federal budget, the exemption was unrestricted as to type of capital gains. The 1992 federal budget imposed a restriction on the capital gains from real properties, i.e., land and buildings. The 1994 federal budget eliminated the general capital gains exemption, but the exemption of capital gains from small business and farming remained (Beam, Laiken and Barnett 2009).

During the time period around the announcement of the LCGE, the partial rate did not change. In addition, the tax rules on dividends received by the individual taxpayers did not change. In summary, the effective tax rate on capital gains was substantially reduced, relative to dividends, upon the introduction of the LCGE.

The existing studies on the effect of capital gains taxation on stock price are not conclusive. For example, capital gains tax capitalization predicts that stock prices will increase when capital gains tax is reduced (Lang and Shackelford 2000, Akindayomi and Warsame 2007, etc). Klein (1999) and Cook (2006), on the other hand, show that by mitigating the lock-in effect, a reduction on capital gains tax will encourage current shareholders to sell the stocks and decrease stock prices. While Miller and Scholes (1978) argue that capital gains tax is not relevant since the marginal investors could be tax-exempt investors and thus not subject to the

changes of capital gains tax. McKenzie and Thompson (1995) find no relationship between stock prices and dividend yields on the announcement of capital gains tax change. Chen et al. (1990) find no effect of capital gains on stock before-tax returns.

One event study on the share price reaction to the 1985 LCGE examines the relationship between stock returns/trading volume and accrued capital gains (Lin and Zeng 2005). Two other studies examine the relationship between stock prices and dividend yields, a proxy for the value-relevance of capital gains tax (McKenzie and Thompson, 1995 and Amoako-Adu et al. 1992) are inconclusive. McKenzie and Thompson (1995) find no relationship between stock prices and dividend yields, while Amoako-Adu et al. (1992) find a weak relationship. This study considers the tax status of the marginal shareholders. It argues that the stock price reaction around the announcement of the LCGE depends not only on the dividend yield, but also depends on whether the marginal shareholders are individuals or non-individuals (e.g., institutions or corporations). This is because the exemption was only applicable to individual shareholders in 1985. After incorporating the tax status of the marginal investors, this study finds a negative relationship between abnormal stock returns and dividend yields around the announcement of the LCGE.

Shackelford (2000) specified seven conditions that must hold for a change in capital gains tax to affect stock price. Among them, one condition is that the marginal investor must be individual or a flow-through entity such as partnership that passes capital gains to individuals, who is subject to tax change. However, only a few existing studies that examine the stock market reactions to shareholders' tax changes incorporate marginal investor's tax status (for example, Lin and Zeng 2005, Dhaliwal et al. 2003, Blouin et al. 2003). However, these studies focus on the shareholders' dividend taxes or accrued capital gains. Ayers et al. (2006) examine the individual shareholders' reactions to a reduction in capital gains tax rate in 1997. However, they focus on the trading around the reduction.

METHODOLOGY, DATA COLLECTION AND VARIABLES

Methodology

When a firm generates cash flow from internal operations, it could distribute this cash flow to shareholders by paying dividends. If the firm does not distribute all cash generated from internal operation, the potential for shareholder capital gains will increase. Thus, a reduction in shareholders' capital gains tax leads to an increase in stock price, to the extent that dividends are not paid. Moreover, the rise of the price increases with the cash retained (i.e., decreases with the cash distributed as dividends). This indicates that the higher the dividend yield, the lower the price increase in response to the reduction in capital gains tax.

A simple model based on Lang and Shackelford (2000) could be used to explain this argument. In their model, current stock price P_0 can be expressed as the present value of future after-tax dividends and capital gains, which is simplified as

$$P_0 = \frac{D_1(1-\tau^d)}{r\left[\tau^c + \frac{D_1}{F}(1-\tau^c)\right]} \quad (1)$$

$$\frac{\partial P_0}{\partial \tau^c} = -P_0 \left[\frac{F - D_1}{(F - D_1)\tau^c + D_1} \right] \quad (2)$$

Where F is free cash flow. D is dividend distribution. τ^d and τ^c are taxes on dividends and capital gains.

If $F > D_1$, the derivative is negative, which implies that a reduction in marginal shareholder's capital gains tax increases stock prices. Furthermore,

$$\frac{\partial \left[\frac{F - D_1}{(F - D_1)\tau^c + D_1} \right]}{\partial D_1} = -\frac{F}{[(F - D_1)\tau^c + D_1]^2} < 0 \quad (3)$$

Thus stock prices with a high dividend yield reacts less positively to the reduction in the capital gains tax, relative to a low dividend yield stock. In other words, as argued by Lang and Shackelford (2000), investors generally place less (more) weight on capita gains tax change when pricing shares with higher (lower) dividend yield. If Stock price reflects capital gains tax, the announcement of capital gains tax reduction should be negatively associated with dividends yields.

However, stock prices might not be affected by the exemption if the marginal investors are institutional and corporate shareholders. There are two reasons. First, the exemption was not applicable to corporations and institutions in 1985. Hence, the capital gains tax for corporations and institutions did not change during the time period used in this event study. Second, some institutional shareholders are tax-exempt (e.g., pension funds, universities, charities, etc.), and thus were not affected by the exemption. In summary, this study argues that prices of the stocks with high dividend yields and individual marginal investors react less positively to the LCGE. The hypothesis to be tested is therefore described as follows:

Hypothesis: Abnormal stock return is negatively associated with dividend yield \times individual marginal investor around the announcement of the LCGE.

For this event study, the announcement date is May 23, 1985. The time period to be tested is May 1, 1985 to June 13, 1985. There are 15 trading days before and after the announcement. This window does not coincide with other important changes, e.g., earning disclosure, declaring of dividend payout, etc. To test if the stock prices react to the LCGE, the abnormal return for each stock is calculated.

Stock return at time t (R_t) is defined as follows:

$$R_t = \frac{P_t + d_t - P_{t-1}}{P_{t-1}} \quad (4)$$

Where d_t is cash dividend paid at time t , and P_t is the stock price at that time.

The coefficients of the market model (Capital Asset Pricing Model) are estimated for each stock for the period of one year from May 1, 1984 to April 30, 1985 (pre-announcement one-year period). These coefficients are used to calculate the abnormal return. The market model is as follows:

$$R_t = \alpha_0 + \alpha_1 R_{m,t} + \varepsilon_t \quad (5)$$

Where $R_{m,t}$ is the market average return at time t . The TSX 300 index is used as a proxy for the market return. The abnormal return is defined as:

$$R_t^a = R_t - (\hat{\alpha}_0 + \hat{\alpha}_1 R_{m,t}) \quad (6)$$

Where $\hat{\alpha}_0$ and $\hat{\alpha}_1$ are the coefficients estimated from the market model (5). The abnormal return for each stock can be calculated using the estimated coefficients for each day of the testing time period.

To test the hypothesis, the abnormal stock return is regressed on dividend yields and other control variables. The control variables are included to control for other differences across firms. In particular, the regression model includes the interaction between dividend yields and an indicator for marginal individual shareholders. Within the testing period from May 1, 1985 to June 13, 1985, stocks with high dividend yields may not react if the marginal shareholders are non-individual shareholders. The hypothesis predicts that the coefficient on dividend yields \times marginal individual shareholder is negative. The regression model is as follows:

$$R_{it}^a = \beta_0 + \beta_1 DIV_i \times IND_i + \beta_2 DIV_i + \beta_j X_{ji} + \varepsilon_t \quad (7)$$

Where:

R_{it}^a : abnormal return for firm i on date t.

DIV_i : dividend yield for firm i at the 1984 fiscal year end.

IND_i : individual shareholding for firm i, an indicator variable taking on a value of 1 if the major shareholder(s) is individual shareholder, and 0 if the major shareholder is corporate or institutional shareholder, at the 1984 fiscal year end.

X_{ji} : vector of other explanatory variables, which might be related to stock abnormal return.

The hypothesis predicts $\beta_1 < 0$ around the announcement of the LCGE.

Data Collection and Variables

Data on the daily stock return and daily TSX 300 index are collected from the “Canadian Financial Market Research Center Summary Information Database”. The data of the individual shareholding and other financial data are collected from the “Canadian Financial Post Card”. Moody’s Investor Service – Common Stock, which provides the number of institutional shareholders and the number of shares held by the institutions is also used. The sample consists of all firms that meet the following criteria: (1) availability of the daily stock return for the period from May 1, 1984 to June 13, 1985 and availability of daily stock return for all trading days from May 23, 1985 to May 29, 1985 (i.e., 5 trading days); (2) availability of financial reports at the end of the 1984 fiscal year; and (3) not in the financial, insurance, or real estate industries.

There are 163 stocks that meet the above three data collection criteria. For the 163 stocks, there are 32 stocks that do not have significant α_1 (some even have negative α_1) from market model (5). These stocks are dropped because the market model can not provide a reasonable calculation of abnormal returns for these stocks. Finally, there are 131 stocks in the sample.

The variables used to test the propositions are measured as follows. Dividend yields are measured as dividends per share (the total dividends paid on common shares, divided by the number of common shares outstanding), divided by share price at the 1984 fiscal year end.

Individual shareholding is an indicator variable used to specify if the marginal shareholder is an individual shareholder. Since it is difficult, if not impossible, to observe the marginal shareholder directly, this study uses the level of individual/non-individual (such as institutional or corporate shareholding) ownership as a proxy for whether the marginal shareholder is an individual or non-individual, following Ayer et al (2002), Dhaliwal et al (2003), Cook (2006), etc.

Sias and Starks (1997) argue that shareholding is generally associated with price-setting traders. They examine a transaction database to investigate the relative importance of institutional versus individual investors in each firm's volume of price-setting trades. They find that the marginal price-setting investor is more likely to be corporate or institutional (individual) investor for a firm with a higher (lower) level of corporate or institutional ownership. In other words, the level of corporate or institutional (individual) ownership could be used as a proxy for the likelihood that the marginal shareholder is a corporation or institution (individual).

Therefore, this study uses the shareholding (i.e., ownership) as a proxy for indicating the marginal shareholder tax status. Since the "Canadian Financial Post Card" discloses the major shareholder(s), and Moody's investor Service – Common stock provides the number of share held by institutions, this study combines these two databases and assume that the marginal investors are institutional shareholders if the major shareholder(s) is institutional shareholder or institutions hold majority shares. Otherwise, it is assumed that the marginal investors are individual shareholders. Furthermore, this study paper follows Lang and Shackelford (2000) and adds three control variables to capture other differences across firms which might affect the abnormal returns. The control variables are: (1) profitability (*PROF*), calculated by the net income divided by total assets, at the 1984 fiscal year end. (2) firm size (*SIZE*), calculated as the log of the firm market value. Market value is calculated as stock price multiplied by the number of shares outstanding at the 1984 fiscal year end. (3) leverage (*LEV*), calculated as the total of short-term and long-term debt, divided by total assets at the 1984 fiscal year end.

Return on assets is introduced to control for differences in profitability across firms. Firm size is induced to ensure that the results are not driven by differences in firm size. Debt/asset ratio is induced to control for differences in leverage across firms. In addition, this study adds industry dummy variables (there are five industries, mining, oil & gas, manufacturing, communications & utilities, and wholesale & retail trade) to control for differences across industries which might affect the abnormal return.

RESULTS

Table 1 presents the descriptive statistics of the independent variables. It shows the mean, median, standard deviation, maximum and minimum value of the independent variables. For example, the mean value of dividend yield is 0.0278 and the median value is 0.0249. There are stocks that do not pay dividend since the minimum value of dividend yield is 0. The mean value of the interaction between dividend yield and individual shareholding is 0.0075 and the median value is 0, i.e., either the shareholding is a non-individual shareholding or zero dividends paid, or both.

Table 1: Descriptive Statistics of Independent Variables

	Mean	1 st Q	Median	3 rd Q	Std. Div.	Max.	Min.
<i>DIV X IND</i>	0.0075	0	0	0.0095	0.0145	0.0585	0
<i>DIV</i>	0.0278	0.0109	0.0249	0.0406	0.0225	0.1077	0
<i>PROF</i>	0.0493	0.0260	0.0520	0.0782	0.0746	0.2223	-0.5919
<i>LEV</i>	0.2661	0.1301	0.2586	0.3866	0.1656	0.7581	0
<i>SIZE</i>	2.419	2.024	2.406	0.8637	0.6443	3.919	0.9858
<i>IND</i>	0.3664	0	0	1	0.4837	1	0

Table 1 entries include the mean, median, standard deviation, maximum and minimum values of the independent variables.

Table 2 presents the correlations between the independent variables. Only one correlation (the correlation between profitability and leverage) is above 0.3, which suggests that multi-collinearity is not a severe problem.

Table 2: Correlation of Independent Variables

Variables	<i>DIV X IND</i>	<i>DIV</i>	<i>PROF</i>	<i>LEV</i>	<i>SIZE</i>
<i>DIV X IND</i>	1				
<i>DIV</i>	0.1717	1			
<i>PROF</i>	-0.0628	0.0976	1		
<i>LEV</i>	0.1424	0.1714	-0.4319	1	
<i>SIZE</i>	-0.1579	0.2098	0.1033	0.0342	1

Table 2 presents the correlations between the independent variables.

Table 3 presents the results from regressing model (7) for each date from May 1, 1985 to June 13, 1985 to compare the results with those by Amoako-Adu et al. (1992). Table 4 presents the results from regressing model (7) for the time period of May 10 – 21 and May 27-June 4, 1985. The dependent variable is the average abnormal return. Table 3 shows that before the announcement of the LCGE (May 7, May 10, and May 21, 1985, i.e., day -11, -8, and -2), the abnormal return of the stocks is negatively related to dividend yields \times individual shareholding, and is significant at the 5% level, which supports the hypothesis. This is also consistent with the argument by Amoako-Adu et al. (1992) that the stock market anticipated the introduction of the LCGE because information about the federal budget might have leaked to the market before the announcement.

Actually there were quite a few issues about the budget, especially the tax changes just before the budget announcement. For example, a discussion of tax changes, including the capital gains tax cut, appeared in the Globe and Mail on May 18, 1985. Nevertheless, Amoako-Adu et al. (1992) found the significantly negative association between the abnormal return and dividend yields happened only on one day - May 8, 1985 (i.e., day -10). By incorporating the variable for the tax status of the marginal investors and controlling for other effects, this study finds the significantly negative association on three days before the announcement, and at a time closer to the announcement.

Furthermore, Table 3 shows that, after the budget announcement (May 26 and June 9, 1985, i.e., day +2 and +9), the abnormal return of the stock is negatively related to dividend yields \times individual shareholding, and is significant at the 5% and 1% level. This indicates that the stock market also reacted after the announcement. However, Table 3 also shows that, on May 5 (i.e., day -13), the abnormal return of the stock is positively related to dividend yield \times individual marginal investor, which is against the hypothesis. In summary, the results from Table 3 only provide preliminary support for the hypothesis to the extent that the abnormal return of the stock is negatively associated with dividend yield \times individual marginal investor on five days around the announcement of the LCGE.

The coefficient on profitability is positive and significant on one day (day -13)). This is reasonable because high earning usually leads to high stock price. On all other days, profitability is not significant. In an alternative test, this study calculates the average abnormal return for the period from May 10 to May 21, 1985 (i.e., day -8 to day -2) as the dependent variable. The average abnormal return is calculated as $\bar{R}_{it}^a = \frac{1}{7} \sum_{t=-8}^{-2} R_{it}^a$.

The results are shown in table 4, panel A. It shows that the average abnormal return is negatively and significantly related to dividend yield \times individual shareholding, which supports the hypothesis.

Table 3: Results from Model (7) for Each Day from May 1-June 13, 1985

Event Day	IND	DIV X IND	LEV	PROF	SIZE	DIV
t-15	0.0235*	0.0397	-0.0225*	-0.046	-0.0034	-0.0771
t-14	-0.0103	-0.1108	0.0083	0.0221	0.0014	-0.0578
t-13	-0.0185*	0.3231**	0.032**	0.0856***	-0.0005	0.0452
t-12	0.0138	-0.0131	-0.01	-0.0441	0.0005	0.1001
t-11	0.0044	-0.3311**	-0.018	-0.0013	0.0012	-0.0334
t-10	0.0156	0.2434	0.0063	-0.0121	-0.0024	-0.1098
t-9	0.0025	0.1122	0.0112	-0.0346	0.0017	-0.0868
t-8	-0.0072	-0.3971**	0.0077	0.039	0.0019	-0.0789
t-7	-0.006	0.1742	-0.0044	-0.0593	0.0018	0.0613
t-6	-0.0169	-0.0267	0.0108	-0.0189	0.0021	0.0093
t-5	-0.0276**	-0.2248	0.0123	-0.0165	-0.004	0.1203
t-4	-0.0066	0.1293	0.0056	0.0069	0.0007	0.0502
t-3	-0.0176	-0.0568	0.01	0.0383	-0.0003	0.0174
t-2	-0.0084	-0.2929**	-0.0056	0.0319	0.001	0.0256
t-1	0.0032	0.2336	0.0224	-0.033	-0.004	0.1252
t-0	-0.0219**	-0.1129	0.0174	0.0225	0.0062**	0.0231
t+1	-0.0048	-0.1177	0.0022	0.0164	0.0017	-0.1429
t+2	-0.0093	-0.3494**	0.0014	0.0075	-0.0027	0.0797
t+3	-0.0017	0.0112	0.0153	0.0347	-0.0006	0.0422
t+4	0.0189	-0.0251	-0.0084	-0.0336	-0.0051	0.0221
t+5	0.01	-0.0829	0.0122	0.0198	-0.0048	0.0457
t+6	-0.0104	0.0322	0.0059	-0.0051	0.0016	-0.1135
t+7	-0.0028	-0.1127	0.0129	0.0426	-0.0012	-0.0357
t+8	-0.0037	-0.0796	-0.0049	0.0061	-0.0004	0.0373
t+9	-0.015	-0.3767***	0.0213	-0.0039	0.0002	0.0785
t+10	-0.0012	-0.1048	-0.0051	-0.0232	-0.0013	0.1804
t+11	0.0045	0.1036	0.0027	0.013	-0.0031	-0.1073
t+12	-0.0114	0.018	0.0083	0.0163	0.0042	0.0362
t+13	0.0084	-0.0318	0.0123	-0.0116	-0.0013	-0.1872**
t+14	-0.0023	0.0535	0.0222**	-0.0121	-0.002	0.0545
t+15	-0.0024	-0.1161	-0.0078	-0.0005	0.0016	-0.0956

Table 3 shows the regression results from model (7). ***, ** and * indicate significance at the 1, 5, and 10 percent levels respectively.

The average abnormal return for the period from May 27 to June 4, 1985 (i.e., day +2 to day +8) is also calculated similarly. The result is presented in Table 4, panel B. It shows that the coefficient on the interaction between the dividend yield and individual shareholding is negative and significant at mere 0.10 levels. In summary, Table 4 generally provides supports for the hypothesis to the extent that the average abnormal return of the stock is negatively associated with dividend yield \times individual shareholding around the announcement of the LCGE.

If we ignore the tax status of the marginal investors (i.e., dropping the variable of the interaction between dividend yield and individual shareholding from regression model (7), it is found that the coefficient on dividend yield is not significant. This finding is consistent with McKenzie and Thompson (1995). They ignore the marginal shareholders' tax status and find no significant result. However, it is important to specify whether the marginal investors are individuals or non-individuals. Since non-individuals are not affected by the LCGE, we do not expect a significant stock reaction to the introduction of the LCGE if the marginal investors of the stocks are not individual investors.

To test for multi-collinearity further, condition indices of the independent variables are calculated (Belsley, et al. 1980). The largest condition index is only 11.49, which is much smaller than 30. This implies that multi-collinearity is not a severe problem. White's test for heteroskedasticity is applied, and none is detected. This suggests that the mean squared error term in the regression model is constant across observations. Under a sensitivity test, we only focus on the dividend-paying firms. There are 23 firms (17.7% of the observations) that did not pay dividends in 1984, and were therefore deleted. The results, which are not

presented in this paper, show that the conclusion from Table 4 does not change qualitatively. Under another sensitivity test, we estimate the abnormal return based on the holding-period-return method. The results, which are not presented in this paper, do not change qualitatively.

Table 4: Results from Model (7) for the Period from May 10-21, 1985 and May 27-June 4, 1985

Panel A – May 10-21, 1985	Intercept	<i>DIV X IND</i>	<i>DIV</i>	<i>LEV</i>	<i>PROF</i>	<i>SIZE</i>
Co. Eff.	-0.0131	-0.0923	0.0258	0.0055	0.0073	0.0006
t-test	-3.31***	-1.915**	0.8289	1.187	0.7554	0.5755
Panel B – May 27 – June 4, 1985						
Co. Eff.	-0.0001	-0.0889	0.0127	0.0048	0.0098	-0.0018
t-test	-0.0152	-1.684*	0.3743	0.9541	0.9257	-1.702*

Table 4 Panel A shows the regression results from model (7) from May 10 – 21, 1985. Panel B shows the results from May 27 to June 4, 1985. ***, ** and * indicate significance at the 1, 5, and 10 percent levels respectively. R-Squ for Panel A is 0.1538; for Panel B is 0.179.

CONCLUSION

This paper uses an event study methodology and finds the effect of personal capital gains taxes on stock price. Using Canadian financial reporting data and Canadian stock market data, this study have documented that changes in capital gains taxation, relative to dividend taxation, can have an effect on stock prices depending on whether the stocks are high dividend yield or low dividend yield stocks. The effective tax rate on capital gains for investors, especially for individual investors, was reduced in 1985 due to the \$500,000 lifetime exemption. It is argued that, in response to the capital gains exemption, individual shareholders may prefer capital gains to dividends. Stock prices, in response to the decreasing demand for dividends from individual shareholders, will react negatively if they are high-yield stocks. Since the institutional or corporate shareholders are not affected by the lifetime exemption in the same way as the individual shareholders, this paper incorporates a proxy for specifying the status of the marginal investors. The tests in this study provide a preliminary support for this argument. It is shown that stock abnormal return is negatively associated with high dividend yields \times individual shareholding around (especially before) the announcement of the LCGE.

This study is of interest to corporate managers, tax advisors, and others in understanding about how stock prices react to tax law changes. This study is also of interest to policy-makers, to the extent that it assists them in understanding about the impact of tax law changes on capital market. However, this study is a small-sample study with 131 observations. Further partition of the data leads to only 54 observations. These small samples may reduce the validity of its findings. This study uses the data from the time period around the announcement of the lifetime capital gains exemption. It does not extend the time period beyond the year 1985 since tax rules changed in 1988. In 1988, the inclusion (deduction) rate on capital gains (capital losses) was changed to two-thirds. In addition, the tax reform in 1987 changed personal tax and corporate taxation dramatically. It may be difficult to isolate this lifetime exemption effect from other tax changes.

An extension of this study may involve an investigation of potential capital gains that are experienced by the marginal shareholder directly, rather than an examination of dividend yields. However, to measure the potential capital gains experienced by the marginal investors, it is very important to determine the initial cost and to examine data on the purchase of the shares by the marginal investors.

REFERENCES

Akindayomi, A. and Warsame, H.A. (2007), Effects of capital gains taxation changes on stock prices: evidence from the February 2000 Canadian Budget. *Accounting Perspectives*, 6(4), 369-387.

Amoako-Adu, B., Rashid, M. and Stebbins, M. (1992), Capital gains tax and equity values: empirical test of stock price reaction to the introduction and reduction of capital gains tax exemption. *Journal of Banking and Finance*, 16, 275-287.

Ayers, B. C., Cloyd, C. B. and Robinson, J. R. (2002), The effect of shareholder-level dividend taxes on stock prices: evidence from the Revenue Reconciliation Act of 1993. *Accounting Review*, 77(4), 933-947.

Ayers, B.C., Li, O.Z., and Robinson, J. R. (2006), Tax induced trading around the Taxpayer Relief Act of 1997, Working Paper, University of Georgia.

Beam, R.E., Laiken, S. N. and Barnett, J. (2009), *Introduction to Federal Income Taxation in Canada*, 30th edition, CCH Canada Limited.

Bell, L. and Jenkinson, T. (2002), New evidence of the impact of dividend taxation and on the identity of the marginal investor. *Journal of Finance*, 52(3).

Belsley, D., Kuh, E. and Welsh, R. (1980), *Regression Diagnostics*, Wiley.

Blouin, J. L., Raedy, J. S. and Shackelford, D. A. (2003), Capital gains taxes and equity trading: empirical evidence. *Journal of Accounting Research*, 41(4), 611-651.

Bolster, P. J. and Janjigian, V. (1991), Dividend policy and valuation effects of the Tax Reform Act of 1986. *National Tax Journal*, 44, 511-518.

Budget Papers - Securing Economic Renewal, Tabled in the House of Commons by the Honorable M. H. Wilson, Minister of Finance, May 23, 1985.

Chen N., Grundy, B., and Stambaugh, R. F. (1990), Changing risk, changing risk premiums, and dividend yield effects. *Journal of Business*, 63, 51-70.

Cook K.A. (2006), Stock price reaction to a reduction in the capital gains tax rate: evidence from the Taxpayer Relieve Act of 1997. Working paper, Texas A&M University.

Dhaliwal, D., Li, O.Z., and Trezevant, R. (2003), Is a dividend tax penalty incorporated into the return on a firm's common stock?. *Journal of Accounting and Economics*, 35, 155-178.

Jang, H. J. (1994), The market reaction to the 1986 tax overhaul: a study of the capital gain tax change. *Journal of Business Finance & Accounting*, 21(8), 1179-1193.

Lang, M. H. and Shackelford, D. A. (2000), Capitalization of capital gains taxes: evidence from stock price reactions to the 1997 Rate Reduction. *Journal of Public Economics*, 76, 69-85.

Lin, H.C. and Zeng, T. (2003), Stock market reactions and capital gains tax: evidence from the 1985 Canadian Lifetime Capital Gains Exemptions. *Review of Accounting and Finance* 4(2), 149-164.

Klein, P. (1999), The capital gains lock-in effect and equilibrium returns. *Journal of Public Economics*, 71, 355-378.

McKenzie K. J. and Thompson, A. J. (1995), The impact of the capital gains exemption on capital markets. *Canadian Public Policy*, 21.

Miller M. and Scholes, M. (1978), Dividends and taxes. *Journal of Financial Economics*, 6, 333-364.

Shackelford D. A. (2000), Stock market reaction to capital gains tax changes: empirical evidence from the 1997 and 1998 Tax Acts. *Tax Policy and the Economy*, 14, 67-92.

Sias, R. W. and Starks, L. T. (1997), Institutions and individuals at the turn-of-the-Year. *Journal of Finance*, 52(4).

White, H., A. (1980), Heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48, 817-838.

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DETERMINING FACTORS OF INTERNET FINANCIAL REPORTING IN INDONESIA

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ABSTRACT

Internet Financial Reporting (IFR) is voluntary in nature. With no specific regulations for IFR, there is a disparity of IFR practices among companies. Some companies disclose only partial financial statements using a low level of technology, while others disclose full sets of financial reports using sophisticated web technologies. The purpose of this study is to measure the quality of Internet Financial Reporting of public firms on the Jakarta Stock Exchange. An index was developed to measure overall internet reporting. In addition, financial variables that affect Internet Financial Reporting (IFR) among Indonesia Stock Exchange companies are identified. The findings show that the nature of IFR disclosure varies considerably across the sample firms. Firm size and return on equity are identified as determining factors of internet financial reporting in Indonesia.

JEL: G30; G33; G41; M41

KEYWORDS: internet financial reporting, website, traditional financial reporting, technology.

INTRODUCTION

Due to the dynamic nature of the business world, traditional paper-based corporate reporting is becoming less timely and less useful to decision makers. Electronic-based reporting removes the confines of paper based reports. Companies can benefit from cost saving and improve their financial reporting strategies by using these new technologies. Users benefit by getting financial information in more breadth and depth. In addition, users are able to more easily obtain financial information. The website opens new opportunities for information presentation. Issues that relate to the website as a communication medium include the readability, usability and understandability of the information. These aspects relate to the nature of the information as well as the technical aspects of the presentation medium. Financial reporting via a website is more complicated than hardcopy channel because of the continuous exposure of information to unauthorized change. The company must ensure the security of the financial information when it is presented via this channel.

Several empirical studies examine corporate financial reporting on the internet in different countries (e.g., Budi and Almilia 2008b, Pirchegger and Wagenhofer 1999; Ismail 2002; Wagenhofer 2003). Pirchegger and Wagenhofer (1999), and Ismail (2002) analyze internet use and the extent of financial disclosure on the internet. Budi and Almilia 2008 examine the use of bank websites and LQ-45 firms in Indonesia. LQ-45 firms are those that are contained in the LQ-45 Indonesian stock index. They find that most public banks and LQ-45 firms in the sample had websites and provided financial data on their sites. Davey and Homkajohn (2004) found that Thai companies provide financial information on websites as a complement to their traditional paper-based annual reports. The Indonesian Company Act 2007 addresses the obligations of a company to report their sustainability activities (Undang-undang Perseroan Terbatas No. 40 Tahun 2007). Indonesian security regulations currently do not require firms to disseminate financial information on the internet. Another issue is the lack of formal guidance and differences in the nature and extent of reporting on the web. This is likely to raise issues concerning the comparability and reliability data. The national standards setters and regulators of accounting practices will not be able to indefinitely treat financial reporting on the internet as identical to traditional distribution channels. We argue that the

Indonesia government or other regulatory bodies should introduce guidelines that provide both firms and information users with a framework for this data exchange.

The analysis of internet financial reporting determinants extends the theories and models that have been developed regarding disclosure through traditional media. Oyelere et al. (2003) indicate that firm size, liquidity, industrial sector and shareholder dispersion are determinants of voluntary internet financial reporting (IFR). Abdelsalman et al. (2007) find corporate internet reporting comprehensiveness is related to analyst following, director holding, director independence, and CEO duality. Ismail (2002) finds that firm assets, profitability, and leverage affect the decision to disseminate financial information on the internet. The purpose of this study was to examine the determinant factors of Internet Financial Reporting of public firms on the Jakarta Stock Exchange. An index was developed based closely on the work of Davey and Homkajohn (2004). These authors devised their framework from the three stages of website financial reporting identified by Lymer et al. (1999). The remainder of the paper is organized as follows. Section 2 briefly discusses the relevant literature. Data selection, research methodology, and empirical models are described in Section 3. Section 4 provides analysis and interpretations of the empirical findings and Section 5 concludes the paper.

LITERATURE REVIEW AND DEVELOPMENT HYPOTHESIS

In this section the relevant literature is discussed. In addition, testable hypotheses are presented. This section is organized as follows. First we discuss the literature related to voluntary disclosure. Next we discuss the literature related to internet financial reporting. Finally, we develop the testable hypotheses.

Voluntary Disclosure

Many studies of voluntary disclosure have been conducted. These studies attempt to identify factors that contribute to voluntary disclosure. Theories that explain voluntary disclosure include agency theory, signaling theory and cost-benefit analysis. Agency theory is regarded as an important construct for understanding financial reporting incentives. Agency theory proposes that, in the presence of information asymmetries, managers will choose the set of decisions required to maximize their usefulness. Several empirical studies examine how agency problems can be mitigated through increased disclosure. Ball (2006) argues that increased transparency and disclosure contribute to a better convergence interests between managers and shareholders. In this sense, agency theory conceives voluntary disclosure as a mechanism to control the manager performance and reduce information asymmetry and monitoring costs.

Signaling theory suggests that higher quality firms will use the internet to disseminate “old” accounting information. Gray and Roberts (1989) considered the cost and benefits of voluntary disclosure and investigated perceptions of the costs and benefits empirically. They found that for British multinationals, the most important perceived voluntary disclosure benefits were: 1) improved reputation of the company, 2) better investment decisions by investors, 3) improved accountability to shareholders, 4) more accurate risk assessment by investors, 5) fairer share prices. The most important cost factors constraining voluntary disclosure were, 1) competitive disadvantage costs and 2) data collection and processing costs.

Internet Financial Reporting

There is a growing body of empirical studies on IFR since 1995 reflecting the growth in this information medium. Several studies have examined the determinants of web-based disclosure policy (Pirchegger & Wagenhoffer, 1999; Budi and Almilial, 2008a). Several other studies have investigated the nature and extent of financial reporting on corporate websites as an instrument for firms’ stakeholder relations. Cheng, Lawrence and Coy (2000) developed a benchmark index to measure the quality of IFR disclosure of the Top 40 New Zealand companies. The results revealed that 32 (80%) on the companies in the

sample had websites and 70% of the sample presented financial information on their websites. Of the 32 companies having websites, only 8 (25%) companies scored more than 50% on the index by virtue of having reasonably well-developed sites.

Deller, Stubenrath and Weber (1999) find that more US corporations (91%) used the internet for investor relation activities than UK (72%) and German (71%) corporations. In the USA, corporate reporting on the internet seems to be standard. In contrast, in Germany only about two-thirds of the corporations used the internet as an alternative way to distribute accounting information. UK corporations are more extensive users of the internet as an alternative distribution channel than German firms. Rikhardsson, Andersen and Bang (2002) find that many GF500 companies publish social and environmental information on their websites. Rikhardsson et al (2002) show the most popular environmental issues addressed are environmental policies, resources consumption, emissions and product performance. With regard to the social aspect of internet reporting the most popular issues addressed are workplace performance, stakeholder relationship, and social policies.

Empirical research of internet financial reporting in Indonesia is also provided by Budi and Almia (2008a). By measuring the IFR of 19 public banks in Indonesia it was shown that most public banks in the sample had websites and provided financial data on their sites. The survey findings show that the nature of IFR disclosure varies considerably across the sample banks. The variation in the content of the websites suggests that firms had different reasons for establishing an Internet presence. Some banks' websites contain only product and service advertising. Most financial reporting is confined to PDF, which appear exactly like the paper-based annual reports. Apart from cost considerations, this may be to protect the data from inaccuracies and unauthorized modifications. Most banks in the sample do not take full advantage of computer technologies. Only one bank allows users to download financial information or provided analysis tool for users to make their own analyses. A common feature of the websites is online feedback. None of the banks used advanced futures (XBRL) to create their websites. Almia and Budi (2008) examine 19 bank industry and 35 LQ-45 firms. The result shows that banking sector firms have higher scores on technology and user support components than LQ 45 firms.

Determinant Factors of Internet Financial Reporting

Firm size is an important determinant of corporate disclosure. Results from prior studies frequently confirm a positive association between firm size and disclosure level (Meek, Roberts and Gray, 1995; Zarzeski, 1996). There are several arguments that may explain this positive association. First, because of their more developed internal reporting systems, large companies may have the resources to produce information, and the cost of producing such information may be lower for these firms. Second, large firms have more incentives to disclose voluntary information, because they face higher political costs and pressures. Third, smaller firms are more likely to hide crucial information because of industry competition. Wallace, Naser and Mora (1997) provide evidence that the amount of detail in Spanish corporate annual reports and accounts is increasing in firm size. This explanation leads to the first hypothesis of this research:

H1: There is a positive association between the internet financial reporting index and firm size.

Studies refer to profitability as an independent factor that may affect disclosure level. For example, Singhvi and Desai (1997) examine 500 large listed US firms, and found a positive association between profitability and the quality of disclosure. Their results suggest that the firm profitability can be regarded as an indicator of good management, as management tends to disclose more information when profitability is high. Based on this finding, we argue that profitable companies have extra financial resources to disseminate financial information voluntarily or in compliance with additional regulations imposed. Alternatively they might have incentives to show stakeholders that they are more profitable

than their competitors. Oyelere, Laswad, and Fisher (2003) examine voluntary adoption of the internet as a medium for transmitting financial reports and determinants of such voluntary practice by New Zealand companies. The result indicate the some determinants of traditional financial reporting such as firm size, liquidity, industrial sector and spread of shareholding are determinants of voluntary internet financial reporting (IFR). The other findings of this research show that other firm characteristic such as leverage, profitability and internationalization do not explain the reporting medium choice. Ismail (2002) examine the extent of internet financial information by Gulf Co-operation Council (GCC) countries. In this research forward stepwise logistic regression was used to assess whether voluntary dissemination of financial information on the internet was related to firm size, leverage, and profitability. The results show that the likelihood of a firm using internet reporting depends not only on Individual characteristic, but also on a combination of interaction effects among firm characteristics. Vance (1975) reported a negative association between social involvement and profitability. Studies by Heinze (1976) and Bowman and Haire (1975) reported a positive association. This explanation leads to our second hypothesis:

H2: There is a positive association between the internet financial reporting index and profitability.

Leverage may also be related to disclosure choices. Agency theory could explain the possible link between leverage and voluntary disclosure. According to this theory, highly leveraged firms have an incentive to voluntary increase the level of corporate disclosure to stakeholders through traditional financial statement, and other media (Jensen and Meckling, 1976). However, research in this relation has been mixed. Ismail (2002) found a positive relationship between internet financial reporting and the amount of leverage in firm's capital structure, whereas studies by Andrikopoulos and Diakidis (2007); Zeghal et al (2007) and Oyelere (2003) do not support this relationship. Meek et al (1995) reported a significant negative relationship between leverage and voluntary disclosure for US, UK, and continental European multinationals. This explanation leads to the third hypothesis of this research:

H3: There is a positive association between the internet financial reporting index and leverage.

DATA AND METHODOLOGY

This section describes the research design of the study including sample description, variable measurement, data collection and empirical model. The sample of this research includes banking sector and LQ-45 firms. As noted earlier, LQ-45 firms are those 45 firms that are contained in the Indonesian LQ-45 stock index. We explore the banking sector because it is a fully regulated industry sector in Indonesia. The screening of corporate websites was carried out in November 2007 and February 2008.

The dependent variable in this study is internet financial and sustainability reporting. A number of models have been developed to assess quality of corporate websites. The criteria were used to construct an Internet Financial Reporting Index to assess company websites. We develop an index to measure the technology used rather than the content of information statements. To add weight to content over technology enhancements, the index criteria are divided into four parts and assigned the following weights: content (40%), timeliness (20%), technology (20%) and user support (20%). The index was developed based closely on the work of Cheng et al. (2000) who devised a framework from three stages of website financial reporting as identified by Lymer et al. (1999). In order to evaluate company websites a checklist was developed to address each relevant issue.

The first reporting instrument was Content. This category includes the components of financial information including the statement of financial position, cash flow, shareholder information and social responsibility disclosures. For example, financial information disclosed in html format scores higher (2 points) than disclosure in PDF format (1 point), since the former makes better use of web technology and is easier for users to access effectively. A copy of the content index is attached as Appendix 1.

The second reporting instrument was Timeliness. Because the internet can provide real time information it is important identify the extent of its use. Real time data include press releases, unaudited latest quarterly results, forward-looking statements, and charts of future profits forecasts. For disclosure of press releases and stock quotes, there is an added score for the recentness of information (on a scale from 0 to 3). Companies receive a score for disclosing unaudited quarterly results and vision statements. A score is also given for appropriate disclaimers. The timeliness index is attached as Appendix 2.

Technology items relate to enhancements that cannot be provided by printed reports. Those items that uphold the quality of electronic financial reporting and facilitate communication with site users score highly on the index. The elements are the ability to download a plug-in on the spot, online feedback, use of presentation slides, use of multimedia technologies, analysis tools such as Pivot Tables, and advanced features such as implementing an “Intelligent Agent” or XBRL. A copy of the technology index is attached as Appendix 3.

User Support relates to the users’ computer skills. Some users are experts while others are novices. Those who do not have state-of-the-art technology may find themselves unable to use a site. Companies score higher if they implement tools that facilitate the use of the internet reporting irrespective of computer skills. The tools scored in the index are: search and navigation tools such as FAQ’s, links to homepages, site maps, site search instruments, the number of clicks required to get financial information and consistency of web page design. A copy of the user support index is attached as Appendix 4.

The independent variables in this research are accounting variables including firm size, profitability, and leverage. Data for relevant variables in this research were collected from corporate websites for and the Indonesia Capital Market Directory which is published annually by the Institute for Economic and Financial Research (ECFIN). Firm size as measured by the logarithm natural of total assets. Profitability is measured by two variables, net profit divided by total assets and net profit divided by total equity. Leverage is measured as the ratio of total debt divided by total assets.

Research Model

Ordinary least square (OLS) regression is used to determine the combined importance of the independent variables to the dissemination of financial information on the internet. The OLS regression equation is:

$$\text{IFR index}_i = \alpha_1 + \beta_0 + \beta_1 \text{LNNTA}_i + \beta_2 \text{LEVERAGE}_i + \beta_3 \text{ROA}_i + \beta_4 \text{ROE}_i + e_{it} \quad (1)$$

Where:

- IFR index_i = Internet Financial and Sustainability Reporting index for firm i
- LNNTA_i = logarithm natural total assets for firm i
- LEVERAGE_i = ratio of total debt divided by total assets for firm i
- ROA_i = ratio net profit divided by total assets for firm i
- ROE_i = ratio net profit divided by total equity for firm i

EMPIRICAL RESULTS

Fifty-eight listed companies were contained in the sample. Five banks were excluded because they did not have a website or the website was inaccessible. Thus, 19 (82.61%) of the 23 listed banks were evaluated. The disclosure index scores ranged from a low of 22% to a high of 64.50% with an average score of 44.34%. Only four banks (21.5%) scored more than 50%. The highest total score for the banking sector was Kesawan Bank and the lowest total score was for Victoria Bank. Thirty-five of the 45 firms

listed on the Jakarta stock exchange, were utilized in the analysis. Thus (77.78%) of listed firms were evaluated. The index scores ranged from a low of 12% to a high of 55.50% with an average score of 39.98%. Only five firms (14.29%) scored more than 50%. The highest total score for LQ 45 firms is Telekomunikasi Indonesia and the lowest is Sumalindo Lestari Jaya. The current state of the 19 sample banks' and 35 sample LQ 45 firms web sites was evaluated based upon the checklist as discussed earlier.

Content

The index scores are summarized in Table 1. All of the sample firms in the survey had financial reports on their websites, although they appear in very different forms. Of the 19 banks, 13 (68.42%) provided a complete set of financial statements. Of the thirty five LQ-45 firms, 25 (71.43%) firms provide a complete set of financial statements. Eight (22.85%) firms provide only annual reports and two (5.71%) firms did not publish financial statements on the internet. All of the banks report their information in the local language and 11 banks (58%) provide bilingual versions (Indonesian and English versions). Of the thirty-five LQ-45 firms, 26 (74.29%) provide an English version and three (8.57%) firms use the Indonesian language. Six (17.14%) firms provide bilingual information.

Table 1: Internet Disclosure Index Scores

Score	Banks Sector		LQ 45 Firms	
100	-	-	-	-
90 – 99	-	-	-	-
80 – 89	-	-	-	-
70 – 79	-	-	-	-
60 – 69	1	5.27%	-	-
50 – 59	5	26.32%	5	14.29%
40 – 49	6	31.58%	15	42.86%
30 – 39	5	26.31%	11	31.43%
20 – 29	2	10.52%	2	5.71%
10 – 19	-	-	2	5.71%
0 – 9	-	-	-	-
Total	19		35	

This table shows the Internet Disclosure index scores for the sample. The first column provides data for the banking sector. The second column provides data for the LQ 45 firms.

The highest content score in the banking sector was for Kesawan Bank while the lowest banking sector content score was for Mayapada Bank. The highest content score for LQ 45 firms is Adhi Karya (Persero) while the lowest is Sumalindo Lestari Jaya. The number of banks and LQ 45 firms in the sample that provide complete content of financial reporting on their websites is shown in Table 2.

Table 2: Internet Content Disclosure Scores

Score	No. of Sample		% of Sample	
	Banks Sector	LQ 45 Firms	Banks Sector	LQ 45 Firms
41 – 50	-	-	-	-
31 – 40	1	8	5%	23%
21 – 30	11	16	58%	45%
11 – 20	7	8	37%	23%
0 – 10	-	3	-	9%
Total	19	35	100%	100%

This table shows the number of banks in the sample that provided complete financial reporting on their websites.

Timeliness

The number of banks and LQ-45 firms in the sample that provided timely information on their website is shown in Table 3. The most frequent item of disclosure on bank websites was the unaudited latest quarterly result, press release and vision statement, being disclosed in 89% - 95% of the websites. In

addition, the most frequent item of disclosure on LQ 45 firm websites were the same three items with rates of 80% - 91%. This was not particularly surprising since press releases are generally text only document that can be added to the websites without alteration or format changes. The final item in the timeliness category is the vision statement. Most of banks and LQ 45 firms in the sample disclosed descriptive statement about future profit forecast or trends for the banks' performance.

Table 3: Disclosure of Timely Information

Timeliness	No. of Sample		% of Sample	
	Banks	LQ 45	Banks	LQ 45
Press releases	17	32	89%	91%
Unaudited Latest Quarterly Results	18	30	95%	86%
Stock Quote	8	21	42%	60%
Vision Statement				
Existence	18	28	95%	80%
Disclaimer	0	2	0%	6%
Charts	3	1	16%	3%

Technology

The technology results are presented in Table 4. Most banks in the sample provided their annual report in PDF format. It was not surprising that most banks made available pdf files. The result showed that direct e-mail contact and mailing lists were quite common. Around 74% of the banks and 3% of the LQ 45 firms in the sample allowed the users to e-mail the firm. Three (16%) of banks used presentation slides to present their annual meetings or companies' profile. Audio or video presentation of annual meetings, press gatherings or analyst conferences was generally not available on the sample companies' websites. In only one case did banks in the sample offer selections of corporate presentations such as speeches at annual meetings or addresses from analyst conferences.

Table 4: Technology Provided on Bank Website

Technology	Bank Website		LQ-45 firms Website	
	Sample	%	Sample	%
Download plug-in on spot	0	0%	0	0%
Online feedback	14	74%	1	3%
Presentation slides	3	16%	0	0%
Multimedia technology	1	5%	0	0%
Analysis tools	1	5%	0	0%
Advanced features (XBRL)	0	0%	0	0%

This table shows the different types of technology that are available on sample firms websites

Although digital reports provide investors with the opportunity to download files that can be used as input in computer-based analysis at low cost, it is rather surprising that only 1 or 5% of the banks in sample provided analysis tools or allowed users to download data for analysis. One reason for this reluctance may be a desire to avoid any discrepancy between internet provided information and traditional paper-based reporting. Table 4 shows that LQ 45 firms do not use extended technologies. Although XBRL is emerging, and its benefits include items such as shortening implementation times and alleviating errors, no companies in the sample used the XBRL format to create their website.

User Support

The type and number of user support facilities on the banks' websites are shown in Table 5. Frequently asked questions (FAQ's) are useful for companies in reducing the number of incoming e-mails. The results show that 14 (74%) banks in the sample offered FAQ's on their websites. All of the banks in the sample provided a homepage link on their websites with 14 (74%) of banks providing a link to the top of

the page. A site map is very useful as it can show the structure of the website on just one page. The survey identified 14 banks that provide site maps on their websites. Most banks (74%) provided a site search instrument on their websites. The type and number of user support facilities on the LQ 45 firms' websites are also shown in Table 5. Three (9%) LQ-45 firms in the sample offered FAQ's on their websites. The results show that 32 of the LQ-45 firms in the sample provide a homepage link on their websites. One firm provided a link to the top of the page. Nineteen firms provided site maps on their websites. Most LQ 45 firms (57%) provided a site search instrument on their websites.

Table 5: User Support Provided on Firm Websites

User Support	Bank Website		LQ-45 firms website	
	Sample	%	Sample	%
Help & FAQ	14	74%	3	9%
Link to Home Page	19	100%	32	91%
Link to Top	14	74%	1	3%
Site Map	14	74%	19	54%
Site Search	14	74%	20	57%

This table shows user support that is available on sample firm websites.

Regression Analysis

Next we use regression analysis to further explore internet disclosure issues. The estimated equation is specified by equation 1 above. The regression analysis result are presented in Tables 6 and 7. The Goodness of Fit test reveals an adjusted R^2 of 0.476 indicating that 47.6% of the variance in the dependent variable are explained by the independent variables. Thus the model has good explanatory power. The F test is significant at the one percent level.

Table 6: The Goodness of Fit Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3571.085	4	892.771	10.603	.000
	Residual	12209.009	145	84.200		
	Total	15780.094	149			

R = 0.476

R Square = 0.226

Adjusted R Square = 0.205

Standard Error of the Estimate = 9.17606

This table shows the results of the goodness of fit test. The estimated equation is $IDEKS = \alpha + \beta_1 ROE + \beta_2 Leverage + \beta_3 LNTA + \beta_4 ROA$.

Table 7 reports the regression coefficients. Firm size is significantly positively related with internet financial reporting. The results are significant at the one percent level. The results imply that larger firms are more likely to disclose financial reports on the website. Return on equity as a proxy for profitability has a significant impact on internet financial reporting. More profitable firms tend to disclose more information on their websites. Leverage and return on assets are not significantly explanatory variables for the internet financial reporting index.

The findings regarding firm size are consistent with Meek, Roberts and Gray (1995) and Zarzeski (1996) who also found that large firms use more internet reporting. The profitability findings are consistent with Singhvi and Desai (1997) who examined 500 large listed US firms, finding a positive association between profitability and disclosure quality. The findings are also consistent with Heinze (1976) and Bowman and Haire (1975) but are not consistent with Vance (1975). According to Agency theory, highly leveraged

firms have an incentive to voluntarily increase the level of corporate disclosure, but the result of this research not support an agency theory explanation.

Table 7: Analysis Regression Result

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.752	9.227		-.081	.935
LNTA	2.767	.545	.398	5.079***	.000
LEVERAGE	-.667	.781	-.070	-.855	.394
ROA	-8.286	10.336	-.074	-.802	.424
ROE	4.138	2.154	.169	1.921*	.057

The Model specification is $IFR\ index_i = \alpha_1 + \beta_0 + \beta_1 LNTA_i + \beta_2 LEVERAGE_i + \beta_3 ROA_i + \beta_4 ROE_i + e_{it}$. *IFR index* = Internet Financial and Sustainability Reporting index for firm *i*, *LNTA_i* = logarithm natural total assets for firm *i*, *LEVERAGE_i* = ratio of total debt divided by total assets for firm *i*, *ROA_i* = ratio net profit divided by total assets for firm *i*, *ROE_i* = ratio net profit divided by total equity for firm *i*. *** indicates significant at 1% ** indicates significant at 5% * indicates significant at 10%

Robustness Test: Mann Whitney Test

To continue the analysis we conduct robustness tests. Specifically, we conduct a Mann-Whitney mean difference test. To determine the appropriate test technique a one sample Kolmogorov Smirnov test is conducted to examine variable normality. We create 2 subsamples of our data, high IFR index firms and low IFR index firms. The *Kolmogorov Smirnov Test* indicate that each of the independent variables are not normal distributed. Due to this non-normality the Mann-Whitney tests for difference in means is utilized to compare the results for firms with low IFR to those with high IFR. Table 8 shows that there are differences of LNTA for firms with high IFR and firms with low IFR.

Table 8: Result of Mann-Whitney Test

	LNTA	LEVERAGE	ROA	ROE
Mann-Whitney U	1587.000	2682.000	2486.000	2317.000
Wilcoxon W	3417.000	4512.000	4316.000	4147.000
Z	-4.270***	-.069	-.821	-1.469
Asymp. Sig. (2-tailed)	.000	.945	.412	.142

This table shows the results of the robustness tests. *LNTA_i* = logarithm natural total assets for firm *i*, *leverage_i* = ratio of total debt divided by total assets for firm *i*, *ROA_i* = ratio net profit divided by total assets for firm *i*, *ROE_i* = ratio net profit divided by total equity for firm *i*. *** indicates significant at 1% ** indicates significant at 5% * indicates significant at 10%

CONCLUDING COMMENTS

The technology revolution has significantly impacted accounting practice and communication. Many companies now utilizing the Internet to disseminating financial information. Firms benefit from cost savings while broadening their disclosure. Users benefit in a variety of ways depending on the extent to which internet capabilities are exploited. Potential advantages include enhanced timeliness, ease of access and search, improved facilities for data extraction, automatic comparisons, and analysis. The internet is outstanding for reporting the expanding information quantities required by accounting rules.

The purpose of this study was to measure the quality of Internet Financial Reporting in the banking sector and LQ-45 firms on the Indonesia Stock Exchange. An index was developed to measure internet reporting. The samples consist of 19 banking sector and 35 LQ 45 firms from Indonesia. By measuring the firms IFR it was shown that most firms in the sample had websites and provided financial data on

their sites. The survey findings show the nature of IFR disclosure varies considerably across banks. Variation in the website contents suggests that firms have different reasons for establishing an Internet presence. Some websites contain only product and service advertising. Moreover, most financial reporting is confined to PDF. Apart from the lower cost consideration, this may be an attempt to limit legal risk associated with providing incorrect financial data. The findings also indicate that firm size and return on equity are important determinants of internet financial reporting. Large firms have more incentives to disclose voluntary information.

This study is restricted to the 19 public banks and 35 LQ 45 firms listed on the Jakarta Stock Exchange in Indonesia. The extent to which these findings can be generalized is not clear. Additional research is necessary to identify the characteristics of internet based financial reporting in other markets.

REFERENCES

Abdelsalam, Omneya H., Stephanie M. Bryant, and Donna L. Street, (2007), "An Examination of the Comprehensiveness of Corporate Internet Reporting Provided by London-Listed Companies". *Journal of International Accounting Research* Vol. 6 No. 2. pp. 1 – 33.

Andrikopoulos, A., and Diakidis, N., (2007), Financial Reporting Practices on the Internet: The Case of Companies Listed in the Cyprus Stock Exchange, *Published Working Paper* <http://www.ssrn.com>.

Almlia, Luciana Spica and Sasongko Budi. 2008. Corporate Internet Reporting of Banking Industry and LQ45 Firms: An Indonesia Example. *Proceeding The 1st Parahyangan International Accounting & Business Conference 2008 - Universitas Parahyangan Bandung - Indonesia*. *Published Working paper* <http://www.ssrn.com>

Ball, R. 2006. International Financial Reporting Standards (IFRS): Pros and Cons for Investors. *Accounting and Business Research*. Vol 36. *International Accounting Policy Forum*. pp. 5 – 27.

Bowman, E. H. dan M. Haire. 1975. A Strategic Posture Toward Corporate Social Responsibility. *California Management Review* Vol. 18 No. 2. pp. 49 – 58

Budi, Sasongko and Luciana Spica Almlia. 2008a. The Practice of Financial Disclosure on Corporate Website: Study in Indonesia. *Proceeding International Conference on Business and Management - Universiti Brunai Darussalam (Brunai Darussalam)*. *Published Working paper* <http://www.ssrn.com>

_____. 2008b. Exploring Financial and sustainability Reporting on the Web in Indonesia. *Proceeding 16th Annual Conference on Pacific Basin Finance, Economic, Accounting and Management - Queensland University of Technology (QUT) Brisbane Australia*. *Published Working paper* <http://www.ssrn.com>

Davey, H., and K. Homkajohn. 2004. Corporate Internet Reporting: An Asian Example. *Problems and Perspectives in Management* Vol. 2, pp. 211-227

Deller, D., M. Stubenrath and C. Weber. 1999. A Survey on the Use of the Internet for Investor Relation in the USA, the UK and Germany. *The European Accounting Review* Vol. 8 No. 2. pp 351 – 364.

Gray, S., J., and Roberts, C. B., 1989. Voluntary Information disclosure and the British Multinationals: Corporate Perceptions of Costs and Benefits. *International Pressures of Accounting Changes*. Hemel Hempstead: Prentice Hall, pp. 116

Heinze, D. C. 1976. Financial Correlates of a Social Involvement Measure. *Akron Business and Economic Review* Vol. 7 No. 1. pp 48 – 51.

Ismail, Tariq H. 2002. An Empirical Investigation of Factors Influencing Voluntary Disclosure of Financial Information on the Internet in the GCG countries. *Published Working Paper* <http://www.ssrn.com>.

Jensen, M.C. and W. H. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Cost and Ownership Structure. *Journal of Financial Economics* Vol. 3. pp. 305 – 360

Lymer, A., (Ed). 1999. Special Section: The Internet and Corporate Reporting in Europe. *European Accounting Review* Vol. 9, pp. 287-396.

Meek, G. K., Roberts, C.B. and Gray, S.J. 1995. Factors Influencing Voluntary Annual Report Disclosure by U.S, U.K and Continental European Multinational Corporations. *Journal of International Business Studies*. Vol. 26. No. 3. pp. 555 – 572.

Oyelere, Peter, Fawzi Laswad and Richard Fisher. 2003. Determinants of Internet Financial Reporting by New Zealand Companies. *Journal of International Financial Management and Accounting*. 14: 1. pp. 26-63.

Pirchegger, B., and A. Wagenhofer. 1999. Financial Information on the Internet: Survey of the Homepages of Austrian Companies. *The European Accounting Review* 9:2 pp. 383 – 395.

Rikhardsson, Pall., A.J.R. Andersen and Heine Bang. 2002. Sustainability Reporting on the Internet: A Study of the Global Fortune 200. *GMI* Vol. 40. pp. 57 – 74

Vance, S. C. 1975. Are Socially Responsible Corporations Good Investment Risks?. *Management Review* Vol. 64 No. 8. pp 18 – 24

Wagenhofer, A. 2003. Economic Consequences of Internet Financial Reporting. *Schmalenbach Business Review* Vol 55 October 2003.

Wallace, R. S. Olusegun, Kamal Naser and Araceli Mora. 1997. The Relationship Between the Comprehensive of Corporate Annual Reports and Firms Characteristic in Spain. *Accounting and Business Research*. Vol. 25. No. 97. pp. 41 – 53.

Zarzeski, M. T. 1996. Spontaneous Harmonization Effect of Culture and Market Forces on Accounting Disclosure Practices. *Accounting Horizon*. Vol. 10. No. 1. pp. 18 – 37.

Zeghal, D., R. Mouelhi and H. Louati. 2007. An Analysis of the Determinants of Research and Development Voluntary Disclosure by Canadian Firms. *The Irish Accounting Review* Vol. 14 No. 2. pp. 61 - 89

BIOGRAPHY

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Appendix 1: The Content Index of Internet Disclosure Instruments

Index Items	Explanations	Score	Multiplier	Max
1. Component of Financial Information				
1.1. Statement of Financial Position				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.2. Statement of Financial Performance				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.3. Statement of Cash Flows				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.4. Statement of Movement in Equity				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.5. Notes to the Financial Statement				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.6. Disclosures of Quarterly Results				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.7. Financial Highlight/Year-in-Review				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
Growth rate, ratios, charts	1 = Yes, 0 = No	1	2	2
1.8. Chairman's Report				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.9. Auditors' Report				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.10. Stakeholder Information				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.11. Corporate Information				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
1.12. Social Responsibility				
Pdf	1 = Yes, 0 = No	1	1	1
HTML	1 = Yes, 0 = No	1	2	2
2. Number of years/quarters Shown				
Annual Report	No. of years	1	0.5	2
Quarterly Report	No. of quarters	1	0.5	2
3. Past Information (HTML Only)				
Annual Report	1 = yes, 0 = no	1	1	1
Quarterly Report	1 = yes, 0 = no	1	1	1
Graph of Share Price	1 = yes, 0 = no	1	2	2
4. Language				
English	1 = yes, 0 = no	1	2	2
Other than English or Indonesia	1 = yes, 0 = no	1	1	1
5. Address (HTML only)				
Company Address	1 = yes, 0 = no	1	1	1

Appendix 2: The Timeliness Index of Internet Disclosure Instruments

Index Items	Explanations	Score	Multiplier	Max	
1. Press Releases					
Existence	1 = Yes, 0 = No	1	2	2	
Number of days since last updated news	See note 1	1	1	3	Note 1: Press Release
2. Unaudited Latest Quarterly Result (3 = updated on the date of investigation)					
Existence	1 = Yes, 0 = No	1	2	2	2 = 1 week or less before the date of investigation
With proper disclaimer	1 = Yes, 0 = No	1	1	1	1 = 2 weeks or less before the date of investigation
3. Stock Quote (0 = news is updated more than 2 weeks ago)					
Existence	1 = Yes, 0 = No	1	2	2	
Updated in how many hours	See note 2	1	1	3	Note 2: Stock Quote
4. Vision Statement/Forward Looking Statement (3 = updated every hour or less)					
Existence	1 = Yes, 0 = No	1	2	2	2 = update every day or less
Proper disclaimer	1 = Yes, 0 = No	1	1	1	1 = updated every week or less
Charts of future profit forecasts/trends	1 = Yes, 0 = No	1	1	1	0 = updated every week or less

Appendix 3: The Technology Index of Internet Disclosure Instruments

Index Items	Explanations	Score	Multiplier	Max	
Download Plug-in On Spot	1 = Yes, 0 = No	1	2	2	
Online Feedback	1 = Yes, 0 = No	1	2	2	
Use of Presentation Slides	1 = Yes, 0 = No	1	2	2	
Use of Multimedia Technology	1 = Yes, 0 = No	1	3	3	
Analysis Tools	1 = Yes, 0 = No	1	4	4	
Advance Features (XBRL)	1 = Yes, 0 = No	1	5	5	

Appendix 4: The User Support Index of Internet Disclosure Instruments

Index Items	Explanations	Score	Multiplier	Max	
Help and Frequently Asked Questions	1 = Yes, 0 = No	1	2	2	
Link to Home Page	1 = Yes, 0 = No	1	1	1	
Link to Top	1 = Yes, 0 = No	1	1	1	
Site Map	1 = Yes, 0 = No	1	2	2	
Site Search	1 = Yes, 0 = No	1	2	2	Note 3: Number of Clicks to get to financial Info
Number of Clicks to get to Financial Info	See note 3	1	1	3	3 = 1 clicks
Consistency of Web Page Design	0 = poor, 1 = fair, 2 = good	1	2	4	2 = 2 clicks

IMPACT OF GENDER DIVERSITY ON VOLUNTARY DISCLOSURE IN ANNUAL REPORTS

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ABSTRACT

This study examines the impact of the firm director's gender on corporate voluntary disclosures in company annual reports. The study uses data for the fiscal years 2005-2007 of companies listed on the Helsinki Stock Exchange during the year 2008 and particularly focuses on the gender of Chief Executive Officers, Chief Financial Officers and board of directors. The results indicate that firms with female Chief Financial Officers are associated with higher voluntary disclosures in annual reports. The findings also reveal that female Chief Executive Officers and proportion of female board members have no significant impact on voluntary disclosure in company annual reports.

JEL: G14, G34, J1

KEYWORDS: gender, diversity, disclosure, annual reports

INTRODUCTION

The study of corporate disclosures in corporate annual reports is a key financial accounting research area. It has received a tremendous amount of attention in recent years. A majority of the research in this area has focused on corporate characteristics as they related to corporate disclosures in annual reports (see, e.g., Archamdault, 2003; Akhtaruddin, 2005; Wallace and Naser, 1995; Inchausti, 1997; Lang and Lundholm, 1993; Cooke, 1989, 1992; Raffournier, 1995; and Owusu-Ansah, 1998). Disclosure is an "...accounting activity involving both human and non-human resources or techniques as well as the interaction of the two" (Perera, 1994: 268). Recently a number of studies have investigated the effect of management factors like corporate governance, culture and management characteristics like director's financial experience as they related to issues like disclosure (see, e.g. Zarzeski, 1996; Chau and Gray, 2002; and Haniffa and Cooke, 2002; Matsunaga and Yeung, 2008).

The primary objective of this study is to examine the impact of the gender of firm directors on corporate disclosures in annual reports. The paper is motivated by two facts. First in practice corporate directors are directly involved in making decisions concerning which information is disclosed in the corporate annual reports. The second motivation is based on the grounds that there has been no prior research examining the impact imposed by gender diversity in general on corporate voluntary disclosures.

To investigate the study objective, the study uses a sample of 108 companies listed on the Helsinki Stock Exchange during the fiscal year 2008. The results of the study reveal that voluntary disclosure by companies are positively associated with gender diversity as measured by female Chief Financial Officers. These results further show that gender diversity as measured by female Chief Executive Officer and proportion of female board of directors have no significant impact on voluntary disclosures in annual reports.

The remainder of this paper is organized as follows. Section 2 reviews prior literature and presents the study hypothesis. Section 3 presents the data used for the study and in Section 4 the methodology employed in the study is presented. Section 5 presents the results and discussion of findings while Section 5 provides the conclusion on the effect of gender diversity on voluntary disclosures in annual reports.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Corporate Disclosure

Corporate financial disclosures are made in corporate annual reports to provide traditional user groups such as shareholders, creditors, financial analysts, debtors, government and security consultants with information useful to them when making investment and regulatory decisions. A number of corporate attributes have been used in previous studies to explain the extent of disclosure in the corporate annual report. These include among others company size, company profitability levels, liquidity, leverage, industry type and corporate governance. As predictors of the comprehensiveness of disclosure, they have been classified into three categories (Wallace, Naser, and Mora, 1995). The categories are structure related, performance related and market variables. Structure related variables describe a firm based on its underlying structure (size and gearing). Performance related variables vary from time to time and represent information that may be of interest to accounting information users. They include liquidity, earnings return, and profit margin. Market related variables are qualitative in nature unlike the previous two categories that are quantitative. They refer to a firm's behavior which results from its association with other firms in its operational environment. Variables identified in this category include industry type, listing status and auditor type. In the accounting context, these corporate attributes are demand-side variables because they are a function of the need to report desirable or undesirable results.

Prior studies have indicated that the size of a firm has a strong influence on corporate disclosures in Corporate Annual Reports (see e.g., Archamdault, 2003; Akhtaruddin, 2005; Depeors, 2000). The association between corporate disclosure and profitability also has been of attention to many previous studies (e.g. Wallace and Naser, 1995; Inchausti, 1997; Akhtaruddin, 2005). Empirical results on profitability have mixed findings with researchers like Owusu-Ansah (1998) indicating a significant relationship and thus suggesting that highly profitable firms are more likely to disclose more information in their reports than those with lower profit levels as a means of signaling their superior performance to the market. Wallace et al. (1994) on the other hand found no relationship between profitability and corporate disclosure.

The association between the level of disclosure and industry type also provides mixed results from previous research. The relationship between industry type and disclosure was found to be insignificant in the findings of studies by Cooke (1992), Raffournier, (1995), Watson, Shrikes and Marton (2002) and Owusu-Ansah's (1998). A significant relationship was however found in the study by Cooke (1989) who reported that manufacturing industries disclose more information in their annual reports than other industries. In addition, capital structure as one of the corporate attributes that have been investigated in earlier studies has had mixed results. Ahmed and Courtis (1999: 51), Jaggi and Low (2000) and Wallace et al. (1994) have reported a positive relationship between leverage and corporate disclosure levels. Zarzeski (1996) however argues that disclosure decreases with leverage on the ground that debtors would have direct access to information.

Gender Diversity and Disclosure

Previous studies have indicated that disclosure is a managed activity which can be explained by the context in which it occurs (see e.g. Gibbins et al., 1992). This idea can be related to prior disclosure studies for example those studies combining corporate governance and director's financial experience with corporate disclosures (see e.g., Chau and Gray, 2002; Matsunaga and Yeung, 2008). Gender diversity is one of the interesting human aspects that has been of interest in many studies. This study considers it to be one of the important aspects to take into account when dealing with disclosure management and thus considers it to be another attribute that could be used to explain information disclosures in annual reports.

Gender diversity research has evolved into a challenging research issue in academia for the last decades. Most of this research has commenced from the fact that there are increasing numbers of women in top management as well as on corporate boards (see e.g., Singh et al., 2001). Related to the above is evidence from prior literature on the existence of differences between men and women regarding decision-making, risk taking, managing, leading, communicating and general performance in business enterprises (see e.g., Johnson and Powell, 1994; Powell and Ansic, 1997; Rose, 2007; Chell and Baines, 1998; Burke, 1999; Peterson and Philpot, 2006; Walt and Ingley, 2003). Gender diversity literature emphasizes that diversity may benefit the board's decision making process as new perceptions on various issues are presented and combined with a mutual exchange of ideas stemming from board members with dispersed backgrounds and experience (see e.g., Alvarez and McCaffery, 2000). It is also argued that diversity leads to a greater knowledge base, creativity and innovation, and therefore becoming a competitive advantage (Watson et al., 1993). It is from this background that, prior research has concluded an influence of gender diversity on a number of corporate issues like firm performance and corporate governance.

Literature in financial accounting has examined the importance of gender diversity in corporate governance (see e.g., Walt and Ingley, 2003; Huse and Solberg, 2006; Peterson and Philpot, 2006; Schubert, 2006; Burke, 2000). The findings by Huse and Solberg (2006) reveal that the starting point for women on board decision making processes is that decision-making does not only take place within the boardroom but also before, during and after meetings as well as outside the meetings. This is an indication that women are more prepared for meetings than men and are therefore more likely to make better decisions. Schubert (2006) notes that women have better multi-tasking skills, risk management and communicative abilities as compared to their male counterparts. These abilities make them more competent and willing to take on different responsibilities at the same time as well making them better at communicating and managing different situations within and outside the organizations. These two studies are in line with the argument raised by Burke (2000) that "increasing women's board presence enriches board information, perspectives, debate and decision making".

In addition to improving the effectiveness of corporate governance, literature indicates that gender diversity also improves firm performance. A vast amount of literatures has examined the relationship between gender diversity and performance (see e.g., Catalyst, 2004; Carter et al., 2003; Rose, 2007; Chell and Baines, 1998; Watson, 2002; Erhardt et al., 2003; Siciliano, 1996). These studies have had mixed findings regarding this relationship. In the study of Carter et al. (2003), they examined the relationship between board diversity and firm value for Fortune 1000 firms and found that there is a significant positive relationship between the fraction of women or minorities on the board and the value of the firm. They argue that firms making a commitment to increase numbers of women on board also have more minorities on their boards and vice versa. Similarly, the studies by Erhardt et al. (2003) and Siciliano (1996) both found a positive relationship between gender diversity and firm performance when they investigated the relationship between board of director diversity and firm financial performance for large US companies and the relationship of board member diversity to organizational performance respectively.

Contrary to the above studies, the studies by Watson (2002), Chell and Baines 1998 and Rose (2007) found no relationship between gender diversity and performance. Watson (2002) in his study based on the argument that female entrepreneurs are more likely to establish maximum business size thresholds (smaller than those of their male counterparts) beyond which they would not prefer to expand hypothesizes that female controlled businesses will generate lower outputs compared to male controlled business. His findings reveal that after controlling for business age, industry and period of operation of business, there were no differences in the performance of male and female-controlled business. Interestingly however, before the control variables, evidence suggested outperformance of female-controlled businesses. The study by Chell and Baines (1998) using a sample of micro businesses in

business service in the UK and that by Rose (2007) using a sample of listed Danish firms also reveal no relationship between gender and firm performance.

It can be assumed that the voluntary disclosure levels are affected by gender diversity considering the findings below. First, that gender diversity leads to improved firm performance (see, e.g., Erhardt et al., 2003; Siciliano, 1996) and second, that better performance by companies leads to an increase in the amount of information voluntarily disclosed by companies (see, e.g. Owusu-Ansah, 1998 among others who find a positive relationship between profitability and the extent of disclosure. It can further be assumed by this study that gender diversity of director's plays an important role during both the communication and decision-making process as to which information to disclose in the reports by the firm directors. This is related to earlier findings of a positive relationship between gender diversity (in terms of female representation and the differences between men and women) and the effectiveness of corporate boards. Based on the above discussion, this study expects gender diversity to have an impact on voluntary disclosure. It is of interest to examine whether gender diversity affects the amount of information voluntarily disclosed in corporate annual reports. This study therefore hypothesizes as below;

H1: There is a positive relationship between gender diversity of firm directors and the voluntary disclosures in annual reports.

DATA

The data for this study is based on companies listed on the Helsinki Stock Exchange during the year 2008. The initial sample of the study is 132 companies. Following prior research like Owusu-Ansah (1998) and Akhtaruddin (2005), this study is limited to non-financial companies and therefore excludes 13 financial institutions as these by law have different disclosing requirements. Further the study eliminates 11 companies with insufficient data for carrying out the study analysis. The remaining 108 companies representing a significant proportion (91.5% and 80%) of the total population of non-financial and companies listed on the Helsinki Stock Exchange respectively comprise the final sample for this study. The data used in this study covers the fiscal years 2005 to 2007.

The two main data sources for the study are the company annual reports for the years 2005, 2006 and 2007 and the Thomson Financial Worldscope database. The annual reports are used for collection of data on gender diversity and items voluntarily disclosed by the sample companies. The Thomson Financial Worldscope database is used for collection of the study control variables data like firm size, leverage, liquidity and profitability. This study employs the use of annual reports because as stated by Gray (1995), the annual report is viewed as the major official and legal document that a firm produces on a regular basis and acts as a significant forum for the presentation of the firm's communication with political, social and economic systems.

The study uses three variables for measuring gender for each firm as follows: (i) female Chief Executive Officer (FCEO) is set to 1 if Chief Executive Officer is female, (ii) female Chief Financial Officer (FCFO) is set to 1 if Chief Financial Officer is female, and (iii) female board members (FBOD) is the proportion of female board members. In addition to the gender test variables, the study further controls for the effects of five firm characteristic variables and one corporate governance variable that have been found in prior research to have an influence on the amount of information voluntarily disclosed by companies. These control variables are, firm size (CSIZE) which is measured by logarithm of assets at the end of year t , firm leverage (LEV) measured by ratio of equity to total assets at the end of year t , firm liquidity (LIQD) measured by the quick ratio at the end of year t , firm profitability (PROF) measured by the return on assets at the end of year t , board size (BSIZE) measured by the total number of board

members for each company and industry (IND) measured as 1 if the company falls under the manufacturing industry.

Table 1: Operational Definitions of Variables

Notation	Variable Investigated	Measurement	Expected Sign
<i>Dependent variable</i>			
TD	Total Disclosure score	Number of items disclosed in the annual report	
<i>Independent variables</i>			
Gender diversity (DGEN)			
FCEO	Female CEO	1 if female and 0 if otherwise	(+)
FCFO	Female CFO	1 if female and 0 if otherwise	(+)
FBOD	Female board members	Proportion of females on board	(+)
<i>Corporate characteristics</i>			
BSIZE	Board size	Total number board members	(+)
CSIZE	Total assets	Logarithm of total assets	(+)
LEV	Leverage	Equity/Total assets ratio	(+)
LIQD	Liquidity	Quick ratio	(-)
PROF	Profitability	Return on invested capital	(+)
IND	Industry	1 if manufacturing and 0 otherwise	(+)

This table presents the operational definitions of the variables employed in this study.

Table 2 shows the breakdown of female director's of the sample companies by industrial groups identified by their SIC codes. It is shown that the number of women in top corporate positions has generally increased during the three years under investigation. This is especially evident for the years from 2006 to 2007 for example, an increase of FCFO's and FBOD's from 22.22% - 23.15% and 42.59% - 50.93% respectively. It is also shown that for the three years, majority of the companies have at least one female member on the board. With regards to industry, more than half of the sample companies are seen to fall under the manufacturing industry.

Table 2: Industry Group Classification by Female Director's Representation for the Sample Firms

SIC Code	Industry Description	Sample in Industry	Firms with FCEO			Firms with FCFO			Firms with at least one FBOD		
			2005	2006	2007	2005	2006	2007	2005	2006	2007
15-17	Construction	3	0	0	0	1	1	1	1	2	2
20-39	Manufacturing	64	2	4	4	15	15	15	30	25	34
40-47	Transportation	5	0	1	1	1	2	2	5	3	3
48	Communications	1	0	0	0	1	0	0	1	0	0
49	Utilities	2	0	0	0	1	0	0	0	2	2
50-51	Wholesale trade	6	1	1	1	1	1	1	3	2	3
52-59	Retail trade	3	0	0	0	1	0	0	2	2	2
70-88	Services	24	4	1	1	5	5	6	7	10	9
Total		108	7	7	7	26	24	25	47	46	55
%			6.48	6.48	6.48	24.07	22.22	23.15	43.52	42.59	50.93

The number and percentage of women director's by industry group classification. The table presents a breakdown of the sample firms by standard industry classification (SIC) codes and female director's representation. The sample consists of firms listed on the Helsinki Stock Exchange exclusive of financial institutions and firms with inadequate data.

METHODOLOGY

The Disclosure Score

In related accounting research, both weighted (Botosan, 1997; Buzby, 1974; Eng et al., 2001) and unweighted (Akhtaruddin, 2005; Archambault, 2003; Cooke, 1989; Owusu-Ansah, 1998; Raffournier, 1995) disclosure indexes have been used to measure disclosure in annual reports. Both approaches to measuring disclosure have their weaknesses for example, using an unweighted disclosure index has been criticized for its fundamental assumption that all items are equally important to all information users and the use of a weighted disclosure index criticized because it may introduce a bias towards a particular user-orientation.

Following the view by Wallace (1988) that all disclosed items are equally important to the average users, this study uses the unweighted disclosure index approach. Under this approach, attention is given to all users of annual reports rather than particular user groups. It has also been argued that unweighted scores reduce subjectivity and may be considered the norm in annual report studies (Ahmed, 1999: 36). In this study therefore, voluntary information disclosures in annual reports for the years 2005, 2006 and 2007 are considered and items are numerically scored on a dichotomous basis. A score of one is assigned if a company discloses a voluntary item and 0 for non-disclosure of the item. The total disclosure score TD for each company is therefore (Total disclosure [TD] score list available on request):

$$TD = \sum_{i=1}^{m_i} d_i \quad (1)$$

Where d_i is 1 if an item is disclosed and 0 if not; m_i is total number of voluntary items disclosed in the annual report by company i .

In order to examine the effect of gender diversity on voluntary disclosure and thus test the study hypotheses, the model below is used:

$$TD_i = \alpha + \beta_1 BSIZE_i + \beta_2 LEV_i + \beta_3 IND_i + \beta_4 LIQD_i + \beta_5 PROF_i + \beta_6 CSIZE_i + \beta_7 DGEN_i + \varepsilon_i \quad (2)$$

where TD is the firm total number of items voluntarily disclosed, BSIZE is the size of the board in terms of total number of board members, LEV is company leverage measured by ratio of equity to total assets, IND is industry in which the company is and this is measured by 1 if the company is in the manufacturing industry, LIQD is company liquidity measured by the quick ratio, PROF is company profitability measured by return on invested capital, CSIZE is the size of the firm measured by logarithm of assets and DGEN is the gender diversity variable measured as follows: female Chief Executive Officer (FCEO) is set to 1 if Chief Executive Officer is female, female Chief Financial Officer (FCFO) is set to 1 if Chief Financial Officer is female, female board members (FBOD) is the proportion of female board members.

Separate models are run in order to illustrate the effects of the different gender measurement variables as well as to avoid any possibilities of multicollinearity problems between these variables. The multicollinearity problem is detected by calculated the variance inflation factor (VIF). VIF measures the degree to which each explanatory variable is explained by the other explanatory variable and “very large VIF values indicate high collinearity and a common cut-off threshold is VIF value above 10” (Hair et al., 1995). In illustrating the effects of the different gender measurement variables, TD is regressed on all control variables and one gender measure for each different regression.

RESULTS AND DISCUSSIONS

Descriptive statistics on disclosure for the total sample and firms with gender presentation are provided in Table 3 panels A and B to G respectively. There are small differences in the means of the disclosure score from all the descriptive panels with means ranging between 47 and 50.467 suggesting high levels of voluntary disclosure by listed companies in Finland. The disclosure score results for firms with FCFO's and those with more FBOD's are higher than those with MCFO's and MBOD's (50.467 and 49.135 vs. 47.000 and 47.802) suggesting that disclosure are higher for those firms with female representation as measured by MCFO's and FBOD's. The mean difference between the disclosure score between FCFO and MCFO is statistically significant at a 1% level. The results further reveal that mean scores for profitability are higher for firms with FCFO's and FBOD's as compared to MCFO's and MBOD's (10.202, 9.799 and 6.939, 7.694 respectively).

Table 3: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
<i>Panel A. Summary statistics for the entire sample (n=324 observations)</i>					
TD	47.802	47.000	71.000	28.000	9.275
BSIZE	5.978	6.000	11.000	2.000	1.858
LEV	46.086	46.365	93.380	-219.290	22.827
IND	0.315	0.000	1.000	0.000	0.465
LIQD	1.157	0.880	7.960	0.230	0.909
PROF	7.694	8.120	125.010	-75.900	12.637
CSIZE	19.287	18.991	26.045	14.921	2.001
<i>Panel B. Summary statistics for the firms with FCEO (n=21 observations)</i>					
TD	47.333	50.000	62.000	33.000	8.169
BSIZE	6.905	6.000	11.000	3.000	2.606
LEV	45.008	44.650	72.240	18.650	14.731
IND	0.286	0.000	1.000	0.000	0.463
LIQD	0.890	0.810	2.520	0.260	0.554
PROF	7.606	5.660	24.770	-15.260	8.442
CSIZE	19.355	18.708	23.595	16.169	1.878
<i>Panel C. Summary statistics for firms with MCEO (n=303 observations)</i>					
TD	47.835	47.000	71.000	28.000	9.357
BSIZE	5.914	6.000	11.000	2.000	1.783
LEV	46.161	46.650	93.380	-219.290	23.299
IND	0.317	0.000	1.000	0.000	0.466
LIQD	1.175	0.890	7.960	0.230	0.927
PROF	7.700	8.270	125.010	-75.900	12.887
CSIZE	19.282	19.002	26.045	14.921	2.012
<i>Panel D. Summary statistics for firms with FCFO (n=75 observations)</i>					
TD	50.467	53.000	67.000	33.000	7.813
BSIZE	5.800	6.000	11.000	3.000	1.931
LEV	48.041	46.730	82.450	18.410	14.413
IND	0.267	0.000	1.000	0.000	0.445
LIQD	1.108	0.840	3.160	0.260	0.624
PROF	10.202	9.050	125.010	-10.120	15.203
CSIZE	19.217	18.865	23.439	15.339	1.938
<i>Panel E. Summary statistics for firms with MCFO (n=249 observations)</i>					
TD	47.000	46.000	71.000	28.000	9.541
BSIZE	6.032	6.000	11.000	2.000	1.836
LEV	45.497	45.450	93.380	-219.290	24.803
IND	0.329	0.000	1.000	0.000	0.471
LIQD	1.171	0.890	7.960	0.230	0.980
PROF	6.939	8.100	36.110	-75.900	11.685
CSIZE	19.308	19.010	26.045	14.921	2.023

	Mean	Median	Maximum	Minimum	Std. Dev.
Panel F. Summary statistics for firms with FBOD (n=148 observations)					
TD	49.135	50.000	67.000	30.000	8.918
BSIZE	6.196	6.000	11.000	2.000	1.933
LEV	47.962	47.510	93.380	6.970	14.958
IND	0.318	0.000	1.000	0.000	0.467
LIQD	1.069	0.855	5.560	0.230	0.703
PROF	9.799	9.340	125.010	-22.010	12.638
CSIZE	19.387	18.885	26.045	14.921	2.201
Panel G. Summary statistics for firms with MBOD (n=324 observations)					
TD	47.802	47.000	71.000	28.000	9.275
BSIZE	5.978	6.000	11.000	2.000	1.858
LEV	46.086	46.365	93.380	-219.290	22.827
IND	0.315	0.000	1.000	0.000	0.465
LIQD	1.157	0.880	7.960	0.230	0.909
PROF	7.694	8.120	125.010	-75.900	12.637
CSIZE	19.287	18.991	26.045	14.921	2.001

The table presents descriptive statistics of the study variables where TD (the dependent variable) is the total number of items voluntarily disclosed by the firm, BSIZE is total number of board members, LEV is ratio of equity to total assets, IND is 1 if the company is in the manufacturing industry and 0 otherwise, LIQD is the quick ratio, PROF is return on invested capital, CSIZE is logarithm of assets FCEO is set to 1 if Chief Executive Officer is female, FCFO is set to 1 if Chief Financial Officer is female and FBOD is the proportion of female board members (at least 1 female board member).

The correlation matrix of the dependent and independent variables is presented in Table 4. The results indicate that voluntary information disclosure is as expected positively and significantly correlated with one gender measurement variable of female Chief Financial Officers and four of the control variables of industry type, board size, profitability and company size (all significant at a 1% level). The results also indicate that firms with female Chief Financial Officers and a bigger proportion of females on the board perform better (significant at a 5% level) as indicated by the positive and significant relationship with profitability. The finding is consistent with results from earlier studies that have documented a relationship between corporate performance and gender diversity both in top management in general and female representation in particular (see, e.g. Carter et al., 2003; Erhardt et al., 2003; Catalyst, 2004).

Table 4: Correlations Matrix of Variables

	TD	FCEO	FCFO	BSIZE	FBOD	LEV	IND	LIQD	PROF
FCEO	-0.013								
FCFO	0.158**	0.004							
BSIZE	0.155**	0.131*	-0.053						
FBOD	0.127*	-0.044	0.085	0.107					
LEV	0.108	-0.012	0.047	0.090	0.100				
IND	0.235**	-0.016	-0.057	-0.067	0.022	-0.086			
LIQD	-0.179**	-0.077	-0.030	-0.070	-0.067	0.337**	-0.117*		
PROF	0.144**	-0.002	0.109*	0.088	0.134*	0.496**	-0.075	0.045	
CSIZE	0.310**	0.009	-0.019	0.304**	0.058	-0.019	-0.120*	-0.243**	0.128*

The table presents Pearson correlations for the study variables where TD (the dependent variable) is the total number of items voluntarily disclosed by the firm, BSIZE is total number of board members, LEV is ratio of equity to total assets, IND is 1 if the company is in the manufacturing industry and 0 otherwise, LIQD is the quick ratio, PROF is return on invested capital, CSIZE is logarithm of assets, FCEO set to 1 if Chief Executive Officer is female, FCFO set to 1 if Chief Financial Officer is female and FBOD the proportion of female board members (at least 1 female board member). ** and * denote statistical significance at the 1 and 5 percent levels respectively.

Table 5 summarizes the regression results for the study variables. In regression Model A, only the control variables (BSIZE, LEV, IND, LIQD, PROF and CSIZE) are regressed against the dependent variable voluntary disclosure (TD). In regression Model B, C and D, disclosure is regressed against all control variables and gender diversity variables (FCEO, FCFO and FBOD). In all models the four models employed, the *F* values are significant at the 1% level a result indicating that these models are highly

significant and hence have a good explanatory power of disclosure. The results of the VIF (not included in the regressions) in all the models also indicate that there are no collinearity problems as indicated by VIF's below 2. The variables in the models (A, B, C and D) when regressed on TD produce adjusted R²'s of 0.196, 0.194, 0.222 and 0.198 respectively.

All control variables in the regressions contain the signs as predicted by this study. It can be observed that board size (BSIZE) and profitability (PROF) are not statistically significant in the regression results. The other three control variables of leverage (LEV), industry (IND), and firm size (CSIZE) are positive and statistically significant at the 5%, 1% and 1% levels respectively for all models. Company liquidity is also significant at 5% in all the models but having a negative relationship with disclosure. These results on the control variables are consistent with most studies on information disclosure. In Model B, the coefficient for the FCEO variable is not in the expected direction as the results indicate a negative but insignificant relationship between FCEO and voluntary disclosure. The results from Model C show that the variable FCFO is positive and significantly associated with voluntary disclosure (at 1% level). The results for Model D show a positive but insignificant relationship between FBOD and voluntary disclosure.

Table 5: Regression Results

Variable	Model A	Model B	Model C	Model D
constant	16.663*** (5.016)	16.784*** (5.026)	14.897** (4.960)	16.432*** (5.011)
<i>Firm characteristics</i>				
BSIZE	0.292 (0.263)	0.312 (0.266)	0.344 (0.259)	0.262 (0.264)
LEV	0.059* (0.025)	0.060* (0.025)	0.059* (0.025)	0.057* (0.025)
IND	5.518*** (1.016)	5.505*** (1.017)	5.731*** (1.001)	5.473*** (1.015)
LIQD	-1.259* (0.567)	-1.283* (0.570)	-1.157* (0.559)	-1.197* (0.568)
PROF	0.041 (0.043)	0.041 (0.043)	0.027 (0.043)	0.036 (0.043)
CSIZE	1.351*** (0.254)	1.344*** (0.255)	1.380*** (0.250)	1.350*** (0.254)
<i>Female representation</i>				
FCEO		-1.032 (1.903)		
FCFO			3.721*** (1.090)	
FBOD				5.397 (3.894)
R ²	0.211	0.211	0.239	0.215
Adjusted R ²	0.196	0.194	0.222	0.198
F-statistic	14.091***	12.093***	14.150***	12.387***

The table presents estimates of the versions of the following regression model: $TD_i = \alpha + \beta_1 BSIZE_i + \beta_2 LEV_i + \beta_3 IND_i + \beta_4 LIQD_i + \beta_5 PROF_i + \beta_6 CSIZE_i + \beta_7 DGEN_i + \epsilon_i$ where TD is the total number of items voluntarily disclosed by the firm, BSIZE is total number of board members, LEV is ratio of equity to total assets, IND is 1 if the company is in the manufacturing industry and 0 otherwise, LIQD is the quick ratio, PROF is return on invested capital, CSIZE is logarithm of assets, DGEN is the gender diversity variable measured as follows: FCEO set to 1 if Chief Executive Officer is female, FCFO set to 1 if Chief Financial Officer is female and FBOD the proportion of female board members (at least 1 female board member). The standard errors are reported in parenthesis. ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.

CONCLUSION

This study has investigated whether voluntary information disclosure in annual reports of 108 firms listed on the Helsinki Stock Exchange for the period of 2008 is associated with gender diversity represented by three groups of variables: female Chief Executive Office, female Chief Financial Officer and the proportion of females on the board of directors. Results based on the analysis indicate that only one variable namely female Chief Financial Officer (FCFO) is positive and significantly associated with voluntary disclosure in annual reports. The results therefore suggest that while voluntary disclosure of information is higher for those firms with a female Chief Financial Officer, those that are highly leveraged, bigger in size and falling under the manufacturing industry, it is lower for firms with female Chief Executive Officers and higher liquidity levels.

The negative finding on the gender diversity variable of FCEO can partially be explained by the differences in the roles played by company CEO in the disclosure process. This finding may indicate that company CEO's as compared to CFO's are more involved in corporate strategic planning matters than they are with preparation of company reports and therefore having less influence on the information disclosed in the reports. The results suggest that gender diversity is one of the attributes influencing the voluntary information disclosures in annual reports as indicated by the positive results from the two gender diversity variables of FCFO and FBOD.

This study is limited to only companies listed on the Helsinki Stock Exchange. The results should be interpreted with caution as they may be different for different setting for example they do not include small and unlisted companies. Future research could be carried out to investigate the differences between listed and unlisted companies as well as small companies as this might reveal interesting and probably different results on the relationship between gender diversity and voluntary disclosures.

REFERENCES

- Ahmed, K., & Courtis, J. K. (1999). Associations between corporate characteristics and disclosure levels in annual reports: a meta-analysis. *British Accounting Review*, 31(1), 35-61.
- Akhtaruddin, M. (2005). Corporate disclosure practices in Bangladesh. *International Journal of Accounting*, 40(4), 399-422.
- Alvarez, R. M., & McCaffery, E. J. (2000). Is there a gender gap in fiscal political preferences? August 24, California Institute of Technology and University of Southern California.
- Archambault, J., & Archambault, M. (2003). A multinational test of determinants of corporate disclosure. *International Journal of Accounting*, 38(2), 173-194.
- Botosan, A. C. (1997). Disclosure level and the cost of equity capital. *The Accounting Review*, July 72(3), 323-349.
- Burke, R. (1999). Women on Canadian corporate boards of director: getting the numbers right! *Corporate Governance*, 7(4), 374-378.
- Burke, R. (2000a). Company size, board size and the numbers of women corporate directors. In R. Burke and M. Mattis (eds), *Women on Corporate Boards of Directors*. Netherlands: Kluwer Academic Publishers, 157-167.

- Buzby, S. L. (1974). Selected items of information and their disclosure in annual reports. *The Accounting Review*, 49(3), 423-435.
- Carter, D., Simkins, B., & Simpson, W. (2003). Corporate governance, board diversity and firm value. *The Financial Review*, 38, 33-53.
- Catalyst (2004). The bottom line. Connecting corporate performance and gender diversity. New York.
- Chau, G. K., & Gray, J. S. (2002). Ownership structure and corporate voluntary disclosure in Hong Kong and Singapore. *The International Journal of Accounting*, 37(2002), 247-265.
- Chell, E., & Braines, S. (1998). Does gender affect business 'performance'? A study of microbusinesses in business service in the UK. *Entrepreneurship & Regional Development*, 10, 117-135.
- Cooke, T. E. (1989). Disclosure in the corporate annual reports of Swedish companies. *Accounting and Business Research*, 19(74), 113-124.
- Cooke, T.E. (1992). 'The effect of size, stock market listing and industry type on disclosure in the annual reports of Japanese listed corporations'. *Accounting and Business Research*, 22(87), 229-237.
- Depoers, F. (2000). A cost benefit study of voluntary disclosure: some empirical evidence from French listed companies. *European Accounting Review*, 9(2), 245-263.
- Eng, L. L., Hong, K. F., & Ho, K. Y. (2001). The relationship between financial statement disclosures and the cost of equity capital of Singapore firms. *Accounting Research Journal*, 14, 35-48.
- Erhardt, N., Werbel, J., & Shrader, C. (2003). Board of director diversity and firm financial performance. *Corporate Governance*, 11, 102-110.
- Gibbins, M., Richardson, A., & Waterhouse, J. (1990). The management of corporate disclosure: opportunism, ritualism, policies and process. *Journal of Accounting Research*, 28(1), spring.
- Gray, S. J. (1988). Towards a theory of cultural influence on the development of accounting systems internationally. *Abacus*, 24(1), 1-15.
- Hair, J. F., Anderson, R. E., Tatham, R. L. & Black, W C. (1995). Multivariate data analysis with readings. New York: Prentice-Hall.
- Haniffa, R. M., & Cooke, T. E. (2002). Culture, corporate governance and disclosure in Malaysian corporations. *Abacus*, 38(3), 317-349.
- Huse, M., & Solberg, A. (2006). Gender-related boardroom dynamics: How Scandinavian women make and can make contributions on corporate boards. *Women in Management Review*, 21, 113-130.
- Inchausti, B. (1997). The influence of company characteristics and accounting regulation on information disclosed by Spanish firms. *European Accounting Review*, 68(1), 45-68.
- Jaggi, B., & Low, P. W. (2000). Impact of culture, market forces, and legal system on corporate disclosures. *International Journal of Accounting*, 35(4), 495-519.

Johnson, J., & Powel, P. (1994). Decision making, risk and gender: are managers different? *British Journal of Management*, 5, 123-138.

Lang, M., & Lundholm, R. (1993). Cross-sectional determinants of analyst ratings of corporate disclosures. *Journal of Accounting Research*, 31(2), 246– 271.

Matsunaga, S. R., & Yeung, P. E. (2008). Evidence on the impact of a CEO's financial experience on quality of the firm's financial reports and disclosures. *Proceedings of the 2008 AAA Financial Accounting and Reporting Section Conference*.

Owusu-Ansah, S. (1998). The impact of corporate attributes on the extent of disclosure and reporting by listed companies in Zimbabwe. *The International Journal of Accounting*, 33(5), 605-631.

Perera, M. H. B. (1994). Culture and international accounting: some thoughts on research issues and prospects. *Advances in international accounting* 7.

Peterson, C., & Philpot, J. (2007). Women's roles on U.S. Fortune 500 boards: director expertise and committee membership. *Journal of Business Ethics*, 72, 177-196.

Powel, M. & Ansic, D. (1997). Gender differences in risk behavior in financial decision-making: an experimental analysis. *Journal of Economic Psychology*, 18, 605-627.

Radecki, C., & Jaccard, J. (1996). Gender-role differences in decision-making orientations and decision-making skills. *Journal of Applied Social Psychology*, 26(1), 76-94.

Raffournier, B. (1995). The determinants of voluntary financial disclosure by Swiss listed companies. *European Accounting Review*, 4(2), 261-280.

Rose, C. (2007). Does female board representation influence firm performance? The Danish evidence. *Corporate Governance*, 15(2), 404-413.

Siciliano, J. (1996). The relationship of board member diversity to organizational performance. *Journal of Management Issues*, 15, 1313-1321.

Singh, V., Vinnicombe, S., & Johnson, P. (2001). Women directors on top UK boards. *Corporate Governance: An International Review*, 9, 206-216.

Schubert, R. (2006). Analyzing and managing risks – on the importance of gender differences in risk attitudes. *Managerial Finance*, 32, 706-715.

Wallace, R. S. O. (1988). Corporate financial reporting in Nigeria. *Accounting and Business Research*, 18(72), 352-362.

Wallace, R. S. O., & Naser, K. (1995). Firm specific determinants of the comprehensiveness of disclosure in the corporate annual reports of firms listed on the stock exchange of Hong Kong. *Journal of Accounting and Public Policy*, 14, 311-368.

Wallace, R. S. O., Naser, K., & Mora, A. (1994). The relationship between the comprehensiveness of corporate annual reports and firm characteristics in Spain. *Accounting and Business Research*, 25(97), 41-53.

Walt, N., & Ingley, C. (2007). Board dynamics and the influence of professional background, gender and ethnic diversity of directors. *Corporate Governance*, 11(3), 218-234.

Watson, J. (2002). Comparing the performance of male- and female-controlled businesses: relating outputs to inputs. *Entrepreneurship Theory and Practice*, 26(3), 91-100.

Watson, A., Shriver, P., & Marton, C. (2002). Voluntary disclosure of accounting ratios in UK. *British Accounting Review*, 34, 289-313.

Watson, E., Kumar, K., & Michaelsen, L. (1993). Cultural diversity's impact on interaction process and performance: comparing homogenous and diverse task groups. *Academy of Management Journal*, 36, 590-603.

Zarzeski, M. T. (1996). Spontaneous harmonization effects of culture and market forces on accounting disclosure practices. *Accounting Horizons*, 10(1), 18-37.

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THE EFFECTS OF FIRM MARKET VALUE ON AUDIT PARTNER TENURE AND FIRM PROFITABILITY

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ABSTRACT

This study investigates the effects audit partner tenure and firm profitability on the market value of the firm. This study extends Ohlson's model by examining audit partner tenure, and the interaction between residual earnings per share and audit partner tenure on firm value. This issue is particularly important in light of regulations requiring audit partner rotation in the United States, Taiwan and other countries. The model is tested using large internationally listed companies in Taiwan. The findings on average do not support audit partner rotation in Taiwan.

JEL: G1; M4

KEYWORDS: Firm's valuation, audit partner tenure, profitability, corporate governance

INTRODUCTION

The current framework for the preparation and presentation of financial statements was first approved by the International Accounting Standards Committee (IASC) in 1989 and was reaffirmed by the newly formed International Accounting Standard Board (IASB) in 2001. The four qualitative characteristics that make financial statement information useful are understandability, relevance, reliability and comparability. Information is relevant if it can be used to make predictions or if it can be used to confirm expectations from the past (Doupnik and Perera, 2007). Although Ball and Brown examine the information content of accounting earnings in capital markets, the relevance of firm value is not only determined by accounting earnings, but also by other information such as book value. Ohlson (1995) proposes the residual income valuation model, in which the firm's market value can be determined by book value, discounted value of expected future abnormal earnings, and other information.

Managers, investors, accountants, and financial service organizations take care to properly identify firm value. The audit assertion is a public trust that is built on independence thereby disclosing any misstatements in a client's audited financing statements. Wallman (1996) investigates how to strengthen the public trust of auditing service and guarantee the quality of accounting information. The U.S.A. enacted the Sarbanes Oxley Act in 2002 in response to the Enron scandal. The act requires mandatory audit partner rotation. The Taiwan Stock Exchange Corporation (TSEC) stipulated financial reports of listed companies will be checked by TSEC staff, when any one audit partner continues to audit the same client five for five years or more after 2004.

The research motivation for this paper is the relationship between audit partner tenure and audit quality (Mautz and Sharaf, 1961; AICPA, 1978; SEC, 1994; Arrunada and Paz-Ares, 1997). Watts and Zimmerman (1986) presented three hypothesis of positive accounting theory including a firm profitability theory. This paper focuses on firm profitability defined as residual earning per share. The paper expands on Ohlson's (1995) valuation model by incorporating audit partner tenure, and the interaction between residual earnings per share and audit partner tenure into the model. The goal is to identify the relationship between market value and audit partner tenure. The research in this paper is first to examine the relationship between firm profitability and auditor tenure. The results show that the relation between market value and audit partner tenure is dependent on firm profitability. The findings on average do not support the concept of legal or professional requirements for audit partner rotation. The next section of this paper describes the literature and hypotheses development, Section 3 describes the research method, Section 4 discusses empirical results, and Section 5 presents the conclusions.

LITERATURE AND HYPOTHESES DEVELOPMENT

As noted by Khurana and Raman (2006), financial reporting credibility reflects an investor's view of financial statements. This credibility focuses on investor decision measures, rather than a preparer view, which focuses on financial statement measures such as discretionary accruals. Prior studies document that investors pay large premiums for "high-quality" earnings because high-quality earnings are viewed as sustainable (Schipper and Vincent, 2003; Teoh and Wong, 1993). Thus, examining the influence of auditor tenure on the pricing of earnings is likely to provide valuable insights into investors' view of the association between audit partner tenure and earnings quality (Ghosh and Moon, 2005). This study uses the firm value to measure audit quality (Titman and Trueman, 1986). The better the audit quality; the more investors rely on companies' accounting information. Also, the better the audit quality, the higher the firm's value. Palepu *et al.* (2008) finds audit quality plays an important role in the analysis of business and financial reports.

The policy of audit partner rotation is already in place in U.S.A. These policies have also been in place in Taiwan. Taiwan provides an excellent venue for examining the effects of audit rotation because prior to 2004 it was not necessary to rotate audit partners in Taiwan, but after 2004, rotation was required. Thus audit quality can be examined under two regimes (Carey and Simnett, 2006).

This study extends the Ohlson (1995) appraisal model by examining audit partner tenure and the interaction between residual earnings per share and audit partner tenure. This study does not predict the influence of audit partner tenure on firm value. Rather, it examines whether the accuracy of firm's value assessment is influenced by audit partner tenure as it relates to firm profitability. This leads to the hypotheses.

Hypothesis 1. The accuracy of a firm's value assessment will be influenced by audit partner tenure as it relates to firm profitability.

Hypothesis 2. The firm's market value will be influenced by audit partner tenure as it relates to firm profitability.

RESEARCH METHOD

This research focuses on companies listed in the Taiwan 50 index since 2002. The study examines data from 2002 and 2003. Due to structural changes in the financial sector in Taiwan, financial industry firms are eliminated from the study. The research sample includes 40 observations in the electronic industry and 34 observations in general industry, coincide with the work of Wang (2009). The source of study data is the databases of the *Taiwan Economic Journal*.

This study predicts that book value per share and residual earning per share have a positive correlation with the market value. The variables are audit partner tenure and the interaction between residual earning per share and audit partner tenure as originally proposed by Ghosh and Moon (2005). Since prior studies, for example, Carey and Simnett (2006), Ghosh and Moon (2005), Burgstahler and Dichev (1997), Watts and Zimmerman (1986) found that control variables can enhance the accuracy of regression model specifications, this study includes the following control variables: Book value per share, age, growth, leverage, and size. The variable definitions and the expected relationship with firm value are identified in Table 1.

This study is based on two models of firm value. Model 1 is a restricted model that does not incorporate the audit tenure variables. Model 2 is an unrestricted model that includes auditor tenure and the interaction between audit tenure and residual earnings per share. The models are estimated as follows:

Model 1: Restricted Model

$$P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPSr_t + \beta_3 BV_{t-1} + \beta_4 Age_t + \beta_5 Growth_t + \beta_6 Leverage_t + \beta_7 Size_t + \varepsilon$$

Model 2 : Unrestricted Model

$$P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPSr_t + \beta_3 Tenure_t + \beta_4 EPSr_t * Tenure_t + \beta_5 BV_{t-1} + \beta_6 Age_t + \beta_7 Growth_t + \beta_8 Leverage_t + \beta_9 Size_t + \varepsilon$$

where, P_t is the market value per share, BV_t the book value per share, $EPSr_t$ is the residual earning per share, Age_t is the amount of time the firm has been listed, $Growth_t$ is the firm's growth, $Leverage_t$ is the firm's debt ratio, $Size_t$ is the firm's size and $Tenure_t$ is the audit partner tenure .

Table 1: The Definition and Expectancy Direction of Research Variables

Research Variables	Code name	Definition	Predicted Sign
Market value per share (Dependent variable)	P_t	Market value of the stock per share at the end of t year	Not suitable
Book value per share	BV_t	Book value of the equity per share at t year	+
Residual earning per share	$EPSr_t$	Residual earning per share for t year $EPSr_t = EPS_t - (\text{Book value of the equity per share at the beginning of t year} \times \text{shareholders' essential rate of return})$	+
Audit partner tenure	Tenure _t	Audit partner tenure at t year How many years of the longer audit partner tenure for same audited client	?
Residual earning per share multiplied by audit partner tenure	$EPSr_t * Tenure_t$	Residual earning per share * audit partner tenure at t year	?
Book value per share at the beginning of t year	BV_{t-1}	Book value of the equity per share at the beginning of t year	+
Length of the firm as listed firm	Age _t	How many years the firm as listed firm at t year	+
Firm's growth	Growth _t	Firm's growth at t year (Market value of the equity + total liabilities) / total assets	+
Firm's debt ratio	Leverage _t	Firm's debt ratio at t year (Total liabilities / Total assets)	?
Firm's size	Size _t	Firm's size at t year Log(market value of equity at the beginning of t year)	?

This table shows the definition of the variables and the relevance of expectation with firm's value.

This study examines the research models' incremental explanatory power from Model 1 to Model 2. and examines whether the accuracy of firm's market value in the capital market is influenced by the interaction between audit partner tenure and firm profitability. The regression analysis is a nested model so the F test for the unrestricted model (Model 2) and restricted model (Model 1) are compared (Greene, 2008; Wooldridge, 2006). This study examines whether a firm's market value is influenced by the audit

partner tenure variables, and uses the interaction term $EPSr_t * Tenure_t$ in a manner similar to Ghosh and Moon (2005). The findings show that the coefficients on auditor tenure and the interaction terms (β_3 and β_4) are different from those found by Wang (2009) who uses dummy variables for long and short auditor tenure. If investors perceive the market value of equity as improving or declining with auditor tenure, β_3 and β_4 are expected to differ from zero. This study uses the t test to examine the statistical significance of the regression coefficient, β_3 and β_4 in a manner similar to (Greene, 2008; Wooldridge, 2006).

EMPIRICAL RESULTS

To examine the models for multicollinearity problems, the variance inflation factor (VIF) is computed. The Variance Inflation Factor (VIF) is less than 10 for each of the regressions indicating no serious collinearity among the research variables (Greene, 2008). The empirical results are summarized for the full sample in Table 2 and for the electronics and general industries only in Table 3.

Table 2: Empirical Results for the Full Sample

Variables	Model 1	Model 2
Intercept (β_0)	-31.24 (-1.18)	-39.60(-1.46)
BV (β_1)	0.78 (1.89)*	0.84 (2.05)**
EPSr (β_2)	2.43 (4.79)***	3.86 (5.06)***
Tenure (β_3)		0.34 (1.67)*
EPSr*Tenure (β_4)		-0.22 (-2.66)***
BVBt-1 (β_5)	0.59 (1.56)	0.60 (1.64) *
Age (β_6)	0.07 (0.95)	0.06 (0.78)
Growth (β_7)	31.01 (10.93)***	31.47 (11.32)***
Leverage (β_8)	15.01 (2.02)**	18.36 (2.23)**
Size (β_9)	-1.31 (-0.54)	-1.12 (-0.48)
R ²	0.95	0.96
Adjusted R ²	0.94	0.95
F test of model	176.45***	151.55***

*This table shows the regression estimates of the equation model 1: $P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPSr_t + \beta_5 BV_{t-1} + \beta_6 Aget + \beta_7 Growth_t + \beta_8 Leverage_t + \beta_9 Size_t + \epsilon$, and model 2: $P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPSr_t + \beta_3 Tenure_t + \beta_4 EPSr_t * Tenure_t + \beta_5 BV_{t-1} + \beta_6 Aget + \beta_7 Growth_t + \beta_8 Leverage_t + \beta_9 Size_t + \epsilon$ for all samples. The bracket in each cell is the t-statistic. ***, ** and * indicate significance at 1, 5, and 10 percent levels respectively.*

The F test of nested model analysis of all samples, electronic industry samples and general industry samples have 5% statistical significance. The findings show that the accuracy of a firm's value appraisal increases in the unrestricted model that incorporates audit tenure. Thus the empirical results support hypothesis 1.

For the full sample, the coefficient of Tenure ($\beta_3 = 0.34$) is positive correlated with stock price in Model 2, and has a 10% statistical significance. The coefficient of the interaction term ($\beta_4 = -0.22$) is negatively correlated with stock price in Model 2, and has a 1% statistical significance. When the residual earnings per share is less than 1.55, there is a positive relationship between audit partner tenure and firm value. But when the residual earning per share is more than 1.55 there is a negative relationship between the two variables. Thus, the empirical results support hypothesis 2. This study next analyzes the samples of electronic industry and general industry independently. The results of the electronic industry supports research hypothesis 2, but the general industry results are not significant.

Table 3: The Empirical Results of Research Model for Industry

Industry		Electronic	Industry	General	Industry
Variables / Model		Model 1	Model 2	Model 1	Model 2
Intercept	(β_0)	-24.88(-0.53)	-31.20(-0.69)	-13.19(-0.86)	-18.37(-1.06)
BV	(β_1)	0.90(1.38)	1.13(1.81)**	0.79(2.52)**	0.60(1.74)*
EPSr	(β_2)	2.07(2.54)***	4.28(3.41)***	0.86(1.90)*	1.87(2.17)**
Tenure	(β_3)		1.07(2.03)**		0.01(0.07)
EPSr*Tenure	(β_4)		-0.38(-2.29)**		-0.08(-1.37)
BVt-1	(β_5)	0.65(1.16)	0.63(1.18)	0.50(1.57)	0.67(1.96)*
Age	(β_6)	0.10(0.60)	-0.15(-0.76)	0.09(1.69)*	0.08(1.44)
Growth	(β_7)	35.17(7.64)***	37.95(8.48)***	29.59(15.14)***	28.12(12.62)***
Leverage	(β_8)	33.44(2.43)**	47.35(3.15)***	-2.61(-0.66)	-3.38(-0.73)
Size	(β_9)	-3.30(-0.82)	-4.65(-1.20)	-2.08(-1.37)	-1.38(-0.83)
R ²		0.96	0.97	0.97	0.98
Adjusted R ²		0.95	0.95	0.96	0.97
F test of model		100.54***	89.68***	135.89***	105.56***

This table shows the regression estimates of the equation model 1: $P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPS_{t-1} + \beta_3 BV_{t-1} + \beta_4 Age_t + \beta_5 Growth_t + \beta_6 Leverage_t + \beta_7 Size_t + \epsilon$, and model 2: $P_t = \beta_0 + \beta_1 BV_t + \beta_2 EPS_{t-1} + \beta_3 Tenure_t + \beta_4 EPS_{t-1} * Tenure_t + \beta_5 BV_{t-1} + \beta_6 Age_t + \beta_7 Growth_t + \beta_8 Leverage_t + \beta_9 Size_t + \epsilon$ for samples of electronic industry and general industry. The bracket in each cell is the t-statistic. ***, ** and * indicate significance at 1, 5, and 10 percent levels respectively.

CONCLUSION

This study focuses on Ohlson (1995) valuation model examining audit partner tenure, and the interaction between residual earning per share and audit partner tenure. The empirical results show that adding these variables to a general valuation model influences the decision usefulness of accounting information. When the residual earning per share is less than 1.55, the longer the audit partner tenure, the higher the firm's value. But when the residual earning per share is more than 1.55 the opposite holds. The results provide clear evidence that the relationship between market value and audit partner tenure is dependent on firm profitability.

Because the average residual earning per share of the research samples is 1.09, the finding on the average do not support the concept of legal or professional requirements to implement of audit partner rotation within the same accounting firm in Taiwan. This study points to new possibilities for future research. This study is a valuable reference regarding mandatory audit partner rotation. This study focuses on listed companies from the Taiwan 50 index. The use of larger samples in future research might provide additional insights.

REFERENCES

- American Institute of Certified Public Accountants (AICPA). (1978) *The Commission on Audit Partners' Responsibilities: Report, Conclusions and Recommendations*. New York.
- Arrunada, B. and Paz-Ares, C. (1997) "Mandatory rotation of firm audit partners: a critical examination," *International Review of Law and Economics*, vol. 17, p. 31-61.
- Burgstahler, D. C. and Dichev, I. D. (1997) "Earnings, Adaptation and Equity Value," *The Accounting Review*, vol. 72, p. 187-215.
- Carey, P. and Simnett, R. (2006) "Audit partner tenure and audit quality," *The Accounting Review*, vol. 81, p. 653-676.

Doupnik, T. S. and Perera, H. B. (2007). *International Accounting*. McGraw-Hill/Irwin.

Ghosh, A. and Moon, D. (2005) "Audit partner tenure and perceptions of audit quality," *The Accounting Review*, vol. 80, p. 585-612.

Greene, W. H. (2008) *Econometric Analysis 6th ed.* Prentice Hill Publishing.

Khurana, I. and Raman, K. (2006) "Do investors care about the auditor's economic dependence on the client?," *Contemporary Accounting Review*, vol. 23, p. 977-1016.

Mautz, R. K. and Sharaf, H. A. (1961) "The Philosophy of Auditing," *American Accounting Association Monograph No. 6*. Sarasota.

Ohlson, J. (1995) "Earning, book values, and dividends in equity valuation," *Contemporary Accounting Research*, vol. 11, p. 661-687.

Palepu, K. G., Healy, P. M. and Bernard, V. L. (2008). *Business Analysis & Valuation: Using Financial Statement, 4th ed.* South-Western Publishing Firm.

Schipper, K. and Vincent, L. (2003) "Earning quality," *Accounting Horizons*, vol. 17, p. 97-110.
Securities and Exchange Commission (SEC). (1994). *Staff Report on Audit partner Independence*. Washington D.C.

Teoh, S. H. and Wong, T. J. (1993) "Auditor size and the earnings response coefficient," *The Accounting Review*, vol. 68, p. 346-366.

Titman, S., Trueman, B. (1986) "Information quality and the valuation of new issue," *Journal of Accounting and Economics*, vol. 8, p. 159-172.

Wallman, S. (1996) "The future of accounting part III: reliability and audit partner independence," *Accounting Horizons*, vol. 10, p. 76-97.

Wang, M. (2009) "The Value Relevance on Auditor Tenure: The View of Investor Decision," *Journal of Business Administration*, vol. 80, p. 67-86.

Watts, R.L. and Zimmerman, J. L. (1986). *Positive Theory of Accounting*. Englewood Cliffs, NY: Prentice-Hall.

Wooldridge, J. M. (2006). *Introductory Econometrics : A Modern Approach, 3rd ed.* South-Western of Thomson Learning.

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STATE RANKINGS OF COST OF LIVING ADJUSTED FACULTY COMPENSATION

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ABSTRACT

In this paper we rank states based on higher education faculty compensation. Data on 574 universities across each of the 50 states and the District of Columbia are aggregated to develop a state compensation average. The analysis examines states both on a raw basis and on a cost of living adjusted basis. Rankings are reported for various academic classifications of faculty. Rankings based on salary data alone and salary and benefit combined data are presented. The results indicate that rankings of states based on raw and cost of living adjusted data are markedly different. The results suggest that faculty seeking employment opportunities should carefully consider cost of living issues. Administrators should design salary packages that reflect the local cost of living conditions in their area to attract quality faculty.

JEL: J31, J44

KEYWORDS: cost of living, ranking, faculty compensation, higher education salaries

INTRODUCTION

Faculty in the academic job market are well aware of differing salaries paid by various higher education institutions. They should also be aware that institutions have, sometimes dramatically, different benefit packages. It is also important the applicant be aware that cities differ, sometimes substantially, in the cost of living. The job applicant must aggregate all of these factors and others to determine the optimal employment offer. Similarly, administrators and legislators must develop compensation plans that optimally balance compensation with the quality of faculty desired. Failure to effectively balance this tradeoff can result in a less than optimal faculty mix.

The impact of differential costs of living on the value of salaries has been the subject of a number of studies dating to a book authored by Viva Boothe (Boothe, 1933). The first known journal article on the issue was by Winakor (1943). Fournier and Rasmussen (1986) ranked states based on the salaries that they pay to their professors. They complete rankings on a raw salary basis as well as on a cost of living adjusted basis. They find that state rankings of salaries in public education change substantially when salaries are adjusted for purchasing power differences.

This paper is one in a series of three papers. Jalbert, Jalbert and Hayashi (2010) examine individual university rankings for doctorate, master and bachelor degree granting universities. Jalbert, Jalbert and Hayashi (2010b) also examine COLA salary. This paper focuses on community college data. This paper is limited to an examination of aggregated state data and examines only universities that confer doctorate, master or bachelor degrees.

This paper extends the work of Fournier and Rasmussen (1986) by using a more recent data set. In this paper, the authors rank states based on salaries paid to college and university faculty. Rankings are provided for raw salaries as well as for cost of living adjusted salaries. In addition, the value of benefits is analyzed. The results clearly indicate that cost of living adjusted salaries differ widely from raw salary figures. States rank dramatically different on a raw basis and on a cost of living adjusted basis. Statistical

tests show that these differences are not random. The results of this research will help faculty identify the best employment opportunities, and administrators to optimally plan employee compensation packages.

The remainder of the paper is organized as follows. In the following section we present the literature on the relative salaries of faculty. Next, we provide a discussion of the data and methodology utilized in the study. State rankings and analysis are provided in the results section. The tests statistics section contains evidence from the statistical analysis. The paper closes with some concluding comments and suggestions for further research.

LITERATURE REVIEW

Ong and Mitchel (2000) examined cost of living adjusted (COLA) salaries at institutions from several countries. They use the Big Mac cost index and purchasing power parity to compute COLA salaries paid to faculty in each country. The Big Mac index compares the cost of a McDonald's restaurant, Big Mac Sandwich at locations throughout the world. The results indicate that COLA salaries vary substantially across countries. On a COLA basis, Hong Kong and Singapore pay the highest salaries. The United States ranks in the midway in the ranking.

Zeglen and Tesfagiorgis (1993) examined salaries paid to full professors. They examined one doctoral granting institution from each of the fifty United States. The institution examined from each state is generally the state's flagship university. Data from the 1991-1992 American Association of University Professors survey are examined after controlling for geographic differences, cost of living differences and tax burdens. The authors found that faculty salary rankings across institutions, and states, differ substantially when adjustments are made for both cost of living and tax differences. Rankings were more affected by cost of living differences than by the other factors considered.

Stoddard (2005) examined how COLA salaries of high school and elementary school teachers differ across states. She argues that studies examining COLA salaries do not account for differences in location quality. She argues that some locations possess better amenities and opportunities, which should be taken into account when comparing salaries. She found that location quality adjusted salaries produce more accurate salary comparisons. She also examined the relationship between student test scores and salaries as well as the relationship between salaries and dropout rates. She found that adjusting salaries for cost of living differences versus location quality adjusted salaries produce significantly different state rankings. Jalbert and Mason (2007) also describe difficulties that can arise when ranking states. When examining the desirability of states as a place to conduct business, they demonstrate that variations in the ranking methodology used can have large impacts on the resulting rankings. In their sample, a simple change in the way dummy variables were coded resulted in states changing rankings by as many as 38 places.

Alexander (2001) examined American Association of University Professors data from 1979-1998. He examined raw salaries, unadjusted for cost of living differences, to identify differences between compensation at public and private universities. Data for 139 public universities are compared to that of 75 private universities. The universities analyzed are all research and doctorate granting. He found that private institutions have both higher salaries and benefits relative to their public counterparts. Moreover, public institutions have become less competitive on the basis of salary and benefits over time. Many other authors have documented the declining competitiveness of public universities including Bell, 2000, Hamermesh, 2002, Zogni 2003, and Ehrenberg, 2003.

Related to faculty compensation is the extent to which faculty supplement their compensation with consulting and other external activities. To the extent that professors earn supplemental income, and there is variation in these earnings across states, direct or cost of living adjusted salary comparisons may be biased. Marsh and Dillon (1980) found that on average faculty supplement their income with external

activities by about 15 percent. They note that at least part of this income is earned during non-duty periods by faculty who are on nine-month appointments.

This paper extends the literature on several fronts. First, this research provides a comprehensive ranking of states based on COLA salaries and benefits. This study is the only known study to have computed any such ranking of states in recent years. This study also extends the literature by ranking not only doctorate granting institutions, but also master and bachelor degree granting institutions. The analysis continues with a discussion of the data and methodology used in the paper.

DATA AND METHODOLOGY

Data on the salaries of faculty at U.S. institutions were obtained from the 2008 special salary issue of *NEA Higher Education Advocate*. The data includes salary information by academic rank. The data is categorized by the highest level of degree offered by the institution. Schools are classified as AA, BA, BA+ and D, indicating associate degree, bachelor degree, master degree and doctorate degree respectively. The data are further classified by state. To limit the study to a manageable size, those universities listed as offering associate degrees are eliminated from the study. These universities will be examined in a separate study.

Five hundred ninety one schools are listed in the NEA dataset that offer a bachelor, master or doctorate level degree. While listed in the NEA dataset, seventeen institutions did not report salary information and were deleted from the dataset. These non-reporting institutions were primarily medical centers. The final dataset includes 574 useable observations. The sample *includes* sixty-nine schools classified as bachelor conferring, 240 classified as masters conferring and 265 classified as conferring doctorate degrees. The dataset is not exhaustive as many notable universities do not report salary information. While it is not possible to identify each non-reporting school, a pattern does seem apparent. Specifically, private institutions are generally excluded from the NEA dataset.

In order to determine the relevant cost of living index for each university, the city where the university is located was identified. The identification was made based on information provided on the university website. To identify the relevant cost of living, the cities were searched against the Yahoo.com real estate website, neighborhood information section. This section reports, among other things, a cost of living index for U.S. cities. For each university, the cost of living adjusted salary was computed. Consider a university that is located in a city with cost of living index, *COLIndex*. The university reports an average salary for its faculty, *Salary*. Then the cost of living adjusted salary, *COLSal*, is computed as:

$$COLSal = \frac{Salary}{COLIndex\left(\frac{1}{100}\right)} \quad (1)$$

To demonstrate these computations, consider a university that reports an average salary of \$100,000 per year. The university is located in a city with a cost of living index of 125. The cost of living adjusted salary is computed as:

$$COLSal = \frac{\$100,000}{125\left(\frac{1}{100}\right)} = \$80,000$$

The interpretation is that a salary of \$100,000 in this city is comparable to a salary of \$80,000 in a city with a cost of living Index equal to 100.

Next, we compute the equally weighted, average salary reported by universities within each state. The equal weighting scheme treats each reporting institution equally within the state. Alternative weightings are certainly possible and may produce different results. The impact of different weighting schemes is relegated to future research. Consider a state with, N , universities. Then the average cost of living adjusted salary for a state is computed as follows:

$$SavgCOL = \frac{\sum_{i=1}^N COLSal}{N} \quad (2)$$

For a state with three universities, paying COLA salaries of \$100,000, \$90,000, and \$80,000, the computations are completed as follows:

$$SavgCOL = \frac{\$100,000 + \$90,000 + \$80,000}{3} = \$90,000$$

Similar computations are made on a raw basis, not adjusted for the cost of living. We rank the states based on their average salaries on a raw basis and on a cost of living adjusted basis. Separate rankings are provided based on the benefits that states provide to their faculty. Finally, rankings are provided based on COLA total compensation, combining COLA adjusted salary and benefit data.

RESULTS

Summary statistics are reported in Table 1. Table 1 depicts the number of universities within a state that report an institution of higher education. The total number of reporting universities in each state are identified in the column titled ALL. Pennsylvania had the largest number of reporting institutions at 41. Wyoming and the District of Columbia each had a single reporting institution. The remaining columns break the data down by the types of degrees offered. The second column reports the number schools reporting for each type of degree conferred. The column labeled doctorate, master and bachelor presents the number of reporting institutions within a state, indicating they offer at least one doctorate, master or bachelor degree respectively.

All of the states report at least one institution that offers a doctorate level degree. The District of Columbia did not have a doctorate granting, salary reporting institution. Texas has the largest number of doctoral granting institutions at twenty-six. Forty-four states had master degree reporting institutions. New York reported the largest number of master granting institutions at twenty-four. Only 25 states had at least one bachelor degree reporting institutions. Pennsylvania had by far the largest number of bachelor degree schools with twenty-one. Only one other state had more than four reporting bachelor degree universities.

Next, we report average salary and benefit data by state and faculty rank. In Table 2 an analysis of the raw data is presented. These data are not adjusted for cost of living difference. Panel A depicts the raw salaries in thousands of dollars. New Jersey reports the highest average salaries for both full and assistant professors at \$113,600 and \$68,200 respectively. New Jersey also reports the highest overall average salaries. Nevada reports the highest salaries for associate professors at \$99,500. Missouri reports the highest instructor level salary at \$60,800. Alaska reports highest benefit levels at \$28,800.

Montana reports the lowest average salary for full and associate levels at of \$60,700 and \$52,100 respectively. Montana also has the lowest overall average salary. Vermont reports the lowest average salary for the assistant level at \$44,800. North Dakota institutions report the lowest average pay for instructors at \$36,200. Washington DC reports the lowest benefit level at \$11,500.

Table 1: Summary Statistics

STATE	ALL	DOCTORATE	MASTER	BACHELOR	STATE	ALL	DOCTORATE	MASTER	BACHELOR
AL	14	7	6	1	MT	7	3	3	1
AK	3	1	2	0	NE	7	3	4	0
AZ	6	6	0	0	NV	4	2	1	1
AR	10	4	5	1	NH	4	1	2	1
CA	32	16	15	1	NJ	13	7	6	0
CO	12	6	3	3	NM	6	3	3	0
CT	6	4	1	1	NY	38	6	24	8
DE	2	2	0	0	NC	16	10	6	0
DC	1	0	1	0	ND	6	2	2	2
FL	11	9	1	1	OH	24	11	11	2
GA	21	8	11	2	OK	14	3	8	3
HI	3	2	0	1	OR	8	4	4	0
ID	4	3	0	1	PA	41	7	13	21
IL	12	9	3	0	RI	2	2	0	0
IN	14	5	9	0	SC	12	3	8	1
IA	3	3	0	0	SD	6	4	2	0
KS	7	4	3	0	TN	9	7	2	0
KY	8	3	5	0	TX	35	26	9	0
LA	13	8	5	0	UT	6	2	2	2
ME	7	2	1	4	VT	5	1	3	1
MD	14	9	4	1	VA	15	10	3	2
MA	13	4	9	0	WA	8	3	5	0
MI	15	10	5	0	WV	11	2	5	4
MN	11	5	4	2	WI	13	2	11	0
MS	8	5	3	0	WY	1	1	0	0
MO	13	5	7	1	Total	574	265	240	69

This table shows the number of observations used in the analysis of each state. The column labeled ALL indicates the number of observations in the full sample without regard to type of degree offered. The columns labeled D, BA+ and BA, indicate the number of observations in each state that were Doctorate, Master and BA granting institutions respectively.

Table 3 presents cost of living adjusted data and rankings. The results are dramatically different than the raw figures reported in Table 2. On a cost of living adjusted basis, Iowa reports the highest average salaries for full, and assistant professors at \$115,200, and 71,800 respectively. It also reports the highest overall average salary of \$86,700. Nevada has the highest associate salaries at \$96,700. Missouri reports the highest instructor salaries. Michigan reports the highest dollar amount of benefits at \$28,500. Hawaii institutions report the lowest average pay for each of the service levels as well as the lowest average. Hawaii salaries average \$56,100, \$45,200, \$40,200, and \$31,100 at the full, associate, assistant and instructor levels respectively. Washington, DC reports the lowest cost of living adjusted benefits.

Interesting insights are revealed by comparing the raw rankings to the cost of living adjusted rankings. A rank comparison is provided in Table 4. Defining the cost of living adjusted rank, *COLRank*, and the ranking based on raw data, *RawRank*, the rank change is computed as follows:

$$RCHG = COLRank - RawRank \quad (3)$$

The largest decrease in ranking at the professor level occurs for Washington, D.C. that declined by 33 places. By contrast, the ranking of Kansas improves by twenty places. At the associate level California declined by 37 places while Oklahoma increased by 24 places. At the assistant, associate and average levels, Nebraska shows the largest gains of 27, 39 and 25 places respectively. The largest rank decreases occurred for Hawaii 39, Washington, DC 39, and Washington, DC 38 places for assistant, instructor and average levels respectively. Changes in benefit ranks range from a gain of 16 places for Tennessee to a decline of 35 places for Hawaii.

Table 2: Ranking of State Average Salaries

STATE	PANEL A: AVERAGE SALARIES						PANEL B: RANKING OF AVERAGE SALARIES					
	PROF	ASSOC	ASST	INST	AVG	BEN	PROF	ASSOC	ASST	INST	AVG	BEN
AL	85.5	67.6	55.8	41.4	64.2	19.2	25	22	23	36	26	24
AK	83.2	65.8	55.2	45.7	62.3	28.8	28	26	29	21	29	1
AZ	104.0	76.6	64.3	47.7	74.3	22.1	2	5	4	17	6	12
AR	72.6	59.7	51.3	39.3	54.8	14.3	45	43	44	44	47	44
CA	103.0	77.4	67.6	58.1	80.8	20.8	4	4	2	2	3	18
CO	83.1	64.7	55.5	38.9	62.2	13.8	29	29	28	46	30	46
CT	102.2	78.0	62.9	52.6	81.7	25.9	5	3	9	4	2	2
DE	103.6	73.9	63.0	48.8	77.6	24.9	3	7	8	13	4	5
DC	92.6	69.4	57.7	52.5	73.3	11.5	13	19	22	5	9	51
FL	95.5	70.7	60.7	45.8	69.6	18.5	10	14	14	20	18	27
GA	78.0	61.5	53.7	42.2	59.5	15.7	36	39	35	32	39	41
HI	87.4	69.9	62.2	48.2	70.6	21.8	20	17	12	15	14	13
ID	73.4	58.5	51.0	39.0	56.7	18.0	44	47	45	45	44	30
IL	90.0	68.8	59.9	42.5	66.2	17.3	16	20	16	30	22	33
IN	83.9	63.5	54.9	41.3	61.3	19.5	27	32	32	37	33	22
IA	101.6	74.1	63.3	46.7	76.5	22.9	6	6	7	19	5	10
KS	86.2	65.3	54.4	41.4	64.0	16.6	23	27	33	35	27	38
KY	85.2	65.9	55.2	42.5	62.4	17.1	26	25	31	29	28	34
LA	77.6	63.4	54.1	38.3	58.3	14.9	38	33	34	49	43	42
ME	74.3	59.0	47.8	45.3	59.1	18.8	42	45	48	22	41	26
MD	96.8	73.7	63.7	50.5	73.4	19.1	9	8	6	9	8	25
MA	86.8	69.6	59.3	50.8	72.1	23.1	21	18	20	8	11	9
MI	91.1	70.0	59.5	43.9	70.4	24.4	15	16	17	25	16	7
MN	81.0	63.8	55.6	39.6	64.4	20.3	31	30	25	43	24	21
MS	74.0	61.6	53.5	40.2	56.2	13.8	43	38	36	40	46	48
MO	79.8	61.1	52.3	60.8	60.8	16.8	33	40	42	1	35	35
MT	60.7	52.1	46.1	37.8	49.8	14.7	51	51	50	50	51	43
NE	79.0	62.1	51.6	40.1	59.9	15.8	34	37	43	41	36	39
NV	100.2	99.5	67.1	53.1	73.8	13.6	7	1	3	3	7	49
NH	86.7	68.4	59.1	49.7	71.5	19.5	22	21	21	10	13	23
NJ	113.6	87.0	68.2	51.9	86.4	25.1	1	2	1	6	1	4
NM	72.3	59.7	53.2	40.4	59.4	15.8	46	44	41	39	40	40
NY	89.8	70.5	59.4	48.8	70.5	22.1	17	15	19	12	15	11
NC	95.1	73.7	64.2	51.7	70.2	17.8	11	9	5	7	17	31
ND	66.6	55.3	48.0	36.2	51.5	16.8	49	48	47	51	50	36
OH	88.1	67.0	55.6	42.3	64.8	20.4	19	24	26	31	23	19
OK	69.8	58.8	50.8	39.8	54.2	16.6	47	46	46	42	48	37
OR	74.8	62.9	53.5	41.7	59.7	24.8	40	35	38	34	37	6
PA	91.7	72.7	61.1	47.9	67.6	18.2	14	10	13	16	21	29
RI	82.7	65.2	55.7	40.7	68.4	25.7	30	28	24	38	20	3
SC	78.6	63.7	55.2	43.2	61.0	17.4	35	31	30	26	34	32
SD	75.5	60.7	53.5	42.1	59.0	13.8	39	41	37	33	42	47
TN	80.8	63.2	53.3	38.8	62.0	20.4	32	34	40	48	31	20
TX	85.8	67.2	59.4	44.2	64.3	14.2	24	23	18	24	25	45
UT	77.8	62.2	55.6	44.6	61.8	24.4	37	36	27	23	32	7
VT	69.6	55.2	44.8	42.7	56.4	21.4	48	49	51	28	45	16
VA	94.5	72.0	60.2	47.3	71.7	21.7	12	12	15	18	12	14
WA	89.3	70.9	62.9	49.3	68.8	18.4	18	13	10	11	19	28
WV	65.8	55.1	46.9	38.8	53.4	13.4	50	50	49	47	49	50
WI	74.3	60.0	53.4	42.8	59.6	21.4	41	42	39	27	38	15
WY	96.9	72.2	62.9	48.7	72.3	21.3	8	11	11	14	10	17
N							51	51	51	51	51	51

This table shows the average salaries paid to faculty by state. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The column labeled BEN is the dollar amount of benefits provided to the faculty member. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

Table 3: Ranking of State Average Cost of Living Adjusted Salaries

STATE	PANEL A: AVERAGE SALARIES						PANEL B: RANKING OF AVERAGE SALARIES					
	PROF	ASSOC	ASST	INST	AVG	BEN	PROF	ASSOC	ASST	INST	AVG	BEN
AL	100.9	79.9	65.9	49.0	75.8	22.6	10	5	9	15	6	12
AK	69.7	55.1	46.3	39.2	52.2	24.1	47	47	48	48	50	7
AZ	103.7	76.3	64.1	47.3	73.9	21.9	6	15	15	27	15	16
AR	87.8	72.4	62.2	47.8	66.3	17.4	28	21	22	21	32	40
CA	84.1	63.2	55.2	47.8	66.3	17.1	34	41	40	22	34	42
CO	82.1	64.3	55.0	38.6	61.6	13.6	37	40	41	49	43	49
CT	90.4	69.0	55.6	46.4	72.2	22.6	23	31	37	32	18	13
DE	100.0	71.5	61.0	47.2	75.0	24.1	13	23	23	29	10	9
DC	71.8	53.8	44.7	40.7	56.8	8.9	46	49	49	44	47	51
FL	94.2	69.7	59.7	45.1	68.6	18.2	20	27	32	34	25	34
GA	87.4	69.0	60.3	47.3	66.7	17.7	29	30	28	28	31	37
HI	56.1	45.2	40.2	31.1	45.4	14.1	51	51	51	51	51	48
ID	83.6	66.7	58.1	44.4	64.6	20.5	36	36	34	37	39	19
IL	96.0	73.3	63.6	45.4	70.6	18.5	18	19	17	33	20	32
IN	101.6	77.1	66.6	50.2	74.2	23.7	8	12	7	11	14	10
IA	115.2	84.1	71.8	53.1	86.7	26.1	1	2	1	4	1	3
KS	105.1	79.7	66.4	50.6	78.0	20.2	3	6	8	10	3	25
KY	101.3	78.5	65.8	50.6	74.3	20.4	9	9	10	9	13	21
LA	89.9	73.5	62.7	44.6	67.5	17.4	25	18	19	35	27	41
ME	79.0	62.8	50.9	48.4	62.9	20.0	42	42	43	19	40	27
MD	91.0	69.3	59.9	44.2	68.9	18.2	22	28	31	38	23	35
MA	74.3	59.7	50.9	44.1	61.8	19.8	43	44	44	39	42	28
MI	106.1	81.7	69.5	51.4	82.0	28.5	2	3	3	8	2	1
MN	88.4	69.7	60.8	43.8	70.3	22.2	26	26	25	40	22	14
MS	90.1	75.2	65.4	49.2	68.5	16.9	24	16	12	14	26	43
MO	96.5	74.0	63.3	73.7	73.7	20.4	17	17	18	1	16	20
MT	66.7	57.3	50.6	41.6	54.7	16.2	49	45	45	43	48	46
NE	98.2	77.0	64.1	49.9	74.5	19.8	16	14	16	13	11	29
NV	98.3	96.7	65.2	52.3	72.5	13.4	15	1	13	6	17	50
NH	81.5	64.3	55.5	46.8	67.2	18.3	38	39	38	31	30	33
NJ	92.9	70.8	55.5	43.6	70.4	20.5	21	25	39	41	21	18
NM	80.0	66.0	58.9	44.5	65.7	17.4	40	38	33	36	36	39
NY	73.1	57.3	48.4	39.6	57.3	18.1	45	46	46	47	46	36
NC	100.3	78.0	67.9	55.2	74.4	18.9	12	10	5	2	12	30
ND	79.9	66.3	57.5	43.5	61.8	20.1	41	37	35	42	41	26
OH	103.9	79.1	65.6	50.0	76.5	24.1	5	8	11	12	5	8
OK	84.9	71.8	62.2	48.9	66.2	20.3	32	22	21	17	35	23
OR	73.6	61.0	52.0	40.4	58.1	24.3	44	43	42	45	44	5
PA	102.1	81.1	68.2	53.7	75.3	20.3	7	4	4	3	9	24
RI	69.3	55.0	47.0	34.5	57.5	21.7	48	48	47	50	45	17
SC	85.5	69.3	60.1	47.5	66.3	18.8	30	29	30	24	33	31
SD	88.0	70.9	62.4	49.0	68.6	16.1	27	24	20	16	24	47
TN	98.6	77.1	65.1	47.4	75.7	24.9	14	13	14	25	8	4
TX	100.9	79.3	70.0	52.2	75.7	16.7	11	7	2	7	7	44
UT	84.6	67.8	60.7	48.6	67.3	26.6	33	33	26	18	28	2
VT	65.8	52.2	42.4	40.1	53.5	20.4	50	50	50	46	49	22
VA	94.7	72.7	60.9	47.8	72.0	21.9	19	20	24	23	19	15
WA	85.3	68.0	60.2	47.0	65.6	17.7	31	32	29	30	37	38
WV	80.3	67.4	57.3	47.3	65.2	16.4	39	35	36	26	38	45
WI	84.0	67.8	60.3	48.4	67.2	24.2	35	34	27	20	29	6
WY	104.2	77.6	67.6	52.4	77.7	22.9	4	11	6	5	4	11
N							51	51	51	51	51	51

This table shows cost of living adjusted average faculty salaries paid by state. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The column labeled BEN is the dollar value of benefits provided to the faculty member. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

Table 4: Ranking of State Average Cost of Living Adjusted Salaries

STATE	PROF	ASSOC	ASST	INST	AVG	BEN	STATE	PROF	ASSOC	ASST	INST	AVG	BEN
AL	15	17	14	21	20	12	NE	18	23	27	28	25	10
AK	-19	-21	-19	-27	-21	-6	NV	-8	0	-10	-3	-10	-1
AZ	-4	-10	-11	-10	-9	-4	NH	-16	-18	-17	-21	-17	-10
AR	17	22	22	23	15	4	NJ	-20	-23	-38	-35	-20	-14
CA	-30	-37	-38	-20	-31	-24	NM	6	6	8	3	4	1
CO	-8	-11	-13	-3	-13	-3	NY	-28	-31	-27	-35	-31	-25
CT	-18	-28	-28	-28	-16	-11	NC	-1	-1	0	5	5	1
DE	-10	-16	-15	-16	-6	-4	ND	8	11	12	9	9	10
DC	-33	-30	-27	-39	-38	0	OH	14	16	15	19	18	11
FL	-10	-13	-18	-14	-7	-7	OK	15	24	25	25	13	14
GA	7	9	7	4	8	4	OR	-4	-8	-4	-11	-7	1
HI	-31	-34	-39	-36	-37	-35	PA	7	6	9	13	12	5
ID	8	11	11	8	5	11	RI	-18	-20	-23	-12	-25	-14
IL	-2	1	-1	-3	2	1	SC	5	2	0	2	1	1
IN	19	20	25	26	19	12	SD	12	17	17	17	18	0
IA	5	4	6	15	4	7	TN	18	21	26	23	23	16
KS	20	21	25	25	24	13	TX	13	16	16	17	18	1
KY	17	16	21	20	15	13	UT	4	3	1	5	4	5
LA	13	15	15	14	16	1	VT	-2	-1	1	-18	-4	-6
ME	0	3	5	3	1	-1	VA	-7	-8	-9	-5	-7	-1
MD	-13	-20	-25	-29	-15	-10	WA	-13	-19	-19	-19	-18	-10
MA	-22	-26	-24	-31	-31	-19	WV	11	15	13	21	11	5
MI	13	13	14	17	14	6	WI	6	8	12	7	9	9
MN	5	4	0	3	2	7	WY	4	0	5	9	6	6
MS	19	22	24	26	20	5	MAX +	20	24	27	28	25	16
MO	16	23	24	0	19	15	MAX -	-33	-37	-39	-39	-38	35
MT	2	6	5	7	3	-3	AVG	12.4	14.7	15.9	16.3	14.2	8.1

This table shows the ranking changes that occur by adjusting salaries for cost of living differences. The figure in each cell is the cost of living adjusted ranking less the raw data ranking.

The average rank changes are substantial. The average changes are 12.4, 14.7, 15.9, 16.3 and 14.2 places at the full, associate, assistant, instructor and average levels respectively. These figures represent between a 24 and 32 percent change in ranks. The average change in benefits ranking is 8.1 places.

While the figures from Tables 2-4 are insightful, more can be inferred. States differ in the level of their institutions. While Texas has primarily doctoral granting institutions, Pennsylvania has primarily bachelor degree institutions and New York is characterized primarily by master’s degree granting institutions. If there are differences in salary by institution type, the previous analysis could be misleading. To gain additional insights the cost of living adjusted analysis is completed for each degree subgroup. The results are presented in Tables 5-7.

Table 5 shows the results for doctorate granting institutions. The analysis is limited to the 50 states because the District of Columbia did not have a doctorate reporting institution. Pennsylvania universities report the highest average salary at the full, associate and assistant levels of \$119,200, \$90,100 and \$73,500 respectively. Pennsylvania also reported the highest average salaries at \$88,400. Missouri reported the highest instructor salaries at \$82,300. Michigan institutions have the highest benefit level of \$28,900. Hawaii reports dramatically lower salaries than the other states in the nation. It ranks last in the nation for each academic rank, on average, and for benefits. Hawaii is \$9,500; \$7,700; \$5,400; \$2,900; \$10,100, and \$800 lower than the second lowest state at the full, associate, assistant, instructor, average, and benefit levels respectively. A common argument is that lower salaries in Hawaii represent the price for opting to live in paradise.

Table 5: Cost of Living Adjusted Salaries by State for Doctorate Degree Granting Institutions

STATE	PANEL A: AVERAGE SALARIES						PANEL B: RANKING OF AVERAGE SALARIES					
	PROF	ASSOC	ASST	INST	AVG	BEN	PROF	ASSOC	ASST	INST	AVG	BEN
AL	111.2	82.3	68.0	47.9	80.1	23.6	8	9	15	23	12	13
AK	75.3	58.0	49.1	42.5	55.9	25.3	47	48	48	45	49	6
AZ	103.7	76.3	64.1	47.3	73.9	21.9	18	23	28	28	28	20
AR	97.8	76.3	67.0	46.8	71.7	17.3	26	24	19	33	33	42
CA	89.2	63.9	55.8	46.7	70.3	15.3	41	46	44	34	38	49
CO	94.9	72.0	60.5	40.0	68.9	15.6	33	33	37	48	43	48
CT	86.2	65.5	54.1	46.5	69.8	22.1	44	45	46	36	40	17
DE	100.0	71.5	61.0	47.2	75.0	24.1	22	34	36	30	23	11
DC												
FL	97.1	70.9	61.5	46.7	70.4	18.4	30	37	34	35	37	38
GA	98.5	73.9	65.1	46.9	73.5	18.1	24	31	26	32	30	40
HI	59.8	47.3	41.6	31.6	47.4	14.5	50	50	50	50	50	50
ID	89.0	70.8	61.3	45.8	67.4	21.8	42	38	35	39	44	22
IL	99.9	75.0	65.2	47.4	74.1	19.2	23	27	25	26	27	32
IN	112.6	82.4	70.6	49.8	83.1	25.2	5	7	9	17	6	7
IA	115.2	84.1	71.8	53.1	86.7	26.1	3	4	2	3	2	4
KS	109.7	82.9	69.0	50.6	82.5	20.7	10	6	13	13	8	27
KY	109.6	81.2	67.0	51.2	80.8	22.1	11	11	20	12	11	18
LA	94.6	76.4	65.6	47.2	70.5	19.0	34	21	24	29	36	35
ME	92.1	71.5	57.6	49.4	73.3	21.9	37	35	40	19	31	21
MD	92.0	69.5	59.8	43.2	69.0	18.0	38	40	38	44	42	41
MA	86.2	67.5	54.8	43.4	69.0	18.9	45	42	45	43	41	36
MI	112.2	84.5	71.4	51.4	85.2	28.9	6	3	3	11	3	1
MN	93.2	71.3	62.6	45.4	74.9	21.7	36	36	30	40	24	23
MS	97.3	78.8	67.4	47.6	71.7	15.6	29	16	17	25	34	47
MO	110.4	79.6	69.2	82.3	82.3	22.1	9	15	12	1	9	16
MT	70.9	60.2	52.9	44.0	57.8	17.1	48	47	47	42	47	43
NE	108.7	85.3	71.2	51.9	80.1	19.1	12	2	7	8	13	33
NV	113.2	83.2	64.2	49.8	81.5	16.3	4	5	27	18	10	46
NH	89.8	66.9	56.9	50.2	73.7	20.5	39	43	42	15	29	28
NJ	96.9	73.7	57.6	41.4	71.4	22.0	31	32	41	47	35	19
NM	96.0	75.1	65.9	45.9	76.1	18.7	32	26	23	38	21	37
NY	105.1	76.3	62.3	50.0	82.9	24.3	15	22	31	16	7	9
NC	101.4	77.7	67.4	52.1	75.5	19.2	20	18	18	7	22	31
ND	97.7	77.0	68.2	48.4	74.4	21.2	27	20	14	22	25	26
OH	111.9	82.4	69.6	51.4	83.5	25.0	7	8	10	10	5	8
OK	117.9	82.3	71.3	50.5	79.0	24.2	2	10	5	14	16	10
OR	85.8	69.3	59.5	46.0	64.0	23.7	46	41	39	37	45	12
PA	119.2	90.1	73.5	52.2	88.4	23.1	1	1	1	6	1	14
RI	69.3	55.0	47.0	34.5	57.5	21.7	49	49	49	49	48	24
SC	106.0	79.9	71.2	49.0	79.2	20.3	13	13	6	20	14	29
SD	94.4	74.2	66.3	48.8	72.4	16.7	35	30	21	21	32	45
TN	101.4	78.4	66.0	47.4	77.4	25.4	19	17	22	27	19	5
TX	103.8	80.8	71.3	51.7	77.2	16.7	17	12	4	9	20	44
UT	100.7	76.2	70.9	52.9	79.2	28.5	21	25	8	4	15	2
VT	88.3	66.5	55.9	42.3	63.9	19.0	43	44	43	46	46	34
VA	98.4	74.5	62.2	47.8	74.4	21.5	25	29	32	24	26	25
WA	89.8	70.1	61.8	47.1	69.8	19.4	40	39	33	31	39	30
WV	97.7	74.5	63.3	44.9	77.8	18.3	28	28	29	41	17	39
WI	105.4	79.8	69.5	54.3	83.8	26.5	14	14	11	2	4	3
WY	104.2	77.6	67.6	52.4	77.7	22.9	16	19	16	5	18	15
N							50	50	50	50	50	50

This table shows cost of living adjusted average faculty salaries paid by state by doctorate degree granting institutions. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The column labeled BEN is the dollar value of benefits provided to the faculty member. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

Table 6 shows the results for master degree granting institutions. Forty-four states had at least one master degree granting institution. However, Nevada did not report salaries at the associate and assistant levels resulting in 43 usable observations for these two ranks. Pennsylvania again has the highest full professor salaries at \$99,900. North Carolina has the highest associate and assistant level salaries at \$78,600 and \$68,900 respectively. Missouri has the highest lecturer salaries at \$70,300. On average Michigan reports the highest overall average salaries of \$75,700 and the highest benefits of \$27,700. Vermont has the lowest full, associate and assistant professor salaries at \$61,100, 49,600, 39,200 respectively. Oregon has the lowest instructor salaries of \$34,900. Alaska has the lowest average salaries of \$50,400. Washington D.C. has the lowest benefit level of \$8,900. It is important to note that Hawaii, which ranked at the bottom of the doctoral list, did not have a master degree granting institution, and thus was not included in this analysis.

Table 7 shows the results for Bachelor degree granting institutions. Twenty-five states report at least one bachelor degree granting institution. Connecticut is the highest paying state at the full professor level, \$118,800 as well as on average, \$91,900. Nevada was the highest paying state at the associate level at \$123,800; Maryland reported highest at the assistant level at \$71,400 and Pennsylvania the highest at the instructor level at \$58,200. Alabama reports the highest benefit level at \$27,400. Hawaii once again has the distinction as being the lowest paying state, ranking at the bottom of each pay category. However, Hawaii is not lowest in the benefit area as Nevada and Colorado both report lower benefit levels.

Finally, we combine COLA salary and benefit data to examine cost of living adjusted total compensation. In order to complete this analysis it is necessary to compute the total compensation. Total compensation is computed as the sum of salary and benefits.

$$Tcomp = Salary + Benefits \quad (4)$$

There are some limitations inherent in computing the total compensation in this fashion. Benefit information is reported as an average for all faculty at an institution. Benefits, however contain both a fixed and a variable component that depends upon salary level. Fixed components include items such as health insurance contributions. Items that vary with salary level include items like Social Security and Medicare contributions. Moreover, the mixture of fixed versus variable costs will vary by institution. Thus, it is not possible to precisely decompose benefits into a fixed and variable component. The process used here is inherently biased. Full professor total compensation will be biased downward, while lecturer total compensation will be biased upwards. While an element of bias is present, we argue that the bias will be approximately equally across states and thus not affect rankings. Moreover, any other method of adjusting the data would also introduce an equally problematic element of bias.

Table 8 shows the results of the COLA total compensation analysis. Iowa has the highest full and overall average COLA total compensation at \$141,200 and \$112,700 respectively. For full professors Iowa is \$6,600 higher than second placed Michigan. Michigan has the highest associate and assistant level COLA total compensation at \$110,200 and \$97,900 respectively. Missouri has the highest instructor COLA total compensation at \$94,100. Hawaii maintains its position as the lowest paying state in the nation. It ranks 51st for total compensation for full, associate, instructor and overall average compensation. However, it is ranked 50th at the assistant level, with Washington DC having the lowest pay for assistant professors. Again, the difference between Hawaii and the next lowest state is significant. At the full professor level, Hawaii total compensation is \$10,500 lower than 50th ranked Washington DC. For the overall average, Hawaii is \$6,300 below 50th ranked Washington, DC.

Table 6: Cost of Living Adjusted Salaries by State for Master Degree Granting Institutions

STATE	PANEL A: AVERAGE SALARIES						PANEL B: RANKING OF AVERAGE SALARIES					
	PROF	ASSOC	ASST	INST	AVG	BEN	PROF	ASSOC	ASST	INST	AVG	BEN
AL	89.4	77.0	62.7	50.0	70.2	20.7	11	3	8	10	10	13
AK	66.9	53.7	44.8	35.9	50.4	23.5	40	41	40	43	44	6
AZ												
AR	78.3	67.6	57.5	47.9	62.1	17.0	28	19	21	19	31	33
CA	78.3	62.5	54.4	48.5	62.7	18.8	29	32	29	15	25	27
CO	74.1	62.2	54.0	37.9	58.1	12.3	35	33	30	41	36	43
CT	78.9	59.6	48.8	39.0	62.3	24.7	27	35	38	39	29	4
DE												
DC	71.8	53.8	44.7	40.7	56.8	8.9	36	40	41	35	38	44
FL	87.4	69.2	56.0	39.5	61.6	17.0	15	15	25	37	32	31
GA	80.2	65.8	57.7	47.9	62.7	17.0	22	24	20	18	26	32
HI												
ID												
IL	84.2	68.0	58.9	39.2	60.3	16.6	18	18	15	38	34	36
IN	95.5	74.2	64.4	50.4	69.3	22.8	5	9	5	8	12	9
IA												
KS	99.0	75.4	62.8	50.6	72.0	19.5	2	6	7	7	4	19
KY	96.3	76.9	65.1	50.3	70.3	19.4	4	4	4	9	7	21
LA	82.5	68.8	58.1	40.5	62.8	14.7	19	17	19	36	24	41
ME	77.4	63.4	50.1	45.9	62.3	19.5	31	31	36	28	30	20
MD	85.4	65.1	57.5	44.2	64.0	19.3	16	28	22	31	19	22
MA	69.1	56.3	49.1	44.3	58.6	20.2	38	38	37	30	35	16
MI	94.0	76.3	65.7	51.5	75.7	27.7	7	5	3	6	1	1
MN	84.9	67.2	59.0	40.7	67.9	21.1	17	21	14	34	14	11
MS	78.2	69.1	61.9	51.8	63.3	18.9	30	16	10	5	22	24
MO	90.5	72.2	60.6	70.3	70.3	19.8	9	11	13	1	8	17
MT	66.3	57.2	50.7	41.6	54.9	15.8	41	36	35	33	40	38
NE	90.3	70.7	58.8	48.5	70.3	20.3	10	13	17	16	9	15
NV	68.8			55.0	62.4	13.3	39			3	27	42
NH	79.1	64.2	53.4	46.4	65.5	17.9	26	30	31	27	15	29
NJ	88.2	67.4	53.0	46.8	69.3	18.8	13	20	33	26	13	25
NM	64.0	56.9	51.8	43.2	55.3	16.2	43	37	34	32	39	37
NY	70.3	55.7	47.3	38.5	54.8	17.3	37	39	39	40	41	30
NC	98.2	78.6	68.9	60.4	72.5	18.3	3	1	1	2	3	28
ND	75.8	61.7	53.2	44.4	57.0	20.8	33	34	32	29	37	12
OH	95.0	75.3	61.8	49.5	70.9	22.9	6	7	12	11	6	8
OK	82.4	71.3	62.0	49.3	65.2	19.2	20	12	9	14	16	23
OR	64.5	52.7	44.4	34.9	52.1	25.0	42	42	42	44	42	3
PA	99.9	78.6	63.6	47.3	75.2	19.8	1	2	6	24	2	18
RI												
SC	80.0	67.1	57.4	47.7	63.3	18.8	24	22	23	20	21	26
SD	75.2	64.2	54.5	49.3	61.2	14.9	34	29	28	13	33	40
TN	88.6	72.5	61.8	47.6	69.5	22.9	12	10	11	21	11	7
TX	92.7	74.7	66.0	53.6	71.6	16.8	8	8	2	4	5	34
UT	79.6	65.7	57.0	48.3	63.8	25.7	25	25	24	17	20	2
VT	61.1	49.6	39.2	37.9	51.9	21.2	44	43	43	42	43	10
VA	87.6	69.2	54.8	47.5	64.9	20.7	14	14	27	22	17	14
WA	82.0	66.4	58.9	47.0	63.1	16.6	21	23	16	25	23	35
WV	76.2	65.6	55.5	49.4	62.4	15.5	32	26	26	12	28	39
WI	80.1	65.6	58.7	47.3	64.2	23.8	23	27	18	23	18	5
WY												
							44	43	43	44	44	44

This table shows cost of living adjusted average faculty salaries paid by state by master degree granting institutions. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant ant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The column labeled BEN is the dollar value of benefits provided to the faculty member. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

Table 7: Cost of Living Adjusted Salaries by State for Bachelor Degree Granting Institutions

STATE	PANEL A: AVERAGE SALARIES						PANEL B: RANKING OF AVERAGE SALARIES					
	PROF	ASSOC	ASST	INST	AVG	BEN	PROF	ASSOC	ASST	INST	AVG	BEN
AL	98.0	80.4	70.2	50.9	78.8	27.4	4	6	2	8	3	1
AK												
AZ												
AR	95.2	80.7	66.1	51.6	65.9	19.4	7	5	6	7	7	9
CA				54.4	54.4	19.9				3	18	6
CO	64.7	51.0	45.2	36.6	50.4	10.6	21	21	21	21	22	24
CT	118.8	92.6	68.6	53.2	91.9		1	2	4	5	1	
DE												
DC												
FL	74.8	59.8	47.4	36.5	59.4	17.7	13	16	20	22	13	14
GA	82.0	67.6	55.8	45.2	60.9	19.6	10	10	12	13	12	8
HI	48.9	41.0	37.5	30.3	41.4	13.2	25	25	25	25	26	23
ID	67.5	54.2	48.4	40.1	56.0	16.5	18	20	17	19	16	17
IL												
IN												
IA												
KS												
KY												
LA												
ME	72.8	58.3	47.7	48.5	57.9	19.3	15	18	19	9	15	11
MD	104.8	84.4	71.4	52.9	88.4	15.1	2	3	1	6	2	20
MA												
MI												
MN	83.1	70.9	59.8	44.1	63.7	25.4	9	8	9	15	10	5
MS												
MO	69.9	58.8	52.4	54.0	54.0	16.1	16	17	15	4	20	18
MT	55.4	48.8	43.8	34.2	45.1	14.6	24	22	22	24	25	22
NE												
NV	98.0	123.8	67.3	54.6	64.6	7.6	5	1	5	2	8	25
NH	77.8	61.9	58.4	44.1	64.4	17.1	11	13	10	16	9	15
NJ												
NM												
NY	57.3	47.8	41.1	35.2	45.9	15.7	23	23	23	23	24	19
NC												
ND	66.1	60.2	51.1	37.6	54.0	18.5	20	15	16	20	19	13
OH	104.1	82.6	64.1	43.4	68.7	25.5	3	4	7	17	6	4
OK	69.6	62.8	53.6	46.1	55.9	19.3	17	12	14	11	17	10
OR												
PA	97.6	79.7	69.2	58.2	71.0	19.6	6	7	3	1	4	7
RI												
SC	67.4	54.6	48.2	41.7	50.7	14.8	19	19	18	18	21	21
SD												
TN												
TX												
UT	73.7	61.6	54.0	44.7	58.9	25.6	14	14	13	14	14	3
VT	57.6	45.8	38.2		47.8	19.2	22	24	24		23	12
VA	87.0	68.8	63.4	48.2	70.8	26.0	8	9	8	10	5	2
WA												
WV	76.8	66.1	56.6	46.0	62.6	16.6	12	11	11	12	11	16
WI												
WY												
N							25	25	25	25	26	25

This table shows cost of living adjusted average faculty salaries paid by state by bachelor degree granting institutions. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The column labeled BEN is the dollar value of benefits provided to the faculty member. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

STATISTICAL TESTS

A final demonstration of the ranking differences is based on rank correlation. We test the extent to which the raw ranks and COLA ranks are correlated using a standard Kendall's Tau test for rank correlation. Kendall's Tau tests the agreement between two rankings. To the extent that the raw rankings and COLA rankings are highly correlated, there is little reason to examine COLA salaries. In the case of perfect correlation, any differences would be by a scale factor only and would not change the ranking of the individual states. If the two rankings are not highly correlated, however, the two rankings are said to be significantly different.

The rank correlation test results are presented in Table 9. The results indicate correlation coefficients between -0.002 between the raw and COLA total compensation of assistant professors at doctorate degree granting institutions and 0.600 for raw and COLA full professor salaries at bachelor degree granting institutions. The significance of the correlations is mixed. For example, when examining total compensation in the full sample, the correlations are significant for the full, associate, instructor and average analyses; however, they are not significant at the assistant professor level. The interpretation is that there is not a high degree of correlation between raw compensation and cost of living adjusted compensation at the assistant level. This suggests that faculty in this category should be especially careful to adequately consider cost of living differences when evaluating compensation packages. Insignificant correlations are also found in the subsample analysis. Overall, the analysis indicates raw salaries and cost of living salaries are not highly correlated.

CONCLUDING COMMENTS

Equitable faculty compensation has long been an issue in higher education. In this paper we rank states based on the salaries and benefits that universities pay to their faculty. Separate rankings are made based on raw data and cost of living adjusted (COLA) data. The analysis is completed for faculty of differing ranks. The analysis is also completed for subgroups of universities offering different degrees.

The analysis indicates that comparing salary and compensation data on a COLA basis produces substantially different rankings than comparing raw salary figures. The data indicates widely varying compensation by state on a COLA basis. The ranking of states are found to change by as many as 39 places when cost of living realities are considered. The data further indicates that some states have consistently higher salaries than others. Iowa, Pennsylvania and Michigan are consistently higher paying states while Hawaii, Vermont, and Washington, DC pay consistently low salaries. Hawaii is particularly noteworthy because it is consistently and significantly lower than all other states.

The analysis here indicates that faculty should exercise care in examining compensation packages on a cost of living adjusted basis. They should not consider only raw data figures. Moreover, they should be sure to take into account the value of different benefit packages in making an employment decision. Administrators should consider the rankings presented here to position their institutions and states as desired in highly competitive faculty markets. It is unlikely that low ranked universities will be able to attract the highest quality faculty. In some cases, administrators of universities that are ranked high might be able to reduce salaries while still attracting the highest quality faculty.

The analysis is limited in several ways. First, some U.S. universities are not included in the sample. Private universities are notably absent from the sample. Second, benefit data was available only as an average amount across academic rank. As such, the combined salary and benefit data by academic rank are necessarily biased. Average data for each state were computed as a simple average of the salaries paid by the universities within the state. To the extent that different universities within a state employ

Table 8: Cost of Living Adjusted Total Compensation by State

STATE	PANEL A: AVERAGE COMPENSATION					PANEL B: RANKING BY COMPENSATION				
	PROF	ASSOC	ASST	INST	AVG	PROF	ASSOC	ASST	INST	AVG
AL	123.6	102.5	88.6	71.7	98.4	9	5	7	12	7
AK	93.8	79.2	70.4	64.6	76.3	45	44	44	36	45
AZ	125.5	98.2	86.0	69.2	95.8	5	12	14	18	10
AR	105.2	89.8	79.5	65.2	83.7	30	27	25	27	35
CA	101.1	80.2	72.2	64.9	83.3	36	42	41	30	36
CO	95.7	77.8	68.6	52.2	75.1	43	45	46	49	47
CT	109.3	87.9	74.5	65.2	91.1	24	30	38	26	21
DE	124.1	95.6	85.1	71.3	99.1	8	16	15	13	6
DC	80.7	62.7	53.6	49.6	65.7	50	50	51	50	50
FL	112.4	87.9	77.9	63.3	86.8	20	29	33	41	25
GA	105.0	86.7	78.0	64.9	84.3	31	34	31	32	34
HI	70.2	59.2	54.3	45.2	59.4	51	51	50	51	51
ID	104.1	87.1	78.6	64.9	85.0	33	32	28	31	31
IL	114.5	91.8	82.2	63.9	89.1	18	24	23	38	23
IN	125.3	100.8	90.3	73.8	97.9	7	8	4	9	9
IA	141.2	110.2	97.9	79.1	112.7	1	2	2	3	1
KS	125.3	99.9	86.6	70.8	98.2	6	10	12	15	8
KY	121.7	98.9	86.2	71.0	94.7	12	11	13	14	12
LA	107.3	90.9	80.1	62.0	84.9	27	26	24	43	32
ME	99.0	82.8	70.9	68.4	83.0	40	40	42	21	39
MD	109.2	87.5	78.1	62.3	87.1	25	31	30	42	24
MA	94.1	79.5	70.7	63.9	81.6	44	43	43	37	42
MI	134.6	110.2	97.9	79.9	110.5	2	1	1	2	2
MN	110.5	91.9	82.9	66.3	92.5	23	23	19	22	18
MS	107.0	92.0	82.2	66.0	85.4	28	21	22	24	29
MO	117.0	94.4	83.7	94.1	94.1	16	18	18	1	14
MT	82.9	73.5	66.8	57.7	70.9	49	48	47	46	49
NE	117.9	96.7	83.9	69.7	94.2	14	14	17	17	13
NV	111.7	110.1	78.6	65.7	85.9	21	3	27	25	27
NH	99.8	82.6	73.9	65.1	85.6	38	41	39	28	28
NJ	113.4	91.3	76.0	64.7	91.0	19	25	37	34	22
NM	97.5	83.4	76.3	62.0	83.1	41	39	35	44	38
NY	91.1	75.4	66.4	57.7	75.4	46	47	48	47	46
NC	119.2	96.9	86.8	74.0	93.2	13	13	10	7	17
ND	100.0	86.4	77.6	63.6	82.0	37	35	34	40	41
OH	128.0	103.2	89.7	74.4	100.6	3	4	6	6	4
OK	105.3	92.1	82.4	69.1	86.5	29	20	21	19	26
OR	99.4	85.3	76.3	64.7	82.4	39	37	36	33	40
PA	122.3	101.4	88.4	74.0	95.6	11	7	8	8	11
RI	91.0	76.7	68.6	56.1	79.2	47	46	45	48	44
SC	104.3	88.1	78.9	66.3	85.1	32	28	26	23	30
SD	104.1	87.0	78.5	65.1	84.7	34	33	29	29	33
TN	123.4	101.9	90.0	72.3	100.5	10	6	5	11	5
TX	117.7	96.0	86.7	69.0	92.5	15	15	11	20	19
UT	111.2	94.4	87.3	75.2	93.9	22	19	9	5	16
VT	86.2	72.6	62.7	61.0	73.8	48	49	49	45	48
VA	116.7	94.6	82.8	69.7	93.9	17	17	20	16	15
WA	103.0	85.7	77.9	64.7	83.3	35	36	32	35	37
WV	96.7	83.8	73.7	63.7	81.6	42	38	40	39	43
WI	108.2	92.0	84.6	72.6	91.5	26	22	16	10	20
WY	127.1	100.5	90.5	75.3	100.6	4	9	3	4	3
N						51	51	51	51	51

This table shows cost of living adjusted average faculty total compensation paid by each state. The columns labeled PROF, ASSOC, ASSIST, INST indicate salary levels at the Full, Associate, Assistant and Instructor levels respectively. The column labeled average is the weighted average of salaries across ranks. The figures in Panel A are in raw dollar amounts. The figures in Panel B are the rankings. Salary amounts are reported in thousands of dollars.

Table 9: Kendall's Tau Test for Rank Correlation

Panel A: All Schools					
	Full	Associate	Assistant	Instructor	Average
Sal and Benefits	0.293	0.179	0.105	0.169	0.028
	0.001***	.032**	0.138	0.040**	0.016**
	0.086	0.032	0.011	0.028	0.043
Salary	0.304	0.189	-0.32	0.042	0.024
	0.001***	0.025**	0.370	0.333	0.401
	0.092	0.036	0.001	0.002	0.001
Benefits					0.552 0.001*** 0.305
Panel B: Doctorate Degree Granting					
	Full	Associate	Assistant	Instructor	Average
Sal and Benefits	0.199	0.059	-0.002	0.222	0.146
	0.021**	0.273	0.490	0.011**	0.067*
	0.040	0.003	0.000	0.049	0.021
Salary	0.081	-0.006	-0.186	0.099	-0.047
	0.204	0.477	0.028**	0.156	0.314
	0.007	0.000	0.035	0.010	0.002
Benefits					0.522 0.001*** 0.272
Panel C: Master Degree Granting					
	Full	Associate	Assistant	Instructor	Average
Sal and Benefits	0.302	0.158	0.143	0.201	0.184
	0.002***	0.067*	0.089*	0.027**	0.039**
	0.091	0.025	0.020	0.040	0.034
Salary	0.305	0.166	-0.017	-0.015	-0.010
	0.002***	0.058	0.438	0.444	0.464
	0.093	0.028	0.000	0.000	0.000
Benefits					0.615 0.001*** 0.378
Panel D: Bachelor Degree Granting					
	Full	Associate	Assistant	Instructor	Average
Sal and Benefits	0.527	0.493	0.360	0.340	0.360
	0.000***	0.000***	0.006***	0.009***	0.006***
	0.277	0.243	0.130	0.116	0.130
Salary	0.600	0.480	0.268	0.200	-0.028
	0.001***	0.000***	0.033**	0.081*	0.421
	0.360	0.230	0.072	0.040	0.001
Benefits					0.524 0.000 0.275

*This table shows the results of the Kendall's Tau test for rank correlation. The first figure in each cell is the correlation. The second figure in each cell is the significance. The third figure in each cell is the coefficient of determination. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively. The number of observations in the sample for the full, doctorate, master and bachelor degree samples are 51, 50, 44 and 25 respectively.*

more or less faculty, the averages computed here may be a biased representation of the salary earned by the average professor within a state. Further research is needed to assess the impact of different weighting schemes on the rankings. Another limitation of the analysis is that different academic fields have different academic salary levels. For example, business professors are traditionally higher paid while humanities professors are generally paid substantially less. To the extent that different schools have different program mixes, it would not be surprising that salaries differ across universities and states. Finally, the data here is aggregated by state. An individual university might be quite different than state average data. Future research might address these limitations.

REFERENCES

- Alexander, F.K. (2001) "The Silent Crisis: The Relative Fiscal Capacity of Public Universities to Compete for Faculty," *The Review of Higher Education*, vol. 24(2), p. 113-129.
- Bell, L. (2000) "More Good News, So Why the Blues?" *Academe*, vol. 86(March/April), p. 1-4.
- Boothe, Viva (1933) *Salaries and the Cost of Living in Twenty-Seven State Universities and Colleges, 1913-1932*, Ohio State University Press, Columbus, OH.
- Ehrenbert, R.G. (2003) "Studying Ourselves: The Academic Labor Market, Presidential Address to the Society of Labor Economists, Baltimore, May 3, 2002," *Journal of Labor Economics*. vol. 21(2), p. 267-287.
- Fournier, G.M. and D.W. Rasmussen (1986) "Salaries in Public Education: The Impact of Geographic Cost-of Living Differentials," *Public Finance Review*, Vol. 14(2), p. 179-198
- Hammermesh, D.S. (2002) "Quite Good—For Now," *Academe*, vol. 88(March/April), p. 20-42.
- Jalbert, T., M. Jalbert, and K. Hayashi (2010) "University Rankings by Cost of Living Adjusted Faculty Compensation," *International Journal of Management and Marketing Research*, vol. 3(2) Forthcoming
- Jalbert, T., M. Jalbert and K. Hayashi (2010b) "Community College Rankings by Cost of Living Adjusted Faculty Compensation," *Working Paper*
- Jalbert, T. and J. Mason (2007) "Locality Ranking Systems: Methodological Considerations and Evidence from State Rankings" *Academy of Accounting and Financial Studies Journal*, vol. 11(1) p. 47-64.
- Kendall, M. (1938) "A New Measure of Rank Correlation", *Biometrika*, vol. 30, p. 81-89.
- Marsh, H.W. and K.E. Dillon (1980) "Academic Productivity and Faculty Supplemental Income," *Journal of Higher Education* vol. 51(5), p. 546-555.
- National Education Association (2009) "Advocate Salary Review" *NEA Higher Education Advocate*, vol. 26 (4, Special Salary Issue). p. 9-44.
- Ong, L.L. and J.D. Mitchel (2000) "Professors and Hamburgers: An International Comparison of Real Academic Salaries," *Applied Economics*, vol. 32, p. 869-876.
- Realestate.yahoo.com Neighborhood Info Section accessed at:
<http://realestate.yahoo.com/neighborhoods>. Accessed on June 4-7, 2009.
- Stoddard, C. (2004) "Adjusting teacher salaries for the cost of living: the effect on salary comparisons and policy conclusions," *Economics of Education Review*, vol. 24, p. 323-339
- Wilcoxon, F. (1945). Individual comparisons by ranking methods. *Biometrics*, 1, 80-83
- Winakor A.H. (1943) "The Faculty Dollar: Cost of Living for Faculty Members in State Universities," *The Journal of Higher Education*, vol. 14(8, Nov.) p. 421-425.

Zeglen M.E. and G. Tesfagiorgis (1993) “Cost of Living and Taxation Adjustments in Salary Comparisons,” *Paper Presented at the Thirty-Third Annual Forum of the Association for Institutional Research May 16-19, The Chicago Marriott, Chicago, IL.* p. 1-22.

Zoghi C. (2003) “Why have Public University Professors Done So Badly?” *Economics of Education Review*, vol. 22(February), p. 45-57.

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