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The Effect of Information Disclosure on Corporate Performance

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Abstract: This study investigates the relation between the Information Disclosure and Transparency Rankings System (IDTRS) and corporate performance measures. If the implementation of and the evaluation results of this system are correlated with corporate performance, then investors will pay more attention to the results which in turn force companies to provide more comprehensive information according to the evaluation criteria. The authors hypothesized that the implementation of the IDTRS can improve corporate performance and that firms experience better corporate performance after the ranking scheme was revised in 2005. Furthermore, the authors analyzed the impact of information disclosure rankings on corporate performance in different ranking schemes and investigate the relationship between changes in disclosure rankings and corporate performance. The empirical findings of the study indicate that corporate performance can be significantly improved by the ranking system and that the level of information disclosure is positively related to corporate performance. Comparing firms with a transparency ranking downgrade, authors showed that firms with a ranking upgrade tend to exhibit a significant increase in their corporate performance.

Key words: Information disclosure, transparency, corporate performance

INTRODUCTION

It is difficult for investors to probe managers' motivations and methods behind abusive earnings management, especially for firms in Taiwan (Leuz *et al.*, 2003)¹ which mainly arises because of information asymmetry between managers and shareholders. Prior studies indicate that the abuse of earnings management hurt firm performance and can even produce a reduction in shareholder wealth. It is apparent that establishing an information disclosure system is essential for the healthy development of securities market.

To better protect the interests of investors, stock market authorities around the world are introducing laws and regulations to improve information disclosure and transparency, in order to protect the interests of investors. Likewise, the government in Taiwan announced

the Corporate Governance Best-Practice Principles (CGBPP) in 2002 and initiated the Information Disclosure and Transparency Rankings System (IDTRS) in 2003 to strengthen corporate governance practices. Specifically, the level of corporate transparency and information disclosure for all listed companies in Taiwan are to be evaluated and ranked by the IDTRS annually. With the implementation of the IDTRS, it is widely believed that the information asymmetry in the market can be effectively reduced and firm's earnings management practices are less likely to escape investors' scrutiny. It is thus interesting to examine whether firms in the post-IDTRS period are more likely to experience better corporate performance than those in the pre-IDTRS period.

It should be noted that, in the first two years of implementing the IDTRS (i.e., 2003 and 2004), firms are grouped into only two categories, namely less transparent

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¹Leuz *et al.* (2003) examine the earnings management across 31 countries and document that Taiwan is ranked the sixth highest country by an earnings management score. This implies that earnings management in Taiwan is more severe than most of the countries examined.

or more transparent. In the 2005-2010 period, the ranking scheme is expanded to five categories that is, A⁺, A, B, C and C⁻. The change of ranking scheme from two levels to five levels provides a testable setting of whether this refinement enhances the information disclosure and exerts an effect on firm's corporate performance. This study postulates that by that assigning an adequate number of rankings can enable firms, investors and regulators to better assess the actual level of transparency for all listed companies in Taiwan and that may force firms to pay more attention to information disclosure which should limit earnings management and improve corporate performance. More concisely, this study expects that firms are more likely to improve corporate performance when more detailed ranking scheme is put in place.

The next investigation is motivated in part by the observation that the extant empirical literature (Chi, 2009; Chang *et al.*, 2013; Jiao, 2011; Lin *et al.*, 2007; Lai *et al.*, 2012) on information disclosure and transparency reclassifies the ranking results of the IDTRS into only two groups that is, more and less transparent. For studies that cover the period of 2005-2010, they simply treat companies with A⁺ and A rankings as more transparent and the rest as less transparent. However, valuable information about the disclosure rankings may be lost due to this arbitrary grouping. This study, therefore, examines the effect of information disclosure using all rankings assigned by INTRS. The extant of literature suggests that the higher the information transparency, the lower the information asymmetry. Lower information asymmetry enables external users of accounting information to detect earnings management activities which limits the abilities of managers to manipulate earnings and thus forces managers to fully focus on their primary business. Therefore, this study hypothesizes that the exclusive information disclosure ranking of different ranking schemes is positively associated with corporate performance.

Furthermore, this study is among the first to analyze corporate performance as a function of changes in disclosure rankings and firm-specific characteristics. More specifically, this study argues that, compared to those receiving a information disclosure ranking downgrade, firms with an upgraded ranking exhibit a significant increase in their corporate performance.

The contribution of this study is third-fold. First, this study contributes to the currently rather sparse literature on whether assigning an adequate number of rankings encourages firms to improve corporate performance, because this adequate reclassification then forces firms to

pay more attention to information disclosure which should limit earnings management and cause positive market reactions and accounting performance. The empirical results indicate that firms have better corporate performance under the five-ranking scheme than under the two-ranking scheme. Second, to reduce probable conflicts resulting from different reclassification schemes, this study considers all ranking levels based on the evaluation results. The empirical results indicate that the level of information disclosure in different ranking schemes is positively related to corporate performance.

Third, this is the first study that examines the association between changes in disclosure rankings and corporate performance by classifying changes in disclosure rankings into three groups, including upgraded, unchanged and downgraded. The findings suggest that firms that are given an upgraded ranking are more likely to have better corporate performance than those that are given a downgraded ranking.

Literature review and hypotheses development: The literature has shown that more disclosures provide investors, companies and the economy with a lot of benefits, including the reduction of agency cost (Leftwich *et al.*, 1981; Welker, 1995), lower cost of capital (Botosan, 1997; Botosan and Plumlee, 2002; Diamond and Verrecchia, 1991; Lang and Lundholm, 1996; Schrand and Verrecchia, 2004), lower costs of debt (Sengupta, 1998), reduced bid-ask equity spreads (Leuz and Verrecchia, 2000; Healy *et al.*, 1999), higher stock market liquidity (Welker, 1995), lower variations in stock prices (Singhvi and Desai, 1971) and higher stock returns (Gelb and Zarowin, 2002; Healy *et al.*, 1999; Lang and Lundholm 2000; Lundholm and Myers, 2002). For example, Welker (1995) finds that a well-regarded disclosure policy reduces information asymmetry and hence increases liquidity in equity markets. Singhvi and Desai (1971) argue that adequate disclosure of information minimizes ignorance on the stock market and as a result, the variations in stock prices of securities will narrow down. However, providing information to the public is not a costless task (McKinnon, 1984; Chow, 1984; Elliott and Jacobson, 1994). Elliott and Jacobsen (1994) suggest that the cost of developing and presenting disclosure is the total cost of gathering, processing, auditing and presenting information which affect cash flows. Thus, it is essential to perform a cost-benefit analysis before deciding to provide more information to the public, although detailed estimation of all costs and benefits is difficult (Healy and Palepu, 1993; Botosan, 1997). This

means that the effectiveness of providing more information to the public for each firm should be different. While these papers make major contributes to the existing body of corporate performance, their analyses do not investigate whether a change in the classification of rankings is effective in increasing corporate performance. Therefore, this study proposes the following two hypotheses:

- H1:** The implementation of the IDTRS increases corporate performance
- H2:** An adequate classification of rankings increases corporate performance

Firms with higher transparency have better corporate performance (Amir and Lev, 1996; Ball and Brown, 1968; Bushee and Noe, 2000; Chi, 2009; Eng and Mak, 2003; Healy *et al.*, 1999; Jiao, 2011; Ho and Wong, 2001; Patel *et al.*, 2002). Ho and Wong (2001) document that by disclosing more information in corporate annual reports, managers' opportunistic behaviors and information asymmetry are likely to be reduced, resulting in an improvement in management performance and a lower cost of getting private information for investors. Eng and Mak (2003) show that the financial information is highly correlated with firm value and stock price. Bushee and Noe (2000) examine the relationship between the information disclosure and the institutional investors and find that firms with higher disclosure levels have greater institutional ownership. Namely, the institutional investors prefer the firms with higher transparency to those with lower transparency. Patel *et al.* (2002) measure transparency and disclosure at firm-level in emerging markets and find a positive relationship between the information disclosure rankings and both stock prices and price-to-book ratios, implying that investors prefer firms with higher transparency. Using data from publicly listed companies in Taiwan, Chi (2009) finds that firm performance is positively associated with the quality of information disclosure, indicating that good information disclosure is one of the most important mechanisms to enhancing corporate governance leading to good corporate performance.

Additionally, Jiao (2011) proposes that three types of hypotheses, such as the information transmission (contagion) hypothesis, the hyping hypothesis and the rating bias hypothesis, posit positive relationships between disclosure quality and stock returns and market value. The information transmission (contagion) hypothesis argues that in order to reduce stock

under valuation and short-run market pressures, managers with favorable private information about future earnings are particularly motivated to improve disclosure quality when firms' disclosures contain information about their future operating performance and high-quality disclosures facilitate the communication of such information to investors. The hyping hypothesis proposes that managers make an effort to create an illusion of high disclosure quality to mislead investors and hype their stocks, particularly when their compensation is tied to stock performance. The rating bias hypothesis emphasizes the difficulties in accurately measuring disclosure quality. Under this hypothesis, one may subconsciously assign high rankings to firms with strong current performance or potentially higher future performance even if the disclosures themselves contain no information about future earnings. In sum, these hypotheses imply that disclosure rankings are positively associated with current operating performance.

The above studies indicate that information disclosure plays a significant role in corporate performance and proposes the third hypothesis as follows:

- H3:** A greater level of information disclosure leads to higher corporate performance

Further, few studies have focused on discussing corporate performance associated with the changes in information disclosure rankings. Jiao (2011) find a positive relationship between disclosure rankings and both stock returns and corporate value. Furthermore, the author documents a positive correlation between changes in disclosure rankings and future earnings surprises. Lai *et al.* (2012) suggest that through reducing information asymmetry, increased disclosure level induces managers to act in the best interest of shareholders which improves capital investment efficiency. This indicates that corporate performance should differ when the information transparency rankings are changed. Accordingly, this study intends to fill the gap in the current literature and, specifies the fourth hypothesis:

- H4:** Firms with a ranking upgrade are likely to experience better corporate performance than firms with a ranking downgrade

MATERIALS AND METHODS

Sample selection and data sources: The sample used in this study which includes 8,039 firm-year observations

from 797 non-financial firms over a 14-year period (from 1997-2010), is drawn from firms listed on the Taiwan Stock Exchange (TSE) and the Over-The-Counter (OTC) market. All variables used in this study are collected from the Taiwan Economic Journal (TEJ) database and are selected based on the following criteria:

- This study eliminates firms in the financial, insurance and security industries, because of the unique nature of their regulations and requirements (Biddle *et al.*, 2009; Chang *et al.*, 2013), as well as firms with unusual conditions, such as those with changes in how they are traded, ceasing to trade, being delisted from the market, having owners who are sued for fraud or receiving going concern opinions from auditors, as well as firms that suffer from other major disputes and deficiencies
- Observations containing missing data are removed from the sample
- Since, information disclosure rankings vary over time, it is essential to capture the dynamics after the implementation of IDTRS in 2003. This study therefore constructs a balanced panel data set

Measurement and model specifications

Corporate performance: The literature suggests that both accounting-based and market-based measures are widely accepted as valid indicators of firm financial performance. For accounting-based measures of profitability, previous studies (e.g., Kotabe *et al.*, 2002; Ruigrok and Wagner, 2003) use annual Return On Assets (ROA) and annual Return On Equity (ROE) to measure accounting performance. This study chooses to focus on the pre-tax return on equity and the pre-tax return on total assets in order to smooth tax differences across firms. For stock market-based measures, consistent with previous studies, this study employs Tobin's Q (Combs *et al.*, 2006; Hoskisson *et al.*, 1999; Hult *et al.*, 2008; Sun *et al.*, 2002) and stock returns (Bailey *et al.*, 2006; Healy *et al.*, 1999; Lundholm and Myers, 2002; Shin, 2003) as the two profitability indicators. Following Warner *et al.* (1988), this study employs the market-adjusted stock return (Ab_SR) estimated as the stock return minus the market index returns.

Measurement of information disclosure level: This study's measure of a firm's information disclosure level is based on the ranking it receives from the IDTRS. Since, the ranking measure is not continuous, dummy variables are used to explore disclosure-related issues. More

specifically, for the 2003-2004 sub-sample period, since the IDTRS assigned only two ranking levels (more/less transparent), the dummy variable LEVEL equals 1 if a firm is ranked as more transparent and 0 otherwise. For the 2005-2010 sub-sample period, when the ranking scheme was expanded to five levels (A⁺/A/B/C/C⁻), firms with the C⁻ ranking are treated as the base group and let dummy variables LEVEL_2, LEVEL_3, LEVEL_4, LEVEL_5 to have a value of 1 if the firm receives a ranking level of C, B, A and A⁺, respectively and 0 otherwise.

To analyze the effect of information disclosure ranking changes, firms receiving a ranking downgrade during the full sample period (2003-2010) are treated as the base group and let dummy variable LEVEL_equal be 1 if a firm's ranking is unchanged and LEVEL_up be 1 if a firm's ranking is upgraded and 0 otherwise.

Control variables: Both Dechow *et al.* (1998) and McNichols (2000) document that a firm's profits and growth ability will affect their earnings management practices. Core (2001) argues that for firms with high growth opportunities, there is a low quality of mandated disclosure and a high level of information asymmetry. The existing literature suggests that agency problems may be exacerbated or mitigated for firms with high levels of insider ownership while the interest-alignment hypothesis suggests that insider ownership aligns the interests of shareholders and managers and leads to less earnings management (Jensen and Murphy, 1990; Walkling and Long, 1984; Warfield *et al.*, 1995). In contrast, Morck *et al.* (1988) suggest that high levels of managerial ownership could introduce an entrenchment effect in which managers has less fear of being removed, since they can use their ownership to resist takeover threats, implying that earnings management is associated with the expropriation of minority shareholder wealth, particularly in firms with high levels of managerial ownership. Researchers also find that managers are likely to provide more voluntary disclosures when their compensation is tied to stock performance (Core, 2001; Nagar *et al.*, 2003; Makhija and Patton, 2004). Firm growth (GROW) and insider holdings (INSIDERS) are thus included as the control variables of disclosure levels. In addition, several studies suggest that firms with larger board size (B_SIZE) tend to have higher degrees of disclosure (Dalton *et al.*, 1999; Certo *et al.*, 2001). Both Yermack (1996) and Anderson *et al.* (2004) implicitly assume that board size impacts transparency but do not explore the issue directly. Huang and Shiu (2009) document that foreign institutions (F_L_H) may focus their investments in more

transparent firms to minimize their information disadvantage, because such firms release prompt and accurate disclosures. As suggested by Chen *et al.* (2008), this study controls for the potential effects of earnings management, including debt ratio (LEV), firm size (LA), CEO duality (DUAL), number of employees (LE) and firm profitability (EBEI).

Model specification: The first hypothesis is to examine whether the implementation of the IDTRS improved corporate performance. To test this, the years 1997-2002 are defined as those before the implementation of the system while 2003-2010 are the years after its implementation and the resulting the regression Eq. 1 with fixed effects for panel data is as follows:

$$CP_t = a_1 + b_1 IDTRS_t + c_1 LEV_t + d_1 LA_t + e_1 GROW_t + f_1 DUAL_t + g_1 INSIDERS_t + h_1 LE_t + i_1 B_SIZE_t + j_1 F_L_H_t + k_1 EBEI_t + \Sigma_1 YEAR + \epsilon_1 \quad (1)$$

Where:

- CP_t = Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t
- IDTRS_t = Dummy variable to indicate firm-year observations after the implementation of IDTRS, IDTRS = 1 if the sample firm year is after the implementation of the system and 0 otherwise
- LEV_t = Firm's debt for year t, scaled by assets
- LA_t = Logarithm of total assets
- GROW_t = Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets
- DUAL_t = Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise
- INSIDERS_t = Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t
- LE_t = Logarithm of total number of employees for year t
- B_SIZE_t = Total number of directors and supervisory representatives on the board of directors for year t
- F_L_H_t = The combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t

EBEI_t = Earnings before extraordinary items divided by net sales for year t

To test the second hypothesis that an adequate classification of rankings can improve corporate performance, the variable IDTRS in regression Eq. 1 is replaced by the dummy variable LEVEL_D and the sample period 2003-2010 is used for estimation. That is, the hypothesis H2 is tested with the following regression Eq. 2:

$$CP_t = a_2 + b_2 LEVEL_D_t + c_2 LEV_t + d_2 LA_t + e_2 GROW_t + f_2 DUAL_t + g_2 INSIDERS_t + h_2 LE_t + i_2 B_SIZE_t + j_2 F_L_H_t + k_2 EBEI_t + \Sigma_2 YEAR + \epsilon_2 \quad (2)$$

where, LEVEL_D is a dummy variable and has a value of 1 if the sample firm is under the five-ranking scheme (i.e., during 2005-2010) and 0 if the sample firm is under the two-ranking scheme during 2003 and 2004.

To test hypothesis H3 that a greater level of information disclosure leads to higher corporate performance, this study replaces the variable IDTRS in regression Eq. 1 with different dummy variables and uses two subsample periods, 2003-2004 and 2005-2010, for estimation, respectively. Specifically, for the period 2003-2004 the dummy variable LEVEL is included and the following regression Eq. 3 is estimated:

$$CP_t = a_3 + b_3 LEVEL_t + c_3 LEV_t + d_3 LA_t + e_3 GROW_t + f_3 DUAL_t + g_3 INSIDERS_t + h_3 LE_t + i_3 B_SIZE_t + j_3 F_L_H_t + k_3 EBEI_t + \Sigma_3 YEAR + \epsilon_3 \quad (3)$$

where, LEVEL_t is an indicator of the information disclosure level during 2003-2004, with LEVEL=1 if a firm was ranked as more transparent, 0 otherwise. For the period from 2005 to 2010, with the ranking scheme expanded into five levels, this study includes the dummy variables LEVEL_2, LEVEL_3, LEVEL_4 and LEVEL_5 to estimate regression Eq. 4 as follows:

$$CP_t = a_4 + b_4 LEVEL_2_t + c_4 LEVEL_3_t + d_4 LEVEL_4_t + e_4 LEVEL_5_t + f_4 LEV_t + g_4 LA_t + h_4 GROW_t + i_4 DUAL_t + j_4 INSIDERS_t + k_4 LE_t + l_4 B_SIZE_t + m_4 F_L_H_t + n_4 EBEI_t + \Sigma_4 YEAR + \epsilon_4 \quad (4)$$

Where:

- LEVEL_2_t = 1 if the firm's ranking is C and 0 otherwise
- LEVEL_3_t = 1 if the firm's ranking is B and 0 otherwise
- LEVEL_4_t = 1 if the firm's ranking is A and 0 otherwise
- LEVEL_5_t = 1 if the firm's ranking is A⁺ and 0 otherwise

Finally, to examine whether firms with ranking upgrades are likely to experience better corporate performance than those receiving downgrades, the variable IDTRS in regression Eq. 1 is replaced with two dummy variables, LEVEL_Equal and LEVEL_Up and the regression Eq. 5 is estimated as follows:

$$CP_t = a_5 + b_5 LEVEL_Equal_t + c_5 LEVEL_Up_t + d_5 LEV_t + e_5 LA_t + f_5 GROW_t + g_5 DUAL_t + h_5 INSIDERS_t + i_5 LE_t + j_5 B_SIZE_t + k_5 F_L_H_t + l_5 EBEL_t + \sum m_5 YEAR + \epsilon_5 \quad (5)$$

Where:

- LEVEL_Equal = Dummy variable for changes in disclosure rankings, 1 if a firm's ranking remains unchanged and 0 otherwise
- LEVEL_Up = Dummy variable for changes in disclosure rankings, 1 if a firm was given an upgraded ranking and 0 otherwise

EMPIRICAL RESULTS

Table 1 shows the industry distribution of the sample before and after the implementation of the IDTRS.

Because there are different ways of classifying the disclosure rankings after the implementation of the IDTRS, the sample distribution is presented based on its information level during different periods. All of the industries, except for the Electronic Parts (Components) industry, account for less than 10% of the sample firms. In 2005-2010, it is clear that the sample follows a normal distribution.

Table 2 reports the descriptive statistics for the corporate performance proxies and control variables for the sample firm-year observations used in this study. Panel A includes all the samples while Panel B includes the sample before the implementation of the IDTRS and Panels C and D include the sample after this. The mean/median corporate performance proxies are larger in Panels C and D than in Panel B. This supports the first hypothesis that the implementation of the IDTRS increases corporate performance. The mean/median Ab_SR and Tobin_Q are larger in Panels D than in Panel C, consistent with H2 while those of ROA and ROE are lower in Panels D than in Panel C, inconsistent with H2.

The test for multicollinearity should be done before all the regressions are estimated. Table 3 presents the Pearson correlation coefficients of the variables employed in the subsequent OLS regression analysis for

Table 1: Industry distribution of disclosure rankings in different sample periods. (T4 = T1+T2+T3)

Industry (TSEC industry code)	1997-2002			2003-2004			2005-2010			1997-2010	
	T1	Less	More	T2	C ⁻	C	B	A	A ⁺	T3	T4 (%)
Cement	24	8	2	10	1	11	9	15	0	36	70 (0.87)
Food	83	28	14	42	6	30	55	32	3	126	251 (3.12)
Plastics	96	23	22	45	3	20	71	53	2	149	290 (3.61)
Textiles	154	66	16	82	14	80	123	33	5	255	491 (6.11)
Electric machinery	104	62	18	80	7	69	130	50	0	256	440 (5.47)
Electrical and cable	32	14	2	16	1	13	26	8	0	48	96 (1.19)
Glass and ceramic	20	6	2	8	1	3	14	6	0	24	52 (0.65)
Paper and pulp	34	11	3	14	2	7	25	8	0	42	90 (1.12)
Iron and steel	99	42	14	56	14	40	64	41	9	168	323 (4.02)
Rubber	35	10	6	16	1	12	30	9	2	54	105 (1.31)
Automobile	18	4	4	8	0	3	12	15	0	30	56 (0.7)
Building material and construction	100	56	9	66	6	45	107	37	1	196	361 (4.49)
Shipping and transportation	25	9	7	16	1	10	6	25	0	42	83 (1.03)
Tourism	19	12	1	13	1	19	14	8	0	42	74 (0.92)
Trading and consumers' goods	30	14	6	20	3	14	31	18	0	66	116 (1.44)
Other	88	54	14	68	2	46	122	44	4	218	374 (4.65)
Chemical	87	42	15	57	5	31	98	54	1	189	333 (4.14)
Biotechnology and medical care	35	29	11	40	3	30	83	39	9	164	239 (2.97)
Oil, gas and electricity	24	13	2	15	1	23	21	12	0	57	96 (1.19)
Semiconductor	120	63	48	111	1	23	249	106	4	383	614 (7.64)
Computer and peripheral equipment	153	78	50	128	5	66	220	137	2	430	711 (8.85)
Optoelectronic	73	61	27	88	2	53	180	57	0	292	453 (5.64)
Communications and internet	64	58	23	81	5	45	148	54	18	270	415 (5.16)
Electronic parts and components	151	111	54	165	1	58	350	149	9	567	883 (10.99)
Electronic products distribution	36	30	17	47	0	23	96	49	0	168	251 (3.12)
Information service	33	32	19	51	1	25	79	48	3	156	240 (2.99)
Other electronic	108	63	33	96	4	49	197	72	5	327	531 (6.61)
Total	1,845	999	439	1,439	91	848	2,560	1,179	77	4,755	8,039 (100.00)

Table 2: Descriptive statistics of the variables in different sample periods

Variable	N	Mean	SD	Min	Q1	Median	Q3	Max
Panel A (full sample, during 1997-2010)								
ROA	8039	0.045	0.061	-0.351	0.012	0.041	0.076	0.795
ROE	8039	0.063	0.098	-1.003	0.011	0.058	0.117	0.823
Ab_SR	8039	0.026	0.203	-0.566	-0.103	-0.001	0.120	1.853
Tobin_Q	8039	1.351	0.849	0.260	0.883	1.122	1.537	15.954
LEV	8039	0.370	0.153	0.013	0.255	0.368	0.477	0.896
LA	8039	29.118	1.289	25.957	28.218	28.938	29.818	34.706
GROW	8039	0.393	0.564	-0.358	0.309	0.356	0.408	35.535
DUAL	8039	0.311	0.463	0.000	0.000	0.000	1.000	1.000
INSIDERS	8039	0.458	0.208	0.022	0.310	0.424	0.562	1.907
LE	8039	5.875	1.209	1.609	5.069	5.808	6.597	10.355
B_SIZE	8039	9.573	2.910	3.000	8.000	9.000	10.000	30.000
F_L_H	8039	0.068	0.114	0.000	0.001	0.017	0.077	0.740
EBEI	8039	0.049	0.724	-33.597	0.010	0.055	0.119	33.943
Panel B (subsample before implementation of the IDTRS, during 1997-2002)								
ROA	1845	0.038	0.055	-0.213	0.008	0.033	0.066	0.383
ROE	1845	0.042	0.100	-1.003	-0.002	0.039	0.091	0.531
Ab_SR	1845	0.006	0.202	-0.566	-0.133	-0.015	0.121	1.161
Tobin_Q	1845	1.258	0.755	0.260	0.804	1.032	1.439	8.137
LEV	1845	0.388	0.147	0.035	0.281	0.385	0.487	0.896
LA	1845	29.283	1.233	26.487	28.446	29.122	29.945	33.775
GROW	1845	0.408	0.883	-0.312	0.309	0.354	0.408	35.535
DUAL	1845	0.287	0.452	0.000	0.000	0.000	1.000	1.000
INSIDERS	1845	0.469	0.235	0.022	0.307	0.425	0.587	1.907
LE	1845	6.142	1.163	2.708	5.366	6.057	6.859	10.355
B_SIZE	1845	9.796	3.906	3.000	7.000	9.000	11.000	30.000
F_L_H	1845	0.050	0.093	0.000	0.000	0.010	0.052	0.712
EBEI	1845	0.022	0.243	-4.667	-0.005	0.044	0.099	0.998
Panel C (subsample after implementation of the IDTRS, during 2003-2004)								
ROA	1439	0.050	0.064	-0.254	0.014	0.045	0.084	0.363
ROE	1439	0.077	0.104	-0.499	0.018	0.070	0.139	0.494
Ab_SR	1439	0.012	0.190	-0.499	-0.108	-0.003	0.105	1.191
Tobin_Q	1439	1.259	0.724	0.398	0.877	1.078	1.410	14.551
LEV	1439	0.401	0.148	0.021	0.297	0.408	0.504	0.872
LA	1439	28.952	1.252	26.026	28.070	28.767	29.636	33.820
GROW	1439	0.425	0.666	0.000	0.328	0.371	0.421	22.682
DUAL	1439	0.318	0.466	0.000	0.000	0.000	1.000	1.000
INSIDERS	1439	0.491	0.220	0.040	0.331	0.457	0.600	1.580
LE	1439	5.819	1.171	1.609	5.063	5.702	6.529	10.277
B_SIZE	1439	9.566	2.848	4.000	8.000	9.000	10.000	29.000
F_L_H	1439	0.058	0.102	0.000	0.000	0.011	0.066	0.649
EBEI	1439	0.061	0.185	-2.919	0.016	0.062	0.126	2.165
LEVEL	1439	1.305	0.461	1.000	1.000	1.000	2.000	2.000
Panel D (subsample after implementation of the IDTRS, during 2005-2010)								
ROA	4755	0.046	0.062	-0.351	0.014	0.043	0.078	0.795
ROE	4755	0.066	0.094	-0.649	0.015	0.063	0.120	0.823
Ab_SR	4755	0.037	0.207	-0.535	-0.092	0.005	0.123	1.853
Tobin_Q	4755	1.415	0.910	0.365	0.918	1.171	1.600	15.954
LEV	4755	0.353	0.154	0.013	0.235	0.350	0.462	0.861
LA	4755	29.104	1.314	25.957	28.188	28.915	29.811	34.706
GROW	4755	0.378	0.318	-0.358	0.302	0.353	0.403	14.051
DUAL	4755	0.318	0.466	0.000	0.000	0.000	1.000	1.000
INSIDERS	4755	0.443	0.191	0.067	0.305	0.414	0.541	1.579
LE	4755	5.788	1.223	2.079	4.942	5.717	6.507	10.307
B_SIZE	4755	9.489	2.433	5.000	8.000	9.000	10.000	26.000
F_L_H	4755	0.078	0.124	0.000	0.002	0.024	0.091	0.740
EBEI	4755	0.056	0.923	-33.597	0.013	0.058	0.126	33.943
LEVEL	4755	3.064	0.751	1.000	3.000	3.000	4.000	5.000

nonfinancial firms. Panel A consists of 8,039 firm-year observations for the full sample period of 1997-2010. To provide further insights on the effects of the IDTRS, the overall sample after the IDTRS was split into two sub-samples of n=1,439 for the period 2003-2004 in

Panel B and n=4,755 for the period 2005-2010 in Panel C. Although, many of the variables are significantly correlated with each other, the magnitude of most of the correlations (absolute value<0.30) does not indicate problems of multicollinearity. This provides some

Table 3: Pearson correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel A (full sample, during 1997-2010)													
(1) ROA	1												
(2) ROE	0.944***	1											
(3) Ab_SR	0.260***	0.272***	1										
(4) Tobin_Q	0.564***	0.501***	0.261***	1									
(5) LEV	-0.135***	-0.038***	-0.038***	-0.150***	1								
(6) LA	0.102***	0.110***	0.014	0.005	0.173***	1							
(7) GROW	0.016	0.025**	-0.000	0.024**	0.024**	0.016	1						
(8) DUAL	-0.005	-0.006	-0.014	0.023**	-0.031***	-0.131***	0.001	1					
(9) INSIDERS	0.077***	0.081***	0.020*	0.039***	0.009	-0.094***	0.004	-0.064***	1				
(10) LE	0.110***	0.098***	0.025**	0.057***	0.084***	0.717***	-0.058***	-0.117***	-0.085***	1			
(11) B_SIZE	0.022**	0.013	0.020*	-0.007	-0.041***	0.288***	-0.024**	-0.157***	0.041***	0.275***	1		
(12) F_L_H	0.199***	0.191***	0.041***	0.194***	-0.070***	0.440***	-0.022**	-0.047***	0.086***	0.368***	0.112***	1	
(13) EBBI	0.156***	0.141***	0.023**	0.068***	-0.022**	0.054***	0.010	0.012	0.010	0.055***	0.012	0.090***	1
Panel B (subsample after implementation of the IDTRS, during 2003-2004)													
(1) ROA	1												
(2) ROE	0.956***	1											
(3) Ab_SR	0.409***	0.438***	1										
(4) Tobin_Q	0.665***	0.594***	0.404***	1									
(5) LEV	-0.183***	-0.058**	0.022	-0.113***	1								
(6) LA	0.062**	0.065**	0.002	0.023	0.133***	1							
(7) GROW	-0.009	-0.000	0.026	0.020	0.026	0.001	1						
(8) DUAL	0.060**	0.063**	0.002	0.051*	-0.032	-0.145***	-0.031	1					
(9) INSIDERS	0.081***	0.089***	0.030	0.063**	-0.022	-0.063**	0.002	-0.054**	1				
(10) LE	0.084***	0.074***	0.044*	0.049*	0.052**	0.724***	-0.081***	-0.120***	-0.069***	1			
(11) B_SIZE	0.022	0.016	0.004	0.004	0.004	0.267***	-0.017	-0.190***	0.076***	0.261***	1		
(12) F_L_H	0.175***	0.160***	0.041	0.230***	-0.082***	0.355***	-0.030	-0.054**	0.142***	0.326***	0.127***	1	
(13) EBBI	0.440***	0.389***	0.090***	0.290***	-0.190***	0.111***	0.002	0.028	0.025	0.133***	0.060**	0.160***	1
(14) LEVEL	0.076***	0.066**	0.017	0.054**	0.005	0.211***	-0.028	0.000	-0.028	0.207***	0.081***	0.103***	0.063**
Panel C (subsample after implementation of the IDTRS, during 2005-2010)													
(1) ROA	1												
(2) ROE	0.952***	1											
(3) Ab_SR	0.215***	0.227***	1										
(4) Tobin_Q	0.514***	0.464***	0.224***	1									
(5) LEV	-0.094***	0.027*	-0.033**	-0.141***	1								
(6) LA	0.153***	0.178***	0.000	-0.011	0.176***	1							
(7) GROW	0.074***	0.096***	0.011	0.081***	0.095***	0.024*	1						
(8) DUAL	-0.029**	-0.029**	-0.014	0.016	-0.028*	-0.105***	-0.017	1					
(9) INSIDERS	0.039***	0.034**	-0.002	0.017	0.020	-0.108***	0.014	-0.076***	1				
(10) LE	0.137***	0.130***	0.031**	0.050***	0.092***	0.715***	-0.068***	-0.096***	-0.121***	1			
(11) B_SIZE	0.039***	0.023	0.009	0.012	-0.053***	0.295***	-0.023	-0.128***	0.029**	0.289***	1		
(12) F_L_H	0.217***	0.211***	0.015	0.177***	-0.042***	0.512***	-0.030**	-0.041***	0.061***	0.427***	0.145***	1	
(13) EBBI	0.138***	0.121***	0.015	0.047***	0.010	0.064***	0.002	0.017	0.005	0.054***	0.054***	0.092***	1
(14) LEVEL	0.118***	0.118***	0.055***	0.081***	-0.061***	0.251***	-0.033**	-0.026*	-0.020	0.235***	0.096***	0.191***	0.096***

Table 4: Sample period is from 1997-2010

OLS					
Dependent variable					
	ROA	ROE _t	Ab_SR	Tobin's Q	VIF
Regression					
Parameters	(1)	(2)	(3)	(4)	
IDTRS _t	0.005*** (0.001)	0.014*** (0.003)	0.030*** (0.006)	0.032** (0.014)	1.042
LEV _t	-0.303*** (0.020)	-0.482*** (0.038)	0.017 (0.075)	-1.350*** (0.175)	1.175
LA _t	0.222*** (0.009)	0.403*** (0.017)	-0.236*** (0.034)	1.091*** (0.080)	1.189
GROW _t	-0.000 (0.000)	-0.001 (0.001)	-0.003 (0.002)	0.006 (0.005)	2.115
DUAL _t	-0.003** (0.001)	-0.005* (0.002)	0.005 (0.005)	0.011 (0.013)	1.016
INSIDERS _t	-0.039* (0.021)	-0.035 (0.038)	0.125 (0.076)	-0.011 (0.177)	1.037
LE _t	0.000 (0.000)	0.002* (0.001)	-0.004* (0.002)	-0.051*** (0.005)	1.212
B_SIZE _t	0.003 (0.002)	0.007* (0.003)	0.023*** (0.007)	0.024 (0.018)	1.013
F_L_H _t	0.011 (0.006)	0.023* (0.012)	-0.045* (0.025)	-0.196*** (0.058)	1.187
EBE _t	-0.000 (0.000)	-0.000 (0.000)	-0.002 (0.001)	0.001 (0.004)	2.111
Adj-R ²	0.0744	0.0739	0.0125	0.0388	
F-value	65.64	65.11	11.16	33.44	
N	8039	8039	8039	8039	

CP_t = a₁+b₁IDTRS_t+c₁LEV_t+d₁LA_t+e₁GROW_t+f₁DUAL_t+g₁INSIDERS_t+h₁LE_t+i₁B_SIZE_t+j₁F_L_H_t+k₁EBE_t+ΣI YEAR+e₁. Standard errors are in parentheses. *, **, ***Significance at 10, 5 and 1% levels, respectively, CP_t: Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t, IDTRS_t: Dummy variable to indicate firm-year observations after the implementation of IDTRS, IDTRS: 1 if the sample firm year is after the implementation of the system and 0 otherwise, LEV_t: Firm's debt for year t, scaled by assets, LA_t: Logarithm of total assets, GROW_t: Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets, DUAL_t: Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise, INSIDERS_t: Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t, LE_t: Logarithm of total No. of employees for year t, B_SIZE_t: Total No. of directors and supervisory representatives on the board of directors for year t, F_L_H_t: Combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t, EBE_t: Earnings before extraordinary items divided by net sales for year t

assurance that the relationships found in subsequent tests are not spurious. It is worth noting that the correlation coefficients between corporate performance measures and the level of disclosure are larger in Panel D than in Panel C, supporting H2 and that there is a significantly positive relationship between these four measures and the level of disclosure which supports the third hypothesis.

In Table 4-8, this study explores the effect of the IDTRS on corporate performance and reports the empirical results of regression Eq. 1. In order to check multicollinearity, the Variance Inflation Factors (VIF) are calculated for each regressor in the regression model and when the largest VIF exceeds 10, the problem of multicollinearity is severe. As shown in Table 4, the results indicate that four proxies for corporate performance are positively and significantly associated with IDTRS which implies that the implementation of the IDTRS system is helpful for the improvement of corporate performance, even in the presence of the control variables, consistent with H1. The coefficients of LEV (LA) in regressions Eq. 1, 2 and 4 are significantly negative (positive). This implies that corporate performance is lower for firms with higher leverage ratios (Jensen and Meckling, 1976; Myers, 1977; Jandik and

Makhija, 2005) and higher for larger firms (Asimakopoulos *et al.*, 2009; Lee, 2009; Majumdar, 1997). In addition, the VIFs for these variables are all less than 4 and thus multicollinearity is not an issue when making inferences based on these results.

Table 5 shows the result for regression Eq. 2 consistent with hypothesis H2, the coefficients of LEVEL_D of regressions Eq. 3-4 are found to be significantly positive, indicating that corporate performance is higher under the five-ranking scheme than under the two-ranking one. This finding also means that assigning an appropriate number of rankings can effectively cause positive market reactions. However, the coefficients of LEVEL_D of regressions Eq. 1-2 are significantly negative which does not support H2.

For the third hypothesis, Table 6 and 7 examine the correlation between corporate performance and the level of information disclosure under different ranking schemes. In Table 6, the results for regression Eq. 3 show that the relationship between LEVEL and the proxies for corporate performance is not statistically significant, implying that under the two-scheme ranking, more transparent firms do not experience better corporate performance than less transparent ones which does not support H3.

Table 5: Sample period is from 2003-2010

OLS					
Dependent variable					
	ROA	ROE _t	Ab_SR	Tobin's Q	VIF
Regression					
Parameters	(1)	(2)	(3)	(4)	
Level_D	-0.006*** (0.002)	-0.011*** (0.003)	0.026*** (0.006)	0.063*** (0.016)	1.018
LEV _t	-0.345*** (0.024)	-0.518*** (0.046)	0.212*** (0.081)	-1.194*** (0.204)	1.225
LA _t	0.264*** (0.011)	0.439*** (0.021)	-0.341*** (0.037)	0.993*** (0.094)	1.238
GROW _t	-0.000 (0.000)	-0.001 (0.001)	-0.003 (0.002)	0.009 (0.005)	2.237
DUAL _t	-0.002 (0.001)	-0.003 (0.003)	0.008 (0.006)	-0.008 (0.015)	1.013
INSIDERS _t	-0.029 (0.026)	-0.039 (0.049)	0.044 (0.086)	-0.216 (0.216)	1.037
LE _t	-0.001** (0.000)	0.000 (0.001)	-0.004* (0.002)	-0.062*** (0.006)	1.219
B_SIZE _t	0.001 (0.002)	0.004 (0.005)	0.022** (0.008)	0.009 (0.022)	1.013
F_L_H _t	0.022*** (0.007)	0.033** (0.014)	-0.072*** (0.025)	-0.221*** (0.065)	1.209
EBEI _t	-0.000 (0.000)	-0.000 (0.001)	-0.002 (0.001)	0.002 (0.004)	2.232
Adj-R ²	0.0894	0.07	0.0205	0.0409	
F-value	61.81	47.62	13.93	27.42	
N	6194	6194	6194	6194	

CP_t = a₂+b₂Level_D+c₂LEV+d₂LA+e₂GROW+f₂DUAL+g₂INSIDERS+h₂LE+i₂B_SIZE+j₂F_L_H+k₂EBEI+l₂YEAR+e₂ Standard errors are in parentheses. *, **, ***Significance at 10, 5 and 1% levels, respectively, CP_t: Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t, LEVEL_D_t: Dummy variable, 1 if the sample firm is under the five-ranking scheme and 0 if the sample firm is under the two-ranking scheme, LEV_t: Firm's debt for year t, scaled by assets, LA_t: Logarithm of total assets, GROW_t: Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets, DUAL_t: Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise, INSIDERS_t: Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t, LE_t: Logarithm of total number of employees for year t, B_SIZE_t: Total No. of directors and supervisory representatives on the board of directors for year t, F_L_H_t: Combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t, EBEI_t: Earnings before extraordinary items divided by net sales for year t

Table 6: Sample period is from 2003-2004

OLS					
Dependent variable					
	ROA	ROE _t	Ab_SR	Tobin's Q	VIF
Regression					
Parameters	(1)	(2)	(3)	(4)	
LEVEL _t	0.001 (0.004)	-0.008 (0.007)	0.007 (0.012)	-0.002 (0.028)	1.055
LEV _t	0.030 (0.044)	0.054 (0.085)	0.218 (0.133)	1.285*** (0.304)	1.015
LA _t	0.151*** (0.024)	0.292*** (0.046)	0.047 (0.072)	1.046*** (0.165)	1.022
GROW _t	-0.000 (0.001)	-0.001 (0.002)	-0.001 (0.003)	0.001 (0.008)	1.629
DUAL _t	0.002 (0.004)	0.001 (0.007)	-0.017 (0.012)	0.019 (0.028)	1.031
INSIDERS _t	-0.025 (0.041)	-0.009 (0.080)	0.014 (0.126)	-0.642** (0.287)	1.022
LE _t	0.000 (0.001)	0.005 (0.003)	-0.011** (0.005)	-0.037*** (0.012)	1.173
B_SIZE _t	-0.004 (0.004)	-0.007 (0.009)	-0.027* (0.014)	-0.001 (0.032)	1.022
F_L_H _t	0.007 (0.022)	0.008 (0.042)	-0.027 (0.066)	-0.332** (0.151)	1.111
EBEI _t	0.001 (0.006)	0.008 (0.013)	-0.004 (0.020)	-0.019 (0.046)	1.635
Adj-R ²	0.026	0.0275	0.0033	0.0561	
F-value	4.4	4.61	1.42	8.57	
N	1439	1439	1439	1439	

CP_t = a₃+b₃LEVEL_t+c₃LEV_t+d₃LA_t+e₃GROW_t+f₃DUAL_t+g₃INSIDERS_t+h₃LE_t+i₃B_SIZE_t+j₃F_L_H_t+k₃EBEI_t+l₃YEAR+e₃. Standard errors are in parentheses. *, **, ***Significance at 10, 5 and 1% levels, respectively, CP_t: Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t, LEVEL_t: An indicator of the information disclosure level during 2003-2004, LEVEL_t: 1 if a firm was ranked as more transparent, 0 otherwise, LEV_t: Firm's debt for year t, scaled by assets, LA_t: Logarithm of total assets, GROW_t: Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets, DUAL_t: Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise, INSIDERS_t: Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t, LE_t: Logarithm of total number of employees for year t, B_SIZE_t: Total No. of directors and supervisory representatives on the board of directors for year t, F_L_H_t: Combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t, EBEI_t: Earnings before extraordinary items divided by net sales for year t

For the sample period 2005-2010, Table 7 presents the empirical results show that the coefficients of dummy variables in each regression seem to have a systematically increasing or upward trend. This means that compared to

Table 7: Sample period is from 2005-2010

OLS					
Dependent variable					
	ROA	ROE _t	Ab_SR	Tobin's Q	VIF
Regression					
Parameters	(1)	(2)	(3)	(4)	
LEVEL_2	0.012* (0.007)	0.020 (0.013)	0.125*** (0.030)	0.223*** (0.063)	8.486
LEVEL_3	0.010 (0.007)	0.014 (0.013)	0.116*** (0.029)	0.221*** (0.061)	13.488
LEVEL_4	0.017** (0.007)	0.025* (0.013)	0.116*** (0.030)	0.242*** (0.062)	10.625
LEVEL_5	0.033*** (0.010)	0.053*** (0.019)	0.161*** (0.044)	0.543*** (0.089)	1.863
LEV _t	-0.315*** (0.029)	-0.447*** (0.053)	0.470*** (0.120)	-1.021*** (0.246)	1.189
LA _t	0.242*** (0.013)	0.384*** (0.024)	-0.583*** (0.054)	0.842*** (0.110)	1.201
GROW _t	-0.000 (0.000)	-0.001 (0.001)	-0.002 (0.004)	0.016** (0.008)	2.571
DUAL _t	-0.003* (0.002)	-0.006 (0.003)	0.007 (0.008)	-0.011 (0.017)	1.013
INSIDERS _t	-0.046 (0.030)	-0.071 (0.056)	0.141 (0.127)	0.005 (0.260)	1.028
LE _t	-0.002** (0.000)	-0.000 (0.001)	-0.006 (0.003)	-0.070*** (0.007)	1.283
B_SIZE _t	0.002 (0.003)	0.002 (0.006)	0.022* (0.013)	0.004 (0.027)	1.009
F_L_H _t	0.015* (0.008)	0.026 (0.016)	-0.118*** (0.036)	-0.294*** (0.074)	1.248
EBEI _t	-0.000 (0.000)	-0.000 (0.001)	-0.001 (0.002)	0.005 (0.005)	2.568
Adj-R ²	0.0764	0.0568	0.0322	0.0426	
F-value	31.25	23.02	13.18	17.29	
N	4755	4755	4755	4755	

CP_t = a₀+b₁LEVEL_2_t+c₁LEVEL_3_t+d₁LEVEL_4_t+e₁LEVEL_5_t+f₁LEV_t+g₁LA_t+h₁GROW_t+i₁DUAL_t+j₁INSIDERS_t+k₁LE_t+l₁B_SIZE_t+m₁F_L_H_t+n₁EBEI_t+Σo₁YEAR+ε₁. Standard errors are in parentheses. ***, **, *Significance at 1, 5 and 10% levels, respectively, CP_t: Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t, LEVEL_2, 3, 4, and 5: An indicator of the information disclosure level, during 2005-2010, LEVEL_2, 3, 4 and 5: Takes on the value 1 whenever the level is C and 0 otherwise, B and 0 otherwise, A and 0 otherwise, A* and 0 otherwise, respectively. LEV_t: Firm's debt for year t, scaled by assets, LA_t: Logarithm of total assets, GROW_t: Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets, DUAL_t: Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise, INSIDERS_t: Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t, LE_t: Logarithm of total No. of employees for year t, B_SIZE_t: Total No. of directors and supervisory representatives on the board of directors for year t, F_L_H_t: Combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t, EBEI_t: Earnings before extraordinary items divided by net sales for year t

Table 8: Sample period is from 2003-2010

OLS					
Dependent variable					
	ROA	ROE _t	Ab_SR	Tobin's Q	VIF
Regression					
Parameters	(1)	(2)	(3)	(4)	
LEVEL_Equal	0.003 (0.002)	0.006 (0.005)	0.004 (0.008)	0.024 (0.023)	1.855
LEVEL_Up	0.009*** (0.003)	0.015** (0.006)	0.023** (0.010)	0.081*** (0.028)	1.853
LEV _t	-0.302*** (0.029)	-0.464*** (0.054)	0.043 (0.087)	-0.701*** (0.241)	1.186
LA _t	0.242*** (0.013)	0.387*** (0.024)	-0.283*** (0.039)	0.727*** (0.110)	1.197
GROW _t	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.002)	0.011 (0.006)	2.807
DUAL _t	-0.003 (0.002)	-0.005 (0.004)	0.007 (0.006)	-0.009 (0.017)	1.011
INSIDERS _t	-0.034 (0.032)	-0.065 (0.060)	-0.070 (0.097)	0.183 (0.270)	1.015
LE _t	-0.001* (0.000)	0.000 (0.001)	-0.002 (0.002)	-0.056*** (0.007)	1.244
B_SIZE _t	0.005 (0.003)	0.008 (0.006)	0.018* (0.009)	0.002 (0.027)	1.005
F_L_H _t	0.028*** (0.008)	0.050*** (0.016)	-0.030 (0.026)	-0.233*** (0.073)	1.229
EBEI _t	-0.000 (0.000)	-0.000 (0.001)	-0.001 (0.001)	0.004 (0.005)	2.802
Adj-R ²	0.0729	0.0564	0.0141	0.0295	
F-value	34.15	26.17	7.04	13.8	
N	4636	4636	4636	4636	

CP_t = a₀+b₁LEVEL_Equal_t+c₁LEVEL_Up_t+d₁LEV_t+e₁LA_t+f₁GROW_t+g₁DUAL_t+h₁INSIDERS_t+i₁LE_t+j₁B_SIZE_t+k₁F_L_H_t+l₁EBEI_t+Σm₁YEAR+ε₁. Standard errors are in parentheses ***, **, *Significance at 1, 5 and 10% levels, respectively, CP_t: Proxies for ROA, ROE, Tobin's Q and Ab_SR for year t, LEVEL_Equal: Dummy variable for changes in disclosure rankings, 1 if a firm's ranking remains unchanged and 0 otherwise, LEVEL_Up: Dummy variable for changes in disclosure rankings, 1 if a firm was given an upgraded ranking and 0 otherwise, LEV_t: Firm's debt for year t, scaled by assets, LA_t: Logarithm of total assets, GROW_t: Firm's sales growth for year t, measured by the change in sales deflated by beginning-of-quarter total assets, DUAL_t: Dummy variable for CEO duality; equal to 1 if the CEO is also the chairman of the board and 0 otherwise, INSIDERS_t: Shares held by insiders, measured by insiders' stockholdings divided by the total outstanding stocks for year t, LE_t: Logarithm of total No. of employees for year t, B_SIZE_t: Total No. of directors and supervisory representatives on the board of directors for year t, F_L_H_t: Combined holdings of foreign institutional investors which includes foreign financial institutions, foreign institutional investors and foreign trusts, for year t, EBEI_t: Earnings before extraordinary items divided by net sales for year t

firms with a grade of C⁻, firms with a higher ranking are more likely to experience better corporate performance, consistent with the third hypothesis. The difference in results between Table 6 and 7 implies that the five-ranking scheme is more helpful for stakeholders to adequately differentiate the actual level of transparency and then improve corporate performance, again supporting H2.

Moreover, in order to test the fourth hypothesis with regard to whether firms with a ranking upgrade are more likely to improve corporate performance than firms with a ranking downgrade, this study sorts firms into three groups, namely, upgraded, unchanged and downgraded, based on the assessments made by the IDTRS and the estimation results estimated are presented in Table 8. The results show that only the coefficient of LEVEL_Up is significantly positive, implying that firms with a ranking upgrade are likely to experience better corporate performance than those that are given a downgraded ranking, giving support to the fourth hypothesis.

CONCLUSION

This study examines the relationship between the IDTRS, introduced by the Taiwanese government in 2003 and corporate performance, hypothesizing that they are positively related. Further, it uses ratings published by the IDTRS to measure disclosure levels and ROA, ROE, Ab_SR and Tobin's Q to measure corporate performance. The results indicate that after the implementation of the IDTRS firms are more likely to experience better corporate performance than before it. In addition, this study suggests that assigning an adequate number of rankings is helpful for the improvement of corporate performance. The results also indicate that compared to firms with a grade of C⁻, those with a higher disclosure rating are more likely to experience better corporate performance. This result holds even after controlling for the effects of potential control variables. As for changes in disclosure rankings, firms with an upgraded ranking are more likely to experience better corporate performance than those with a downgraded ranking. The IDTRS has thus enhanced the quantity and quality of information disclosure by Taiwanese listed companies, both of which are instrumental in the improvement of corporate performance.

To the best of the authors' knowledge, this study is the first to examine the correlation between corporate performance and change in level of information disclosure under different ranking schemes, with each scheme having its own exclusive information disclosure ranking. The findings have significant implications for regulators, academics and investors, as follows.

For regulators, the top priority is to establish mechanisms (e.g., the IDTRS) to alleviate the abuse of both DA and RAM. Similar to prior research (Chen *et al.*, 2012; Lobo and Zhou, 2001), the results suggest that policy-making bodies should oblige firms to disclose more information and even set minimum disclosure requirements, by enacting more detailed regulations than those contained in the IDTRS, because these may play a significant role in restraining earnings management.

For academics, future researchers exploring the determinants of corporate performance could consider the role of different information disclosure rankings in different ranking scheme.

For investors, this study shows a positive relationship between both the level and the changes in the level of disclosure and corporate performance and suggests that the government should continue to enforce the IDTRS and even set minimum disclosure requirements for firms. This will help further reduce the information asymmetry between insiders and outsiders and increase investors' ability to assess and monitor managers' investment decisions. Lai *et al.* (2012) document that increased levels of disclosure can reduce information asymmetry which in turn improves capital investment efficiency and thus that investors can view firms with higher disclosure levels as having greater investment efficiency when assessing their value.

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