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Corporation financial performance and market reaction to ESOP: evidence from Taiwan

Abstract

This study examines whether companies in Taiwan have different financial performances when adopting employee stock ownership plans (ESOP). We also analyze the reactions of the stock returns when the board meeting announces to adopt employee stock ownership plans. The results indicate that the electronic and non- electronic industry have significant differences on ROE, profit margin and equity multiplier during the pre- and post-event periods. The non-electronic industry, however, has no significant difference during the pre- and post-event periods on total asset turnover rate. Antedating reactions toward the information are observed before the event occurs in the market and the electronic industry makes the most significant reaction. Moreover, we find that there are negative relations between the CAAR and firm size, and positive relations with market to book ratio and debt ratio.

Introduction

There is a surge in the number of Employee Stock Ownership Plan (ESOP) adoption throughout Taiwan's electronic industry in recent years. One important factor for the proliferation of an ESOP is that it has become a standard business practice resulting from fierce competition for talented high-tech professions in electronic industry (Han, 2003). With the property of very short product life cycle, electronic industry is a highly competitive one and starves for talented high-tech professionals to work hard on innovation. Thus, ESOPs are used as a mean to recruit, retain and motivate qualified personnel. Accordingly, ESOPs intend to enhance efficiency and effectiveness of business operations. However, with recent low economic prosperity and a series of accounting and financial scandals by Enron and WorldCom, foreign investors began to question the rationality of ESOP in Taiwan. The investors concerned that employees are over benefit than the shareholders, and this situation has led to a heated discussion in the industry and the academia.

As stated in the past literature, there will be an increase of stock prices before and after the date of ex-right and abnormal return on the date of ex-right. As a result, both shareholders and employees gain in this matter, and enhance the willingness of issuing bonus stock by electronic companies, thus causing the capital value to be over inflated and diluted the stockholder equity. However, when the stock market enters the bearish period and the down cycle of the economy, the issue of ESOP, which results the transfer of wealth from the shareholder equity to employees, is thereby highly questionable by the concerned parties.

From the view point of investor, all shareholders must bear the capital cost for ESOP as well as the risk of operating failure. On the contrary, employees enjoy the high dividend shares without cost and less risk. Furthermore, high dividend shares reflect over inflated capital value and dilution of per share earning. If the growth of company earning did not pace with the rate of inflation for capital value, it will cause the stock price to drop in the long run.

Foreign companies express employee dividend and after-tax gain as the actual after-tax profit given to shareholders, after deducting employee dividend and salaries for board of directors. However, in Taiwan, income statement preparation requires the auditing of accountant first; the board of directors then will decide on the ratio of salary and dividend distribution. After this, a general shareholders meeting is held to decide whether to uphold the ratio. Thereby controversy arises due to this difference.

In view of the above, the purpose of this study is to explore the reaction of market in different sectors when information of ESOP is announced by the board of directors. Also, we intend to study whether the financial performance for companies with policy of ESOP outperformed those without. Further, we will discuss the relationship of corporate size, growth potential, and debt ratio to the market reaction of ESOP information.

1. Literature review

Park and Song (1995) evaluated the efficiency of 232 companies in the U.S. by the market net worth ratio and return on asset from 1979 to 1989. They stated that companies with ESOP certainly provide positive effect to the company operations in the long run. Meanwhile, these companies all possess independent auditor responsible for monitoring the managerial decision making to prevent unfavorable

decision made by managerial team. They believe the practice of ESOP can stimulate employee moral and increase efficiency; however, the possession of company stock by managing team might lead to an extension of voting power, which in this turn might endanger the interest of shareholders. Therefore, other than an efficient motivating system, a well supervised system is equally important.

DeFusco, Johnson and Zone (1990) stated the practice of ESOP would lead to a wealth transfer effect for shareholders, and induce managing team to adopt investment of higher risk. In fact, shareholders are equivalent to a buy option, and the value of a buy option increases with heightening of company asset variation risk. As a result, managing team with ESOP would tend to adopt higher risk activity as to detract the value of creditors.

Hung, Chen and Jiang (2003) used the financial information of Taiwan IT industry from 1996 to 2001, along with Du Pont Equation, as research subject and review the financial performance of company. They found that operating efficiency and asset utilization for companies with ESOP outperformed those without. Moreover, companies with ESOP show lower financial leverage than those without, which implies the practice of ESOP tends to lower company financial risk.

Ding and Qian (2000) argued that the adoption of ESOP holds the characteristic of associating with the employee interest, in case of that will ease off the acting problem management and lower the cost of financial report. Furthermore, they used the financial information of listed companies in Singapore from 1992 to 1995, along with Matsunaga's (1995) Pooled Multiple-Regression method to conclude that ESOP is positively related with corporate size and future growth opportunity; and negatively related with company capital liquidity. Meanwhile, they also found that there is significant cumulative abnormal return on the day of ESOP announcement and continued till the forth day. This indicated that investors in Singapore are optimistic to the practice of ESOP, even though ESOP is strictly regulated in Singapore.

2. Data and methodology

Past literatures have suggested that ESOP can effectively lower the problem arised between shareholders and managing teams due to conflict of interest. Thus, this research firstly will examine the differences in financial performance between companies exercising ESOP to those did not, by means of Du Pont Identity. We will then probe into the reaction by Taiwan investors to companies with ESOP when ESOP information is announced. That

is, whether there exists an abnormal return in stock price, and if the information is of value. Furthermore, Market model will be used to estimate abnormal return and accrual to cumulative abnormal return, in order to test whether information revealing will cause abnormal return in stock price. Finally, multiple regression model will be used to examine the relationships of ESOP with corporate size, growth opportunity and debt ratio.

The time period used is from fiscal year 2003 to 2005. Data are obtained from Taiwan Economic Journal. Criteria for sample selection are (1) listed companies in TAIEX; (2) non-financial sector companies; financial industry is highly regulated by government, thereby creating a distinctive rule for ESOP and therefore is excluded to reduce bias; (3) exclusion of full value transaction stocks as these stocks are usually issued by companies with poor financial situations; (4) sampling companies must be based on fiscal year system to ensure comparability and consistency in cross-sectional analysis; (5) to avoid interference, stocks with ex-right and ex-bonus on the same day are excluded.

2.1. Hypotheses. *2.1.1. ESOP and company performance.* Wagner and Rosen (1985) stated that as compared with companies not practicing ESOP, companies with ESOP have higher ROE, sales growth and operating profitability. In this research, we use Du Pont Equation to measure company operating efficiency, asset turnover rate, and degree of financial leverage for examining the financial performance of companies with and without ESOP. If ESOP conforms to incentive program for accordance of both managing team and shareholders' objective, then we use the following three hypotheses to test and verify that companies with ESOP outperformed those without, financially.

Hypothesis 1: ESOP can enhance the operating efficiency and hence increase the company's financial performance.

Hypothesis 2: ESOP can strengthen the efficiency of asset utilization and hence increase the company's financial performance.

Hypothesis 3: ESOP can reduce company financial risk by lowering financial leverage.

2.1.2. ESOP information revealing and market efficiency. In practice, Taiwan credited the bonus share by face value of the share, which is not reasonable from accounting point of view. Based on the principal of accountancy, bonus shares should be the incentive for employees to work harder and create revenue and the relevance costs should be incurred as well. In this research we intend to find out how

investors regard the information of employee bonus shares issuance. If Taiwan capital market is an efficient market, investors should realize that ESOP in fact transfer the cost to them, and the increase of shares will inflate company capital value, dilute the EPS and market should not be affected. Thus, we use the electronic and non-electronic sectors as samples to investigate the reaction by market investors to the information of bonus share issuance.

Hypothesis 4: Ceteris paribus, on the event day of announce, the average abnormal return (AAR) is different from zero.

Hypothesis 5: Ceteris paribus, on the event window, the cumulative average abnormal return (CAAR) is different from zero.

That is, whether the *ARR* and *CAAR* calculated by market model are different from zero to verify the influence on price when information is announced and, hence, determine if the information is of value.

2.1.3. Regression analysis of CAAR. We use multiple regression model to determine the effect on *CAAR* by company size, growth opportunity, and debt ratio.

Hypothesis 6: Ceteris paribus, company size (Size) is negatively related to market CAAR when ESOP is announced.

According to Chang, Tsai, and Yeh (1993) research on TAIEX for 1986-1991, TAIEX has the scale effect in which company stock price is negatively related to company size.

Hypothesis 7: Ceteris paribus, growth opportunity is positively related to market CAAR when ESOP is announced.

Due to asymmetry of information, managing team has more information on future growth plan than shareholders, and when the objectives are inconsistent, future investment decision will tend to be conservative and cause shortage of the investment. In order for the management team to be more aggressive on investment plan, use of ESOP to align the objectives with shareholders will be the a favorable method.

Hypothesis 8: Ceteris paribus, debt ratio (Debt) is negatively related to market CAAR when ESOP is announced.

With high debt ratio, implying majority of the capital is from creditors. In order to avoid taking excessive risk investment by management and transfer of wealth to shareholders, creditors will request more risk excessive return than shareholders and market response to ESOP information will be negative.

2.2. Methodology. *2.2.1. Event Study.* Event study is the method used to understand the relationship

between stock price and certain event in an empirical study. In this research, we use the board meeting as the event date, instead of the ex-right date, because the decision of bonus shares is taken by the board, and whether to upheld is decided by the general meeting, in which, both dates are earlier than the ex-right date. The estimation period used is 150 days. The longer the event periods, the better to grasp the effect, however it will be easily influenced by other factor as well.

We use the Market Model to estimate the expected return rate of individual stock, as market model assumed individual stock return is only related to market return. We set the daily return rate of TAIEX index as independent variable and the individual companies' daily return rate as dependent variable.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where R_{it} is the daily return rate on t^{th} day for i^{th} stock; R_{mt} is the daily return rate on t^{th} day for market index (volume weighted price index); α_i is the linear interception term; β_i is the systematic risk; ε_{it} is the error term. If individual stock was not affected by the research event, the expected return for specific event date will be:

$$E(R_{it}) = \hat{\alpha}_i + \hat{\beta}_i + R_{mt}$$

After estimating the stock expected return, the abnormal return (AR) can be obtained by subtracting the expected return from actual return of event period, that is:

$$AR_{it} = R_{it} - E(\hat{R}_{it}).$$

where AR_{it} is the abnormal return for company i on t^{th} event date, $E(\hat{R}_{it})$ is the expected return for company i on t^{th} event date. The average abnormal return (*AAR*) is:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it},$$

where N is the number of sample for each group; AAR_t is the average abnormal return for each sample for all events on event date t. *CAAR* is the cumulative average abnormal return for selected samples in event period accumulated from date t_1 to t_2.

$$CAAR_t(t_1, t_2) = \sum_{t_1}^{t_2} AAR_t = \frac{1}{N}\sum_{i=1}^{N}\sum_{i=t_1}^{t_2} AR_{it}.$$

2.2.2. Regression model. If the announce of ESOP is of information value, there exists a relationship between the *CAAR* and company characteristics. That is, *CAAR* as the dependent variable, company size (*Size*), company market to book ratio (*MBR*),

and debt ratio (*Debt*) as the independent variables. Then, the regression model will be:

$$CAAR_t = \alpha_0 + \beta_1 Size_{it} + \beta_2 MBR_{it} + \beta_3 Debt_{it} + \varepsilon_i,$$

where $Size_{it}$ is the replacement variable for company size from the book value for company i in period t; MBR_{it} is the market to book ratio in the tth period for company i. We follow Core and Guay's (2001) statement of the larger the intangible asset is, the greater the opportunity for growth appears to be. Thereby, we use the ratio of market value to book value as the replacement variable for measurement of company growth opportunity (*Growth*); $Debt_{it}$ is the debt ratio in period t for company i; ε_i is the error term.

The null hypotheses are: $H_{o1} : \beta_1 < 0$, ceteris paribus, *Size* is negatively related to market *CAAR* when ESOP is announced; $H_{o2} : \beta_2 > 0$, ceteris paribus, *Growth* is positively related to market *CAAR* when ESOP is announced; $H_{o3} : \beta_3 < 0$,

ceteris paribus, *Debt* is negatively related to market *CAAR* when ESOP is announced.

3. Empirical result

From Table 1, on the average of about 75% of the samples for electronic sector had decided to practice ESOP during the sampling period. This indicated that ESOP is a usual practice in electronic sector and has a growing trend with the high of 86.09% in 2005. This may be due to the intense competition and eagerness for high level talent in the industry. With high employee turnover rate, it is hard to retain talent without a hefty ESOP. Whereas, on the average only about 25% of the non-electronic sector practice ESOP and decreasingly from 24.31% of 2003 to 13.90% of 2005. Due to the difference of characteristics in industries, following empirical results are compared based on electronic and non-electronic sectors.

3.1. Du Pont identity analysis. Table 2 presents the ratio of Du Pont identity analysis for electronic sector in 2003 to 2005 for testing the significance of difference for ESOP practice. Practice of ESOP is defined as those companies with earning and issued stock dividend to employees. Companies with lost for

Table 1. Percentage of ESOP companies according to industry and year

	2003		2004		2005		03~05
	n	%	*n*	%	*n*	%	Avera-ge %
Cement	0	0%	0	0%	1	0.45%	0.15%
Food	2	0.92%	0	0%	0	0%	0.31%
Plastic	2	0.92%	0	0%	1	0.45%	0.46%
Textile	2	0.92%	1	0.44%	2	0.90%	0.75%
Electric	12	5.51%	9	3.98%	11	4.72%	4.74%
Cable	2	0.92%	0	0%	0	0%	0.31%
Chemical	7	3.21%	6	2.65%	6	2.58%	2.81%
Glass	0	0%	0	0%	0	0%	0.00%
Paper	1	0.46%	0	0%	0	0%	0.15%
Steel	2	0.92%	2	0.89%	3	1.35%	1.05%
Rubber	0	0%	0	0%	1	0.45%	0.15%
Automobile	4	1.84%	4	1.77%	4	1.79%	1.80%
Electronic	165	75.69%	185	81.86%	192	86.10%	81.22%
Construction	2	0..92%	3	1.33%	2	0.90%	1.11%
Transport	1	0.46%	2	0.89%	1	0.45%	0.60%
Trading	0	0%	1	0.44%	1	0.45%	0.30%
Others	16	7.34%	13	5.75%	7	3.00%	5.37%
Total	218	100%	226	100%	233	100%	100%

Note: *n* is the number of companies.

the year and issued bonus from retained earning are excluded from the sample. The financial ratio averages for companies with ESOP and those without are tested using Mann-Whitney-Wilcoxon method. The result shows that during 2003-2005 sales profit margins for ESOP companies are larger than those without, with significant difference of p-value less

than 0.05 for 2003 and 2004. This indicates that ESOP companies have better operating efficiency in the electronic sector.

For the asset turnover, annual averages for the ESOP companies are larger than for those without. As for the equity multiplier, annual averages for the ESOP companies are smaller than for those without,

due to the dilution of shareholders equity by employee bonus shares and, hence, changed the capital structure of ESOP companies. P-value of 0.0059 for 2005 indicates that ESOP companies can reduce the financial risk through the increase of shareholders equity. As for the equity return rate, ESOP companies do have better operating effectiveness than those without.

Table 2. Du Pont equation ratio for ESOP and non-ESOP in 2003-2005 (electronic)

Ratio	Year	Average for ESOP (1)	Average for non-ESOP (2)	P-value (3)=(2)-(1)
Profit margin	2003	0.1335 (0.1231)	0.1144 (0.1051)	0.0671*
	2004	0.2294 (0.2779)	0.075 (0.0831)	0.0238**
	2005	0.1179 (0.1051)	0.0947 (0.0918)	0.6828
Asset turnover	2003	1.0061 (0.8590)	0.9568 (0.6269)	0.0988*
	2004	1.005 (0.8067)	0.9829 (0.6232)	0.0761*
	2005	1.3347 (1.5694)	0.9022 (0.7410)	0.0155**
Equity multiplier	2003	1.4369 (0.4681)	1.5528 (0.3549)	0.0482**
	2004	1.572 (0.4035)	1.7398 (0.6976)	0.0105**
	2005	1.5526 (0.4565)	1.5874 (0.4922)	0.0059**
ROE	2003	0.1356 (0.1192)	0.1223 (0.0880)	0.0285**
	2004	0.1187 (0.0760)	0.0836 (0.0874)	0.0068***
	2005	0.1322 (0.1186)	0.0918 (0.0597)	0.0220**

Note: the values in parentheses represent the standard deviation; *** 1% significance level, ** 5% significance level, * 10% significance level.

In general, for electronic sector, ESOP companies tend to have better operating efficiency as stated in Hypothesis 1. Adoption of ESOP enhances cost control capabilities, which in turn increases profit margins. In regard to asset turnover, companies that implement ESOP have higher asset turnover than those without it, this supported Hypothesis 2. Through ESOP, management team can increase the asset utilization in order to further enhance operation efficiency. In terms of equity multiplier, companies that implement ESOP have significantly smaller equity multipliers than those without it. This is due to dilution of shareholder equity after ESOP is implemented, hence in support of Hypothesis 3. Companies that implement ESOP can reduce financial risks involved by diluting company equity.

Table 3 shows the 2003-2005 financial ratio average of non-electronics industries in the Du Pont equation. We use the Mann-Whitney-Wilcoxon method to test the significance of difference between ESOP and non-ESOP companies. In terms of profit margin, ESOP companies are significantly differ from those without at the significance level of $\alpha = 0.05$. It indicates that ESOP companies have better operation efficiency in the non-electronic industries. In terms of asset turnover, ESOP

companies have higher turnover than non-adoption companies. Therefore, for ESOP adoption companies with better asset utilization are supported. In terms of equity multiplier, since ESOP lead to diluted company equity, thus, those companies implementing the plan have smaller equity multiplier than those without. It demonstrates that ESOP companies undergo capital structure changes, hence reduce debt ratio and financial risk. However, for the shareholder ROE, in non-electronic industries, companies with ESOP were better off in effectiveness than those without.

Table 3. Du Pont equation ratio for ESOP and non-ESOP in 2003-2005 (non-electronic)

Ratio	Year	Average for ESOP (1)	Average for non-ESOP (2)	P-value (3)=(2)-(1)
Profit margin	2003	0.1093 (0.1076)	0.0425 (0.7728)	0.0263**
	2004	0.0904 (0.0945)	0.0836 (0.0854)	0.0511*
	2005	0.1408 (0.2201)	0.1027 (0.1060)	0.0253**
Asset turnover	2003	0.1957 (0.1703)	0.1557 (0.0666)	0.7730
	2004	0.1880 (0.1236)	0.1838 (0.0864)	0.7742
	2005	0.166 (0.0765)	0.1191 (0.0133)	0.0030***
Equity multiplier	2003	1.6319 (0.3737)	2.2167 (2.5174)	0.0784*
	2004	1.6102 (0.4700)	2.0300 (1.3115)	0.0655*
	2005	1.6813 (0.4419)	2.1567 (1.9945)	0.0349**
ROE	2003	0.0305 (0.0169)	0.0254 (0.0266)	0.0849*
	2004	0.0354 (0.0315)	0.0247 (0.0215)	0.0030***
	2005	0.0753 (0.0496)	0.0316 (0.0354)	0.0220**

Note: the values in parentheses represent the standard deviation; *** 1% significance level, ** 5% significance level, * 10% significance level.

In general, for non-electronic industries, ESOP companies tend to have better operating efficiency as stated in Hypothesis 1, similar to the electronic industry. The same conclusions have also been drawn in the electronics industry. In terms of asset turnover, Hypothesis 2 is inconclusive as only 1 out of 3 years shows significance. In terms of equity multiplier, ESOP companies show smaller equity multipliers than companies without ESOP. This is due to diluted equity caused by ESOP, thus, Hypothesis 3 is supported. ESOP companies can reduce financial risks through equity dilution.

3.2. Announcement effect of ESOP. Table 4 is a list of the average abnormal return and test statistic t in the electronics industry within the 41-day event period (-15, 15)[1]. Table 4 shows that the *AAR*s are positive for all pre-event date except -12, -8, -7, and -1. Also, 14 out of the 20 pre-event dates are significant with maximum *AAR* of 0.97% on -6 day. On the event date, the *AAR* is 0.20%, relatively lower than others. We believed this may be due to that most companies choose to hold

board meetings in the afternoon to avoid affecting the market. After the event date, 7 out of the 20 dates have significant *AAR*. In contrary to pre-event dates, the probability of significant *AAR* is lower for the post-event dates. Therefore, it is inferred that ESOP information had been disclosed before the event date, due to information leakage, thus had higher *AAR* occurred. After the event date, other than day 4 that displayed significant result, the rest of the *AAR*s were relatively lower, which shows that ESOP information had been fully reflected in the stock market.

Table 4. AAR and test statistics for electronic industry

Day	AAR	t value		Rank test	CAAR	t value		Rank test	
-15	0.46%	2.423	**	0.460	2.47%	4.982	***	1.267	
-14	0.49%	2.651	***	0.650	2.96%	5.614	***	1.418	
-13	0.43%	1.616		0.360	3.39%	5.823	***	1.453	
-12	-0.03%	0.049		-0.530	3.36%	5.506	***	1.193	
-11	0.66%	3.260	***	1.070	4.02%	6.255	***	1.469	
-10	0.74%	3.793	***	1.570	4.76%	7.107	***	1.874	**
-9	0.40%	1.789	*	0.390	5.16%	7.321	***	1.907	*
-8	-0.36%	-1.773	*	-0.670*	4.80%	6.542	***	1.368	
-7	-0.12%	-0.550		-0.480	4.68%	6.157	***	1.189	
-6	0.97%	4.730	***	2.210	5.65%	7.170	***	1.178	*
-5	0.97%	4.850	***	1.970*	6.62%	8.155	***	2.155	*
-4	0.48%	2.266	**	0.490	7.10%	8.461	***	2.209	*
-3	0.61%	2.947	***	1.050	7.71%	8.917	***	2.394	**
-2	0.60%	3.678	***	1.470	8.31%	9.523	***	2.668	***
-1	-0.29%	-1.488		-0.880	8.02%	8.949	***	2.405	*
0	0.20%	0.896		0.030	8.22%	8.929	***	2.354	
1	0.68%	2.884	***	1.260	8.90%	9.339	***	2.570	**
2	0.70%	3.328	***	1.480	9.60%	9.827	***	2.821	***
3	0.52%	2.626	***	1.150	10.12%	10.156	***	2.996	***
4	0.52%	3.072	***	1.260	10.64%	10.565	***	3.187	***
5	0.32%	1.367		-0.040	10.96%	10.628	***	3.117	***
6	0.22%	1.410		0.050	11.18%	10.701	***	3.067	***
7	0.23%	1.035		0.030	11.41%	10.704	***	3.018	***
8	0.13%	0.799		0.140	11.54%	10.666	***	2.993	***
9	0.28%	1.406		0.410	11.82%	10.743	***	3.017	***
10	-0.24%	-1.132		-1.020	11.58%	10.365	***	2.785	***
11	-0.49%	-1.371		-0.930	11.09%	9.960	***	2.577	***
12	0.06%	0.180		0.000	11.15%	9.839	***	2.538	***
13	-0.38%	-1.986	**	-1.310	10.77%	9.352	***	2.375	***
14	0.07%	0.300		-0.010	10.84%	9.269	***	2.241	**
15	0.39%	2.163	**	0.800	11.23%	9.499	***	2.342	**

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

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[1] Due to limitations of printed page, event period (-20, 20) results are available upon request.

When the event period is to be divided into multiple sections and analyzed in terms of *CAAR*, Table 5 shows that among the 6 event windows of (-20, 20), (-10, 10), (-20, 0), (-5, 5), (-1, 1), and (0, 20), only event window (-1, 1) was not significant. Also, other than the event window (-5, 0) that has a *CAAR* less than that of event window (0, 5), the rest of the pre-event *CAARs* are greater than those after the event date. It shows that ESOP returns had been expected by investors, and had been reflected on the stock price. The *CAARs* for the entire event period (-20, 20) are significantly greater than 0, indicating that disclosure of ESOP information conveyed a positive messages to the market.

Table 5. CAAR and test statistics for electronic industry

Event window	CAAR	t value		Rank test	
(-20,20)	12.17%	9.683	***	2.335	**
(-10,10)	7.57%	8.277	***	2.371	**
(-5,5)	5.32%	7.968	***	2.785	***
(-1,1)	0.58%	1.323		0.244	
(-20,0)	8.22%	8.929	***	2.354	**
(-10,0)	4.20%	6.374	***	1.852	*
(-5,0)	2.57%	5.368	***	1.688	*
(0,5)	2.94%	5.786	***	2.098	*
(0,10)	3.57%	5.333	***	1.434	
(0,20)	4.16%	4.795	***	0.916	

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Concluding from the above, inferred by the accumulation rate of *CAAR*, investors in the market had already anticipated the ESOP information to be released by the board of directors prior to the meeting, and believed that even though this incentive system eroded equity, it was beneficial for the long-term development and operation performance. Hence it was well reflected in the price. Since the stock market had already reacted, therefore on the day of board meeting ESOP information did not cause significant abnormal return. Also, the abnormal return as compared to before the date of meeting was much smaller. On the day of the event date, the *AAR* is not significantly different from 0, thus it is not in support of Hypothesis 4. In event window (-20, 20), the *CAAR* is significantly different from 0, therefore Hypothesis 5 is supported.

Table 6 shows that the *AAR* was higher for pre-event date than for post-event. However, only the -19-18-14-10 and -6 of the pre-event and +3 and +9 of the post-event were significant. In terms of

CAAR, as shown in Table 7, event windows (-20, 0) (-10, 0) and (-5, 0), prior to board meeting, had higher *CAAR* than event windows (0, 5) (0, 10) and (0, 20). This indicated that the market reacted to ESOP information prior to board meeting, similar to the electronic sector.

Table 6. AAR and test statistics for non-electronic industry

Day	AAR	t value		Rank test	CAAR	t value		Rank test
-15	0.06%	0.485		-0.330	2.13%	3.165	***	1.378
-14	0.33%	2.382	**	0.870	2.46%	3.745	***	1.612
-13	0.10%	-0.379		-0.690	2.56%	3.439	***	1.319
-12	0.21%	0.752		0.200	2.77%	3.217	***	1.169
-11	-0.08%	-0.861		-0.560	2.69%	2.725	***	0.903
-10	-0.41%	-1.741	*	-0.940	2.28%	1.650	*	0.300
-9	0.30%	1.376		1.030	2.58%	1.984	*	0.661
-8	-0.40%	-1.317		-1.350	2.18%	1.584		0.253
-7	0.26%	0.602		0.140	2.44%	1.411		0.112
-6	0.38%	0.800		0.790	2.82%	1.379		0.222
-5	0.77%	2.620	***	1.460	3.59%	1.853	*	0.542
-4	-0.07%	-0.035		-0.440	3.52%	1.835	*	0.565
-3	0.13%	0.804		0.560	3.65%	1.826	*	0.647
-2	0.18%	0.735		0.100	3.83%	1.973	**	0.656
-1	0.27%	0.476		0.690	4.10%	1.869	*	0.703
0	0.06%	-0.213		0.320	4.16%	1.804	*	0.777
1	-0.09%	-0.336		-0.102	4.07%	1.805	*	0.631
2	-0.17%	0.042		-0.110	3.90%	1.745	*	0.583
3	0.50%	2.022	**	0.930	4.40%	2.026	**	0.722
4	-0.10%	-0.716		-0.650	4.30%	1.779	*	0.570
5	-0.43%	-1.425		-1.050	3.87%	1.531		0.357
6	-0.15%	-1.189		-1.030	3.72%	1.440		0.196
7	-0.21%	-1.296		-1.140	3.51%	1.175		-0.004
8	0.04%	-0.104		-0.280	3.55%	1.102		-0.091
9	-0.65%	-2.081		-1.660*	2.90%	0.810		-0.283
10	-0.21%	0.315		-0.030	2.69%	0.719		-0.364
11	-0.06%	-1.292		-0.930	2.63%	0.475		-0.508
12	-0.08%	1.034		0.050	2.55%	0.605		-0.513
13	0.40%	0.429		0.610	2.95%	0.597		-0.433
14	0.06%	0.000		-0.330	3.01%	0.494		-0.531
15	0.11%	-0.063		-0.590	3.12%	0.430		-0.647

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Table 7. CAAR and test statistics for non-electronic industry

Event Window	CAAR	t value	Rank test
(-20,20)	2.94%	1.317	-0.297
(-10,10)	0.01%	-0.144	-0.805
(-5,5)	-0.43%	0.743	0.289
(-1,1)	0.24%	-0.042	-0.005
(-20,0)	4.16%	1.804**	0.777
(-10,0)	1.47%	-0.106	0.213
(-5,0)	1.34%	1.195	1.103
(0,5)	-0.23%	-0.227	-0.541
(0,10)	-1.41%	-1.315	-1.559
(0,20)	-1.17%	-2.518**	-2.174*

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Figure 1 shows that the *AAR* trends are similar for both electronic and non-electronic industries. It shows that investors reacted in the same manner in the market for both sectors. However, since the electronic industry is a technologically concentrated one, ESOP is inevitable if R&D talents are to be retained. On the other hand, market capital is generally concentrated in electronic stocks rather than non-electronics stocks. Thus, even though the *AAR* trend for the non-electronic industry is similar to the electronic industry, the occurrence of significant abnormal return is relatively lower as compared to the electronics industry.

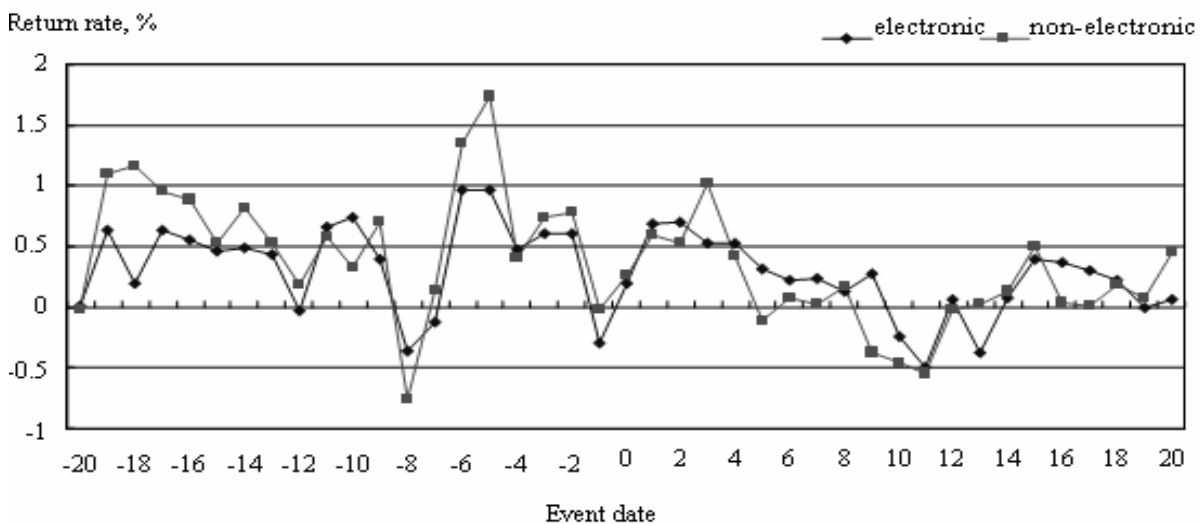In terms of the entire event period, (-20, 20) the *CAAR* is not significantly greater than 0.

Fig. 1. AAR for electronic and non-electronic industries

It shows that ESOP information is relatively not of information value in the non-electronic industry. In terms of *AAR*, both electronic and non-electronic industries displayed the same market reactions. The *AAR* before event date is much higher than that after the event date. During the event period, individual trading date or the entire event period (-20, 20), are not statistically significant as in the electronic industry. It is inferred that as capital is mostly concentrated in the electronic industry, greater concerns are placed on electronic stocks by market investors as compared to non-electronic stocks. On the other hand, since ESOP is widely adopted by the electronic industry to recruit talents, investor still hold great faith in its future even it causes equity dilution. Thus, once non-electronic industries disclose ESOP information, investors in the market tend to remain on watch and conservative toward it. Their reactions are not as intense as they would have with the electronic industry. On the day of the event, *AAR* is not significantly different from 0 with ESOP information, thus Hypothesis 4 is not supported. The *CAAR* in

event window (-20,20) is not significantly different from 0, thus Hypothesis 5 is not supported either.

Besides, Figure 1 shows that both electronic and non-electronic sectors displayed similar *AAR* trends, with high on pre-event date -6~-5. The rate of increase for *AAR* prior to the event is greater than that after the event. It shows that prior to the event, both sectors had fully reacted on the ESOP information. From Figure 2 we can see that the differential prior to the event date is lesser than after the event date. It shows that if investors invest primarily in the electronic sector, the attainable cumulative return would be higher than they would have if invested in non-electronics stocks. This is probably due to the fact that the market is still electronics oriented and prices are therefore more sensitive to information.

Meanwhile, as compared to Ding and Qian's (2000) finding on ESOP announcement effect in Singapore, both Taiwan and Singapore investors affirmed to the intrinsic values of ESOP information, but the reactions are different. The abnormal return for

Singapore ESOP information was significant only after information was released. In this research we found that the TSE possesses significant abnormal return prior to the occurrence of an event. This is

likely due to the fact that the subject of ESOP had long been going around in the market. Also, the difference of time frame and regulations might have contributed to the variation of this result.
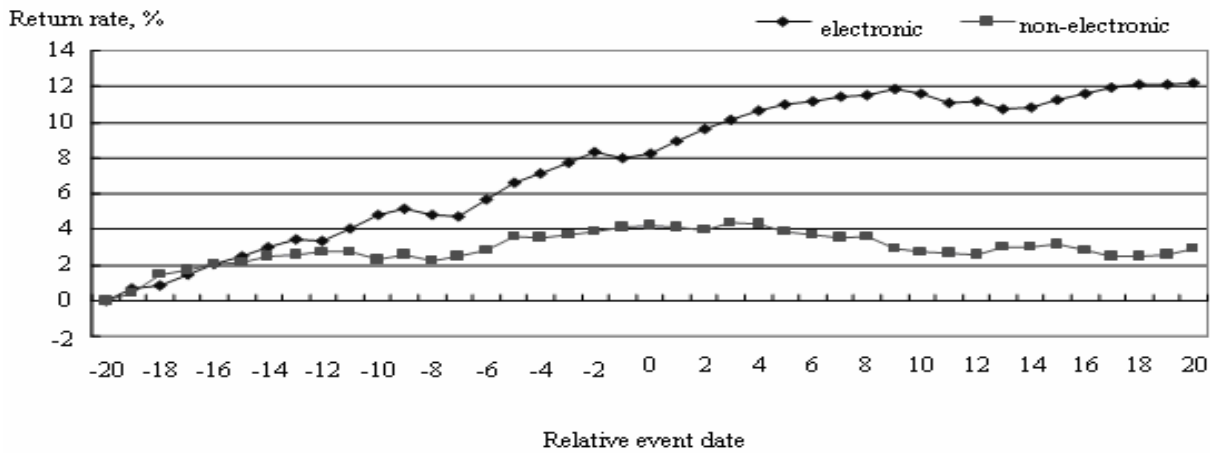

Fig. 2. CAAR for electronic and non-electronic industries

3.3. Regression analysis. As the ESOP information produced greater intrinsic values with the electronics sector, therefore we use the *CAAR* of electronic industry for event window (0, 5) as the dependent variable for the multiple regression model and use the growth opportunity, market to book ratio (*MBR*) and debt ratio (*Debt*) as the independent variables to confer the relationships in between.

Table 8. Descriptive statistics for regression variables

Variable	Mean	σ	Medium	Max	Min
$CAAR_i$	0.588	0.331	0.322	0.670	0.001
$Size_i$	0.340	0.223	0.343	0.991	0.036
MBR_i	1.327	1.237	1.052	22.512	0.066
$Debt_i$	0.221	0.120	0.233	0.890	0.001

Note: $CAAR_i$ is the Cumulative Average Abnormal Return for electronics industry in event window (0, 5).

Table 9. Correlation analysis

Variable	$CAAR_i$	$Size_i$	MBR_i	$Debt_i$
$CAAR_i$	1	-0.123	0.352	-0.015
$Size_i$	-0.111	1	-0.073	0.212
MBR_i	0.439	-0.021	1	0.332
$Debt_i$	-0.032	0.129	0.219	1

Table 8 listed the descriptive statistics for multiple regression variables including the mean, standard deviations, minimum and maximum value. Among the variables, *MBR* has the largest level of dispersion. To avoid the multi-collinearity in

regression analysis, we investigate the relationship between the independent variables as stated in Table 9. We found that other than *MBR* that reaches medium level of correlation, the remaining variables showed only slight correlation. Thus the problem of collinearlity does not exist among variables.

The analysis results of the electronic industry sample in Table 10 shows that independent variable MBR is positively related to *CAAR* and all others tend to have negative relationship. The coefficient for Size is negatively related to the market *CAAR*, thus in support of Hypothesis 6: Ceteris paribus, company size is negatively related to market *CAAR* when ESOP is announced. It represents that scale effect exists in Taiwan capital market and small scale companies are more easily manipulated than large scale companies and hence have better performance in the price. The coefficient for *MBR* is positively related to *CAAR*, implied ESOP promote consistency in objective for management and shareholders, and prevent the problem of inadequate investment by management. Companies will then adopt more aggressive investment plans to increase company value and Hypothesis 7 is thus sustained. When company leverage level or debt ratio is higher, ESOP will have negative effect on stock price. It implies that when company capital mostly comes from creditors, they will demand more risk excessive premium than shareholders and prevent management from high risk investment. On the other hand, creditors will try to avoid stock dividend distribution that may lead to increase in number of shareholders and transfer of wealth to shareholders. Thus, the results support Hypothesis 8 and conform to Ding and Qian's (2000) findings.

Table 10. Regression result for

$$CAAR_i = \alpha_0 + \beta_1 Size_{it} + \beta_2 MBR_{it} + \beta_3 Debt_{it} + \varepsilon_i$$

Variable	Coefficient	t-value		p-value	
Interception	1.741	3.242	***	0.000	***
$Size_i$	-0.016	-2.210	***	0.000	***
MBR_i	1.861	1.891	**	0.046	***
$Debt_i$	-0.004	-2.374	***	0.000	***
R-Squared	0.241	F-statistic 3.642***			
Adjusted R-Squared 0.296		Prob(F-statistic) 0.000			

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Conclusion

In this research, we use the Du Pont identity analysis to study if ESOP has an effect on the company performance, and analyze the announcement effect of ESOP on the market investors. Regression analysis is conducted on

$CAAR$ after ESOP announcement. The results show that adoption or non-adoption of ESOP in the electronic industry significantly affected their company performance. Among which, ROE displayed the most significant disparities. Results in the non-electronics industries show that ESOP adoption also contributes to company operation capability improvement, increased shareholder ROE, and reduced financial risks. Through event study method, we found that both the electronic and non-electronic industries reacted prior to event date. The reaction is most significant in electronics industry and shows that investors prefer electronics stocks in the Taiwan stock market. Through multiple regression model, it is inferred that company scale, market-book ratio, and debt ratio affected the $CAAR$ at the time of ESOP information release. After years of ESOP implementations, the stock market regards ESOP information as one that has intrinsic value. And antedating reactions toward the information are observed before the event occurs in the market.

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