

# 國立交通大學

財務金融研究所

碩士論文

股利政策的演變、稅制改革以及庫藏股買回

-以台灣公司為例

Evolution of Dividend policy、Tax Reform and Share repurchase

-Evidence from Taiwan



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# 股利政策的演變、稅制改革以及庫藏股買回-以台灣上市公司為例

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## 摘要

本研究探討台灣上市公司過去十五年來股利政策的演變。利用台灣 2008 年上市公司從 1994 至 2008 年資料進行實證研究，觀察台灣上市公司因為稅制改革以及庫藏股買回實施而造成的股利政策改變。本文利用 1998 年實施之兩稅合一制進行捕捉稅改對股利政策的影響。並且利用 partial-adjustment model 去評估稅制及法規改變前後，公司股利調整速度以及股利發放偏好的改變。本文發現，在兩稅合一實施之後，稅改誘因對投資人而言並未有顯著的股利偏好改變，但對公司而言，則會根據公司稅額扣抵比率高低進而調整股利發放。此外，庫藏股買回與現金股利發放之間存在互補效果而與股票股利之間呈現替代效果。透過 Partial-adjustment model 發現利用每股盈餘無法正確反映股利發放率且長期的股利發放率是根據每股現金流量為基準。在稅制改革或政府法規改變後，股利調整速度有減緩傾向。

關鍵詞：股利政策、買回庫藏股、稅制改革、兩稅合一

**Evolution of Dividend policy 、 Tax Reform and Share repurchase  
-Evidence from Taiwan**

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**ABSTRACT**

This paper examines the evolution of dividend policy affected by tax reform and share repurchase over the past 15 years in Taiwan. The sample data are collected from the period 1994 to 2008 firms listed on TSE. We use imputation tax system to represent tax reform to capture tax effect. Then we use partial-adjustment model to estimate the adjustment speed and estimated target payout ratio before and after tax reform and government regulation. The evidences show that investor will not increase their dividend payment preference after tax reform. Nevertheless, firms will increase paying dividend according to the imputation tax credit. Furthermore, Furthermore, the published earning may not correctly reflect the firms' dividend paying level and the long-term dividend payout ratio may be based on cash flows. The adjustment speed of dividend will have inclination to decline after tax reform and governance regulation.

Keywords : Dividend policy, Share repurchases, Tax reform, Imputation tax system

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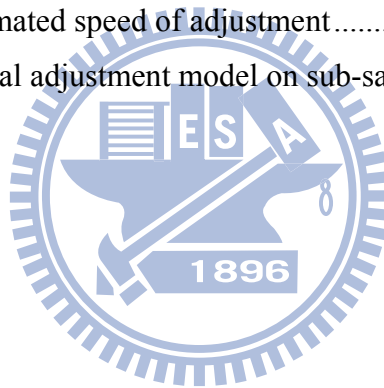
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## 1. Introduction

Dividend is always being one of thorniest puzzles in corporate finance even number of theories have been put forward in the literature to explain their pervasive presence. How firms set their dividend policy has been one of the extremely popular topics in research for many years. Under the evolution of corporate finance and substantial researches, supposing that transaction cost or tax are ignored then it even can be said that the effect of paying dividend will be equivalent to share repurchase (Franklin, Antonio and Ivo, 2000). Therefore, dividend policy is irrelevant to firms' value in a frictionless capital market (Miller, Modigliani, 1961). Miller and Scholes (1978) showed that in a world where both dividend income and capital gains are taxed at investor levels, the preference for dividends or capital gains depends on relative tax rules governing possible tax arbitrage. Like in U.S., share repurchase are apparently superior to dividends if dividends are taxed more than capital gain.

However, for instance, dividend taxes continue to be a substantial source of income to personal investors in U.S. for Internal Revenue Service (IRS). The period from 1973 to 1983, dividends for the largest 1,000 firms in the United States averaged 44 percent of earnings whereas repurchases averaged only 6 percent (Allen and Michaely, 1995). Although, as Bagwell and Shoven (1989) have stressed that repurchase increased significantly in 1984 and have remained high, repurchases were not a substitute for dividends. From 1984 to 1988, repurchases increased from 6 percent to 38 percent of earnings but dividend still increased from 44 percent to 51 percent (Pattenden and Twite, 2008). It means that even though many shareholders are taxed more heavily than capital gain on dividend paying that firms have still paid out a significant proportion of earnings in the form of dividend. And there is another puzzling fact about the propensity of firms preferred to smooth dividend payout as originally

showed in Lintner (1956). Thus, inclinations of firms that to pay dividends rather than to repurchase shares and to smooth dividends payout have been labeled the “dividends puzzle” (Black, 1976) which is also reflecting the lack of a substantive empirical research for firms and investor behavior.

Since capital gain will not be taxed in Taiwan so that we will not demonstrate the tax effect and share repurchase simultaneously. Here we reveal tax effect on dividend policy by imputation tax system separately. A dividend imputation tax system provides shareholders with a tax credit that can be used to offset personal tax on dividend income. The introduction of imputation tax system for firms in 1998 has partially eliminated the double taxation of the classical tax system. Twite (2001) demonstrates that the imputation tax system created a differential impact on firm financing decision and investor preferences resulting in a change with the firm away from debt and retained earnings to new equity. Pattenden and Twite (2008) showed that consistent with the tax preference for the distribution of franked credits, they reveal that dividend initiations, all dividend payout measures-gross, regular and net dividend payout ratio and the use of dividend reinvestment plans increased subsequent to the introduction of dividend imputation. And it supports the role of tax determinants in dividend policy for both firms and investors.

Thus, we introduce clientele effect into reveal tax effect on dividend policy. Under many prevailing tax researches, marginal taxes on dividends are usually higher for individual investors, but lower for institutional investors. Conversely, marginal tax rates on capital gains are usually higher for institutional investors, but lower for individual investors. When institutional investors are relatively less taxed than individual investors, dividends induce ownership clientele effect (Franklin, Antonio and Ivo, 2000). Otherwise, firms paying dividends attract relatively more institutions, which have a



relative advantage in detecting high firm quality and in ensuring firms are well managed to reduce agency problem. Under such dividends puzzle influence, we consider that different kind of investors have different propensity which will force the boards of corporate to shift their financing choice, marginal tax rate and tax credit preference, when the tax reform has been implemented. Small investors may not have the incentive to monitor the board (Grossman and Hart, 1980) but large investors, in contrast, potentially accumulate sufficient control rights over firm's decision (Shleifer and Vishny, 1986).

Therefore, firms with large controlling or simply influential stockholders may follow the preferences of these investors, and in consequence, they would induce the clientele the firm caters to. Since 1992, the Cadbury Report showed that various governance reviews have expressed concern about the ability of shareholders, especially financial institutional firms.<sup>1</sup> Agency models contend that the dividend payment helps to mitigate conflict of incentive between firms' management and shareholders (Easterbrook, 1984; Jensen, 1986). Rozeff (1982) argues that dividends provide indirect control benefits in the absence of active monitoring of a firms management by its shareholders. His research predicts that if the ownership is dispersed then dividends will tend to be higher. However, La Porta et al. (2000) have argued that in a legal market which will provides a powerful protection to shareholders to force firms to distribute cash. For instance, the higher dividend payment in UK is result from the strong protection mechanism. Studies for UK show that there is a negative relationship between inside ownership and dividend payment (Short et al., 2002; Renneboog and

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<sup>1</sup> The Cadbury Report (1992) argues that given the weight of their votes, the way in which institutional investors use their right is important. The Greenbury Report (1995) states that institutional investors should use their power and influence to ensure best practice as set out in the Code' while according to the Hampel Report (1998), institutional investors have a responsibility to make considered use of their votes. The Newbold Inquiry (1999) recommends regular considered voting should be regarded as a fiduciary responsibility by trustee of pension funds, cited in Mallin (2001)

Trojanowski, 2005). In this paper, we try to examine what the roles of tax reform and government regulation will be with the evolution of dividend policy. We use the imputation tax system and share repurchase system to reveal how the dividend policy will be affected. From clientele effect and agency problem concept, we investigate whether investors change their propensity to dividend payout before and after that tax reform and government regulation are effective. The use of Taiwan data allows a research of dividend policy under the tax reform with different distribution incentive across both stages, to retain or distribute dividends. About the government regulation, this paper focus on how the share repurchase will affect the present dividend policy. Furthermore, we use partial adjustment model to capture the behavior of firms to adjust their dividend payout and compare the estimated target payout ratio with aggregated payout ratio around the change of financial environment.

This paper is structured as follows. In the next section, we will reveal the taxation background in Taiwan and the comparison with other countries. Further, we show the aggregated data about cash dividend, stock dividend and share repurchase in Taiwan. We then describe our data set and provide descriptive statistics in Section 3. In Section 4, we will show the methodology and demonstrate the result. Section 5 concludes.

## **2. The background of dividend policy in Taiwan**

During the sample period 1994 to 2008, Taiwan has come through lots of tax reforms, especially, imputation tax system and alternative minimum tax system. On 1, Jan, 1998, Taiwan dividend imputation tax system was effective and on 1, Jan, 2006 for alternative minimum tax system.

## 2.1 The mechanism of taxation and investor change in ownership structure

Prior to 1998, double taxation system was effective that profit of firms will be taxed on both corporate level and personal level. In contrast with countries like Australia and German, Taiwan operated a partial imputation tax system such that shareholders can only potentially receive a credit for part of the tax paid at the corporate level. This tax credit reflects the amount of enterprise income tax paid on the source profit from which the dividend was paid and the imputation tax credit can be used to offset personal tax obligations. Furthermore, the other consideration on dividend payment for investor is on the relative taxation of dividends and capital gains. In general, there will be a preference for dividends whenever the effective personal tax on capital gains is greater than the effective personally tax on dividend income and vice versa.<sup>2</sup> But we can only introduce the ordinary taxation into our model since the capital gain in Taiwan is tax-free. Thus, under clientele effect concept, assuming that all taxes are paid at the statutory rate and net income realized. In case of firm paying dividends then the marginal effective tax rates for individual investors are 55% and 40% in the time before and after imputation tax system, respectively.<sup>3</sup> And the marginal effective tax rates for institutional investors are 28.75% and 25% in the time before and after imputation tax system, respectively.<sup>4</sup> We infer that institutional investors and individual investors have higher benefit from dividend payment after imputation tax system. These changes decline the taxation gap between firms and investors thereby increased the value to the

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<sup>2</sup> This recognizes that investors are able to adjust the timing of capital gains and losses.

<sup>3</sup> Before imputation tax system, for the highest marginal tax investors, each 1\$ distributed will taxed 25% for enterprise income tax and 40% for effectively personal tax then the income after tax is 0.55\$ without undistributed retain earning tax. But individual investor will gain 0.75\$ from dividend after corporate tax and refund 0.25\$ from imputation tax credit then the income after is 0.6\$.

<sup>4</sup> Institutional investor will be taxed by dividend payment before imputation tax system, and each 1\$ distributed will taxed 25% on corporate level and 25% on investor level, thus, the total tax is 0.2875\$. But dividend payment will be tax-free after tax reform, thus, the total tax for institutional investor are 0.25 each 1\$ earning.

investor of the tax credit.

In terms of the conception, investors will reconsider about the tax incentive and the following agency problem will come to challenge the dividend preference between shareholder and firms' decision. Rozeff (1982) demonstrate a model in which dividends being as a mechanism for reducing agency cost by offering a rationale for the distribution of cash resources to shareholders. Concentrated share ownership is a key of corporate governance; large ownership of shares motivates investors to undertake monitoring and also provide the leverage necessary to exercise control (Shleifer and Vishny, 1986). From Fig. 1, we found the proportion of share own by major investors and institutional investors have been increasing since 1994 besides the proportion of institutional investor fall down in 2000. According to the agency theory, the more dispersed the equity structure, the more severe the agency problem and the more attention need for monitoring managers. In the other words, it will be difficult to monitor the managers' behavior when the ownership structure is widely dispersed. If dividend can act as a monitoring mechanism by reducing cash available for managers' unnecessary consumption, a positive relationship between the proportion of share own by major or institutional investor and dividend payment is expected.

**[Insert Figure 1 here]**

## **2.2 Aggregate data on cash dividend 、 stock dividend and share repurchase**

Fig. 2 presents the time series of aggregate data of different type of dividend payout for publicly held Taiwan firms from 1994 until 2008. This figure shows that the proportion of stock dividend paying only company become decreasingly over time and cash dividend paying become increasingly. By Table1, the percent of stock dividend paying only companies is changed from 61.67% to 31.95% during 1998 but the percent of cash dividend paying only companies is increasing from 5.27% to 10.79%. In the

macroeconomic environment, companies become preferring to pay cash dividend in place of stock dividend and since the SFB ( Securities and Futures Bureau ) advocate “stable dividend policy” on 2000, dual dividend paying has affected the dividend policy over all the companies in Taiwan. So that percent of dual dividend paying companies had been stable after 2000.

The emergence of share repurchase around 2000 is clearly evident in Fig. 4, showed the percentage of firm using cash dividend or share repurchase. We can tell that the percent of cash dividend paying company keep increasing from 1997 to 2004, 21.45% to 69.18%, and the percent of companies repurchase shares decreasing from 31.6% to 22.94% during 2000 to 2003 but increasing to 31.03% in 2005 then decreasing to 21.82% in 2007. We almost can't tell there is any substitutive effect between cash dividend paying and share repurchase.

From Fig. 3, we even found that the scale of cash outflow for share repurchase is complementary to cash dividend payment in 2001 and 2007 but 2004 and 2005.



**[Insert Figure 2 here]**

**[Insert Table 1 here]**

**[Insert Figure 3 here]**

**[Insert Figure 4 here]**

### **3. Hypothesis and basic descriptive data**

#### **3.1 Hypothesis development**

The main hypothesis that we address in the paper will be showed below. According to the pervious literatures support that we infer that taxation will affect dividend policy. In order to observe the tax effect on dividend policy, we chose to focus on the imputation tax system. Since the emergence of imputation tax system come into market,

the imputation tax credit rate will be calculated in the end of calendar year by firms and being recalculated by the government unit. Under imputation tax system, company will set up an imputation tax credit account for accounting how much tax can refund to investor. In order to let the taxation burden being less on both firm and investors, firm with higher imputation tax credit rate will pay more dividends to make the imputation tax credit being more for investors. Under 25% of enterprise income tax and 10% of tax on undistributed retain earnings, firm will pay more dividends to make value of company being maximum if investors suffer from the 32.5% of personal income tax rate, From above mentioned leads to the following hypothesis:

H1. After imputation tax system took into practice, firms will pay more dividends.

H2. Imputation tax credit rate will be positively correlated to dividend payout.

Investors will adjust their original preference on dividend payout since firms pay dividend with imputation tax credit. Even though investors still need the power to force the managers to reconsider the dividend policy and follow the expected dividend payout of investors. So that we conclude that the level of shares owned by different type of investors will make different ability to force the corporate managers. From Fig. 2, we found that shares owned by major investors and institutional investors have been increasing since 1997. We can conclude that both individual and institution investors will have the taxation incentive after imputation tax system. This leads to the following hypothesis:

H3. Under the tax effect from imputation tax system, investors have incentive to ask for more dividends.

And the other main hypothesis that I address in this paper that, in U.S., share repurchases have increasingly substituted for dividend in the sense of being earnings payouts in the early 1980s. Since Lintner (1956), it has been known that managers are

reluctant to cut dividends. Brav, Graham, Harvey and Michaely (2005) report survey evidence that managers of firms with long-standing dividends are especially reluctant to reduce dividends and would prefer not to be paying dividends at all, but feel compelled to do so by their firms' long-term dividend payout history. As a result of firm with a dividend history, managers can now use repurchase to distribute earning to shareholders. We expect that dividend policy becomes increasingly conservative over time to minimize the possibility of dividend cut or omissions. Conversely, since managers have the flexibility to vary repurchases, earnings are more likely to be paid out with repurchase than with dividend.<sup>5</sup> So we conclude that there is a substituted effect between share repurchase and dividend payout. This leads to the following hypothesis:

H4. Cash dividend payout will be negatively correlated to the regulation of share repurchase take into practice.



## 3.2 Methodology

### 3.2.1 OLS model

To investigate the impact of taxation and government regulation that we first use dummy variables to trace the change of dividend policy. For tax reform, we add imputation tax credit rate to reveal the power of tax effect on dividend payout and in order to consider the substitution effect between cash dividend and share repurchase, we choose cash for repurchasing share per net income to reveal the power of government regulation.

### 3.3.2 Partial adjustment model

Lintner (1956) conducted with 28 U.S. companies to investigate the reason behind their dividend policy. This research found that there is a considerable difference in

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<sup>5</sup> It is well known that managers have more flexibility to change repurchase than dividend (e.g. Guay and Harford, 2000). Survey evidence indicates that managers believe that repurchases offer more flexibility than dividends.

dividend policies across companies but also unveiled some common patterns.

Marsh and Merton (1987) summarize these patterns as follow, (a).Managers believe that firms should have some long-term target payout ratio; (b).In the dividend decision, managers focus on the change in current payouts and not on the dividend level; (c).Change in dividends is usually triggered by a major unexpected and persistent change in earnings; (d).Most managers try to avoid changing the dividend if there is a high probability that this dividend change may be reversed within one year or so. Based upon these results, we use partial adjustment model, used by Lintner (1956), to formalize corporate dividend behavior. In order to investigate the impact of taxation on corporate dividend distribution behavior, the Lintner (1956) specification is modified to in incorporate both the tax dummy and tax discrimination variables (Ameziane, 2009). The original Lintner model suggests that for any year  $t$ , firms set their target level of dividend,  $D_{i,t}^*$  by relating to current reported earnings,  $E_{it}$ , by desired payout ratio  $\gamma_i$ . We follow Ameziane (2009), assume that the target payout ratio is function of tax dummy and tax discrimination. First, we take the imputation tax credit as a consideration of the target level of dividend payout, as represent in the following:

$$D_{it}^* = \gamma_i E_{i,t} + \delta ITC_{i,t} \quad (1)$$

Where  $ITC_i$  is the tax discrimination variable, imputation tax credit rate, and in any given year, the firm is assumed to adjust partially to the desired level of dividend payment and that the change is dividend per share from  $t-1$  to  $t$ . Hence, we have:

$$D_{i,t} - D_{i,t-1} = a_i + \lambda_i (D_{it}^* - D_{i,t-1}) + u_i \quad (2)$$

Where  $a_i$  is a constant that expected to be positive to reflect the reluctance of manager to reduce their dividend payment and their desire for a gradual growth in the



level of dividend;  $\lambda_i$  is the speed of adjustment coefficient, with  $0 \leq \lambda_i \leq 1$ , expected to reflect the degree of movement toward the new target;  $D_{i,t} - D_{i,t-1} = \Delta D_{i,t}$  is the actual change in the dividend and  $D_{i,t}^* - D_{i,t-1}$  is the desired change in the dividend. Combining Eqs. (1) and (2) we obtain:

$$D_{i,t} - D_{i,t-1} = a_i + \lambda_i [(\gamma_i E_{i,t} + \delta_i ITC_{i,t}) - D_{i,t-1}] + u_i \quad (3)$$

Fama and Babiak (1968) extend the partial adjustment model by including a lagged earnings variable. It assumed that the process generating the annual earnings of firm  $i$  is showed as follows:

$$E_{i,t} = (1 + \theta_i)E_{i,t-1} + v_{i,t} \quad (4)$$

where  $v_{it}$  is a serially uncorrelated error term. A further assumption is that there is full adjustment of dividends to expected earnings change  $\theta_i E_{i,t-1}$  and partial adjustment to the remainder:

$$D_{i,t} - D_{i,t-1} = a_i + \lambda_i [\gamma_i (E_{i,t} - \theta_i E_{i,t-1}) - D_{i,t-1}] + \gamma_i \theta_i E_{i,t-1} + \lambda_i \delta_i ITC_{i,t} + u_i \quad (5)$$

this is rearranged as following:

$$D_{i,t} = a_i + (1 - \lambda_i)D_{i,t-1} + \lambda_i \gamma_i E_{i,t} + \gamma_i \theta_i (1 - \lambda_i)E_{i,t-1} + \lambda_i \delta_i ITC_{i,t} + u_{i,t} \quad (6)$$

yielding the following empirically testable equation

$$D_{i,t} = a_i + (1 - \lambda_i)D_{i,t-1} + b_i E_{i,t} + c_i E_{i,t-1} + d_i ITC_{i,t} + u_{i,t} \quad (7)$$

where  $b_i = \gamma_i \lambda_i$ ,  $c_i = \gamma_i \theta_i (1 - \lambda_i)$  and  $d_i = \lambda_i \delta_i$ ,  $\lambda_i$  the speed of adjustment coefficient.

Our empirically testable model is based on Eqs. (7) and further added the tax dummy variable into the model:

$$D_{i,t} = a_i + (1 - \lambda_i)D_{i,t-1} + b_i E_{i,t} + c_i E_{i,t-1} + d_i ITC_{i,t} + e Tax\_Dummy_i + \varepsilon_{i,t} \quad (8)$$

Where  $D_{it}$ ,  $D_{i,t-1}$  are the dividend per share at time  $t$  and  $t-1$ , respectively, for firm  $i$ ;  $E_{i,t}$  is published profits (EPS $_{i,t}$ ) or cash flow(CF $_{i,t}$ ) per share at time  $t$  form  $i$  and Tax\_Dummy $_i$  is the time dummy that control for the impact of tax reform on dividend behavior of all sample firms.  $\varepsilon_i$  is a disturbance term.

**[Insert Table 2 here]**

### **3.3 Basic descriptive data**

The data used in this study were obtained from the Taiwan Economic Journal (TEJ) database.<sup>6</sup> Our sample consists of all the companies that being listed on Taiwan Stock Exchange (TSE) and the sample period is selected from 1994 to 2008. The criteria for the data choose were: (i) Only firms in the non-financial industries were to be included in the sample; Firms in the financial industry would be excluded essentially because their financial structure differs from that of other industries; (ii) Companies with incomplete financial data for the past 15 years will be excluded from our sample ; In order to response to the correct reaction of the evolution of dividend policy, we only use the data from the year when companies being listed on TSE even they had been distributed dividend before that. (iii) The company which does not use Calendar year will be eliminated.

Table 1 describes the distribution of the sample based upon the selection criteria outlined above. Throughout the fifteen-year period, the cash-dividend sample (those paying only cash dividends) comprised of 22.34% of total sample, the stock-dividend sample (those paying only stock dividends) comprised of 13.01% of all , and the dual-dividend sample (those paying both cash and stock dividends) comprised of 34.94% of all. In 1998, a total of 26 firms paid cash dividends, 77 firms paid stock

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<sup>6</sup> The TEJ database is one of the main economics resource in Taiwan which many researchers extract their financial data.

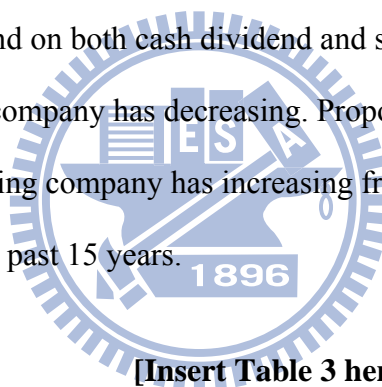
dividends and 60 firms paid dual dividends; by 2000, the respective figures had changed to 76, 22 and 93 and so on 2006, the figures had changed to 168, 6 and 226. Of these statistics, the most notable is the reduction in the number of firms paying only stock dividends, as compared to the increase in the numbers of firms using the other dividend payment methods. It should be noted that within each industry in Taiwan, most of the leading companies pay dual dividends; hence the cash-dividend sample in this study is relatively small, which is quite different from other markets. In the US, for example, as noted by DeAngelo et al. (2004), those firms paying the largest cash dividends also account for the majority of the aggregate dividends in the market. As we can see by Table 1, companies only pay stock dividends had been decreasing by 1998; at the same time, companies preferred to pay cash dividends with stock dividend and the dual dividend payout had been increasing. After 2001, the proportion of company that only pay cash dividend has been stable. The final total firm-observations are 11,038 and table 3 is the descriptive statistic of each sample.

#### **4. Empirical results**

Section 4.1 is the descriptive statistic and section 4.2 provides evidence from OLS to the tax effect and the emergence of share repurchases on dividend policy, to assess the extent, the reaction of companies to face tax reform and government regulation, by this to examine hypotheses. Section 4.3 focus on partial adjustment model, which provides the dividend adjustment speed on different period, and show that under tax reform and government regulation that company will be much more flexibility to their dividend policy.

## 4.1 Summary statistics

Table 3, which presents the summary statistics, shows that for the all sample and sub-period sample. According to the time of tax reform or government regulation change, we have different time period descriptive statistics. Before imputation tax system, the cash dividend per EPS and stock dividend per EPS are 17.54%, 49.74%, respectively, but 17.1% and 42.88% after tax reform. There is no obviously increasing between these two periods. But after 2000, which share repurchase took into practice, the average cash dividend payout has increasing to 43.35%, on the other side, stock dividend has decreasing to 15.72%. From table 1 can also show that there is no obviously changed trend on both cash dividend and stock dividend but after 2000, stock dividend paying only company has decreasing. Proportion of cash dividend paying only company and dual paying company has increasing from 11.37% and 15.56% to 32.99% and 36.41% during the past 15 years.



[Insert Table 3 here]

## 4.2 Tax effect and government regulation effect on dividend policy by OLS

### 4.2.1 Tax effect on dividend policy

In this section, first, we use OLS to test the timing structure change and incentive of paying dividend, by using dummy variable and imputation tax credit rate, respectively. We use dividend payout to be dependent variables to estimate the change of dividend policy over the sample period from 1994 to 2008. For these regressions, we include the product term from the ownership structure factors and dummy variable of tax reform, to test H3, whether investors have incentive to force managers to pay more dividends.

Under H1 and H2, we expect that in order to maximum the investors' benefit, firms will pay more dividends after imputation tax system. And the higher imputation tax credit rate that firms have, the higher dividend firms will pay to investors. The evidence in Table 4 is consistence with the prediction of H2 but not H1, we find evidence that firm with higher imputation tax credit rate will pay more cash dividend and stock dividend, the regressive coefficients are positively to cash dividend and stock dividend; the difference between cash dividend and stock dividend is negatively correlated to imputation tax credit rate, it indicates that firm will pay more stock dividend rather than cash dividend. But it's not significant to the tax effect dummy variable on cash dividend, in other words, we have no evidence to prove that firms have propensity to pay more cash dividend after imputation tax system. But to stock dividend, it's significant to be negatively correlated to the tax effect dummy variable. We infer that balanced dividend payout policy and abolishment of lagged taxation regulation result in the negatively correlated between stock dividend and the imputation tax system.<sup>7</sup>

Alli et al. (1993) used the proportion of shares owned by institutional investors to capture different tax clientele effect on different marginal tax rate of shareholders. Here we use proportion of share owned by investors which are institutional or individual to capture clientele effect after imputation tax system. Under H3, we expected that investor ask for higher dividend payout since they will gain tax credit from the new tax reform. The higher proportions of share owned by institutional investor and individual investors, the more right they can execute to force managers pay more dividends because of the tax incentive.

From table 4 we found that both proportion of institutional and individual investors are negatively correlated to the imputation tax system even thought they are

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<sup>7</sup> On 2000, The Securities and Futures Bureau in Taiwan that advocate the balanced dividend policy, which promote firms paying stock dividend with cash dividend, to avoid the value of firm being affected by diluted earning per share; at the same year, lagged tax stock dividend has been canceled .

significantly correlated. From Jianguo and Nont researched on 2009, there is strong evidence to support that in New Zealand stock market the corporate dividend payment is closely tied with management share holdings. The higher the management share holding, the lower the dividend payout ratio, which is consistent with the agency cost hypothesis reported in Chen and Steiner (1999). But there is no propensity to manager to affect dividend payout.

#### **4.2.2 Government regulation on dividend policy**

In this part we test several predictions derived from substitution hypothesis. Follow Dittmar (2000), he found that firms usually use share repurchase to substitute pay cash dividend in U.S. and Grullon and Michaely (2002) found that cash spend on repurchasing share has been increasing higher than cash dividends. In this section, follow the test as above, by using dummy variable and share repurchase per net income, respectively, to test H3 and H4.

Under H4, we expect that firm will prefer to use share repurchase to substitute cash dividend payout. For firms that exclusively use repurchase to pay out cash to shareholders, earnings are likely to explain repurchase in a manner similar to traditional relation between dividends and earnings. By table 4, we found that firms will not reduce the cash dividend payment after the government regulation change. And the correlated coefficient between cash dividend and share repurchase per net income is negative, it is not consistence with the prediction of H3 , we find no evidence to said that firm will use share repurchase to substitute cash dividend payout, in other words, there is no substituted effect but complementary effect between cash dividend and share repurchase. We thought the reasons are that the level of free cash flow of firms can afford paying cash dividend and repurchasing share, simultaneously. But we found that there is

negative correlated between share repurchase and stock dividend payout.

We infer that there is the same reason as the circumstance in tax reform, On 2000, The Securities and Futures Bureau in Taiwan that advocate the balanced dividend policy, which promote firms paying stock dividend with cash dividend, to avoid the value of firm being affected by diluted earning per share so that firms will reduce stock dividend payout but increase cash dividend payout. According to the empirical result, that firm will not use share repurchase to substitute cash dividend payout in Taiwan since the market environment is quit differ from U.S. and the purposes of share repurchase in Taiwan are not focus on distributing earning to shareholders. Overall, if firms have enough free cash flow then they will make effect will transfer to complementary effect. DeAngelo (2002) showed the same result.

**[Insert Table 4 here]**

To prevent the interaction between tax reform and government regulation, we divide the sample into two sub-period sample, 1994 to 1999 for imputation tax system · 1998 to 2003 for share repurchase. From Table 5 that we found cash dividend is significant to be positively correlated to the dummy variable of imputation tax system. The proportion of share own by institutional investor become insignificant to dividend payout. And the results on the sub-period form 1998 to 2003 are identical to the whole period sample; there is no substituted effect between share repurchase and cash dividend.

**[Insert Table 5 here]**

### 4.3 Partial adjustment model on tax effect

In this section, we follow the model formalized by Andres (2009), he use partial adjustment model (Lintner, 1956) to capture firms' attitude of facing tax reform and following Fama and Babiak (1968) that extend the partial adjustment model by including a lagged earnings variable, showed as Eqs. (4). And we combine this model with Lasfer (1996), in order to investigate the impact of taxation on corporate dividend distribution behavior, the original Lintner specification is modified to incorporate both tax discrimination variable and tax reform dummy variable.

We use both published earning and cash flow to test this model separately and simultaneously. The parameter estimates obtained from published earning (based on Eqs. (8)) are reported in Table 6. The coefficient on the lagged dividend,  $(1-\lambda)$ , is 0.686 on EPS prediction and 0.798 on cash flow prediction. Thus, the speed of adjustment,  $\lambda$ , lies within a broad range from 0.314 to 0.202 by different earning basis on whole sample period. From Table 7, our estimated speed of adjustment coefficients are at the top end of values from different countries, like the US, the UK, France and German.

Another useful statistic is the estimated target payout ratio ( $\gamma = b/\lambda$ ), which can be calculated from Table 6. The estimated target payout ration with lagged earning variables on earning per share basis and cash flow per share are 0.726 and 0.342, respectively; 0.517 and 0.364 for excluding lagged earning variables. The empirical data showed that the aggregated average payout ratios on earning per share basis and cash flow per share are 0.526, 0.481, respectively. The substantial aggregated payout ratio is lower than the estimated target payout ratio on earning per share basis but higher than the estimated target payout ratio on cash flow share basis; the cash flow basis yields parameter estimates which are closer to reality. When inspecting the results obtained by simultaneously including earnings and cash flows, we find that the explanatory power



of both the cash flow variables and the published earnings remains.<sup>8</sup> We infer that Taiwan firms pay out a lower proportion of their cash flows, however, on a published profits basis, the pattern is reversed, with Taiwan firms showing significantly payout ratios. This result also showed that dividend payout is positively correlated with the tax dummy variable; it is consistent with the result provided by OLS estimation.

**[Insert Table 6 here]**

Then we estimated dividend adjustment speed factor on each sub period sample to test whether there is structured change on firms' dividend policy. We divide whole period into two sub period according to the year of tax reform and government regulation, including 1994 to 1997 · 1998 to 2008 and 1994 to 2000 · 2001 to 2008. And we will demonstrate that behavior of firms to adjust their dividend policies by dividend adjustment speed factor on the sub period which is before and after tax reform and government regulation. Furthermore, we use the estimated target payout ratio to compare with the aggregated payout ratio to show what the circumstance of dividend payment in Taiwan is.

From Eqs. (2), if  $a_i=0$  and  $\lambda_i=1$ , the actual changes in dividends coincide with the desired changes. Conversely, if  $\lambda_i=0$ , then changes in dividend towards the desired level are not undertaken. The hypothesis that firms gradually adjust dividends in response to change in earnings and thus apply dividend smoothing implies that the speed of adjustment factor  $\lambda_i$  is within the range between 1 and 0. Furthermore, a positive  $a_i$  represents the management's resistance to reduce dividends. By table 8, panel A, we found the adjustment speed factors, which are based on earning per share basis, are 0.465, 0.339 on 1994 to 1997 and 1998 to 2008, respectively. For cash flow per share

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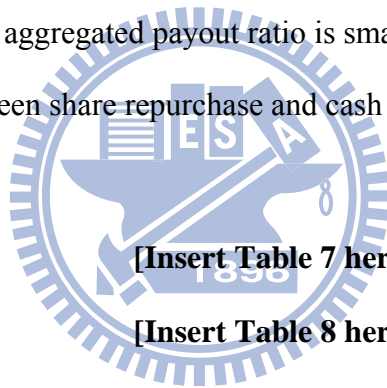
<sup>8</sup> Although the cash flow per share and earning per shares are correlated to certain extent, variance inflation factors and the related tolerance levels suggest that multicollinearity is not a problem in our analysis.

are 0.463 and 0.208. And the adjustment speed factors for earning per share basis on 1994 to 2000 and 2001 to 2008 are 0.471, 0.367, respectively. And for cash flow per share are 0.432 and 0.214. We refer the structure change to the more complicated circumstance of dividend policy to firms like tax reform and government regulation. For tax reform, firms will minimum the tax burden of all investors and maximum the value of firms so dividend policy of firms will not react as soon as before tax reform. For government regulation, even though firm will have lower speed of adjustment after government regulation but we found that the level of decreasing is slighter than the situation of tax reform. We thought the reason is that the main purpose of share repurchase in Taiwan, just as we said in section 4.2.2, is not for distributing earnings even though the original purposes of share repurchase in many other countries are helping firm to adjust share price, reissue employee stock option certificates or distribute earnings.

Furthermore, we reveal the estimated target payout ratio on earning per share basis, calculating on earning per share basis, on 1994 to 1997 and 1998 to 2008 are 0.109, 0.721, respectively. For cash flow per share, the estimated target payout ratio is 0.145 and 0.323, respectively. We found that estimated target payout ratios are increasing after both tax reform and government regulation. For the published earnings basis, the aggregate payout ratios for earning per share basis on 1994 to 1997 and 1998 to 2008 are 0.155, 0.592, respectively. For cash flow per share are 0.141 and 0.448. We find that firms will give a greater confidence to pay higher dividend before tax reform and firms will become more conservative on dividend payout after tax reform. Furthermore, cash flow per share can be better to estimate the aggregated payout ratio before tax reform, but overestimated the aggregated payout ratio.

Besides, the estimated target payout ratio for earning per share basis on 1994 to

2000 and 2001 to 2008 are 0.107, 0.745, respectively. For cash flow per share basis, the estimated target payout ratios are 0.175 and 0.491, respectively. And the aggregate payout ratios for earning per share basis on 1994 to 2000 and 2001 to 2008 are 0.224, 0.619, respectively. For cash flow per share are 0.186 and 0.47. The result shows that cash flow per share basis can be better estimated the aggregated target payout ratio. It also showed firm will have higher dividend payout before government regulation but lower after that. For tax reform, we infer that even though there are evidence said that imputation tax system will give firms incentive to positively adjust their dividend payout but it's not really consistent in Taiwan because of the propensity of balanced dividend payout. For share repurchase, we found the difference between estimated target payout ratio and aggregated payout ratio is smaller, so it proves again that the substituted effect between share repurchase and cash dividend is not significant in Taiwan.



[Insert Table 7 here]

[Insert Table 8 here]

## 5. Conclusion

In this paper, we reveal the evolution of dividend policy in Taiwan. According to the previous researches, we can conclude two major changes of regime, tax reform and government regulation, will affect the attitude of firm face to dividend payout. We test these two changes respectively and simultaneously by dummy variables to find out whether there is any effect on dividend policy from tax reform and government regulation; and estimated the speed of adjustment before and after the year when the regime changed to demonstrate there is effect on dividend.

The reported results show that taxation affects payout policy, but it's not really

following the intuitional and theoretical reaction. The empirical results show that higher imputation tax credit will force firms paying more cash dividends and stock dividends. But we found no evidence for the hypothesis, which indicate that firm will pay more dividends after imputation tax system, it is negative correlated between tax dummy variable and dividend payout. And there is no such behavior on institutional investors that to ask for higher dividend payout after imputation tax system.

For the share repurchase, the previous researches showed that repurchases are increasingly linked to earnings in a manner that suggests they are replacing regular dividends in US. Our empirical result show that there is no substituted effect but complementary effect between cash dividend and share repurchase. Conversely, there is substituted effect between stock dividend and share repurchase. And the more shares that firms repurchase will cause firms paying more cash dividends and stock dividends. We infer that stock dividend payout is increasing with firm repurchasing shares; firms repurchase share will make share price increasing so that shareholder will have tax-free capital gain from this manipulation.

Furthermore, according to result of partial adjustment model, we find that the adjustment speed will decline after tax reform and government regulation since the more complicated environment to the dividend policy. And the aggregated target payout ratio will be higher than the estimated target payout ratio but lower after tax reform and government regulation. Cash flow will be better to estimate the aggregated target payout ratio. We conclude that dividend payout ratio of Taiwan firms are based on cash flows rather than published earning. The reason of why cash flows can be better estimation for aggregated target payout ratio may be the higher degree of smoothing of the latter.

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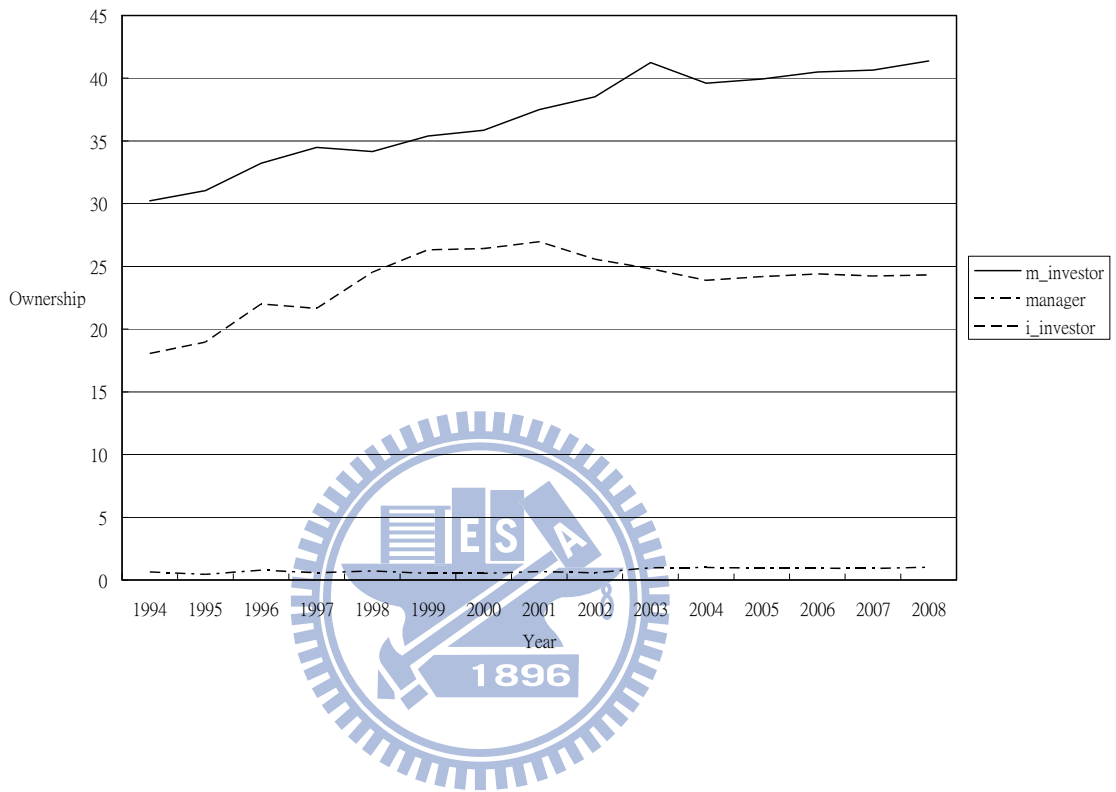
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**Figure 1**

**Trend of ownership structure from 1994 to 2008**

This figure represents the trend of ownership structure from 1994 to 2008 in Taiwan. The ratio is proportion of share owned by different investors. m\_investor represents the average proportion of shares own by board and major investors, the top ten highest share owners excluding boards and managers; I\_investors represents the average proportion of shares own by institutional investors excluding government and financial institution.

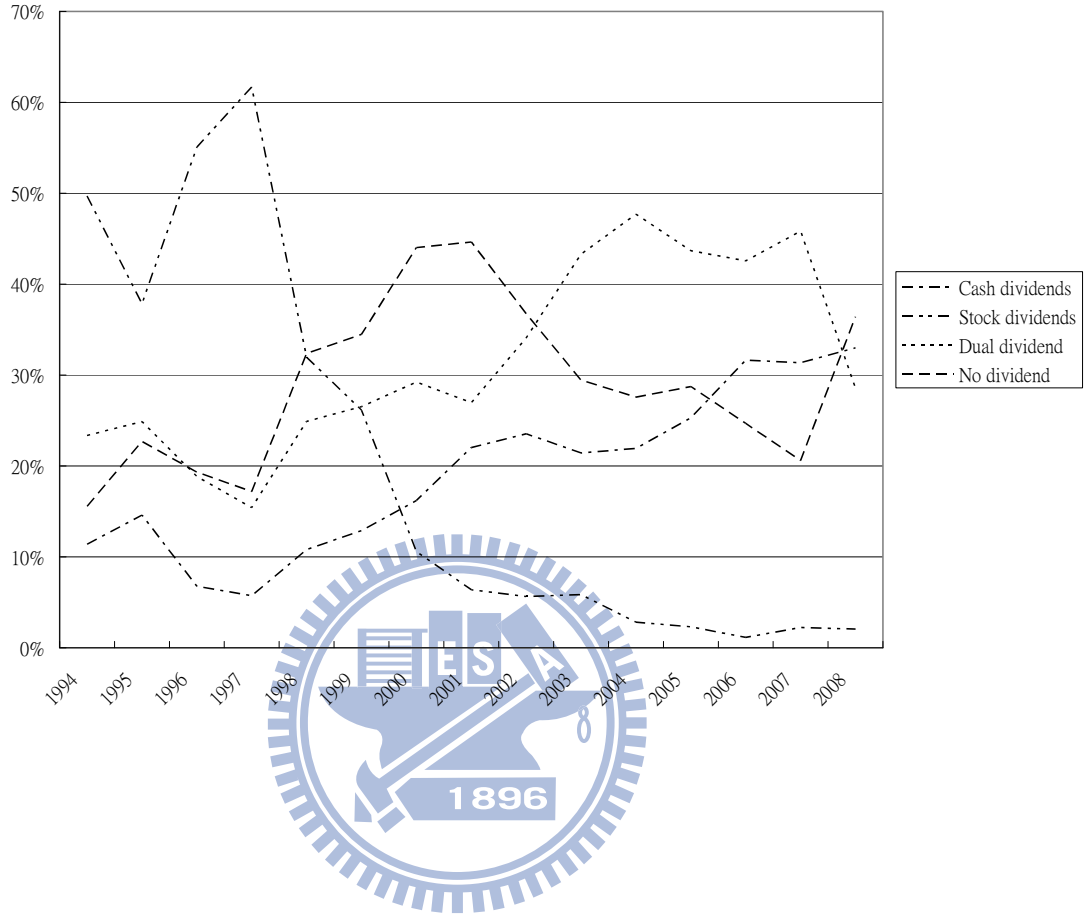




**Figure 2**

**Different types of dividend payout companies.**

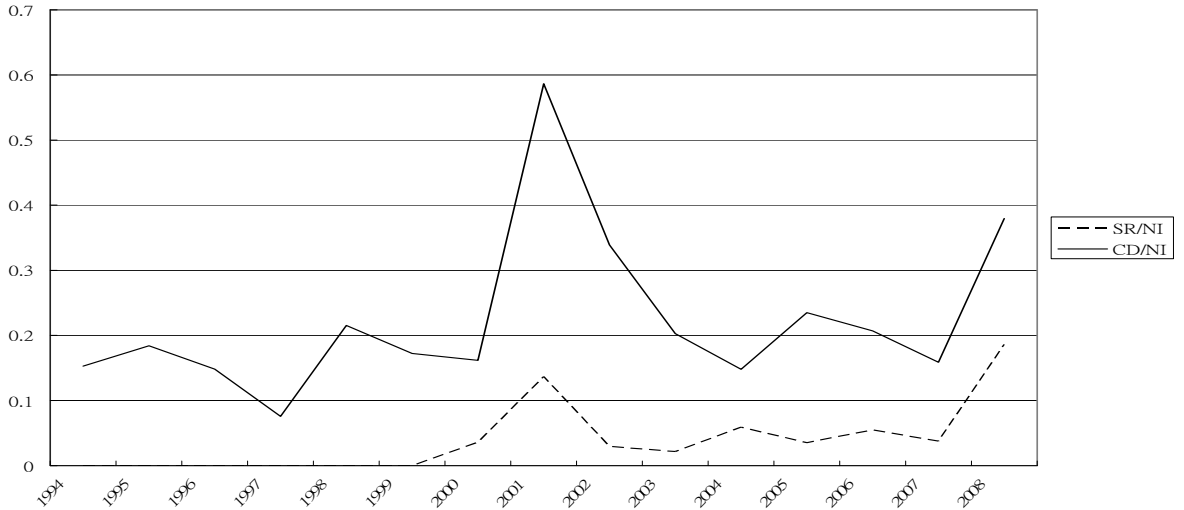
This figure represents proportion of firms which are cash dividend payout only, stock dividend payout only and dual dividend payout. No dividend represent that the companies didn't pay any dividend.



**Figure 3**

**Scale of dividend payment and cash on repurchasing shares**

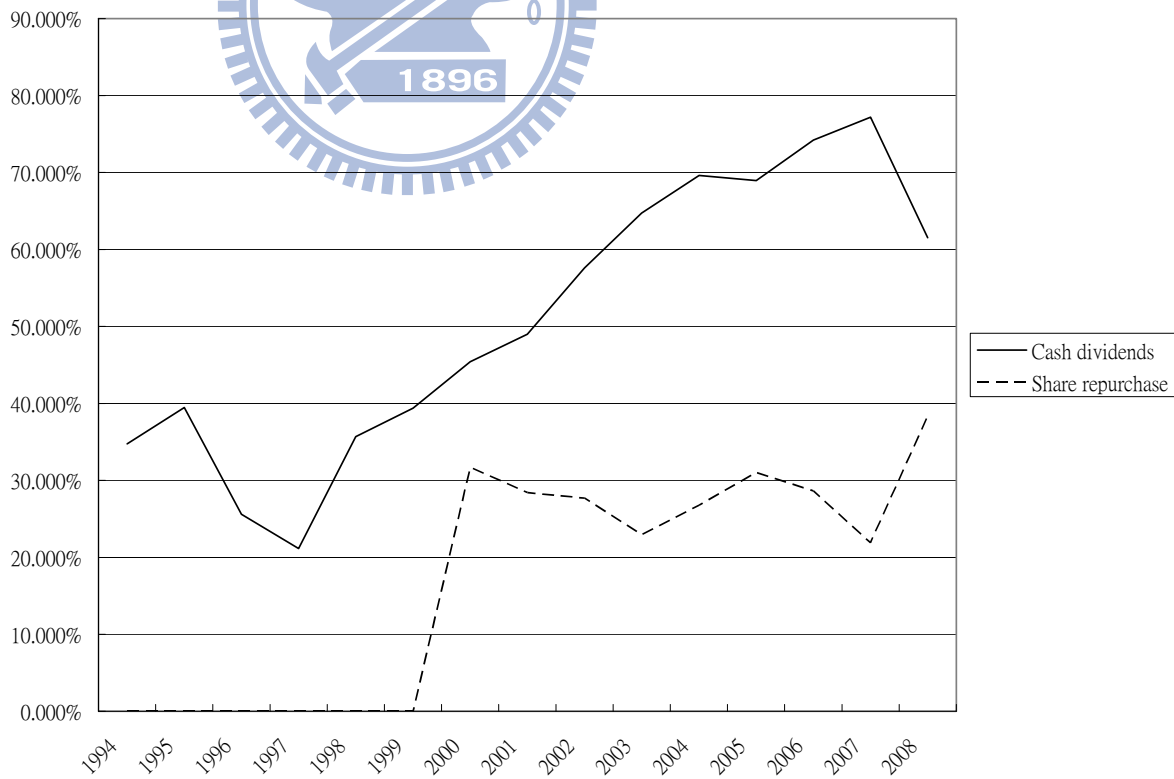
The ratio represents the cash outflow for each cash dividend paying and share repurchasing in money divide by net income after tax.



**Figure 4**

**Proportion of dividend paying and share repurchasing firms**

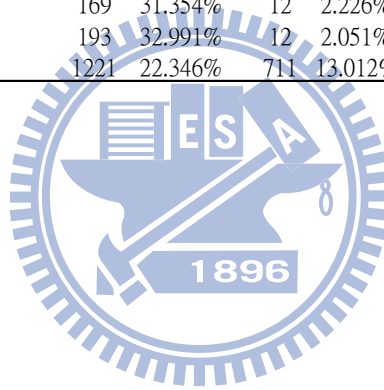
This figure presents the distribution of firm which is cash dividend paying firms and shares repurchasing firms in Taiwan.



**Table 1****Distribution of different dividend paying propensity to firms**

This table presents the proportion of different kind of dividend paying firms; the term “cash dividends” and “stock dividends” refers to those observations which are only paying cash dividend and stock dividend. And “Dual dividends” refer to those observations which are paying both cash dividend and stock dividend.

Year	Total number of firms	Cash dividends		Stock dividends		Dual dividend		No dividend	
		No.	%	No.	%	No.	%	No.	%
1994	167	19	11.377%	83	49.701%	39	23.353%	26	15.569%
1995	185	27	14.595%	70	37.838%	46	24.865%	42	22.703%
1996	207	14	6.763%	114	55.072%	39	18.841%	40	19.324%
1997	227	13	5.727%	140	61.674%	35	15.419%	39	17.181%
1998	241	26	10.788%	77	31.950%	60	24.896%	78	32.365%
1999	264	34	12.879%	69	26.136%	70	26.515%	91	34.470%
2000	284	46	16.197%	30	10.563%	83	29.225%	125	44.014%
2001	345	76	22.029%	22	6.377%	93	26.957%	154	44.638%
2002	408	96	23.529%	23	5.637%	139	34.069%	150	36.765%
2003	462	99	21.429%	27	5.844%	200	43.290%	136	29.437%
2004	497	109	21.932%	14	2.817%	237	47.686%	137	27.565%
2005	522	132	25.287%	12	2.299%	228	43.678%	150	28.736%
2006	531	168	31.638%	6	1.130%	226	42.561%	131	24.670%
2007	539	169	31.354%	12	2.226%	247	45.826%	111	20.594%
2008	585	193	32.991%	12	2.051%	167	28.547%	213	36.410%
Total	5464	1221	22.346%	711	13.012%	1909	34.938%	1623	29.704%

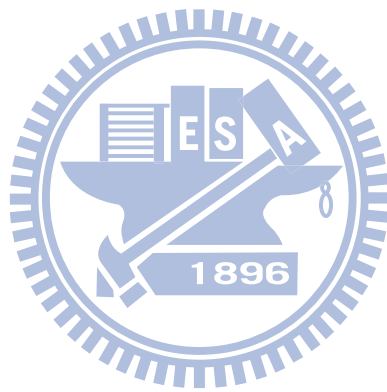


**Table 2**  
**Definition of variables**

Varaibe	Definition
Dependent variables	
C_d	Cash dividend payout ratio. Cash dividend divided by EPS.
S_d	Stock dividend payout ratio. Stock dividend divided by EPS.
DIF_d	Difference between Cash and Stock dividend divided by EPS.
SR_NI	Cash expense on Share repurchase divided by net income after tax.
CA_NI	Total Cash dividend payout divided by net income after tax
Independent Variables	
I_Investors	Percentage of Corporation own the sotck of firm.
M_Investors	Percentage of major investors own the sotck of firm where major investor defined as the board and top 10 individual investors.
Manager	Percentage of manager own the stock of firm.
StockBonus	Total Stock distribute to employee as bonus divide by total number of employee
SRR	Cash outflow from share repurchase - cash inflow from employee - stock tnsfer/earning for distribution
ITC	Imputation tax credit for investors to cut the payable personal tax.
Control Variables	
DA	Total debt divided by total asset.
FCF	
SIZE	Firm size as measured by using natural logarithm to book value of
ROA	Return on asset
BETA	Company systematic risk
LIFEYEAR	Life cycle of firm from IPO to now
Dummy Variables	
D_ITC	Dummy variable of imputataion tax system, where 1 for the year after ITC (1998) bring into practice otherwise 0.
D_Repurchase	Dummy variable of share repurchase, where 1 for the year after share repurchase (Jun, 2000) been exercised otherwise 0.
D_AMT	Dummy variable of alternative minimum tax, where 1 for year after AMT (2006) bring into practice otherwise 0.

**Table 3**  
**Descriptive statistic of full-sample and sub-sample**

	Panel A. 1994 - 2008 (Full sample)					Panel B. 1994 - 1996 (Between ITC and Repurchase)				
	Mean	Median	Maximum	Minimum	Std. Dev.	Mean	Median	Maximum	Minimum	Std. Dev.
C_D	0.37249	0.235849	110	-7.5	1.720917	0.175467	0	2.8125	0	0.351326
S_D	0.227916	0	25	-6.25	0.65955	0.497459	0.46875	5.454545	-0.06667	0.548133
DIF_D	-0.14457	0	25	-110	1.798719	0.321992	0.294118	5.454545	-2.8125	0.699869
I_INVESTOR	24.21555	18.96	97.56	0	18.61499	19.82082	14.67	97.56	0	18.23211
M_INVESTOR	1.461993	0	47.17	0	5.404908	4.408497	0.24	42.04	0	7.676005
BOARD	23.81053	20.77	95.33	2.01	13.71305	27.19399	24.69	82.44	5.2	14.92495
SR_NI_TAX	0.129165	0	121.9443	-20.4818	2.369534					
SRR?	0.005903	0	164.8557	-413.842	6.082908					
ITC	11.264	6.075	48.15	0	12.81812					
DA	0.377723	0.376051	0.987155	0.014573	0.155469	0.357979	0.360551	0.876193	0.062293	0.135304
FCF	0.026514	0.030982	0.778472	-2.19073	0.11726	-0.00084	0.015466	0.331791	-0.51331	0.096011
SIZE	15.7933	15.63086	20.29043	12.58495	1.185089	15.61371	15.46626	19.05669	13.36952	1.002404
ROA	7.225137	6.63	51.02	-93.04	8.334476	8.838408	7.98	49.21	-33.98	6.572986
BETA	0.86517	0.8712	2.4466	-0.3903	0.314434	0.823332	0.8162	1.5641	0.0829	0.265279
	Firm-year observatons : 5464					Firm-year observatons : 559				
	Panel C. 1997 - 1999 (Before Stock repurchase )					Panel E. 2000 - 2008 (After share repurchase)				
	Mean	Median	Maximum	Minimum	Std. Dev.	Mean	Median	Maximum	Minimum	Std. Dev.
C_D	0.171285	0	6.25	0	0.409193	0.433513	0.354826	110	-7.5	1.954349
S_D	0.428818	0.416667	4.166667	-1.66667	0.490128	0.157205	0	25	-6.25	0.676315
DIF_D	0.257532	0.103448	4.166667	-6.25	0.700959	-0.27631	0	25	-110	2.001566
I_INVESTOR	23.80639	20.11	77.55	0	17.56618	24.79217	19.27	93.49	0	18.69291
M_INVESTOR	9.840302	8.28	69.74	0	10.06999	16.56769	15.19	73.51	0	10.89674
BOARD	24.00627	21.42	71.8	2.11	13.13087	23.21971	20.2	95.33	2.01	13.53561
SR_NI_TAX						0.169125	0	121.9443	-20.4818	2.710233
SRR?						0.007729	0	164.8557	-413.842	6.960728
ITC	5.965826	0	40.8	0	10.178	13.45982	10.09	48.15	0	13.04005
DA	0.362539	0.36967	0.72936	0.049483	0.135842	0.382446	0.380415	0.987155	0.014573	0.160488
SIZE	15.9781	15.87827	19.16788	13.38226	1.040943	15.79	15.613	20.29043	12.58495	1.230469
ROA	6.470337	5.97	44.37	-28.96	7.137664	7.132121	6.53	51.02	-93.04	8.667381
BETA	0.889728	0.8581	1.7146	0.057	0.284619	0.87233	0.881	2.4466	-0.3903	0.325178
	Firm-year observatons : 732					Firm-year observatons : 4173				



**Table 4**

**Full sample regression between tax effect and effect from share repurchase**

This table reports ordinary least square regression with different sample set under imputation tax credit and stock repurchase. The dependent variables are dividend payout including (1) cash dividend payout, (2) stock dividend payout and (3) difference between cash and stock dividend payout. The independent variables related to ownership structure are as follows: I\_investor is institutional investors and M\_investor is included board and the top ten major investors; the independent variables related to tax reform and government regulation are ITC , imputation tax credit and SR/NI\_after tax, respectively. The dummy variable, YEAR<sub>2000</sub> equals one if the time period is after stock repurchase put into practice and zero for the time period before it. The dummy variable, YEAR<sub>1998</sub> equals one if the time period after imputation tax credit put into practice and zero for the time period before it. The companies to be included in the sample should be listed on Taiwan Stock Exchange (TSE) , financial companies are excluded from the sample. \*, \*\*, \*\*\* mean significances at 10%, 5%, 1% ,respectively.

Variables	Tax reform			Share repurchase			All sample		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
I_investor×YEAR <sub>1998</sub>	-0.0033 ** (-2.1524)	-0.0040 (-0.9575)	0.0026 * (1.4218)				-0.0001 (-0.0324)	-0.0020 (-1.3592)	-0.0018 (-0.4784)
M_investor×YEAR <sub>1998</sub>	0.0011 (0.5971)	0.0039 (1.1120)	0.0005 (1.2195)				0.0018 (0.4236)	0.0011 (0.6870)	-0.0007 (-0.1486)
I_investor×YEAR <sub>2000</sub>				-0.0042 *** (-2.6196)	-0.0040 *** (-3.9895)	0.0009 (0.1404)	-0.0042 (-1.0481)	-0.0030 (0.8262)	0.0054 (1.3144)
M_investor×YEAR <sub>2000</sub>				0.0018 (0.9169)	0.0017 (0.1922)	-0.0024 (-0.0569)	-0.0012 (-0.0081)	0.0006 (0.3093)	0.0005 (0.1082)
SR/NI_after tax				0.1837 *** (19.5270)	0.1819 *** (19.2103)	-0.1855 *** (-18.9001)	0.1837 *** (-19.5148)	0.1819 (-0.4502)	-0.1856 (-18.8948)
ITC	0.0178 *** (8.9575)	0.0194 ** (2.1091)	-0.0162 *** (-7.802)	0.0155 *** (8.0625)	0.0182 *** (9.0218)	-0.0128 *** (-6.3692)	0.0158 *** (8.1537)	0.0188 *** (3.9692)	-0.0128 (-6.3282)
DA	-0.3755 ** (2.3131)	-0.2936 * (1.3104)	0.4575 *** (2.6939)	-0.3801 *** (-2.3858)	-0.2486 (-3.3291)	0.5116 *** (3.1122)	-0.3839 *** (-2.4212)	-0.2493 (2.2012)	0.5186 *** (3.1459)
SIZE	0.0644 *** (2.9499)	0.0548 ** (-2.1078)	-0.0740 *** (-3.2293)	0.0608 *** (2.8433)	0.0449 ** (2.1971)	-0.0766 *** (-3.4723)	0.0624 *** (2.9520)	0.0485 ** (-1.6787)	-0.0764 *** (-3.4589)
ROA	0.0010 (0.3609)	0.0069 *** (2.1099)	0.0048 (0.5245)	0.0021 (0.8776)	0.0083 *** (3.1851)	0.0041 (1.2664)	0.0019 (0.6891)	0.0080 *** (5.2535)	0.0041 (1.3084)
BETA	-0.1188 (-0.4524)	-0.0775 (-0.3501)	0.1601 ** (1.8846)	-0.1147 (-1.4624)	-0.0398 (1.1273)	0.1896 ** (2.2871)	-0.1122 (-1.392)	-0.0396 (2.3716)	0.1847 ** (2.2223)
YEAR <sub>1998</sub>	0.0387 (0.3676)	-0.2866 *** (-8.4263)	-0.3639 *** (-3.4359)				-0.1867 (-1.0790)	-0.2605 (-1.0699)	0.1128 (0.6333)
YEAR <sub>2000</sub>				0.1144 ** (1.3931)	-0.2703 *** (-1.4245)	-0.5073 *** (-5.6112)	0.2458 (1.3959)	-0.1027 (-5.2957)	-0.5943 *** (-3.2228)
R <sup>2</sup>	2.18%	2.64%	2.29%	8.65%	7.42%	9.01%	8.70%	7.49%	9.04%
Adj. R <sup>2</sup>	2.02%	2.50%	2.13%	8.48%	7.25%	8.84%	8.47%	7.26%	8.80%
N	5464	5464	5464	5464	5464	5464	5464	5464	5464

**Table 5****Tax effect and share repurchase on sub-sample**

This table reports ordinary least square regression with different sub-sample set under imputation tax credit and stock repurchase. The dependent variables are dividend payout including (1) cash dividend payout, (2) stock dividend payout and (3) difference between cash and stock dividend payout. The independent variables related to ownership structure are as follows: I\_investor is institutional investors and M\_investor is included board and the top ten major investors; the independent variables related to tax reform and government regulation are ITC, imputation tax credit and SR/Ni\_after tax, respectively. The dummy variable, YEAR<sub>2000</sub> equals one if the time period is after stock repurchase put into practice and zero for the time period before it. The dummy variable, YEAR<sub>1998</sub> equals one if the time period after imputation tax credit put into practice and zero for the time period before it. The companies to be included in the sample should be listed on Taiwan Stock Exchange (TSE), financial companies are excluded from the sample. \*, \*\*, \*\*\* mean significances at 10%, 5%, 1%, respectively.

Variables	1994~1999			1998~2003		
	(1)	(2)	(3)	(1)	(2)	(3)
I_investor×YEAR <sub>1998</sub>	-0.0009 (-3.7125)	-0.0008 (-3.5121)	0.0001 (0.1071)			
M_investor×YEAR <sub>1998</sub>	0.0014 (0.5712)	-0.0007 (-0.9412)	-0.0021 (-1.1142)			
I_investor×YEAR <sub>2000</sub>				-0.0018 (-0.4781)	-0.0009 (-0.6191)	0.0009 (0.3201)
M_investor×YEAR <sub>2000</sub>				0.0034 (0.2531)	0.0010 (0.0721)	-0.0024 (-0.1312)
SR/Ni_after tax				0.0820 *** (3.2215)	0.0021 (0.0291)	0.0799 *** (3.1150)
ITC	0.0139 *** (5.1291)	0.0066 ** (2.1412)	-0.0073 *** (-3.2241)	0.0119 *** (2.7679)	0.0037 ** (2.3214)	-0.0083 *** (-3.6715)
DA	-0.3329 *** (-2.9612)	0.0521 (0.5125)	0.3849 *** (3.4512)	-0.2526 (-0.0912)	0.2403 (0.0098)	0.4929 ** (2.0152)
SIZE	0.0732 *** (3.1599)	0.0080 *** (2.6192)	-0.0651 *** (-4.1523)	0.0721 *** (5.3193)	-0.0255 (-0.1028)	-0.0975 *** (-3.2198)
ROA	-0.0046 *** (-6.3612)	0.0148 *** (2.4910)	0.0194 *** (3.8991)	-0.0006 (-0.0071)	0.0156 *** (0.2519)	0.0162 *** (3.9912)
BETA	-0.0577 * (-1.3121)	0.0100 (0.0015)	0.0677 (0.0412)	-0.1581 ** (-2.0172)	0.2057 *** (3.7561)	0.3638 *** (5.0192)
YEAR <sub>1998</sub>	0.1879 *** (5.2215)	-0.2181 *** (-2.8712)	-0.0302 (-0.0129)			
YEAR <sub>2000</sub>				0.0388 *** (2.3512)	-0.2703 *** (-3.1129)	-0.3092 *** (-2.512)
R <sup>2</sup>	14.41%	10.56%	8.00%	10.29%	5.26%	8.17%
Adj. R <sup>2</sup>	13.80%	9.93%	7.36%	9.57%	4.51%	7.44%
N	1575	1575	1575	1769	1769	1769



**Table 6****Partial adjustment model on full sample**

This table presents the result of partial adjustment model and (a) for added lagged earning variable, (b) for the original model.

Variables	OLS in EPS		OLS in CF		OLS in both
	(a)	(b)	(a)	(b)	
constant	-0.154 ***	-0.193 ***	-0.078 ***	-0.074 ***	-0.176 ***
$D_{i,t-1}$	0.686 ***	0.615 ***	0.798 ***	0.805 ***	0.659 ***
$EPS_{i,t}$	0.228 ***	0.199 ***			0.217 ***
$EPS_{i,t-1}$	-0.069 ***				-0.071 ***
$CF_{i,t}$			0.069 ***	0.071 ***	0.032 ***
$CF_{i,t-1}$			0.006 *		0.001
Tax discriminatoin variable	-0.186 ***	-0.177 ***	0.041	0.035	-0.169 ***
Tax Dummy	0.224 ***	0.252 ***	0.109 ***	0.109 ***	0.224 ***
R-squared	84.35%	83.83%	77.32%	77.30%	84.72%
Adjusted R-squared	84.34%	83.82%	77.29%	77.29%	84.70%
No.	5030	5030	5030	5030	5030

**Table 7****Estimated speed of adjustment and payout ratios form previous study**

- a. Parameter from the model including lagged earnings.  
b. For firms with institutional shareholders owning in excess of 5%.

Study	Sample	Period	Speed of adjustment	Target payout ratio	
				Estimated	Arithmetic average
Lintner (1956)	All U.S. firms	1918-1940	0.30	0.50	
Behm and Zimmermann (1993)	32 major quoted German firms	1962-1988	0.26; 0.13 <sup>a</sup>	0.48	0.58
McDonald et al. (1975)	75 French firms randomly selected from 400 largest frims	1962-1968	0.12-0.33	0.41-1.01	
Short et al. (2002)	211 U.K. frims	1988-1992	0.38	0.19 <sup>b</sup>	0.26
Benzinho (2004)	All 34 firms listed on Euronext Lisbon	1990-2002	0.35	0.22	0.42
Aivazian et al. (2006)	All U.S. firms in Compustat database	1981-1999	0.24	0.50	0.26

**Table 8****Partial adjusted model on sub-periods**

This table presents the partial adjustment model on sub-period and (c) for earning per share basis, (d) for cash flow per share basis.

Panel A. Partial adjustment model on 1994~1997 and 1998~2008

Variables	1994~1997		1998~2008	
	(c)	(d)	(c)	(d)
constant	0.038 ***	0.067 ***	0.102 ***	0.036 *
$D_{i,t-1}$	0.535 ***	0.537 ***	0.661 ***	0.792 ***
$EPS_{i,t}$	0.051 ***		0.244 ***	***
$EPS_{i,t-1}$	-0.017 **		-0.068 ***	***
$CF_{i,t}$		0.067 *		0.075 ***
$CF_{i,t-1}$		0.537		0.008 *
Tax discriminatoin variable			-0.003 ***	0.000
R-squared	39.70%	37.86%	85.43%	77.75%
Adjusted R-squared	39.45%	37.59%	85.42%	77.73%
No.	710	710	4320	4320

Panel B. Partial adjustment model on 1994~2000 and 2001~2008

Variables	1994~2000		2000~2008	
	(c)	(d)	(c)	(d)
constant	0.026 *	0.054 ***	0.116 ***	0.041 *
$D_{i,t-1}$	0.529 ***	0.568 ***	0.633 ***	0.786 ***
$EPS_{i,t}$	0.050 ***		0.273 ***	
$EPS_{i,t-1}$	0.012 *		-0.077 ***	
$CF_{i,t}$		0.017 ***		0.083 ***
$CF_{i,t-1}$		0.011 ***		0.005
Tax discriminatoin variable	0.00456 ***	0.00482 ***	-0.003 ***	-0.001
R-squared	45.18%	40.89%	86.60%	77.97%
Adjusted R-squared	45.03%	40.72%	86.59%	77.94%
No.	1442	1442	3588	3588