# How the introduction of stock repurchases affects dividend payouts under a full imputation system?
# 兩稅合一下實施庫藏股對股利政策之影響？

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**Abstract:** This study investigates whether the introduction of repurchases in 2000 affects the payout policy of TWSE (Taiwan Stock Exchange)-listed firms. For this purpose, we adopt Lintner's (1956) model for both cash dividends and total payouts to examine the perfect substitute effect. The introduction of dividend imputation and stock repurchases does increase total payout ratios. We find that cash dividends are stickier than total payouts in Lintner's model. Under a full imputation system as well as a tax-free capital gain environment, TWSE-listed firms do not substitute stock repurchases for dividends. Additionally, Taiwan stock market is classified as having poor legal shareholder protection market that is attributed to the dividend substitute model (La Porta *et al.*, 2000). However, our finding is consistent with the dividend outcome model that firms with strong corporate governance have higher dividend payouts than firms with weak corporate governance.

**Keywords:** Dividends, repurchases, total payouts, Lintner model, corporate governance.

摘要：本研究探討 2000 年起，台灣開放實施庫藏股買回制度後，對公司現金股利政策的影響。我們分別以現金股利和總現金發放，透過 Lintner (1956) 模型驗證完全替代效果以及財務彈性假說。而且，台灣的股票市場被 La Porta

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*et al.* (2000) 歸類為法令對小股東保護較弱的市場之一，股利政策應該適用股利替代模型，本研究結合股利代理模型與 Lintner 模型，進一步驗證公司治理對現金股利政策的影響。本研究發現，在兩稅合一及資本利得免稅的環境下，庫藏股買回制度開放後，台灣上市公司的現金股利與總現金發放同時增加，但是，與總現金發放相較，現金股利較具有僵固性，此一結果不符合現金股利與庫藏股完全替代假說，卻支持現金股利來自持久盈餘的財務彈性假說。最後，本研究發現，公司治理良善的公司，所發放的現金股利與總現金發放金額，比公司治理較弱者高，該結果不支持股利替代效果，而是符合股利結果模型。

**關鍵詞**：現金股利、庫藏股、總現金發放、Lintner 模型、公司治理

# 1. Introduction

Lintner (1956) conducted a pioneering survey on financial executives to investigate how firms determine their dividend policies. Almost five decades later, Brav, Graham, Harvey, and Michaely (2005) conducted a similar survey based on Lintner's findings. Their survey established that managers were reluctant to make dividend changes that might have to be reversed and instead smoothed dividends relative to earnings. Miller and Modigliani (1961) argued that in a perfect market, dividends completely substitute for stock repurchases. Miller and Scholes (1978) suggested that the preference of investors for dividends or capital gains depended on the relative tax rules governing possible tax arbitrage. However, the proportion of dividend payers has decreased and most cash dividends are distributed by a few large firms in the United States (DeAngelo, DeAngelo, and Stulz, 2006; Denis and Osobov, 2008; Fama and French, 2001). U.S. listed firms decreased cash dividend payouts but increased the amount of stock repurchases between 1978 and 2005 (Fama and French, 2001; Grullon and Michaely, 2002; Skinner, 2008). Investors have viewed stock repurchases as one of the most important financial instruments to substitute for cash dividends in the United States (Grullon and Michaely, 2002) and European Union (von Eije and Megginson, 2008). However, stock repurchases are made in addition to dividends and thus do not substitute for them in Sweden (Jansson and

Larsson-Olaison, 2010).

Most of the previous research has examined Lintner's (1956) partially adjusted model with dividends but not with repurchases; however, Skinner (2008) and Andres *et al*. (2015) expanded Lintner's dividend model to total payouts (dividends and repurchases). Skinner (2008) determined that total payouts provide a clearer explanation than dividends for U.S. listed firms between 1970 and 2005. Andres *et al*. (2015) used Lintner's model to analyze how the introduction of repurchases affected the dividend payouts for German listed firms over 1988~2008. They observed that German listed firms used permanent earnings to pay regular dividends, and transitory earnings to pay special dividends and stock repurchases. Their results are consistent with the financial flexibility hypothesis (Jagannathan, Stephens, and Weisbach, 2000). However, the stock repurchases did not perfectly substitute for special dividends. Benefitting from the tax reform in 1998 and the 2000 change in repurchase law in Taiwan. This study investigates the dividend/repurchase substitute effect (Miller and Scholes, 1978) under a low or no tax arbitrage environment after 2000, which is challenging to do in other countries. Under a full imputation system as well as a tax-free capital gain environment, we find TWSE-listed firms do not substitute stock repurchases for dividends. The cash dividends are stickier than the total payouts in Lintner's model.

Even though we cannot fully explain why firms pay dividends under an unfavorable tax treatment for dividends (Black, 1976), tax is one of the factors that affects dividend policy (Grullon and Michaely, 2002; Miller and Scholes, 1978). Germany and Taiwan have similar regulations for stock repurchases but contrasting tax systems. Stock repurchases were effectively prohibited until 1998 in Germany and 2000 in Taiwan, but German firms decreased dividend payout ratios after 1998 (Andres *et al*., 2015) whereas Taiwanese companies increased dividend payout ratios after 2000 (Liu, Chiou, and Yang, 2014). Tax-based explanations partially describe the evolution of corporate payout policies in both Germany and Taiwan. In 2001, the tax system in Germany changed from a full imputation system to a partial imputation system, which is a favorable tax treatment for repurchases. In contrast, tax system in Taiwan changed from a classical system to a full imputation system in 1998, which is a favorable tax

treatment for dividends[3]. The TWSE-listed firms increased cash dividends and aggregate dividends following tax reform. Consistent with the tax preference hypothesis, a higher level of tax deductible rate was associated with a higher cash dividend payout ratio. However, the stock dividends which were treated as a type of dividend for taxation purposes decreased under dividend imputation (Chan and Lin, 2017). Australia has similar tax reform, changing from classical tax to imputation tax, to Taiwan, but does not prohibit stock repurchases. Australian firms raise cash dividends and gross dividends subsequent to the tax reform. The incentive to change payout policy is dependent upon each firm's available tax credits. Moreover, the firms change the form which dividend is paid, increasing the use of stock dividends and off-market stock repurchases[4] (Pattenden and Twite, 2008).

Andres *et al*. (2015) examined how the introduction of stock repurchases affects corporate payout policy with German firms under a partial imputation system. This study analyzes the same issue with TWSE-listed firms, but under a full imputation system. Subsequent to the 1998 tax reform, the preference for dividends versus repurchases depends on an investor's status (domestic versus foreign) and personal tax rate, and corporate investors are largely indifferent between dividends and stock repurchases. If a perfect substitute effect exists among dividends, stock repurchases, and cash refunds, the total payout ratio should not change over the sample period. The parameters of a Lintner model of total payout should not be affected by the introduction of stock repurchases. Furthermore, according to the financial flexibility hypothesis (Jagannathan *et al*., 2000), firms use permanent earnings to pay regular dividends, and transitory earnings to pay special dividends and stock repurchases. The volatility of repurchases, coming from transitory earnings, should be larger than the corresponding value of the dividends. Hence, the speed of adjustment coefficient

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[3]  Individual investors can deduct their tax credit on dividends with a top rate of 33.33% when they file an individual income tax return. If a firm pays out all of its earnings, there is effectively only one layer of tax, which is the tax on the shareholder. The dividend tax rate of domestic individual investors decreased considerably after the introduction of dividend imputation.

[4]   In Australia, the tax treatment of on-market and off-market stock repurchases differs. Off-market offers may include a dividend component that has a tax credit. On-market offers are subject to capital gain tax.

is larger in a Lintner model of total payout than in a Lintner model of dividends. Finally, this study further investigates the relationship between corporate governance and payout policy. The Taiwan stock market is classified as having poor legal shareholder protection (La Porta *et al.*, 2000); therefore, the corporate dividend policy should be consistent with the dividend substitute model.[5] The dividend substitute model predicts that weak corporate governance (WCG) firms with high growth opportunity should have higher dividend payout ratios than strong corporate governance (SCG) firms with low growth opportunity.

Our paper contributes to the literature in several ways. First, we examine how the introduction of stock repurchases, where capital gains are tax exempt, affects dividend payouts under a full imputation system. Second, Comparing Lintner's partial adjustment model across different tax systems provides new evidence about how firms determine their payout policies. The introduction of dividend imputation and stock repurchases affects total payout ratios of TWSE-listed firms. This result is consistent with Pattenden and Twite (2008), they find gross dividend payouts are more volatile in Australia after tax reform. Third, we investigate the financial flexibility hypothesis, that is, whether the speed of adjustment coefficient of the total payout is larger than the dividend in Lintner's model after 2000. Our finding that dividends are more rigid than total payouts is consistent with the flexibility/payout hypothesis. Fourth, we use the first ranking data of corporate governance in 2014 to investigate the relationship between corporate governance and dividend policy. We find that SCG results in a higher percentage of dividend payers and larger dividend payout than WCG.

The remainder of this paper is organized as follows. Section 2 reports on the institutional environment and tax treatment in Taiwan, Section 3 describes the development of hypotheses and methodology, Section 4 presents the findings.

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[5]    La Porta *et al*. (2000) provided remarkable insights on the relationship between the agency problem and dividends; they formulated and tested two agency hypotheses of dividends from the perspective of country-level corporate governance, which are the outcome and substitute models. The outcome model predicts that stronger minority shareholder protection (strong corporate governance) should be associated with higher dividend payouts, which contradicts the substitute model's prediction. Furthermore, the outcome model predicts that in countries with adequate shareholder protection, companies with greater investment opportunities should have lower dividend payout ratios, whereas the substitute model predicts that in countries with poor minority shareholder protection (weak corporate governance), firms with greater investment opportunities might pay out more dividends to maintain their reputation.

Section 5 describes the relationship between corporate governance and payout policy. Finally, Section 6 presents concluding remarks.

# 2. Institutional environment and tax treatment

This section describes the institutional environment and tax treatment of TWSE-listed firms.

## 2.1 Dividends

Taiwanese firms pay regular annual dividends, but not special dividends. The dividend payouts are decided in regular shareholder meetings, where shareholders usually vote in favor of the board of directors' proposal. The shareholder meetings are held before June and the dates of payment are usually in the third quarter. The firms' dividends of the current year are paid in the subsequent year (e.g., the firm's 2014 dividends are paid in 2015).

## 2.2 Stock repurchases

To prevent the manipulation of stock prices, stock repurchases were effectively prohibited in Taiwan until July 2000 and permitted with the enactment of a new law in August 2000.[6] Firms expecting to buy back stock must follow a standard procedure voted in by the board of directors. When a firm engages in stock repurchase, it must set up the target stock price range, volume, and execution date two months in advance. At the end of the stock repurchase procedure, the firm must disclose the number of shares repurchased. The upper bound of the stock repurchase volume is 10% of outstanding shares[7]; however, firms are authorized but not obligated to implement their proposed plans. Even if firms do not completely achieve their stock repurchase plans, they can announce

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[6]  According to Article 28-2 of the Securities Exchange Law, listed firms can repurchase common stocks under the following three conditions: (1) for employee stock option plans or as incentives of compensation programs, (2) to prevent the extreme fluctuation of the stock price to protect stockholders from capital loss, and (3) as conversion objects of convertible securities.

[7]  The Canadian stock repurchase regulatory environment is similar to the Taiwanese environment. In Canada, stock repurchase programs last one year and are limited to the maximum of either 10 percent of the public float or 5 percent of shares outstanding (Ikenberry, Lakonishok, and Vermaelen, 2000).

another repurchase proposal in the future. Skinner (2008) argued that a firm buying back stocks and reissuing them in the future does not constitute a payout to shareholders. According to Taiwanese repurchasing laws, listed firms must retire or reissue stocks in six months or three years according to the repurchase objective. However, stocks are rarely reissued because regardless of the objectives the firm claims, most repurchases are retired in six months or three years.

## 2.3 Cash refund

Besides stock repurchases, there are two other types of capital reduction: making up losses and cash refunds. Making up losses reduces both capital and retained losses, but distributes no cash to shareholders. Cash refunds reduce capital and distribute cash to shareholders, but according to Article 168 of the Company Act, firms expecting to reduce capital must follow a standard procedure voted in during regular shareholder meetings. The cash refund is a primary tool used by firms that have no adequate investment opportunities. Firms that refund cash reduce capital and increase earnings per share; therefore, cash refunds are viewed as a means of liquidating dividends paid by firms to shareholders, as well as being tax exempt.

If a firm's stock price is higher than par value (NT$10 per share), cash refunds might be a more desirable alternative than stock repurchases because the former enables firms to benefit from increasing earnings per share. However, although not prohibited by the Company Act, cash refunds were not used by TWSE for listed firms until 2002. If a firm's investment return is lower than the corresponding value of shareholders, cash refunds are a better choice than investment and should be executed by firms with abundant cash to reduce capital in order to increase earnings per share.

## 2.4 Taxation of dividends and repurchases

Until 1998, Taiwan operated a classical tax system where dividends and retained earnings were taxed at the corporate rate. In addition, before December 1998, domestic individual taxpayers could deduct dividends (not exceeding NT$270,000 per year, including cash and stock dividends) of listed firms with exemption for themselves. Since capital gains were tax exempt for all investors

under the classical tax system, repurchases were clearly more favorable than dividends. A full imputation system was introduced in 1998[8], whereby dividends paid to domestic individual investors are essentially taxed at the investors' personal tax rate, and retained earnings are taxed at the corporate tax rate. Moreover, if the retained earnings of the current year are not distributed by a firm, an additional tax is levied on them at a rate of 10%. Consequently, dividends are favored by investors with a personal tax rate below the corporate tax rate, and repurchases by those whose personal rate is higher than the corporate rate.

In summary, the pre-1998 tax system seemed to favor capital gains; however, corporations could not repurchase stocks until 2000. Subsequent to the 1998 tax reform and the 2000 law change, the preference for dividends versus repurchases depends on an investor's status (domestic versus foreign) and personal tax rate. For corporate investors, not only are dividends from the shares held in other companies essentially tax free, but capital gains are also tax exempt; therefore, corporate investors are largely indifferent regarding dividends and repurchases. Compared with domestic investors, foreign investors who do not receive tax credit should prefer repurchases.

# 3. Hypotheses and methodology

## 3.1 Hypothesis development

The classical Lintner's model (1956) was presented during a time when repurchases were not popular. However, Skinner (2008) argued that repurchases would become the dominant payout form by firms in the United States, and Andres *et al*. (2015) found that for German listed firms, the total payouts are better suited for Lintner's model than dividends when repurchases are permitted. In Taiwan, listed firms pay regular dividends annually, but do not pay special dividends; hence, if a substitute effect exists among dividends, repurchases, and cash refunds, the total payout should not change over the sample period. The total payout offers a better explanation than dividends in Lintner's model after

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[8]    In 2015, a partial imputation system was introduced; now only 50% of corporate tax paid by firms is deductible for domestic personal investors.

2000.

$H_1$ (perfect substitute): The introduction of repurchases in 2000 does not affect the parameters of the Lintner model for total payouts.

Subsequent to the law change, firms have executed stock repurchases from 2000. Moreover, some firms with abundant free cash flow have executed cash refunds to increase earnings per share from 2002. The financial flexibility hypothesis implies that regular dividends are paid by permanent earnings, and stock repurchases and cash refunds are paid by transitory earnings.

$H_2$-I (flexibility/payout): Dividend changes are affected by changes in permanent earnings, and not related to changes in transitory earnings.

Stock repurchases and cash refunds accommodate more rapid adjustments to temporary changes in earnings, as reflected by the high speed of adjustment during the repurchase period. Hence, after 2000, the adjustment speed in Lintner's total payout model should be higher than that in Lintner's dividend model.

$H_2$-II (flexibility/speed of adjustment): The speed of adjustment coefficient is larger for total payouts than for dividends in Lintner's model.

La Porta *et al.* (2000) found that firms operating in countries with greater legal protection of minority shareholders pay higher dividends. Moreover, in these countries, high growth firms pay lower dividends than low growth firms. However, poorly protected shareholders seem to take whatever dividends they can get, regardless of investment opportunities. Taiwan is classified with the countries where minority shareholders are poorly protected. Based on the dividend outcome model, SCG firms have larger dividend payout ratios than WCG firms. Firms with strong growth prospects have lower dividend payout ratios than firms with poor growth prospects within the SCG group. By contrast, the dividend substitute model predicts that high growth firms pay higher dividend payout ratios than low growth firms within the WCG group. Mitton (2004) further found that a firm's dividend payout ratio is affected by firm-level corporate governance in a single country. The firm-level corporate governance arrangements directly affect stock repurchasing behavior in Sweden (Jansson and Larsson-Olaison, 2010). However, in Australia corporate governance variables show no significant influence on the buyback decisions (Yarram, 2013).

In this study, we use the 2014 corporate governance ranking provided by the

TWSE in 2015 to decompose our sample firms into subgroups by firm-level corporate governance (SCG and WCG), and examine the relationship between corporate governance and payout policy after the permission of repurchases. We expect that for both the SCG and WCG groups, the total payouts should more effectively explain Lintner's model than dividends.

**H$_3$-I** (dividend agency/firm-level corporate governance): SCG firms have higher dividend payout (and total payout) ratios than WCG firms.

**H$_3$-II** (dividend agency/outcome model): For the SCG group, high growth firms pay lower dividend payout (and total payout) ratios than poor growth firms.

**H$_3$-III** (dividend agency/substitute model): For the WCG group, high growth firms pay higher dividend payout (and total payout) ratios than poor growth firms.

**H$_3$-IV** (dividend agency/total payout): The total payouts should more effectively explain Lintner's model, for both the SCG and WCG groups, than dividends post-2000.

## 3.2 Methodology

Corporate managers are usually reluctant to make dramatic dividend changes and smooth dividend payouts (Lintner, 1956; Brav *et al.*, 2005). When a firm develops a dividend policy, it considers not only the dividend payouts of the current period but also the level of past periods. A dynamic panel data model (Arellano and Bover, 1995) that undergoes a partial adjustment process can properly describe the characteristics of dividends. Hence, we use a dynamic panel data model to estimate Lintner's (1956) dividend model.

Bond (2002) argued that with a large number of cross-sectional firm observations over a small number of time periods, the ordinary least square (OLS) method yields upward-biased estimates of the coefficient of the lagged dependent variable. By contrast, the within-group estimator (WG) yields downward-biased estimates. GMM (generalized method of moments)-in-systems can be used to obtain consistent parameter estimates (Andres *et al.*, 2015; Blundell and Bond, 1998; Bond, 2002).

We research time-series and cross-sectional relationships by using the following regression model.

$$CD_{i,t} = \alpha_1\, CD_{i,t-1} + \alpha_2\, EPS_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $CD_{i,t}$ represents the cash dividends payout per share of firm i in period t, $EPS_{i,t}$ represents the earnings per share, and $\varepsilon_{i,t}$ represents residual error.

Listed firms in the United States and European Union decreased cash dividend payouts but increased the amount of share repurchases from 1978 to 2005 (Fama and French, 2001; Grullon and Michaely, 2002; Skinner, 2008; von Eije and Megginson, 2008). Hence, we consider stock repurchases per share (SR) as a component of total payouts and add it to our model.

$$(CD_{i,t} + SR_{i,t}) = \alpha_1\, (CD_{i,t-1} + SR_{i,t-1}) + \alpha_2\, EPS_{i,t} + \varepsilon_{i,t} \tag{2}$$

The financial flexibility hypothesis (Jagannathan *et al*., 2000; Andres *et al*., 2015) separates dividends into regular and special dividends, respectively coming from permanent and transitory earnings. However, Taiwanese firms do not pay special dividends under the regulations. Instead of special dividends, firms use cash refunds to distribute excess cash to shareholders, and the shareholders who receive cash refunds do not need to pay tax on it. Hence, cash refunds might be viewed as a proxy of special dividends. We add cash refunds per share (CR) to our partial adjustment model, making the variable total payouts (cash dividends, stock repurchases, and cash refunds) per share.

$$(CD_{i,t} + SR_{i,t} + CR_{i,t}) = \alpha_1\, (CD_{i,t-1} + SR_{i,t-1} + CR_{i,t-1}) + \alpha_2\, EPS_{i,t} + \varepsilon_{i,t} \tag{3}$$

Previous studies have found that most cash dividends were distributed by a few large and profitable firms with low growth opportunity (Fama and French, 2001, 2004; Skinner, 2008). Moreover, different industries might be at different stages of growth and maturity that determine their dividend policies (DeAngelo *et al*., 2006). Hence, we use firm size (the logarithm of market value of firms, LNMV) and the sales growth rate (SG) as control variables that affect a firm's payout policy. We modify our panel data model as follows.

$$\begin{aligned}(CD_{i,t} + SR_{i,t} + CR_{i,t}) = {} &\alpha_1\, (CD_{i,t-1} + SR_{i,t-1} + CR_{i,t-1}) + \alpha_2\, EPS_{i,t} \\ &+ \alpha_3\, LNMV_{i,t} + \alpha_4\, SG_{i,t} + \varepsilon_{i,t}\end{aligned} \tag{4}$$

### 3.3 Sample selection

This study examines the changes in corporate payout policy from 1985 to

2014 in Taiwan. We divide our sample period into two subperiods: without repurchase (1985~1999) and including repurchase (2000~2014). Our sample comprises 779 domestic nonfinancial firms that were listed on the TWSE in December 2014. Because these firms were initially publicly offered in different years, each firm has a different sample period. Therefore, we use an unbalanced dynamic panel data model to analyze time-series and cross-sectional relationships. The corporate payout data are collected from the Taiwan Economic Journal database. The dividend is a nominal value excluding tax credit under a full imputation system in effect after 1998. We also collect stock repurchase and cash refund data over the repurchase period 2000~2014. A firm that engages in stock repurchase must execute it within two months and disclose the number of shares at the end of each stock repurchase program. Figure 1 shows that cash dividends, stock repurchases, and cash refunds all increased after 2000 and decreased during the 2009 financial crisis. Figures 2 and 3 indicate the number and percentage of firms that paid and did not pay dividends over the period 1995~2014. From Figure 3, we find that the percentage of firms that paid dividends decreased from 1988 to 1998, and increased from 1999 to 2014, except for the slowdown during the 2009 financial crisis.
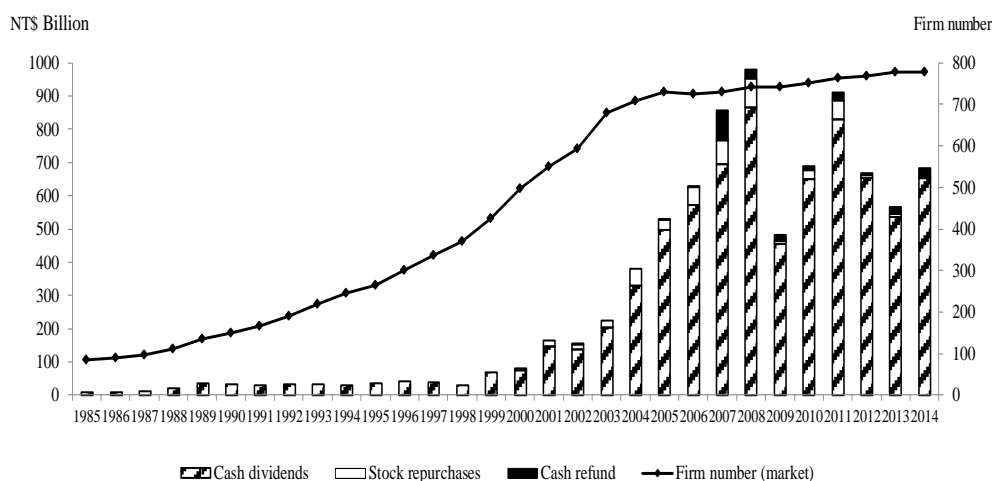


**Figure 1**
**The trends of three types of cash payout in Taiwan, 1985~2014**
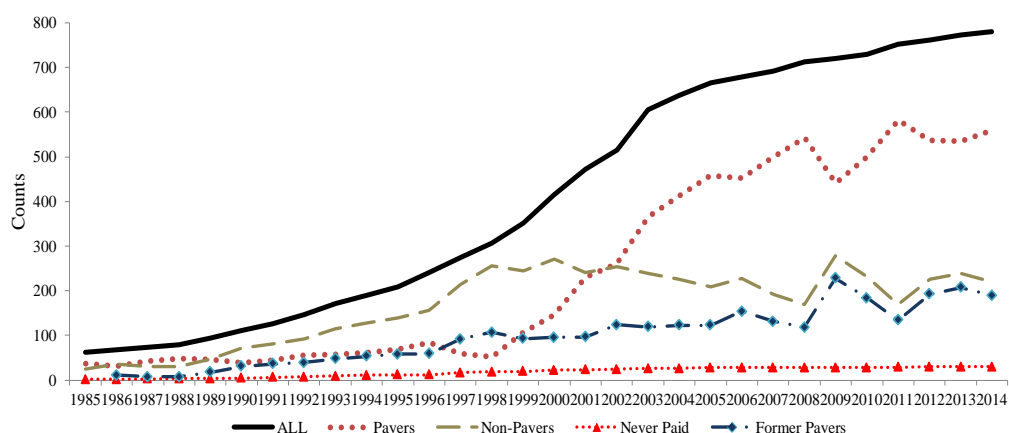
**Figure 2**
**The number of firms with different dividend policies**

This figure depicts the development (in firm number) of different dividend policies in market. The Payers presents that firms pay dividends in year *t,* but Non-Payers do not. Furthermore, the Non-Payers includes two subgroups, Never Paid ( firms that have never paid) and Former Payers (firms that do not pay in year *t* but did pay in a previous year).
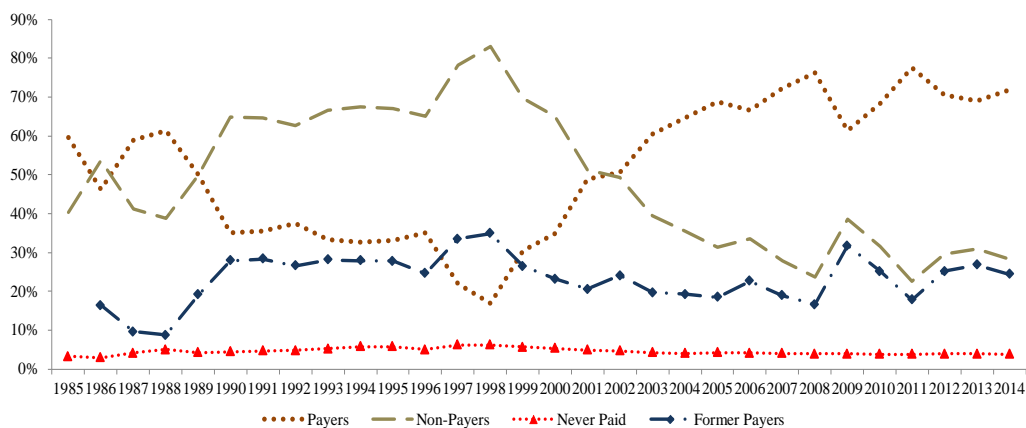


**Figure 3**
**The percent of firms with different dividend policies**

This figure depicts the trend (in percent) of different dividend policies in market.The difinitions of Payers, Non-Payers, Never Paid, and Former Payers are as same as Figure 2.

# 4. Empirical results

## 4.1 Statistics summary

Column 1 of Table 1 shows that the average earnings per share (EPS) (NT$1.79) and average firm size (NT$20,272 million) of stock repurchase firms is lower than the corresponding values, NT$2.83 and NT$25,385 million, respectively, of dividend payout firms. This implies that low-earning and small firms prefer to use stock repurchases. Although cash refunds are rarely executed in Taiwan (72 firm-year observations only), the firm size (NT$59,377 million) of cash-refunding firms is larger than the corresponding value (NT$25,385 million) of dividend-paying firms. This implies that cash refunds are adopted by relatively large firms.

Column 2 of Table 2 shows the evolution of the weighted average dividend payout ratio (WDP). The WDP is 61% over the entire sample period, 29% over 1985~1999, and 65% over 2000~2014. The WDP appears to increase after the 1998 tax reform.

Stock repurchases were not permitted before July 2000, but firms have executed stock repurchases since August 2000. Column 3 shows that the weighted average stock repurchase ratio (WSR) is 5% over 2000~2014, and the

**Table 1**
**Summary statistics for earnings and firm size of various types of payout**

This table provides summary statistics for earnings per share (EPS), market value of cash dividend (CD), stock repurchase (SR) and cash refund (CR) over the sample period from 1985 to 2014.

|  | #OBS | Mean | Median | Std. Dev. | Maximum | Minimum |
|---|---|---|---|---|---|---|
| EPS (NT$) |  |  |  |  |  |  |
| Cash devidend (CD) | 7,832 | 2.83 | 2.06 | 3.34 | 73.32 | -5.24 |
| Stock repurchase (SR) | 1,646 | 1.79 | 1.18 | 3.42 | 50.48 | -11.22 |
| Cash refund (CR) | 72 | 2.25 | 1.71 | 2.49 | 15.14 | -2.09 |
|  |  |  |  |  |  |  |
| Firm size: Market value ( NT$ M.) |  |  |  |  |  |  |
| Cash devidend (CD) | 7,832 | 25,385 | 6,061 | 98,073 | 2,735,469 | 137 |
| Stock repurchase (SR) | 1,646 | 20,272 | 4,833 | 86,897 | 1,743,504 | 196 |
| Cash refund (CR) | 72 | 59,377 | 6,639 | 155,464 | 718,533 | 709 |

**Table 2**
**Payout as a percentage of earnings per year**

This table dipicts four kinds of weighted average payout ratio and arithmetic average payout ratio respectively. Column (2) to (5) presents weighted rations, they are weighted average dividend payout ratio (=ΣDividends /ΣEarnings, WDP), weighted average stock repurchase ratio (=ΣStock Repurchases /ΣEarnings, WSR), weighted average cash refund ratio (=ΣCash Refunds /ΣEarnings, WCR) and weighted average total payout ratio (=ΣTotal Payout / Earnings,WTP. Total Payout is the sum of dividends, stock repurchases and cash refunds.) respectively. Additionally, column (6) to (9) present arithmetic ratios, they are arithmetic average dividend payout ratio (ADP), arithmetic average stock repurchase ratio (ASR), arithmetic average cash refund ratio ( ACR) and weighted average total payout ratio (ATP).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Year | #OBS | WDP | WSR | WCR | WTP | ADP | ASR | ACR | ATP |
| 1985 | 62 | 43% | - | 0% | 43% | 32% | - | 0% | 32% |
| 1986 | 67 | 37% | - | 0% | 37% | 27% | - | 0% | 27% |
| 1987 | 73 | 25% | - | 0% | 25% | 26% | - | 0% | 26% |
| 1988 | 80 | 30% | - | 0% | 30% | 22% | - | 0% | 22% |
| 1989 | 94 | 40% | - | 0% | 40% | 21% | - | 0% | 21% |
| 1990 | 111 | 38% | - | 0% | 38% | 16% | - | 0% | 16% |
| 1991 | 127 | 49% | - | 0% | 49% | 21% | - | 0% | 21% |
| 1992 | 147 | 44% | - | 0% | 44% | 23% | - | 0% | 23% |
| 1993 | 171 | 45% | - | 0% | 45% | 26% | - | 0% | 26% |
| 1994 | 190 | 33% | - | 0% | 33% | 18% | - | 0% | 18% |
| 1995 | 209 | 25% | - | 0% | 25% | 17% | - | 0% | 17% |
| 1996 | 240 | 23% | - | 0% | 23% | 18% | - | 0% | 18% |
| 1997 | 275 | 21% | - | 0% | 21% | 12% | - | 0% | 12% |
| 1998 | 307 | 11% | - | 0% | 11% | 8% | - | 0% | 8% |
| 1999 | 352 | 39% | - | 0% | 39% | 18% | - | 0% | 18% |
| 2000 | 415 | 27% | 6% | 0% | 32% | 17% | 16% | 0% | 34% |
| 2001 | 471 | 30% | 5% | 0% | 35% | 23% | 23% | 0% | 46% |
| 2002 | 515 | 83% | 12% | 1% | 97% | 34% | 23% | 1% | 58% |
| 2003 | 605 | 60% | 8% | 0% | 68% | 32% | 9% | 0% | 41% |
| 2004 | 638 | 53% | 10% | 0% | 63% | 34% | 16% | 0% | 50% |
| 2005 | 665 | 53% | 4% | 0% | 57% | 35% | 7% | 0% | 42% |
| 2006 | 679 | 67% | 7% | 0% | 74% | 48% | 11% | 2% | 61% |
| 2007 | 692 | 66% | 7% | 8% | 82% | 45% | 14% | 1% | 60% |
| 2008 | 712 | 64% | 6% | 2% | 72% | 45% | 16% | 2% | 62% |
| 2009 | 719 | 88% | 2% | 4% | 93% | 58% | 6% | 15% | 79% |
| 2010 | 730 | 88% | 4% | 2% | 94% | 53% | 4% | 1% | 59% |
| 2011 | 751 | 65% | 4% | 2% | 71% | 48% | 13% | 0% | 61% |
| 2012 | 762 | 81% | 1% | 1% | 83% | 56% | 4% | 0% | 60% |
| 2013 | 773 | 77% | 1% | 3% | 81% | 56% | 12% | 7% | 75% |
| 2014 | 779 | 58% | 0% | 2% | 60% | 67% | 10% | 4% | 80% |
| | | | | | | | | | |
| 1985-1999 | 2505 | 29% | - | 0% | 29% | 18% | - | 0% | 18% |
| 2000-2014 | 9906 | 65% | 5% | 2% | 72% | 45% | 12% | 2% | 59% |
| 1985-2014 | 12411 | 61% | - | 2% | - | 40% | - | 2% | - |

highest WSR (12%) appears in 2002. Although cash refunds were not prohibited, no cash refund was executed before 2002. Column 4 shows that the weighted average cash refund ratio (WCR) is 2% over 2000~2014, and the highest cash refund ratio (8%) appears in 2007. Column 5 shows that the weighted average total payout ratio (WTP) is 29% over 1985~1999, and 72% over 2000~2014. The firms that repurchased stocks also increased dividend payouts over 2000~2014. In other words, repurchases did not substitute for dividends after 2000.

Column 6 of Table 2 shows the evolution of the arithmetic average dividend payout ratio (ADP). The ADP is 40% over 1985~2014, 18% over 1985~1999, and 45% over 2000~2014. Column 7 shows that the arithmetic average stock repurchase ratio (ASR) is 12% over 2000~2014, and the highest ASR (23%) appears in 2001 and 2002. Column 8 shows that the arithmetic average cash refund ratio is (ACR) is 2% over 2000~2014, and the highest cash refund ratio (15%) appears in 2009. Column 9 shows that the arithmetic average total payout ratio (ATP) is 18% over 1985~1999, and 59% over 2000~2014.

For the repurchase period 2000~2014, the WDP (65%) is notably higher than the ADP (45%); however, the WSR (5%) is lower than the ASR (12%). This implies that dividends are paid by large firms and stock repurchases are executed by small firms.

Table 2 shows that the WDP (65%) is approximately 13 times as high as the WSR (5%) over 2000~2014. However, the highest WSR, 12%, occurs in 2002. Even in 2002, the WDP (83%) is approximately 7 times as high as the WSR. Those firms that repurchased stocks also increased dividends, which is consistent with previous studies of U.S. firms (Grullon and Michaely, 2002) and Australian firms (Pattenden and Twite, 2008).

We further calculate the percentages of dividends paid out by the top third of the largest firms; in our investigation, these are the highest net income firms. Column 3 of Table 3 shows that 93% of the dividends are distributed by the top third of the largest firms over 1985~2014. The lowest ratio (77%) appears in 1987, and the highest ratio (96%) appears in 2006. These results show that most cash dividends are distributed by the top third of the largest firms. Column 5 shows that 93% of the total payouts are distributed by the top third of the largest firms over 1985~2014. The lowest ratio (77%) appears in 1987, and the highest ratio (95%) appears in 2005 and 2009. This observation, that most payouts in the

## Table 3
## Percentages of payouts for high income firms

This table explains the situation that most payouts are distributed by high income firms. Column (2) presents the percentage of the one-third higest net income in the market (= $\Sigma$ 1/3 highest net income/ $\Sigma$ Total market net income). Column (3) to (5) presents the percentage of payouts from these one-third highest net imcome firms, these three kinds of payout are cash dividend (CD), cash dividend adds stock repurchase (CDSR), and CDSR adds cash refund (Total Payout), respectively.

|  | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Year | #OBS | NI Amount | CD Amount | CDSR Amount | Total Payout Amount |
| 1985 | 62 | 90% | 88% | 88% | 88% |
| 1986 | 67 | 101% | 90% | 90% | 90% |
| 1987 | 73 | 85% | 77% | 77% | 77% |
| 1988 | 80 | 83% | 87% | 87% | 87% |
| 1989 | 94 | 84% | 92% | 92% | 92% |
| 1990 | 111 | 88% | 94% | 94% | 94% |
| 1991 | 127 | 97% | 94% | 94% | 94% |
| 1992 | 147 | 91% | 94% | 94% | 94% |
| 1993 | 171 | 94% | 94% | 94% | 94% |
| 1994 | 190 | 93% | 93% | 93% | 93% |
| 1995 | 209 | 89% | 90% | 90% | 90% |
| 1996 | 240 | 94% | 91% | 91% | 91% |
| 1997 | 275 | 91% | 94% | 94% | 94% |
| 1998 | 307 | 87% | 89% | 89% | 89% |
| 1999 | 352 | 119% | 91% | 91% | 91% |
| 2000 | 415 | 109% | 93% | 89% | 89% |
| 2001 | 471 | 105% | 94% | 91% | 91% |
| 2002 | 515 | 189% | 95% | 94% | 94% |
| 2003 | 605 | 126% | 94% | 93% | 93% |
| 2004 | 638 | 100% | 94% | 93% | 93% |
| 2005 | 665 | 103% | 95% | 94% | 94% |
| 2006 | 679 | 106% | 96% | 95% | 95% |
| 2007 | 692 | 103% | 94% | 93% | 94% |
| 2008 | 712 | 97% | 94% | 94% | 94% |
| 2009 | 719 | 149% | 95% | 95% | 95% |
| 2010 | 730 | 122% | 94% | 93% | 93% |
| 2011 | 751 | 99% | 93% | 92% | 92% |
| 2012 | 762 | 128% | 92% | 91% | 91% |
| 2013 | 773 | 126% | 93% | 93% | 91% |
| 2014 | 779 | 103% | 91% | 91% | 90% |
|  |  |  |  |  |  |
| 1985-1999 | 2505 | 93% | 92% | 92% | 92% |
| 2000-2014 | 9906 | 111% | 94% | 93% | 93% |
| 1985-2014 | 12411 | 109% | 93% | 93% | 93% |

market are distributed by a few large and profitable firms, is consistent with previous studies of U.S. firms (DeAngelo *et al.*, 2006; Denis and Osobov, 2008; Fama and French, 2001).

Column 2 of Table 4 shows that the average dividend per share (CD) is NT$0.91 over 1985~2014, NT$0.32 over 1985~1999, and NT$1.06 over 2000~2014. Column 3 shows that the median CD over these periods is respectively NT$0.35, NT$0.00, and NT$0.50. The CD appears to increase after the 1998 tax reform. Column 2 also shows that the average total payout per share (Total payout) is NT$0.99, NT$0.32, and NT$1.16. Column 3 shows that the respective medians for Total payout are NT$0.45, NT$0.00, and NT$0.52.

Column 2 of Table 4 shows that the average EPS increases from NT$1.53 over 1985~1999 to NT$1.77 over 2000~2014. Column 2 shows that the median EPS is NT$1.29 and NT$1.23. The average sales growth rate (SG) increases from 11% to 22%. By contrast, the median SG decreases from 6% to 4%. The average firm size (LNMV) decreases from 15.75 to 15.35. The medians for LNMV are 15.70 and 15.22.

## 4.2 Estimation methods

Our sample period 1985~2014 does not consist of a small number of periods, but it comprises two sub-periods; therefore, we use the former three methods to estimate the model. Table 5 shows the results of the dynamic panel data regression.

Column 1 of Table 5 shows the coefficients of the lagged dependent variable on regular dividends over 1985~2014. The GMM estimate is 0.45, lower than the OLS estimate (0.57), but higher than the WG estimate (0.41). For the target payout ratio, the GMM estimate is 47%, lower than the OLS estimate (52%), but higher than the WG estimate (37%). This is consistent with the results of Bond (2002) and Andres *et al.* (2015). However, the WDP is 61% over 1985~2014 (Table 2). We can thus conclude that the OLS method provides a more accurate estimate of the target payout ratio (52%) than GMM (47%) or WG (37%).

Column 4 of Table 5 shows the coefficients of the lagged dependent variable on regular dividends over 1985~1999. The GMM estimate is 0.15, which is lower than both the OLS (0.38) and WG (0.16) estimates. For the target payout ratio, the GMM estimate is 27%, higher than the OLS estimate (22%) and the

**Table 4**
**Summary statistics for payout and firm characteristics**

This table provides summary statistics of payout and firm characteristics. Payout represents cash dividend per share (CD) or total payout per share (Total payout = CD + stock repurchase per share + cash refund per share). In addition, firm characteristics includes earnings per share (EPS), firm size (LNMV, logarithm of market value), and sales growth rate (SG). This study adopts deviation adjustment method at SG variable as outliers beyond three-sigma limits from mean, we replace each of them with the value of mean adds three sigma.

|  | #OBS | Mean | Median | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|---|
| Panel A: 1985-2014 |  |  |  |  |  |  |
| CD | 12411 | 0.91 | 0.35 | 1.69 | 0.00 | 40.00 |
| Total payout | 12411 | 0.99 | 0.45 | 1.86 | 0.00 | 61.33 |
| EPS | 12411 | 1.72 | 1.24 | 3.34 | -52.32 | 73.32 |
| LNMV | 12411 | 15.43 | 15.34 | 1.41 | 10.61 | 21.73 |
| SG | 12411 | 0.21 | 0.05 | 2.90 | -1.97 | 127.46 |
| Panel B: 1985-1999 |  |  |  |  |  |  |
| CD | 2505 | 0.32 | 0.00 | 0.70 | 0.00 | 20.00 |
| Total payout | 2505 | 0.32 | 0.00 | 0.70 | 0.00 | 20.00 |
| EPS | 2505 | 1.53 | 1.29 | 2.36 | -12.21 | 39.27 |
| LNMV | 2505 | 15.75 | 15.70 | 1.15 | 11.57 | 19.94 |
| SG | 2505 | 0.11 | 0.06 | 0.38 | -1.97 | 6.37 |
| Panel C: 2000-2014 |  |  |  |  |  |  |
| CD | 9906 | 1.06 | 0.50 | 1.82 | 0.00 | 40.00 |
| Total payout | 9906 | 1.16 | 0.52 | 2.02 | 0.00 | 61.33 |
| EPS | 9906 | 1.77 | 1.23 | 3.54 | -52.32 | 73.32 |
| LNMV | 9906 | 15.35 | 15.22 | 1.46 | 10.61 | 21.73 |
| SG | 9906 | 0.22 | 0.04 | 3.33 | -1.34 | 142.69 |

WG estimate (20%). Because the WDP is 29% over 1985~1999 (Table 2), we argue that the GMM method provides a more accurate estimate than both OLS and WG.

Column 7 of Table 5 shows the coefficients of the lagged dependent variable on regular dividends over 2000~2014. The GMM estimate is 0.49, lower than the OLS estimate (0.54) but higher than the WG estimate (0.37). For the target payout ratio, the GMM estimate is 51%, lower than the OLS estimate (52%), but higher than the WG estimate (39%). This is consistent with Bond (2002) and Andres *et al*. (2015). However, the WDP is 65% over 2000~2014; thus, the OLS method provides the most accurate estimate.

## Table 5
## Classical Lintner model and total payout model

This table depicts the results of OLS, within-groups (WG), and GMM-in-systems regressions with cash dividends per share (CD) and total payout per share as dependent variables. Total payout per share includes two definitions, one is CD adds stock repurchases per share (SR), the other is CD and SR adds cash refund per share (CR). Each cell shows the estimated coefficient, Z-value (in parentheses) for GMM or $t$-value (in parentheses) for OLS and WG as obtained from Stata 13. The superscript *, **, and *** denotes significance at the 10%, 5%, and 1% level. *Speed of adjustment* is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}$; $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period.

*Target payout ratio* equals the coefficient for $EPS_{i,t}$ divided by *Speed of adjustment* in the respective period.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | | 1985-2014 | | | 1985-1999 | | | 2000-2014 | |
| | Regular dividend | Total payout | | Regular dividend | Total payout | | Regular dividend | Total payout | |
| **Panel A: GMM** | | | | | | | | | |
| $CD_{i,t-1}$ | 0.45 | | | 0.15 | | | 0.49 | | |
| | (58.92)*** | | | (10.43)*** | | | (52.70)*** | | |
| $CD_{i,t-1}+SR_{i,t-1}$ | | 0.42 | | | 0.15 | | | 0.43 | |
| | | (54.45)*** | | | (10.43)*** | | | (46.72)*** | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | 0.42 | | | 0.15 | | | 0.43 |
| | | | (52.22)*** | | | (10.43)*** | | | (44.63)*** |
| $EPS_{i,t}$ | 0.26 | 0.28 | 0.27 | 0.23 | 0.23 | 0.23 | 0.26 | 0.29 | 0.28 |
| | (70.09)*** | (60.23)*** | (56.35)*** | (32.15)*** | (32.15)*** | (32.15)*** | (58.98)*** | (51.56)*** | (47.99)*** |
| *Target payout ratio* | *0.47* | *0.48* | *0.47* | *0.27* | *0.27* | *0.27* | *0.51* | *0.51* | *0.50* |
| *Speed of adj.* | *0.55* | *0.58* | *0.58* | *0.85* | *0.85* | *0.85* | *0.51* | *0.57* | *0.57* |
| **Panel B: OLS** | | | | | | | | | |
| Constant | 0.06 | 0.08 | 0.09 | -0.00 | -0.00 | -0.00 | 0.12 | 0.14 | 0.16 |
| | (7.23)*** | (8.18)*** | (8.95)*** | (-0.30) | (-0.30) | (-0.30) | (12.31)*** | (12.36)*** | (13.07)*** |
| $CD_{i,t-1}$ | 0.57 | | | 0.38 | | | 0.54 | | |
| | (98.96)*** | | | (22.83)*** | | | (82.88)*** | | |
| $CD_{i,t-1}+SR_{i,t-1}$ | | 0.56 | | | 0.38 | | | 0.52 | |
| | | (89.50)*** | | | (22.83)*** | | | (73.30)*** | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | 0.55 | | | 0.38 | | | 0.51 |
| | | | (86.22)*** | | | (22.83)*** | | | (70.20)*** |
| $EPS_{i,t}$ | 0.22 | 0.23 | 0.24 | 0.14 | 0.14 | 0.14 | 0.24 | 0.26 | 0.26 |
| | (76.92)*** | (69.40)*** | (67.82)*** | (25.00)*** | (25.00)*** | (25.00)*** | (73.8)*** | (65.87)*** | (64.30)*** |
| *Target payout ratio* | *0.52* | *0.53* | *0.53* | *0.22* | *0.22* | *0.22* | *0.52* | *0.54* | *0.54* |
| *Speed of adj.* | *0.43* | *0.44* | *0.45* | *0.62* | *0.62* | *0.62* | *0.46* | *0.48* | *0.49* |
| **Panel C: WG** | | | | | | | | | |
| Constant | 0.20 | 0.25 | 0.26 | 0.03 | 0.03 | 0.03 | 0.29 | 0.34 | 0.36 |
| | (21.8)*** | (22.27)*** | (23.02)*** | (1.82)* | (1.82)* | (1.82)* | (25.44)*** | (24.73)*** | (25.45)*** |
| $CD_{i,t-1}$ | 0.41 | | | 0.16 | | | 0.37 | | |
| | (58.78)*** | | | (8.14)*** | | | (46.95)*** | | |
| $CD_{i,t-1}+SR_{i,t-1}$ | | 0.39 | | | 0.16 | | | 0.35 | |
| | | (52.43)*** | | | (8.14)*** | | | (40.93)*** | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | 0.38 | | | 0.16 | | | 0.34 |
| | | | (49.91)*** | | | (8.14)*** | | | (38.49)*** |
| $EPS_{i,t}$ | 0.22 | 0.23 | 0.23 | 0.17 | 0.17 | 0.17 | 0.24 | 0.26 | 0.26 |
| | (69.62)*** | (60.1)*** | (58.29)*** | (25.70)*** | (25.70)*** | (25.70)*** | (67.46)*** | (57.08)*** | (55.29)*** |
| *Target payout ratio* | *0.37* | *0.37* | *0.37* | *0.20* | *0.20* | *0.20* | *0.39* | *0.40* | *0.39* |
| *Speed of adj.* | *0.59* | *0.61* | *0.62* | *0.84* | *0.84* | *0.84* | *0.63* | *0.65* | *0.66* |

Because GMM-in-systems cannot consistently offer the most accurate parameter estimate, we use GMM, OLS, and WG to estimate Lintner's model, and compare the results. Generally, the three regression models provide similar results.

## 4.3 Dividend payout around tax reform

Panel A (GMM) of Table 5 shows that, for regular dividends, the speed of adjustment coefficient decreased from 0.85 over 1985~1999 (Column 4) to 0.51 over 2000~2014 (Column 7). The coefficient of the lagged dependent variable $CD_{t-1}$ increased from 0.15 to 0.49. Furthermore, the target payout ratio increased markedly from 27% to 51%. The dividend payout ratio became stickier in 2000~2014 compared with 1985~1999. However, Table 2 shows that the WDP changed from 29% (1985~1999) to 65% (2000~2014).

Panel A of Table 5 also shows that the coefficient of $EPS_t$ increased from 0.23 over 1985~1999 to 0.26 over 2000~2014. These results show that the corporate payout policy is affected by the tax reforms enacted in 1998 that favored dividends. The listed firms not only increased their dividend payout ratio but also improved stickiness over 1985~2014. The results are consistent with Brav *et al*. (2005) and Skinner (2008), who reported that dividends are primarily affected by current earnings.

Panel A of Table 5 shows that, for the total payout ($CD_{t-1}+SR_{t-1}+CR_{t-1}$), the speed of adjustment coefficient decreased from 0.85 over 1985~1999 (Column 6) to 0.57 over 2000~2014 (Column 9). Hence the total payout became stickier in 2000~2014 compared with 1985~1999. The coefficient of the total payout increased from 0.15 to 0.43. Furthermore, the target total payout ratio increased from 27% to 50%. The introduction of repurchases in 2000 does increase total payout ratio. However, the Hypothesis $H_1$, that dividends and repurchases are perfect substitutes, is not supported.

The coefficient of $EPS_t$ increased from 0.23 over 1985~1999 (Column 6) to 0.28 over 2000~2014 (Column 9). The listed firms not only increased their total payouts but also improved in stickiness after 2000. Stock repurchases were executed by TWSE-listed firms from 2000; however, the stock repurchases do not substitute for dividend payouts. Both dividends and total payouts increased synchronously.

## 4.4 Stock repurchases and dividend payout

Stock repurchases were introduced in 2000, and in the short term, the highest WSR is observed in 2002 (Table 2). However, even in 2002, the WDP (83%) is approximately 7 times as high as the WSR (12%), and the WDP (65%) is approximately 13 times as high as the WSR (5%) over 2000~2014.

Panel A of Table 5 shows that the target dividend payout ratio is 51% (Column 7), and the target total payout ratio is 50% (Column 9), over 2000~2014. Concerning the estimated speed of adjustment coefficients, the total payout model yields higher estimate 0.57 than dividend-only model estimate 0.51, meaning that total payouts are more flexible than dividend payouts. This result is consistent with the flexibility/speed of adjustment hypothesis ($H_2$-II). The coefficient of the lagged dependent variable is 0.43 for total payouts and 0.49 for dividends. Because dividends are stickier than total payouts, they offer a better explanation than total payouts in the Lintner model, which is consistent with the flexibility/payout hypothesis ($H_2$-I).

Panels A, B, and C of Table 6 respectively show the results of using GMM-in-systems to obtain added parameter estimates of frim size (LNMV), growth opportunity (SG), and both of them. Panel C shows that frim size has a positive relationship with regular (and total) dividends over post-2000. By contrast, growth opportunity has a negative relationship with regular (and total) dividends over 1985~1999. The firms that have higher revenue growth paid lower cash (and total) dividends over 1985~1999, and the firms that are larger paid higher cash (and total) dividends post-2000. Generally, large firms that have lower revenue growth paid higher cash (and total) dividends. This result is consistent with life-cycle theory (DeAngelo *et al.*, 2006)

# 5. Corporate governance and payout policy

DeAngelo, DeAngelo, and Skinner (2009) argued that payout decisions are related to the preferences of controlling shareholders. The TWSE drafted the first ranking of corporate governance for listed firms in 2014 and announced the ranking list in April 2015, declaring the top 20% ranked firms to have SCG and the remaining 80% to have WCG. We divide a sample of 779 firms into two

## Table 6
## Classical Lintner model and total payout model by introducing firm characteristics

This table shows the results of GMM-in-systems regression with cash dividends per share (CD) and total payout per share as dependent variables. Total payout per share equals to the sum of cash dividends per share (CD), stock repurchases per share (SR), and cash refund per share (CR). Besides, we introduce firm size (LNMV, logarithm of market value) and growth opportunity (SG, sales of growth rate) as control variables. This investigation adopts deviation adjustment method at SG variable as outliers beyond three-sigma limits from mean, we replace each of them with the value of mean adds three sigma. Each cell shows the estimated coefficient and Z-value (in parentheses) as obtained from Stata 13. The superscript *, **, and *** denotes significance at the 10%, 5%, and 1% level. *Speed of adjustment* is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period. *Target payout ratio* equals the coefficient for $EPS_{i,t}$ divided by *Speed of adjustment* in the respective period.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Regular dividend | | | Total payout | | |
| | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 |
| **Panel A: Firm size** | | | | | | |
| $CD_{i,t-1}$ | 0.36 | 0.15 | 0.36 | | | |
| | (42.59)*** | (10.35)*** | (34.54)*** | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | 0.33 | 0.15 | 0.29 |
| | | | | (36.68)*** | (10.35)*** | (26.71)*** |
| $EPS_{i,t}$ | 0.24 | 0.22 | 0.24 | 0.25 | 0.22 | 0.26 |
| | (67.06)*** | (30.88)*** | (58.36)*** | (54.11)*** | (30.88)*** | (47.37)*** |
| $LNMV_{i,t}$ | 0.05 | 0.00 | 0.06 | 0.06 | 0.00 | 0.08 |
| | (21.08)*** | (0.26) | (19.67)*** | (20.02)*** | (0.26) | (21.06)*** |
| *Target payout ratio* | *0.37* | *0.27* | *0.38* | *0.38* | *0.27* | *0.37* |
| *Speed of adj.* | *0.64* | *0.85* | *0.64* | *0.67* | *0.85* | *0.71* |
| | | | | | | |
| **Panel B: Growth opportunity** | | | | | | |
| $CD_{i,t-1}$ | 0.45 | 0.15 | 0.49 | | | |
| | (58.91)*** | (10.28)*** | (52.68)*** | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | 0.42 | 0.15 | 0.43 |
| | | | | (52.21)*** | (10.28)*** | (44.60)*** |
| $EPS_{i,t}$ | 0.26 | 0.23 | 0.26 | 0.27 | 0.23 | 0.28 |
| | (70.09)*** | (32.22)*** | (58.98)*** | (56.33)*** | (32.22)*** | (47.98)*** |
| $SG_{i,t}$ | -0.00 | -0.02 | -0.00 | -0.00 | -0.02 | -0.00 |
| | (-1.16) | (-2.71)*** | (-1.12) | (-0.36) | (-2.71)*** | (-0.59) |
| *Target payout ratio* | *0.47* | *0.27* | *0.51* | *0.47* | *0.27* | *0.50* |
| *Speed of adj.* | *0.55* | *0.85* | *0.51* | *0.58* | *0.85* | *0.57* |
| | | | | | | |
| **Panel C: Size and growth opportunity** | | | | | | |
| $D_{i,t-1}$ | 0.36 | 0.15 | 0.36 | | | |
| | (42.59)*** | (10.22)*** | (34.52)*** | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | 0.33 | 0.15 | 0.29 |
| | | | | (36.68)*** | (10.22)*** | (26.68)*** |
| $EPS_{i,t}$ | 0.24 | 0.23 | 0.24 | 0.25 | 0.23 | 0.26 |
| | (67.06)*** | (30.96)*** | (58.38)*** | (54.09)*** | (30.96)*** | (47.37)*** |
| $LNMV_{i,t}$ | 0.05 | 0.00 | 0.06 | 0.06 | 0.00 | 0.08 |
| | (21.08)*** | (0.18) | (19.68)*** | (20.02)*** | (0.18) | (21.07)*** |
| $SG_{i,t}$ | -0.00 | -0.02 | -0.00 | -0.00 | -0.02 | -0.00 |
| | (-1.14) | (-2.71)*** | (-1.34) | (-0.30) | (-2.71)*** | (-0.84) |
| *Target payout ratio* | *0.37* | *0.27* | *0.38* | *0.38* | *0.27* | *0.37* |
| *Speed of adj.* | *0.64* | *0.85* | *0.64* | *0.67* | *0.85* | *0.71* |

subgroups according to their ranking on this list. The firms that belong to the top 20% ranking constitute the SCG group, and the rest constitute the WCG group. We use the TWSE 2014 corporate governance ranking data to examine firm-level dividend agency models (La Porta *et al.*, 2000; Mitton, 2004).

## 5.1 Statistics of SCG and WCG

Figure 4A and Figure 4B show that the SCG group has a higher percentage of dividend payers than the WCG group over 1985~2014.

Table 7 shows descriptive statistics for dividend payouts with regard to corporate governance. Panel A of Table 7 shows the statistics over 1985~2014. The SCG group's average CD, median CD, average EPS, and median EPS ($1.41, $0.96, $2.78, $2.16) are higher than the corresponding values ($0.80, $0.25, $1.49, $1.08) of the WCG group. The SCG group's average Total payout, median Total payout, average LNMV, and median LNMV ($2.78, $2.16, 16.86, 16.77) are also higher than the corresponding values ($1.49, $1.08, 15.13, 15.13) of the WCG group. However, the SCG group's median SG (7%) is higher than the corresponding 4% of the WCG group, indicating that SCG group has more promising investment opportunities, although the SCG group's average SG (13%) is lower than the corresponding 22% of the WCG group. Which means WCG group has a volatile SG among group firms.

Panel B of Table 7 shows the statistics over 1985~1999. The SCG group's average CD, median CD, average EPS, and median EPS ($0.56, $0.40, $2.51, $2.15) are higher than the corresponding values ($0.25, $0.00, $1.28, $1.09) of the WCG group. The average SG (13%) of SCG firms is also larger than the corresponding 11% of WCG firms.

Panel C of Table 7 shows the statistics over 2000~014. The SCG group's average CD, median CD, average EPS, and median EPS ($1.67, $1.00, $2.87, $2.17) are higher than the corresponding values ($0.93, $0.40, $1.55, $1.07) of the WCG group. However, the average SG (12%) of SCG firms is lower than the corresponding value (24%) of WCG firms.

## 5.2 Dividend payout and corporate governance

Panel A of Table 8 shows that the speed of adjustment coefficient for dividend payouts for the SCG group increased from 0.48 over 1985~1999 to 0.73
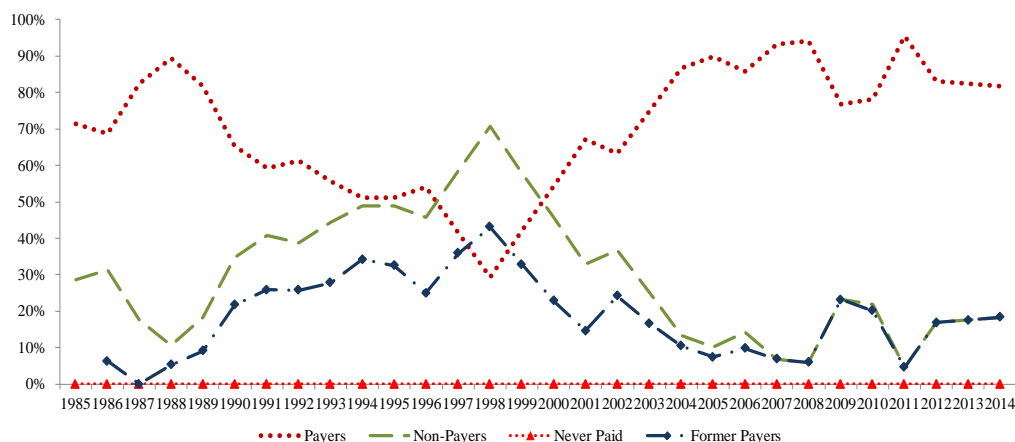
**Figure 4A**
**The percent of strong corporate govermance (SCG) firms with different dividend policies**

This figure depicts the trend (in percent) of different dividend policies for SCG firms. The difinitions of Payers, Non-Payers, Never Paid, and Former Payers are as same as Figure 2.



**Figure 4B**
**The percent of weak corporate governance (WCG) firms with different dividend policies**

This figure depicts the trend (in percent) of different dividend policies for WCG firms. The difinitions of Payers, Non-Payers, Never Paid, and Former Payers are as same as Figure 2.
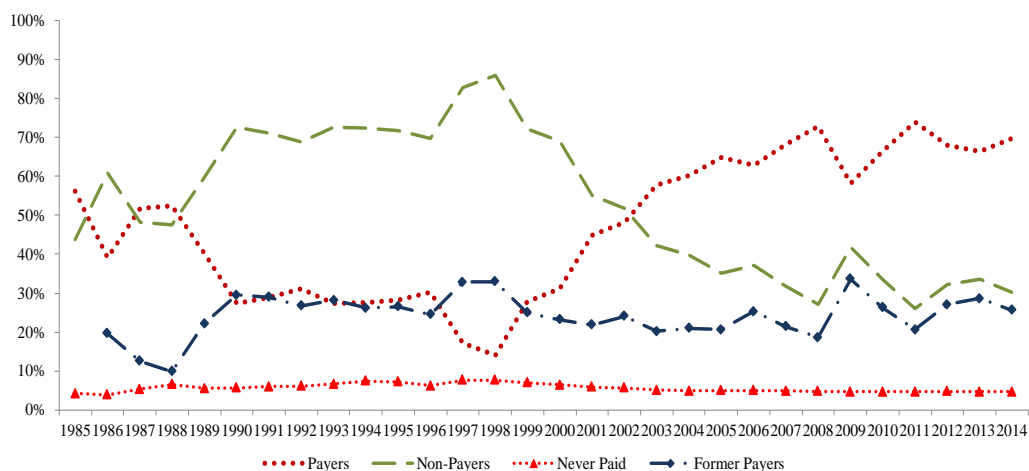
# Table 7
## Summary statistics for payout and firm characteristics under different corporate governance regimes

This table provides the summary statistics for payout and firm characteristics by different corporate governance regimes. Payout represents cash dividends per share (CD) or total payout per share (Total payout). Total payout equals to the sum of cash dividends per share (CD), stock repurchases per share, and cash refund per share. Additionally, firm characteristics includes average earnings per share (EPS), average firm size (LNMV, logarithm of market value) ,and average sales growth rate (SG). This study adopts deviation adjustment method at SG variable as outliers beyond three-sigma limits from mean, we replace each of them with the value of mean adds three sigma. Moreover,TWSE did the first ranking of corporate governance for listed firms in 2014 and announced the ranking list in April 2015. TWSE disclosed top 20% ranking firms with strong corporate governance (SCG) and the other 80% firms with weak corporate governance (WCG). This paper divides our 779 sample firms into two subgroups according to the ranking list. The firms that belong to top 20% ranking are SCG group, and the other firms are WCG group.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong Corporate Governance (SCG) | | | | | | Weak Corporate Governance (WCG) | | | | | |
| | #OBS | Mean | Median | Std. Dev. | Minimum | Maximum | #OBS | Mean | Median | Std. Dev. | Minimum | Maximum |
| **Panel A: 1985-2014** | | | | | | | | | | | | |
| CD | 2174 | 1.41 | 0.96 | 2.35 | 0.00 | 40.00 | 10237 | 0.80 | 0.25 | 1.49 | 0.00 | 28.50 |
| Total payout | 2174 | 1.52 | 1.00 | 2.80 | 0.00 | 61.33 | 10237 | 0.88 | 0.30 | 1.57 | 0.00 | 28.50 |
| EPS | 2174 | 2.78 | 2.16 | 4.07 | -10.78 | 73.32 | 10237 | 1.49 | 1.08 | 3.11 | -52.32 | 71.64 |
| LNMV | 2174 | 16.86 | 16.77 | 1.54 | 11.70 | 21.73 | 10237 | 15.13 | 15.13 | 1.17 | 10.61 | 20.23 |
| SG | 2174 | 0.13 | 0.07 | 0.30 | -0.96 | 1.68 | 10237 | 0.22 | 0.04 | 3.39 | -1.97 | 140.39 |
| **Panel B: 1985-1999** | | | | | | | | | | | | |
| CD | 512 | 0.56 | 0.40 | 0.68 | 0.00 | 3.30 | 1993 | 0.25 | 0.00 | 0.69 | 0.00 | 20.00 |
| Total payout | 512 | 0.56 | 0.40 | 0.68 | 0.00 | 3.30 | 1993 | 0.25 | 0.00 | 0.69 | 0.00 | 20.00 |
| EPS | 512 | 2.51 | 2.15 | 2.66 | -4.14 | 31.97 | 1993 | 1.28 | 1.09 | 2.21 | -12.21 | 39.27 |
| LNMV | 512 | 16.80 | 16.79 | 1.12 | 14.05 | 19.94 | 1993 | 15.48 | 15.52 | 0.99 | 11.57 | 18.67 |
| SG | 512 | 0.13 | 0.08 | 0.21 | -0.35 | 0.87 | 1993 | 0.11 | 0.05 | 0.43 | -1.97 | 7.12 |
| **Panel C: 2000-2014** | | | | | | | | | | | | |
| CD | 1662 | 1.67 | 1.00 | 2.60 | 0.00 | 40.00 | 8244 | 0.93 | 0.40 | 1.59 | 0.00 | 28.50 |
| Total payout | 1662 | 1.82 | 1.10 | 3.13 | 0.00 | 61.33 | 8244 | 1.03 | 0.50 | 1.68 | 0.00 | 28.50 |
| EPS | 1662 | 2.87 | 2.17 | 4.41 | -10.78 | 73.32 | 8244 | 1.55 | 1.07 | 3.29 | -52.32 | 71.64 |
| LNMV | 1662 | 16.88 | 16.75 | 1.64 | 11.70 | 21.73 | 8244 | 15.04 | 15.00 | 1.20 | 10.61 | 20.23 |
| SG | 1662 | 0.12 | 0.06 | 0.32 | -0.96 | 1.85 | 8244 | 0.24 | 0.04 | 3.91 | -1.34 | 156.47 |

## Table 8
## Classical Lintner model and total payout model under different corporate governance regimes

Table 8 Classical Lintner model and total payout model under different corporate governance regimes
This table shows the results of GMM-in-systems regression with cash dividends per share (CD) and total payout per share as dependent variables by different corporate governance regimes. Total payout per share equals to the sum of cash dividends per share (CD), stock repurchases per share (SR), and cash refund per share (CR). The criterion of corporate governance we use in this study is explained at Table 7. Each cell shows the estimated coefficient and Z-value (in parentheses) as obtained from Stata 13. The superscript *, **, and *** denotes significance at the 10%, 5%, and 1% level. Speed of adjustment is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period. *Speed of adjustment* is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period. *Target pauout ratio* equals the coefficient for $EPS_{i,t}$ divided by *Speed of adjustment* in the respective period.

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
|  | Regular dividend | | | Total payout | | |
|  | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 |
| **Panel A: SCG** | | | | | | |
| $CD_{i,t-1}$ | 0.32 | 0.52 | 0.27 | | | |
|  | (20.69)*** | (11.16)*** | (15.07)*** | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | 0.28 | 0.52 | 0.23 |
|  | | | | (16.53)*** | (11.16)*** | (11.53)*** |
| $EPS_{i,t}$ | 0.40 | 0.07 | 0.44 | 0.44 | 0.07 | 0.48 |
|  | (48.73)*** | (4.19)*** | (46.66)*** | (35.54)*** | (4.19)*** | (32.53)*** |
| *Target payout ratio* | *0.59* | *0.15* | *0.60* | *0.61* | *0.15* | *0.62* |
| *Speed of adj.* | *0.68* | *0.48* | *0.73* | *0.72* | *0.48* | *0.77* |
| **Panel B: WCG** | | | | | | |
| $CD_{i,t-1}$ | 0.42 | 0.12 | 0.49 | | | |
|  | (51.20)*** | (7.92)*** | (48.46)*** | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | 0.37 | 0.12 | 0.40 |
|  | | | | (41.96)*** | (7.92)*** | (37.91)*** |
| $EPS_{i,t}$ | 0.22 | 0.24 | 0.21 | 0.24 | 0.24 | 0.24 |
|  | (58.67)*** | (32.98)*** | (46.08)*** | (51.41)*** | (32.98)*** | (41.65)*** |
| *Target payout ratio* | *0.38* | *0.28* | *0.41* | *0.38* | *0.28* | *0.40* |
| *Speed of adj.* | *0.58* | *0.88* | *0.51* | *0.63* | *0.88* | *0.60* |

over 2000~2014; therefore, the dividend payout policy became less sticky. The coefficient of $CD_{t-1}$ decreased from 0.52 to 0.27, whereas the coefficient of $EPS_t$ increased from 0.07 to 0.44. Hence, the dividend payout of the SCG group was significantly affected by the prior dividend payout ($CD_{t-1}$) before 1999, and by current earnings ($EPS_t$) post- 2000.

Panel B of Table 8 shows that the speed of adjustment coefficient of dividend payouts for the WCG group decreased from 0.88 to 0.51. The coefficient of $CD_{t-1}$ increased from 0.12 to 0.49, in contrast to the coefficient of $EPS_t$, which decreased from 0.24 to 0.21. The dividend payout of the WCG group was significantly affected by current earnings ($EPS_t$) before 1999, and by the prior dividend payout ($CD_{t-1}$) post- 2000.

SCG firms' target payout ratio increased from 15% over 1985~1999 to 60% over 2000~2014. WCG firms' target payout ratio increased from 28% to 41%. Regardless of which corporate governance group a firm belongs to, its dividend target payout ratio increased notably post-2000.

Column 2 of Table 8 shows that the speed of adjustment coefficient of dividend payout is lower in SCG firms (0.48) than in WCG firms (0.88) over 1985~1999. However, Column 3 shows that the corresponding value of dividend payout is higher in SCG firms (0.73) than in WCG firms (0.51) over 2000~2014.

Column 6 of Table 8 shows that the speed of adjustment coefficient of total payout for the SCG firms (0.77) and the WCG firms (0.60) over 2000~2014. For both groups, the speed of adjustment coefficient is lower in Lintner's dividend model (SCG, 0.73; WCG, 0.51) than in Lintner's total payout model (SCG, 0.77; WCG, 0.60) post-2000. The dividend payout is stickier than the total payout in Lintner's model. These results do not support hypothesis $H_3$-IV, the total payouts should more effectively explain Lintner's model, for both the SCG and WCG groups, than dividends post-2000.

## 5.3 Dividend payout and company characteristics

Table 9 shows the results of using GMM-in-systems to obtain added parameter estimates of LNMV, SG, and both of them. Panel A shows that LNMV has a positive relationship with the dividend payout for SCG firms. The coefficient of LNMV increased from 0.02 (Column 2) pre-2000 to a significant value of 0.04 (Column 3) over 2000~2014. By contrast, SG has a negative relationship with regular dividends. The coefficient of SG decreased from a significant value of -0.17 (Column 5) to -0.20 (Column 6). Generally, for SCG group, the firms that are larger and lower revenue growth paid higher dividends. This result supports the dividend outcome model ($H_3$-II). The target payout ratio increased from 12% to 54% (Column 8, 9), and the speed of adjustment

# Table 9
# Classical Lintnr model and total payout model by introducing firm characteristics under different corporate governance regimes

Table 9  Classical Lintner model and total payout model by introducing firm characteristics under different corporate governance regimes

This table depicts the results of GMM-in-systems regression with cash dividends per share (CD) and total payout per share as dependent variables under different corporate governance regimes. Total payout per share equals to the sum of cash dividends per share (CD), stock repurchases per share (SR), and cash refund per share (CR). Moreover, this study introduces firm characteristics, firm size (LNMV, logarithm of market value) and growth opportunity (SG, sales of growth rate), as control variables in this model. The criterion of corporate governance we use in this study is explained at Table 7. This investigation adopts deviation adjustment method at SG variable as outliers beyond three-sigma limits from mean, we replace each of them with the value of mean adds three sigma. Each cell shows the estimated coefficient and Z-value (in parentheses) as obtained from Stata 13. The superscript *, **, and *** denotes significance at the 10%, 5%, and 1% level. Speed of adjustment is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period. Speed of adjustment is calculated as one minus the coefficient for $CD_{i,t-1}$ (or $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$) in the respective period. Target payout ratio equals the coefficient for $EPS_{i,t}$ divided by Speed of adjustment in the respective period.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Regular dividend | | | | |
| | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 |
| **Panel A: SCG** | | | | | | | | | |
| $CD_{i,t-1}$ | 0.29 | 0.52 | 0.21 | 0.31 | 0.52 | 0.25 | 0.28 | 0.52 | 0.20 |
| | (18.27)*** | (11.12)*** | (11.69)*** | (19.60)*** | (11.10)*** | (13.99)*** | (17.16)*** | (11.05)*** | (10.57)*** |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | | | | | | |
| $EPS_{i,t}$ | 0.39 | 0.05 | 0.42 | 0.41 | 0.08 | 0.45 | 0.40 | 0.06 | 0.43 |
| | (47.39)*** | (2.85)*** | (46.26)*** | (47.14)*** | (4.33)*** | (45.00)*** | (46.16)*** | (3.05)*** | (44.97)*** |
| $LNMV_{i,t}$ | 0.02 | 0.02 | 0.04 | | | | 0.02 | 0.02 | 0.04 |
| | (5.57)*** | (2.81)*** | (7.51)*** | | | | (5.76)*** | (2.80)*** | (7.73)*** |
| $SG_{i,t}$ | | | | -0.16 | -0.17 | -0.20 | -0.17 | -0.17 | -0.23 |
| | | | | (-2.43)** | (-1.12) | (-2.65)*** | (-2.71)*** | (-1.17) | (-3.16)*** |
| *Target payout ratio* | *0.55* | *0.11* | *0.54* | *0.59* | *0.16* | *0.60* | *0.55* | *0.12* | *0.54* |
| *Speed of adj.* | *0.71* | *0.48* | *0.79* | *0.69* | *0.48* | *0.75* | *0.72* | *0.48* | *0.80* |
| **Panel B: WCG** | | | | | | | | | |
| $CD_{i,t-1}$ | 0.30 | 0.12 | 0.32 | 0.42 | 0.12 | 0.49 | 0.30 | 0.12 | 0.32 |
| | (33.38)*** | (8.01)*** | (27.19)*** | (51.18)*** | (7.78)*** | (48.43)*** | (33.36)*** | (7.89)*** | (27.17)*** |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | | | | | | | | | |
| $EPS_{i,t}$ | 0.20 | 0.25 | 0.19 | 0.22 | 0.25 | 0.21 | 0.20 | 0.25 | 0.19 |
| | (54.64)*** | (32.23)*** | (44.08)*** | (58.67)*** | (33.11)*** | (46.08)*** | (54.65)*** | (32.37)*** | (44.10)*** |
| $LNMV_{i,t}$ | 0.06 | -0.01 | 0.07 | | | | 0.06 | -0.01 | 0.07 |
| | (24.01)*** | (-1.23) | (23.20)*** | | | | (24.01)*** | (-1.31) | (23.21)*** |
| $SG_{i,t}$ | | | | -0.00 | -0.02 | -0.00 | -0.00 | -0.02 | -0.00 |
| | | | | (-1.16) | (-2.94)*** | (-0.89) | (-1.25) | (-2.98)*** | (-1.17) |
| *Target payout ratio* | *0.28* | *0.28* | *0.27* | *0.38* | *0.28* | *0.41* | *0.28* | *0.28* | *0.28* |
| *Speed of adj.* | *0.70* | *0.88* | *0.68* | *0.58* | *0.88* | *0.51* | *0.70* | *0.88* | *0.68* |

**Table 9**

**Classical Lintnr model and total payout model by introducing firm characteristics under different corporate governance regimes (continued)**

| | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Total payout | | | | |
| | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 | 1985-2014 | 1985-1999 | 2000-2014 |
| **Panel A: SCG** | | | | | | | | | |
| $CD_{i,t-1}$ | | | | | | | | | |
| | | | | | | | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | 0.24 | 0.52 | 0.14 | 0.27 | 0.52 | 0.23 | 0.23 | 0.52 | 0.14 |
| | (13.69)*** | (11.12)*** | (6.79)*** | (16.01)*** | (11.10)*** | (11.12)*** | (13.28)*** | (11.05)*** | (6.57)*** |
| $EPS_{i,t}$ | 0.42 | 0.05 | 0.45 | 0.44 | 0.08 | 0.49 | 0.42 | 0.06 | 0.46 |
| | (34.17)*** | (2.85)*** | (31.84)*** | (34.69)*** | (4.33)*** | (31.64)*** | (33.37)*** | (3.05)*** | (30.86)*** |
| $LNMV_{i,t}$ | 0.05 | 0.02 | 0.09 | | | | 0.05 | 0.02 | 0.09 |
| | (6.40)*** | (2.81)*** | (9.26)*** | | | | (6.41)*** | (2.80)*** | (9.24)*** |
| $SG_{i,t}$ | | | | -0.14 | -0.17 | -0.14 | -0.13 | -0.17 | -0.11 |
| | | | | (-1.46) | (-1.12) | (-1.18) | (-1.42) | (-1.17) | (-0.93) |
| *Target payout ratio* | *0.55* | *0.11* | *0.53* | *0.61* | *0.16* | *0.63* | *0.55* | *0.12* | *0.53* |
| *Speed of adj.* | *0.76* | *0.48* | *0.86* | *0.73* | *0.48* | *0.77* | *0.77* | *0.48* | *0.86* |
| **Panel B: WCG** | | | | | | | | | |
| $CD_{i,t-1}$ | | | | | | | | | |
| | | | | | | | | | |
| $CD_{i,t-1}+SR_{i,t-1}+CR_{i,t-1}$ | 0.25 | 0.12 | 0.24 | 0.37 | 0.12 | 0.40 | 0.25 | 0.12 | 0.24 |
| | (26.01)*** | (8.01)*** | (19.71)*** | (41.95)*** | (7.78)*** | (37.89)*** | (26.01)*** | (7.89)*** | (19.69)*** |
| $EPS_{i,t}$ | 0.21 | 0.25 | 0.21 | 0.24 | 0.25 | 0.24 | 0.21 | 0.25 | 0.21 |
| | (47.83)*** | (32.23)*** | (39.18)*** | (51.39)*** | (33.11)*** | (41.64)*** | (47.81)*** | (32.37)*** | (39.18)*** |
| $LNMV_{i,t}$ | 0.06 | -0.01 | 0.08 | | | | 0.06 | -0.01 | 0.08 |
| | (23.06)*** | (-1.23) | (23.39)*** | | | | (23.06)*** | (-1.31) | (23.39)*** |
| $SG_{i,t}$ | | | | -0.00 | -0.02 | -0.00 | -0.00 | -0.02 | -0.00 |
| | | | | (-0.45) | (-2.94)*** | (-0.50) | (-0.50) | (-2.98)*** | (-0.77) |
| *Target payout ratio* | *0.28* | *0.28* | *0.27* | *0.38* | *0.28* | *0.40* | *0.28* | *0.28* | *0.27* |
| *Speed of adj.* | *0.75* | *0.88* | *0.76* | *0.63* | *0.88* | *0.60* | *0.75* | *0.88* | *0.76* |

coefficient for the dividend payout decreased from 0.88 to 0.68.

Panel B shows that LNMV has no consistent relationship with the dividend payout for WCG firms. The coefficient of LNMV increased from -0.01 to a significant value of 0.07. The coefficient of SG increased from a significant value of -0.02 to -0.00. This implies that low revenue growth firms paid higher dividends over1985~1999, and large firms paid higher dividends after 2000. Generally, WCG firms that have lower revenue growth paid higher dividends. This result does not support the dividend substitute model ($H_3$-III). The target payout ratio did not change (from 28% to 28%), and the speed of adjustment coefficient for the dividend payout increased from 0.48 to 0.80.

Table 9 also shows that, for SCG firms and WCG firms, LNMV has a positive relationship with the total payout. In summary, we find that SCG firms increase their target dividend payout (and total payout) ratio and the speed of adjustment after 2000, whereas WCG firms keep their target dividend payout (and total payout) ratio and decrease the speed of adjustment after 2000.

# 6. Conclusion

This study uses dynamic panel data regression to investigate the evolution of TWSE-listed firms' dividend payout around the introduction of stock repurchases. We find that tax reform in 1998 and the introduction of repurchases in 2000 significantly affected firms' payout policies. Corporate payouts, both dividend payouts and total payouts, have increased and become stickier since 2000. The introduction of repurchases does affect the parameters of Lintner's total payout model. Under Taiwan's full imputation system and policy of tax-free capital gains, firms do not substitute stock repurchases for dividends; therefore, the hypothesis that dividends and repurchases are perfect substitutes is not supported.

Our finding that dividends are more rigid than total payouts during the repurchase period 2000~2014 is consistent with the flexibility/payout hypothesis that dividends are primarily paid out from permanent earnings. The target dividend payout ratio of firms increased year by year, and the speed of adjustment coefficient decreased after 2000. The speed of adjustment coefficient is lower in Lintner's dividend model than in Lintner's total payout model for

both the SCG and WCG groups after 2000. These results are consistent with the flexibility/speed of adjustment hypothesis; regardless of which group the firms belong to, the dividend payout is more rigid than the total payout in Lintner's model.

We find that the SCG group has a higher percentage of dividend payers and larger dividend payout ratio than the WCG group over the sample period. SCG firms increased target dividend payout ratio and the speed of adjustment coefficient after 2000, and conversely, WCG firms maintained target dividend payout ratio and decreased speed of adjustment coefficient after 2000. For the SCG group, firms with higher revenue growth paid lower dividends; this is consistent with the dividend outcome model of La Porta *et al*. (2000). However, in the WCG group, firms that have higher revenue growth had lower dividend payouts. Thus, the dividend substitute model is not supported.

We also find that SCG firms with higher revenue growth have a lower target payout ratio than WCG firms over the non-repurchase period 1985~1999. By contrast, SCG firms with lower revenue growth have a higher target payout ratio than WCG firms over the repurchase period 2000~2014. In summary, the firm-level corporate governance and dividend outcome models are supported.

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