現金減資與股票質押之研究:以台灣市場為例

Capital reduction and share pledge: Evidence from Taiwan

ABSTRACT

Our paper addresses a gap in the capital reduction literature by investigating the relationship between the share pledges of insiders and the motivations of capital reduction and the market reaction. We suggest that capital reduction can also be a method to reduce the agency problem caused by pledge and brings benefits to all shareholders, especially shareholders who pledge their shares. High pledge ratios motivate the company to implement capital reduction. When facing the pressure of a margin call pledges strengthen the motivation to initiate a capital reduction program. CAR shows that the market generally believes that the announcement of a capital reduction is good news, and companies with weak corporate governance are more likely to be viewed as sending a positive signal since they are implementing a policy that reduces agency problems, which exceeds shareholders' expectations.

Keywords：Capital reduction、 Share pledge、 Agency problem

1. INTRODUCTION

When companies face sustainability problems caused by changes in the environment and economic prosperity their payout policies should also be adjusted. According to DeAngelo, DeAngelo, and Skinner (2009), a company's payout policy can be considered from the short- or long-term perspective, since either offers a mass of information based on their size, timing, and form. How they are used varies depending on the state of the company and the prospects of the industry. Therefore, management usually adjusts its policies from time to time to respond to new situations.

In the past, most payment policies were based on cash dividends. Miller and Modigliani (1961) purpose that dividends are distributed to release signals which was about management's perception of future earnings to external investors. If the information is not expected by investors, the stock price will reflect the change in dividends. Stable dividend policy is a common and regular approach to distributing earnings to shareholders. Its advantage is that it attracts shareholder investment, yet it is inelastic: once it is decided to issue a dividend, canceling or reducing dividends becomes negative news. Moreover, DeAngelo, DeAngelo, and Skinner (1996) show that the current dividend changes are not related to the company's future earnings growth. Thus, increasing dividends does not imply that the company's future revenues will also increase. Under these restrictions, many companies no longer promise to pay cash dividends as a long-term payout policy, instead choosing to distribute earnings to shareholders in other ways.

With its financial flexibility and tax advantages, capital reduction has become another common payout method in recent years. Via capital reduction a firm returns cash directly to shareholders using the proportion of shares held by all shareholders. It has no impact on the original control rights. Using capital reductions as a payment policy satisfies both firms and their shareholders. In Taiwan, if a company returns cash to shareholders through capital reduction, the cash shareholders obtain is treated as a capital gain instead of dividend income. Since the capital gains tax rate in Taiwan is lower than the dividend income tax rate shareholders can benefit.

To the company, capital reduction is more flexible than issuing dividends since the firm does not have to commit to a regular payout. A capital reduction has an immediate effect on the company's financial ratio, increasing earnings per share, return on equity, return on assets, and share prices, which can attract more investors. Moreover, according to DeAngelo, DeAngelo, and Stulz (2006) when the enterprise is mature, its long-term profit will be stable. In the absence of appropriate investment targets or need for capital expenditures, the company may have excess cash. Returning cash to shareholders can eliminate excess funds and address the agency problem (Jensen, 1986). These benefits have led to an increasing number of companies using capital reduction as a payout policy.

The one of the earliest and most important capital reduction cases among Taiwan listed companies was the Regent Hotel's capital reduction on March 25, 2002. The decision to engage in capital reduction was made by the board of directors, with the aim of eliminating excessive idle funds. NTD 5 in cash was given back to the shareholders. Two weeks after the capital reduction, the stock price rose from NTD 15 to NTD 22, a 46.7% increase. The unexpected performance of the stock price made Regent a model for capital reduction.

Since then, capital reduction has generally been interpreted as positive news, with many companies choosing capital reduction as a payout tool which brought a wave of capital reduction, including Yageo, Taiwan Mobile, and Chunghwa Telecom. From 2002 to the present, 130 Taiwan listed companies have adopted capital reduction activities, with a total of NTD 244,092 million returned to shareholders. Table 4-1 shows the number of companies

using capital reduction in Taiwan through the end of 2017.

The latest news was the well-known enterprise Foxconn had also made an announced of capital reduction on May 11, 2018. Foxconn returned NTD 2 in cash back to the shareholders (200 shares per 1,000 shares) and NTD 2 in cash dividends, so did the stock price rise from NTD 82.9 to NTD 89 after an announcement.

This decision made some analysts began to explore the purpose of their capital reduction, shareholders can finally get NTD 4, but why the Foxconn chose to pay it in two kinds of payout policy instead of one. Is it simply because of the decline of investment opportunities, so returned part of the funds to shareholders, or is it for the self-interests of the shareholders? Analysts pointed out that one year prior to the announcement Foxconn's share price was not satisfactory, which may put tremendous pressure on the financing of major shareholders. Taking Terry Gou, the chairman of Foxconn, as an example, according to the information of M.O.P.S, the pledge rate of Terry Gou's was about 46%. If the stock price keeps falls, he may face the pressure to replenish huge funds, but after capital reduction, the number of shares pledged by Terry Gou will decrease and the stock price will increase, which can ease his pressure of replenishing funds.

Start late of capital reduction in Taiwan, few of our researchers explored capital reduction. The literature largely focuses on announcement effects, with few scholars discussing motivation, share pledges, and the pressure caused by the fall in stock prices. Therefore, this paper focuses on the relationship between capital reduction and share pledges, to identify whether pledges lead companies to make a decision to implement capital reduction. Do the pressures of declining stock prices strengthen the company to adopt capital reduction? Is it good news for shareholders when managers, facing the pressure of declining stock prices, order a capital reduction?

Controlling shareholders pledge their shares to gain greater control rights without paying more cash, which not only increases agency problems for the company but also leads to poor performance. Thus, we infer that capital reduction can reduce the agency problem caused by share pledges and bring benefits to all shareholders. The refund of cash via capital reduction allows all shareholders to enjoy the advantage of lower taxes on capital in Taiwan. Especially for shareholders who pledge their shares, the refund of cash through capital reduction can address the funding gap and keep the maintenance ratio at a higher level. Therefore, we suggest that the announcement of cash returns to the shareholders through capital reduction can satisfy both shareholders who pledge and shareholders who do not pledge.

Our research shows that share pledges of the insiders is positively related to capital reduction, indicating that the high pledge ratio of the insiders will increase the probability of using a capital reduction, and the pressures of the stock declining also strengthen the company to adopt capital reduction. Furthermore, when the company uses capital reduction due to the pressure of share pledges the cumulative abnormal return shows a significant positive performance. Cash reduction will effectively address the agency problem caused by share pledges, which is generally good news for shareholders, especially for companies with weaker corporate governance.

With the increasing number of cases of capital reduction in Taiwan, the importance of capital reduction has gradually increased. Although the motivation for capital reduction has been studied, the factor of share pledges has not been emphasized. This paper addresses this gap by investigating the relationship between the share pledges of the insiders, the motives for the capital reduction, and the market reaction. All other motivations mentioned in the literature are controlled for in our regressions. We also suggest that capital reduction can be a method to reduce the agency problem experienced by companies with higher share pledges (an agency

problem) since they are willing to adopt capital reduction they are reducing the agency problem. We thus believe this article makes important contributions to the literature on capital reduction.

The remainder of the paper is structured as follows. In Section 2 we introduce the meaning and type of capital reduction and literature review of the all motivations. In Section 3 we describe the data and the methodology we use to select our samples, and also explain how we construct the regression models. In Section 4 we show the results. We offer conclusions in Section 5.

2. LITERATURE REVIEW

2.1. Type of capital reduction

There are two broad approaches to capital reduction in Taiwan companies: reducing capital to return capital to shareholders (RCRS), and reducing capital to atone for loss (RCAL). Both follow Article 168 of the Company Law: (1) The proposal should be sent to the shareholders after approval by the board of directors; (2) After more than half of the shareholders pass this proposal, it should be sent to the Securities and Futures Bureau for review and approval before the company executes the capital reduction; and (3) Shares must be eliminated according to the shareholding ratio of shareholders.

RCAL is also called nominal capital reduction. The main purpose of the company is to eliminate the losses on the account by capital reduction. Assets are not substantially reduced. Usually a long-term loss-making company finds it difficult to increase new capital, due to legal restrictions. Thus, the elimination of losses through large-scale capital reduction can create a new opportunity to restart. RCRS is known as real capital reduction, under which excess funds will be directly returned to shareholders, resulting in a substantial reduction in assets. This paper focuses only on RCRS and excludes RCAL samples.

2.2. Motivations of capital reduction

Liu, Chiou, and Yang (2014) find that listed companies in Taiwan replace cash dividends with repurchases or capital reduction. Because few studies describe capital reduction, some of the studies cited below explore repurchases and their findings are applied to capital reduction.

Lintner (1956) shows payout policy is a consideration for investors. Shareholders view capital reduction as an abnormal payout method of the company. It is a more flexible method for the companies that do not want to promise a long-tern payout policy (Jagannathan, Stephens, and Weisbach, 2000). Since capital reduction involves cash payouts, cash flow uncertainty is an important determinant of corporate payout policies (Brav, Graham, Harvey, and Michaely, 2005). The amount of cash required for capital reduction pay outs far exceeds that necessary for dividends, which means that the company must have sufficient and stable cash flow to pay large amounts at one time (Chay and Suh, 2009). Moreover, once the company decides to implement capital reduction, seasoned equity offerings (SEO) and the issuing of corporate bonds are prohibited for a year afterwards. Therefore, capital reduction can only be adopted when the company has ensured its future financial stability.

According to DeAngelo, DeAngelo, and Stulz (2006), when the companies reach maturity they can usually generate large free cash flows, since the decrease in investment opportunities will increase free cash on hand. If the company does not have a comprehensive supervision mechanism, the agency problem may cause an increase in agency costs. Therefore, returning cash directly to shareholders can dispose of idle funds within the company while reducing agency costs and solving agency problems (Easterbrook, 1984; Jensen, 1986). This not only effectively inhibits managers from improper investment decisions but also raises the company’s stock price (Lin and Chung, 2008).

Capital reduction and Repurchase are very similar but not identical. Repurchase often involves buy backs of shares at market prices through the open market, while capital reduction eliminates shares at the par value (Comment and Jarrell, 1991). But they can both achieve the same purpose, decreasing shares outstanding and increase current earnings per share Voss (2012). It is thus reasonable to infer that improving EPS is one of the motivations in a firm's exercise of capital reduction (Badrinath and Varaiya, 2000; Brav, Graham, Harvey, and Michaely, 2005).

If a company implements a capital reduction and repurchase which using the same amount of cash, the number of shares recovered by the capital reduction is far higher than by repurchase. This is because the capital reduction eliminates shares at par value, which lower than the market value. Moreover, the law has a limit on repurchase amounts, but there is no restriction on capital reduction. Hence, we expect that the effect of capital reduction on EPS will be even better than repurchase.

In the previous section, we described how companies use capital reductions to allocate excess funds to shareholders. When the company allocates the funds, it reduces equity and increases the leverage ratio. Assuming that the company has an optimal capital structure, the company may adjust its leverage ratio via capital reduction to achieve its target (Bagwell and Shoven, 1988). We may then assume that when the company's leverage ratio is lower than its target capital structure (Chang, Chou, and Huang, 2014), the company will be more likely to exercise capital reduction. Therefore, a company's capital structure does significantly affect the decision to execute a capital reduction.

Hsieh and Wang (2008) and Farrar and Selwyn (1967) observed that the tax preferences of internal owners are an important factor that affect the payout policy. In Taiwan, when a company distributes dividends, shareholders are must pay personal income tax, the highest bracket of which is 40%, meaning that a dividend issue imposes a tax burden on shareholders. Cash from a capital reduction is taxed as capital gains instead of dividend income. Since the capital gains tax rate is lower than the dividend income tax rate, shareholders receive the benefits of reduced tax expenses. Moreover, according to the regulations of capital reduction shares should be eliminated based on the shareholding ratio of shareholders. Although the shareholding ratio of the shareholders is reduced, their ownership is not diluted. Thus, shareholders can maintain their shareholding ratio and enjoy reduced tax expenses.

2.3. Shares pledge related Literature

With the diversification of financial instruments, it is common for shareholders to use stocks as collateral for personal loans. Numerous studies show that a high pledge ratio has a negative impact. Chen and Hu (2007) find that high pledge ratios among insiders will lead create higher risk for the firm and lower its valuation. Lee and Yeh (2004) found that the higher the share pledge ratios of the insiders, the higher the risk that the firm has a financial crisis in the following year.

Taiwanese companies are largely family held. Chiou, Hsiung, and Kao (2002) contended that the phenomenon of poor performance is caused by agency problems: the high pledge ratio of insiders permits them to strengthen their control rights without using their own funds. Insiders can obtain funds by collateralizing their shares and then buying new shares (Kao, Chiou, and Chen, 2004).

Claessens, Djankov, Fan, and Lang (2002) find that the greater the shareholder's cash flow rights, the higher the company's value, but that value will decrease when control exceeds cash flow rights, which means the controlling shareholder has the incentive to choose policies unfavorable to the company. However, a high deviation between control rights and cash flow rights will occur when shareholders pledge their shares to gain more control rights. The higher

the pledge ratio, the more serious the agency problem between controlling shareholders and the minority shareholders, since controlling shareholders are more likely to sacrifice the interests of minority shareholders by reducing the distribution of cash dividends (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Faccio, Lang, and Young, 2001; Chen, Kao, Chen, and Chen, 2013).

In addition, over pledging can also hurt shareholders' own wealth and control. If the insiders use shares as collateral, the fluctuation of stock price will determine the value of the collateral. When share prices decline, shareholders may be faced with insufficient collateral value and a margin call be triggered when the stock price falls under a certain level. Once the shareholders receive a margin call, they are required to fill the funding gap, otherwise the shares they pledged will be sold by the bank. If shareholders are unable to meet the margin call, they may face the risk of losing the control of the company (Grossman and Hart, 1988; Johnson, La Porta, Lopez-de-Silanes, and Shleifer 2000; Chan, Chen, Hu, and Liu, 2018; Dou, Masulis, and Zein, 2019).

Corporate governance mechanisms play a key role in reducing agency problems in a firm. Easterbrook (1984) argues that cash dividends can be used as part of the governance mechanism, and agency problems can be controlled through the distribution of dividends. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) suggest that paying dividends can protect the rights of minority shareholders, consistent with the findings of Kao, Chiou, and Chen (2004). Thus, we reasonably infer that capital reduction can also be a method to reduce the agency problems caused by share pledges.

Lai (2011) found that after a company announces a capital reduction, there is a significant positive abnormal return on both announcement day and the next day. Que (2006) also shows that a company can successfully improve its financial performance (ROA, ROE, and EPS), driving stock prices higher, indicating that investors consider capital reduction to be good news. Zhang (2008) compares companies in Hong Kong with companies in China and shows that when weak corporate governance companies facing serious agency problems, they distribute fewer dividends. Therefore, we reasonably infer that when companies with higher share pledges (an agency problem) are willing to adopt capital reduction, they are reducing their agency problems (Shleifer and Vishny, 1986; Pagano and Roell, 1998; Gompers and Metrick, 2001; Dou, Masulis, and Zein, 2019).

In this study we test whether the share pledges of insiders act as an incentive for implementing a capital reduction to reduce agency problems. This is because shareholders who do not pledge receive cash back, while shareholders who do pledge can maintain the value of their collateral, especially when facing the pressure of stock declining (Chan, Ikenberry, and Lee, 2004; Brav, Graham, Harvey, and Michaely, 2005; Ginglinger and Hamon, 2007).

3. DATA, METHODOLOGY AND REGRESSION MODELS

3.1. Data

Taiwan's capital reduction methods may be separated into two types; reducing capital to return shareholders (real capital reduction) and reducing capital to atone for loss (nominal reduction). The sample used in this study consists only of real capital reduction, in which cash is returned to shareholders.

In this study, the sample is drawn from all TWSE-listed companies. Sources include the Taiwan Economic News, TEJ, and the Market Observation Post System (MOPS). They are organized through cross-comparison by this paper. The sources of other motivation variables and control variables are also taken from TEJ. Since Regent Hotels was the most successful

case of capital reduction in Taiwan in 2002, the research period of this study is from 2002 to 2017.

Firms that choose capital reduction usually have firm characteristics different from other companies. To estimate more accurately what factors affect the company's decision to execute a capital reduction, we use the propensity score matching model (see below) to create a new sample which consists of 130 event samples and 130 matched samples for a total of 260 cases.

3.2. Matched control firm: propensity score matching model

Rosenbaum and Rubin (1983) proposed the propensity score matching model (PSM), which is often used as a pairing method for biomedical and disease research, and was later applied to the field of economics and sociology. The propensity score matching model is used to eliminate the differences of in characteristic variables between two samples. It uses the characteristic variables of the event sample to obtain the probabilities, known as the Propensity Score, which is used to construct an appropriate matched sample among the non-event group.

Under our original grouping sample, we found that the company characteristics of firms in the capital reduction and non-capital reduction groups are significantly different. We applied the propensity score matching method to eliminate the differences in characteristic variables between firms in the capital reduction and non-capital reduction groups to obtain more accurate results. After using the propensity score matching model we argue that there is no significant difference between the two sets of samples' company characteristics. We use these matched samples to measure the company's motivation for capital reduction. The estimation function is set as:

$$\begin{aligned} &\mathrm{P}(\mathrm{REDUCTION}_{\mathrm{i,t}} = 1) \\ &\quad = \mathrm{L}\left(\alpha_0 + \beta_1 \mathrm{SIZE}_{\mathrm{i,t-1}} + \beta_2 \mathrm{MB}_{\mathrm{i,t-1}} + \beta_3 \mathrm{CASH}_{\mathrm{i,t-1}} + \beta_4 \mathrm{DEBT}_{\mathrm{i,t-1}} \right. \\ &\quad \left. + \beta_5 \mathrm{DIV}_{\mathrm{i,t-1}}\right), \end{aligned} \tag{1}$$

where REDUCTION is the dependent variable, defined as a dummy variable equal 1 for the firm adopts capital reduction, and zero otherwise. L is the logistic distribution, and the company characteristic variables we control are SIZE, MB, CASH, DEBT, and DIV.

According to the literature capital-reducing firms have significantly different characteristics. Opler, Pinkowitz, Stulz, and Williamson (1999) found that larger companies more easily enter capital markets, lowering their capital costs. Therefore, they are more able to issue cash to shareholders. In this study SIZE is defined as the natural log of total assets 1 year before the event year.

DeAngelo, DeAngelo, and Stulz (2006) indicated that as the company matures its investment opportunities decrease. Managers can reduce potential agency costs by returning idle cash back to shareholders (Jensen, 1986). Thus, the company's investment opportunities affect the company's payment policy. We use MB, defined as the market value of equity divided to the book value of equity, which was 1 year before the event year, to control for the company's investment opportunities. In this study we use CASH, the ratio of cash divided to total assets 1 year before the event year, to represent the cash holding of the company.

Shih and Yang (2013) show that companies with low debt ratios and higher past dividend yields are more likely to use capital reduction as a means of payout policy. In this study DEBT is defined as total liabilities divided by total assets 1 year before the event year, and DIV is the dividend yield 1 year before the event year. Hence, in this study the company characteristic variables we control for are SIZE, MB, CASH, DEBT, and DIV.

3.3. Definition of variable

To examine whether cash-flow uncertainty is a factor that affects capital reduction decisions, we use STD as a proxy variable to measure uncertainty. STD is defined as the standard deviation of 24 months of monthly returns before the event year. We use this measure because stock prices are usually in a state of high volatility when cash flows are not predictable. Since capital reduction is restricted by the capital increase within one year after implementation, it can only be adopted when the company has ensured its future financial stability. This means the possibility of uncertainty in cash flow should be minimized to prevent crises in the firm. We thus expect that STD and REDUCTION will be negatively correlated.

According to the life-cycle theory of DeAngelo, DeAngelo, and Stulz (2006), a long-term mature company will accumulate huge profits, greater than those of growth companies, and will be more likely to execute a one-time repayment of cash to shareholders. We use the variable RE, which is calculated by retained earnings/total equity, to examine this. We expect RE and REDUCTION to be positively correlated.

Capital reduction is a way of eliminating shares while achieving a payout. Following Voss (2012), companies can increase their current earnings per share by decreasing shares outstanding. Hence, in this study, we use EPSG as a variable to measure whether the company will improve its earnings per share through a capital reduction when the company's earnings per share are in a lower than expected EPS situation . EPSG is defined as the average growth rate of earnings per share for the 3 years before the event year. Therefore, we expect a negative correlation between EPSG and REDUCTION.

From the previous literature, we use LEVER_TARGET as a proxy variable. This is the gap between a company’s leverage ratio and its target leverage ratio, 1 year before the event year, where the leverage ratio is calculated as net debt/total assets, and the target leverage ratio of the company is measured by the average of leverage ratio for all companies in the same industry (Dittmar, 2000). As mentioned, if a company has an optimal capital structure, then we can assume that when the company's leverage ratio is lower than its target capital structure, managers may choose to adjust the leverage ratio by capital reduction to achieve the target leverage ratio. Hence, we predict a negatively correlation between LEVER_TARGET and REDUCTION.

As mentioned above, insiders prefer payout policies which are beneficial to their personal wealth and interests, which mean that the preference of internal owners for taxation will affect the payout policy. Because of Taiwan’s regulations on capital reduction, insiders not only enjoy a tax advantage but also control their wealth more easily through capital reduction. INSIDER, a variable defined by the ratio of shares held by insiders in the year before the event year, was used to examine our prediction. Obviously, a higher ratio of insider ownership will lead to greater use of capital reduction as a way to distribute excess funds. Therefore, we expect a positively correlation between INSIDER and REDUCTION.

As mentioned, when a shareholder uses stock as collateral, the more they pledge, the more they increase the agency problems of the company. Zhang (2008) compares companies in Hong Kong and companies in China and shows that when firms with weak corporate governance face serious agency problems they distribute fewer dividends. Therefore, we infer that when companies with higher share pledges (an agency problem) execute a capital reduction they are reducing agency problems, benefiting all shareholders (Shleifer and Vishny, 1986; Pagano and Roell, 1998; Gompers and Metrick, 2001). Moreover, the fluctuations in the stock price will determine the value of the collateral (Chan, Chen, Hu, and Liu, 2018; Dou, Masulis, and Zein, 2019). Once the share price declines, shareholders may be faced with a

margin call and risk losing control of the company. Thus, capital reduction is likely to benefit shareholders who pledge their shares. We use PLEDGE as the ratio of pledge shares held by insiders 1 year before the event year (total pledge shares of insiders/insiders total holding shares) and we expect PLEDGE and REDUCTION to be positively correlated.

However, the share pledge ratio does not mean that shareholders are under pressure to meet the demand for funds caused by the margin call. We can only be infer that the higher the share pledge ratio, the more likely the company is facing the threat of a margin call, but as long as the stock price does not fall, it has no effect. Therefore, we believe that recent stock performance is also an important consideration. We test the cross-effect using the variable PLEDGE UNDER PRESSURE, an interaction variable calculated by the share pledge ratio (PLEDGE) multiplied by the previous three-month stock return (PRESSURE) to obtain more accurate evidence that shareholders are under pressure to repay.

Assume that the initial loan ratio is 60 percent. A shareholder can borrow 60 dollars if the stock is now worth 100 dollars. The maintenance margin is set at 140 percent. As the loan is made, the initial maintenance ratio is about 167 percent (=100/60). A margin call will be triggered when the share price drops and causes the pledger's maintenance ratio to fall below 140 percent, which means ((100−X)/60)) is smaller than 140 percent. In other words, if the stock price drops below 84 dollars (16 percent) the pledger will receive a margin call. Based on this reasoning, PRESSURE is defined as a dummy variable equaling 1 if the three month return before the event year is lower than −15%, and zero otherwise (Chan, Chen, Hu, and Liu, 2018). Hence, a positive correlation between the cross-effect of PLEDGE UNDER PRESSURE and REDUCTION is expected, if the pressure of being force to sell shares strengthens the motivation of shareholders who have pledged their shares, to use capital reduction.

Based on the literature discussed above, we infer that capital reduction may be used to reduce the agency problem caused by share pledges and will certainly bring benefits to all shareholders. Based on the regulations governing capital reduction, the total value of shares will remain unchanged, which will not lead to deviation of control rights and cash flow rights. All shareholders can receive cash back, preventing controlling shareholders from sacrificing the interests of minority shareholders by reducing the distribution of cash dividends, while the refund of cash allows all shareholders to use cash more efficiently and enjoy the advantages of lower taxes in Taiwan. For the shareholders who pledge their shares, the refund of cash through capital reduction may enable them to cover funding gaps and keep the maintenance ratio at a higher level. Finally, capital reduction can drive the stock price higher, preventing margin calls and easing pressure on shareholders.

Therefore, an announcement of capital reduction should be good news for all shareholders since all shareholders believe it can reduce agency problems. We expect both PLEDGE and PLEDGE UNDER PRESSURE to be positively related to CAR if companies adopt capital reduction to relieve the pressure on shareholders. Companies with weak corporate governance are more likely to be viewed as sending a positive signal since they are implementing a policy that reduces agency problems, which exceeds shareholders' expectations.

3.4. Motivations for capital reduction

First, we investigate whether the ratio of share pledges and the pressure of stock price declines motivate the company to implement capital reduction. We use the matched sample and logistic regression models below to perform the estimation:

$$\begin{aligned}P(\text{REDUCTION}_{i,t} = 1 \mid & \text{PLEDGE}_{i,t-1}, \\ & \text{PLEDGE UNDER PRESSURE}_{i,t-1}, \text{OTHER}_{i,t-1}, \text{CONTROL}_{i,t-1}) \\ & = L\,(\alpha_0 + \beta_1 \text{PLEDGE}_{i,t-1} + \beta_2 \text{PLEDGE UNDER PRESSURE}_{i,t-1} \\ & + \beta_2 \text{PLEDGE UNDER PRESSURE}_{i,t-1} + \boldsymbol{\Phi}\text{OTHER}_{i,t-1} \\ & + \boldsymbol{\theta}\text{CONTROL}_{i,t-1} + \delta_j + Y_t\,), \qquad (2)\end{aligned}$$

where REDUCTION is the dependent variable, defined as a dummy variable equaling 1 for firms adopting capital reduction, and zero otherwise. L is the logistic distribution and PLEDGE is the ratio of pledge shares held by insiders 1 year before the event year (total pledge shares of insiders/insiders total holding shares). PLEDGE UNDER PRESSURE is an interaction variable calculated by PLEDGE times PRESSURE. OTHER is a series of other possible motivations in year $t-1$ mentioned in the literature, including STD, RE, EPSG, LEVER_TARGET, and INSIDER. CONTROL is a series of company characteristic variables in year $t-1$, including SIZE, MB, CASH, DEBT, and DIV. δ_j is the fixed effect of the industry and Y_t is the fixed effect of year. The definitions of all variables are shown in the Appendix. Standard errors are adjusted for heteroscedasticity (White, 1980) and clustered by firm (Petersen, 2009).

3.5. Market reaction of capital reduction

To determine the market reaction, we test the short-term performance after the announcement of capital reduction using cumulative abnormal returns (CAR). If companies take action because of the ratio of pledge (PLEDGE), is it good news for shareholders? Is it good news for shareholders when the managers take action when facing the pressure of stock price declines (PLEDGE UNDER PRESSURE)? We use the event sample and ordinary least square (OLS) regression models to perform the estimation. The model is:

$$\begin{aligned}\text{CAR}_i = \ & \alpha_0 + \beta_1 \text{PLEDGE}_{i,t-1} + \beta_2 \text{PLEDGE UNDER PRESSURE}_{i,t-1} + \boldsymbol{\Phi}\text{OTHER}_{i,t-1} \\ & + \boldsymbol{\theta}\text{CONTROL}_{i,t-1} + \delta_j + Y_t + \varepsilon_{i,t-1}, \qquad (3)\end{aligned}$$

where the dependent variable is a cumulative abnormal returns of (−1, +1) event period. δ_j is the fixed effect of the industry, Y_t is the fixed effect of year, $\varepsilon_{i,t-1}$ is the regression residual and all of the variables are defined as in Section 3.4.

Finally, we separated the event sample into two groups by the level of corporate governance (DEVIATE), to test which group experiences better market reactions after announcing a capital reduction when firms have a high share pledge ratio and high pressure. Our model is the same as Model (4). All of the variables are identical to those discussed in Section 3.4.

4. EMPIRICAL RESULTS

4.1. Summary statistics

Table 4-1 shows the distributions for our samples from 2002 to 2017. It exhibits a clear increasing trend. Since the successful capital reduction of Regent Hotels in 2002, an increasing number of companies have executed capital reductions. As the news exposure grows, investors are increasingly able to accept this form of payout method, doubling the number of capital reduction events during these five years. Although the number of capital reduction events has increased, the average amount of capital reduction has not risen.

Table 4-1 Sample distribution

Panel A: Year classification of sample			(Unit: thousand dollars)	
Year	Mean	Median	Lump sum	N
2002	2,156,250	2,156,250	2,156,250	1
2005	500,000	500,000	500,000	1
2006	2,590,203	1,556,250	7,770,608	3
2007	8,427,500	946,912	84,275,000	10
2008	2,538,176	649,679	25,381,760	10
2009	1,675,769	410,716	11,730,381	7
2010	3,646,117	457,397	21,876,704	6
2011	1,574,635	687,500	4,723,905	3
2012	1,017,974	481,250	5,089,870	5
2013	1,309,364	642,279	18,331,097	14
2014	1,708,319	503,605	23,916,472	14
2015	764,464	505,552	12,231,425	16
2016	763,177	527,078	13,737,193	18
2017	562,353	377,195	12,371,764	22
Total	2,088,164	516,315	244,092,429	130

Table 4-2 presents the summary statistics of the matched sample, in which the non-capital reduction companies are matched with capital reduction companies based on the control variables. Firm characteristic variables are not significantly different, which means that the results will not be affected by the firm characteristic. The mean of PLEDGE and PLEDGE UNDER PRESSURE are significantly different, indicating that the share pledge and the pressure of share decline more often occur in the capital reduction group than in the non-capital reduction group.

Table 4-2 Summary statistics

Summary statistics of matched sample						
Variables	Capital reduction firm (N=130)		Non-capital reduction firm (N=130)		Difference	
	Mean	Std.dev.	Mean	Std.dev.	Mean	P-value
PLEDGE	0.1249	0.1837	0.0701	0.1226	−0.0548	0.0051***
PLEDGE UNDER PRESSURE	0.0081	0.0540	0.0000	0.0000	−0.0081	0.0897*
STD	0.0886	0.0359	0.1024	0.0454	0.0138	0.0069***
RE	0.1454	1.8594	0.2306	0.2268	0.0851	0.6052
EPSG	−0.0465	2.1101	0.2087	4.2252	0.2552	0.5386
LEVER_TARGET	−0.1769	0.3982	−0.1689	0.3983	0.0081	0.8702
INSIDER	0.2219	0.1203	0.2128	0.1371	−0.0092	0.5669
SIZE	16.1263	1.1311	15.9788	1.5168	−0.1475	0.3750
MB	1.2261	1.2598	1.2587	0.6979	0.0325	0.7971
CASH	0.1910	0.1395	0.2036	0.1409	0.0126	0.4682
DEBT	0.3222	0.1596	0.3429	0.1640	0.0207	0.3029
DIV	0.0401	0.0334	0.0416	0.0303	0.0015	0.7016

We use t-test to test the difference of means between capital reduction firm and non-capital reduction firm. All variable definitions are shown in the Appendix, and all continuous variables are winsorized at the 1% and 99% levels to control for outliers. We use ***, **, and * to represent significance at 1%, 5%, and 10% level, respectively.

The correlations of independent variables before the residuals are adjusted. We find three high coefficients among our independent variables. The coefficient between MB and RE is −0.7145, the coefficient between CASH and LEVER_TARGET is −0.4120, and the coefficient between DEBT and LEVER_TARGET is 0.4459. Considering that there may be problems with collinearity, we obtain the residuals using regressions, and the firm characteristic variables have been replaced as the residual. The correlations of the independent variables after the residuals are adjusted. Our results suggest that there are no collinearity problems among our independent variables.

4.2. Motivations for capital reduction

First, we examine whether the ratio of share pledges (PLEDGE) is a factor affecting the insider decision to execute a capital reduction. We infer that when companies with higher share pledges (an agency problem) are willing to adopt capital reduction, they are reducing their agency problem. The regression results are shown in Table 4-3 using REDUCTION as the dependent variable.

Table 4-3 Motivations for capital reduction

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−0.2917	1.9990	−0.7986**	0.2178	−1.0512***	1.2343
	(−0.87)	(0.73)	(−2.56)	(0.08)	(−3.20)	(0.45)
PLEDGE	2.591**	2.666**			2.327**	2.326**
	(2.39)	(2.40)			(2.11)	(2.10)
PLEDGE UNDER PRESSURE			103.03***	101.00***	101.37***	99.33***
			(17.35)	(13.11)	(16.48)	(12.97)
STD		−12.02**		−12.83**		−13.64**
		(−2.21)		(−2.34)		(−2.36)
RE		2.9269***		2.7441***		2.7712***
		(2.96)		(2.70)		(2.77)
EPSG		−0.0016		−0.0001		0.0077
		(−0.03)		(−0.00)		(0.13)
LEVER_TARGET		0.2545		−0.1049		0.1526
		(0.36)		(−0.14)		(0.21)
INSIDER		0.4132		0.5743		0.4629
		(0.32)		(0.45)		(0.36)
SIZE		−0.0908		−0.0106		−0.0804
		(−0.61)		(−0.07)		(−0.54)
MB		−0.5965**		−0.6392**		−0.6404**
		(−2.06)		(−2.08)		(−2.20)
CASH		−0.0733		−0.7031		−0.1911
		(−0.04)		(−0.34)		(−0.09)
DEBT		−1.2181		−1.2478		−1.3024
		(−0.82)		(−0.81)		(−0.87)
DIV		−7.8013		−8.9246		−7.2202
		(−1.25)		(−1.46)		(−1.15)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R−square	0.0327	0.1228	0.0290	0.1299	0.0542	0.1475
Obs	260	260	260	260	260	260

We use the matched sample to test the firm's motivations for capital reduction. Year and industry fixed effects are included. Standard errors are adjusted for heteroscedasticity (White, 1980) and clustered by firm (Petersen, 2009). All variable definitions are shown in the Appendix, and all continuous variables are winsorized at the 1% and 99% levels to control for outliers. We use ***, **, and * to denote significance at 1%, 5%, and 10% level respectively, and t-statistics are shown in the parentheses.

We separately check whether the effect of PLEDGE will be diluted after adding control variables. We find that the share pledge ratio of insiders (PLEDGE) is significantly and positively related to the probability of a company performing a capital reduction. Even when we enter all other motivation variables and control variables in the regression, the effect of PLEDGE remains strong. Columns 1 and 2 indicate that a higher pledge ratio for insiders is the motivation for the company to implement capital reduction.

We next examine whether the pressure of stock price declines strengthens the motivation to execute a capital reduction. We check the effect of PLEDGE UNDER PRESSURE with and without adding other variables and control variables. The impact of PLEDGE UNDER PRESSURE is significantly and positively related to REDUCTION. Columns 3 and 4 show that when the share price continues to decline, and the pressure of an impending margin call

will actually strengthen the motivation to initiate a capital reduction program. Finally, we put PLEDGE and PLEDGE UNDER PRESSURE into the model together, and Columns 5 and 6 still show a significant positive correlation. This indicates that PLEDGE and PLEDGE UNDER PRESSURE are the motivation that triggers the company to implement a capital reduction, which reduces the agency problem.

4.3. Market reaction of capital reduction

Table 4-4 shows the descriptive statistics of cumulative abnormal return after the announcement of a capital reduction. The estimation period was defined using the market model, and runs from 255 days prior to the announcement to 31days prior to the announcement. All the event windows in Panel A of Table 4-4 are all significantly different from zero and show a positive reaction, indicating that the market thinks the announcement of a capital reduction is good news. Panel B of Table 4-4 is the subsample of CAR on pledge while panel C of Table 4-4 is the subsample of CAR on corporate governance. Most of them remain significantly different from zero and show a positive reaction, especially for pledge firms and the weak governance group. This indicates that when companies with a higher pledge ratio or weaker corporate governance adopt capital reduction the positive market reaction will be more obvious.

Table 4-4 Cumulative abnormal return of capital reduction announcement

Panel A: CAR of whole capital reduction samples (N=130)

CAR	Mean	Median
(0,+1)	0.0207***	0.0168***
(−1,+1)	0.0192***	0.0165***
(−1,+2)	0.0218***	0.0147***

Panel B: Subsample of CAR on pledge

CAR	Pledge Firm (N=68)		Non-Pledge Firm (N=62)		Difference	
	Mean	Median	Mean	Median	Mean	P-value
(0,+1)	0.0230***	0.0101***	0.0183***	0.0234***	−0.0047	0.6112
(−1,+1)	0.0199***	0.0153**	0.0183**	0.0185***	−0.0016	0.8654
(−1,+2)	0.0244***	0.0130**	0.0190**	0.0187***	−0.0054	0.6486

Panel C: Subsample of CAR on Corporate Governance

CAR	Weak Governance (N=65)		Strong Governance (N=65)		Difference	
	Mean	Median	Mean	Median	Mean	P-value
(0,+1)	0.0280***	0.0283***	0.0135**	0.0075*	−0.0145	0.1172
(−1,+1)	0.0263***	0.0275***	0.0120*	0.0080	−0.0143	0.1355
(−1,+2)	0.0251***	0.0236***	0.0184**	0.0105	−0.0067	0.5731

The estimation period was set up using market model, with 255 days prior to the announcement to 31days prior to the announcement. We use t-test and Wilcoxon test to test whether the mean and the median are unequal to zero. We use ***, **, and * to represent significance at 1%, 5%, and 10% level respectively.

When companies adopt capital reduction due to the ratio of pledge (PLEDGE), is it good news to shareholders? What if the capital reduction is driven by the pressure of stock price declines (PLEDGE UNDER PRESSURE)? The results are shown in Table 4-5, where the dependent variable is cumulative abnormal returns over the (−1, +1) event period (CAR). Columns 1 and 2 show PLEDGE is not significantly related to CAR, while columns 3 to 6 show that PLEDGE UNDER PRESSURE is significantly related to CAR.

We contend that capital reduction can reduce the agency problem caused by share pledges and bring benefits to all shareholders. It can raise the stock price and return cash to all shareholders, allowing them to use the cash more effectively and enjoy the benefits of reduced tax expenses. For shareholders who pledge their shares, the refund of cash through capital

reduction can be used to address funding gaps and keep the maintenance ratio at a higher level. Further, capital reduction can drive the stock price higher, preventing a margin call and easing the pressure for shareholders.

Table 4-5 Market reaction of capital reduction

variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.0555*	−0.0039	0.0563*	−0.0209	0.0558*	−0.0016
	(1.90)	(−0.03)	(1.89)	(−0.23)	(1.89)	(−0.01)
PLEDGE	0.0309	0.0297			0.0207	0.0146
	(1.12)	(0.79)			(0.87)	(0.41)
PLEDGE UNDER PRESSURE			0.1979***	0.2536***	0.1829***	0.2441***
			(4.65)	(3.68)	(4.45)	(3.56)
STD		−0.1327		−0.2094		−0.2104
		(−0.60)		(−0.96)		(−0.96)
RE		−0.0305		−0.0413		−0.0406
		(−0.90)		(−1.18)		(−1.19)
EPSG		−0.0043		−0.0026		−0.0025
		(−1.42)		(−0.96)		(−0.93)
LEVER_TARGET		−0.0147		−0.0230		−0.0210
		(−0.97)		(−1.44)		(−1.35)
INSIDER		0.0164		0.0047		0.0034
		(0.32)		(0.09)		(0.07)
SIZE		0.0034		0.0053		0.0039
		(0.48)		(0.99)		(0.57)
MB		−0.0041		−0.0043		−0.0046
		(−0.32)		(−0.34)		(−0.36)
CASH		0.0170		0.0020		0.0033
		(0.30)		(0.03)		(0.06)
DEBT		−0.0214		−0.0335		−0.0327
		(−0.43)		(−0.68)		(−0.67)
DIV		0.3944*		0.3908**		0.4099*
		(1.86)		(1.99)		(1.97)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.0529	0.0430	0.0776	0.0878	0.0731	0.0792
Obs	130	130	130	130	130	130

We use the event sample to test the short-term performance of capital reduction. Cumulative abnormal returns (CAR) are computed using event windows of (–1,+1) days relative to the date of the capital reduction announcement (0). The estimation period was set up using Market Model, with 255 days prior to the announcement to 31days prior to the announcement. Year and industry fixed effects are included. Standard errors are adjusted for heteroscedasticity (White, 1980) and clustered by firm (Petersen, 2009). All variable definitions are shown in the Appendix, and all continuous variables are winsorized at the 1% and 99% levels to control for outliers. We use ***, **, and * to denote significance at 1%, 5%, and 10% level respectively, and t-statistics are shown in the parentheses..

We separated the sample into two groups by the level of corporate governance (DEVIATE), to test which group experiences a better market reaction after announcing a capital reduction when there are a high share pledge ratios and high pressure on share pledgers. The regression results are shown in Table 4-6, where the dependent variable is the cumulative abnormal returns for the (−1, +1) event period (CAR). Column 2 shows that in the weak corporate governance group, PLEDGE UNDER PRESSURE is significantly and positively related to CAR. This indicates that when companies with weak corporate

governance adopt capital reduction, which can reduce the agency problem, it is a positive signal to shareholders, since they do not foresee that managers are willing to choose policies beneficial to shareholders. Hence, the positive market reaction will be more obvious than for companies with strong corporate governance.

Table 4-6 Market reaction of capital reduction — subsample on corporate governance

Variable	Weak Governance		Strong Governance	
	(1)	(2)	(3)	(4)
Intercept	−0.0491	−0.0175	−0.3088*	−0.3045*
	(−0.16)	(−0.06)	(−1.87)	(−1.77)
PLEDGE	0.0529		−0.0041	
	(0.63)		(−0.07)	
PLEDGE UNDER PRESSURE		0.4673*		−0.2802
		(1.82)		(−0.78)
STD	−0.2285	−0.2269	0.5197	0.5227
	(−0.90)	(−0.86)	(1.36)	(1.44)
RE	−0.0802	−0.0498	−0.0244	−0.0237
	(−0.74)	(−0.56)	(−0.48)	(−0.46)
EPSG	−0.0099**	−0.0053	−0.0067*	−0.0067*
	(−2.25)	(−0.93)	(−1.91)	(−1.97)
LEVER_TARGET	0.5862	0.6552	−0.0339	−0.0332**
	(0.53)	(0.62)	(−1.51)	(−2.08)
INSIDER	0.0694	0.0726	−0.0734	−0.0726
	(0.85)	(0.90)	(−0.78)	(−0.78)
SIZE	0.0127	0.0113	0.0184**	0.0180*
	(1.09)	(1.06)	(2.10)	(1.93)
MB	0.0105	0.0014	−0.0571***	−0.0571***
	(0.58)	(0.07)	(−2.94)	(−2.97)
CASH	0.8759	0.9624	0.0466	0.0456
	(0.53)	(0.62)	(0.31)	(0.31)
DEBT	−0.8608	−0.9904	−0.2979***	−0.2972***
	(−0.50)	(−0.61)	(−3.00)	(−3.13)
DIV	0.6904*	0.6071*	0.5300*	0.5368*
	(1.99)	(1.85)	(1.90)	(1.92)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Adj. R-squared	−0.1333	−0.0978	0.1802	0.2104
Obs	65	65	65	65

We use the event sample, which has been separated by the quality of Corporate Governance, to test whether the short-term performance of capital reduction is affected by the level of Corporate Governance. Cumulative abnormal returns (CAR) are computed using event windows of (–1,+1) days relative to the date of the capital reduction announcement (0). The estimation period was set up using Market Model, with 255 days prior to the announcement to 31days prior to the announcement. Year and industry fixed effects are included. Standard errors are adjusted for heteroscedasticity (White, 1980) and clustered by firm (Petersen, 2009). All variable definitions are shown in the Appendix, and all continuous variables are winsorized at the 1% and 99% levels to control for outliers. We use ***, **, and * to denote significance at 1%, 5%, and 10% level respectively, and t-statistics are shown in the parentheses.

5. CONCLUSION

Start late of capital reduction in Taiwan, seldom of our researchers have done the research of capital reduction, most of the published literature are focusing on announcement effect few of them discussing the motivations especially shares pledge and the pressure caused by the fall in stock prices. Therefore, our paper fills this gap by investigating the relationship between shares pledge of the insiders with both motivations of capital reduction and the market reaction.

Lots of empirical results show the view of high pledge ratio a negative impact on

performance. Taiwanese companies are mostly family-holding. The controlling shareholders pledge their shares in order to gain more control right without paying their own fund. The more they pledge the more they increased the agency problems to the company. Therefore, researchers in Taiwan believed that the phenomenon of poor performance is caused by agency problems due to the high pledge of insiders.

Our results suggest that capital reduction can also be a method to reduce the agent problem caused by pledge and will certainly bring some benefit to all shareholders. Through capital reduction all shareholders can remain the total value of their shares unchanged which won't increase the deviation of control rights and cash flow rights. The refund of cash allows all shareholders to use them more efficiently and enjoy the advantage of tax. Especially for the shareholders who do pledge their shares, the refund of cash through capital reduction can effectively use to pay the funding gap and keep maintenance ratio at a higher level. Even more, capital reduction can lead the stock price to a higher level to avoid a margin call and ease the pressure for the shareholders. Therefore, an announcement of capital reduction should be good news for all shareholders since all shareholders believe it could reduce the agent problem.

Share pledges ratio of the insiders is significantly positively related to the probability of a company adopt capital reduction, indicating that the high pledge ratios do motivate the company to implement capital reduction and when share price keep declining then the pressure of facing margin call will exactly strengthen the motivation to initiate a capital reduction program.

Next, CAR shows that market is generally believed the announcement of capital reduction is good news, and companies with weak corporate governance are positively correlated to CAR at the 0.1 level. Companies with weak corporate governance are more likely to show a good sign since they are implementing a policy that reduces the agency problem, which exceeds shareholders' expectations.

APPENDIX1. VARIABLE DEFINITION

Variable	Definition
Dependent variables	
REDUCTION	Dummy variable equal 1 if the firm adopts capital reduction, and zero otherwise.
CAR	A cumulative abnormal returns of (−1, +1) event period.
Main motivation variables of capital reduction	
PLEDGE	PLEDGE is the ratio of pledge shares that were held by insiders 1 year before the event year (total pledge shares of insiders / insiders total holding shares).
PRESSURE	PRESSURE is a dummy variable equal 1 if the prior three months return is lower than −15%, and zero otherwise.
PLEDGE UNDER PRESSURE	PLEDGE UNDER PRESSURE is an interaction variable calculated by PLEDGE times PRESSURE.
Other motivation variables of capital reduction	
STD	STD is measured as the standard deviation of 24 months monthly returns before the event year.
RE	RE is calculated by retained earnings / total equity.
EPSG	EPSG is defined as the average growth rate of earnings per share that was 3 years before the event year.
LEVER_TARGET	LEVER_TARGET is the gap between a company's leverage ratio and its target leverage ratio, which was 1 year before the event year. Leverage ratio was calculated by net-debt / total asset.
INSIDER	INSIDER is the ratio of shares that were held by the insiders 1 year before the event year. (Insiders holding shares / total shares outstanding) Insiders are total of managers plus directors.
Firm characteristics	
SIZE	SIZE is defined as the natural log of total assets 1 year before the event year.
MB	MB, the market value of equity divided to the book value of equity, which was 1 year before the event year.
CASH	CASH, the ratio of cash divided to total assets 1 year before the event year.
DEBT	DEBT is total liabilities divided by total assets 1 year before the event year.
DIV	DIV is defined as the dividend yield 1 year before the event year.
Subsample proxy of Corporate Governance	
DEVIATE	Weak corporate governance has DEVIATE equal to 1, where the median of DEVIATE is larger than DEVIATE, and 0 otherwise. DEVIATE was calculated by control right-cash flow right.

REFERENCES

Badrinath, S. G., and Varaiya, N. P. (2001). The share repurchase decision: Causes consequences and implementation guidelines. *Financial Executives Research Foundation* working paper.

Bagwell, L. S., and Shoven, J. B. (1988). Share repurchases and acquisitions: An analysis of which firms participate. In *Corporate takeovers: Causes and consequences.* Chicago: University of Chicago Press, 191–220.

Ball, R., and Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research* 6, 159–178.

Brav, A., Graham, J. R., Harvey, C. R., and Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics* 77, 483–527.

Chan, K., Chen, H. K., Hu, S. Y., and Liu, Y. J. (2018). Share pledges and margin call pressure. *Journal of Corporate Finance* 52, 96–117.

Chan, K., Ikenberry, D., and Lee, I. (2004). Economic sources of gain in stock repurchases. *Journal of Financial and Quantitative Analysis* 39, 461–479.

Chang, Y. K., Chou, R. K., and Huang, T. H. (2014). Corporate governance and the dynamics of capital structure: New evidence. *Journal of Banking and Finance* 48, 374–385.

Chay, J. B., and Suh, J. (2009). Payout policy and cash-flow uncertainty. *Journal of Financial Economics* 93, 88–107.

Chen, Y., and Hu, S. Y. (2007). The controlling shareholder's personal leverage and firm performance. *Applied Economics* 39, 1059–1075.

Chiou, J. R., Hsiung, T. C., and Kao, L. F. (2002). A study on the relationship between financial distress and collateralized shares. *Taiwan Accounting Review* 3, 79–111.

Claessens, S., Djankov, S., Fan, J. P., and Lang, L. H. (2002). Disentangling the incentive and entrenchment effects of large shareholdings. *Journal of Finance* 57, 2741–2771.

Comment, R., and Jarrell, G. A. (1991). The relative signalling power of Dutch-auction and fixed-price self-tender offers and open-market share repurchases. *Journal of Finance* 46, 1243–1271.

DeAngelo, H., DeAngelo, L., and Skinner, D. J. (1996). Reversal of fortune dividend signaling and the disappearance of sustained earnings growth. *Journal of Financial Economics* 40, 341–371.

DeAngelo, H., DeAngelo, L., and Skinner, D. J. (2009). Corporate payout policy. *Foundations and Trends in Finance* 3, 95–287.

DeAngelo, H., DeAngelo, L., and Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial Economics* 81, 227–254.

Dittmar, A. K. (2000). Why do firms repurchase stock. *Journal of Business* 73, 331–355.

Dou, Y., Masulis, R. W., and Zein, J. (2019). Shareholder wealth consequences of insider pledging of company stock as collateral for personal loans. *Forthcoming, Review of Financial Studies*.

Easterbrook, F. H. (1984). Two agency-cost explanations of dividends. *American Economic Review* 74, 650–659.

Faccio, M., Lang, L. H., and Young, L. (2001). Dividends and expropriation. *American Economic Review* 91, 54–78.

Fama, E. F., Fisher, L., Jensen, M. C., and Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review* 10, 1–21.

Fama, E. F., and French, K. R. (2001). Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics* 60, 3–43.

Farrar, D. E., Farrar, D. F., and Selwyns, L. L. (1967). Taxes, corporate financial policy and return to investors. *National Tax Journal* 20, 444–454.

Ginglinger, E., and Hamon, J. (2007). Actual share repurchases, timing and liquidity. *Journal of Banking and Finance* 31, 915–938.

Gompers, P. A., and Metrick, A. (2001). Institutional investors and equity prices. *Quarterly Journal of Economics* 116, 229–259.

Grossman, S. J., and Hart, O. D. (1988). One share-one vote and the market for corporate control. *Journal of Financial Economics* 20, 175–202.

Hsieh, J., and Wang, Q. (2008). Insiders' tax preferences and firms' choices between dividends

and share repurchases. *Journal of Financial and Quantitative Analysis* 43, 213–244.

Jagannathan, M., Stephens, C. P., and Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics* 57, 355–384.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76, 323–329.

Johnson, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2000). Tunneling. *American Economic Review* 90, 22–27.

Kao, L., Chiou, J. R., and Chen, A. (2004). The agency problems, firm performance and monitoring mechanisms: the evidence from collateralised shares in Taiwan. *Corporate Governance: An International Review* 12, 389–402.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics* 58, 3–27.

La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance* 54, 471–517.

Lee, T. S., and Yeh, Y. H. (2004). Corporate governance and financial distress: Evidence from Taiwan. *Corporate Governance: An International Review* 12, 378–388.

Lintner, J. (1956). Distribution of incomes of corporations among dividends, retained earnings, and taxes. *American Economic Review* 46, 97–113.

Liu, J. C., Chiou, J. J., and Yang, C. C. (2014). Payout policy in Taiwan: Cash dividends, stock repurchases and capital reduction. *Review of Securities and Futures Markets* 26, 47–96.

Miller, M., and Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *Journal of Business* 34, 411–433.

Opler, T., Pinkowitz, L., Stulz, R., and Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52, 3–46.

Pagano, M., and Röell, A. (1998). The choice of stock ownership structure: Agency costs, monitoring, and the decision to go public. *Quarterly Journal of Economics* 113, 187–225.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* 22, 435–480.

Rosenbaum, P. R., and Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika* 70, 41–55.

Shih, N. S., and Yang, M. L. (2013). Why Do Firms Choose Refunds to Shareholders Through Capital Reduction? *Asia-Pacific Journal of Financial Studies* 42, 627–652.

Shleifer, A., and Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy* 94, 461–488.

Voss, J. (2012). Why do Firms Repurchase Stock? *Major Themes in Economics* 14, 55–75.

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

Zhang, H. (2008). Corporate governance and dividend policy: A comparison of Chinese firms listed in Hong Kong and in the Mainland. *China Economic Review* 19, 437–459.

Chen, A. L., Kao, L. F., Chen, Y. K., Chen, W. Y. (2013). Share collateralization by directors and corporate governance. *Sun Yat-sen Management Review* 21, 299–337.

Kao, L. F., Chiou, J. R., Chen, A. L. (2004). The agency problems, firm performance and monitoring mechanisms: the evidence from collateralized shares in Taiwan. *Corporate Governan* 12, 389–402.

Lin, L. J., and Chung, H. M. (2008). The study of capital reduction through distributing cash

to shareholders (unpublished master's thesis). Institute of Finance, National Chiao Tung University.

Lin, Y. F., Huang, L. J., and Chen, S. Y. (2012). Executive compensation, corporate governance, and cash dividend policy. *Sun Yat-sen Management Review* 20, 1213–1251.

Lai, Y. C. (2011). A study of announcement effect of capital reduction by cash (unpublished master's thesis). Accounting, National Taiwan University.

Que, Z. Z. (2006). The effect on the value of shareholder: Through capital reduction (unpublished master's thesis). National Chengchi University.