

Repurchase and Dividend Policy of Taiwanese Firms

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Abstract

Firms in Taiwan are allowed to conduct share repurchase programs after 2000 and must follow strict regulations when conducting repurchases. This article examines the factors affecting a Taiwanese firm's decision to conduct repurchase programs by investigating a set of 3,399 programs from 2000 to 2012 in particular the issue of connection between payout policy, capital structure and corporate life-cycle stage is investigated. Repurchasing firms are characterized by higher ratio of retained earnings to total equity and lower leverage, which supports the hypothesis of life-cycle theory for repurchases and the hypothesis of altering capital structure. The hypothesis of disgorging cash holding is only mildly supported. Finally, it is found that Over the Counter (OTC) repurchasing firms with large size tend to also pay dividends; however, there exist no such feature among larger size Taiwan Stock Exchange (TWSE) repurchasers.

Keywords: Dividends, life cycle, payout policy, repurchases, Taiwan.

1. Introduction

Before 1984, the annual aggregate dollar amount of repurchased shares in the U.S. was always below US\$10 billion; however, there appeared a

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substantial increase in 1984, with an annual amount of nearly US\$30 billion (DeAngelo, DeAngelo and Skinner, 2000, p. 344). It steadily increased thereafter, topping US\$233 billion in 2004, which substantially exceeded the corresponding value of dividends by 18 percent. The legislation of Rule 10b-18 of the Securities Exchange Act Release is held accountable for this trend. Rule 10b-18 gives U.S. firms explicit guidelines to buy back their shares without the concern of being charged with manipulation charges (Grullon and Michaely, 2002).

Share repurchases have also become the preferred approach of initiating cash distribution to investors. In 1998, 81 percent of those firms initiating payouts did so with share repurchases instead of paying dividends, substantially higher than 27 percent in 1973 (Grullon and Ikenberry, 2000). Prior studies have documented that the advantages of distributing earnings through repurchases over paying dividends include undervaluation signaling, relatively lighter tax burden and maintaining financial flexibility, etc. In particular, investors view dividends as a commitment from the firm to shareholders and the firm is quite hesitant to reduce existing dividends. On the other hand, repurchases do not represent a similar commitment. (See Allen and Michaely (2003) or Kalay and Lemmon (2007) for a comprehensive survey).

Taiwanese firms are allowed to buy back their own shares after August 2000, following the amendment of Article 28 of the Securities and Exchange Act (SEA) and the implementation of Regulations Governing Share Repurchase.¹ In the first year following the enactment of these regulations, about one quarter of the firms listed on either TWSE or the Greta Securities Exchange (traditionally called the Over-the-Counter market, OTC)² announced share repurchase programs within five months of that year. Substantially differing from the U.S. market, Taiwanese Regulations mandate strict and detailed guidelines for the repurchasing process.

¹Contents of the Act and Regulations are available at <http://law.moj.gov.tw/>.

²However, both the market value of capital and the annual payout value of OTC-listed firms are less than 7 percent of the TWSE-listed firms. Their listing criteria are available at <http://eng.selow.com.tw/>.

According to the regulations, when a firm's board of directors authorize a repurchase program, it should submit a detailed report to both the Financial Supervisory Commission (FSC) and the Market Observation Post System (MOPS, a bulletin system accessible to the public)³. On expiration of the repurchase period or within five days of completion of the program, the repurchasing firms must submit another report to both the FSC and the MOPS specifying the status of the repurchase program. In particular, the firm should provide explanation for failing to fully execute the program if it does not buy back the number of shares as it has originally proclaimed to do. In contrast, Rule 10b-18 imposes much less strict regulations to U.S. firms. Rule 10b-18 requires that U.S. repurchasing firms should publicly announce the program, only use one broker or dealer on any single day, avoid trading on an uptick or during the last half-hour before the closing of the market, and limit the daily volume of repurchases to a specified amount (Allen and Michaely, 2003, p. 405).

In this paper, records of the 3,399 repurchase programs conducted by TWSE- and OTC-listed firms over the sample years from 2000 to 2012 is retrieved from the data base of Taiwan Economic Journal (TEJ). It is the most prominent vendor providing economic and financial data in Taiwan. With respect to the sample size of Taiwanese share repurchases, this paper is the most comprehensive study ever done. For example, Hung and Chen (2010) contain 1,145 events and others (presented later) typically contain a sample size of less than 1,000 events.

The objective of this paper is to analyze the factors affecting a firm's decision to announce a repurchase program. We find that a repurchasing firm is characterized by a higher ratio of retained earnings to total equity (RE/TE), lower leverage with higher ratio of total equity to total assets (TE/TA) and large size (Log(TA), the logarithm of total assets). Besides, only mild evidence supporting the free cash flows hypothesis is found; that is, the ratio of cash to total assets has no association with the repurchase decision.

³The MOPS is available at <http://mops.twse.com.tw/>. This system is similar to the EDGAR of the SEC, whereas the FSC is the Taiwanese counterpart of the SEC.

Finally, the factors are examined that drive a repurchasing firm to simultaneously pay dividends within the same calendar year that it announces a repurchase program. A repurchaser's tendency to simultaneous pay dividends is highly associated with RE/TE. It manifests the critical role of a firm's life-cycle stage (with TE/TE as its proxy, as suggested by DeAngelo, DeAngelo and Stulz, 2006) in the determination of a firm's dividend policy. On the other hand, we find that OTC repurchasing firms with large size tend to also pay dividends; however, there exist no such feature among TWSE repurchasers with large size.

Another type of dividend is stock dividend which used to be popular in Taiwan (Hu and Tseng 2006) but is not discussed here for two reasons. One, it is not a genuine dividend since no cash leaves its balance when a firm distributes stock dividends to shareholders. Rather, stock dividend increases the number of shares outstanding, thereby reducing the value of each share. Second, Taiwanese firms distributed much less stock dividend in recent years, as documented by Liu, Chiou and Yang (2014).

The remaining part of the paper is organized as follows. Section 2 gives a literature review, especially of studies related to Taiwan. Section 3 gives an overview of payout policy in Taiwan. Section 4 examines the decision to repurchase shares. Section 5 gives a brief conclusion.

2. Literature Review and Hypotheses

The seminal contribution to the study of payout policy is that of Miller and Modigliani (MM, 1961). Prior to MM, both practitioners and academicians believed that the more dividend a firm paid the more valuable the firm would be. However, MM established a framework for studying corporate payout policy and showed that payout policy is irrelevant under the assumptions of complete and perfect markets. Shareholders need not care about a firm's payout policy, because their personal portfolio adjustments ("homemade dividend") can offset any decision at the firm level. If a firm decides to pay dividend, shareholders could use the funds to buy additional

shares. Conversely, if a firm decides a repurchase program, shareholders can sell shares to match the amount they would have received if dividend had been distributed.

Later, researchers relaxed their assumptions and considered the roles of taxes, asymmetric information and incomplete contracts, etc. In particular, with the existence of personal income tax, share repurchases should prevail over paying dividends. This fact has been noted by Bagwell and Shoven (1989). In practice; we have witnessed an upsurge of repurchases in the U.S. market, as documented by Allen and Michaely (2003) and many other studies. Another disadvantage of paying dividends is its higher processing cost, which includes fee of transferring cash and the time cost of disbursing cash to the shareholders. Liu and Yin (2013).document that the period between the ex-dividend date and the payment date is typically 30 days in Taiwan and it can take as long as 125 days for some firms. Ogden (1984) showed that the period in the U.S. market typically range from 2 to 5 weeks i.e. on average 18 days. Subsequently, Taiwanese investors suffer an additional interest for the extra 12 (=30-18) days on average. On the other hand, investors can receive cash within two days after selling the stock when the firm conducts a repurchase program and the stock price goes up resulting from the announcement effect.

The above fact reveals the financial flexibility advantage of repurchases from a perspective different than that of Jagannathan, Stephens and Weisbach (2000). They found that a firm with a permanent increase in cash flows is likely to increase dividends. Conversely, a firm whose cash flow increase is only temporary is likely to distribute cash through repurchases. By replacing dividends with repurchases, a firm avoids granting investors the view that it would be a continuous payout. Sometimes, firms announce repurchase programs for misleading the investors and do not actually exercise the programs (Chan, Ikenberry, Lee and Wang, 2010). In addition to these flexibility advantages of repurchases, there was no capital gains tax in Taiwan before 2013, whereas the dividend income tax rates range from 6 percent to 40 percent.

The motive of a firm to buy back its shares is not purely for paying out earnings. Here we review some important studies on the motives of announcing repurchases. Dittmar (2000) examine the U.S. repurchase programs on year-by-year basis from 1977 to 1996 and find that repurchasers usually take advantage of undervaluation and, in later years, distribute excess funds. However, in some periods, they also repurchase to alter the leverage ratio, fend off hostile takeovers and counter the dilution effects of stock options. Managers of firms announcing repurchases attempt to maximize their wealth through executive stock options and to fund employee stock options (Kahle, 2002).

Lo, Wang and Yeh (2008) examined TWSE firms announcing share repurchases over 2000-2005 and showed that repurchase firms are undervalued, with significantly negative cumulative abnormal returns for 30 days prior to the announcement of share repurchase. In addition, the repurchase firms are less leveraged and have higher growth opportunities. Hung and Chen (2010) studied TWSE firms announcing repurchases over 2000-2006, and show that the price range announced by the firm conveys information about its future prospects. Both Liu (2008) and Liu and Chen (2010) studied market reacting behavior of repurchases over 2000-2005. Liu (2008) showed that the market tends to overreact to repurchase announcements and suggests that this phenomenon is probably due to overconfidence and self-attribution bias of the investors. On the other hand, Liu and Chen (2010) found that undervalued firms with greater agency problems are active repurchasers. The sample firms of both papers pool TWSE and OTC-listed repurchasers together.

In contrast, Lee, Liu, Lu and Yin (2013) attempted to differentiate between TWSE and OTC-listed repurchasers. They find that a TWSE-listed repurchaser is more likely to do it for the purpose of reducing the number of outstanding shares, whereas an OTC-listed repurchaser is more likely to do it for the purpose of transferring the shares bought to their employees. Chan, Ikenberry and Lee (2004) and Hovakimian, Opler and Titman (2001) suggested that a corporation can buy back shares for the purpose of lowering

debt ratio and to improve its capital structure. Accordingly, a repurchasing firm should have a higher TE/TA ratio relative to an otherwise firm, and the following hypothesis was established.

Hypothesis 1 (Hypothesis of Altering Capital Structure) *When a firm decides to conduct a repurchase program, its TE/TA ratio tends to be higher.*

DeAngelo, DeAngelo and Stulz (DDS, 2006) propose a life-cycle theory of dividend policy that incorporates the agency theory of Jensen (1986) with the investment opportunities theory of Fama and French (2001). According to the reasoning of DDS (2006), the ratio of retained earnings to total equity (RE/TE) is a logical proxy for the life-cycle stage of a firm. DDS (2006) found that US firms' propensity to pay dividends is highly associated with both RE/TE and RE/TA ratios. Chay and Suh (2009) also corroborated the life-cycle theory by analyzing a broad set of international sample firms. They examine the dividend policy of seven major developed markets in detail and also other 26 countries, including Taiwan, as supplementary evidence.

By examining the payout policy of TWSE firms over 2000-2010, Liu, Chiou and Yang (2014) found that firms paying out cash (either through paying dividends or through conducting repurchase programs) are characterized by a higher ratio of RE/TE. It is noteworthy to point out that Liu, Chiou and Yang (2014) excluded OTC firms from their sample and their results are dominated by dividend-paying firms. Substantially differing from their approach, this study conducts a comprehensive investigation on share repurchases conducted by TWSE or OTC firms. When treating repurchases as payouts and following the rationale of DDS (2006), it is believed that a repurchasing firm is more mature than an otherwise firm. Hence, the following Hypothesis is proposed.

Hypothesis 2 (Life-Cycle Hypothesis for Repurchases) *When a firm becomes mature with higher RE/TE ratio, it is more likely to conduct repurchase programs.*

Following the theory of Jensen (1986), a firm should distribute free cash

flows to the shareholders for mitigating agency cost. We treat the cash and cash equivalent to total assets as a proxy for free cash flow. By examining a large sample across seven developed countries over 1998-2006, Lee and Suh (2011) showed that firms tend to experience substantial increases in cash holdings prior to share repurchases. Accordingly, we establish the following Hypothesis.

Hypothesis 3 (Hypothesis of Disgorging Cash Holding) *When a firm has higher cash holdings with higher ratio of Cash to total assets, it is more unlikely to conduct repurchase programs.*

In this study, these issues are explored using both Logistic (logit) models. In particular, the dividend-paying decision of a repurchasing firm is investigated, which helps clarify the life-cycle theory of dividends (DDS, 2006).

3. Descriptive Summary

The data is retrieved from TEJ, containing 3,399 records of share repurchase programs, 2,172 of which were conducted by TWSE firms and the remaining 1,227 were conducted by OTC firms. For the sake of deriving complete and reliable financial statements, we screen only repurchase programs which were conducted by firms still listed in the TWSE and OTC in Dec, 2013. As a result, repurchase programs announced by firms which are unlisted due to merger and acquisition or unlisted due to financial distress are not included in this study. Therefore, mild survivor bias could exist; however, this bias is very trivial since such firms account for only a small portion.

Table 1 shows the sample size (the row labeled with *All*) and the number of firms adopting different payout policy from 2000 to 2012, including TWSE firms (Panel A) and OTC firms (Panel B). The rows *Div* (*Rep*) indicate the number of firms paying dividends (repurchasing shares), while the percentage under each number is calculated by dividing the

corresponding number by the sample size. The row *Both* indicates the number of firms both paying dividends and repurchasing shares within a calendar year, while the percentage under each number is relative to the corresponding number in row *Rep*. Specifically, they represent the percentage of repurchasing firms that also pay dividends. The largest ratio in each row is highlighted in bold type. For example; 217 of the 353 repurchasing TWSE firms (85.8 percent) in 2008 also paid dividends.

As shown in the row *Div* of Table 1, the proportion of firms distributing dividends almost strictly increased from 2000 to 2008, which highlights the increasing tendency of paying dividends among Taiwanese firms (Liu, Chiou and Yang, 2014). This increasing trend was interrupted in 2009 due to the 2008 global recession triggered by the U.S. subprime mortgage crisis. Subsequently, the proportion of dividend-paying firms dropped from 76.6 percent to 61.9 percent among the TWSE firms, and from 66.3 percent to 54.2 percent among the OTC firms. The impact of global recession on dividend policy lagged by one year; however, it reflected in the repurchase policy immediately within the same year. In 2008, the proportion of TWSE firms announcing repurchases is 35.6 percent and that of OTC firms is 36.5 percent, both of which are the highest in history.

The above fact demonstrates two issues. First, the primary motive for a firm to announce repurchase programs is due to undervaluation of share prices. Second, it manifests the flexibility advantage of repurchase programs over paying dividends. A Taiwanese firm's dividend policy is regulated by article 240 of the Company Law, which mandates that the dividend policy must be confirmed by the general meeting of stockholders. On the other hand, the board of directors can authorize and execute a repurchase program at any time of the year as long as it follows the Repurchase Regulations.

As shown in the row *Rep* of Table 1, there were 28.2 percent of TWSE firms and 18.5 percent of OTC firms making repurchase plans when the Regulations were enacted in 2000. They then decreased for three consecutive years. The highest ratios (35.6 percent for TWSE firms and 36.5 percent for

Table 1
Annual Payout Policy of Taiwanese Firms

Panel A: Numbers of TWSE firms paying dividends													
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
All	432	489	563	629	646	665	673	687	710	713	729	744	753
Div	150	241	292	377	419	459	454	501	544	441	510	580	534
	34.7%	49.3%	51.9%	59.9%	64.9%	69.0%	67.5%	72.9%	76.6%	61.9%	70.0%	78.0%	70.9%
Rep	122	102	77	88	167	105	97	107	253	59	37	134	74
	28.2%	20.9%	13.7%	14.0%	25.9%	15.8%	14.4%	15.6%	35.6%	8.3%	5.1%	18.0%	9.8%
Both	44	61	45	64	125	76	68	84	217	35	30	113	47
	36.1%	59.8%	58.4%	72.7%	74.9%	72.4%	70.1%	78.5%	85.8%	59.3%	81.1%	84.3%	63.5%
Panel B: Numbers of OTC firms paying dividend													
All	92	144	245	360	427	472	482	511	534	548	571	601	623
Div	25	60	103	188	236	311	306	342	354	297	330	385	403
	27.2%	41.7%	42.0%	52.2%	55.3%	65.9%	63.5%	66.9%	66.3%	54.2%	57.8%	6.1%	64.7%
Rep	17	17	30	33	102	76	52	67	195	34	33	119	72
	18.5%	11.8%	12.2%	9.2%	23.9%	16.1%	10.8%	13.1%	36.5%	6.2%	5.8%	19.8%	11.6%
Both	6	8	19	15	54	51	38	60	158	18	27	96	51
	35.3%	47.1%	63.3%	45.5%	52.9%	67.1%	73.1%	89.6%	81.0%	52.9%	81.8%	80.7%	70.8%

The rows *Div* (*Rep*) indicate the number of firms paying dividends (repurchasing shares), while the percentage under each number is relative to the sample size on the row *All*. The row *Both* indicate the number of firms both paying dividends and repurchasing shares within a calendar year, while the percentage under each number is relative to number in row *Rep*. The largest ratio in each row is highlighted in bold type.

Data source: TEJ.

OTC firms) occurred in 2008 and the lowest ratios (5.1 percent for TWSE firms and 5.8 percent for OTC firms) occurred in 2010. There was no substantial upsurge in the proportion of firms conducting repurchases, except in 2004, 2008 and 2011, which are also depicted as dashed line (for TWSE repurchasers) and solid line (for OTC repurchasers) in Figure 1. It is well known that the three incidences of upsurge were due to systematic market downturns and were attributed to the breakout of SARS (Severe Acute Respiratory Syndrome) of 2003, the U.S. subprime mortgage crisis of 2008 and the European debt crisis of 2011. The motives behind Taiwanese firms' repurchase programs are mainly due to underpricing in spite of the obvious advantage of tax saving and flexibility.

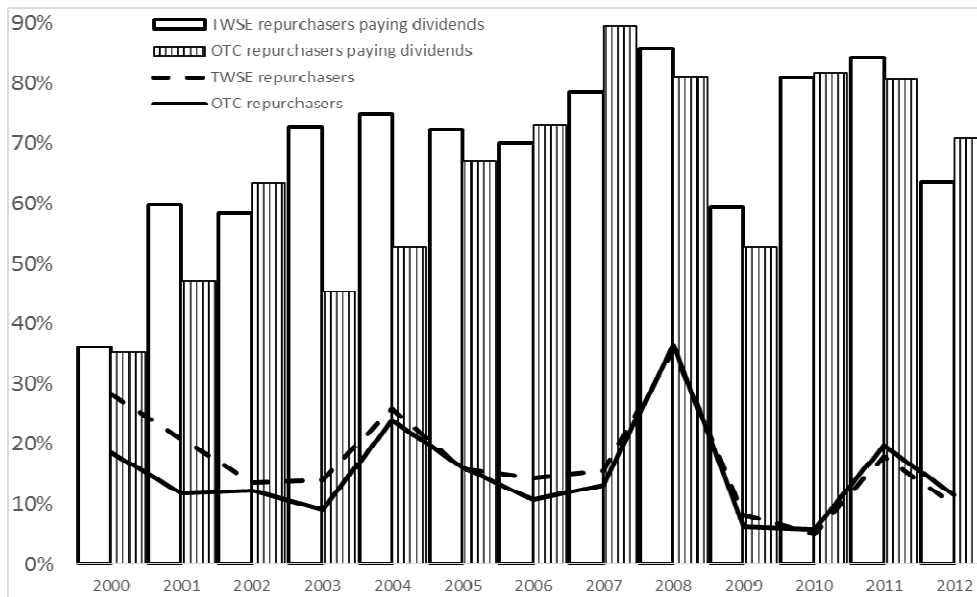


Fig 1. Annual ratios of firms repurchasing TWSE (dashed line) and OTC firms (solid line), and ratios of TWSE (blank histogram) and OTC repurchasers (histogram) paying dividends.

Finally, the proportion of repurchasing firms that also distribute dividends in row *Both* of Table 1, are also shown as blank histograms (for TWSE payers) and drawn histograms (for OTC payers). This proportion is lowest in 2000 (36.1 percent for TWSE and 35.3 percent for OTC) due to the repurchase rush when the Repurchase Regulation was enacted in that year.

Afterwards, this proportion is never less than 58.4 percent for TWSE firms and not less than 45.5 percent for OTC firms. In other words, a substantial proportion of repurchasers also pay dividends after 2000. Figure 1 reveals that these proportions are stable relative to those of the ratios of repurchasers. In fact, the time-series coefficients of variations of the ratios are 0.197 for TWSE repurchasers and 0.259 for OTC repurchasers. On the other hand, the time-series coefficient of variations of the ratios of repurchasers to all firms is 0.491 for TWSE firms and 0.552 for OTC firms.

4. Decision to Repurchase Shares

When a firm decides to conduct repurchase programs, it usually conducts these programs more than once within a calendar year. For example, TSMC (Taiwan Semiconductor Manufacturing Corp) announced two separate repurchase plans on 13 May and 12 Aug, 2008. Their respective execution durations are from 26-May to 30-June (resulting in TW\$13,927 million of repurchases)⁴ and from 14-Aug to 20-Sept (resulting in TW\$16,499 million). Therefore, in order to identify the possible factors affecting a firm's decision to conduct repurchase plans, it is inappropriate to do it based on announcements. Rather, it should be done on the basis of repurchase firm-years versus non-repurchase firm-years. This procedure is necessary and logical since the average number of repurchase programs announced by a repurchaser within a calendar is 1.5.

Table 2 presents mean and medians of the variables for firm-years categorized according to repurchase policy, where Panel A (B) is for the TWSE (OTC) firms. The row *All* denotes the whole sample. Firms in the row *Repurchase* are included into two disjoint groups: those also paying dividends (the row *Both*) and those that repurchase only (the row *Repurchase only*). Of the 8,433 observations from the TWSE market, 1,422 firm-years conduct repurchases (Panel A of Table 2). Of the 5,610 observations from

⁴US\$=30TW\$ or so. For most of the time the exchange rate is between US\$=29TW\$ and US\$=31TW\$.

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Table 2
Descriptive Statistics for Events (Firm-Years) Categorized According to Repurchase Policy Over 2000-2012

Variables	RE/TE		TE/TA		Cash/TA		Log(TA)		No. of obs.
Panel A. Means and (medians) of the variables for TWSE firm-years over 2000-2012.									
All	-0.0162	(0.107)	0.565	(0.558)	0.121	(0.088)	8.827	(8.661)	8,433
Repurchase	0.113	(0.104)	0.586	(0.576)	0.129	(0.098)	9.004	(8.860)	1,422
Both	0.157	(0.137)	0.594	(0.583)	0.142	(0.108)	9.005	(8.834)	1,009
Repurchase only	0.005	(0.007)	0.566	(0.558)	0.098	(0.074)	9.001	(8.948)	413
Panel B. Means and Medians of the variables for OTC firm-years over 2000-2012.									
All	-0.254	(0.103)	0.590	(0.592)	0.162	(0.118)	7.306	(7.239)	5,610
Repurchase	0.115	(0.116)	0.619	(0.609)	0.181	(0.140)	7.609	(7.490)	847
Both	0.170	(0.149)	0.629	(0.623)	0.196	(0.150)	7.654	(7.533)	601
Repurchase only	-0.018	(0.006)	0.593	(0.582)	0.145	(0.109)	7.497	(7.407)	246

All denotes the whole sample. Firms in the Repurchase row are divided into two disjoint groups: those also paying dividends (Both) and those not paying dividends (Repurchase only). RE denotes retained earnings. TE is the book value of total equity. TA is the book value of total assets. Cash includes cash and cash equivalence.

the OTC market, 847 firm-years conduct repurchases (Panel B of Table 2). We focus on firms conducting repurchase policy.

Firms that announce repurchase programs but do not pay dividends within a calendar year have the lowest values of RE/TE, TE/TA and Cash/TA among repurchasing firms. Financial flexibility inherent in repurchase programs should be welcome by such firms, with lower ratios of RE/TE, TE/TA and Cash/TA. These firms are neither ready enough to pay regular dividends nor ready enough to bear the stress of future dividend omission. On the other hand, those repurchasers also paying dividends have the higher RE/TE, TE/TA and Cash/TA than other repurchasers. This result is also consistent with prior studies. Finally, note that a firm buying back shares tends to be larger in size as shown in the column of Log(TA), which is consistent with the findings of Dittmar (2000).

Before proceeding to Logistic (logit) models to examine a firm's repurchase decision, the correlation matrices of these explanatory variables is examined in Table 3. It reveals no collinearity between any two variables with the P-value of Pearson correlation tests always less than 1 percent.

Table 3
Correlation Matrices of Firm-Year Variables Over 2000-2012

Markets	Correlations of TWSE Firms, Sample Size 8433			Correlations of OTC Firms, Sample Size 5610		
Variables	RE/TE	TE/TA	Cash/TA	RE/TA	TE/TA	Cash/TA
TE/TA	0.1296			0.1580		
Cash	0.0583	0.3521		0.0319	0.4314	
Log(TA)	0.0695	-0.2694	-0.0694	0.1048	-0.2970	-0.1533

All are significant at 0.01 level

The probability of the event $Y=1$, i.e. payout by a firm with characteristics vector X , is assumed to follow the standard Logistic model (Greene, 2013, p. 688),

$$\Pr(Y = 1) = \frac{1}{1 + e^{-X\beta}}, \quad (1)$$

where X is a row vector of explanatory variables including RE/TE, TE/TA, Cash/TA, Log(TA) and constant, while β is a column vector of the corresponding coefficients.

The results of Logistic (logit) models examining a firm's decision to conduct a repurchase program are presented in Table 3. Panel A1 (B1) of Table 3 examines a TWSE (OTC) firm's decision to repurchase; while Panel A2 (B2) examines a TWSE (OTC) repurchasing firm's decision to distribute dividends within the same calendar year it announces a repurchase program.

Table 4
Logistic Models Testing a Firm's Decision to Repurchase Shares Over 2000-2012

Panel A1: TWSE Firms Repurchasing (y=1) versus Firms not Repurchasing (y=0)						Number of Observations	
Variables	RE/TE	TE/TA	Cash/TA	Log(TA)	Constant	(y=0)	(y=1)
Coefficients	0.592	0.831	0.037	0.126	-3.246	7,011	1,422
Z-statistics	(4.57)***	(4.12)**	0.13	(5.56)***	(-12.37)***		
Panel A2: TWSE Repurchasers Paying Dividends (y=1) versus Repurchasing only (y=0)							
Coefficients	18.053	0.738	1.885	0.038	-1.520	413	1009
Z-statistics	(15.98)**	1.42	(2.19)**	0.601	(-2.06)**		
Panel B1: OTC Firms Repurchasing (y=1) versus Firms not Repurchasing (y=0)							
Coefficients	0.891	1.572	0.396	0.482	-6.375	4,763	847
Z-statistics	(5.16)***	(5.66)***	1.41	(10.60)***	(-14.77)***		
Panel B2: OTC Repurchasers Paying Dividend (y=1) versus Repurchasing only (y=0)							
Coefficients	18.814	0.693	2.843	0.365	-4.242	246	601
Z-Statistics	12.37***	0.95	(2.49)**	(2.76)***	(3.37)***		

Panel A1 (B1) models a TWSE (OTC) firm's decision to repurchase shares. Panel A2 (B2) models a repurchasing TWSE (OTC) firm's decision to distribute dividends within the calendar year in which it repurchases.

Unlike Panel A1 (B1) of Table 4, the dependent variable is $y=1$ if a firm repurchase shares and $y=0$ otherwise. In the TWSE market, the number of observations with $y=1$ are 7,011; while that with $y=0$ are 1,422 (Panel A1). In the OTC market, the number of observations with $y=1$ are 4,763; while that with $y=0$ are 847 (Panel B1). The significant positive coefficients of RE/TE in Panel A1 (0.592 with z-statistics 4.57) and B1 (0.89 with z-statistics 5.16) are supportive of the Life-Cycle Hypothesis for Repurchases.

A significant positive coefficient of TE/TA is also found in both Panel A1 (0.831 with z-statistics 4.12) and B1 (1.572 with z-statistics 5.66), supporting Hypothesis of Alternating Capital Structure. The coefficient of Cash/TA is positive but not significant; hence, the Hypothesis of Disgorging Cash Holding is not supported. This result conforms to what Chan et al. (2004) found in the U.S. market. Besides, firms conducting repurchase programs are characterized by large size, consistent with the finding of Dittmar (2000).

Panel A2 (B2) of Table 4 consists of TWSE (OTC) firms conducting repurchase programs. The dependent variable is $y=1$ if a repurchase pays dividends and $y=0$ if the repurchaser does not pay dividends. The significantly positive coefficient of RE/TE in both Panel A2 (18.05 with z-statistics 15.98) and B2 (18.81 with z-statistics 12.37) is highly supportive of the Life-Cycle Theory of dividends (DeAngelo et al., 2006). As a matter of fact, they are the most significant two coefficients among all coefficients in Table 4, while that of TWSE is larger than that of the OTC market. This result is intuitively appealing as TWSE firms are typically more mature than OTC firms. The result is also supportive of the findings of Liu, Chiu and Yang (2014) for TWSE firms over 2000-2010.

Unlike Panel A1 (B1), the coefficients of Cash/TA in Panel A2 (B2) are significant and positive. The coefficients are 1.89 (z-statistics 2.19) for TWSE firms and 1.48 (z-statistics 2.49) for OTC firms. A repurchasing firm tends to pay dividends when its cash holding is higher. Finally, repurchasers that pay dividends are characterized by larger size in the OTC market (with coefficient 0.365 and z-statistics 2.76), while no such phenomena appears in the TWSE market (with z-statistics merely 0.6).

The results of Table 4 are derived from a pooled sample across 2000 to 2012. It is necessary to investigate the robustness by imposing year-fixed effect, which captures the exogenous market changes. The left hand columns of Table 5 are for the TWSE firms and are corresponding to Panel A1 and A2 of Table 4; while the right side columns are for the OTC firms and are corresponding to Panel B1 and B2 of Table 4. All coefficients are significant

for the repurchase decision of TWSE firms. It is noteworthy that the coefficient of Cash/TA is also significant in the year-fixed model, while it is not significant in Panel A1 of Table 4.

A TWSE repurchasing firm's decision to pay dividends are given in column (A2) of Table 5. The high significance of the coefficients of RE/TE in all models of both Table 4 and 5 manifests the dominant role of a firm's life-cycle stage (with proxy variable RE/TE) in determining its payout policy. However, the variable TE/TA is less obvious in affecting a repurchaser's decision to pay dividends, although it is significant in Panel A2 of Table 4. There is also discrepancy between Panel A2 of Table 4 and column (A2) of Table 5 in the coefficients of Cash/TA; the former is significantly positive at 5 percent level, while the later is mildly negative.

The repurchase decision of OTC firms are presented in columns (B1) and (B2) of Table 5. When including all dummy variables over 2000-2012 as done in column (A1), the Logistic model cannot converge due to being highly collinear. Accordingly, we can only include parts of the year-fixed dummies into the model. To screen the appropriate dummy variables, we first run Logistic model (1) with variables as given below:

$$X = [\text{RE/TE TE/TA Cash/TA Log(TA) Constant Dummy}]^T \quad (2)$$

which is a column vector of six variables, including a constant and a dummy variable of years (2000 to 2012). An OTC repurchasing firm's dividend-paying decision is run first based on equation (1) and variables (2) with dummy denoting year 2000 to 2012, separately and repeatedly. Consequently, 13 sets of coefficients are attained, six of which have the coefficient of the dummy significant at 5 percent level. These are years 2002, and 2008 to 2011. Columns (B1) and (B2) of Table 5 are generated as a result. Two additional variations are also provided for examining the robustness of an OTC firm's repurchase decision. Overall, the aforementioned conclusions based on Table 4 are also supported.

Table 5
 A Supplement to Table 4 with Year-Fixed Effect (Dummy)
 Logistic Models Testing a Firm's Decision to Repurchase Shares Over 2000-2012

Markets	TWSE				OTC											
	Repurchase Decision (A1)		Dividend Decision (A2)		Repurchase Decision (B1)						Dividend Decision (B2)					
	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v	Coef.	P-v
RETE	0.45	0	15.38	0	4.29	0	4.40	0	4.34	0	12.25	0	12.26	0	12.28	0
TETA	0.85	0	2.37	0.018	6.14	0	6.12	0	6.23	0	0.57	0.572	0.67	0.505	0.66	0.508
CASH/TA	1.02	0	-0.34	0.733	3.85	0	3.55	0	3.65	0	1.36	0.174	1.60	0.110	1.65	0.099
LOGTA	0.16	0	0.72	0.470	11.95	0	11.79	0	12.06	0	1.60	0.110	1.98	0.048	1.99	0.047
Constant					-15.72	0	-15.61	0	-15.94	0	-2.25	0.025	-2.53	0.011	-2.54	0.011
D 2000	-2.92	0	-4.28	0	-2.73	0.006	-2.69	0.007								
D 2001	-3.32	0	-2.80	0.005												
D 2002	-3.82	0	-2.53	0.012	6.15	0	6.41	0	6.57	0	-3.83	0	-4.00	0	-4.02	0
D 2003	-3.79	0	-1.75	0.080												
D 2004	-3.03	0	-2.11	0.035												
D 2005	-3.69	0	-1.98	0.048												
D 2006	-3.83	0	-2.03	0.043												
D 2007	-3.78	0	-1.72	0.086												
D 2008	-2.69	0	-1.12	0.265	-7.27	0	-7.08	0	-7.00	0	0.34	0.733	0.14	0.887		
D 2009	-4.52	0	-2.33	0.020	-4.24	0	-3.96	0	-3.85	0	0.26	0.798	0.02	0.984		
D 2010	-5.10	0	-1.35	0.177	-1.91	0.056					1.53	0.126				
D 2011	-3.70	0	-1.27	0.203	-4.76	0	-4.50	0	-4.42	0	2.30	0.036	1.87	0.061	1.87	0.061
D 2012	-4.40	0	-1.86	0.063												

Panel A1 (B1) models a TWSE (OTC) firm's decision to repurchase shares. Panel A2 (B2) models a repurchasing TWSE (OTC) firm's decision to distribute dividends within the calendar year in which it repurchases. Coefficients with significant level of 5 percent are highlighted in bold type.

In conclusion, both the Life-Cycle Hypotheses for Repurchases and the Hypothesis of Altering Capital Structure are verified based on the results of both Tables 4 and 5. The Hypothesis of Disgorging Cash Holding is supported based on Table 5 although it is not supported based on Table 4. An OTC repurchasing firm with large size tend to also pay dividends; however, there exist no such feature among TWSE repurchasers with large size.

5. Conclusion

The term “payout policy” has replaced the traditional term “dividend policy” as a result of the growing magnitude of share repurchases. Firms in Taiwan are allowed to conduct share repurchase programs after August 2000. The motive of this article is to investigate the factors affecting a Taiwanese firm’s decision to conduct a repurchase program. Both the Life-Cycle Hypotheses for Repurchases and the Hypothesis of Altering Capital Structure are verified based on our empirical research. The Hypothesis of Disgorging Cash Holding is only mildly supported since it is not supported based on Logistic model of Table 4 although it is verified based on Table 5. Finally, it is concluded that OTC repurchasing firms with large size tend to also pay dividends; however, there exist no such feature among TWSE repurchasers with large size.

References

- Allen, F., & Michaely, R. (1995). Dividend Policy. In R. Jarrow, V. Maksimović, W.T. Ziemba (Eds.), *Handbooks in Operations Research and Management Science*. Amsterdam, Netherland: North-Holland Press.
- Allen, F., & Michaely, R. (2003). Payout Policy. In G. Constantinides, M.G. Harris, R. Stutz (Eds.), *Handbook of the Economics of Finance*. Amsterdam, Netherland: North-Holland Press.
- Bagewell, L.S., & Shoven, J.B. (1989). Cash Distributions to Shareholders. *Journal Economic Perspectives*, 3(3), 129-140.

- Brigham, E.F., & Ehrhardt, M.C. (2005). *Financial Management: Theory and Practice* (11th Eds.). Mason, U.S.A.: South-Western.
- Chan, K., Ikenberry, D.L., & Lee, I. (2004). Economic Sources of Gain in Stock Repurchases. *Journal of Financial and Quantitative Analysis*, 39(3), 461-479.
- Chan, K., Ikenberry, D.L., Lee, I., & Wang, Y.Z. (2010). Share Repurchases as a Potential Tool to Mislead Investors. *Journal of Corporate Finance*, 16(2), 137-158.
- Chay, J.B., & Suh, J. (2009). Payout Policy and Cash-Flow Uncertainty. *Journal of Financial Economics*, 93(1), 88-107.
- DeAngelo, H., DeAngelo, L., & Skinner, D.J. (2000). Special Dividends and the Evolution of Dividend Signaling. *Journal of Financial Economics*, 57(3), 309-354.
- DeAngelo, H., DeAngelo, L., & Stulz, R. (2006). Dividend Policy and the Earned/Contributed Capital Mix: a Test of the Life-Cycle Theory. *Journal of Financial Economics*, 81(2), 227-254.
- Dittmar, A.K. (2000). Why Do Firms Repurchase Stock? *Journal of Business*, 73(3), 331-355.
- Fama, E., & French, K. (2001). Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? *Journal of Financial Economics*, 60(1), 3-43.
- Greene, W.H. (2011). *Econometric Analysis* (7th ed.). N.J., USA: Pearson Education.
- Grullon, G., & Ikenberry, D. (2000). What Do We Know about Share Repurchase? *Journal of Applied Corporate Finance*, 13(1), 31-51.

- Grullon, G., & Michaely, R. (2002). Dividends, Share Repurchases and the Substitution Hypothesis. *Journal Finance*, 57(4), 1649-1684.
- Hovakimian, A., Opler, T., & Titman, S. (2001). The Debt-Equity Choice. *Journal of Financial and Quantitative Finance*, 36(1), 1-24.
- Hu, S.Y., & Tseng, Y.L. (2006). Who Wants to Trade around Ex-dividend Days? *Financial Management*, 35(4), 95-119.
- Hung, J.H., & Chen, Y.P. (2010). Equity Undervaluation and Signaling Power of Share Repurchase with Legal Restrictions. *Emerging Markets Finance and Trade*, 46(2), 101-115.
- Jagannathan, M., Stephens, C.P., & Weisbach, M.S. (2000). Financial Flexibility and the Choice between Dividends and Stock Repurchases. *Journal of Financial Economics*, 57(1), 355-384.
- Jensen, C.M. (1986). Agency Costs of Free Cash-Flow, Corporate Finance and Takeovers. *American Economic Review*, 76(2), 323-329.
- Kahle, K.M. (2002). When a Buyback Isn't a Buyback: Open Market Repurchases and Employee Options. *Journal of Financial Economics*, 63(2), 235-261.
- Kalay, A., & Lemmon, M. (2007). Payout Policy. In B.E. Eckbo (Eds.), *Handbook of Empirical Corporate Finance*. Amsterdam, Netherland: North-Holland Press.
- Lee, S.C., Liu, J.C., Lu M.H., & Yin, H.C. (2013). Corporate Life Cycle Stages and Share Repurchases: Purposes, Completion Rates and the Listed Exchange. *Journal of Chile Institute of Technology*, 33, 1-26.
- Lee, B.S., & Sub, J. (2011). Cash Holdings and Share Repurchases: International Evidence. *Journal of Corporate Finance*, 17(5), 1306-1329.

- Lintner, J. (1956). Distribution of Incomes of Corporations among Dividends, Retained Earnings and Taxes. *American Economic Review*, 46(2), 97-113.
- Liu, Y.C. (2008). Do Stock Prices Overreact Following Share Repurchase Announcements? A Perspective of Overconfidence and Self-Attribution Bias. *Review of Securities and Futures Markets*, 20, 39-86.
- Liu, C.C. & Chen, N.Y. (2010). Market reaction to the completion rate in open market repurchase programs. *Review of Securities and Futures Markets*, 22, 139-176.
- Liu, J.C., Chiou, J.J., & Yang, C.C. (2014). Payout Policy in Taiwan: Cash dividends, Stock Repurchases and Capital Reduction. *Review of Securities and Futures Markets*, 26(3), forthcoming. Available at: <http://ssrn.com/abstract=2140337>
- Liu, J.C., & Yin, H.C. (2012). Payout Policy and the Period between the Ex-Dividend Date and the Payment Date: An Analysis of Taiwan Market over 2009-11. *Takming University Journal*, 37(1), 1-18. Available at: <http://ssrn.com/abstract=22305431>.
- Lo, K.H., Wang, K.L., & Yeh, C.T. (2008). Stock Repurchase and Agency Problems: New Evidence in Taiwan's Stock Market. *Emerging Markets Finance and Trade*, 44(1), 84-94.
- Miller, M.H., & Modigliani, F. (1961). Dividend Policy, Growth and the Valuation of Shares. *Journal of Business*, 34(4), 411-433
- Ogden, J.P. (1994). A Dividend Payment Effect in Stock Returns. *Financial Review*, 29(3), 345-369
- Ross, S.A., Westerfield, R.W., & Jaffe, J. (2003). *Corporate Finance* (6th ed).

N.Y., U.S.A.: McGraw-Hill.

Ross, S.A., Westerfield, R.W., & Jaffe, J. (2005). *Corporate Finance* (7th ed).
N.Y., U.S.A.: McGraw-Hill.

Skinner, D.J. (2008). The Evolving Relation between Earnings, Dividends
and Stock Repurchases. *Journal Financial Economics*, 87(3), 582–609.