行政院國家科學委員會補助專題研究計畫成果報告

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※宣告買回庫藏股票對宣告公司及其競爭者財富移轉效果※

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計畫主持人：陳炤良

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行政院國家科學委員會專題研究計畫成果報告

宣告買回庫藏股票對宣告公司及其競爭者財富移轉效果之研究

Preparation of NSC Project Reports

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Abstract

Taiwan implemented the open market shares repurchase system beginning on August 7, 2000. This paper examines the announcement effects in the first year of this new system. The empirical results show that the cumulative average abnormal returns around the 3-day announcement period are significantly, negatively related to the price-to-equity ratio. Among high price-to-equity ratio firms, the abnormal returns are significantly negative related to the free cash flow, while among low price-to-equity ratio firms, the abnormal returns are significantly, positively related to the free cash flow. Moreover, the change in insiders' proportional holdings during the month preceding the announcement is significantly, negatively related to the abnormal return among low price-to-equity ratio firms, while it incurs a insignificantly positive relationship among high price-to-equity ratio firms.

These results support our argument that two hypotheses, the traditional signaling hypothesis (TSH) and the free cash flow hypothesis (FCFH), exist simultaneously to explain the repurchase announcement effect. The TSH argues that a company's willingness to pay a premium to purchase its own shares sends a strong signal to less-informed outside investors that the company's future prospects are improving and the firm is undervalued. Alternatively, the FCFH argues that the firm with excess cash and a poor portfolio of investment opportunities will face sizeable agency costs if the excess cash is not distributed to shareholders. Share repurchases allow a firm to distribute its excess free cash flow, thereby eliminating the incentive for wasteful investment and increasing a firm's value. However, the investor will treat the under-valuation announcements with more skepticism than the excess cash-distribution announcements in a recession.

Key Words: open market shares repurchase, traditional signaling hypothesis, free cash flow hypothesis.

Ⅰ、Introduction

Taiwan implemented the open market share repurchase system on August 7, 2000. During the first year (coincidentally during a recession), there were a total of 512 announcements, with the 3-day cumulative average abnormal return around the announcement day being 2.097%. Of particular interest and different from other countries is that firms must disclose their repurchasing purpose in Taiwan. Based on the laws, three purposes can be used in the open market shares repurchase system. The first is to transfer the repurchased stocks to employees, which helps extend the system of stock options for employees. The second is to use the repurchased stocks as reserves to issue stock-related derivative securities. The last purpose is to protect the interest of

long-run shareholders. In other words, this allows firms to maintain their prices of stocks publicly.

Though a number of studies explain investor reaction on share repurchasing announcements, two alternative hypotheses seem to be the most widely accepted.[1] These alternative hypotheses are the traditional signaling hypothesis (TSH) and the free cash flow hypothesis (FCFH). The TSH argues that a company's willingness to pay a premium to purchase its own shares sends a strong signal to less-informed outside investors that the company's future prospects are improving and the firm is undervalued. Alternatively, the FCFH, following Jensen (1986), argues that the firm with excess cash and a poor portfolio of investment opportunities will face sizeable agency costs if the excess cash is not distributed to shareholders. Share repurchases allow a firm to distribute its excess free cash flow, thereby eliminating the incentive for wasteful investment and increasing a firm's value.

Lang and Litzenberger (1989) discussed these two alternative hypotheses in the context of an alternative form of corporate payout, namely dividends. They used Tobin's q, the ratio of the market value of assets to the replacement cost of assets, as a measure of a firm's investment opportunities in order to show that under certain assumptions, having a Tobin q value of less than one is a sufficient condition for a firm to be categorized as over-investing. By segmenting their sample into high-q and low-q firms, Lang and Litzenberger showed that the market reacts more to dividend changes of low-q firms than to those of high-q firms. They argued that this evidence supports the FCFH. Their conclusions were further supported by Perfect et al. (1995) and Nohel and Tarhan (1998) in the context of tender offer share repurchases, and by Vafeas and Joy (1995) in the context of open market share repurchases. In the recent work of Isagawa (2000), a free cash flow signaling model was provided and simultaneously predicts that a stock price will drop prior to an open market repurchase announcement and will rise in response to the announcement. These predictions are consistent with stylized facts.

There are a number of signaling models of fixed-price or Dutch-auction repurchases, including Vermaelen (1984), Ofer and Thakor (1987), Constantinides and Grundy (1989), Hausch and Seward (1993), Persons (1997), and McNally (1999a). A signaling model of open market share repurchases was first provided by McNally (1999b), who yielded some predictable implications that the market's revaluation should be positively related to the repurchase proportion, the volatility of the firm, and the prior level of the entrepreneur's stock holdings. These predictable implications are consistent with some other empirical literatures. Comment and Jarrell (1991) examined open market signaling by estimating an ad hoc specification of the market's strategy function. They found that both the repurchase proportion and managerial ownership are significant positive explanatory variables for the market's announcement-period revaluation.

Ikenberry and Vermaelen (1996) provided an option-signaling model that yields implications that the announcement return should be positively related to the fraction of shares to be purchased and the volatility of the stock, and negatively related to the explanatory power of the market model. Raad and Wu (1995) empirically examined the effects of insider trading activities, repurchase proportion, and the management ownership on stock returns around open market share repurchase announcements. Their results show that insider trading activities during the month that immediately precedes the announcement have a significant effect on the announcement. They also indicated that both the management ownership and the repurchase proportion have a significant positive effect on stock return. As a whole, these previous studies in the signaling hypothesis support the agency theory of Jensen and Meckling (1976) and Leland and Pyle (1977).

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[1] Other hypotheses include dividend or personal taxation hypothesis (Black and Scholes, 1974), leverage hypothesis (Modigliani and Miller, 1958 and 1963), bondholder expropriation hypotheses (Galai and Masulis, 1976), the insider-trading option model (Ikenberry and Vermaelen, 1996), etc.

In the existing literature, the motivation behind repurchases is examined in a framework that assumes that either the FCFH or the TSH is correct. However, it may be the case that both hypotheses explain the data. It is quite possible that different firms repurchase shares for entirely different reasons. In this paper we argue that there are two styles of firms that announce repurchase plans. One is the high-growth firm with good future prospects, informing outside investors by a share repurchase that its stock is undervalued. The other is a low-growth firm that has poor investment opportunities. It is willing to distribute its excess free cash flow to its shareholders so as to reduce the agency cost by repurchasing its own stocks. However, A stock investor will treat an under-valuation announcement with more skepticism than a cash-distribution announcement during a recession. For this reason, we use the price-to-equity ratio as a proxy of Tobin's q to sort our sample into sub-samples of high-growth and low-growth firms. For a high-growth firm, share purchases may cost the firm in terms of giving up some profitable investments and turning itself into an under-invested firm, particularly for a with a scarce cash flow. Therefore, for high-growth firms, we infer that the policy of share repurchases should convey a more positive signal of under-valuation for those firms with a low free cash flow than those with a high free cash flow. On the other hand, for the low-growth firm, particularly one with a high free cash flow, share repurchases may prevent the firm from becoming over-invested. Hence, we also infer that to low-growth firms, the policy of share purchases should convey more information about distributing excess cash for high free cash flow firms than for low free cash flow firms.

One may wonder the result of the previous study of Raad and Wu (1995), regarding that the relationship between stock returns during the announcement period and insider trading activity before the announcement is still robust under FCFH. As stressed by Ikenberry and Vermaelen (1996) and Isagawa (2000), firms do not commit to their open market share repurchase announcements. We argue that for the low-growth firms, the increase in insiders' proportional holding before the announcement will give an extra signal to outsiders that the insiders are more likly to enjoy some private benefit by over-investing than by committing to distributing the excess cash flow. Our arguments differ from the hypothesis of Raad and Wu (1995), whereby insider net buying activities before an announcement provide more information about under-valuation.

Our empirical results show that the cumulative average abnormal returns around a 3-day announcement period are significantly, negatively related to the price-to-equity ratio. Among high price-to-equity ratio firms, the abnormal returns are significantly, negatively related to the free cash flow, while among low price-to-equity ratio firms, the abnormal returns are significantly, positively related to the free cash flow. The change in insiders' proportional holdings during the month preceding the announcement is significantly, negatively related to the abnormal return among low price-to-equity ratio firms, while it incurs a insignificantly positive relationship among high price-to-equity ratio firms. Moreover, the disclosed purpose for a firm's stock repurchase is a particular variable in Taiwan. Though most firms with the third purpose announcement have relatively low price-to-equity ratios in our sample period, from a regression controlling for other explanatory variables, there is not a significant difference in abnormal returns between different repurchasing purposes.

The paper will proceed as follows. Section Ⅱ describes the statistics of sample. Section Ⅲ discusses the methodology. Section Ⅳ shows the empirical results. Section Ⅴ provides the cross-sectional regression analysis, while the final section concludes this paper.

Ⅱ、Statistics of sample

Our sample of 512 open market share repurchases is collected from the Infowinner Plus database and covers the period of one year after August 2000, which is when the new repurchase system began in Taiwan. All announcing firms are listed on the Taiwan Securities Exchange (TSE) or traded on the over-the-counter market in Taiwan. Among the sample, 360 events are disclosed with the first repurchasing purpose of transferring the repurchased stocks to employees, 4 events are

of the second purpose for using the repurchased stocks as reserves to issue stock-related derivative securities, while 148 events declared the third purpose of protecting the interest of long-run shareholders. We delete those 4 events of the second purpose and thus have a total of 508 events in our final sample.

Summary statistics for the sample based on the repurchasing purpose and industrial classification are showed in table 1. The finance group consists of 164 events from industries related to banking, securities, and insurance. The high-technology group consists of 102 events from industries related to electronics, communication, and biotechnology, while the other 242 events are sorted into the traditional group. Panel B in table 1 shows that most firms in the finance industry (85.98%) and high-technology industry (97.06%) chose the first purpose to repurchase stock. Panel C in table 1 shows that most firms choosing the third purpose (82.43%) belong to the traditional group.

[Table 1 here]

Table 2 further breaks each sub-sample in the previous table into two groups based on price-to-equity ratio. The price-to-equity ratio is measured by averaging the daily stock price one month prior to a stock repurchase announcement over the equity per common shares (net values minus capital of prefer stocks, and divided by the numbers of common shares outstanding) reported on the last financial report before announcement, using the Infowinner Plus database. Table 2 shows that 63% (324 of 508) of announcements were from a firm having a price-to-equity ratio less than one. Moreover, 84.45% (125 of 148) of the third purpose announcements were firms with low price-to-equity ratios of less than one, while most of the low price-to-equity ratio firms focus on the traditional group, 194 of 324 (59.88%).

[Table 2 here]

Ⅲ、Methodology

The abnormal returns around the announcement day are examined by a standard event study methodology. For each firm's announcement, an estimation period from day –180 to day –11 relative to the repurchase announcement date is used to estimate the parameters of $\hat{a}_0$ and $\hat{a}_1$ following the one-factor market model as follows:

$$R_{i,t} = \beta_{i,0} + \beta_{i,1} R_{m,t} + \varepsilon_{i,t}, \qquad (1)$$

where $R_{i,t}$ is the rate of stock return of company i on day t, adjusted for dividends; $R_{m,t}$ is the TSE value-weighted market rate of return on day t, also adjusted for the dividends; $\hat{a}_{i,1}$ is the estimated market risk of stock I; $\hat{a}_{i,0}$ is the estimated intercept; and å is the error term. The estimated parameters for each announcing firm, $\hat{\hat{a}}_{i,0}$ and $\hat{\hat{a}}_{i,1}$, are then used to calculate the abnormal returns, $ER_{i,t}$, from day –10 to day +10 for each announcing company as follows:

$$ER_{i,t} = R_{i,t} - \hat{\hat{a}}_{i,0} - \hat{\hat{a}}_{i,1} R_{m,t}. \qquad (2)$$

The average abnormal returns (AR) for each day of the event period and cumulative average abnormal returns (CAR) are further calculated to test the announcement effects as follows:

$$AR_t = \frac{1}{n} \sum_{i=1}^{n} ER_{i,t} \qquad (3)$$

$$CAR(-d, d) = \sum_{t=-d}^{d} AR_t, \qquad (4)$$

where n is number of companies and (-d, d) represents one period in the event period. Figure 1 shows the empirical periods in this paper and the return data is collected from the Taiwan Economic Journal (TEJ) database.

[Figure 1 here]

Ⅳ、Empirical Results

Table 3 and figure 2 display the average abnormal returns (ARs) and cumulative average

abnormal returns (CARs) for all 508 samples over the twenty-one event days. The sign of average abnormal return changes to positive from negative on day –1 and does not change again in the following eleven event days. The average abnormal return on day 0 and day 1 are 0.3847% (t-value = 2.7980) and 1.5840% (t-value = 12.1923), respectively, which are significant at the 1% level. The announcing firms' shares seem to experience poor performance over the period preceding the announcement and have a significant abnormal performance over the announcement period. The results are consistent with previous findings, especially Isagawa (2000).

[Table 3 here]

[Figure 2 here]

Breaking the total sample into two sub-samples based on the purpose of repurchasing, table 4 examines the differences in ARs and CAR over the three days from day –1 to day +1 between the first and third purpose. Though the ARs and CAR of the third purpose over the three-day announcement period are higher than the first purpose, the results in table 4 show that the differences in ARs are significant only on day +1, while the 3-day CAR are not statistically different.

[Table 4 here]

For our argument, the sample also is divided into two groups: one with a price-to-equity ratio less than one, and another with a price-to-equity ratio more than or equal to one. Table 5 examines the differences in ARs and CAR surrounding the announcement day between low and high price-to-equity ratio firms. The results in table 5 show that the ARs with a price-to-equity ratio less than one are significantly higher than the ARs with a price-to-equity ratio more than one on the days –1 and +1. Moreover, the 3-day CAR is significantly higher for the low price-to-equity firm. Using the price-to-equity ratio as a proxy of Tobin-q, the preliminary results in table 5 are consistent with the FCFH.

In the next section we will further examine whether the repurchase announcements convey different information among groups with different price-to-equity ratios.

[Table 5 here]

Ⅴ、Cross-sectional Regression Analysis

A cross-sectional regression analysis is used to explore the joint effects of price-to-equity ratio, repurchasing purpose, and others variables related to TSH and FCFH. The model I is set as equation (5):

$$CAR(-1,+1) = \hat{a}_0 + \hat{a}_1 D + \hat{a}_2 PE + \hat{a}_3 BR + \hat{a}_4 LMA + \hat{a}_5 CI + \hat{a}_6 FC + \aa \qquad (5)$$

where CAR(-1,+1) is the cumulative average abnormal returns from day-1 to day+1; D is a dummy variable; D=1 means the first repurchasing purpose and D=0 means the third repurchasing purpose; PE is the price-to-equity ratio; BR is the repurchase proportion that is measured by the number of shares announced for repurchase divided by the number of shares outstanding at the end of the month that precedes the announcement; LMA is the natural logarithm of the percentage of outstanding shares held by managers at the end of the month before the announcement; CI is the change in insiders' proportional holdings during the month that precedes the announcement. Insiders include directors, supervisors, managers, and shareholders whose proportional holdings exceed 10%; lastly, å is the error term.

The variables of BR and LMA are considered from Jensen and Meckling (1976) and Leland and Pyle (1977). An increase in managerial equity holdings reduces the agency costs of the principal-agent problem and positively affects the firm's stock price. The previous empirical studies of Vermaelen (1981, 1984), Comment and Jarrell (1991), and Raad and Wu (1995) indicated that share repurchases reduce the number of shares outstanding and increase the management proportional ownership in the firm, while keeping the number of shares owned by management constant. They also found that both the percentage of common shares authorized for repurchase and managerial ownership significantly, positively affect stock returns.

The variable CI considers that insider transactions before announcements will convey some nature of information about the announcements. Raad and Wu (1995) argued that an increase in insiders' equity holdings before an announcement conveys more information about under-valuation. However, we argue that for announcements by relative low-growth firms, an increase in insiders' proportional holdings before the announcement will give a extra signal to outsiders that the insiders are more like to enjoy private benefits by over-investing than by distributing the excess cash flow.

While the variables of BR, LMA, and CI are considered to follow some previous traditional signal models, the variable of free cash flow (FC) can further test the FCFH. Here, FC is defined as operating income before depreciation minus interest expense, taxes, and preferred and common dividends, as in Lehn and Poulsen (1989), and normalized by dividing by total assets. The last data from financial reports before announcements are used to measure this. As with our argument, under FCFH, repurchase announcements will convey more information about distributing excess cash for firms with more free cash flow. However, if two under-valued and over-invested firms that announce stock repurchases exist simultaneously in the sample, the coefficient of FC in model I may not be significant. For this reason, we sort the sample into two group, PE , and PE<1, and run the model II as equation (6):

$$CAR(-1,+1) = \hat{a}_0 + \hat{a}_1 D + \hat{a}_2 BR + \hat{a}_3 LMA + \hat{a}_4 CI + \hat{a}_5 FC + \varepsilon \qquad (6)$$

The group of PE 1 represents firms with relative high-growth, while the group of PE<1 represents firms of relative low-growth. For high-growth firms, share purchases may cost the firm to give up some profitable investments and become under-invested, particularly for firms with a scarce cash flow. Therefore, we infer from relative high-growth firms that share repurchase announcements should convey more positive signals about under-valuation for low free cash flow firms than for high free cash flow firms. For a low-growth firm, particularly for high free cash flow firms, share repurchases may prevent firms from becoming over-invested. Thus, we also infer from low-growth firms that share purchase announcements should convey more information about distributing excess cash for high free cash flow firms than for low free cash flow firms..

To correct for the variation in residuals across repurchasing firms, we employ weighted least squares (WLS) regressions. The weighting factor used for each firm is the reciprocal of the standard deviation of its market model residuals. Table 6 shows the estimated results of WLS cross-sectional regressions. The coefficients of dummy variable (D) in all regressions are not significant, which is consistent with the result of table 4. This means that the announcement effects on CAR are not significantly different among different repurchasing purposes and that the repurchasing purposes convey limited information about announcements. The coefficient of the price-to-equity ratio in model I is –0.4118, which is significant at the 0.01 level (t=-2.6451). The negative relationship between the price-to-equity ratio and CAR reveals that outside investors favor an excess cash-distribution announcement.

The coefficients of repurchase proportion (BR) in all regressions are positive, but insignificant. The coefficient of the natural logarithm of the percentage of outstanding shares held by managers (LMA) is positively significant at the 10% level in mode I and becomes insignificant in model II when samples are sorted into two groups based on the price-to-equity ratio. These results are not completely consistent with previous studies. The possible reason is that the average repurchase proportion in our sample is only 2.78%, which is a low scale relative to other markets.

Although the coefficients of the change in insiders' proportional holdings (CI) and free cash flow (FC) are not significant in model I, they reveal important information in model II when samples are sorted into two groups based on the price-to-equity ratio (PE). While FC has a significantly negative relationship with CAR in the group PE 1, the relationship becomes positive in the group PE<1. Using the price-to-equity ratio as a proxy of Tobin's q, this result can be simultaneously explained by TSH and FCFH.

For high-growth firms (with high PE), share purchases may cost a firm to give up some profitable investments and become under-invested, particularly for firms with a scarce cash flow.

Thus, the policy of share repurchases from high-growth firms should convey more positive signals of under-valuation for low free cash flow firms than high free cash flow firms. On the flipside, for the low-growth firm (with low PE), particularly for high free cash flow firms, share repurchases may prevent firms from becoming over-invested. Therefore, for low-growth firms, the policy of share repurchases should convey more information about distributing excess cash for high free cash flow firms than for low free cash flow firms.

Contrary to FC, the variable CI has a positive relationship with CAR in the group PE has a significant negative relationship with CAR in the group PE<1. The positive relationship can be explained by Raad and Wu (1995), that insider net buying activities before an announcement provide more information about under-valuation. However, we explain the negative relationship by FCFH whereby the increase in insiders' proportional holding before an announcement will give an extra signal to outsiders that the insiders are more like to enjoy private benefits by over-investing than by committing to distributing the excess cash flow.

[Table 6 here]

Ⅵ、Conclusion

This paper examines the announcement effects in the first year of Taiwan's open market share repurchase system. The empirical results show that the cumulative average abnormal returns around a 3-day announcement period are significantly, negatively related to the price-to-equity ratio. Among high price-to-equity ratio firms, the abnormal returns are significantly, negatively related to the free cash flow, while among low price-to-equity ratio firms, the abnormal returns are significantly, positively related to the free cash flow. The change in insiders' proportional holdings during the month preceding the announcement is shown to be significantly, negatively related to the abnormal return among low price-to-equity ratio firms, while it incurs an insignificantly positive relationship among high price-to-equity ratio firms.

These results support our argument that two hypotheses, the traditional signaling hypothesis (TSH) and the free cash flow hypothesis (FCFH), exist simultaneously to explain the repurchase announcement effect. The TSH argues that a share repurchase announcement sends a strong signal to less-informed outside investors that the company's future prospects are improving and the firm is undervalued. Alternatively, the FCFH argues that the firm with excess cash and a poor portfolio of investment opportunities will face sizeable agency costs if the excess cash is not distributed to shareholders. Share repurchases allow a firm to distribute its excess free cash flow, thereby eliminating the incentive for wasteful investment and increasing a firm's value. However, the investor will treat the under-valuation announcements with more skepticism than those announcements of excess cash-distribution during a recession.

Taiwan's share repurchases system started up during a serious recession. The limited data and timing may be harmful to the robustness of our results. Further studying using more data is necessary and expected.

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