

# **The Impact of the Company's Market Timing on Insider Trading of Repurchase Announcement**

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## **Abstract**

In this study, we explore the influence of market timing on insider trading and buy-and-hold abnormal returns by the sample of Taiwan listed companies at stock exchange market and the firms at over-the-counter (OTC) market from 2001 to 2016. According to Dittmar and Field [7], we use the relative repurchase price (RRP) to measure the strength of market timing abilities when firm repurchases its own stock. We find that the stronger market timing ability is accompanied with the greater insider net buying. Thus, insiders can indeed know the company's future information when firms repurchase. In addition, when market timing abilities of the OTC firms are stronger, their insiders net buy transaction have greater influence on future buy-and-hold returns. We also find that the firm with smaller market value has lower credibility of stock repurchase, the more information content of insider transaction and the more future buy-and-hold abnormal return.

**JEL classification numbers:** G11, G14

**Keywords:** share repurchase, market timing, insider trading, buy-and-hold abnormal return.

## **1. Introduction**

Stock repurchase can be considered as one of the company's channels to release private information because it shows that the managers think the stock price is undervalued. Choi and Chen [5] indicate that the response of price after the stock repurchase is stronger than that after the dividend payment, and the analyst adjusts the range of the earnings forecast after the

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stock repurchase is more than that after the dividend payment.

There are many literature [2], [11] to discuss whether the manager has the ability of market timing. Although the definition and measure of market timing is different, most of measuring the company's market timing ability depends on the cumulative abnormal return after stock repurchase. However, due to the different benchmarks to measure the cumulative abnormal remuneration, the results may be different. Thus, it has some drawbacks to use the event study method to measure the market timing ability. In addition, the market timing ability is traditionally measured by long-term returns after the announcement. Nonetheless, most of the firms announce the repurchase but do not actually implement it [13], [16]. According to Dittmar and Field [7], we use the relative repurchase price (RRP) to measure the strength of market timing abilities when firm repurchases its own stock.

Raad and Wu [18] and Li and McNally [14] find that after the announcement, the correlation between the excess return and insider information is significant, indicating that insider transactions do have information advantages. Ke, Huddart and Petroni [12] suggest that the company's insiders can not only choose the time to expose the information, but also control the length of the earnings growth. The insider can forecast future earnings trend for up to two years, implying that the insiders do have the market timing ability. Because the insider with information advantage can more clearly know the motive and purpose of repurchase than the market investors, resulting in the information asymmetry. Thus, insiders can use the undisclosed information to buy or sell its own stocks before the announcement. Nevertheless, insider trading is traditionally used as an explanatory variable of market timing ability to explore the market reaction. For example, Dittmar and Field [7] show that the more insider buying, the lower repurchase price, the better market timing ability. Little attention has been given to the effect of market timing ability to insider trading in the literature. In recent years, due to the increasingly strict regulations of insider trading, insiders worry about the litigation issues and would postpone the transaction to the post-announcement period. Therefore, we explore the impact of market timing ability on post-announcement insider trading.

Since insiders with more private information can recognize the company's future prospect better, insider's trading may have more information contents about future returns message. Babenko, Tserlukevich and Vedrashko [1] and Cziraki, Lyandres and Michaely [6] argue that the abnormal returns after the stock repurchase announcement and insider trading has a positive relationship, and the insider trading has the forecasting ability for future returns. Piotroski and Roulstone [17] point out that when the relationship between the insider trading and the future company's profit are stronger, insiders may have more company information. Thus, their trading capacity for the future compensation is higher. Moreover, Dittmar and Field [7] mention that the companies with non-often repurchases usually have more market

timing ability and its long-term returns after announcement is up to three years. It shows that the long-term post-announcement returns of company with market timing ability is also more significant. Therefore, investors not only can observe insider transactions, but also can use the level of market timing ability to let their investments more accurate. Finally, we discuss whether the strength of market timing ability is related to the impact of insider trading to buy-and-hold returns.

Main findings of this paper are as follows. First, the market timing ability is positively correlated with insider net buying, indicating that the stronger market timing ability is accompanied with the greater insider net buying after three month of actual repurchase. Thus, insiders can indeed recognize the company's future information when firms repurchased. They believe that the share price still has a rising trend after the share repurchase. In order to avoid litigation risk, insiders only have the action of buying stocks after the actual repurchase. Second, the market timing ability and the insider net buying for the future buy-and-hold abnormal returns is not significantly related in full sample. Nevertheless, OTC firms with stronger market timing abilities are associated with the greater impact of insiders net buying on future buy-and-hold abnormal returns.

The remainder of this paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 presents data and methodology. In Section 4, we discuss the results. Section 5 provides the conclusion.

## **2. Literature review**

### **2.1 Market timing**

Baker and Wurgler [2] point out that four evidence of stock markets have market timing. First, the company issue shares rather than bonds in the market value is high and it tend to repurchase the stock in the market value is relatively low. Second, long-term stock returns of the company's financial decision-making shows that market timing is successful in the average, the company will issue shares in the low cost of equity and will repurchase stock in the high cost of equity Third, the earnings forecast analysis of the stock issue shows that the company tends to issue shares when the investor is optimistic about the profit outlook. Fourth, the company manager recognize the market timing in a variety of anonymous investigation.

There are two views on market timing, first of all, the mispricing theory points out that the managers and investors in the company are irrational. The investors will push the stock price up in high sentiment, making the stock price overvalued; the investors will push the stock price down in depressed sentiment, making the stock price undervalued. Second, the message asymmetry theory suggests that corporate managers are more aware of the true value of the company than other market investors.

Jenter [11] argues that the market is often mispriced. The corporate executives and markets generally view corporate value in the opposite sense, so that managers' perceptions of corporate value are not in line with market estimates. The results confirm that managers' private portfolio decisions is related to changes in the company's capital structure, and also indicate that managers have market timing ability when conducting individual transactions and corporate decisions.

Hong et al. [10] explore the actual implementation of the listed and the OTC firms after its share repurchase was announced and the impact on the abnormal return of the stock price before and after the execution period. They also explore whether Taiwanese managers have double market timing ability and the investor's attitude to actually share repurchase of the company. The results show that after the announcement of stock repurchase, the stock price has a positive response. The execution rate is inversely related to the stock price after the execution announcement. After the execution period ends, the stock price reaction of the earlier actual execution is better than the later actual execution. Confirming that the manager does have both the timing ability for repurchased announcement and the actually repurchase.

Chan et al. [3] mention that whether managers have the market timing ability when the company releasing issue is still critical in recent years. However, the introduction of Pseudo-market timing has become one of the important explanations for the market timing. Pseudo-market timing assumes that even if the efficiency market and managers have no market timing ability, they will repurchase at the time of announcement based on the prevailing market stock price. That is, the lower the stock price, the more companies will be announced to buy back. This article revisits this controversy in the context of stock repurchase and adopts the same method using the abnormal return after stock repurchase as a measure of timing ability. The results show that the pseudo-market timing is not the only viable explanation. The result is consistent with the manager has the market timing ability when the stock repurchase.

Dittmar and Field [7] compare the relative repurchase prices of US corporate stock repurchase data from 2004 to 2011 and explore the market timing ability when the company repurchase shares. The article uses RRP to measure timing ability, which not only learns whether companies have market timing ability but also measures the strength of timing ability. The results show that most companies do have market timing ability. In addition, if the number of repurchases is divided into frequent repurchaser and non-frequent repurchaser, non-frequent repurchaser repurchase at a price that is 6% to 8% less than the average price in the market. The long-term excess returns of repurchase firms can be significantly positive for 3 months to 36 months.

Hovakimian and Hu [9] mention that both the market pecking theory and the market

timing theory assume that a company's financing policy would be in the interest of existing shareholders. In the past, most of the literature examining whether the Second Equity offering (SEO) was in line with institutional investors' transaction. They found that institutional investors would usually base on the overestimate signal of SEO declaration to increase their holdings. The result confirms that managers do have the market timing ability, the stock return before SEO is positive, and the stock return after SEO is significantly negative.

## **2.2 The factors to influence insider's trading**

Luo et al. [15] discuss the insider trading, the stock abnormal returns after trading, operating performance of the company after the transaction and the factors affecting the type of insider trading. They find that after the insider buying transaction, there was a positive abnormal return of the stock within a short period of three months and the insider selling transaction had a negative abnormal return of the stock in the long run. The performance of buying firms is better than the selling firms after the insider trading. In addition. When large-scale firms face poor past performance, low growth opportunities and the market sentiment shows a long-trend, the performance of the firms will be better after the insiders buying. Finally, with regard to the influencing factors of the insider trading patterns, we find that when the past operating performance of the company is good, the short boom, the relatively low stock price, the traditional industries, the large scale and the negative abnormal return in the previous year, the insider are more likely to do buying transaction.

Raad and Wu [18] examine insider trading, common share repurchase ratio, and manager shareholding returns in the open market repurchase announcement. They study 204 firms which repurchased in open-market from 1982 to 1990 and demonstrate significant insider trading prior one month of announcement. While insiders earn extra remuneration for net selling, those net buying insiders earn more remuneration. However, too long-term insider trading will not affect the stock price. The results show that managers' ownership of stock has a significant positive impact on returns, and this effect is more significant when the repurchase ratio is larger.

Li and McNally [14] examine the effect of insider ownership on the stock repurchase announcement and use incident research method to measure the stock compensation. As a result, they find that the excessive returns after announcement is significantly related to the private information of insiders. The market learned the firm's proprietary information from the shock repurchase announcement. The more shares held by insiders, the easier it is for the firm to repurchase shares and the greater the percentage of insider ownership, the higher announcement return of the firm's stock repurchase.

### **2.3 The impact of insider's trading on future stock return**

Piotroski and Roulstone [17] mention that insiders have more leading messages. They find a positive correlation between insider trading and future earnings of the firms, insider trading and firm B/M ratio are positively correlated, insider trading is negatively correlated with recent earnings of the firms and each relationship has explanatory power. The results show that the relationship between insider trading and future earnings performance is stronger (weakened) when corporate transactions are profitable (losses)

Babenko et al. [1] find that stock repurchases are often accompanied by an undervalued signal, but most of the company's share price information is untrue. Using the publicly stock repurchase announcement of Thomson Financial Securities Data Corporation (SDC) from 1993 to 2008. The authors explore managers buy stocks before announcement whether increase the credibility of undervalued stock. The study confirms that there is a positive relationship between the declared returns and the past insider buying behavior, and the insider buying behavior can predict the announced stock returns.

Chen et al. [4] mention that the discussion of long-term returns after the share repurchase in the open market has remained a hot issue in recent years. The paper proposes a dichotomous expectation hypothesis that insider trading after repurchase announcement exposes private information about future operating compensation and it reflect the insider's expectation of the firms after the stock repurchase announcement. First, suppose the insider has the advantage of repurchase, indicating that insiders would use proprietary information to sell the shares at good prices after the shares repurchase. Second, suppose the insider buying is informative, indicating that some insiders in public repurchase firm may be expecting improvement of future operating performance and use that information to repurchase shares in their own private accounts. As a result, insider over-repurchase (over-selling) can anticipate higher (lower) operating performance, resulting in higher (lower) long-term stock price returns.

Cziraki, Lyandres, Michaely [6] use the 4360 share repurchase and the 1789 cash replenishment in SDC Platinum from 1986 to 2011 as a sample of events to examine the implied information of insider transaction prior to stock repurchase and cash replenishment. The study found that insiders tended to buy back shares before firm's repurchase and sell shares before cash replenishment, so insider trading also conveyed the firm's future fundamentals. In addition, insider trading has the ability to predict future returns. In addition, insider trading has the ability to predict future returns. However, in the case of stock repurchase, stock price response is slow. Therefore, there is a positive relationship between insider trading before the event and the long-term remuneration after the incident

## **2.4 Hypotheses**

The existence of firms with stronger market timing ability indicates that there is a problem of information asymmetry between investors and insiders. That is, the insiders have higher degree of mastery for future information than investors [15], [18]. When the firm announces to repurchase stock, investors infer that the stock price is underestimated.

Since insiders who buy shares in personal account before the repurchase announcement would face litigation risk, they would move the timing to buy stocks to the post-announcement period. Therefore, we propose the following hypothesis to investigate whether the stronger market timing ability is accompanied with the greater insider net buying.

**Hypothesis 1: The firm with stronger market timing ability is accompanied with the greater insider net buying.**

According to the information asymmetry hypothesis, if the company has a high degree of mastery of market information, the firms may have strong market timing ability. Insiders have more information about the firm, suggesting that their transactions may have greater influence on future returns. Piotroski and Roulstone [17] argue that there is a positive correlation between insider trading and firm future earnings. Babenko et al. [1] document that insider buying behavior can predict the share price returns after announcement. Therefore, we examine the following hypothesis to explore when market timing abilities of the OTC firms are stronger, their insiders net buy transaction would have greater influence on future returns.

**Hypothesis 2: When market timing abilities of the firms are stronger, their insiders net buy transaction would have greater influence on future buy-and-hold abnormal returns.**

## **3. Data and Methodology**

### **3.1 Data**

In this paper, we explore the influence of market timing on insider trading and buy-and-hold abnormal returns by the sample of Taiwan listed companies at stock exchange market and the firms at OTC market from January 1, 2001 to December 31, 2016. Stock characteristics such as returns, trading volume, and are based on Taiwan Economic Journal (TEJ) databases. Insiders include directors, supervisors, managers, shareholders holding more than 10% of the total shares of the firm, and the above holders' spouses, minor children and the use of other notional holders. However, the financial, securities and insurance industry are different from other industries owing to their business characteristics, such as capital structure and laws and regulations. Therefore, those industry is excluded from our sample.

Table 1 describes the statistical variables for the main variables in this paper. There are

3667 repurchase announcements, which are 2296 for listed firms and 1371 for OTC firms. The average repurchase amount in the listed firm is 248,562 (in thousand New Taiwan Dollar (NTD)), and 41,561 in OTC firm (in thousand NTD). Thus, although there is no much difference between the number of repurchases for listed firms and OTC firms, the repurchase amount for listed firms is about 6 times that for the OTC firms.

Insider Trading (IT) is represented by insider net buy, which is the number of insider buying minus the number of insider selling. The average insider net buy in the entire sample is 387.65. The average insider net buy for the listed firms is 397.875, which is more than 338.708 for the OTC firms. The firm insiders buy shares more than sell shares after the firm's repurchase, indicating that insiders buy back shares after the actual repurchase to avoid the risk of litigation. Buy-and-Hold Abnormal Return (BHAR) is the difference between the firm's returns and the market return during the shareholding period. The average BHAR in the whole sample is -0.016, which means the stock return is slightly less than the market return after the actual purchase. It might be that the stock return has been completed after the repurchase announcement. Therefore, BHAR is negative after the actual repurchase.

Table 1: Basic Statistics

This table shows the basic statistics for all variables. The sample is divided into listed companies and OTC companies. MT is market timing, SIZE is firm size, IT is the insider net buy, MS is the market sentiment, IND is the industry, BCAR is the cumulative abnormal return before trading, BHAR is the buy-and-hold abnormal returns, CF is the cash flow, Ret is the cumulative return for the first 6 months before announcement, Q is Tobin's Q, and R\_size is the stock repurchase scale.

variable	All sample		Listed firm		OTC firm	
	Average	Median	Average	Median	Average	Median
MT	0.028	0.016	0.026	0.017	0.032	0.014
SIZE	8.352	8.203	8.720	8.557	7.6471	7.5390
IT	387.65	0	397.87	0	338.71	0
MS	0.385	0	0.397	0	0.329	0
IND	0.443	0	0.535	1	0	0
BCAR	-10.784	-12.223	-10.319	-11.996	-13.012	-13.858
BHAR	-0.016	-0.037	-0.009	-0.031	-0.034	-0.054
CF	33043.91	31267.5	14437.58	49233.5	81132.46	18898.5
Ret	-12.180	-10.747	-10.8384	-9.628	-15.656	-14.756
Q	1.175	1.075	1.216132	1.111	1.070	0.971
R_size	0.102	0.054	0.096458	0.048	0.115	0.070



## 3.2 Methodology

### 3.2.1 Market timing ability in the stock repurchase

Based on Dittmar and Field [7], we use the relative repurchase price (RRP) before and after 1, 3, 6 ( $\pm 1, \pm 3, \pm 6$ ) months to measure whether the firm has the market timing ability when the firm repurchases its own stock. If RRP is less than 0, it indicates that the firm have market timing ability when firm repurchases its own stock. On the contrary, if the RRP is greater than 0, it means that the firm have no market timing ability when firm repurchases its own stock.

### 3.2.2 Insider trading and buy-and-hold abnormal returns

Traditionally, most of articles about the relationship between market timing ability and insider trading focus on the insider trading before repurchase announcement. Nevertheless, due to the high litigation risk before the transaction, insiders have the tendency to transfer the transaction to the post-announcement period. Therefore, we use the insider trading next three months after actual repurchase to explore the impact of market timing on the insider trading.

We use BHAR to measure the firm's performance after share repurchase announcement to explore whether the stronger market timing abilities of the firms is associated with the greater influence of their insiders' net buy transaction on future buy-and-hold abnormal returns.

## 3.3 Regression model and variable selection

According to Dittmar and Field [7], we calculate the RRP to proxy market timing (MT) ability.

$$\text{Relative repurchase price}_{\pm t}(\text{RRP}) = \frac{\text{The average share repurchase price of repurchased month}}{\text{The closing price of } t \text{ months before and after repurchased month}} - 1 \quad (1)$$

If RRP is less than 0, it represents the firm has market timing ability, whereas if RRP is greater than 0, it denotes the firm has no market timing ability. Specifically, we use the following two classification methods for this variable. First, -RRP is used to proxy the market timing ability. If the market timing ability is stronger, this value is greater. Second, we set a RRP dummy variable. This dummy variable is 1 if the firm has the market timing ability, otherwise 0. The firm with strong market timing ability usually use stock repurchase announcement as a means of signaling undervaluation, rather than the real demand for repurchase.

This study explores the factors influencing the insider trading through the following regression model.

$$IT = \alpha_0 + \beta_0 MT + \beta_1 MS + \beta_2 SIZE + \beta_3 IND + \beta_4 BCAR + \varepsilon \quad (2)$$

If  $\beta_0$  is significantly greater than 0, then we support the hypothesis 1.

Insider trading (IT) is proxied by insider net buy, which is calculated by the number of shares bought minus number of shares sold. The existence of the firm with strong market timing ability (MT) indicates that there actually exists the problem of information asymmetry between insiders and investors. The stock is relatively undervalued when firm announces stock repurchase. Relative to the market investors, insiders have more information future firm's prospect. Therefore, we expect that market timing is positively related with insider net buying. According to Luo et al. [15], we use the stock price changing index of Economic Council Economic Commission Boom Countermeasures signal as the benchmark to set the dummy variable, which is 1 if the stock market is long and 0 if the stock market is short. When the stock market is boom, insider trading is more active and insiders are more inclined to sell their stocks in the bull market. In contrast, insiders buy their stocks in the bear market. Therefore, insider net buy is expected to be negatively correlated with the market sentiment (MS). Large firm are more likely to receive the attention by investors and analysts than small firm. In addition, Givoly and Palmon [8] argue that the insiders in small firms are more accessible to inside information than the insiders in large firms. Therefore, we expect firm size (SIZE) to be negatively correlated with insider net buy.

This paper distinguishes industries by industry dummy variables (IND), which is 1 in the electronics industry and 0 in the traditional industries. Luo et al [15] show that managers in the electronics industry usually use stocks as a reward and remuneration for employees. Insiders in the electronics industry should be more likely to sell their stocks when they have financial needs, whereas insiders in traditional industries are more inclined to buy stocks. As a result, we estimate that IND have a negative correlation with insider net buy. Luo et al. [15] show that the stock price decreases before the insider buying, while the stock price increases before the insider selling. The changes in the stock price prior to insider trading is the most significant in the cumulative abnormal returns before 12 months. Therefore, we use the cumulative abnormal returns before trading (BCAR) in 12 months as variables and expect BCAR to be negatively correlated with insider net buy.

We explore the factors influencing the Buy-and-hold abnormal returns through the following regression model.

$$BHAR(t_1, t_2) = \alpha_0 + \beta_0 MT + \beta_1 Itr + \beta_2 MT \times Itr + \beta_3 CF + \beta_4 Ret + \beta_5 Q + \beta_6 R_{SIZE} + \beta_7 SIZE + \varepsilon \quad (3)$$

If  $\beta_2$  is significantly greater than 0, the hypothesis 2 is supported.

We use buy-and-hold abnormal returns (BHAR) to measure the firm's performance after

the repurchase announcement. The advantage of BHAR is that it directly observes the profit changes made by investors during the inspection period. BHAR is calculated as follows:

$$BHAR_{j,T} = BHR_{j,T} - BHRM_{j,T} \quad (4)$$

where  $BHAR_{j,T}$  is the  $j$ th firm's abnormal returns during the holding T period;

$BHR_{j,T}$  is the  $j$ th firm's returns during the holding T period;

$BHRM_{j,T}$  is the  $j$ th firm's returns during the holding T period for corresponding market index.

When the stock price is undervalued, the firm with strong market timing ability can control the market information to repurchase stocks at a relative low price. The firm would have better performance in the future. The firm with strong market timing ability may have more forecasting ability of future returns. Therefore, we predict Market timing (MT) and BHAR are positively correlated. The insiders have better information than market investors when the stock repurchase. The content of insider trading has more information content about the firm's future prospect [1]. Thus, we expect that there is a positive correlation between insider net buy (IT) and future returns. We use the interaction term between the market timing and insider net buy ( $MT \times IT$ ) to explore the impact market timing ability on the relationship between insider net buy and buy-and-hold abnormal returns. We predict that the insider net buy of the firm with stronger market timing ability has higher impact on BHAR. The free cash flow hypothesis suggests that companies can return excess free cash to shareholders to reduce agency problems. Stock repurchase is a conduit for the return of free cash, thereby reducing the firm's agency costs and increasing the firm's value [1]. Therefore, we estimate the cash flow (CF) is negatively correlated with BHAR. Future stock return tends to be related to past stock returns and performance. Based on Dittmar and Field [7], we use the cumulative return for the past 6 months before announcement as a control variable. We expect that the cumulative return for the past 6 months before announcement (Ret) would be positively correlated with BHAR. Tobin's Q ( $Q$ ) is measured by B/M ratio. If the B/M ratio is higher, the value of the company may be underestimated. The company may use the stock repurchase to support the stock price, resulting in decreasing future stock returns. Therefore, we estimate that Tobin's Q is negatively correlated with BHAR. Larger scale of firm's repurchase announcement is associated with more underestimated signal of firm released. Moreover, large number of repurchased shares can strengthen this signal, and the market investors would give positive support [1]. Therefore, we expect the stock repurchase scale ( $R\_SIZE$ ) is positively correlated with BHAR. Since large firms are more likely to receive the attention of investors and analysts than small firm, large firms send less information when stock repurchase announcement [1] and large firms would respond less future stock prices to

corporate announcement than small firm. Therefore, we estimate the firm size (SIZE) would be negatively correlated with BHAR. The definition of the above variables is presented in Table 2.

Table 2: variable and operation definition

variable	operation definition
Market timing (MT)	$\frac{\text{The average share repurchase price of repurchased month}}{\text{The closing price of t months before and after repurchased month}} - 1$
Firm size (SIZE)	Log(firm's total market capitalization at the end of the previous year )
Insider net buy (Itr)	number of shares bought - number of shares sold
Market sentiment(MS)	Stock price changing index of Economic Council Economic Commission Boom Countermeasures signal as the benchmark setting the dummy variable 1 is long and 0 is short.
Industry (IND)	Distinguishing industries by dummy variables, 1 in the electronics industry and 0 in the traditional industries
Cumulative abnormal return before trading (BCAR)	Cumulative abnormal returns before 12 months transaction as variable
Buy-and-hold abnormal returns (BHAR)	$BHR_{j,T} - BHRM_{j,T}$
Cash flow (CF)	Cash flow of firm's repurchase month
Cumulative return for the first 6 months before announcement (Ret)	Cumulative return for the first 6 months before announcement (Ret)
Tobin's Q	B/M
Stock repurchase scale (R_SIZE)	the total amount of repurchase / available funds

## 4. Empirical results

### 4.1 Market timing ability on insider trading

Because insiders have more information advantage than market investors, insider trading may contain certain internal information when the company purchases shares. Raad and Wu [18] and Li and McNally [14] confirm that insider trading does have an informational advantage. When a company issues a repurchase announcement, the content of insider's transaction may contain more information about firm's future prospective. Nonetheless, insiders may face the litigation risk when buying stocks by using personal account before the repurchase announcement. Moreover, there is less concerned for insider trading in the literature about the market timing ability. Therefore, we explore whether the firms with stronger market timing ability is associated with the more net insider buying.

Table 3 shows the impacts of market timing ability on the insiders net buy transaction. Panel A shows the results in full sample and Panels B and C present the results in listed companies and OTC companies respectively. In Panel A, MT around  $\pm 1$ ,  $\pm 3$ ,  $\pm 6$  months show positive correlations with insider net buy at 5% significant level, indicating that the stronger market timing ability represent by the company is accompanied with the more insiders net buy. In addition, the results in Panels B and C are similar with the results in Panel A. Regardless in the whole sample, listed companies or OTC companies, the insiders in the company with stronger the market timing ability can know the price information of the company's shares better while repurchasing. Thus, there would be the higher the insider net buying.

Table 3: The impact of market timing ability on insider net buy

This table shows the result of regression analysis of the market timing ability to the insider net buy. The insider net buy is calculated by the number of shares bought minus the number of shares sold. Market timing ability is calculated as the ratio of  $-RRP$  ( $-(\text{average repurchase price of shares purchased month divide by average closing price of } t \text{ months before and after the stock repurchase}) - 1$ ) and dummy variables. This study uses  $\pm 1$  month,  $\pm 3$  months, and  $\pm 6$  months of actual month repurchases to analyze. The definition of variable is shown in Table 2. All variables used t-values to determine significant level, \*\*\* significant level 1%; \*\* significant level 5%; \* significant level 10%.

Panel A	Itr		
	$\pm 1$ month	$\pm 3$ month	$\pm 6$ month
Full sample			
MT	2889.5** (2.51)	2785.2** (2.53)	2706.0** (2.46)

Ms	-330.9 (-1.23)	-357.8 (-1.33)	-355.2 (-1.32)
SIZE	26.07 (0.26)	17.90 (0.18)	20.20 (0.20)
IND	166.7 (0.62)	133.5 (0.50)	138.7 (0.52)
BCAR	3.646 (0.94)	3.444 (0.89)	3.429 (0.89)
Intercept	199.5 (0.26)	307.6 (0.40)	283.3 (0.37)
<b>adj. R-sq</b>	0.002	0.002	0.002
Panel B		Itr	
Listed company	±1 month	±3 month	±6 month
MT	3081.1** (2.08)	2971.2** (2.11)	2949.0** (2.10)
Ms	-429.1 (-1.35)	-467.3 (-1.48)	-465.8 (-1.48)
SIZE	62.25 (0.53)	49.73 (0.43)	49.96 (0.43)
IND	171.9 (0.56)	117.2 (0.38)	119.2 (0.39)
BCAR	5.349 (1.17)	5.158 (1.13)	5.160 (1.13)
Intercept	-76.05 (-0.08)	95.67 (0.10)	91.72 (0.10)
<b>adj. R-sq</b>	0.002	0.002	0.002
Panel C		Itr	
OTC company	±1 month	±3 month	±6 month
MT	2191.6** (2.56)	2078.8** (2.44)	1859.9** (2.12)
Ms	206.2 (0.62)	214.2 (0.62)	229.2 (0.66)
SIZE	-158.2 (-0.97)	-189.0 (-1.12)	-186.5 (-1.10)
IND	0	0	0

	(0)	(0)	(0)
BCAR	-4.604	-4.999	-5.139
	(-1.21)	(-1.30)	(-1.33)
Intercept	1354.4	1573.6	1543.0

#### 4.2 Market timing and insider trading on buy and hold return

When companies repurchase stocks, the power of control over market information can be reflected in its market timing ability. The more information content of insider trading is associated with the company with better market timing ability. Compared to investors, insiders have more private information about company's decision-making and future prospects and have more accurate judgments. Piotroski and Roulstone [17] document that insiders have more advanced message and there is a positive correlation between insider trading and future earnings of the company, indicating that the information content of insider trading about future return may be more accurate. Therefore, the insider net buy transaction in the firm with stronger market timing ability has a greater impact on future buy-and-hold return.

Table 4 shows the result of regression analysis of market timing ability on future buy-and-hold return. Panel A shows the results in full sample and Panels B and C present the results in listed companies and OTC companies respectively. In Panel A, the coefficients of the interaction term of MT and Itr are not significant. Panel B shows in the listed companies, only the interaction term of MT and Itr for  $\pm 1$  month is significantly and negatively correlated with buy-and-hold return at 10% level, whereas the interaction term of MT and Itr for  $\pm 3$  and  $\pm 6$  months are not significant. Panel C presents in OTC companies, the interaction terms of MT and Itr for  $\pm 1$ ,  $\pm 3$  and  $\pm 6$  months show the positive and significant correlation with the buy-and-hold return at 1% level, implying that OTC companies with stronger insider net buy ability have greater impacts on insider buy-and-hold return. It might be due to its' incomplete information disclosure and more potential insider information. On the contrary, since there are more analysts concerning about the information disclosure of listed companies, its insider net buy has less effect on future buy-and-hold returns.

Market timing (MT) shows a positive and significant correlation with buy and hold return at 1% level, indicating that the higher company's market timing ability is accompanied with the higher future buy-and-hold return. Cash flow (CF) is negatively and significantly correlated with buy-and-hold return at 10% level. It shows that the less a company's cash flow results in a smaller agency problem and the higher the buy-in-hold return; The first six months cumulative return before announcement (Ret) is positively and significantly correlated with buy and hold return at 1% level, indicating that the past returns are positively correlated with

the future buy and hold return, and the return exhibits a continuous pattern. Tobin's Q is negatively and significantly correlated with buy and hold return at 1% level, implying that companies with lower information asymmetry have lower buy and hold returns.

Table 4: The Impact of market timing and insider trading on buy and hold return

This table shows the result of regression analysis of market timing ability and insider's trading on buy and hold return. Buy and hold return is calculated by the return of the company shares during the holding period minus the market index return of the company's shares; Market timing ability is calculated as the ratio of -RRP (- (average repurchase price of shares purchased month divide by average closing price of t months before and after the stock repurchase) -1) and dummy variables. This study uses  $\pm 1$  month,  $\pm 3$  months, and  $\pm 6$  months of actual month repurchases to analyze. The definition of variable is shown in Table 2. All variables used t-values to determine significant level, \*\*\* significant level 1%; \*\* significant level 5%; \* significant level 10%.

Panel A	BHAR		
	$\pm 1$ month	$\pm 3$ month	$\pm 6$ month
Full sample			
MT	0.3254*** (7.84)	0.0625*** (4.73)	0.0503*** (4.87)
Itr	3.59e-08 (0.33)	-4.65e-08 (-0.63)	-1.93e-08 (-0.21)
MT×Itr	-5.23e-08 (-0.27)	4.46e-08 (1.00)	9.19e-08 (0.22)
CF	-5.51e-09* (-1.88)	-5.21e-09* (-1.80)	-5.26e-09* (-1.82)
Ret	4.32 e-05*** (2.94)	4.08 e-05*** (2.80)	4.01 e-05*** (2.76)
Q	-0.0372*** (-5.67)	-0.0402*** (-6.13)	-0.0388*** (-5.91)
R_size	-0.0248 (-0.79)	-0.0268 (-0.85)	-0.0201 (-0.64)
SIZE	0.00319 (0.92)	0.00252 (0.73)	0.00201 (0.58)
Intercept	0.00915 (0.29)	0.0180 (0.57)	0.0190 (0.60)
adj. R-sq	0.017	0.018	0.017
Panel B	BHAR		
Listed company	$\pm 1$ month	$\pm 3$ month	$\pm 6$ month



MT	0.4030*** (7.91)	0.0988*** (5.64)	0.0655*** (4.75)
Itr	-4.92e-08 (-0.35)	-1.03e-07 (-1.18)	-1.09e-07 (-1.09)
MT×Itr	-3.59 e-07* (-1.92)	-5.33e-08 (-0.10)	-3.08 e-08 (-0.66)
CF	-5.57e-09* (-1.86)	-5.51e-09* (-1.86)	-5.41e-09* (-1.82)
Ret	4.06e-05** (2.30)	3.79e-05** (2.16)	3.82e-05** (2.18)
Q	-0.036*** (-4.77)	-0.038*** (-5.05)	-0.039*** (-5.08)
R_size	-0.0188 (-0.48)	-0.0133 (-0.34)	-0.0105 (-0.27)
SIZE	-4.52e-04 (-1.03)	-5.21e-04 (-1.20)	-5.41e-04 (-1.23)
Intercept	0.0809* (1.95)	0.0874** (2.12)	0.0888** (2.14)
adj. R-sq	0.016	0.016	0.016
Panel C		BHAR	
OTC company	±1 month	±3 month	±6 month
MT	0.1709** (2.42)	0.0262 (1.17)	0.0427** (2.44)
Itr	4.96e-08 (0.08)	2.12e-07 (0.24)	4.96e-07 (0.74)
MT×Itr	2.88e-07*** (5.65)	1.15 e-07*** (6.78)	1.35 e-07*** (4.51)
CF	-7.31e-09 (-0.39)	-8.15e-09 (-0.44)	-1.20e-08 (-0.66)
Ret	3.22e-05 (1.18)	3.15 e-05 (1.17)	2.74 e-05 (1.03)
Q	-0.0525*** (-3.78)	-0.0572*** (-4.08)	-0.0508*** (-3.60)
R_size	-0.0470 (-0.91)	-0.0616 (-1.19)	-0.0468 (-0.90)

SIZE	0.0117 (1.37)	0.0131 (1.50)	0.0104 (1.21)
Intercept	-0.0573 (-0.80)	-0.0589 (-0.82)	-0.0486 (-0.69)
adj. R-sq	0.028	0.033	0.024

## 5. Conclusion

This paper explores the impact of market timing on insider trading and buy-and-hold abnormal returns by the sample of the listed and the OTC firms in Taiwan from 2001 to 2016. Based on Dittmar and Field [7], we use before and after 1, 3, 6 ( $\pm 1, \pm 3, \pm 6$ ) months relative repurchase price to measure whether the firm has the market timing ability when the firm repurchases its own stock. Through the related literature to establish the hypotheses, we test on the whole sample, listed firms and OTC firms to acquire the following results. First, the market timing ability is positively correlated with insider net buying, indicating that the stronger market timing ability is accompanied with the greater insider net buying after three month of actual repurchase. Thus, insiders can indeed recognize the company's future information when firms repurchased. They believe that the share price still has a rising trend after the share repurchase. In order to avoid litigation risk, insiders only have the action of buying stocks after the actual repurchase. Second, the market timing ability and the insider net buying for the future buy-and-hold abnormal returns is not significantly related in full sample. Nevertheless, OTC firms with stronger market timing abilities are associated with the greater impact of insiders net buying on future buy-and-hold abnormal returns.

We also find when the market timing abilities of the firms are stronger, their insiders net buy transaction would have greater influence on future buy-and-hold abnormal returns. The insider of the OTC firms can indeed recognize that the purpose of the firm's stock repurchase is for the operation of the company rather than the means of operation. Therefore, the buy-and-hold abnormal returns of OTC firms are higher. Nonetheless, although insiders of the listed firm with stronger market timing ability also buy their firms' stocks but still have doubt about the actual purchase. Thus, insider trading and the future buy-and-hold abnormal returns show a slight negative correlation. Insider trading of firms with smaller market values is more informative and the future buy-and-hold abnormal returns is also higher. Therefore, investors need to check the firm's financial position rather than blindly convincing firm's announcement to repurchase.

Possible direction for future research is suggested. Future research can also observe the changes of shareholding of the top ten shareholders and corporate legal person shares because

their increasing shareholding may be more reliable for the firm's stock repurchase.

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