

The Effects of Share Repurchase on Performance during Financial Crisis—— Empirical Study of Shanghai Stock Exchange

By

Yijun Zhao

ANR: 730843

Supervisor Name: Dr. D.A.Hollanders

Department of Finance

Faculty of Economics and Business Administration

A research project submitted in partial fulfilment of the requirements for the degree of Master of
Finance

Table of Contents

1. Introduction.....	4
1.1 Propose of study	4
1.2 Research question	4
1.3 research plan	5
2. Current state of Literature.....	6
2.1 Motivation of repurchases.....	6
2.2 effects of repurchases on execution firms' stock price	9
2.3 effects of repurchases on rivals' stock price.....	10
3. Data Selection and Sample Description.....	16
4. Hypothesis and Methodology of Event study.....	12
4.1 Hypothesis	12
4.2 Methodology	12
5. Results of Event study.....	18
5.1 Significant test for execution firms	18
5.2 Significant test for rival firms	20
6. Cross-sectional Analysis if intra-industry effects	22
7. Limitations and future discussion	29
8. Conclusion	30
References	32

Abstract:

This paper examines the firm specific and information-transfer effects of stock repurchases by using firms listed on Shanghai Stock Exchange from a post financial crisis period (2008 to 2013). The results of event study are consistent with prior studies, where repurchase announcement works as a signal of an undervaluation and therefore bring statistically positive significant to both execution firms and rival firms. Furthermore, a cross-sectional analysis is used to estimate the heterogeneous effects due to information transfer. Consistent with expectations, contagious effect positively affect rivals' CARs and competition effects influence rivals in a negative way.

Keywords: share repurchase, financial crisis, information transfer, heterogeneous effects, Shanghai Stock Exchange (SSE)

1. Introduction

In the recent decades, share repurchase becomes a widely used way to distribute cash to shareholders. According to firms list on U.S. stock market, S&P 500 companies spent 98 billion dollars in the first quarter and totally 400 billion dollars over year 2013. “When companies with outstanding business and comfortable financial positions find their shares selling far below intrinsic value in the market place, no alternative action can benefit shareholders as surely as repurchases” said by Warren Buffet. During the global financial crisis started in U.S., firms prefer to use stock buyback instead of dividend since the chaotic stock market circumstance and shareholders also prefer share repurchase since they can have more valuable shares and can avoid tax that come out when they receive dividends.

1.1 Background of study

Many researchers investigate the real effects of repurchases to market performance through a variety of periods and locations. Most of these studies are focus on developed countries and choose periods before the recent financial crisis. In other words, most of prior studies are considered to put the emphasis on repurchases that occurred in a good market environment. However, this paper focuses on companies that were listed on the Shanghai Stock Exchange (SSE) during the recent financial crisis and economic contraction. An Event study is used to test the reaction of stock price subsequent repurchases. Moreover, the relationship between repurchase and the reaction of rival firms is also tested by an event study and a cross-sectional analysis. The results of tests then used to compare with the results from previous studies.

1.2 Research question

In this study firms are separated into two types: execution firms and rival firms. Execution firms are firms executed share repurchase during sample period and the rival firms are firms in the same industry with execution firms.

The main research question of this paper shown as below:

What are the effects of share repurchases to both the market reaction of execution firms and the rival firms on SSE during financial crisis?

In order to give a more detailed analysis, the main research question is split into three secondary research questions.

- a) *What are the main motivations of share repurchase on SSE?*
- b) *How the returns of execution firms change surrounding the repurchase?*
- c) *How the price performances of rival firms change due to the announcement of repurchases?*

1.3 Research plan

The first section of this study is introduction, then the second section introducing an overview about current state of literature review from previous researchers includes motivations of firms' repurchases and the current situation of China stock markets. The third part presents hypotheses and model used in this study. Section four gives a description of data selection and samples. Section five is the main part of this study. An event study has been used to estimate the price performance of both execution firms and rival firms. The basic idea is to calculate the expected returns by using the average daily return that 120 days before repurchase activities as the estimate window, then calculate the abnormal returns (ARs) and cumulative abnormal returns (CARs) of each firm. Section six will examines the ways that firm's characteristics may affects the influences caused by share repurchase through a cross-sectional analysis. These characteristics include firm's size, profitability, leverage, liquidity, age as well as a year dummy variable which indicate the market circumstances when repurchases happened. I will also collect daily price and calculate the abnormal returns of rival firms at the same estimate and event window as execution firms. As before, results of t-statistics will present the significance of each average cumulative abnormal return. After that, an OLS regression will be implemented to estimate the relationship between CARs of each rival firm and the factors mentioned above. The interpretation and the comparison of results from this study and previous studies are also presented in this section. Whether the results from this study are consistent with the results from previous studies? Dose the industry performance consistent with the assumption? The possible limitations of this study and potential future researches will be presented in the section seven and the final section will give the whole conclusion of this study.

2. Current state of Literature

2.1 Motivation of repurchases

Old studies on motivations of share repurchase

According to previous researches, there are several possible reasons why managers choose to use share repurchase instead of dividend.

- 1) To change ownership concentration. Managers may want a change of the relative weighting of shareholders for the reason of control.
- 2) To avoid tax. Both firms and shareholders can avoid tax payment through share repurchase.
- 3) To give a positive signal to shareholders since the stock price is undervalued by market.
- 4) Working as a reserve of shares that provide currency to potential opportunity of acquisition.

In many empirical studies “undervaluation” is deemed as the most important reason of share repurchases. Once managers think their share prices are undervalued by market, they will announce and repurchase their stocks on open market in order to reduce the quantity of share outstanding and therefore increase share price. A price decreasing in pre-event period has always be a feature of this type of repurchase. Takashi Hatakeda and Nobuyuki Isagawa (2003) examining stock price surrounding stock repurchase announcement due to undervaluation through evidence from Japan stock market from 1995 to 1998. They select companies which reported the pre-announcements during the target period and divided them into two groups: execution and non-execution firm, the former one is firm that gives announcement and actually performs this repurchase, the latter one is firm which publishes announcement but does not carry out it. They find that, on average, there is no significant difference between two groups in a 2-days event window. However, in the pre-announcement period they do have obviously difference. The execution group experiences a large stock price decreasing, while the non-execution group does not. This pattern of repurchase can be fully explained by undervaluation.

Moreover, this kind of activities is identified as a signal to investors that the share prices of these companies will increase (Comment and Jarrell, 1991). This signaling theory suggest that,

when a firm choose to buy back its stocks, investors consider this as a signal that share price of this firm is undervalued and will be increased immediately, therefore, more investors will willing to invest in this share. To support this argument, Robert Comment and Gregg A. Jarrell (1991) examine three types of common stock repurchases announced by U.S. corporations between 1984 and 1989: Dutch-Auction, Fixed-Price Self-Tender offers and open market share repurchases. They find that, all of these three types repurchase give average significantly positive excess returns. Fixed-price self-tender offers show the highest average excess return of 11%, while Dutch-action and open market repurchase have excess returns of 8% and 2% respectively. Vermaelen (1981) also expound that a repurchases announcement is the same as a signal that managers give to investors, especially when a firm offers an over market price, investors may believe that this company is undervalued and its profitability will improve after share repurchase. The results of his study conclude that stock buyback leads to a permanent increase in stock price. The market prices of repurchasing firms around the announcement day are significantly increased at 5% level.

Furthermore, this signaling theory assumes weak-form efficient market. According to the efficient market hypothesis, there is no positive abnormal return if the market is completely efficient. However, in an inefficient market, firm relaters have opportunities to take advantage from the information asymmetry (Voss, 2012). Since share repurchase gives a signal to investors that stocks are undervalued, regardless of the fact, firm can always create shareholder value by buying their own shares at a discount to intrinsic value. Hence, in this study, I tacitly approve these firms buy back their shares due to an actual undervaluation.

In addition, based on historical analyses, repurchases always occurred when market at the bottom stage and always due to the reason of undervaluation (Beverly Hirtle, 2013). The propose of repurchases by those listed companies is to pass a signal to market to show that their stocks are undervalued, and reduce the number of stock outstanding through repurchases in order to improve the stock price (Jin Guo, 2014). This also explains why more firms choose to repurchase their share during financial crisis.

Another motivation of share repurchase is tax effects. Firms and investors can benefit from saving tax through share repurchase rather than cash dividend. Particularly, if the firm stays in a country with a relative tax advantage of capital gains over dividends and if the firm has payout policy associate with the tax status of its shareholders (Bessler, Drobetz and seim, 2009). There are two potential sources of tax saving from stock buyback. First, shareholders saving tax from repurchase compare to receive dividend. Second, the share repurchase help companies to escape the double taxation of equity. Of dividends and repurchases eliminate equity, equity earnings are subject to corporation income tax, while debt interest is not. (Shoven, 1987)

Liquidity also plays an important role in repurchase (Brockman, 2008). When company has higher market liquidity, managers are more willing to use repurchase rather than dividend since repurchase is more flexible. Lintner (1956) argue that companies are more willing to pay dividends when they have long-term sustainable incomes since dividend is costly. However, repurchases do not required by a guarantee of future payment. The importance of liquidity also because it can influence shareholders' transaction cost and their require rate of return, therefore, also affects the firm's cost of capital (Rasbrant & Ridder, 2013). Brav et al (2005) gave the evidence that more than 50 percent of managers feel that the liquidity of their stock is an important factor when they make decisions.

The current situation in China

Stock repurchase was introduced into Chinese stock market in earlier 1990s. The first case of stock repurchase happened due to Dayuyuan merger with Xiaoyuyuan. However, stock repurchase is still a rare activity in China. According to the report from WIND, one of the biggest statistics institutions in China, there is only one firm did repurchase in 2009, less than ten firms did repurchase from 2010 to 2011 and 62 firms completed their buyback process during 2012 to 2013.

Moreover, the China Corporation Law stipulates that firms can repurchase shares of the company by meets the following conditions: 1) To reduce the company's registered capital; 2) To merge with the company who hold its shares; 3) As a bonus to employees; 4) Due to shareholders requesting. And three ways of repurchase: 1) Firms buyback its own stocks with

current market price; 2) Firms announced it would buy back a certain number of shares to all shareholders; 3) Company repurchases a certain number of shares from certain shareholders.

However, after experienced a baptism of the financial crisis, stock market of China suffered a huge loss and the SSE composite index dropped from over 6000 points in 2008 to below 2000 points in 2013. Affected by the market environment, the stock prices of those listed companies are shrunk a lot. Therefore, more and more firms are willing to use share repurchases to stimulate their stock prices since they believe their stock prices are undervalued by market. Thus, these rules and regulations seem to be out of date. Chen (2005) and Tan (2008) support this view by indicate that although the motivations of stock repurchase in China are restricted and undervaluation is not accepted as a reason of repurchase, in consequence of financial crisis and demand of the market, regulation was gradually eased and undervaluation became an acquiescent reason of repurchases. Xiao-Feng Yuan and Qi Huang (2004) also point out that lagging and faulty laws make listed firms and investors suffer loss.

The actual reasons of repurchases proceeded by firms listed on SSE can be easily fund out through the information expounded on proclamations announced by each execution firm and the result will be summarized in next section.

2.2 effects of repurchases on execution firms' stock price

The earlier researchers normally examine the effects of the share buyback announcement by looking at the following performance of market price. As I mentioned in last section, there are several reasons why companies might want to repurchase their shares. However, Signaling (undervaluation) hypothesis is the most commonly motivation for share repurchases during financial crisis.

The signaling hypothesis suggests that there is an unexpected increasing in market return of stocks after the announcement of repurchase (Miller & Rock, 1985). N.Bhana (2007) examines the market reaction to open market share repurchase announcement in the South African. He selects companies who reported the share repurchase announcement from October 2000 to

March 2003. Bhana focus on the repurchases due to undervaluation, either the managers think there will a future increase in stock price or they disagree with the current market performance, and test how the positive signal works. The results show that the initial market reaction to share repurchase is small; the average abnormal return is 4.38% at the announcement day. However, with a buy and hold strategy, a three-year abnormal return increase to 14.35% which provide that the stock price of execution firm is undervalued by market.

Bessler et al. (2009) investigate the short-run and long-run effects of share repurchases announcement in Germany stock market from 1998 to 2008 by using data from both established firms and initial public offerings. The same as N.Bhana, they found that short-run valuation effects are best explained with undervaluation signaling for both established firms as well as for IPOs. In addition, the abnormal returns for initial public offerings are significantly higher than establish firms.

Not only announcement, the real repurchase is also considered as having positive influence on following market price. Hua Zhang (2003) conducts a study on how share price changes surrounding and following actual shares repurchase with the actual daily share repurchase data from the Hong Kong market. However, the results of his study show that neither short run nor long run performance is positively significant with a real share repurchase.

2.3 effects of repurchases on rivals' stock price

According to the information transfer hypothesis, investors use the information from one firm to make reasonable inference about rival firms (Lang and Stulz, 1992). Identically, the information about stock buyback may lead investors to revise expectations of rivals' earning prospects. The information conveyed by repurchase announcement may be relevant for rivals in 2 ways (Heterogeneous effects): 1) information reflects economic environment that the market facing as a whole. 2) The information presents a change in competitive balance in industry-wide. The first way is defined as a contagious effect, that is a positive effect on rival firms, and the second way is a negative effect due to the competition power within industry. Akhigbe and Madura (1999) support this hypothesis by examining the effects of repurchase in bank industry. They find that stock repurchases result in a significantly cumulative abnormal

return of 1.59% for execution banks and 0.19% for rival banks in two days surrounding the announcement day. The results of Akhigbe and Madura's study give a proof of the existence of intra-industry effects; moreover, the average positive cumulative abnormal returns show that competitive effect is dominated by contagious effect in bank industry.

Similar with Lang and Stilz, Erwin and Miller (1998) elaborate that since the repurchase decisions may also highly relative to the firm specific information, it is necessary to separate rivals into two groups: 1) rivals who have similar characters with execution firms (high homogeneous), in this case, the rivals will be affected in the same way as execution firms (contagious effects); or 2) rivals are low homogeneous with execution firms, then the effects on rivals will be negative (competition effects). The result of Erwin and Miller's study shows that execution firms experience a significantly positive abnormal return of 3.35%; however rival firms experience a significantly negative abnormal return of -0.25%. Thus, the contagion effects are dominated by the competition effects within industry. Otchere and Roos (2002) also present results on an empirical study of Australia market, the results are consistent with the information transfer hypothesis. Through examining both execution firms that repurchase due to undervaluation and rival firms, they find that the shareholders of rivals earned a significant abnormal return of 0.39% on a 2-days post-announcement window and 1.39% for three days surrounding the announcement. This result is consistent with the information transfer hypothesis and gives evidence that contagion effects dominate competitive effects in this case. Chang and Lu (2012) provide an empirical estimate by using Taiwan stock market as sample. They focus on repurchases motivated by capital reduction and excess cash distribution. The results show a positive average abnormal return after announcement; the abnormal return on announcement day is 1.38% and increase to 2.11% one day after, both significant at 1% level. For rival firms, abnormal returns are much smaller than execution firms, 0.31% and 0.47% respectively, but still significant at 1% level. Moreover, they provide that contagion effects affected by firm's size, payout ratio, leverage ratio and ownership structure. However, not every researcher gives significance results. Hertzels (1991) use data from 1970 to 1984 in U.S. market and divided rival firms into three subsamples by using alternative industry classifications,

the value line subsample, the dominant firm subsample and the homogeneous line of business. Neither full sample nor subsamples gives significant result. He concludes that rivals stock prices are largely unaffected by repurchases announcement.

3. Hypothesis and Methodology

3.1 Hypothesis

This study analyzes the price performance of execution firms and rival firms influenced by share repurchase.

H1.a: The announcement of stock repurchases lead to a positive cumulative average abnormal return for execution firms in short run.

H1.b: The actual stock repurchases lead to a positive cumulative average abnormal return for execution firms in short run.

H2.a: The announcement of stock repurchases lead to a positive cumulative average abnormal return for execution firms in long run.

H2.b: The actual stock repurchases lead to a positive cumulative average abnormal return for execution firms in long run.

Since most of the prior empirical studies find that contagious effect will dominate competitive effect. I also assume that share repurchase will affect rival firms in a positive way

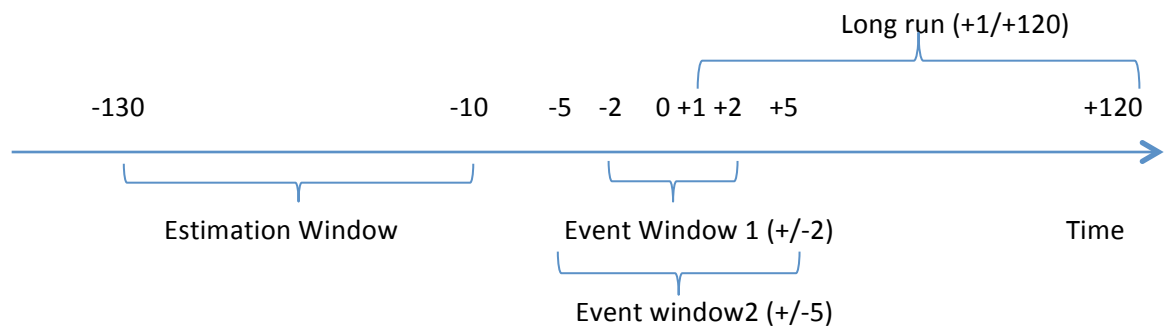
H3.a: The announcement of stock repurchases lead to a positive cumulative average abnormal return for rival firms in short run.

H3.b: The announcement of stock repurchases lead to a positive cumulative average abnormal return for rival firms in long run.

3.2 Methodology

In order to investigate the effects of repurchases in short run, I selected daily stock price of 5 days (-2 to 2) surrounding each event day as the event window of this study. Moreover, a 9 days (-4 to 4) event window is added to show the robustness of the tests. The event day ($t=0$) can be either announcement day or actual repurchase day. The announcement day is the day firms publish their formal announcement on stock market through China Securities Regulatory Commission (CSRC). While, the real repurchase day is the actual day that firm buys back its

stocks. Since the market model is used in this study to estimate the expected returns of event windows, a typical size of 120 days (-130 to -10) prior to the event day is used to be an estimate window. This estimate window ends 10 days before event day; hence it is not affected by the returns of event window. Besides, these 120 days historical returns are enough to calculate valid expected returns and can rule out the possible influences from other issues if choosing too long estimate window, such as policy change, release of new products and takeover or merger (Mackinlay, 1997). Furthermore, this study also looks at long-term effects by testing the cumulative abnormal return up to 120 days after the real repurchases. Due to the same reason discussed above, a long-run event window with too long period will inevitable affected by other influences, therefore, a 120-day period is chose as long-run event window in this study. The following time line provides a visualized explanation of estimate window and event window.



The evaluation of stock return will be conducted into two levels: the firm level and the industry level. For firm level, I am going to value the cumulative abnormal return (CAR) of each event window surrounding the announcement and real repurchase for each execution firm to see if the results are consistent with earlier researchers. For industry level, all firms are divided into 8 different groups according to which industry they belong to. After that, the cumulative abnormal return of each rival firm surrounding the announcement day will be used to do a significance test to see if this cumulative abnormal return is significantly different from zero. If there are more than one execution firm in an industry, each announcement of each execution firm will be tested separately. Different from execution firms, only results surrounding announcement day will be tested at industry level. The reason of removing real repurchase day is according to the information transfer theory, only information published on open market will have influence on rivals. However, the real repurchase day is not required to be open published

by CSRC. All real repurchase days of execution firms were found on firm's home page or in firm's annual report. Therefore, this kind of information may be difficult awarded by investors of rival firms. Hence, only announcement day is tested as event day at industry level.

The initial stage of the analysis examines the abnormal return (AR) of execution firms following the events, there are two types of event ($t=0$): 1) announcement day; 2) real repurchase day. Daily returns of each firm were calculated by using discrete compounded rates of return:

$$R_{i,t} = (P_{i,t} - P_{i,t-1}) / P_{i,t-1}^1$$

Where $R_{i,t}$ is the return of firm i on day t ; $P_{i,t}$ is price of firm i on day t and $P_{i,t-1}$ is price of firm i on day $t-1$. The expected returns of each firm during event window are estimate by Market Model and the SSE Composite Index is used as benchmark.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

By running a regression on returns of firms and benchmark during estimate window, the constant term α and coefficient β can be estimated and used to calculate the expected return:

$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t}$$

$R_{m,t}$ Is the daily return of the market at date t , use SSE Composite Index as benchmark.

Therefore, the abnormal return, average abnormal return (AAR) and cumulative abnormal return (CAR) can be calculated as follow:

$$AR_{it} = R_{it} - ER_{it}$$

$$CAR_i = \sum AR_{it}$$

$$AAR_t = \frac{1}{N} \sum AR_{it} = \frac{1}{N} CAR_i$$

Where, AR_{it} is the abnormal return t periods after the event day. For example, $AR_{i,0}$ denotes the abnormal return of firm i on the event day and $AR_{i,2}$ denotes the abnormal return 2 days after the event. Moreover, if firms have more than one event, they are treated as separate firms.

In order to check whether the ARR of each firm is significant different from zero, a t-teat can be used to test the cumulative abnormal returns of each firm by using following formula.

$$TS = \sqrt{N} * \frac{AAR}{AR_SD} \sim N(0,1)$$

¹ The stock price obtained from DataStream is already adjust with dividend

Where AR_SD is the standard deviation of abnormal return. This standard deviation in practice is unknown, however, an estimator of standard deviation can be calculated as:

$$AR_SD = \sqrt{\frac{1}{N} \sum (AR_{it} - AAR_t)^2}$$

In this study, a reasonable assumption is that AR and AAR are independent and identically distributed. According to the Central Limit Theorem, one can maintain the assumption that the abnormal returns are independent and have same mean and variance if $N > 30$. Therefore, a quintiles of normal distribution can be used as critical values for the test.

Furthermore, because of $AAR = \frac{1}{N} \sum CAR_i$, the formula can be rewrite as:

$$TS = \frac{1}{\sqrt{N}} * \frac{CAR_i}{AR_SD} \sim N(0,1)$$

A 5% significant level is used here, therefore, If the absolute value of TS larger than 1.96, the null hypothesis of abnormal return equals zero is rejected.

The next step is to test the significance across all firms that require calculating the cumulative abnormal return for all firms as a group. Use the same model, however, the cumulative abnormal returns of rival firms are used in test. By use execution firms' announcement day as event day, then calculate the abnormal return and cumulative abnormal return of rival firms during event window as well as the TS value. As explained before, effects of actual repurchase day are neglected at industry level since the effects of repurchases on rival firms are based on the information transfer theory. Hence, rival firms are influenced by the announcement of repurchase on securities market rather than real repurchase activities. The real repurchase day may out of operation in that it is not published on stock market and investors of rival firms may not pay attention to it.

4. Data Selection and Sample Description

The execution firms in this study are selected from firms list on Shanghai Stock Exchange (SSE) and the information about repurchases is obtained from SSE website and execution firms' home page. The daily stock prices are collected from DataStream. Since the research focuses on repurchases during finance crisis, this study select firms brought back their stocks after year 2007 that is between January 1st 2008 and January 1st 2014. In order to eliminate the influence of government policies, I exclude banks, social services industries as well as companies control by state. Moreover, in order to avoid the involvement of foreign assets, the firms list on "B" share market are also dropped from sample.²

Until July 2014, there are 963 firms on SSE. The repurchases occurred between 2008 and 2013 are concentrated into two types: 1) Firms buy back their stocks on stock market by a certain price; 2) firms buy back their shares from departing employees by a certain price. According to the announcements published on SSE website, total 25 firms recorded as execution firm in sample. Among these 25 firms, 8 of them belong to the first type and 17 firms belong to the second types.

The table 1 gives the detail of those repurchases. Panel A lists the firms under first type of repurchase and panel B lists the firms belong to second type of repurchase. Column 1 and 2 show the ticker and name of each firm. The third and fourth columns give the date of announcement and real repurchase of each firm and the column five present the reasons of repurchase refer to the announcements.

² "B" share is a special kind of share trade at SSE and SZSE (Shenzhen Stock Exchange), the market value of "B" share indicated by RMB but subscription and trading in foreign currency. Therefore, only share repurchases occurred on "A" share market are used.

Table 1: Detail of execution firms

(1)Ticker	(2)Firms	(3)Announcement day	(4) Actual repurchase day	(5)Motivation
PANEL A				
600380	JOINCARE KUNMING	18-1-2011	28-2-2011	Undervaluation, stimulate the price
600422	Pharmaceutical	14-3-2012	26-3-2012	Undervaluation, stimulate the price
600588	YONYOU	5-12-2012	31-12-2012	Undervaluation, stimulate the price, capital reduction
600577	TONGLING JINDA	21-12-2012	16-1-2013	Undervaluation, stimulate the price, enhance investors' confidence
600143	KINFA SCI&TECH	9-7-2013	19-8-2013	Undervaluation, stimulate the price, enhance investors' confidence
601313	SJEC	19-7-2013	23-8-2013	Undervaluation, stimulate the price
600256	GUANGHUI ENERGY	27-7-2013	23-8-2013	Undervaluation, stimulate the price
601233	TONGKUN	16-8-2013	13-9-2013	Undervaluation, stimulate the price, enhance investors' confidence
PANEL B				
600315	YONYOU	30-7-2009	30-7-2009	Employee Turnover
		14-9-2009	14-9-2007	Employee Turnover
		22-6-2010	22-6-2010	Employee Turnover
		3-9-2010	3-9-2010	Employee Turnover
		13-9-2011	13-9-2011	Employee Turnover
600315	SHANGHAI JIAHUA	18-5-2010	18-5-2010	Employee Turnover
		8-6-2012	8-6-2012	Employee Turnover
		24-7-2013	24-7-2013	Employee Turnover
600410	BEIJING TEAMSUN	2-12-2011	2-12-2011	Employee Turnover
		17-2-2012	17-2-2012	Employee Turnover
		10-7-2012	10-7-2012	Employee Turnover
	BEIJING DYNAMIC POWER	28-9-2011	28-9-2011	Employee Turnover
		10-4-2012	10-4-2012	Employee Turnover
		27-3-2013	17-10-2013	Employee Turnover
	JIANGSU KANION			
600557	PHARMS	30-3-2012	16-5-2012	Employee Turnover
600571	SUNYARD	29-1-2013	24-1-2013	Employee Turnover
		19-10-2013	18-10-2013	Employee Turnover
600589	BRIGHT OCEANS	20-4-2012	25-6-2012	Employee Turnover
		26-9-2013	27-9-2013	Employee Turnover
601126	SIFANG	23-7-2012	23-7-2012	Employee Turnover
		25-9-2012	25-9-2012	Employee Turnover
600594	YIBAI PHARM	22-8-2012	28-9-2012	Employee Turnover
		23-1-2013	19-3-2013	Employee Turnover
		16-8-2013	19-3-2013	Employee Turnover
		16-8-2013	10-9-2013	Employee Turnover
	CHANGZHOU XINGYU			
601799	AUTV. LTG.	24-11-2012	17-12-2012	Employee Turnover
600597	BRIGHT DAIRY & FOOD	27-9-2013	27-9-2013	Employee Turnover
	ZHUZHOU KIBING			
601636	GROUP	6-3-2013	7-3-2013	Employee Turnover
		22-6-2013	20-6-2013	Employee Turnover
600797	INSIGMA TECHNOLOGY	12-4-2013	9-4-2013	Employee Turnover
		13-8-2013	12-8-2013	Employee Turnover
600570	HUNDSUN	19-4-2013	24-4-2013	Employee Turnover
601566	JOEONE	26-11-2013	5-12-2013	Employee Turnover
	KUNMING			
600422	Pharmaceutical	18-6-2013	14-6-2013	Employee Turnover
600066	YUTONG	2-7-2013	8-7-2013	Employee Turnover

According to the National Economy Industry Classification (NEIC), which is formulated by the National Bureau of Statistics of the People's Republic of China, all execution firms are separated into 15 industries. Based on these 15 industries, all corresponding rival firms are picked out from firms listed on SSE "A" share market. In order to obtain more accurate results, industries with number of rival firms less than 30 as well as firms involving multiple industries are dropped³. Finally, there are 3 industries included in this study. Table 2 shows the detail about those industries.

Table 2 : Detail of industries

(1)Industry Number	(2)Industry name	(3)NO. of execution firms	(4)NO. of repurchases	(5)NO. of rivals
276	Biological pharmaceutical manufacturing	4	6	49
341	Boiler and original equipment manufacturing	1	2	18
268	Daily chemical products manufacturing	1	3	30

Note: the first and second columns give the 3 digit industry number and industry name according to the National Economy Industry Classification. Column 3 presents numbers of execution firms belong to this industry. Column 4 shows the total numbers of repurchases belong to this industry and column 5 is the total number of rival firms.

5. Results of Event study

5.1 Significant test for execution firms

The average CAR for execution firms and value of t-statistics are present in Table 3. This sample includes total 38 times of repurchase, 9 of them belong to the first type of repurchase that discussed in section 3 and 29 repurchases belong to the second type. Panel A of the table 3 present the CARs and T-statistics for announcement day and panel B presents the results for actual repurchases.

³ In order to maintain the assumption of normal distribution and keep the effectiveness of the tests, the sample size of each industry have to larger than 30. One firm with more than one times repurchases is regarded as separate firms.

Not fully consistent with previous studies, only results of full sample and type one firms show significant results in short run. With 5 days event window, the average CAR of full sample generate an out performance of 2% at 5% significant level (t-statistics equals 2.446). While, looking at two subsamples, the average CAR of type one firms equals 5.77% which is at 1% significant level (t-statistics equals 2.967); however, type two firms has an insignificant average CAR of 1%. This phenomenon may due to the scale of repurchase. Normally, the shares buy back from employees are much less than from the open market. Therefore, the effects of share repurchase on stock performance are more obvious if firms buy back shares from open market than the buyback from departing employees. Similar results are obtained by using 9 days event window (-4 to 4). The average CAR of full sample is 2.23% and statistically significant different from zero at 5% level. For type one firms, average CAR is 6.82% with an associated t-statistics of 2.899, which is significant at 1% level. For type two firms, average CAR is 1%, but not significantly different from zero. Besides, no significant results appear in long run as well as use real repurchase day as event day. In addition, these similar results that are generate by 5 days and 9 days event window provide the robustness of significance test.

Table 3: Cumulative Abnormal Returns & Test Statistics for Execution Firms

DAY	Average cumulative abnormal return for full sample			Average cumulative abnormal return for type 1 firms ⁴			Average cumulative abnormal return for type 2 firms		
	n	CAR	TS	n	CAR	TS	n	CAR	TS
Panel A: Use announcement day as event day									
CAR(-2/+2)	43	0.0201	2.446**	8	0.0577	2.967***	35	0.0101	1.210
CAR(-4/+4)	43	0.0223	1.989**	8	0.0682	2.899***	35	0.0101	0.841
CAR(+1/+120)	43	-0.0439	-0.895	8	0.0751	1.0142	35	-0.0721	-1.186
Panel B: Use real repurchase day as event day									
CAR(-2/+2)	43	0.0095	1.140	8	-0.0149	-1.381	35	0.0160	1.608
CAR(-4/+4)	43	-0.0022	0.230	8	-0.0181	-1.111	35	0.0075	0.684
CAR(+1/+120)	43	-0.0097	-0.195	8	0.0696	0.819	35	-0.0298	-0.485

Notes: The sample composed by 25 execution firms and 43 open market shares repurchases between 2008 and 2013. The T-statistics reveal a test that average cumulative abnormal returns are differ with zero. The asterisks*, ** and *** reflect significant level at 10%, 5% and 1% respectively. "n" indicate the number of repurchases.

⁴ Since only 7 firms belong to type 1, under assumption the t-statistics follows a student-t distribution with N-1 degrees of freedom.

These results fail to reject the hypothesis H1.a. As the hypothesis described in pervious section, announcement of stock repurchases lead to a positive cumulative average abnormal return for execution firms in short run. The hypothesis H1.b, H2.a and H2.b are all rejected since no significant results obtained either by using real repurchase day as event day or by long-run performance.

These insignificant results of long-run event window and real repurchase days may due to the small sample size, 43 repurchases in total is not a large sample and may have bias. Moreover, an asymmetric distribution problem also cannot be ignored. For example, many of small negative abnormal returns together with some very large positive abnormal returns can create a small positive CAR but insignificantly different from zero. Other possible explanations are include: 1) Market downturn. Affected by stagnancy of global market, Chinese Stock Market suffers huge loss during 2012 to 2013. Therefore, the positive effects of stock repurchase may be dominated by the tendency of the whole market. 2) Quantity of stock repurchase is too small to affect the stock's market price. The numbers of Stocks buy back from leaving employees normally very small, which may give a very small influence on stock price. 3) Long intervals between announcement day and actual repurchase day may become another reason why the actual repurchase days have weak significance. Some firms start to repurchase their stock 3 months or even half year after the announcement; hence, the long gap may cool investors down. 4) Due to the poor regulation of stock repurchase, some firms give announcements after real repurchases, which may eliminate the effects of real repurchases.

5.2 Significant test for rival firms

According to the arguments that are presented in section 3, real repurchase days are neglected when testing the significance of rival firms for each industry. The average CAR of each industry over days surrounding the announcement is reported with different event window around announcement day. Table 4 gives the results of this industry level test.

The results of industry level tests are quite complex and could be largely affected by the industry characteristics. Table 4 gives the results of significant test in industry level. The 2 times of open market repurchase in Biological Pharmaceutical Manufacturing show that repurchase announcement of execution firms due to reason of undervaluation not have significant effects on rivals performance in short run. However, the long-run performance presents a positive average cumulative abnormal return of 11.25%, which is significant at 5% level. For the announcements in consequence of employee turnover, only Biological Pharmaceutical Manufacturing gives significant results in short-run. The 5 days event window shows a negative average CAR of 3.83%, which is significantly different from zero at 1% level. The 9 days event window also gives a negative average CAR of 7.38% and significantly different from zero at 1% level. The consistency on the results of both short-run event windows confirms the robustness of this test.

Table 4: Table 3: Cumulative Abnormal Returns & Test Statistics for Execution Firms

Industry Number	Industry name	n	N	Type	CAR(-2/2)	TS(-2/2)	CAR(-4/4)	TS(-4/4)	CAR(1/120)	TS(1/120)
268	Daily chemical products manufacturing	30	3	E	0,0116	0,978	0,0291	1,514	-0,0581	-0,662
276	Biological pharmaceutical manufacturing	49	2	U	0,0183	1,685*	-0,0075	-0,522	0,1125	2,018**
		49	4	E	-0,0383	-	-0,0738	-	0,0404	1,083
341	Boiler and original equipment manufacturing	18	2	E	-0,0108	-1,175	-0,0061	-0,43	-0,0545	-0,868

Note: “n” is numbers of firms in each industry; “N” is numbers of announcements in each industry ranked by time. The asterisks*, ** and *** reflect significant level at 10%, 5% and 1% respectively. Type “E” means this repurchase is due to employee turnover and “U” means the repurchases is due to undervaluation.

The problem of small sample size can be used to explain why only one industry show significant results. By looking at scale of each industry (n) in sample, one can easily find is that Biological pharmaceutical manufacturing is the industry with the largest size of rivals. Another possible reason of this phenomenon is the heterogeneous effects of rival firms. For example, the effects of repurchase announcement may affect one group of rival firms positively (contagious effect)

and another group of rival firms negatively (competitive effect), hence the influence of the announcement was weakened in industry-wide and average cumulative abnormal returns may tend to zero (Hertzel, 1991). Moreover, due to the different industry characteristics, such as the speed of information transfer, the effects of repurchase announcements may have a lag.

As results present by Chang and Lu (2012), the sign of each CARs affect by characters of each rival firm. Rival firm who has similar characters with execution firm will obtain positive CARs and rival firm who has great difference with execution firm normally has negative CARs (Erwin and Miller, 1998). A widely accepted reason for positive CARs is that repurchase gives positive signal about execution firm's expected earnings. Investors would consider this signal has an industry-wide effect, and counterpart firms in same industry will benefit from the contagious effects. Thus, a positive average cumulative return for rival firms would be evidence of the contagious effects. Inversely, if the announcements enhance the competitive effects of information transfer (e.g. increase the market share of execution firm), a negative average CAR will be raised. Both contagious effect and competitive effect differ across industries.

In conclusion, execution firms' announcements are able to affect their corresponding rival firms, while; these effects are highly influenced by rival firms' characteristics. Hence, hypothesis H3.a and H3.b are rejected. In section 6, the relationship between rival firms' price performance and their characteristics will be estimated.

6. Cross-sectional Analysis if intra-industry effects

In order to determine whether the significant effects of repurchase announcement may be undetected when heterogeneous effects of rival firms exist and in what way effects of information transfer may be influenced by firm specific characteristics, a cross-sectional analysis is used in this section. The factors examined in this section include the degree of similarity and degree of competition.

Degree of Similarity

According to the theory of contagious effects, If open market share buyback announcement reflects an improvement in execution firm's future cash flow through a positive industry-wide effect, then this positive effect may contagious within industry (Erwin and Miller, 1998). Such contagious effects will more prominent if rival firms have similar cash flows as the execution firm. In line with Firth (1996), the correlation of stock return between execution firm and each rival firm will be used to express the degree of similarity. In this study, the correlations will be calculated by each estimate window. For example, there are 4 execution firms, 49 rival firms and total 6 times repurchase in Biological pharmaceutical manufacturing industry. Therefore, correlations between rivals and corresponding execution firm will be calculated 6 times within this industry and with 6 different estimate windows. Thus, holding all other variables constant, if the price returns of rival firms are more correlated with the corresponding execution firm, the contagious effects are more powerful. In other words, the higher correlation of execution firm and rival firm, the bigger CAR of rival firms.

Degree of Competition

With imperfectly competitive industry, such contagion effects may cancel out if information of repurchase announcement shifts the competitive balance in this industry (Laux, Starks and Yoon, 1998). The higher the competition within industry, the lower the abnormal return of rival firms.

There are several factors can be used as indicators of competition. Akhigbe and Madura (1999) use asset portfolio, capital ratio, trading location and institution type to measure degree of competition. The results of their study give evidence of positive significant industry-wide effects of bank stock repurchases. Otchere and Ross (2002) evaluate degree of competition by the size of industry, that is, competitive effects should more strength for industries with small number of firms. Consistent with Liargovas and Skandalis (2008), this study indicates a number of independent variables may significantly influence firms' competitiveness.

- 1) *Leverage*: It is measured by using debt to common equity ratio. Leverage ratio gives an idea of how companies utilize borrowed money in their operating activities. While, leverage can benefit companies only when the return can offset the cost of borrowing, therefore, high leverage ratio may lead to high risk of bankruptcy if firm fails to pay back its debt.
- 2) *Profit Performance*: It is measured by net profit margin (net income/net sales). This ratio determines the firms' ability of make a profit. The net profit margin is a good way to comparing companies in the same industry. It is expected that firms with high profit margin would be less affected by others.
- 3) *Liquidity ratio*: The ratio of current assets minus inventory divided by current liabilities. The quick ratio refers a company's ability to meet the short-run obligations with its most liquid assets. Firms with higher quick ratio are more financially secure in short run.
- 4) *Size*: Firm size is measured by the total assets of this firm. Small firm normally has less power of competition, therefore, has higher chance to be affected by other firms that have larger size.

In summary, firms with good profit performance, high liquidity ratio, large size and relative low leverage level should have high power of competition and therefore less affected by repurchase announcement from other firms.

Moreover, Papadigonas, George and Fotini (2013) use Greece market as sample and test the relationship between market power and age during financial crisis. They point out that firm's age has positive relationship with its market power at 10% significant level and indicate that factors such as experience and reputation, which are highly associated with age, bring advantage over young firms. Hence, firms with long history should be less affected by other firms' activities.

In this study, a year dummy variable will be added as an independent variable in regression. As the stock market environment introduced in second section, share repurchases increased rapidly during 2012 and remained this tendency in 2013. Thus, it is necessary to see the difference of information transfer effects when an announcement published on a market with frequently repurchases activities compare to a market where repurchase rarely happen.

A cross sectional regression then applied to provide a more robust result of heterogeneous effects and describe the relationship between dependent variable and independent variables referred above.

$$CAR_{i(-t,t)} = \alpha + \beta_1 leverage_i + \beta_2 Profit\ Performance_i + \beta_3 liquidity_i + \beta_4 \ln(size_i) + \beta_5 year\ dummy_i + \beta_6 correlation + \beta_7 age + \epsilon_i$$

Where $CAR_{i(-t,t)}$ is cumulative abnormal return of rival firm i over the event window. The year dummy equals 1 if announcement published in year 2012 or 2013 and equals 0 if announcement appeared at 2011 or before. Table 5 gives an overview about all variables appeared in regressions.

Table 5. Descriptive Statistics for the industry-wide variables to be used in the cross-sectional regression analysis

Variable	Obs	Mean	SD	MIN	MAX
Firm	499	73,0621	40,4496	1	148
Industry	499	4,2385	1,5253	1	8
CAR(-2/2)	499	-0,0043	0,0655	-0,7766	0,4456
CAR(-4/4)	499	0,00693	0,1512	-0,9536	1,1943
CAR(1/120)	499	0,03343	0,393	-1,4087	2,4712
Correlation	499	0,3857	0,1706	-0,1048	1
Ln(size)	492	15,3866	0,948279	13,26911	18,1955
Debt/CE (%)	495	85,7023	166,3743	-447,13	1810,91
ROE (%)	467	5,4583	22,1328	-279,38	32,16
Quick ratio (%)	495	1,3083	1,3437	0,02	8,68
Age	499	37,5671	75,5626	5	473

Notes: Ln (size) defines the nature logarithm of firm's total assets and all ratios are show in percentage.

All independent variables are selected from yearly financial statements from each firm since there are lots of missing data exist if I want use explicit data corresponding to each

announcement day. The full sample includes 148 firms that belonging to 8 different industries. In general, CARs are small for all event windows and the leverage levels are volatile across firms as well as return on equities and ages.

An OLS regression is run to estimate the relationship between the CARs of each rival firm and all independent variables listed above. Since there are intra-class correlations exist among the multiple repurchases a company experienced, a cluster (firm) robust option is added in order to allow for difference in standard errors due to intra-group correlation. Table 6 gives the results of regressions.

Table 6. OLS regression of CAR of rival firms according to the type of industry effect

Independent variable	CAR(-2/2)	CAR(-5/5)	CAR(1/120)
Correlation	0,03468 (0.062*)	0,13156 (0.022**)	0,46602 (0.01***)
Debt/CE (%)	0,00004 (0.01***)	0,00003 (0,278)	-0,00009 (0.074*)
ROE (%)	0,00003 (0,818)	-0,00025 (0,506)	-0,00065 (0,163)
Quick ratio (%)	-0,00032 (0,847)	-0,00049 (0,942)	0,00417 (0,699)
Ln(size)	-0,00090 (0,775)	-0,02335 (0.008***)	-0,04200 (0.036**)
Year dummy	0,02739 (0.00***)	0,08260 (0.00***)	0,22566 (0.00***)
Age	0,00002 (0,220)	0,00006 (0,249)	0,00005 (0,748)
constant	-0,03128 (0,468)	0,22089 (0,064)	0,37588 (0,265)
R ²	0,0389	0,077	0,0811
F-statistics	6.66***	7.88***	8.29***

Notes: the sample consists with 148 firms belong 8 industries and totally 20 times of repurchase announcements from 2008 to 2013. The correlation is calculated by the daily returns of stock price of rivals relative to their corresponding execution firms by using the same period as estimate window (-10 to -130) of event study. 3 ratios, firm's size and age are collected from yearly financial statements of each rival. Year dummy is a dummy variable the equals 1 if announcement published in year 2012 or 2013 and equals 0 if announcement appeared at 2011 or before. Three regressions are run by use CAR (-2/2), CAR (-4/4) and CAR (1/120) as dependent variable respectively.

*** Significant at 1% level.

** Significant at 5% level.

*Significant at 10% level.

Through the regressions I find that correlation are positively significant with cumulative abnormal return in all event periods. Furthermore, this relationship enhanced by extends length of event window. The coefficient of correlation increases from 0.03468 in five days event window to 0.46602 in long run. Different with Otchere and Ross, the Leverage gives a tiny significant positive result in short run and also a tiny significant negative result in long run, which means that leverage is positively correlated to CAR in short run and reverse in long run. This may due to the ambivalent effects of leverage, appropriate borrowing can help firm to create cash flow but too high debt may leads to bankrupt since firm may unable to pay back its debt. Firm's size shows a negative relationship with CAR and significant at both 9 days event window and long run. This result is consistent with the prior studies: large company should be less affected by information transfer from competitors. Unlike previous studies, return on equity, quick ratio and age do not show any significance in this study and the coefficients of them are all very small, which can be neglected.

The year dummy variable presents unexpected highly significant results. If the event occurred between 2012 and 2013, the CARs of each rival firm will on average 11.19%⁵ higher than events occurred at 2011 and before. The results show that no matter in short run or in long run, if an execution firm announces a repurchase during a period that stock repurchase frequently occurred, then the CARs of rivals will significantly higher than if an announcement published during period with rare repurchase.

By considering that those specific factors may be able to generate different results in different industries, an industry fixed effect is included in regressions. The fixed effect regressions help to control the average differences across industries in any observable or unobservable predictors. The fixed effect coefficients assimilate all across industry actions and left the within industry actions and provide more robust results. Table 7 shows the results of fixed effects regressions.

⁵ $(0.02739 + 0.08260 + 0.22566) / 3 = 0.1119$

Table 7. OLS regression of CAR of rival firms according to the type of industry effect (industry fixed effect)

Independent variable	CAR(-2/2)	CAR(-5/5)	CAR(1/120)
Correlation	0,08000 (0.002***)	0,2171 (0.007***)	0,74215 (0.000***)
Debt/CE	0,00005 (0.001***)	0,00005 (0,054*)	-0,00001 (0,77700)
ROE	0,00009 (0,507)	-0.0001 (0,721)	-0,00031 (0,526)
Quick ratio	0,00124 (0,492)	0,0015 (0,831)	0,00976 (0,403)
Ln(size)	-0,00301 (0,409)	-0,0277 (0.005***)	-0,05157 (0.024**)
Year dummy	0,03622 (0.00***)	0,1032 (0.00***)	0,30402 (0.00***)
Age	0,00003 (0,165)	0,00006 (0,342)	0,00003 (0,872)
constant	-0,00958 (0,851)	0,26434 (0,044)	0,32542 (0,315)
R ²	0,0754	0,1032	0,1270
F-statistics	7.14***	6.04***	5.94***

Notes: the sample consists with 148 firms belong 8 industries and totally 20 times of repurchase announcements from 2008 to 2013. The correlation is calculated by the daily returns of stock price of rivals relative to their corresponding execution firms by using the same period as estimate window (-10 to -130) of event study. 3 ratios, firm's size and age are collected from yearly financial statements of each rival. Year dummy is a dummy variable the equals 1 if announcement published in year 2012 or 2013 and equals 0 if announcement appeared at 2011 or before. Three regressions are run by use CAR (-2/2), CAR (-4/4) and CAR (1/120) as dependent variable respectively. A fixed effect of industry is added into regressions.

*** Significant at 1% level.

** Significant at 5% level.

*Significant at 10% level.

The same as before, the correlation and Year dummy variable are highly significant relative to cumulative abnormal returns at 1% level; Firm size again shows the negative relationship with CAR in 9 days window and in long run at 1% and 5% significant level respectively; and leverage still gives an ambiguous result. The absolute values of all significant coefficients are increased by adding industry fixed effects. However, return on equity, quick ratio and age show tiny and insignificantly results as before, which can be ignored. R-squares of fixed effects regressions are

much higher than OLS regressions, which means more data can be explained by fixed effects regressions.

On the whole, the results of both OLS and Fixed Effects regressions are consistent with the heterogeneous effects hypothesis. The bigger the firm size, the larger the competition power and therefore less affected by information transfer from others (Competitive effects). Also, if one firm has a higher correlation associate with execution firm, it will more easily to be influenced by execution firm's activities (Contagious effects).

7. Limitations and future discussion

This study examines the stock buyback effects on price returns of both execution firms and rival firms by an event study, and furthermore estimates in what way these rival firms affected by repurchase announcement through a cross-sectional analysis. All firms in sample are selected from Shanghai Stock Exchange with period of 2008 to 2013 (Post Financial Crisis Era). In general, the results of the event study and cross-sectional analysis are consistent with the previous studies. However, there are more limitations may exist.

First, the poor and outdated rules and regulations may lead to a chaotic market reaction. For example, some firms announced their repurchases after the actual repurchase activities. This kind of activities may weaken the effects of repurchases since investors may recognize repurchase before they receive the announcement, therefore, the CARs surrounding announcement will become smaller and less significantly different from zero. Also, under the constraint of the normal distribution assumption, most industries are dropped due to little number of rival firms. The small sample size limits the veracity of the cross-sectional analysis. A more robust result may appear if one can have a large sample size. Nevertheless, an endogeneity-problem can be produced since there are omitted variables that may affect both dependent and independent variables. For example, both CAR and firm size can be affected by a large one-time investment or a market movement. An important assumption of OLS estimate is $E(x/u) = 0$, if this assumption is not valid, the OLS estimator is biased. Moreover, perhaps

there is a reversed causality problem exist between CAR and return on equity. Since I selected value of each factor from yearly financial statements, it is difficult to judge whether ROE affect CARs or CARs determines ROE. A more precise result should be obtained if one can use more accurate values of each control variable (e.g. monthly or daily). In addition, this study simply excluded the effects of government control by remove state-owned companies, a study that includes these effects will be very interesting in the future.

8. Conclusion

The objective of this study is to estimates the short run and long run effects of share repurchases by using sample of Shanghai Stock Exchange firms. Through select information of each announcement, the full sample can be divided into two subgroups: undervaluation and employee turnover. The former one is due to the poor market performance and the latter one is due to the leaving of employee who holds firms' shares. According to the first stage of event study, both full sample and undervaluation group show significantly positive CARs in short run (both 5 days 9 days event window). However, neither long run effects nor group of employee-turnover gives significant results by using announcement day as event day. Moreover, no significant results are appeared by using the real repurchase day as event day for all groups with all event windows. The potential reason may be the small sample size (only 43 repurchases in total) and asymmetric distribution of abnormal returns.

The second stage of event study analysis CARs of rival firms corresponding to each execution firm. By wiping off industries which have less than 30 firms, more robust results are obtained. The results of rival firms are much more complex than execution firms. Attribute to small sample problem, only one industry (Biological pharmaceutical manufacturing) gives significant results at this step. For repurchases due to undervaluation, neither 5days nor 9 days short-run event window obtains average CAR that significantly different from zero. While, the long-run event window shows a positive average CAR of 11.25%, which is significant at 5% level. For repurchases due to employee turnover, both 5 days and 9 days event windows give highly significant negative average CARs of 3.83% and 7.38% respectively. The difference between

short-run and long run effects may be highly influenced by characteristics of each industry. Normally, repurchase due to undervaluation sustains a longer period (6 months or longer) than repurchase cause by employee turnover, which are usually at the same time as announcements published. Thus, the effects of repurchase announcement due to undervaluation are more willing to show in long-run. Although only one industry shows efficient results, it is enough to support information transfer theory since repurchase announcement has significant effects on both execution firms and rival firms either in short-run or in long-run.

The second part of this study is to investigate the factors that affect the direction of the influence from repurchase announcement. Based on information transfer theory, the heterogeneous effects may exist, and therefore rivals suffer a negative effect if the competition effects dominate the contagious, vice versa. Both OLS regressions and fixed effect regressions present that the correlations and firm size play an important role. When a rival firm has high correlation with corresponding execution firm, a significant positive influence will work on its CARs (contagious effect); and if a firm has large size, it will be less affected by other's activities (competition effect). The year dummy variable also reveals a significant and positive effect on rivals' CARs in all event periods. This phenomenon illustrates that a higher average CAR will appear in a period with numerous repurchases compare to a period has rare repurchases. The results of regressions proved the existences of heterogeneous effects since both competition effect and contagious effect are verified.

References

- Akhigbe, A., & Madura, J. (1999). Intraindustry effects of bank stock repurchases. *Journal of Financial Services Research*, 15(1), 23-36.
- Almeida, H., Fos, V., & Kronlund, M. (2013). The Real Effects of Share Repurchases. *Available at SSRN*.
- Axelsson, L., & Brissman, P. (2011). Share repurchase announcements and abnormal returns for Swedish listed real estate companies.
- Banyi, M.Dyl, E. A. & Kahle, K. M. (2005), measuring share repurchases.
- Bartov, E. (1991). Open-market stock repurchases as signals for earnings and risk changes. *Journal of Accounting and Economics*, 14(3), 275-294.
- Bessler, W., Drobetz, W., & Seim, M. (2009). Motives and valuation effects of share repurchase announcements in Germany: A comparison of established firms and initial public offerings. *Justus Liebig University*.
- Bhana, N. (2007). The market reaction to open market share repurchases announcements: The South African experience. *Investment Analysts Journal*, (65), 25-36.
- Bititci, U., Firat, S. U. O., Garengo, P., & Gumussoy, C. (2010), Performance comparisons in SMEs. *International Journal of Production Planning and Control*.
- Comment, R., & Jarrell, G. A. (1991), the relative signaling power of Dutch-auction and fixed-price self-tender offers and open-market share repurchases. *The Journal of Finance*, 46(4), 1243-1271.
- Chang, C. H., & Lu, T. K. (2012). Information Contents and Intra-industry Effects of the Announcements of Capital Reduction by Returning Cash to Shareholders: Evidence from Taiwan Market.
- Erwin, G. R., & Miller, J. M. (1998). The intra-industry effects of open market share repurchases: contagion or competitive? *Journal of Financial Research*, 21(4), 389-406.
- Firth, M. (1996). Dividend Changes, Abnormal Returns, and Intra-Industry Firm Valuations. *Journal of financial and Quantitative Analysis*, 31(02), 189-211.
- Fried, J. M. (2001). Open market repurchases: signaling or managerial opportunism? *Theoretical inquiries in Law*, 2(2).
- Graham, R. C., & King, R. D. (1996). Industry information transfers: the effect of information environment. *Journal of Business Finance & Accounting*, 23(9-10), 1289-1306.

Hatakeda, T., & Isagawa, N. (2004). Stock price behavior surrounding stock repurchase announcements: Evidence from Japan. *Pacific-Basin Finance Journal*, 12(3), 271-290.

Hertzel, M. G. (1991). The effects of stock repurchases on rival firms. *The Journal of Finance*, 46(2), 707-716.

Jagannathan, M., Stephens, C. P., & Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of financial Economics*, 57(3), 355-384.

Jie Chen (2005) Some thinking to the problem of share repurchase of listed companies in our country, China Academic Journal Electronic Publishing House.

John B.Shoven (1987), the tax consequences of share repurchases and other non-dividend cash payments to equity owners, National bureau of economic research, 0-262-19263-2.

June Pham & Thanh Nguyen (2013), IPOs Intra-Industry Effects on Firm's Stock Repurchase, Available at SSRN: <http://ssrn.com/abstract=2398159>

Lang, L. H., & Stulz, R. (1992). Contagion and competitive intra-industry effects of bankruptcy announcements: An empirical analysis. *Journal of Financial Economics*, 32(1), 45-60.

Laux, P., Starks, L. T., & Yoon, P. S. (1998). The relative importance of competition and contagion in intra-industry information transfers: An investigation of dividend announcements. *Financial Management*, 5-16.

Lee, D. S., Mikkelsen, W. H., & Partch, M. M. (1992). Managers' trading around stock repurchases. *The Journal of Finance*, 47(5), 1947-1962.

Liargovas, P., & Skandalis, K. (2005). Factors Affecting Firm Competitiveness: The Case of Greek Industry.

Liang Tan (2008), Shallow discussion share repurchase of listed companies.

Li & Zhang (2013, October), Short-Run and Long-Run Consumption Risks, Dividend Processes and Asset Returns, In *Asian Finance Association (AsFA) 2013 Conference*.

Lie, E. (2005), Operating performance following open market share repurchase announcements. *Journal of Accounting and Economics*, 39(3), 411-436.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of economic literature*, 13-39.

Ofer, A. R., & Thakor, A. V. (1987). A theory of stock price responses to alternative corporate cash disbursement methods: Stock repurchases and dividends. *The Journal of Finance*, 42(2), 365-394.

Otchere, I., & Ross, M. (2002), do share buyback announcements convey firm-specific or industry-wide information? A test of the undervaluation hypothesis. *International Review of Financial Analysis*, 11(4), 511-531.

Papadogonas, T., George, S., & Fotini, V. (2013). Market Power, Cost Efficiency and Firm Performance in the Post-Crisis Era, *Review of Contemporary Business Research*, 2(2).

Råsbrant and De Ridder, 2013, The Liquidity Impact of Open Market Share Repurchases.

Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of financial economics*, 9(2), 139-183.

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

Wang, J., & Johnson, L. D. (2008). Information asymmetry, signaling and share repurchase. *Queen's University*.

XiaoFeng Yuan & Qi Huang (2004), the issue of share repurchase of listed companies, *Sci-Technology and Management*, 1008-7133(2004)05-0089-03

Zhang, H. (2005). Share price performance following actual share repurchases. *Journal of Banking & Finance*, 29(7), 1887-1901.

Zulkaflī, A. H. Ownership Concentration and Share Repurchase: Evidence from Malaysia.