Three effects of stock repurchase on rival firms in Vietnam

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Abstract

Purpose – The purpose of this paper is to examine the effects of share repurchase announcements on the stock price of rival firms in the same industry in Vietnam during 2010–2017.

Design/methodology/approach – Both event study and *t*-test are employed to test the effects of share repurchase announcements on rival firms. In addition, cross-sectional analysis by ordinary least square regression is also applied for investigating the heterogeneous effects due to information transfer.

Findings – The finding shows that stock repurchase announcements result in a positive and significant valuation effect for both announcing firms and rival firms in Vietnam. Furthermore, the degree of signal to the industry is conditional on the degree of signal about the announcing firms as a contagious effect. Intra-industry effects are more favorable when profit performance of rival firms is good and when leverage of rival firms is low.

Practical implications – Rival firms can seize opportunities surrounding share repurchase announcements in the same industry in Vietnam. However, due to firm characteristics, intra-industry effects of stock repurchases differ among industries.

Originality/value – By examining different methods, the paper attributes valuable results to investigate the stock price behavior of rival firms in the same industry when firms announce stock repurchase in Vietnam.

Keywords Market efficiency, Cumulative abnormal return, Average cumulative abnormal return, Contagious-competitive effect, Intra-industry effects, Stock repurchase

Paper type Research paper

1. Introduction

In the last few decades, stock repurchase has become increasingly popular and widely used in the world stock market as well as in Vietnam. According to Vermaelen (2005), this program has a great impact on a firm's financial situation and strategies such as distributing cash to shareholders, improving earnings per share or increasing stock prices. Moreover, stock repurchase also has a certain influence on the securities market, including rival firms in the same industry. It has been proven in many previous studies such as the studies of Hertzel (1991) and Erwin and Miller (1998) that investigated all firms in the US market or the studies of Akhigbe and Madura (1999) and Miller and Shankar (2005) that examined bank and insurance firms. These studies' results showed fluctuations in stock prices or the existence of rival firms' average cumulative abnormal return (ACAR) surrounding share repurchase announcements. Based on hypotheses of contagious effect and competitive effect, stock price behavior of rival firms could be seen as a positive or negative effect, depending on each firm characteristic such as firm size, profit performance or capital ratio.

In the Vietnamese stock market, firms announce share repurchases to signal that they are undervalued. According to the StoxPlus Corporation, the period 2005–2017 has recorded 980 stock repurchase announcements in Vietnam made by 302 firms in various industries. Especially in 2011, there were 203 stock buyback announcements with approximately 204m shares registered to buyback. However, the effects of stock buyback on rival firms in different industries in Vietnam have not been previously examined in the literature. Thus, it can be seen that the intra-industry effects of repurchase announcements in different industries is an appealing topic to study in the context of Vietnam.

In order to investigate the effect of stock repurchases on rival firms in the same industry, we focus on the following specific objectives: to assess how share repurchase announcements affect rival firms' valuation and to determine the factors affecting the ACAR of rival firms in Vietnam around stock repurchases.

This paper is structured as follows: Section 2 presents a literature review on the effects of stock repurchases on rival firms, Section 3 gives hypotheses and methodology, Section 4 describes the sample selection, Section 5 discusses the abnormal return (AR) results and Section 6 discusses the cross-sectional analysis. Finally, Section 7 is conclusion.

2. Literature review

The literature regarding the impact of share buyback on rival firms has been examined in previous studies. Beginning in the 1980s, by emphasizing the relationship between capital structure and market conditions, Titman (1984), Brander and Lewis (1986) and Maksimovic (1988) developed models proving that rivals might be affected by strategic changes in the debt-to-equity ratio. The theories of Jensen (1986) and Stulz (1988) also suggested that stock repurchases were influenced by corporate governance and capital structure, which would impact rivals. In addition, results from studies by Vermaelen (1981) and Miller and Rock (1985) showed that the information signal of stock repurchases could affect rivals' stock prices.

Further to the 1990s, more direct studies related to the influence of stock repurchases on rival firms were carried out, such as those of Hertzel (1991), Akhigbe and Madura (1999) or Miller and Shankar (2005). Researchers hypothesized that rival firms would only be affected by share repurchase announcements while the actual transaction day was often overlooked by rivals. In general, most studies suggested that by information transfer theory, information conveyed by a repurchase announcement might affect rival firms in two ways: information reflects the economic condition that the market is facing as a whole and the information reflects a change in competitive balance in the industry. The first way is called the contagious effect, which often has a positive effect on rivals. The second one is a competitive effect, which often has a negative effect. Hence, share repurchase announcements could have a positive, negative or heterogeneous stock price effect for rivals.

A study that suggested a contagious effect on rival firms is the study of Akhigbe and Madura (1999), with a sample of 77 banks' repurchase announcements for the period 1978–1995, and it found that the buyback of stocks resulted in a significantly positive AR of 0.19 percent for rival banks for two days around the date of the announcement. Besides, the Chang *et al.* (2005) study of the Taiwan stock market resulted in the positive average AR of rival firms after the announcement; the AR on announcement day was 1.38 percent and increased to 2.11 percent one day after, both significant at a 1 percent level. This is considered as evidence of the hypothesis that "good signals" will spill over. Specifically, what is considered good news for the firms is also considered as a good signal for the industry.

However, there are cases where investors assess the stock buyback as a negative signal and this may also have a negative impact on rival firms. The research of Erwin and Miller (1998) examined the stock repurchase announcements of 240 industrial firms from

1985 to 1990 and found that rival firms often had negative reactions to repurchase announcements (about −0.25 percent). Moreover, Miller and Shankar (2005) reported 96 repurchase announcements by insurance firms in the USA between 1980 and 2000, suggesting a competitive effect of −0.32 percent to rival insurance firms, especially after 120 days from the publishing of initiations for the repurchase of shares. These studies are considered as evidence of the hypothesis that "stock buyback information reflects a change in competitive balance in the industry," which is the competition effect.

There are also studies that record both negative and positive responses depending on the specific industry, such as the study of Zhao (2014) using the Shanghai stock market as a sample. This study indicated the significantly positive AR of −0.00738 of rivals in biological pharmaceutical manufacturing while daily chemical products manufacturing responded positively to the coefficient of 0.0291. Nevertheless, the study of Hertzel (1991) selected a sample of 134 share repurchases by US firms during the 1970–1984 period, which found no evidence of significant intra-industry effects of share buyback. In addition, the study of Jukka (2007), with 160 samples of repurchase announcements in Finland, indicated that very few rivals in the same industry were affected by the share buyback decision.

The AR of rival firms surrounding the stock repurchase announcement date is also proven to depend on firms' characteristics such as the ratio related to the asset structure, capital structure, firm size or degree of announcing firms' response. First, Zhao (2014) suggested a firm that has a low debt-to-equity ratio (leverage ratio) would often be less affected by the repurchase announcement, with a correlation coefficient of 0.0004 at 1 percent significance. This is because high leverage can lead to a high risk of bankruptcy if firms fail to repay debt. Second, regarding capital ratio, according to a study by Akhigbe and Madura (1999), firms with high capital ratios are more likely to buyback shares than others and as the signal from a stock buyback announcement is more likely to be followed by more capital-intensive firms, the rival firms will be favored more. Therefore, the reaction of the rival firms will be correlated with the capital ratio (positively 0.024 correlation at a 1 percent significance level). Third, the reaction of announcing firms is also indicated to have impact on the ACAR of rival firms around the announcement date. Specifically, the research of Akhigbe and Madura (1999) resulted in positive correlation of 1.0019 at a 1 percent significance level between the AR of execution firms and ACAR of rival firms around the announcement date. It is also proven in the study of Chang *et al.* (2005) researching firms in Taiwan, with result of 0.206 correlation at a 1 percent significance level. Fourth, firm size has shown to have a negative impact on this response, according to Zhao (2014). Small-scale firms tend to have less competitiveness, so there is a higher chance of being impacted by larger firms. The results show that the impact coefficient of the scale is −0.023 with a significance level of 1 percent and in the long term it is −0.042 with a significance level of 5 percent. The following factor is the time of the announcement that could lead to the sensitivity of investors to stock prices. Akhigbe and Madura (1999) studied the timing before and after the Federal Deposit Insurance Corporation Improvement Act regulation related to the disclosure of US financial information and Zhao (2014) studied the time before and after Shanghai's financial crisis. Both studies resulted in a 1 percent significance level. Additionally, other factors related to the firms' financial situation, including the ratio of return on equity, return on sales (ROS) or quick liquidity or types of assets, types of firms or geographic locations are also suggested, but the results of these factors are not really statistically significant.

3. Hypotheses and methodology
3.1 Hypotheses
This study analyzes the ACAR of rival firms influenced by share repurchase announcement. Since most of the previous studies suggested that the contagious effect will dominate the competitive effect, we also assume that rival firms in Vietnam will be affected by share

repurchase announcements due to the contagious effect. Thus, the announcement of stock repurchases will have influence on the ACAR of rival firms in the same way affecting the cumulative abnormal returns (CARs) of announcing firms:

H1. The announcement of stock repurchases leads to a positive CAR for announcing firms in the short run.

H2. The announcement of stock repurchases leads to a positive ACAR for rival firms in the short run.

3.2 Methodology

Following previous researches of Akhigbe and Madura (1999) and Zhao (2014), the event study method, *t*-test and ordinary least square method (OLS) are used to test the hypothesis that the ACAR of rival firms is affected by stock buyback announcements. In addition, as explained before, since the effects of repurchases on rival firms are based on the information transfer theory, the actual repurchase day is not paid attention to by rival firms. Therefore, they are influenced by the announcement of repurchase on the stock market rather than real repurchase activities. Hence, the study will only focus on the data around the announcement date.

Event study is implemented to measure the AR, CAR and ACAR of announcing firms and rival firms surrounding the announcement date for each share repurchase announcement event. In particular, the event date is t_0, which is defined as the first notice date of the share repurchase program. The periods used in the model are given in Figure 1, in which the study uses a 245-day estimation window, a typical size of around 200 days in most previous research papers. Moreover, the estimation window ends before the event date, therefore it is not affected by the returns of the event window.

Abnormal returns (AR). ARs are the crucial measure to assess the impact of an event. The AR of firm i on event date t is defined as the difference between the actual stock return and the expected return given the absence of the event:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}),$$

where $AR_{i,t}$ is the abnormal return of firm i on event date t and it is calculated daily in the event window of 21 days (-10, 10) as in Figure 1, $R_{i,t}$ is the actual stock return of firm i on event date t and it is calculated by the natural logarithm of stock price i on day t divided by the price on day $t-1$, $E(R_{i,t})$: the expected return of firm i on event date t and it is estimated by market model.

Expected return – market model. By market model, the expected return (normal return) is predicted based on two inputs; the relationship between the firm's stock and its reference index (expressed by the α and β parameters), and the actual reference market's return ($R_{M,t}$):

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

where $R_{M,t}$ is the actual reference market's return (VN-Index's return) on event date t and it is calculated by the natural logarithm of market price of VN-Index on day t divided by the price on day $t-1$, α_i and β_i are the regression coefficients of market model and are estimated
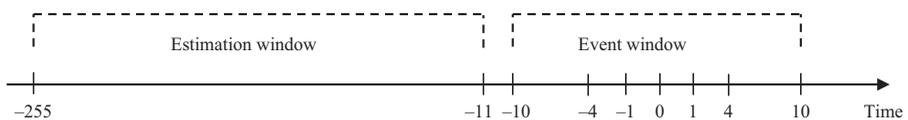
Figure 1.
Estimation window and event window are used in the study

by running OLS regression for a period of 245 days in the estimation window (−255, −11) as in Figure 1.

Cumulative abnormal return (CAR). CAR of firm i is estimated during the period of $t1$ to $t2$:

$$\text{CAR}(t1, t2) = \sum_{t1}^{t2} \text{AR}_{i,t}.$$

Average cumulative abnormal return (ACAR). ACAR is estimated during the period of $t1$ to $t2$ of many rival firms. This study investigates rival's ACAR in the event windows (−1, 1), (−4, 4), (−10, 10), (−10, −1), (0) and (1, 10):

$$\text{ACAR}(t1, \ t2) = \frac{1}{N} \sum_{i=1}^{N} \text{CAR}(t1, \ t2),$$

where N is number of observations.

Cross-sectional t-test. Under the null hypothesis, the CARs and the ACAR are equal to zero. The variance estimator of this statistic is based on the cross-section of ARs. Therefore, the study uses t-test to test CAR and diff (with diff $= \text{CAR}_i - \text{ACAR}_j$) as in the following formula:

$$t_{\text{cross}} = \frac{\text{ACAR}(t1, \ t2)}{\hat{\sigma}(\text{ACAR}(t1, \ t2))/\sqrt{N}},$$

$$\hat{\sigma}^2(\text{ACAR}(t1, \ t2)) = \frac{1}{N-1} \sum_{i=1}^{N} \left(\text{CAR}_i(t1, \ t2) - \frac{1}{N} \sum_{j=0}^{N} \text{ACAR}_j(t1, \ t2) \right)^2.$$

After employing event study methods to examine the stock price behavior surrounding the stock repurchase announcements, the research continues to test the significance across all firms and also to test the significance of the relationship between rival firms' ACAR and firms' characteristics by using the OLS method and t-test.

4. Sample selection and description

The analysis in this study is based on an initial sample of 681 open market stock repurchase announcements from 2011 to 2017 on HOSE and HNX in Vietnam compiled by the StoxPlus Corporation[1]. Only observations that satisfy certain screening criteria are included in the investigation. First, the sectors studied in this paper are information technology, pharmaceutical and medical, consumer goods, materials and energy (290 announcements). Hence, share repurchase announcements by finance, industry and services will not be considered. Second, the study also removes events of stock buyback announcements that occur in the same day by at least two different firms in the same industry. In addition, the study eliminates all observations in which the intended buyback number of shares is less than 0.01 percent of the total number of shares outstanding. Finally, after screening the data, there are 201 remaining observations that satisfy our criteria, as detailed in Table I.

From these above share repurchase announcements, the study continues to gather rival firms in the same industry with the company giving repurchase announcement. The industry is identified as the sector level 1 which is classified according to the criteria of the industry classification benchmark and applied in Vietnam by StoxPlus. Hence, our sample consists of 296 rival firms for all five industries (information technology: 29,

Industry	No. of repurchase announcement	No. of rival firms	No. of announcing firms
Information technology	11	17	7
Pharmaceutical and medical	19	15	9
Consumer goods	104	65	27
Materials	43	55	22
Energy	24	38	11
Observes	201	190	76
Mean	40.2	38	15.2
Min.	11	15	7
Max.	104	65	27

Note: The table presents descriptive statistics for a full sample of stock repurchase announcements, rival firms and announcing firms in five fields (information technology, pharmaceutical and medical, consumer goods, and materials and energy)

pharmaceutical and medical: 24, consumer goods: 109, materials: 83 and energy: 51). However, rival portfolios are screened to exclude firms that have announced stock repurchases between 2011 and 2017 or have insufficient data as the methodology required. Thus, the remaining rival firms observed are 190 firms, as detailed in Table I. Rival firms, stock prices at market price of the VN-Index and other financial data will be collected from the website www.cophieu68.vn and yearly financial reports at http://cafef.vn.

Table I shows that in the period from 2011 to 2017, there are 201 stock buyback announcements made by 76 Vietnamese firms in the fields of information technology, pharmaceuticals and medical, consumer goods, and materials and energy. The average number of announcements per industry is 40.2. In total, 38 rival firms in the industry, and about 15.2 firms have share buyback programs. Besides, industries of larger scale and with a larger number of firms often have more share buyback announcements.

5. Results of event study

5.1 Significant test for announcing firms

Table II describes the CAR of announcing firms for the sample of 201 stock repurchase announcements in Vietnam from 2011 to 2017. By using the event study method and the market model, we calculate CAR in the event windows $(-1, 1)$, $(-4, 4)$, $(-10, 10)$, $(-10, -1)$, (0) and $(1, 10)$

| | CAR | | | | | |
	$(-1, 1)$	$(-4, 4)$	$(-10, 10)$	$(-10, -1)$	(0)	$(1, 10)$
Information technology	0.0029	−0.0008	0.0666	0.0203	0.0033	0.043
t-stat	0.1118	−0.0198	1.3043*	0.777	0.2483	1.4088*
Pharmaceutical and medical	0.0153	0.0237	0.0414	−0.014	0.0098	0.0281
t-stat	1.8154**	1.4623*	2.5093**	−1.553	1.9682**	2.1563**
Consumer goods	−0.0064	−0.017	0.0209	−5E−04	0.0006	0.0101
t-stat	−0.5518	−0.575	2.8227**	−0.076	0.2606	1.5878*
Materials	0.00447	0.0166	0.0315	0.0208	−6E−04	0.0112
t-stat	0.8099	1.7354**	1.8106**	1.5932*	−0.166	1.0124
Energy	0.01375	0.0418	−0.025	0.0019	−0.008	−0.019
t-stat	0.5158	0.5157	−2.0199**	0.1593	−1.835**	−2.1892**

Notes: The table provides the cumulative abnormal returns of announcing firms for the sample of 201 stock repurchase announcements in Vietnam from 2011 to 2017. The cumulative abnormal returns during $(-1, 1)$, $(-4, 4)$, $(-10, 10)$, $(-10, -1)$, (0) and $(1, 10)$ windows surrounding announcement dates are reported, using the market model. Parameters from the market model are estimated by using OLS regression over the pre-event period, $t = -255$ to -11. *,**Significant at the 10 and 5 percent level, respectively

surrounding the announcement date. This sample includes the five fields of information technology, pharmaceutical and medical, consumer goods, and materials and energy.

Overall, most firms are reported to have positive CAR surrounding the announcement date. This result is similar to the findings of Byun and Trung (2016) when providing evidence that the CAR of Vietnamese firms' stock repurchases gradually increased from −30 to +30 days around the stock repurchase announcement date in the period 2005–2014.

In almost every event window observed, the CARs of pharmaceutical and medical firms have most significant positive reactions around the event, with a statistical significance of 5 and 10 percent. Especially in the event window (−10, 10) and 10 days after the event, the results of the CAR are 0.0414 and 0.0281, respectively, at the significance level of 5 percent. Meanwhile, firms in the information technology sector have a relatively weak reaction to stock repurchase events, with the results being hardly significant. The reason may be that the sample of this field is not large enough (only 11 announcements). However, technology firms' CAR is positive in the event window (−10, 10), with a positive coefficient of 0.0666 at a 10 percent significance level. In addition, after ten days of reporting, these firms have a positive coefficient of 0.043 of CAR at a 10 percent significance level.

The announcing firms of the consumer goods industry also have a positive CAR around the event window (−10, 10), with a CAR of 0.0209 at a 5 percent significance level. Moreover, the CAR for a period of ten days after the event is positive: 0.0101 at a 10 percent significance level. However, when considering the event windows (−4, 4) and (−1, 1), there are no statistically significant results. Materials announcing firms reported positive results around the date of the share buyback announcement. The CAR of window (−10, 10) is 0.0315 – relatively large, at a statistically significant level of 5 percent and the CAR of window (−4, 4) is smaller but the result was positive, with 0.0166 at a 5 percent significance level. Besides that, announcing firms of the materials industry are the only ones that have a positive statistically significant CAR in window (−1, 10).

These above four sectors have results that are consistent with the results of previous studies of Akhigbe and Madura (1999), Miller and Shankar (2005) and Zhao (2014). However, the announcing firms in the energy sector have negative reactions in long-run windows around the date of announcing. Specifically, in the event windows (−10, 10), (0) and (1, 10), the CARs of the firms that announced the buyback shares have negative results of −0.025, −0.08 and −0.019 at a 5 percent significance level, respectively. This could be explained by the lack of credibility of the energy sector's share buyback, the reaction of investors for this announcement not being optimistic or the CAR result is affected by confounding events.

5.2 Significance test for rival firms
Table III describes the ACAR of rival firms for the sample of 201 stock repurchase announcements in Vietnam from 2011 to 2017. By using the event study method and market model, we calculate the ACAR in the event windows (−1, 1), (−4, 4), (−10, 10), (−10, −1), (0) and (1, 10) surrounding the stock repurchase announcement date and then compare with the CAR of firms giving announcements by diff (= CAR of announcing firm − ACAR of rival firms) and t-test for diff. This sample includes the five fields of: information technology, pharmaceutical and medical, consumer goods, materials and energy.

In general, the ACARs of rival firms around the date of stock repurchase announcement are quite complex and different among sectors and event windows, but most of the ACARs are positive and consistent with the "contagious effect" as in the hypothesis and many previous studies. The ACARs of rival firms are generally less significant than the CAR of announcing firms. In addition, the long-run windows have more dramatic ACARs of rival firms than the short-run, but it might be affected by confounding events.

Regarding the information technology industry, in almost all event windows, although the ACAR of rival firms has negative results, these results are not statistically significant.

	ACAR					
	(−1, 1)	(−4, 4)	(−10, 10)	(−10, −1)	(0)	(1, 10)
Information technology	−0.00843	−0.014	0.000455	−0.007	−0.003	0.0108
(diff)	0.01134	0.0136	0.066138	0.0272	0.0139	0.0322
t-stat	0.4957	0.3178	1.4707*	1.0048	0.4808	1.268
Pharmaceutical and medical	0.00154	−0.003	0.003347	−0.004	0.002	−0.013
(diff)	0.01378	0.0263	0.03802	−0.01	0.0078	0.0425
t-stat	1.7495**	1.7587**	2.8116***	−0.945	1.4101*	3.637***
Consumer goods	−0.0058	−0.017	−0.00402	−0.003	−5E-04	−6E-04
(diff)	0.00065	0.0101	0.02488	0.0022	0.0011	0.0107
t-stat	0.0452	0.2578	1.6075**	0.373	0.4939	1.5011*
Materials	−0.0018	−0.002	0.010846	0.0057	−9E-05	0.0053
(diff)	0.00623	0.0183	0.020625	0.0151	−5E-04	0.0059
t-stat	1.3843*	2.1893**	1.4298*	1.3737*	−0.16	0.6508
Energy	0.00787	0.0417	0.019936	0.0054	−7E-04	0.0151
(diff)	0.00588	0.0001	−0.04492	−0.004	−0.007	−0.034
t-stat	0.234	0.0018	−2.596***	−0.269	−1.534**	−3.225***

Table III.
Average cumulative abnormal returns for matching portfolios of rival firms

Notes: The table provides the average cumulative abnormal return of rival firms for the sample of 201 stock repurchase announcements in Vietnam from 2011 to 2017. The average cumulative abnormal return during (−1, 1), (−4, 4), (−10, 10), (−10, −1), (0) and (1, 10) windows surrounding announcement dates are reported, using the market model. Parameters from the market model are estimated by using OLS regression over the pre-event period, $t = −255$ to $−11$. diff $=$ CAR$_i$ − ACAR$_j$. *,**,***Significant at the 10, 5 and 1 percent levels, respectively

It may be because the sample of this field is not large enough (only 11 announcements). However, regarding event windows (−10, 10), the ACAR of rival firms in the information technology industry is positive at 0.000455, which is consistent with the "contagious effect," and is 0.066138 lower than the firm's announcing, at a 10 percent significance level.

The ACAR of rival firms in the pharmaceutical and medical industry is quite complex between event windows. For the event windows (−1, 1) and (−10, 10), the ACAR of rival firms is positive at 0.00154 and 0.003347, respectively. This result is consistent with the "contagious effect." However, in the event windows (−4, 4) and (1, 10), the ACAR of rival firms has negative reactions of −0.003 and −0.013, respectively, which is consistent with the "competitive effect." Rivals in the pharmaceutical and medical industry react to stock repurchase announcements less strongly than announcing firms (less than 0.01 to 0.04 units). The results of the study also show that most coefficients are statistically significant at 1 and 5 percent levels.

In the consumer goods industry, rival firms have negative ACARs to the announcement of share buyback. At the event windows (−4, 4), rival firms have the strongest reaction at −0,017. The ACAR of rival firms is also less than that of announcing firms in all windows, in which the greatest difference is in the windows (−10, 10) with 0.02488 at a 5 percent significance level. It could be said that consumer goods industry firms in Vietnam are likely to be affected in share repurchase announcements by the "competitive effect." This is reasonable in Vietnam; it is a large and competitive industry. This result is also similar to the study of Erwin and Miller (1998) and Miller and Shankar (2005).

Rivals in the materials sector react quite dramatically around the date of announcing share repurchases on the stock market. The ACAR is negative in the windows (−1, 1), (−4, 4) and (0) and positive in the windows (−10, 10) and (1, 10). Furthermore, the reaction of rivals is not as strong as the execution firms, with the majority of diff results at 5 and 10 percent significance levels.

For the energy sector, the ACARs of rival firms around the announcement date are mostly positive. Results from the event windows of (−10, 10), (0), and (1, 10) are statistically

significant at 1 and 5 percent levels. Short-term event windows have positive results following the "contagious effect." However, as they are not statistically significant, it is difficult to draw conclusions.

6. Cross-sectional analysis of intra-industry effects

6.1 Research model

Cross-sectional regression is used to provide a more robust result from heterogeneous effects and describes the relationship between firm characteristics and the ACARs of rival firms around stock repurchase announcements. The study is based on Akhigbe and Madura (1999) and Zhao (2014) and the actual situation of the Vietnamese stock market to select dependent and independent variables. Intra-industry effects of stock repurchases are conditional on the following factors:

$$ACAR_j(-1,1) = \alpha_0 + \alpha_1 CAR_i(-1,1) + \alpha_2 ROS_j + \alpha_3 LIQUIDITY_j$$

$$+ \alpha_4 SIZE_j + \alpha_5 CAPITAL_j + \alpha_6 PERIOD_j + u_j,$$

where j represents rival firms; i represents announcing firms; $ACAR_j(-1,1)$, the average cumulative abnormal returns of rival firms in the event window $(-1,1)$ surrounding the stock repurchase announcement, is a dependent variable calculated by the event study method mentioned before; $CAR_i(-1,1)$, the cumulative abnormal returns of announcing firms surrounding the announcement in event window $(-1,1)$, is calculated by the event study method. Due to the information transfer theory, intra-industry effects might be related to the valuation effect of the corresponding firms that are repurchasing their shares. Based on the above results of the event study, the study hypothesizes that there is a positive relation between announcing firms' CARs and rival firms' ACARs; ROS represents the profit performance of the firms, measured by net profit divided by net sales. Due to the information transfer theory, firms with high profit margins would be more attractive to investors and then more affected by other firms. The research hypothesizes that the ROS positively correlates with ACAR; LIQUIDITY represents the firm's quick liquidity, measured by the ratio of current assets minus inventory divided by current liabilities. Firms that are able to pay quickly for current liabilities are considered to have a stable financial status so they will be less affected by the announcement of stock repurchase. Therefore, this variable is assumed to inversely correlate to the ACAR; SIZE represents the scale of the firm, measured by the natural logarithm of total assets. It is hypothesized that small businesses are less competitive, hence, more likely to be affected than larger firms. The SIZE variable is expected to inversely correlate with the ACAR of rival firms around the event date; CAPITAL is measured by the ratio of capital divided by total assets. As the signal of a stock buyback announcement is more likely to be followed by more capital-intensive firms, those firms would be more favored. Therefore, the reaction of the rival firms will be proportional to the firm's capital ratio; PERIOD represents the time of the announcement. The study uses year dummy variables to distinguish between stock repurchase announcements before 2015 vs those that occurred in 2015 and after. Since 2015, Vietnam has signed a large number of agreements such as the free trade agreement (FTA) with Europe, the Vietnam – South Korea FTA and the ASEAN economic community. Thus, the study assumes that the signed agreements have a positive impact on the Vietnamese economy and stock markets. It means that PERIOD is expected to positively correlate with the ACAR of rival firms (Table IV).

6.2 Results

Univariate results. Table V shows the descriptive statistics of variables used in this study.

Variable name	Variable definition
ACAR (−1, 1)	Average cumulative abnormal returns of rival firms in event window (−1, 1) surrounding announcement date, calculated by event study method
CAR (−1, 1)	Cumulative abnormal returns of announcing firms in event window (−1, 1) surrounding announcement date, calculated by event study method
ROS	Ratio of net profit margin (net income divided by net sales) at the end of the previous fiscal year
LIQUIDITY	Ratio of current assets minus inventory divided by current liabilities at the end of the previous fiscal year
SIZE	Natural logarithm of total asset at the end of the previous fiscal year
CAPITAL	Ratio of equity divided by total assets at the end of the previous fiscal year
PERIOD	Equals 1 if announcement published in 2015 or thereafter and 0 otherwise

Notes: The table provides a summary of the variables that are included in the model to explain the relationship between the firm characteristics and the average cumulative abnormal returns of rival firms around the stock repurchase announcement date. ROS, LIQUIDITY, SIZE and CAPITAL variables are selected from yearly financial statements from each firm

Table IV.
Definition of variables

Variable	Obs	Mean	SD	Min.	Max.	VIF
ACAR (−1, 1)	201	−0.000561	0.04016	−0.17131	0.19479	
CAR (−1, 1)	201	0.001079	0.099779	−0.58229	0.51401	1.02
ROS	201	0.067120	0.048628	−0.059111	0.246767	1.61
LIQUIDITY	201	1.391796	0.2537793	0.8182508	2.983773	1.82
SIZE	201	26.92221	0.475571	26.35947	28.76402	1.75
CAPITAL	201	0.520825	0.047371	0.376266	0.71538	1.76
PERIOD	201	0.37811	0.486126	0	1	1.66

Table V.
Descriptive statistics of the variables

First, ACAR (−1, 1) – the dependent variable has a negative mean of −0.000561. The value of this variable has a range from negative to positive, with a standard deviation of about 0.04. Second, CAR (−1, 1) is also similar, ranging from negative to positive, so the mean value is relatively small at 0.001079. Third, the mean of ROS is 0.06712 and the difference between the maximum and the smallest is about 0.3, showing that all companies generated profits in the previous fiscal year. Fourth, the LIQUIDITY mean is 1.391796 and standard deviation is approximate 0.25, which points out that all observations have no difficulty in paying current liabilities. In addition, the mean of SIZE is 26.92221 which is the largest number. The CAPITAL has a standard deviation of 0.0475571 and a mean of 0.520825. Finally, the PERIOD is a dummy variable, so there are only two values of 1 and 0. The PERIOD mean is 0.38, which indicates that there are more stock repurchase announcements before 2015 than announcements in 2015 and thereafter. Moreover, all variables have a VIF of less than 2, indicating that there is no multi-collinearity in the model.

Multivariate results. Overall, when analyzing all firms, the ACAR (−1, 1) of rival firms surrounding the announcement date is affected by the CAR (−1, 1), ROS and LIQUIDITY, with coefficients of 0.1097389, 0.3169544 and −0.0358209, respectively. This is consistent with the expectation while quite different from previous studies (Table VI).

As the CAR (−1, 1) has a positive correlation of 0.1097389 at a 1 percent significance level, it reinforces the hypothesis of "contagious effects." It could be explained that when a firm announces a stock buyback, the stock of not only the announcing ones but the whole industry may be considered as undervalued. As a result, rivals' stock will become more attractive and share prices will tend to increase. The effect of competition also proves that it

has not really influenced the ACAR (−1, 1) of rival firms in Vietnam in the period 2011–2017. The CAR (−1, 1) is relatively large, so it seems that the response of the announcing firms will have a strong impact on the reaction of rival firms. The results are consistent with the study's expectation as well as many previous studies, such as the Akhigbe and Madura (1999) study of banking firms and Chang *et al.* (2005) study of Taiwan firms.

ROS which is represented as the profit performance of firms is positively correlated with the ACAR (−1, 1) of rival firms with a coefficient of 0.3169544 at a 1 percent significance level. This suggests that rival firms with high ROS, have more chance to be affected by stock repurchase announcements. This result is consistent with the expectation, but is however, different from previous studies. While the prior studies did not give results with statistically significant coefficients, in Vietnam the coefficient is very significant, indicating that investors do pay attention to the profit performance of firms.

LIQUIDITY variable shows a negative relationship with the ACAR (−1, 1) of rival firms, with a correlation coefficient of −0.0358209 at the 5 percent significance level. The results are similar to expectations, which means that when rival firms have a high liquidity level, they will be less affected by the share buyback. It could be explained that a good ratio of quick liquidity shows the stable financial position of firms and therefore they are less affected by external events. This result is different from previous research such as Zhao (2014).

SIZE, CAPITAL and PERIOD are correlated to the ACAR (−1, 1) of the rival firms with the coefficients of −0.0013928, −0.0344446 and 0.0105852, respectively. However, these results are not statistically significant, which is different from previous studies such as Zhao (2014) or Akhigbe and Madura (1999). While most prior studies indicated statistically significant results, with the sample of firms in Vietnam, it is hard to draw the conclusion that these factors have influence on the ACAR of rivals surrounding the stock repurchase announcement date.

The model has a F-statistic of 7.63 at the 1 percent significance level, indicating that the model results have a high confidence level. However, the adjusted R^2 coefficient is only 0.1659, which means independent variables explain only 16.59 percent of the dependent variable. However, the results of this regression model may not be fully accurate as there are many confounding events affecting the stock price. In addition, certain differences between the industries may also affect the generality of the results.

In order to evaluate the firms' characteristics influencing the intra-industry effect of stock buyback announcements accurately, the study continues to research the model grouped by industries. Table VII reports the results of the OLS regression model estimating the relationship between firm characteristics and the ACARs of rival firms in event window (−1, 1) surrounding the announcement date in the three groups of consumer goods,

Variables	Expectation	Coefficient	t-statistics
CAR (−1, 1)	+	0.1097389	(4.17***)
ROS	+	0.3169544	(4.69***)
LIQUIDITY	−	−0.0358209	(−2.60**)
SIZE	−	−0.0013928	(0.37)
CAPITAL	+	−0.0344446	(−0.47)
PERIOD	+	0.0105852	(1.54)
CONS		0.0793564	(0.37)
No. of obs: 201	R^2: 0.1909	Adj R^2: 0.1659	F-statistic: 7.63***

Notes: The table presents the results of OLS regression models explaining the relationship between firm characteristics and average cumulative abnormal returns (ACAR) of rival firms in event window (−1, 1) surrounding announcement date for a sample of 201 repurchase announcements from 2011 to 2017. "+" is expectation of positively correlate with ACAR and "−" is expectation of inversely correlate with ACAR. **,***Significant at the 5 and 1 percent level, respectively

Table VI.
OLS regression
explaining the
average cumulative
abnormal returns of
rival firms
surrounding
announcement date

materials and others. In general, the relationship between the independent variables and dependent variables differs among various industries and the expectation. However, the ACARs of rival firms in all sectors have positive correlation with the CARs of announcing firms at the 1 and 5 percent significance levels.

Regarding the consumer goods industry, the ACAR (−1, 1) of rival firms has a statistically significant correlation with the CAR (−1, 1) and PERIOD variables that is different from the whole industry result. CAR (−1, 1) has a statistically significant 0.0794643 at the 5 percent level. The results are the same as expected and prove the hypothesis of the "contagious effect." The ROS, LIQUIDITY, SIZE and CAPITAL are respectively −0.2773936, −0.026651, −0.1232776 and −1.07367 but are not statistically significant. Finally, the PERIOD variable has a coefficient of 0.0454179 at the 5 percent significance level. It means that when comparing the time of announcing share repurchase between before and after 2015, the rival firms have a more dramatic reaction to repurchase announcement. As it is also the only sector that has statistically significant results with the PERIOD variable, it could be explained that the consumer goods industry had a lot of positive impact when Vietnam signed the agreements. However, the F-statistic of the model is only 1.89 at a 10 percent significance level, the adjusted R^2 is 0.0491 and the R^2 is 0.1045 which means the results of the model are not fully reliable.

Rival firms in the materials industry have an ACAR (−1, 1) around the stock announcement date correlating positively with the CAR (−1, 1) and inversely with LIQUIDITY, as is the expectation. Specifically, the coefficient of the CAR (−1, 1) is 0.290645 at a 1 percent significance level, which proves the hypothesis of the "contagious effect." The LIQUIDITY variable is inversely correlated to the ACAR (−1, 1) with the coefficient −0.0536731, at a 5 percent significance level, which is different from previous studies. It indicates that rivals in the materials industry in Vietnam with high ratios of quick liquidity (stable financial situation), are usually less affected by share repurchase announcements. The ROS, SIZE, CAPITAL and PERIOD variables correlate with the ACAR (−1, 1) of −0.1053902, 0.0279153, 0.06288 and −0.0104576, respectively, however, the results are not statistically significant. That the F-statistic of model is 4.58 at the significance level of 1 percent proved that the model results were highly reliable and the adjusted R^2 equals 0.3386, indicating that the independent variables explain about 33.86 percent of the dependent variable.

Finally, for the remaining sectors, including information technology, pharmaceuticals, and energy, the variables that have statistically significant results are the CAR (−1, 1), ROS

Variable	Consumer goods ($N = 104$)		Materials ($N = 43$)		Others ($N = 54$)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
CAR (−1, 1)	0.0794643	(2.17**)	0.290645	(5.00***)	0.2122351	(4.09***)
ROS	−0.2773936	(−0.36)	−0.1053902	(−0.20)	0.3413215	(4.49***)
LIQUIDITY	−0.026651	(−0.67)	−0.0536731	(−1.86**)	−0.0617483	(−2.82***)
SIZE	−0.1232776	(−1.48)	0.0279153	(0.38)	0.0014085	(0.09)
CAPITAL	−1.07367	(−1.15)	0.062885	(1.41)	0.0821099	(0.40)
PERIOD	0.0454179	(2.19**)	−0.0104576	(−0.64)	−0.0045677	(−0.43)
CONS	3.873611	(1.54)	−0.7034971	(−0.35)	−0.0130835	(−0.03)
R^2	0.1045		0.4331		0.4734	
Adj R^2	0.0491		0.3386		0.4061	
F-statistic	1.89*		4.58***		7.04***	

Table VII.
OLS regression explaining the average cumulative abnormal returns of rival firms surrounding announcement date grouped by industries

Notes: This table presents the results of OLS regression models explaining the relationship between firm characteristics and average cumulative abnormal returns (ACAR) of rival firms in event window (−1, 1) surrounding announcement date for grouped by industries (Consumer Goods, Materials and Others) for a sample of 201 repurchase announcements from 2011 to 2017. *,**,***Significant at the 10, 5 and 1 percent level, respectively

and LIQUIDITY (quite similar to the whole industry results). The ACAR $(-1, 1)$ is proportional to the CAR $(-1, 1)$ with a coefficient of 0.2122351 at the 1 percent significance level which proves the hypothesis of the "contagious effect" in Vietnam. The ROS also has a positive coefficient of 0.3413215, at the 1 percent significance level, indicating that firms with high ROS are more attractive to investors and hence, it is easier for them to be affected by repurchase announcements. LIQUIDITY has a negative correlation of -0.0617483, at a 1 percent significance level, which is similar to expectations. Rivals in these sectors, when able to pay off their short-term debt, are less likely to be influenced by a stock buyback. The remaining variables SIZE, CAPITAL and PERIOD are correlated with coefficients of 0.0014085, 0.0821099 and -0.0045677, respectively, but they are not statistically significant. The F-statistic of the model is 7.04 at the 1 percent significance level indicates that the model's results have a high confidence level. The adjusted R^2 equals 0.4061 and the R^2 equals 0.4734, indicating that the independent variables explain more than 40 percent for the dependent variable.

7. Conclusion

This paper aims to examine the effects of share repurchase announcements on the value of rival firms in the same industry by using a sample of 201 open market repurchases announced in Vietnam from 2011 to 2017. With event study, t-test and OLS regression methods, the study finds evidence to prove that there is an ACAR of rival firms when a stock repurchase is announced in the Vietnamese stock market. Moreover, this ACAR round the event date is also affected by firms' characteristics.

Specifically, the event study method is employed to calculate and test the significance of the CAR and ACAR. Its result indicates that the effect of stock repurchase announcement on rival firms in Vietnam is statistically significant and less dramatic than on announcing ones. This effect could be positive or negative depending on the specific characteristics of each industry. However, almost all the results suggest the hypothesis of the "contagious effect."

The study also applies OLS regression to determine some firm characteristics that could affect the ACAR of rival firms in Vietnam in event window $(-1, 1)$ surrounding the announcement date. The first factor is ROS presenting profit performance. It is proved that firms with high ROS would have more chance to be influenced by stock buyback announcements. Second, rival firms having a stable financial situation (high LIQUIDITY – the ratio of current assets minus inventory divided by current liabilities) are less affected by this program announcement. And finally, in particular, the ACARs of rival firms are closely and positively correlated with the CARs of announcing firms. This continues to emphasize that the reaction of rival firms in Vietnam follows the hypothesis of the "contagious effect." In addition, these factors have significant differences among the different industries.

Note

1. StoxPlus Corporation which provides the most comprehensive ready-to-use financial information platform is the leading financial and business information corporation in Vietnam.

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