Dividend Announcements and Stock Market Reaction in Taiwan Market

Abstract

This essay concentrates on measuring the effects of dividend announcement on Taiwan stock market. Based on the dividend signaling theory and agency theory, the announcement is one of the methods that can delivery the inside content to the public under asymmetric information and there is a positive correlation between dividend changes and abnormal returns of the market. In order to observe the association in Taiwan stock market, an event study is constructed to detect the information conveyed in such announcement. However, the findings do not confirm these statements as the effect of dividend announcement is not significant, and the correlation of the announcement and market prices is not positive.

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Introduction

The dividend policy decision of a firm conveys important information from agents or managers to investors or other agents in the market. Loads of researches reveal that there is a positive correlation between dividend changes and market reaction. The two main theories associated dividend policy in previous researches are agency theory and dividend signaling theory. In the viewpoint of agency theory, when dividend increase, the probability of misusing cash flow of a corporate is minimized (Jensen, 1986) and it aligns agents' behavior with the interest of stockholders. In regard to the perspective of signaling theory, agents can send positive messages to market by a generous dividend policy which signals the faith in the future position and prospect of firms. In this case, such signaling is one of the means compensates the mismatch in asymmetric information between agents and investors. This essay is constructed to inspect dividend announcements and analyze if there is any information disclosed to Taiwan stock market.

The main methodology adopted in this study is event study which is widely used in finance, accounting and economics. It benefits from the postulate that given rationality in a marketplace, the prices of equity can immediately reflect the impact of an event, and it would be an empirical procedure to measure an effect of a specific event on the valuation of firms. Such events include regular statements like earning announcements and dividend announcements or unusual cases, for example stock split, merges and acquisitions or even quantitative easing.

The prime objective of this study is to measure the abnormal impact of dividend announcements on the prices of common equities in Taiwan Stock Exchange (TWSE). In order to investigate the fact that disclosures of dividend of firms have some information content and the assumption that the correlation between the dividend changes and price behavior is positive, the dividend increase associated with rise in the value of security and dividend decrease with decline of value are examined.

The rest of this essay is organized as follows: Section 2 reviews the related literature. The statistical model, parameter setting and statistics of the methodology are described in Section 3. Test procedure and empirical results are displayed in Section 4, and Section 5 summarizes and concludes.

Literature Review

The previous studies about the effect of dividend announcement on market behavior are developed from two main theories, dividend signaling theory and agency theory. Bhattacharya (1979), Miller and Rock (1985) and John and Williams (1985) developed the dividend signaling hypothesis and suggest that since agents know more about the firm's prospect dividend payout is a means to relay some information to the market. An alternative explanation of market

reflection to dividend changes provided by agency theory. Easterbrook (1984) and Jensen (1986) indicate that dividend behaves as discipline tool to the agents. By increasing the cash flow to stockholders and reducing the budget available for management, the unprofitable investment decision will lessen. Both theories imply that the market response to dividend variation in the same direction.

With respect to the long history of event study, the first study perhaps is published by PerDolley (1993). He finds that effect of the stock splits on stock prices. The following improvements including market price removing and confound event separating are developed by Mayer and Bakay (1948), Baker (1956, 1957, 1598) and Ashley (1962). Following that, Ball and Brown (1968) and Fama et al. (1969) develop an essential methodology. Ball and Brown take the information of earnings into consideration and Fama et al. studied the influence from dividend from the effects of stock splits. In recent work, Schwert (1981) and Campbell, Lo, and MacKinlay (1997), among others, recommend diversifying away cross-sectional correlation among securities by forming portfolio by firm characteristics and comparing the portfolio return during event window with nonevent period to observe whether a significant difference exists.

This work adopts the event study approach published by MacKinlay (1997) in Taiwan stock market and test whether there is any effect of information content conveyed in dividend announcement on prices of securities in the market.

Data Description

This essay data is on the daily prices of stocks from companies of top 50 market value in TSEC index in 2016, which is a capitalization-weighted index of all listed common shares traded on the Taiwan Stock Exchange (TWSE). The daily data is downloaded from Capital IQ website database, and the dividend announcements of each company in Taiwan are accessed from the website of market observation post system of TWSE. The observations are sampling during 10 years from 2005 to 2015. There are 478 announcements, however, due to equities of some companies are issued on the market less than ten years. Moreover, according to dividend announcing is after market close, the event days are designed to be the days after dividend announcements.

Methodology and Parameters

Event Study proposed by MacKinlay (1997) is the main methodology applied in this study. It can easily construct a measurement to examine the effect on the value of firms involved by an economic event such as issues of securities, mergers and acquisitions and earning announcement. It also takes the idiosyncratic characteristic of a firm into consideration.

The following specifies models, test methods and parameters used in this essay with associated equations implemented by R language dealing with the massive data calculating.

Model for Measuring Normal Performance

The market model is a statistical model adopted which is one of the methods describes the relation of return of the market portfolio to the given security. It is supposed to have a higher ability to detect the event effect by removing the variance of the market and leading to variance reduction of abnormal return with higher R^2. The basis of the model is specified as follows:

$$R_{it} = \alpha_{it} + \beta_{\mathrm{i}} R_{mt} + \varepsilon_{it} \text{ , where}$$

R_{it} = the return on security i in period t
α_{it} = the interception in regression, a constant influenced by market
β_{it} = the slope in regression, variable/explained part contributed by market
ε_{it} = the zero mean disturbance, regarded as an abnormal return

Windows

The testing involves two windows, event window and estimation window. Firstly, the event window is centered at the dividend announcement date which is defined as event day and is labelled as time zero. 5 days before and after the event day, which is marked positive and negative number respectively for these 10 days, and event day constitute the whole event window (t = -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5).
Secondly, the estimation window is regarded as the time slot to calculate the normal return by the market model which is designed to comprise the 120 days before the event window, not overlapping with event window to avoid the parameters of normal return model from the influence of returns around the event.

Abnormal Return, $\overline{AR}$ and $\overline{CAR}$

Given the parameters, $\hat{\alpha}_{it}\ and\ \hat{\beta}_{\mathrm{i}}$, of estimates of the market model, the abnormal returns in the event window can be measured and analyzed. The sample abnormal return is

$$\widehat{AR}_{it} = R_{it} - \hat{\alpha}_{it} + \hat{\beta}_{\mathrm{i}} R_{mt}$$

In order to eliminate the idiosyncratic characters due to particular stocks, the average abnormal return for each day, $\overline{AR}_t$, is calculated in the event window. All abnormal returns of announcement events are aggregated to find the average abnormal returns at each time t with the following formula.

$$\overline{\widehat{AR}}_t = \frac{1}{N}\sum_{i=1}^{N} \widehat{AR}_{it}$$

In addition to $\overline{\widehat{AR}}_t$, the cumulative average abnormal return is calculated to provide long-term information about the impact of events on stock's prices and measure the overall stability of stocks. It is also helpful to prove whether the effect of the event during the event window is exclusively on the event day itself or spreads over a few days before and after the event date.

$\overline{\widehat{CAR}}_T = \sum_t^T \overline{\widehat{AR}}_t$, where

T = the days during event window, i.e. (t = -5, ..., -1, 0, 1, ...,5)

Parametric Test

Here are three tests performed on the study, one parametric test and two nonparametric tests. The parameter test adopted in this study is t-test with cumulative abnormal returns, which asymptotically follows a standard normal distribution under the null hypothesis as follows.

H_0: *There is no statistically substantial impact related to dividend change on the movement of share prices. Therefore, an abnormal return associated with dividend is the consequence of chance.*

and the test statistic is constructed with an average cumulative abnormal return and its variance as the following equation.

θ_1: $\frac{\overline{\widehat{CAR}}_T}{var(\overline{\widehat{CAR}}_T)^{1/2}} \sim N(0,1)$

Nonparametric Tests

The first nonparametric test involved is sign test, which tests the null hypothesis that proportion of positive abnormal return is at the expected level. In other words, this proportion is not influenced by the announcement. Such test is robust to deal with non-normal distribution by a binomial distribution approximating to standard normal distribution.

H_0: *The expected proportion of positive abnormal return is close to 0.5, not affecting by the announcement.*

The corresponding test statistic is established in the following way.

θ_2: $\frac{[p-p^*]}{[p^*(1-p^*)/N]^{1/2}} \sim N(0,1)$

p = the actual proportion of negative abnormal returns in the event window

p^* = expected proportion of negative abnormal returns calculated from the estimation window

N = the number of events happened in corresponding news categories

Another nonparametric test, rank test, is proposed by Charles Corrado (1989). It is observed that after transform each abnormal returns into their corresponding ranks, the under test statistic can provide more powerful test without requiring symmetry of the cross-sectional abnormal return distribution.

H₀: *The expected rank of the event day is (L+1)/2, where*

L = the length of the event window

Under the null hypothesis, the test statistic of no abnormal return on announcement day is

θ₃: $\frac{\frac{1}{N}\sum_{i=1}^{N}\left(K_{i0}-\frac{L+1}{2}\right)}{s(k)}$, where

$$s(k)=\sqrt{\frac{1}{L_2}\sum_{t}^{T}\left(\frac{1}{N}\sum_{i=1}^{N}\left(K_{it}-\frac{L+1}{2}\right)\right)^2}\sim N(0,1)$$

T = the days during event window, i.e. (t = -5, ..., -1, 0, 1, ...,5)

L = the length of the event window

K_{it} = the rank of the abnormal return in the time series of T associated to security i, which $1 \leq K_{it} \leq L$

N = the total numbers of securities' events in this study

Empirical analysis and findings

This experiment starts with measuring the normal return for each event, i.e. dividend announcement. With the sample data for each security and market during the estimation window, the market model is used to produce the parameters, $\hat{\alpha}_{it}$ and $\hat{\beta}_{it}$ respectively. These parameters can describe the behavior of security's returns related to market returns and therefore are applied in the model to find the abnormal returns and disturbance of the returns during event window. After the abnormal returns, $\widehat{AR}_{it}$, is reaped, they are added to average abnormal return, $\overline{AR}_t$, to eliminate the nonsystematic portion of securities. As cumulative abnormal return allowing a more accurate assessment of the stock's true worth, finally, the average cumulative abnormal returns, $\overline{CAR}_T$, are aggregated with the average abnormal returns.

Moreover, basing on the assumption that dividend announcements convey information to investors and they would preform buy and sell transaction according to higher than expected dividend associated with increases in value of firms and lower than expected dividend with decreases, each announcement is categorized into one of the three types: good news, no news and bad news to catch this association. If the actual dividend is higher than the previous year one the announcement is regarded as good news, and if the actual is lower than the previous year the announcement is designated as bad news. Those announcements with a dividend equal to the previous year are typed no news.

The content of dividend sample data processed by the described procedure illustrates the connection between sample abnormal residuals and the announcements. Table 1 shows 478 event observations are averaged across by the abnormal returns as well as cumulative abnormal returns for the three event categories. Figure 1 presents the plot of cumulative abnormal returns for the three categories of announcements from event day -5 to event day 5. With regard to the parametric and nonparametric statistic test, three kinds of tests are employed to examine the abnormal performances of firms, and the consequences are summarized in Table 2.

Focusing on the day 0, the abnormal return for good news is 0.2965 percent showed in Table1. Given the variation of CAR, 0.000029, in Table2. test statistic value of θ1 for good news results in 1.272472 and the corresponding of p-value comes to 0.20323. It is evident that with 5% significant level, the null hypothesis that the dividend changes do not impact the stock price of firms is not rejected. The announcement events influence less on prices of the kind of news. The same story happens to the no news category with p-value 0.32882, which is as expected that the prices should maintain at the same level on the event day. On the contrary, the statistic test reveals that the prices response to the announcement of bad news with p-value 0.00056. As would be expected, there is some effect of dividend announcement on the abnormal return of bad news category.

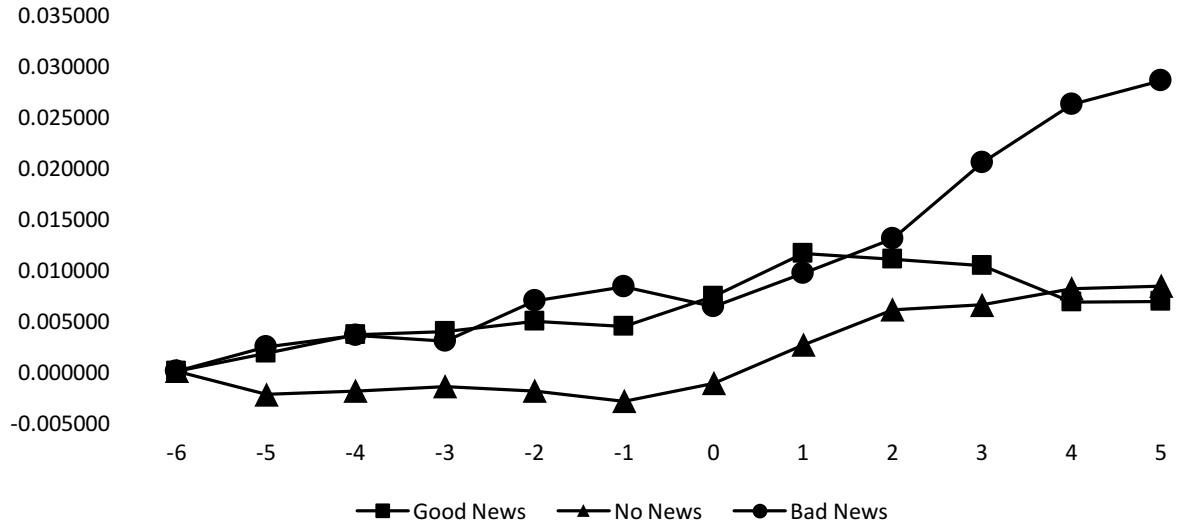
Table 1. Abnormal Returns for Good/Bad/No News

	Good News		No News		Bad News	
Day	AR	CAR	AR	CAR	AR	CAR
-5	0.001778	0.001778	-0.002264	-0.002264	0.002418	0.002418
-4	0.001812	0.003590	0.000329	-0.001935	0.001087	0.003505
-3	0.000326	0.003916	0.000454	-0.001480	-0.000563	0.002942
-2	0.000989	0.004905	-0.000447	-0.001928	0.003979	0.006921
-1	-0.000506	0.004399	-0.001024	-0.002951	0.001372	0.008293
0	0.002965	0.007364	0.001775	-0.001176	-0.001924	0.006370
1	0.004231	0.011595	0.003775	0.002599	0.003272	0.009642
2	-0.000599	0.010996	0.003440	0.006039	0.003388	0.013030
3	-0.000653	0.010343	0.000494	0.006533	0.007477	0.020507

4	-0.003536	0.006807	0.001590	0.008122	0.005705	0.026211
5	0.000019	0.006826	0.000262	0.008384	0.002336	0.028547

From the Figure 1., the CAR line graph presents that in the good news category, the abnormal returns do not vary significantly to delivery enough evidence of the announcement effect on the valuation of corporates, although it increases in as the same direction as dividend change on event day. In comparison, the bad news abnormal returns decline on event day and then the reaction is spread during the last half days of event window to reach 2.8% in the opposite direction as would be predicted.

Figure 1. Cumulative Abnormal Return for Dividend nnouncement



In contrast to the parametric test, the both of nonparametric tests display different consequences. In sign test, the statistics, θ2, found in Table2 shows that there is indeed an effect of the announcement on the securities' prices and reject the null hypothesis for each category with p-value small far from the significant level, 0.05. This is explained by that the deviation of the negative proportion of actual abnormal return from the expected, 0.47~0.48, is at least 0.11 during the event window. This result is contrary to the other nonparametric test. Bank test presents that in spite of high ranks of good news and no news categories in the average returns, the p-value is still not small enough to reject the null hypothesis. This is due to that majority of sample data are clustering in high rank and a few of the sample stay in the bottom rank. Not to mention the bad new category, it stays at the lowest level, not to response to the announcement on the event day.

Table 2. Summary of Statistic Test

	Good News	No News	Bad News

θ1	CAR	0.006826	0.008384	0.028547
	var(CAR)	0.000029	0.000074	0.000068
	Statistic	1.272472	0.976541	3.453237
	P-Value	0.203235	0.328820	0.000556
θ2	P*	0.475000	0.483333	0.483333
	P	0.363636	0.272727	0.181818
	Statistic	-3.447592	-3.674084	-7.703256
	P-Value	0.000568	0.000240	0.000000
θ3	Event Rank	10	8	0
	Statistic	1.040980	1.127804	-1.286441
	P-Value	0.297910	0.259430	0.198319

In brief, the abnormal returns of no new category are as expected, which don't significantly react to the dividend announcements and are supported by t-test and bank test. Although bad category backed by t-test and sign test shows that effect of the event on the prices of equity exists, however, they diverge from the direction of dividend decrease. With reference to the good news, it shows that the event announcement cannot move the prices of the firms, whose null hypothesis is only rejected by sign test and accepted by the others.

Conclusion

From signaling theory and agency theory, dividend announcement is regarded as a one of the means to relay information of firm's future prospect and a tool to discipline agents. In order to capture the association in Taiwan stock market, the event study proposed by MacKinlay (1997) is applied which considers removing the market effect from abnormal returns and diversifying away corporate idiosyncrasies. Additionally, the positive correlation of dividend changes and abnormal returns of a portfolio of firms are expected. Nevertheless, in this study, the dividend increases do not be responded by the abnormal returns of good news with strong evidence and the converse direction of price behavior with dividend decrease does not support the above correlation implied by theories which are observed in the returns of bad news. Hence, there is no strong evidence demonstrating the positive connection between dividend announcement and market reaction. This might be attributed to the fact that earnings are leading indicators and cab be used to deduce the dividend in next year so that it reduces the effect of dividend changes on the market. Therefore, isolating the effect of dividend events from earning events would be taken into consideration in the future work.

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