

Market Reactions at the Equity Offerings Announcement: A Short Window Event Study

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This study measures the average abnormal stock returns (AAR) at the announcement of equity issuance of 150 US companies during the period of 1999-2012. The study finds negative average abnormal stock returns which are statistically significant at 1 percent level. It also runs a cross-sectional regression considering AAR as dependent variable and six variables, categorized as security specific, firm specific and macroeconomic variables, as independent variables. The regression outcome shows a significant negative relation between AAR and past average stock returns whereas it shows significant positive relations between AAR and other variables such as change in capital expenditure, firm's profitability and Treasury bill rate.

INTRODUCTION

The events of security offerings are visible and important for firms. Their visibility arises to a certain degree because firms generally raise a large amount of new capital, comparing to their existing capital or asset size (Eckbo, Masulis & Norli, 2007). Past studies, for example, Masulis & Korwar (1986) and Medeiros & Matsumoto (2005), find a key stylized fact that average abnormal stock returns around the date of equity offering announcements are negative. However, majority of the research on the impact of security offering announcement on the stock price cover periods ending in the mid-1990s. Therefore, this study analyses more recent data, which are from 1999 to 2012 for randomly selected 150 US listed companies, to investigate the market reactions and the determinants of abnormal stock return around corporate equity offering announcements.

The study first predicts a negative abnormal stock return upon the announcement of equity offering based on the past studies. Past literatures, for example, Masulis & Korwar (1986) find a negative average abnormal return of -3.25 percent for industrial firms listed in either NYSE or AMEX whereas Cornett et al. (2014) find -1.43 percent for US financial companies over a different sample period. Besides, the adverse selection model of Myers & Majluf (1984), agency theory by Jensen & Meckling (1976), and signalling theory developed by Leland & Pyle (1977) indicate negative stock market reactions around the equity offerings period.

In the next section, the study measures the abnormal stock returns over the windows (-1,0), (0,0), and (0,1) relative to the announcement date of the equity issuance of the 150 sample companies by using Eventus. The outcomes from the test confirm the negative stock price reaction around the announcement day and these results are significant at 1 percent level.

Next, the study focuses on the explanatory variables which may have significant impacts on abnormal stock return around the announcement day of the stock issuance. The study considers six variables which

are categorized as firm-specific variables, security-specific variables, and macroeconomic variables. After checking correlation among the explanatory variables, the study does not find any potential multicollinearity problems. It also does not find any linear heteroscedasticity problems and omitted variable bias in the model. In the subsequent section, the study includes the outcome of the ordinary least square (OLS) regression where it finds that some explanatory variables have statistically and economically significant impacts on the abnormal stock returns.

The rest of the paper explains the explanatory power of the model compared to the results in existing studies and the importance of the research for managers as well as investors to obtain more insight into the magnitude and the determinants of stock price reaction to security offering announcements.

PREDICTIONS ON STOCK PRICE REACTION

Firms usually offer common stock or equity to raise external capital for various purposes such as to finance new projects, retire debts, distribute dividends, and/or repurchase shares. The common stock offerings, however, change the ownership structure of the firms and decrease the firms' leverage, *ceteris paribus*. According to Masulis & Korwar (1986), many empirical studies, for example, Vermaelen (1984), show that management stock ownership and firm values are interrelated and as a result stock prices react to the announcement of stock offerings of the respective firms. In the following segment, this paper mainly analyses three popular models which examine how the stock market reacts when particular companies announce equity issuance.

The adverse selection model of Myers & Majluf (1984) assumes that management has better information on firm's true value than potential investors and at a price based on average quality, high quality firms have less incentive to sell their stocks. Thus, rational investors think that the stocks are overvalued when the firms announce new stock issuance. Consequently, these investors lower their assessment about the stock quality and the stocks face negative returns compared to the returns that would have otherwise been earned if there was no new stock issuance announcement.

Again, the agency theory developed by Jensen & Meckling (1976) indicates that the conflict of interest between management and shareholders is minimized when management holds a larger portion of share of the firm. This is based on the assumption that management seeks to maximize its own utility whereas investors want the share price to be increased. Thus, any stock offering which decreases the percentage of management ownership is predicted to have a negative reaction.

Moreover, the signalling model of Leland & Pyle (1977) predicts that management compared to the outside investors are well informed about the future earnings of the firms and thus large portion of share holdings by the management gives a credible signal about the true value of the firm. Therefore, according to this model, any action which decreases the management ownership of share-holdings gives a negative signal about the true value of the firms.

Masulis & Korwar (1986) examine the stock price changes at the announcement of underwritten common stock offerings and find that average announcement period return for industrial firms and public utilities are -3.25 percent and -0.68 percent respectively. Their findings are statistically significant at 1 percent level. Medeiros & Matsumoto (2005) conduct similar research in the Brazilian stock market and find a negative average abnormal cumulative return of -0.01 percent around the announcement period. Cornett et al. (2014) investigate equity and credit default swap (CDS) market reactions of 129 seasoned equity offerings by 56 US financial companies between 2002 and 2012 and find that the three-day cumulative average abnormal stock return of negative -1.43 percent during the announcement period. They also analyze the reactions for non-financial companies over the same sample period and find that the overall reaction is a loss of 2.87 percent.

All of the above mentioned theories predict that new stock announcement by firms lowers investors' assessment about the quality of the stock, and investors presume that the stocks are overvalued. Thus, the study can predict a negative average abnormal stock return upon announcement of the equity issuance by firms.

MEASUREMENT OF AVERAGE ABNORMAL RETURN

In this study, the abnormal returns are calculated using the following equation.

$$AR_{jt} = R_{jt} - E(R_{jt}) \quad (1)$$

Here, R_{jt} is the continuously compounded common stock rate of return of firm j on day t . Average abnormal return is given by the following equation where N is the total number of sample companies.

$$AAR_t = \frac{1}{N} \sum_{j=1}^N AR_{jt} \quad (2)$$

The study considers the announcement date to be the earlier of the registration date or in some cases the trading day prior to the date when the Wall Street Journal reports the offering. In order to test the prediction, this study uses Eventus to measure the abnormal return around the announcement day of the equity issuance of randomly selected 150 listed US companies. It chooses a market model and reports abnormal returns based on both CRSP-equally weighted and CRSP-value weighted index. The market model is given by,

$$E(R_{jt}) = \alpha_j + \beta_j R_{mt} \quad (3)$$

where α_j and β_j are coefficients of OLS estimates of firm j 's market model parameter and R_{mt} is the continuously compounded rate of return for the CRSP equally or value weighted index on day t .

In this test the study considers 200 trading days in the estimation period since Brown & Warner (1985) indicate 200 trading days' estimation period as standard event methodology. The estimation period in this test ends 60 days before the announcement of equity issuance so that there is no news effect on the normal stock return near the announcement days. The study uses the auto date back and considers stock returns including dividends.

The event period in the test is from -1 to 1 with three different windows which are (-1,0), (0,0) and (0,1) where (0,0) represents the particular announcement day. The Eventus results are reported in table 1. Column 1 and 2 of table 1 report the average abnormal return and Patell Z value respectively when considering CRSP-equally weighted index and column 3 and 4 report the average abnormal return and Patell Z value respectively when considering CRSP-value weighted index for all three windows.

Column 1 exhibits that all three event windows i.e. (-1,0), (0,0) and (0,1) give negative average abnormal returns when considering CRSP-equally weighted market index. All these values are statistically significant at 1 percent level. Similarly, these three windows again give negative average abnormal returns when considering CRSP-value weighted index. Like the previous results, these average abnormal returns are also statistically significant at 1 percent level.

The table also reports the magnitude of the reaction of average abnormal returns in different event periods. It can be seen that the negative reactions in first 2 windows are close to each other whereas the negative reactions in the third window are relatively very high. These coefficients report an economically significant result which may affect the investors' decisions upon their investment choices. The outcomes reported in this table are consistent with the theories and findings of past literatures discussed in previous section. The predicted negative reactions of stock market by researchers such as Jensen & Mecklin (1976), Myers & Majluf (1984) and Leland & Pyle (1977) are evident from this test.

TABLE 1
AVERAGE ABNORMAL RETURNS (AAR) OF THE STOCKS AROUND THE
ANNOUNCEMENT DAY OF NEW EQUITY ISSUANCE FOR 150 COMPANIES

Event Window	Equally Weighted Index		Value Weighted Index	
	(1) (AAR)	(2) (Z Value)	(3) (AAR)	(4) (Z Value)
(-1,0)	-2.99%***	-5.201	-2.86%***	-4.906
(0,0)	-2.62%***	-6.512	-2.57%***	-6.314
(0,1)	-4.31%***	-8.207	-4.20%***	-7.930

Note: *** indicates statistically significant at 1 percent level

CROSS-SECTIONAL ANALYSIS OF THE ABNORMAL STOCK RETURN

Description of the Explanatory Variables

Different theories, for example, adverse selection model developed by Myers & Majluf (1984), agency theory model developed by Jensen & Meckling (1976) etc., predict that equity offering by firms lowers stock prices of the respective firms. According to Masulis & Korwar (1986), many researchers anticipate that the decline is related to the proportional change in share outstanding. Past papers, for example, Jegadeesh (1990), Debondt & Thaler (1985), and Jegadeesh & Titman (1993) state that the past returns of common stocks have significant impacts on the expected future returns. These papers find that past returns of both short-term (less than one month) and long-term (three to five years) are negatively related to future average returns, while intermediate horizon (three months to twelve months) past returns are positively related to the future average returns.

According to Masulis & Korwar (1986), given there is no change in actual shareholding within companies, the percentage change in shares outstanding is negatively correlated with the change in management's fractional ownership of shares¹. This suggests that the value of a firm is likely to decrease in this case, which is consistent with findings from Jensen & Meckling (1976) agency theory and the Leland & Pyle (1977) signalling theory. Based on the theories, stock prices of the firms show negative reaction to the surge in shares outstanding. Besides, combining primary offerings with secondary offerings to sell company shares would result in larger negative stock returns. Thus, it is reasonable to expect a negative correlation between the announcement day stock return and change in share outstanding.

A signalling model developed by Trueman (1986) predicts that capital expenditure increase will be followed by positive stock price reaction. Generally speaking, management may be able to reflect its information to the market through a series of financial variables such as the debt level of the corporation, the fraction of total shares, and the firm's dividend policy. The theory states that the level of capital expenditures can reflect management's private information. Besides, the stock market reacts positively when there is any unexpected capital expenditure announcement by the firms as McConnell & Muscarella (1985) assume that managers are motivated to maximize current share holders' wealth by accepting positive net present value projects. Thus, a positive relation is predicted.

Lewis, Rogalski & Seward (1999) state that investment growth is measured as the change in total asset around the year of the convertible debt security offerings. The study relates this to equity offerings since the equity offerings are sometimes associated with the changes in the fraction of capital structure. It considers long term debt over total assets as one of the firm specific variables. The study predicts long-term debt over total assets to be positively related to the abnormal stock return. Booth, Cornett & Tehranian (2002) include total debt to total assets ratio to measure the degree of leverage and thus agency

conflict. The larger this ratio, the less equity the firm uses and the greater the opportunity for agency conflict to exist. Total long term debt to total assets can act as a proxy for solvency which gives us an idea about the terms on which firms are able to refinance their debt in the future.

In terms of operating income, the study predicts that the return of the operating income is positively related to the abnormal return of the stock. A study conducted by Chu (1997) on Taiwan's stock market reveals that both operating and non-operating income are positively related to stock. The market views non-operating income as a complimentary factor to operating income.

Finally, Alsharkas (2004) also studies the effect of interest rate on stock return over emerging markets and find the same positive relation. Both studies take the Treasury bill rate as the interest rate. Since the dependent variable in the regression model is the abnormal stock return, which is a function of market index and interest rate, and the T-bill is negatively related to the expected future return of the stock, it is reasonable to assume that the coefficient of the T-bill in the regression would be positive.

In order to assess the potential causes of stock price reactions around the announcement day, the study uses a linear regression model. This study selects Ordinary Least Square (OLS) method to estimate the cross-sectional regression where the 2-day cumulative abnormal stock returns² [$CAR_{i(-1,0)}$] around the announcement day of the 150 sample companies have been regressed against 3 different types of explanatory variables. This paper collects the abnormal stock return data from Eventus. The descriptions of the explanatory variables are as follows.

Security specific variables: Two variables considered in the regression model are: (a) average common stock return over pre-announcement three-month period (RET), and (b) percentage change in number of common stock outstanding between one quarter prior and one quarter after the announcement day (Δ SHR) of the equity issuance of all 150 sample companies. All security specific variables data have been taken from CRSP of WRDS.

Firm specific variables: Three firm specific variables are considered in the model and these are: (a) percentage change in the capital expenditure between the year prior and the year after the announcement day (Δ CAPEX), (b) total long-term debt over total asset of the year prior to the announcement day (LTD/TA), and (c) firm's profitability as measured by earnings before interest and taxes of the year prior to the announcement day (EBIT) of the respective companies. These data have been taken from CRSP/Compustat Merged of WRDS.

Macroeconomic variable: In the cross-sectional analysis, average of US treasury rates of last three months prior to the announcement day (TBILL) of the sample companies is considered. The study takes the TBILL data from Fama-French Portfolios and Factors of WRDS.

Multicollinearity, Heteroscedasticity and Omitted Variable Bias Test

In the presence of multicollinearity, the effect of one specific variable on the dependent variable cannot be precisely checked. To test the presence of multicollinearity among the explanatory variables this study chooses, it checks the correlation among them. It also checks the variance inflation factors (VIF) and tolerances of the explanatory variables. The results are reported in Table 2. Moreover, the study also runs separate OLS regressions considering each explanatory variable as dependent variable and rest of the explanatory variables as independent variables³.

Table 2 shows that there is no significant correlation among the independent variables and VIFs of all the variables are between 1.00 and 1.02. Besides, OLS outcome in regression analysis shows that all coefficients are statistically insignificant (lowest p-value is 0.232). Thus, the study finds that there is no multicollinearity among the explanatory variables.

Moreover, to check the heteroscedasticity in OLS regression, the study performs Breusch-Pagan test. It finds the chi-square value of 0.10 (prob> Chi² is 0.7490) which is relatively low. Thus, it can be said that there is no linear form of heteroscedasticity in this model. However, there might be the presence of non-linear form of heteroscedasticity. Therefore, in the cross-sectional regression analysis, the study considers heteroscedasticity consistent standard error to find out the statistical significance of the coefficients of the explanatory variables. This study also performs Ramsey RESET test to check if there is any omitted

variable bias in this model. It finds a low F-value i.e. 0.41 (prob>F is 0.7493) which suggests that there is no omitted variable bias in the regression model.

TABLE 2
CORRELATION AMONG EXPLANATORY VARIABLES AND VIF OF THE VARIABLES

Variables	Correlation						VIF	
	RET	Δ SHR	Δ CAPEX	LTD/TA	EBIT	TBILL	VIF	Tolerance
RET	1.0000						1.02	0.978233
Δ SHR	0.0110 (0.8932)	1.0000					1.00	0.998406
Δ CAPEX	0.1052 (0.2001)	-0.0247 (0.7637)	1.0000				1.02	0.981581
LTD/TA	0.0024 (0.9771)	-0.0027 (0.9734)	-0.0548 (0.5050)	1.0000			1.01	0.993026
EBIT	-0.0323 (0.6945)	-0.0145 (0.8605)	-0.0409 (0.6189)	-0.0301 (0.7150)	1.0000		1.01	0.989595
TBILL	0.1008 (0.2199)	-0.0241 (0.7694)	0.0563 (0.4939)	-0.0577 (0.4831)	0.0782 (0.3416)	1.0000	1.02	0.977480

Note: P-values are given in parenthesis

REGRESSION RESULT ANALYSIS AND THE EXPLANATORY POWER OF THE MODEL

Cross-sectional Regression Analysis

The cross-sectional analysis outcomes of 2-day announcement period abnormal returns are represented in this section. Table 3 shows the impacts and statistical significance of the six explanatory variables which are discussed in section 4.1 on the cumulative abnormal stock returns, $CAR_{(-1,0)}$, around the announcement days of the stock issuance of 150 sample companies.

TABLE 3
OLS REGRESSION OF 2-DAY ANNOUNCEMENT PERIOD ABNORMAL STOCK RETURNS
 $CAR_{(-1,0)} = B_0 + B_1 * RET + B_2 * \Delta SHR + B_3 * \Delta CAPEX + B_4 * EBIT + B_5 * (LTD/TA) + B_6 * TBILL + U_1$

Explanatory Variables	Predicted Sign	Coefficient	P-Value
RET	-	-1.653*	0.093
ΔSHR	-	0.063	0.158
ΔCAPEX	+	0.007***	0.005
LTD/TA	+	0.001***	0.000
EBIT	+	0.000**	0.021
TBILL	+	14.999**	0.025
INTERCEPT		-0.081***	0.000
R ²		0.296	
Adjusted R ²		0.266	

Note: *, ** and *** indicate statistical significance at 10 percent, 5 percent and 1 percent level respectively.

Table 3 shows that average three-month stock returns prior to the announcement day has a negative impact, which is consistent according to the prediction, on the abnormal stock return and it is statistically significant at 10 percent level. Thus, the stock prices decrease more at the announcement of the equity

issuance for the firms whose last 3 months' average return of stocks is higher compared to others and vice versa. It is also economically significant since its perceived impact on abnormal stock return is high as indicated by the high coefficient value. Thus, managers of the respective companies may take this finding into consideration before any new stock issuance decision. Next, even though the study finds a contradictory result from the prediction about the change in share outstanding, the OLS outcome shows that it is statistically insignificant.

Again, from the table above it can be seen that change in capital expenditure, long-term debt over total assets, and firms' profitability which is measured by EBIT have positive impact on abnormal stock returns and these results are consistent according to the prediction. Here, first two are significant at 1 percent level whereas EBIT is significant at 5 percent level. Nevertheless, because of the very little impact as measured by the coefficients of the LTD/TA and EBIT on abnormal stock returns, these two are not economically highly significant. However, managers of the firms should consider the capital expenditure decision prior to the equity issuance as it is economically significant which is indicated by the comparatively higher coefficient value.

Lastly, the table shows that last 3 months' Treasury bill rates prior to the announcement day has a positive impact on abnormal stock returns and it is statistically significant at 5 percent level. Thus, the firms that face a higher 3-month average T-bill rate prior to the new equity issuance, experience higher increases in their stocks' abnormal return at the new stock issuance. This is economically highly significant as indicated by a high coefficient value in the OLS outcome. Thus, managers of the firms may take the T-bill rates prior to the announcement of the stocks into account. The outcome shown in the table for T-bill is also consistent according to the prediction.

Explanatory Power of the Model

Based on the regression results, the study finds R^2 is 0.2960 and adjusted R^2 is 0.2664. Theoretically, the larger the R^2 , the better the model fits the data. In the analysis, the study uses adjusted R^2 , because it takes the degree of freedom and the number of variables into consideration. Generally, the values of R^2 vary wildly in different situations. A large R^2 can be found in time series rather than cross-section research. Compared to adjusted R^2 of 0.008 (Guiking, 2011), the model in this study gets a relatively high adjusted R^2 . The probable reason of the higher adjusted R^2 is that the model selects variables from diversified aspects to get rid of all possibilities of multicollinearity. Selected variables include two security specific variables, three firm specific variables and one macroeconomic variable. Moreover, the study uses Ramsey Reset test and the model is proved to have no omitted variables, thus decreasing the Type I error " α " and increasing the power of test " $1-\beta$ ". Eventually, since the power of explanation is much greater with shorter periods than with longer periods (Brown and Warner, 1985), the study uses as much short period data as it can. In addition, F-value in this regression is 240.57 (prob> F is 0.0000) suggesting all the variables collectively have a significant impact on the abnormal stock return.

RELEVANCE OF THE RESEARCH FOR CORPORATE MANAGERS AND INVESTORS

It is necessary for both managers and investors to obtain more insight into the magnitude and the determinants of the stock price reaction to security offering announcement. In this analysis, the study has taken firm specific, security specific and macroeconomic determinants into consideration which are all available to investors; and it has illustrated the magnitude and the determinants of the stock price reaction to the equity offering. If investors happen to know these determinants or even have a better understanding of the determinants, they might be able to make precise prediction about the stock price after the announcement of equity offering and make profits or avoid losing money. Myers & Majluf (1984) states that issuing equity always reduces a firm's stock price when managers have superior information. Managers undoubtedly know more information about the firm than investors considering that the markets are inefficient. If managers can predict how investors will react to the security offering announcement, it will be easier for them to make the decision about when and how much equity they should offer to avoid a huge price fall.

CONCLUSION

Investigating the stock market reactions at the announcement of any financing events has been a key interest of research among the academicians and the corporate managers over the past many years. This paper investigates the average abnormal stock returns at the announcement of new equity issuance of randomly selected 150 listed US companies. The paper documents a negative average abnormal stock return around the announcement day and these results are statistically significant at 1 percent level. These results are consistent with the past researches such as Mikkelson & Partch (1986), Cornett et al. (2014), etc. The cross-sectional regression finds that past stock returns prior to the announcement day negatively affects stock returns at the announcement of equity issuance and this is statistically significant at 10 percent level. Other explanatory variables which are considered in this paper such as percentage change in capital expenditure, long term debt over total asset, firm's profitability, and T-bill have positive impacts on abnormal stock returns and these variables are significant at different significance levels. However, the study does not find any significant impacts of percentage change in share outstanding on abnormal stock returns even at 10 percent level. Moreover, compared to past researches such as Guiking (2011) the study finds a high adjusted-R² value which is 26.64 percent. The original contribution of this paper includes the stock price reaction at the announcement of equity issuance and cross-sectional study of the abnormal returns with more recent data and wide spectrum of explanatory variables.

ENDNOTES

1. This variable may also act as proxy for offering proceeds, which is the appropriate explanatory variable in Miller and Rock (1985) analysis.
2. CRSP equally-weighted market index is used and 200 trading day estimation period is considered which ends 60 days before the event date.
3. Detail result is not included in the paper.

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