I. INTRODUCTION

One of the most popular financial models for predicting the asset price is the Fama and French three-factor model. The Fama and French model shows that the behavior of stock returns relates to behavior earnings of firm characteristics, which are market, size and value factors. However, during a stock market crash, unexpected events can put more stress on the financial market, and market participants may lose their abilities to assess stock value rationally; as a result, the market price of stocks may deviate from that of rationality. Therefore, it is an opportunity to test whether the pricing model continues to yield the same results or not.

The lesson from the 1987 Black Monday stock market crash indicates that factors other than market fundamentals may have had an effect on stock prices. One of the controversial issues concerning the crash of 1987 is whether the rational expectations are valid when an unexpected event arises. Shiller (1987) asserts that anomalies such as “herding behavior” or “market psychology” tend to appear during the stock market crash period. Therefore, the model , which predicts the asset pricing, may give different results during a stock crash period.

Recent study in Thailand has shown that market risk (*BETA*) during a stock crash period differs from that in a normal period which has a positive relationship between return and risk. Siriphun (2009) finds that the Thailand SET50 stock returns during the day of the stock market crash, a black Tuesday, can be explained by their market risk, which is proxied by betas. Her finding contradicts the finding of Fama and French (1992) which suggests that *BETA* is a weak explanatory variable in stock returns while size and value factors are significant variables used to explain stock returns. Moreover, Siriphun (2009) finds that *BETA* in the crash period has a negative relationship with the stock return, whereas Fama and MacBeth (1973) find a positive tradeoff between return and risk.

The Stock Exchange of Thailand (SET) had two stock crash events which were significantly different. The first event was when the Bank of Thailand implemented capital controls on international investors in 2006. This event is classified as internal policy shock. In another event, the financial crisis in the United States in 2008 spread to the world stock markets. This event is external

contagion. In both events, stock trading was temporarily suspended during the day and the Thailand SET index declined by double-digits in both events.

This study examines whether stocks with different financial characteristics are affected differently in a stock market crash or not by using Thai data. In general, the Fama and French model is used to assess the price of the stock in a normal period. Therefore, we explore the behavior of the model in a stock market crash to find whether this model is applicable or not.

Up until now, no comprehensive study has considered the roles of firm characteristics in explaining stock returns during a crash period. The past studies concerning the relationships between firm characteristics and stock returns are conducted during a normal period. For example, in the Capital Asset Pricing Model (CAPM), a stock's returns are explained by its market risk (*BETA*). There have been many studies that use CAPM during a normal period while in the stock crash period there have only been a few of their studies. Fama and French (1992 and 1993) propose a three-factor capital asset pricing model. In addition to *BETA*, the use of size and the book-to-market ratio as determinants of asset returns are studied. They demonstrate that the size and book-to-market ratio are two significant proxies for risk that can explain asset returns better than using *BETA* alone. Moreover, in the past, many studies attempted to explain the effect of a stock market crash in the aspect of co-movements or volatility transmission between the markets. The studies of Roll (1988), King and Wadhwani (1990), Malliaris and Urrutia (1992), Arshanapalli and Doukas (1993) focused on the impact of stock market crashes on stock returns while in the past the focus was on the co-movements of national stock markets. When we consider the studies in Thailand, there are many empirical studies that test the characteristics of the firm which have an impact on stock returns during normal periods but during a stock market crash period there was no such study.

Our results show that during a crash period, the returns of stocks can be explained differently from the returns during a normal period. Unlike Fama and French (1992), we find that *BETA* is statistically significant in explaining stock returns during a crash period in both events. However, our *BETA* has a negative sign which opposes the sign of *BETA* in the Fama and French three-factor model. In addition, size and value factors have not played important roles in explaining stock returns during a stock crash period which contradicts Fama and French (1992). Apart from the variables

proposed in the Fama and French model, illiquidity has a positive relationship in explaining stock returns during both periods.

In addition, we find that the crash event affects the determinants of stock return. We find different results from two crash events - one from internal policy shock and another from external contagion. During the 2006 event, *BETA*, Book equity to Market equity (*BEME*) and illiquidity played significant roles in explaining the stock market crash in 2006, whereas the 2008 event shows that only *BETA* and long-term commutative return (*LR3*) served as an explanatory factor during this stock market crash.

The remainder of this paper is organized as follows: Section 2 provides the literature review. Section 3 presents a data description and events background. Section 4 describes the methodology. Sections 5 and 6 provide the empirical results and the conclusion, respectively.

II. LITERATURE REVIEW

According to the Fama and French model, the determinants of stock returns came from three factors such as beta, size and value factor. Apart from the Fama and French model, there has been extensive research that suggested that liquidity played an important role in explaining stock returns. As for the studies concerning stock market crashes, there was evidence which showed that during past stock market crashes people behaved differently than their usual behavior. Therefore, it is a good opportunity to test the validity of the Fama and French model and related factors during stock market crash periods.

A. Relationship between the stock return and variables on firm characteristics

Fama and French (1992) have suggested that patterns in the average stock price usually are related to firm characteristics. They focused on two variables: size and book-to-market equity, in observing the cross-sectional variation in average stock returns associated with market beta, size, leverage, book-to-market equity, and earnings-price ratios. The study examined data during the period of 1963-1990. They applied an asset-pricing framework to determine the relationship among average returns, size and book-to-market equity. The results were consistent with the rational asset-pricing

theory. They found that size and book-to-market equity had an ability to describe the cross-section of average stock returns. Thus, the average stock returns were positively related to market beta. Furthermore, Fama and French (1993) concluded that high (low) returns could be observed for companies with high (low) Book-to-Market ratio (BEME), in which it was a result of such companies having high (low) exposure to systematic risk. Similarly, Stattmann et al. (1990) and Rosenberg et al. (1985) discovered that the average return on U.S. stocks are positively related to the ratio of a firm's book value of common equity (BE) to its market equity (ME).

Chan et al. (1991) classified cross-sectional differences in returns on the four variables: earnings yield, size, book-to-market ratio, and cash flow yield. The approach of alternative statistical specifications and various estimation methods were selected as the main methodology. The study used data from 1971 to 1988 from the Tokyo Stock Exchange. The findings disclosed a significant relationship between the four variables and expected returns. Cash flow yield had a positive significant impact on expected returns. The finding was consistent with the "size effect" that small firms could outperform larger firms whereas earnings yield had partial explanatory power to predict stock returns. Stocks with high E/P ratios outperform stocks with low E/P ratios. However, once book-to-market ratio was added to the model, earnings yield tended to have a negative impact on stock returns. Among the four variables, the cash flow and book-to-market ratio had the most significant positive impact on expected returns.

Wang et al. (2009) found that stocks with higher betas, larger capitalization, more liquidity, more volatility and higher returns prior to the event date lose more value in stock market crashes. They found certain firm characteristics to be significant determinants of stock performance in some crashes.

Relative to Fama and French (1992) and Chan et al. (1991), both studies examined the effect of fundamentals to predict future stock returns. Two more variables were introduced into the model: firm size and *BETA* or market risk. The papers claimed that both variables had a significant impact on the fundamentals. However, Wang et al. (2009) used data on the event of a stock crash. They found that beta and firm size are significant but book-to-market ratio is insignificant.

B. Relationship between the stock return and illiquidity

Many studies found significant cross-sectional relations between stock returns and the variability of liquidity. Brennan et al. (2008) asserted that the pricing of illiquidity comes from the sell-side. Allowing for differential price impact on the buy- and sell-sides, they showed that it was the sell-side price impact that was related to future expected returns. The studies of Amihud (2002), Chordia et al. (2000), Huberman and Halka (2001), Huang and Wang (2009) and Pastor and Stambaugh (2002) determined that illiquidity in the market led to high expected returns. Moreover, the study of Chordia, Subrahmanyam, and Anshuman (2001) found that stocks with more volatile liquidity have lower expected returns. In Thailand, Sophonvanitch (2008) found a positive illiquidity during the period from January 1998 to March 2008.

C. Behavior of security around the stock market crash and beta

Unexpected events can create more stress in the market, and market participants may lose their ability to rationally assess the valuation implications of the event. In this direction, a number of papers have examined the security price behavior when uncertainty in financial market increases after dramatic events. The results of most literature suggest that systematic risk had a significant impact on the movement of the stocks. The differences are the manner by which prices react to the event. In some stock markets, the percentage of decline in stock prices is less than the stocks implied historical betas and vice versa.

There have been many studies concerning the relationship between stock and beta. Linmack and Ward (1990) investigated the explanatory power of a number of competing models, including the market model and factor based models. They found that systematic risk had a significant influence on the U.K. stock movement, especially in October 1987, the year a major stock crash occurred. The influences were strengthened when the tests were conducted on portfolio data. Feinberg and Tokic (2002) used the 30 DJIA to study how stocks reacted by using two extreme single-day declines in stock prices during the Asian crisis on September 1, 1998 and on September 11, 2001.The stocks systematic betas are significantly explanatory as to the percentage decline in stock prices. The stock with higher betas decreased more in a single day than those with lower betas. Also, they found that

stocks with higher betas increased in value more quickly in the stock market than did stocks with lower betas.

The reaction of the S&P 500 stocks to the market crash on Black Monday, October 19, 1987 appeared to be something between efficiency and irrationality (Harris & Spivey (1990)). When unexpected events arise, some kinds of irrational behavior may appear. Kryzaowski, Switzer and Jiang (1995) investigated the abnormal return, volatility, and residual risk premium behavior of portfolios during the Canadian Stock Market Crash of 1987. One of their findings was that the performance of beta-sorted portfolios over various time intervals around the crash was inversely related to systematic risk. Also, Bohl and Siklos (2005) used DJIA data in the period of 1915 to 2004 and their hypothesis was that positive feedback trading behavior plays a role during crashes. Selling in a falling market could result from extrapolating expectations about stock prices or trend chasing. Both studies supported the hypothesis that positive feedback trading behavior played a role during crashes. Furthermore, Shiller (1987) investigated the behavior of investors during the October 1987 U.S. stock market crash by using these same surveys. He sent out questionnaires at the time of the October crash and found that no news or any other economic fundamental event appeared to be immediately responsible for the market downturn. He suggested positive feedback trading and herding behavior among stock market investors during crash periods.

The study of Siriphun (2009) was conducted by using evidence from the Thai Stock Market. She asserted that the fundamental characteristic of stocks as measured by their betas is a significant explanatory variable to the magnitude of securities price drops on Black Tuesday, regardless of the time period used to estimate betas. Aktas and Oncu (2006) tested the Turkish Stock Market Crash which had market similarities similar to the Thai markets as both are categorized as emerging markets. They also determined that betas are a significant explanatory variable of stock returns during the day of the crash. However, there was no clear evidence concerning under-priced or over-priced stock returns.

[Table 1 is here]

III. METHODOLOGY

In order to find which factors affect the return in stock market crashes, we use firm characteristics as explanatory variables. We adopt the methodology from Wang et al. (2009). In their study, they describe that returns on the crash date depend on firm characteristics. The determinants of returns of stocks for a one-day event window are calculated according to the Fama and French three-factors model.

In the Capital Asset Pricing Model (CAPM), an asset's risk consists of the company's unspecific risk, which can be eliminated through diversification, and systematic risk, which cannot be diversified away. Systematic risk or Market risk, measured by *BETA*, is the contribution of an asset to the riskiness of a well-diversified portfolio. Because systematic risk cannot be eliminated by diversification, investors require a market risk premium to compensate for bearing the risky assets. *BETA* measures the volatility of the returns on the asset relative to that of on-the-market portfolio. Therefore, we use *BETA* as an explanatory variable in the regressions in order to determine whether stock returns are affected by *BETA* during a stock market crash. *BETA* is computed from the model of Scholes and Williams (1977) by using historical daily returns from two years prior to the date of the event.

As for other factors, Fama and French (1992 and 1993) present a three-factor asset pricing model. In addition to *BETA*, they use size and the book-to-market ratio as determinants of asset returns. They demonstrate that size and the book-to-market ratio are two significant proxies for risk that can help explain asset returns more clearly than using *BETA* alone. Furthermore, Miyajima and Yefeh (2007) and Jiang and Lee (2007) found that firm size and market-to-book ratio play a significant role in determining the performance of the firm. Therefore, we also use *SIZE* and the book-to-market ratio (*BEME*) as explanatory variables in the regressions in order to find whether or not these variables influence stock returns during a stock market crash. In our study we define *SIZE* as the logarithm of the firm's market capitalization. *BEME* is the book value of the firm's equity divided by its market value.

Apart from the CAPM and the Fama and French three-factor model, Amihud et al. (1990) and Chordia, Subrahmanyam,and Anshuman (2001) showed that the decrease in liquidity leads to high expected returns and a decline in stock prices. Therefore, liquidity has an effect on stock return. As for the proxy for liquidity, the studies of Rouwenhorst (1999), which used data from twenty emerging markets during the years 1982 to 1997, suggested that turnover cannot explain the difference in average returns in an emerging market. In contrast, Lesmond (2005) examined five common liquidity measurements of emerging markets including Thailand. He suggested that on average the Amihud illiquidity ratio is a better proxy than turnover which is insignificant in his study. Therefore, we use the illiquidity measurement from Amihud (2002) as the explanatory variable. *ILLIQ* is computed as the average daily absolute price change, $|r_i|$, divided by trading volume.

$$ILLIQ = \frac{\sum_{t=1}^{T} \frac{|r_i|}{Volume_i}}{t} * 10^6 \quad (1)$$

Where,

$|r_i|$ = stock's *i* daily absolute return change

$Volume_i$ = daily volume in baht

t = number of days

$i = i^{th}$ stock during the events

When the stock return considerably changes in response to trading value, such a stock is considered to be relatively illiquid and vice versa. In other words, the returns of the stock with high *ILLIQ* have greater change in response to trading value compared with that of the stock with low *ILLIQ*.

We also test the validity of pricing behavior during stock market crash events. According to the efficient market hypothesis (EMH), investors would not be able to make excess profits based on past return information. In order to observe pricing behavior, we use the lagged of the stock returns as an explanatory variable in order to observe momentum and reversal pattern during a stock market event. Momentum effect is stock prices that tend to move in the same direction as before, whereas

reversal effect is stock prices that tend to reverse themselves. In the regression, we use the LR1 (Lagged return 1) which is the cumulative return from -7 to -2 day before the crash event, LR2 (Lagged return 2) which is the cumulative return from -70 to -2 day before the crash event, and LR3 (Lagged return 3) which is the cumulative return from -756 to -2 day before the crash event to capture the short-term and long-term momentum and reversal effects in the stock crash event.

Therefore, the returns (RET_i) of the stocks for the one-day event window can be written as a function of variables which come from firm characteristics from the Fama and French three-factors model and related factors as the following linear regression:

$$RET_i = \beta_0 + \beta_1 BETA + \beta_2 SIZE + \beta_3 MVBV + \beta_4 ILLIQ + \beta_5 LR1 + \beta_6 LR2 + \beta_7 LR3 + \varepsilon_i \quad (2)$$

Where,

RET_i= stock returns on the event date

β_0 = intercept

BETA= the CAPM beta of the stock computed returns data for 2-year period prior to crash date

SIZE= logarithm of the firm market capitalization [unit : million baht]

BEME = the book-to-market ratio (book value of equity/market value of equity)

ILLIQ= illiquidity measure of Amihud (2002) [unit : percentage/million baht]

LR1 = Lagged of cumulative return of SET50's stocks in period 1 (-7 to -2 days before event date) [unit : percentage/million baht]

LR2 = Lagged of cumulative return of SET50's stocks in period 2 (-70 to -2 days before event date) [unit : percentage]

LR3 = Lagged of cumulative return of SET50's stocks in period 3 (-756 to -2 days before event date) [unit : percentage]

$\beta_1,...,\beta_7$ are parameters to be estimated

The result of this method helps us to determine whether or not the behavior of investors during a stock crash period is rational. It also reveals to us which factors over-react or under-react to incoming information during the stock crash period.

IV. DATA

Our sample for each event consists of Thailand's SET 50 Stocks, which are the stock prices of the top 50 listed companies in the Stock Exchange of Thailand in terms of large market capitalization, high liquidity and compliance with the requirements regarding the distribution of shares to minor shareholders. We obtain the stock returns data from SETSMART database and the financial statements data from the annual report of the company.

In general, people define a stock market crash as a dramatic decline of stock prices in which the percentage decline in a stock market index commonly reaches double-digits across a significant cross-section of a stock market. During a Stock Market Crash, people tend to get panicky and sell off their shares. According to BusinessDictionary.com, the first definition of a stock market crash is "precipitous and rapid decline in the prices of shares traded on a stock exchange, caused by panic selling. Stock market crashes are triggered typically by loss of investor confidence after an unexpected event, and are exacerbated by fear. They are usually preceded by a period of prolonged and high inflation, economic or political uncertainty, or hysteric speculative activity. They bring normal economic activity to a halt, wipe out the savings of millions of investors, and bring widespread misery in their wake, especially for the weaker and vulnerable sections of the society". The second definition is "a situation in which a stock market experiences a sudden and major decline in the prices of its underlying stocks. A stock market crash could be brought about by the collapse of a speculative bubble, a financial crisis or an economic crisis. The severity of a stock market crash depends on both the underlying financial events that precipitated the problem and the pressure placed on the stock market by investors reacting to negative news". Therefore, we define a stock market crash as a one-day decline of 10% or more which triggers the SET circuit breaker in the daily value-weighted market index returns.

To reduce the chance that missing data might affect our analysis, we also require that a firm have valid stock returns for the estimation period, -252 to -30 days prior to the event date. Our financial statements data for each event date are obtained from the firm's year-end financial statements for the prior year. Firms with missing financial data are excluded from the sample. In our sample, we exclude some companies from our analysis. This is due to mergers and acquisitions which result in their financial data being difficult to ascertain. A one-day event window is used for all the events in which the stock returns decrease more than 10 percent in one day on the event day.

There were two stock market crashes from April 30, 1975 to December 31, 2008:

Crash Date	% Index Decline
December 19, 2006	- 14.84 %
October 27, 2008	- 10.50 %

The description statistics of the variables used in the study are presented in table 2. Stock returns are normally skewed to the right during normal periods. The mean return losses in the table 2 are lower than the value-weighted-index (SET index) in both events. This implies that larger firms should be affected less than smaller firms.

[Table 2 is here]

Our events deal with two stock market crashes. There are different reasons for the two stock market crashes. In the first event, stock market crash of 2006, Bank of Thailand implemented capital controls on international investors. Another event, the stock market crash of 2008 was connected to the financial crisis in the United States which had spread to the world's stock markets.

During the stock market crash of 2006, the Bank of Thailand imposed an unremunerated reserve requirement on short-term capital inflows which financial institutions were required to withhold 30% of foreign currencies bought or exchanged against the Thai Baht, except those related to trade in goods and services, or repatriation of investment by Thai nationals abroad. As a result, the Thai Stocks Index (SET Index) experienced an historic fall. The Stock Exchange of Thailand (SET) had activated the Circuit Breaker to temporarily stop stock trading after the SET index fell more than 10% in value by numerous selling orders from panicked investors.

During the stock market crash of 2008, due to the failures of large financial institutions in the United States, many of the world's stock exchanges experienced the worst declines in their history, with drops of around 10% in most indices. This is due primarily to the exposure of securities of packaged subprime loans and credit default swaps issued to insure these loans and their issuers.

In table 3.1 and 3.2, we rank the firm characteristics by the returns. In our analysis we define groups of stocks from the bottom of the sample 30% as "Low" and the top 30% of the sample as "High." We found that during the stock market crash of 2006, the High return group has Low *BETA*, High *BEME*, Low *SIZE*, and High *ILLIQ*, while the low return group has High *BETA*, High *SIZE*, and Low *ILLIQ*. During the stock market crash of 2008, the High return group has Low *BETA*, and High *ILLIQ*, while the low return group has High *BETA* and High *SIZE*.

[Table 3.1 and 3.2 is here]

V. EMPIRICAL RESULT

We performed multivariate linear regression analysis. Our results can be seen in table 4. The F statistics for both regressions are statistically significant at the 1 percent level. R-squared are 0.8977 and 0.3738 respectively. We tested the heteroskedasticity by using Breusch-Pagan test. The results from both equations show that the p-value of both equations exceed 0.05. Therefore, we do not reject a null hypothesis of a constant variance. Our regression has no heteroskedasticity problem. In table 5.1 and 5.2, the Pearson correlation coefficients between the variables are presented and the variable inflation factor (VIF) test is used for testing multicollinearity. The results show that no variable has a VIF of more than 10. This indicates that there is no major multicollinearity problem with the variable used in the regression.

Our results show that the coefficient estimates for *BETA* is -0.1726 and 0.0242 during the periods of the crash in 2006 and 2008 respectively. *BETA* is significantly different from zero at the 1% level. The negative sign of *BETA* means that stocks with higher betas have greater losses and those with lower betas have smaller losses during stock market crashes.

Our findings contradict the study of Fama and MacBeth (1973) which find a positive tradeoff between return and risk, and Fama and French (1992) which suggest that *BETA* is a weak explanatory variable used to explain stock returns. Nevertheless, our result is similar to that of Markowitz (1959). He indicated that investors' responses to a downside risk are different from those responses to the total market risk. In other words, investors are risk averse. Therefore, beta during a crash period should be different than that of during the conventional period.

SIZE had coefficients of 0.0139 and -0.0093 during the crash in 2006 and 2008, respectively. However, each is not significantly different from zero at the 5% level. It means that percentage change in size is not correlated with the stock returns.

Fama and French (1993) used data from Hong Kong, Malaysia and the Philippines. They found that small-sized stock generates higher returns than large-sized stock. This is due to the fact that small firms have a more limited ability to acquire capital. Thus, investors require higher return to compensate their risk. Similarity, Lo and MacKinlay (1990) and Richardson and Peterson (1999) found that large firm returns lead small firm returns and large firms respond faster to new information compared with small firms.

BEME had coefficients of 0.0139 and -0.0093 during the period of the crashes in 2006 and 2008, respectively. During 2006, *BEME* was significant at the 10% level while during 2008 *BEME* was insignificant. The positive sign of *BEME* shows that value stocks have higher returns than growth stocks. During a crisis, value stocks outperform growth stocks because value firms have more of an ability to withstand losses when compared with growth firms.

Our results are similar to those of Fama and French (1993). Also, Stattmann et al. (1990) and Rosenberg et al. (1985) discover that the average return on U.S. stocks are positively related to the ratio of a firm's book value of common equity (BE) to its market equity (ME). Therefore, *BEME* can explain stock return in both normal periods and crash events.

Apart from variables from Fama and French, illiquidity is also an important variable in explaining stock returns. Our results find that illiquidity (*ILLIQ*) had a coefficient of 0.0001 and 0.0001 during the periods of the crash of 2006 and 2008, respectively. Only the coefficient in 2006 is positive significant at the 10% level. Thus, high illiquidity stock returns decreased less than those of

low illiquidity stock during the crash of 2006. The positive sign of the regression coefficient for *ILLIQ* indicates that illiquid stocks lose less value in stock market crashes.

Our findings are similar to Sophonvanitch (2008) who found a positive illiquidity by using Thai data during the period from January 1998 to March 2008. Wang et al. (2009) suggest that stocks with a higher illiquidity ratio appear to respond to market news slower than stocks with a lower illiquidity ratio. Amihud and Mendelson (1986), Amihud (2003) Pastor and Stambaugh (2003) assert that investors need higher returns to hold illiquid assets. They suggest that illiquidity is a risk that requires higher compensation. In contrast, liquidity can be viewed as risk-reducing, and investors will therefore be more willing to hold assets that have greater liquidity.

As for the cumulative returns, *LR1* had coefficients of -0.1930 and 0.0893 during the time of the stock crash in 2006 and 2008. Unfortunately, the estimated results were insignificant in both periods; thus, changes in the cumulative return within a week before a crash (*LR1*) did not correlate with the stock returns. *LR2* had coefficients of -0.0065 and 0.0793 during the period of the crashes of 2006 and 2008, respectively. Again, the results were insignificant in both periods; thus, change in cumulative returns within a quarter before a crash (*LR2*) did not correlate with the stock returns. *LR3* had coefficients of 0.0042 and 0.0698 in 2006 and 2008, respectively. During the 2008 crash, *LR3* was positively significant at the 10% level. During the two-year period prior to crash of 2008, stock that had higher returns lost its value less than that of lower returns. It suggests that those stocks that performed better during the two-year period prior to the crash continued to perform well during the crash. Those stocks had higher cumulative returns and suffered fewer losses in the crash. Therefore, we have a momentum effect in this event.

Lakonishok et al. (1992) and Grinblatt et al. (1995) assert that the momentum effect is a result of herding behavior. A predictable return behavior implies that markets are inefficient. Barberis et al. (1998), Daniel et al. (1998), Hong and Stein (1999), and Grinblatt and Han (2005) interpret the price momentum and reversal as the result of either under reaction or overreaction.

Our finding indicates that firm characteristics are affected differently during stock market crash periods. We find *BETA* is a highly significant explanatory variable in stock returns, whereas size and value factors are weak variables when used to explain stock returns. Moreover, our findings show

a negative relationship between stock return and *BETA*. *SIZE* is not related to stock returns. However, Fama and French find average stock returns are positively related to *BETA*. The largest firms have the lowest returns, and the value firms yielded the lower return. *BETA* is a weak explanatory variable in stock returns while size and value factors are significant variables used to explain stock returns. Homsud et.al (2009) suggested that the Fama and French three-factors model can explain risk in stock returns better than CAPM's beta in The Stock Exchange of Thailand. Nevertheless, some variables such as illiquidity have the same sign in both periods.

In addition, we find that different events yield different effects on the determinants of stock return. We find different results from two crash events - one from internal policy shock and another from external contagion. During the 2006 event, beta, Book equity to Market equity (*BEME*) and illiquidity played significant roles in explaining the stock market crash in 2006, whereas the 2008 event shows that only beta and long-term commutative return (*LR3*) served as explanatory factors during this stock market crash. An unremunerated reserve requirement on short-term capital inflows during the 2006 event may force foreign investors to sell their stocks. Therefore, they may sell overpriced stocks (low *BEME*) and liquidity stocks in order to protect the value of their portfolio. The 2008 global stock crash originated from the collapse of financial institutions in the United States. Many governments took actions to rescue themselves from such a crisis. Hence, the exposure of the U.S. financial collapse was limited to certain sectors. Investors had time to prepare themselves for this event.

VI. CONCLUSIONS

This study examines whether stocks with different financial characteristics are affected differently in a stock market crash. We study this issue in two crash events by using data based on stocks listed on the SET50 index in Thailand. The first event is an internal shock caused by capital control policy while the second event is external contagion from the global financial crisis.

We find that the crash event affects the determinants of stock return. We find different results from two crash events - one from internal policy shock and another from external contagion. During

the 2006 event, *BETA*, Book equity to Market equity (*BEME*) and illiquidity played significant roles in explaining the stock market crash in 2006, whereas the 2008 event shows that only *BETA* and long-term commutative return (*LR3*) served as explanatory factors during this stock market crash.

We also found that in the stock market crash period, a financial model may operate differently from the normal period. Our results found that *BETA* is a strong explanatory variable in a stock market period while size and the value factor are not. This is different from the Fama and French model in a normal period.

The limitation of this study is that the SET 50 is composed of companies with large market capitalization and high liquidity. We suggest that further studies can expand the data set to cover the listed stocks on the Stock Exchange of Thailand. More coverage data will improve accuracy.

Furthermore, this model can be applied to find a strategy which can analyze the benefits of the signal from firm characteristics during the stock crash event.