THE MARKET PRICING OF ANOMALOUS WEATHER: EVIDENCE FROM EMERGING MARKETS

[INCOMPLETE DRAFT]

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ABSTRACT

The paper examines impacts of the weather on emerging stock markets. In our previous study, we found that “Halloween effect” or “Go away in May come back Halloween Day” in the Vietnam stock index (VN-index) were statistically attached to the rainy season during the observed period from 2000-2010 inclusively. There was a significant negative correlation between average monthly rainfall measures and mean monthly stock returns indicating that rain could be an explanation. This research is expanded to emerging markets to determine if there is a cause and effect relationship between rainfall levels and stock returns during observed periods, which gives investors an opportunity to hedge weather related risks with weather derivatives.


KEY WORDS: Weather derivatives, seasonal effects, anomalous weather, and market efficient hypothesis.

JEL: G11, G14.

INTRODUCTION

Previous studies found evidences that weather had impacts on the behavior of investors. Researchers have constructed different models to explained correlation between stock market returns and effects of weather on investors’ decisions. In the others words, they hypothesize that weather impacts on investors’ mood; therefore, trading activities are also affected by behavioral changes. Unlike previous studies where researchers have tried to determine correlations between human moods impacted by the weather factors and stock market returns, this study will examine whether anomalous weather itself impacts on market pricing in SET. If so, what are explanatory variables for the correlation? We posit that emerging-markets economies and stock markets may be influenced by the rainy season when monsoons and even typhoons and flood are an even-present threat, which could be possible explanation that we have not found in previous studies.

LITERATURE REVIEW

Efficient Market Hypothesis (EMH) is one of the important conceptual hypotheses to applied finance. EMH holds that it is impossible for investors to make consistently excessive returns because financial markets make efficient use of available information in reflecting market
movements. In the other words, such information will be already incorporated in asset prices; therefore, markets always tend to stay at equilibrium itself (“Efficient Market Hypothesis” 2008). However, the existence of seasonality in stock returns appears to violate the hypothetical assumption about EMH. Nageswari and Selvam (2011) stated that such the presence of seasonality including Halloween effect, January effect, and ‘Day of the Week Effect’ in stock returns violates especially weak form of EMH because investors can predict and time the markets based on the past patterns and historical data. By observing past patterns, investors and market participants may devise trading strategies and making abnormal profits. For instance, buying on Mondays and selling on Fridays or ‘Selling in May and go away until Halloween day’ are trading strategies for investors to make excess profits in stock markets. An empirical study done by Bouman and Jacobsen (2002) found that Halloween effect appeared across 36 stock markets in the total of 37 countries including Argentina, Austria, Australia, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Italy, Japan, Jordan, Korea, Malaysia, Mexico, Netherlands, Norway, Philippines, Portugal, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, The United Kingdom, and the United States. The results became more attractive when they found that November-April holding period had a slightly smaller return standard deviation than May-October period. That is, investments were relatively less risky as investors held securities during November-April period. Maberly and Pierce (2003) documented Halloween effect in Japanese equity market over prior years of the mid-1980s. However, the Halloween effect was strongly evident over a bull market observed in the data set (Maberly and Pierce, 2003).

Tax-loss selling hypothesis is trading strategy that market participants use to predict market movements. Stock selling pressure peaks at high level as investors try to sell their securities in order to reduce taxable incomes and net capital gains. As a result, stock prices decline during the end of the year period and rebound in January. That makes trading volume abnormally high in December and high returns in January. A study done by Starks, Yong, and Zheng (2007) indicated that the average January return for municipal bond closed ended funds was 2.21% as compared to the average return of -0.19% for the other 11 months of a year over 1990 to 2000. Gultekin M. and Gultekin B. (1983) documented that significantly large mean returns were found at the turn of tax year stock markets observed in 18 countries. Remarkably, January was the month with high return. However, in examining seasonality of stock monthly returns, Fountas and Segredakis (2002) tested eighteen emerging stock markets for the period 1987-1995 including Thailand and found that January effect and tax-loss selling hypothesis were not statistically supported in stock markets being observed. In the other words, the result supported the existence of EMH those stock markets.

Monthly temperatures of cities where stock exchanges are located may influence seasonality of monthly stock returns. Since weather affects psychologically the moods and attitudes of investors, which influences on their behavior and how they make financially trading decisions. Keef and Roush (2007) examined three dimensions of weather in Australian stock indices including S&P/ASX 20 and S&P/ASX 300. They found that daily wind speed and daily level of cloud cover had no effects and relationship to seasonality of stock returns. However, their findings indicated a negative relationship between the returns of the two indices and the temperature in Sydney. Cao and Wei (2005) also documented significant results of potential linkage between temperature and stock returns while examining nine international indices in
eight financial markets included Asian countries such as Japan and Taiwan. They found that the higher stock returns were associated with lower temperature due to regressive risk-taking and vice versa. Like previous studies of seasonality in stock index, our study examines whether evidences of abnormal returns due to seasonality are found in the Thai stock index since the stock exchange was established.

DATA

We collect historical monthly returns for SET index from Quandl Beta dataset during the observed period from May 1975 through December 2013 inclusive to conduct statistical analysis. Monthly returns are calculated as demonstrated in the following equation:

\[
\text{Monthly Return} = \frac{\text{Current month last day closing price} - \text{Prior month last day closing price}}{\text{Prior month last day closing price}}
\]  

(1)

We posit rainfall levels and precipitation in Bangkok where the stock exchange is located as a factor affecting on monthly returns for the market. Monthly total precipitation data for Bangkok was collected from National Climatic Data Center (NOAA) from 1975 through December 2013.

METHODOLOGY

To detect seasonality in the Thai stock index, we use linear regression analysis to determine if any evidences of abnormal monthly returns exist in SET index. In this paper, we use Brauer and Chang’s (1990) model:

\[
R_t = \sum_{i=2}^{12} \alpha_i D_{it} + \mu_t + \alpha_1
\]  

(2)

Where \( R_t \) is the return on SET index in month \( t \), \( D_{it} \) is a dummy variable which takes the value 1 if the month is \( t \)th and zero otherwise, and \( \mu_t \) is an error term. The estimate of the intercept coefficient \( \alpha_1 \) represents the rate of return for January. Finally, \( \alpha_t \) represents the coefficient for the month \( t \)

The second model we use in our examination to test Halloween effect comes from Lucey and Zhao’s (2008) model:

\[
R_t = \alpha + \beta W_t + \mu_t
\]  

(3)

Where \( R_t \) is the return on SET index in the month \( t \), \( W_t \) is the Halloween indicator, which takes value 1 if the month falls from November to April and zero otherwise.

RESULTS

CONCLUSION

REFERENCES


**BIOGRAPHY**