

AN ANALYSIS OF MONTHLY STOCK MARKET VOLATILITY: THE EMPIRICAL EVIDENCES FROM COLOMBO STOCK EXCHANGE IN SRI LANKA

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ABSTRACT

Empirical studies have revealed a broad variation of the seasonal anomalies in the stock market. The existence of the stock market anomalies help investors to earn abnormal returns and they are playing significant importance for both investors and the researchers who are currently engaging in financial market decision making. However, the concept of Stock Market Anomalies is still novel to a developing country like Sri Lanka where the financial market was not relatively dynamic. As a result the study examines the monthly effect with respect to the stock price and the return in the Colombo Stock Exchange (CSE) using the All Share Price Index (ASPI) during the period of 1st of January 2005 to 31st of January 2019. The monthly effect is tested using Ordinary Least Square (OLS) Regression model. The results of the study indicate the presence of a statistically significant positive effect on stock prices in June and October as well as significantly negative effect during the months of May and December. Further, the study identified a significant negative May and December effects for the stock returns in CSE during the sample period. Findings of this study will help both Sri Lankan and international investors to make profitable investment strategies and to plan their investment portfolios.

Keywords: Stock Return, Stock Price, Colombo Stock Exchange, Ordinary Least Square Regression, Financial Market

Introduction

A Stock market (known as Equity Market and Share Market) is the combination of investors and stock vendors (also known as shares) representing business property claims; it includes the securities listed on a government stock exchange as well as stocks traded only privately. Hence it consists the general activity of buying stocks and shares, and the people and institutions that organize it. The evolution of Sri Lanka's stock market has since begun and the present Colombo Stock Exchange (CSE) came into being in 1990. Currently, the Colombo Stock Exchange (CSE) has 297 companies representing 20 business sectors, with a Market Capitalization of Rs. 2,793.0Bn. Consequently, Colombo Stock Market has witnessed fast growth and played a significant role in economic growth and development.

The stock market anomalies are essential for both investors and scientists involved in financial markets. Previous Colombo stock market research has usually verified the existence of stock market anomalies. Most scholars identified the existence of daily and monthly effect as the most common stock market anomalies. Availability of the anomalies limits the validity of the Efficient Market Hypothesis. According to the Efficient Market Hypothesis investors cannot make an extra profit, as the stock prices reveal all the information.

Availability of the seasonality of the stock returns violates the Efficient Market Hypothesis (EMH). EMH suggest that it is difficult to outperform the market by using market timing or the stock selections. Thus, it suggests that all the securities in the market priced in efficient manner to completely reflect all the required data of the basic value of the stocks. However, the existence of the seasonal effect that create higher or the lower returns depend on time periods has identified in the case of financial markets as well as the equity markets. This effect is identified as "anomalies" by the scholars as they are not described by the traditional asset pricing models. The studies carried out by the scholars identified that the violation of the security market efficiency occurs due to reaction by investors, policy decisions, cash flows, timing and macroeconomic events etc. As a result, if one individual is going to take advantages from such anomalies in the market, other one can earn greater return (Zeimba and Hensel, 1994). Even if some anomalies are controversial, it is difficult to predict and time fluctuating thus the studies are interesting and stimulating, and provide motivating responses for portfolio management. As per the studies conducted in late seventies and eighties many in capital market provide evidences on ineffectiveness of information in constantly generating abnormal return. Hence the availability of stock price anomalies and volatility has been commonly addressed by the scholars in the context of developed markets as well as the emerging markets situations. However, the stock market price anomalies and volatility in the Sri Lankan context

is empirically addressed as well as stock market anomalies is still new concept to Sri Lanka. Thus, drawing from this gap researcher asked the main research question as “Does monthly stock market anomalies exists in the Colombo stock Exchange in Sri Lanka?” Based on the primary research question researcher try to give answers for “Does monthly effect exists on stock prices in the Colombo Stock Exchange?” as well as “Does monthly effect exists on stock return in the Colombo Stock Exchange?”. Hence, the objectives of the study are; to examine the existence of monthly stock market anomalies in the Colombo stock Exchange in Sri Lanka, to analyze the existence of Monthly Effect on stock price in the Colombo Stock Exchange and to analyze the existence of Monthly Effect on stock return in the Colombo Stock Exchange.

Literature Review

There are global stock price anomalies and the January effect is likely one of the well-known stock anomalies (Wachtel, 1942). For examples, Keim (1983) recognized that the stock prices are frequently higher in the first two weeks of January than at the end of December. Shiller (1989) also found the monthly pattern in the U.S. stock index returns at the start and during the first half of the calendar months with a favorable average return and zero average returns in the second quarter. Wahlroos and Berglund (1983), Choudhry (2001) and Mehdiian and Perry(2002) have found that the favorable and greater impact in January could not be found on a monthly basis. The studies conducted by Nassir and Mohammad (1987), Pang (1988) and Coutts and Sheikh (2000) have also discovered the presence of monthly effect for the developing markets. Conversely, they also found the same concerns as Wahlroos and Berglund (1983), Choudhry (2001), and Mehdiian and Perry (2002) which indicates the unavailability of January effect for the certain emerging markets. Moreover, Lakonishok and Smidt (1988), Wilson and Jones, (1993), Mills and Coutts (1995), Arsad and Coutts (1997), Mookerjee and Yu (1999) , Coutts, Kaplanidis and Roberts (2000), and Abeysekera (2001) have reflected holiday effect as well. The "January Effect" and the "April Effect" are the most predominant and interesting results of the research above the month of the year. The Keim (1983) was the first study combining the January and magnitude anomalies. Raj and Kumari (2006), for the period of 1979 to 1998, studied the month-of-year impact on the Indian stock market. They discovered that April's return were significantly greater than the rest of the months in the year. Fountas and Segredakis, (2002) explored the month-of-year impact in eighteen emerging equity markets from January 1987 to December 1995 and noted that stock returns for January were considerably greater than returns for only Chile, Greece, Korea, Taiwan and Turkey for the remaining eleven months.

Rauf (2013), discovered the monthly impact of stock exchange in developed and emerging economies during the period from 1985 to 2012. In April and December, he recorded the satisfactory return. April has the largest favorable return among these two months, with other months, and Australia's lowest return on the stock market recognized in the month of October. For the Singapore market, there was a significant favorable monthly return for the entire sample period from 1985 to 2012 during the month of December. The favorable mean monthly average return received in May and December in the U.S. stock market. In January and April, also greater favorable returns were recorded but adverse returns were received in August and September. The favorable important monthly return as for the outcome of Hong 125 Kong stock market was recorded in February and July. For Japan, however, positive monthly important return in January and adverse return obtained during the sample period in June, July, August, September and October. Finally, he gave evidence of the presence of monthly return effect in the Colombo stock exchange. His results indicate the important favorable average monthly return in January and September, but only in the months of September and in December during the period from 1985 to 2012 important impact is significantly noted.

According to Reinganum (1983) study, in order to capture the capital losses investors sell stocks which have fallen in their values in past months before the end of the tax year and reinvest the proceeds on the market in January to prevent tax payments. The greater inventory demand pushes up stock prices creating the impact of January. Conversely, Gultekin (1983) found that The January effect phenomenon in many countries cannot be explained by the tax loss selling theory. There are no capital benefit tax or loss offsets in Japan, for instance, but there is still an impact in January. A January effect existed in Canada prior to 1972 capital gain tax (Berges, McConnell, and Schlarbaum, 1984). Ritter, (1988) also recognized that the proportion of individual investor stock purchases to revenues reaches an annual low at the end of December and an annual high at the start of January. Aggarwal and Rivoli (1989) investigated the Hong Kong stock market from 1976 to 1988 and disclosed the presence of January effect. Pang's (1988) study showed seasonal returns in January, April, and December in the Hong Kong stock market. However, Cadsby and Ratner (1992) stated no evidence of monthly effects in the countries of Japan and Hong Kong. Wong (1995) showed that intra-month effects were almost non-existent in stock markets in Singapore, Malaysia, Hong Kong, Taiwan, and Thailand. Fountas and Segredak (2002), confirmed for seasonal effects in stock returns (January effect anomaly) using monthly stock returns in eighteen emerging stock markets for the period of 1987-1995. They found less evidence in favor of the January effect in the emerging markets.

However, Balaban (1995) provided evidences of January effect in Turkey and Malaysia, where the average January returns were significantly positive and higher than in other months respectively. As per the study carried out by Ho, (1990) for the daily returns from January 1975 to November 1987 showed that six out of eight emerging Asian Pacific stock markets exhibit considerably higher daily returns in January than in other months. Thus, the study conducted by Deyshappriya (2014) identified the positive January effects are common for CSE and the negative December effects cannot be identified for post war period in Sri Lanka. Therefore, the study confirms the existence of Stock Market anomalies for both day of the week effect and monthly effect particularly during the war period in Sri Lanka. Moreover, Thushara and Perera (2013) identified that the monthly return in January, February, April and September are significantly higher than average returns of other months in Colombo Stock Exchange in Sri Lanka.

Research Methodology

The research study used secondary data. All share stock market return data and all share stock market price data were collected from the registered companies in Colombo Stock Market which represents 291 companies in different sectors during the period of 1st of January 2005 to the 31st of January 2019. Researcher collected All Share Price Index (ASPI) data for the study. This index is considered as market capitalization weighted index which calculated in real time. Thus, it includes all voting and non-voting ordinary shares listed in CSE. The monthly calendar effects are examined by applying Ordinary Least Square (OLS) regression using dummy variables. As the research study is based on time series data, it is necessary to check the stationary of the variables in order to avoid from the errors in regression. Hence, Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1981) was carried out to test the stationary of the variables.

Ordinary Least Squared (OLS) Regression for Monthly Effect

By considering the less dynamic behavior of the monthly data than the regular data, OLS regression is suitable to identify the monthly impact of stock prices and the returns.

$$R_t = \alpha_1 M1_t + \alpha_2 M2_t + \alpha_3 M3_t + \dots + \alpha_{12} M12_t + \epsilon_t$$

Where; R_t is the monthly return and $M1_t \dots M12_t$ are the dummy variables signifies the months from January to December. Furthermore, to prevent the ideal co-linearity among the factors, the regression equation intercept term was skipped. The α_1 to α_{12} coefficients represent the average monthly return while the error value is indicated by ϵ_t . Moreover, the monthly prices are also tested by using Ordinary Least Square (OLS) regression with dummy variables.

Data Findings Reporting

Monthly Price Data

The stationary of the monthly data in CSE were tested by using ADF test and the results indicates Dickey- Fuller value as -8.4052 for lag 5 and the p value is 0.01. Hence the data is significant at 0.05 significant level.

Table 1: Results of the OLS regression

Month	Coefficients	t value	Pr(> t)
Jan	105.23	1.226	0.22
Feb	-40.00	-0.449	0.65
Mar	149.72	1.745	0.08
Apr	-40.58	-0.473	0.64
May	-204.18	-2.380	0.01 *
Jun	316.66	3.690	0.00 ***
Jul	-127.10	-1.481	0.14
Aug	-27.38	-0.319	0.75
Sep	-50.23	-0.585	0.55
Oct	176.04	2.052	0.04 *
Nov	-7.14	-0.083	0.93

Dec	-229.38	-2.673	0.00 **
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Source: Based on Authors Calculations

According to the analyze data, the regression shows that May, June, October and December months have a significant impact on the ASPI monthly prices of the Colombo Stock Exchange Data at 95 percent confidence level. Moreover, positive impact on the monthly stock prices can be observed in the months of June and October as it recorded the positive coefficient value. Thus negative impact is there from the months of May and December on the ASPI monthly prices of the Colombo Stock Exchange at 0.05 significant level. Therefore, remaining months not implies any significant impact on the monthly ASPI price data during the period of 1st of January 2005 to the 31st of January 2019. The R-squared is estimated to approximately 20%, indicating that the independent variables explain 20% of the variations in the monthly ASPI prices. Since monthly parameters of the months of May, June, October and December are significant the null hypothesis is rejected. In generally, the existence of monthly price effects of Colombo Stock Exchange has been proved by the findings. This monthly effects are also supported by the significant Wald F test.

Monthly Return Data

The stationary of the monthly data also checked using the ADF test and the results implies -4.1766 Dickey-Fuller value at lag 5. The p- value is 0.01 and the data is stationary at 0.05 significant level. The results of the regression are presented in the following tables

Table 2: Results of the OLS regression-Return data

Month	Coefficients	t value	Pr(> t)
Jan	-0.0055133	-0.366	0.71
Feb	-0.0180514	-1.197	0.23
Mar	0.0030249	0.201	0.84
Apr	0.0019929	0.132	0.89
May	-0.0407306	-2.701	0.00 **
Jun	0.0220147	1.460	0.14
Jul	0.0002943	0.020	0.98
Aug	-0.0140803	-0.934	0.35
Sep	-0.0148533	-0.985	0.32
Oct	0.0150935	1.001	0.31
Nov	0.0235584	1.562	0.12
Dec	-0.0250038	-1.658	0.09

Source: Based on Authors Calculations

Based on the analyzed data, the regression results shows that only the month of May has recorded a significance impact on the monthly All Share Price Index return data at 95 percent confidence level. It implies a negative impact on the monthly stock returns with -0.041 coefficient value. However negative impact can be identified in the month of December on the stock returns at 90% confidence level and it has recorded as -0.025 coefficient value. Therefore, remaining months not implies any significant impact on the monthly ASPI price data during the period of 1st of January 2005 to the 31st of January 2019. The R-squared value is assessed to approximately 11%, signifying that the independent variables explain only 11% of the variations in the monthly ASPI returns. Since monthly parameter of the month of May is significant and the null hypothesis is rejected. Accordingly, the existence of monthly return effects of Colombo Stock Exchange has been proved by the findings. This monthly effects are also supported by the significant Wald F test.

Ordinary least squares regression assumptions

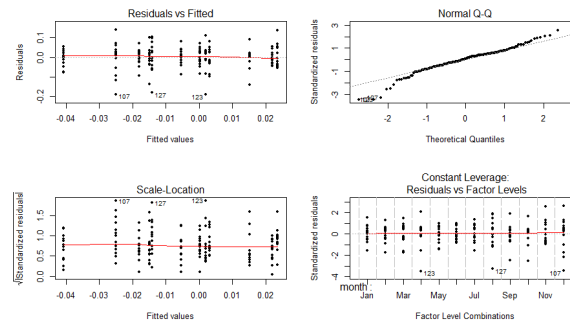


Figure 1: Assumptions for OLS Regression – Monthly stock prices

Source: Based on Analyzed Data

As per the above data assumptions of the both monthly stock price data and monthly stock return data shows same results. The first plot, “Residuals vs. Fitted” is helpful for the assessment of Linearity and Homoscedasticity. Based on the graph most of the values are scattered around the zero line and hence linearity assumption is not violated and there is no any visible pattern in the residuals and the assumption of homoscedasticity is satisfied. As per the second plot residuals are plotted closer to the line and therefore normal distribution in the standardized residual of the OLS regression analysis. Hence, the assumption of normality is satisfied. As in the first graph, there is no particular pattern in the residuals in the third graph. Therefore, the OLS regression model is not influenced by any problem of heteroscedasticity.

Discussion and Conclusion

Regression results indicate the availability of the monthly effect with respect to the stock prices in the CSE during the study period. Results show significantly positive June and October effect and significantly negative May and December effect in the Colombo stock market. Therefore, low stock prices are there during the months of May and December and significantly high prices can be observed on the months of June and October. The presence of the monthly effect with respects to the stock returns was also successfully tested by the study; especially statistically significant negative May and negative December effects were observed for the entire sample period. Even though the scholars identified the availability of January effect for the emerging markets there is no such significant effect during the sample period of the study. Based on their studies the average return in the month of January is higher than the other months of the year. The reason for this is most investors tend to sell their shares in the month of December to show capital losses to avoid from the taxes. Negative December effects are recorded in the sample period and the coefficient is significant at 10%. This effect may cause by the unstable economic conditions, higher sensitivity towards the tax imposition as well as the budget proposals at the end of the year. Moreover, the existence of the monthly effect of CSE is proved by the F test results as well. The stock market anomalies are essential for both investors and the people involved in financial market. Therefore, the study will be beneficial for the investors to make their investment decisions more rationally. Finally, this will assist both Sri Lankan and global investors plan their investment portfolios and create lucrative investment policies.

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