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An Empirical Investigation on Stock Market Anomalies: The Evidence from Colombo Stock Exchange in Sri Lanka

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Abstract

The current study examines the Stock Market Anomalies in Colombo Stock Exchange (CSE); Sri Lanka during the period of 2004 to 2013. The existences of both Day of the Week Effect and Monthly Effect have been tested using daily and monthly data respectively. The Ordinary Least Squares (OLS) method and GARCH (1, 1) model were employed to capture the Day of the Week effects and Monthly Effects along with the daily volatility behavior. The sample period was divided in to two periods as War Period and Post War Period in order to take the impacts of the War in to account. The results indicate the presence of negative Monday effect and the positive effects for all other days only for the war period. Further, the positive volatility effect on Monday and the negative volatility effect on Friday have been examined for both war period and the entire sample period with significant Wald F statistics. Despite, the positive January effects are common for all sample periods, the negative December effects cannot be identified for post war period. Hence, the study confirms the existence of Stock Market anomalies; both day of the week effect and monthly effect particularly during the war period. Moreover, these seasonality patterns limit the validity of Efficient Market Hypothesis in the context of Colombo Stock Exchange.

Keywords: day of the week effect, monthly effect, efficient market hypothesis, volatility effect, stock market anomalies

1. Introduction

1.1 Background of the Study

Stock market is the place where the secondary shares are issued to fulfill the capital requirements of public companies ensuring the continuity of the economic expansion and making opportunities for people to earn higher returns for their investments. The establishment of the current Stock Market of Sri Lanka has a long history and it goes back to 19th century. Probably, the stock trading in Sri Lanka has been started by British planters in order to find the financial requirements for setting up the tea plantation in Sri Lanka. As a result of that, the first formal stock trading company was started in 1896 titled the Colombo Share Brokers Association (CSBA) which had been formed to trade the shares of limited small liability companies. Since then, the evolution of the stock market of Sri Lanka started and consequently the current Colombo Stock Exchange (CSE) was originated in 1990. It is a common fact that, the stock market prices and returns are highly sensitive for the information which follows the seasonality pattern. Hence, the anomalies those are based on information account for many dynamic behaviors of the stock indices.

The seasonality pattern or stock market anomalies are essentially important for both investors and researchers who are engaging with the financial markets. Generally, Day of the Week Effect and Monthly Effect are the most common stock market anomalies identified by many scholars. Day of the week effect reflects the idea of unequal average daily returns for all the day of the week while monthly effect indicates unequal average monthly return for all months of a year. According to the day of the week effect, the negative return on Monday and the positive return for Friday have been widely examined. Especially, the negative effect on Monday is mainly due to the unfavorable news and information which can be easily accessed by the investors during the weekends. Damodaran (1989). In addition to that, some other academics such as Solnik and Bousqet (1990), Aggarwal and Rivoli (1989), Ho (1990) Wong et al. (1992) argued that the weekend effect causes for negative returns not only in Monday; but Tuesday also due to the lag behavior of the information.

In terms of the monthly effect, the positive January effect has been observed by the most of researchers. (Choudhry, 2001; Mehdian & Perry, 2002; Nassir & Mohammad, 1987). According to them, the average return in January is higher than any other month of the year. The main reason for this is, the most of the investor used to sell the shares in December in order to show the capital losses to avoid from paying taxes. However, they reinvest the money in the stock market in the next January once the tax calendar starts from January. Existence of stock market anomalies limits the validity of Efficient Market Hypothesis. According to the efficient market hypothesis, none of the investor can earn an extra profit, as the stock prices reflect all the information. However, when the day of the week effect exists, investors can earn abnormal profit by buying the stock in low return Monday and selling them at a higher return on Friday.

The second part of this paper has addressed the objectives, the significance of the study and the detailed analysis for day of the week effect and monthly effect followed by the conclusion.

1.2 Research Objective

The main objective of the study is to examine the existence of stock market anomalies in the context of Colombo stock Exchange in Sri Lanka. However, the study focuses on two specific objectives as follows.

i. Analyzing the existence of Day of the Week Effect on stock return and volatility in Colombo Stock Exchange;

ii. Analyzing the existence of Monthly Effect on stock return in the Colombo Stock Exchange.

1.3 Significance of the Study

The existence of the day of the week effect and monthly effect has been more commonly addressed in the context of developed market such as USA, Japan, Canada and Australia. (Aggrawal & Tadon, 1994) and (French, 1980). In addition, some of the emerging markets situations such as Singapore, Malaysia and Hong Kong have been also documented by Aggrawal & Rivoli (1989) and Padmakanthi (2011). However, the concept of Stock Market Anomalies is still new to Sri Lanka where the financial market was not quite active. Therefore, it is identified that the empirical studies are very limited in the context of Sri Lanka, except the work conducted by Basher and Sadorsky (2006) and Thilakarathne (2008). Thus, the current study will be a gap filling study in the context of Sri Lanka. The findings of the current study will immensely help to the investors to make their buying and selling decisions more rationally and efficiently. In fact, the stock market in Sri Lanka is now expanding its branches and all the stock market indices have been showing a remarkable improvement after finishing the 30 years long civil war. Therefore, the results will show an avenue to new and existing investors to maximize their returns on investment. Further, this will be an important opportunity to test the existence of Efficient Market Hypothesis in Colombo Stock Exchange.

2. Literature Review

The issue of stock market anomalies has been widely documented by many researchers mainly in the context of developed and emerging markets. The results from the study by Kim (1988), Tang and Kwok (1997), and Lee et al. (1990) confirmed the day of the week effect for both developed and emerging markets. Further, they have identified the negative Monday effect and the positive and relatively high mean return for Friday. In addition, they have mentioned that, day of the week effect in Asian markets were lower compared to the developed markets. An empirical work by Thilakarathne et al. (2008), has identified the negative Monday effect and positive Friday effectfor Colombo Stock Exchange in Sri Lanka during the period of 1994–2007. According to them Colombo stock Exchange does not follow the Random Walk Hypothesis. Barone (1990) found that negative effect in both Monday and Tuesday for Italian stock market. Further, he identified the higher positive effect for the Friday.

Singapore and many other Asian countries have been covered by Brooks and Persand (2001), Al-Loughani and Chappell (2001), Chandra (2004), Lian and Chen (2004) and Nath and Dalvi (2005), Aggrawal and Rivoli (1989), Balaban (1995) and Choudhry (2000). Some of them specifically have recognized the low and negative average return in Monday and positive and higher mean return in Friday. Moreover, the negative Tuesday effect has also been examined by them especially for Singapore due to the lag effect of the information. The effort of Clare et al (1998), Kok (2001) and Lian and Chen (2004) to identify the day of the week effect in the stock markets that is occurred due to the volatility has emphasized the existence of day of the week effect in terms of both volatility and return. Rogalski (1984) has used both the industry level data from 1974 to 1984 and the Standard & Poor (S&P) 500 from 1979 to 1984 to examine the day-of-the-week effect. His study also detected the negative Monday effect and the positive effect for Friday. Lauterbach and Ungar (1995) have used the daily data from 1977 to 1992 collected from Israel stock market to test the availability day of the week effect. The uniqueness of this study is, used both nominal return and inflationary adjusted real return have been for this study. Apart from that, re-examination of day of the week effect of the stock markets such as French, USA, UK, Japan and German done by Dubois and Louvet (1996). This re-examination conducted during 1969–1992 also stressed the existence of day of the week effect in these markets.

Apart from the day of the week effect, Wahlroos and Berglund (1983), Choudhry (2001), and Mehdian and Perry (2002) have examined the monthly effect of the developed markets. Though, they have found the monthly effect; were unable to find the positive and higher January effect especially for the post war period. The studies conducted by Nassir and Mohammad (1987), Pang (1988), Ayadi et al (1998) and Coutts and Sheikh (2000) have also discovered the existence of monthly effect for the emerging markets. However, they also found the same results as Wahlroos and Berglund (1983), Choudhry (2001), and Mehdian and Perry (2002); indicating unavailability of January effect for the some emerging markets. In addition to day of the week effect and the monthly effect; Wong and Ho (1986), Lakonishok and Smidt (1988), Wilson and Jones (1993), Mills and Coutts (1995), Chan et al. (1996), Arsad and Coutts (1997), Mookerjee and Yu (1999), Coutts et al. (2000), and Abeysekera (2001) have considered holiday effect as well. The importance of these researches is, some of them have identified the presence of stock market anomalies for both developed and emerging markets where the other researchers have not found the stock market anomalies. It is obvious that despite the vast literature on seasonality in stock markets in developedcountries and other emerging markets; considerably very limited studies have been conducted in the context of Sri Lanka. Therefore, this study attempts to fill the existing gap by analyzing the stock market anomalies in Sri Lanka.

3. Day of the Week Effect

3.1 Data and Sample Period

Daily stock market return data were collected from the Colombo Stock Exchange during the period of 1st of January 2004 to 28th of June 2013. The business days in Colombo Stock Exchange are also from Monday to Friday, except the public holidays. The sample time period was divided in to two time periods considering the civil war situation in Sri Lanka.

War Period–2nd of January to 18th of May 2009;

Post War Period–19th of May 2009 to 28th of June 2013.

Since, the stock markets are highly sensitive to the economic and political stability of the economy; the sample period was divided as War and Post War periods to identify the stock market anomalies in these periods separately.

3.2 Methodology

3.2.1 Unit Root Test

Since the study is dealing with time series data, it is essential to check the stationary of the variables in order to avoid the spurious regression. Hence, Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1981) was employed to test the stationary of the data.

The theoretical background of the ADF test has been explained using the following model.

$$\Delta Y_{it}=\alpha_{0i}+\theta_i Y_{it-1}+\alpha_{i1}+\sum_{j=1}^{p}\delta_{ij}\Delta Y_{it-j}+\varepsilon_t \tag{1}$$

$$\Delta Y_{it}=\alpha_{0i}+\theta_i Y_{it-1}+\sum_{j=1}^{p}\delta_{ij}\Delta Y_{it-j}+\varepsilon_t \tag{2}$$

According to the theoretical view that has been stated in the above equations, Y_{it} is the any time series variable of i–th country for time period t. Further, $\Delta Y_{it} = Y_{it} - Y_{it-1}$ and the t is the time trend term and α_{0i} is the constant. P is the number of lagged terms and e_{it} is the error term which is white noise. According to the above model, the hypothesis can be expressed as follows.

$$H_0 : \theta_1 = 0$$

$$H_1 = \theta_1 < 0$$

The null hypothesis explains the series is non-stationary or the there is a unit root problem while the alternative hypothesis indicates the series is stationary and no unit root problem exists. If the null hypothesis is rejected, it means Y_t is stationary and it is known as $I(0)$ variable. If the series is non-stationary, then the series should be differenced and tested for higher integration.

3.2.2 Ordinary Least Squared (OLS) Regression for Day of the Week Return Effect

In order to examine the day of the week effect, the regression analysis based on OLS technique was utilized in accordance with Lian and Chen (2004). In the regression, five dummy variables were included to represent the five business days of the week. Since, the five dummy variables were used, the intercept term was purposely omitted to avoid the perfect co-linearity of the model.

$$R_t = \alpha_1 Mo_t + \alpha_2 Tu_t + \alpha_3 We_t + \alpha_4 Th_t + \alpha_5 Fr_t + \varepsilon_t \tag{3}$$

Where R_t is the daily stock return, $Mo_t...Fr_t$ are the days of the Week starting from Monday to Friday and ε_t is the error term. Further, $Mo_t...Fr_t = 1$; if the considered daily return on day t is on Monday to Friday respectively and otherwise 0. The coefficient of $\alpha_{1...}\alpha_5$ reflects the average day return from Monday to Friday. The same regression has been used for entire sample period, war period and post war period.

The Wald Test can be used to test the presence of day of the week effect based on the following hypothesis.

H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5$;

H_1: At least one of the coefficients is not equal to another coefficient.

According to the null hypothesis, average returns of all days of the week are equal. Therefore, if the null hypothesis can be rejected through the significant Wald test; it indicates the existence of day of the week effect since the average returns of the days are unequal.

3.2.3 GARCH (1,1) Model for Day of the Week Effect on Return

OLS regression may be affected by ARCH effect, since the study is dealing with highly volatile daily data. Therefore, there is a higher possibility to change variance of the error term with the time. As a result of that, it is crucial to introduce an Auto Regressive Heteroscadastic (ARCH) model in order to capture the ARCH effect of the OLS regression. Otherwise, the results are drawn from the OLS method may be not valid. Applications of ARCH family models are quite common in the financial literature and specifically GARCH models introduced by Bollerslev (1986). This study has occupied GARCH (1,1) model which has been explained as follows.

$$R_t = \propto_1 Mo_t + \propto_2 Tu_t + \propto_3 We_t + \propto_4 Th_t + \propto_5 Fr_t + \varepsilon_t \tag{4}$$

$\varepsilon_t \sim n(0, h_t)$ and the conditional variance of ε_t is given by;

$$h_t = \lambda_0 + \lambda_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} \tag{5}$$

According to the mean equation, R_t is the daily stock return, Mo_t ....Fr_t are the days of the Week starting from Monday to Friday and ε_t is the error term. Further, $Mo_t...Fr_t = 1$; if the considered daily return on day t is on Monday to Friday respectively and otherwise 0. The coefficient of $\alpha_{1...}\alpha_5$ reflects the average daily return from Monday to Friday. Further, λ_1 and β_1 are representing the ARCH term and GARCH term respectively. In order to satisfy the non-explosiveness conditional variance, $\lambda_1 + \beta_1 < 1$ and all λ_0, λ_1, β_1 should be positive to satisfy the non-negativity of the conditional variance. This GARCH (1,1) model has been applied for entire sample, war period and post war period samples appropriately. In this GARCH (1,1) model also, the Wald test has been used to check the equality of mean return across the days.

3.2.4 GARCH (1,1) Model for Day of the Week Effect on Volatility

In fact the model described in 03.2.2 section, analyzes only the day of the week effect on return in the Colombo Stock Exchange but not the volatility behavior. However, it is essential to identify the day of the volatility effect in order to provide a better image about the stock market anomalies. Hence, the investigation of day of the week volatility effect is also based on the following GARCH (1,1) model.

$$R_t = \lambda_0 + e_t \tag{6}$$

$\varepsilon_t \sim n(0, h_t)$ and the conditional variance of ε_t is given by;

$$h_t = \lambda_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} + \propto_1 Mo_t + \propto_2 Tu_t + \propto_3 We_t + \propto_4 Th_t + \propto_5 Fr_t + \varepsilon_t \tag{7}$$

This model was also applied to the all sample periods to capture the day of the week volatility effect. Moreover, the Wald test has been employed to examine the equality of the mean volatility across the days of the week.

3.3 Results

3.3.1 Results of the ADF Test

The following table summarizes the results of the ADF test, which was carried out to check the level of integration of the data series.

Table 1. Results of the ADF test

Variables	Entire Period		War Period		Post War Period	
	Observation	Probability	Observation	Probability	Observation	Probability
Return	2264	0.0000	1280	0.0000	982	0.0000
Monday	2264	0.0000	1280	0.0000	982	0.0000
Tuesday	2264	0.0000	1280	0.0000	982	0.0000
Wednesday	2264	0.0000	1280	0.0000	982	0.0000
Thursday	2264	0.0000	1280	0.0000	982	0.0000
Friday	2264	0.0000	1280	0.0000	982	0.0000

Source: Author's Calculation.

According to the Table 1, all of the variables are stationary at the level form. Since, all the variable are *I(0)*; the OLS estimation technique can be applied to regress the above variables in order to capture the day of the week effect.

3.3.2 Results of the OLS Regression Model

According to the Table 2, the OLS estimation indicates that there is no day of the week effect exists except the war period.

Table 2. Results of the OLS regression

	α_1 Monday	α_2 Tuesday	α_3 Wednesday	α_4 Thursday	α_5 Friday	Wald F-Statistic	ARCH Test	N
Entire	0.0186	0.2669	-0.3047	0.2255	0.2306	2.7328	565.94***	2264
	(0.9490)	(0.3553)	(0.2939)	(0.4353)	(0.4330)	(0.6035)	(0.0000)	
War	-0.1097	-0.1117	0.0679	0.2212***	0.2511***	16.4184***	156.28***	1280
	(0.2005)	(0.1906)	(0.4263)	(0.0098)	(0.0038)	(0.0025)	(0.0000)	
Post	0.1880	0.7530	-0.7928	0.2309	0.2039	2.9131	245.85***	982
War	(0.7772)	(0.2489)	(0.2294)	(0.7229)	(0.7595)	(0.5725)	(0.0000)	

Source: Author's Calculation. *** - Significant at 1%.

Both entire period and post war period do not have significant coefficients across the days of the week and the Wald F test also insignificant. Thus, there is no any evidence for day of the week effect during these two periods. However during the war period, both Monday and Tuesday have negative average return though it's statistically insignificant. Further, it is found that the positive average return from Wednesday to Friday had increased sharply with higher statistically significance and it provides the evidences for positive Friday effect in the Colombo Stock Exchange. Further, the Wald coefficient restriction test also significant at 1% level rejecting the null hypothesis. Consequently, it is apparent that the existence of the day of the week effect during the war period. However, the validity of these results cannot be justified due to the presence of ARCH effect. Since, the ARCH test is statistically significant at 1% level; the variance of the error term is varying with the time. Therefore, the estimates of the OLS regression are not valid further and conclusions drawn from the model are not accurate. Therefore, it is essential to employ a model from ARCH family.

3.3.3 Results of the GARCH (1,1) Model for Day of the Week Effect on Return

After examining the ARCH effect of the OLS regression, GARCH (1,1) model was selected to apply based on the auto correlation function. The results of the GARCH (1,1) model can be summarized as follows.

Table 3. Results of the GARCH (1,1) model for return

	α_1 MON	α_2 TUE	α_3 WED	α_4 THU	α_5 FRI	λ_0	λ_1	β_1	Wald F-Test Statistic	N
Entire	0.16	0.40	0.13	0.53	0.29	21.60***	0.07***	0.54***	0.04	2264
	(0.91)	(0.75)	(0.94)	(0.76)	(0.85)	(0.00)	(0.00)	(0.00)	(0.99)	
War	-0.12**	0.19***	0.13***	0.13***	0.15***	0.22***	0.78***	0.38***	46.9***	1280
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Post	0.82	1.16	0.25	0.39	0.26	45.7***	0.10***	0.51***	0.04	982
War	(0.83)	(0.71)	(0.96)	(0.94)	(0.94)	(0.00)	(0.00)	(0.00)	(0.99)	

Source: Author's Calculation. ** - Significant at 5%*** - Significant at 1%.

The results of the entire sample period and post war period estimated by the GARCH (1,1) model is quite similar to the OLS estimations. As the Table 3 indicates, none of the daily coefficient is statistically significance and it clearly proves the unavailability of the day of the week effect in terms of stock return during the entire sample period and post war period. Further, the insignificant Wald F test also confirms the non-existence of daily seasonality in the Colombo Stock Exchange during these periods. Unlike these periods, all the daily coefficient are highly significant during the war period confirming the negative Monday effect and higher positive effect for the Friday compared to the all other days. This negative Monday effect and the positive and higher Friday effects are also supported by the significant Wald F test. Especially, people were highly sensitive for the news and information flows; since the economy was at unstable and critical stage. During the weekend investors could easily access to the sources of information; mainly bad news. Consequently, this unfavorable information affects stock return adversely resulting significant negative Monday effect. However, it is natural to die out this effect once the business days come together with the actual news which allows investors to behave more rationally. Hence after the Monday, the daily average return turned to positive and it causes to higher positive averages on Friday; since the investor tries to close their positions before the weekend. Moreover, the coefficient of ARCH and GARCH terms are also highly significant showing the appropriateness of the model.

3.3.4 Results of the GARCH (1,1) Model for Day of the Week Effect on Volatility

The above Table 4 illustrates the daily volatility effect of the Colombo Stock Exchange during three time periods including the entire sample period.

Table 4. Results of the GARCH (1,1) model for volatility

	λ_0	λ_1	β_1	α_1 MON	α_2 TUE	α_3 WED	α_4 THU	α_5 FRI	Wald F-Test Statistic	N
Entire	-0.01	0.10***	0.61***	5.12	5.66	-61.7***	-22.7***	-4.01	563.3***	2264
	(0.99)	(0.00)	(0.00)	(0.40)	(0.24)	(0.00)	(0.00)	(0.48)	(0.00)	
War	0.31***	0.11***	0.57***	10.8	10.9	-159.2***	-85.1***	-26.5***	11835.4***	1280
	(0.00)	(0.00)	(0.00)	(0.16)	(0.12)	(0.00)	(0.00)	(0.00)	(0.00)	
Post	0.09***	0.37***	0.61***	-1.44	-1.31	-1.08	-1.89	-1.54	686.6***	982
	(0.00)	(0.00)	(0.00)	(0.56)	(0.59)	(0.66)	(0.44)	(0.53)	(0.00)	

Source: Author's Calculation; *** - Significant at 1%.

There are considerably high negative and statistically significant volatility effects in both Wednesday and Thursday during the entire sample period. The Monday volatility effects of both entire period and war period are positive; though those are not significant. Further, the positive volatility effect of Monday during the war period is significantly higher than that of both entire post war periods. It clearly indicates the volatility and risk attached to the war period is apparently high due to the instability of economy and critical political conditions. Moreover after the stock markets close on Friday, the investors are uncertain about stock prices on Monday; so this situation may cause for high volatility on Monday. This implies that there is a significant volatility effect at the weekend. However, this higher volatility is gradually dying out after the Wednesday and as a result of that the negative and highly significant average volatility can be seen from Wednesday to Friday. During the post war period, all the average volatilities are negative throughout the week; reflecting the importance of favorable economic and political conditions for investment decision. The availability of the day of the week volatility effect for all three periods has been also confirmed by the highly significant Wald F tests. In addition, ARCH and GARCH terms are also highly significant for all the periods, showing the accuracy of the model.

Making a bridge between day of the week effect on return (Table 3) and day of the week effect on volatility (Table 4), it can be concluded that the results run counter to the theory of risk bearing, which indicates that the expected return of an asset is positively related to its expected risk. However, these results are consistent with Agrawal and Tando (1994). One reason is the bad news hypothesis whereby firms tend to announce bad news after-market close on Friday. Another explanation is the private information hypothesis where by informed traders tends to use private information to trade after opening the markets on Monday. This will cause more variations in the price changes resulting in a high standard deviation on Monday.

4. Monthly Effect

4.1 Data and Sample Period

Monthly stock return data were calculated using the daily stock return collected from the Colombo Stock Exchange. The monthly data were formed by taking the sum of the daily return and it was divided by the number of working days of the month. Further, the sample period was divided into two periods as in the day of the week analysis.

War Period – January to June 2009;

Post War Period – June 2009 to June 2013.

4.2 Methodology

4.2.1 Unit Root Test

In order to check the level of integration among the variables, ADF test (Dickey & Fuller, 1981) employed. The theoretical background and the testing procedure of the ADF test are same as the section 03.2.1.

4.2.2 Ordinary Least Squared (OLS) Regression for Monthly Effect

Since, the monthly data are quite less dynamic than the daily data; OLS regression is theoretically appropriate to capture the monthly effect.

$$R_t = \alpha_1 D1_t + \alpha_2 D2_t + \alpha_3 D3_t + ... + \alpha_{12} D12_t + \varepsilon_t \tag{8}$$

Where; Rt is the monthly return and $D1_t$ … $D12_t$ are the dummy variables those represent the months from January to December. The considered month is January, if $D1_t = 1$ and otherwise 0 and the month is February if $D2_t = 1$ and otherwise 0 and so on. Further, the intercept term of the regression equation was skipped to avoid the perfect co-linearity among the variables. The coefficients from α_1 to α_{12} reflect the average monthly return while ε_t is indicating the error term.

In order to check the presence of monthly effect, the Wald F coefficient test was applied together with following hypothesis.

$$H_0 : \alpha_1 = \alpha_2 = ... = \alpha_{12}$$

H_1: At least one of the twelve coefficients is not equal to another coefficient.

If the Wald F coefficient test can successfully reject the null hypothesis, it is an evidence to prove that the existence of monthly effect of the Colombo Stock Exchange. Conversely, if the F statistic of the Wald coefficient test is insignificant, then the presence of monthly effect cannot be justified. The above OLS regression was used to check the availability of the monthly effect for entire sample period, war period and post war period as well.

4.2.3 Results of the ADF Test

The stationary of the monthly data were also checked using the ADF test and the results have been summarized in Table 5 below.

Table 5. ADF test results for monthly return data

Variables	Entire Period		War Period		Post War Period	
	Observation	Probability	Observation	Probability	Observation	Probability
Return	114	0.0000	65	0.0000	49	0.0000
January	114	0.0000	65	0.0000	49	0.0000
February	114	0.0000	65	0.0000	49	0.0000
March	114	0.0000	65	0.0000	49	0.0000
April	114	0.0000	65	0.0000	49	0.0000
May	114	0.0000	65	0.0000	49	0.0000
June	114	0.0000	65	0.0000	49	0.0000
July	114	0.0000	65	0.0000	49	0.0000
August	114	0.0000	65	0.0000	49	0.0000
September	114	0.0000	65	0.0000	49	0.0000
October	114	0.0000	65	0.0000	49	0.0000
November	114	0.0000	65	0.0000	49	0.0000
December	114	0.0000	65	0.0000	49	0.0000

Source: Author's Calculation.

It is apparent according to the Table 5; all the monthly dummy variables and the return variable are stationary at levels. Thus, all the variables can be named as I(0) variables. These I(0) variables allow to be run the OLS regression in this regard.

Table 6. Results of the OLS regression for monthly effect on return

Variables	Entire Period		War Period		Post War Period	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
January	0.3565***	0.0011	0.4825***	0.0012	0.1675	0.2794
February	0.0708	0.5057	0.0606	0.6691	0.0860	0.5765
March	-0.0212	0.8417	0.0202	0.8867	-0.0833	0.5882
April	0.1475	0.1669	0.0683	0.6304	0.2665*	0.0891
May	0.1000	0.3475	0.1674	0.2408	-0.0010	0.9946
June	0.0868	0.4389	0.0284	0.8546	0.0763	0.5794
July	0.1576	0.1615	0.1430	0.3592	0.1758	0.2566
August	0.0996	0.3746	0.0049	0.9746	0.2180	0.1615
September	0.3562***	0.0019	0.1776	0.2559	0.5795***	0.0005
October	-0.1104	0.3256	-0.0177	0.9089	-0.2261	0.1469
November	-0.1397	0.2141	-0.1301	0.4038	-0.1516	0.3268
December	-0.0294	0.7927	-0.2750*	0.0811	0.2775*	0.0771
Wald Test	22.3935**	0.0215	19.0748**	0.0357	22.5467**	0.0205
ARCH Effect	0.0051	0.9426	0.1721	0.6782	0.7934	0.3730
J-B Statistic	1.9197	0.3829	2.3963	0.3017	0.5865	0.7458
N	114	114	65	65	49	49

Source: Author's Calculation. * - Significant at 10%** - Significant at 5%*** - Significant at 1%.

4.2.4 Results of the OLS Regression for Monthly Effect on Return

The estimated results for equation (9) which addresses the monthly return has been illustrated in Table 5 below. According to the results of the OLS regression, the significant January effect can be found for both entire period and the war period with the highest average positive average return. In fact, the main reason for the significant and positive January effect is; the reinvesting behavior of the investors in January who sold out the share in November and December in order to show a capital loses to avoid from the taxes at the end of the year. However, there is no presence of significant January effect during the post war period but the significant September and April effects. The presence of the January effect for emerging markets has been also confirmed by the scholars such as Ayadi et al. (1998), Coutts and Sheikh (2000), Fountas and Segredakis (2002), Mookerjee and Yu (1999), Coutts et al. (2000), and Abeysekera (2001). The negative December effects were examined for both entire period and war period while the coefficient is significant at 10% level. Especially, unstable economic condition and higher sensitivity of investor to tax imposition and budget proposal at the end of the year may have caused the significant negative effect in December. In contrast, there is a positive and significant December effect for post war period; showing the investors' confidence about the economy.

Particularly, investors dislike to sellout their shares even to show capital losses for tax avoiding purpose; since they are expecting much more return on their investment in the near future. In generally, the existence of monthly effects of Colombo Stock Exchange has been proved by the Wald F test as well. More specifically, January and December effects are more common followed by the September and April effects. These findings have been similar to the results of Thilakarathne et al. (2008) and Abeysekera (2001) as well. In addition, the in significant ARCH statistics and J-B statistics successfully indicates the unavailability of ARCH effect and the presence of normal distribution for the error term.

5. Conclusion

By confirming the results of many financial scholars', the current study also emphasizes the availability of the day of the week effect and the monthly effect in Colombo Stock Exchange. Specifically, both OLS and GARCH (1,1) models have shown the presence of day of the week effect for war period. According to the results, the negative Monday effect followed by the positive effects for all other days with higher positive magnitude for Friday effect have been noticed by the models. The critical and unstable economic and political background during the war period led people to depend highly on available information and unrealistic forecasts. Particularly, the positive mean return on Friday is mainly due to the willingness of selling their shares before the weekends. Apart from that, uncertainty of future prices and arrival of bad information may cause to the negative mean return on Monday.

Day of the week effect on volatility was also verified by this study stressing the considerably higher positive Monday volatility effect for the war period followed by the entire period. However, the volatility has turned to negative pattern starting from Wednesday to Friday. Moreover after the stock markets close on Friday, the investors are uncertain about stock prices on Monday; so this situation may cause for high volatility on Monday. This implies that there is a significant volatility effect at the weekend. Unlike the war period, the daily mean volatility of the post war period is entirely negative. Hence, it is obvious that the relatively favorable economic condition during the post war period might have caused for reducing the volatility and risk attached to Colombo Stock Exchange. The presence of the monthly effect was also successfully verified by the study; especially statistically significant positive January and negative December effects were observed for the war period and the entire sample period. However, the irregular monthly effect has been found for post war period with significant positive April, September and December effects. In general, both day effect the week effect and monthly effect are common in war period than the post war period. The study strongly recommends to investors to follow stock market anomalies appropriately in order to make a fruitful investment decision.

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