International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 20
September 2018

Stock Market Performance and the Macroeconomic Factors: Evidence from Colombo Stock Exchange (CSE)

Garthika, S. & Rajapakse, R P C R

(garthi123@gmail.com), (champa@sjp.ac.lk)

Abstract

Stock market as a main component of the capital market of an economy plays a vital role in determining the development of the economy. Macroeconomic factors cause significant fluctuations in the performance of the stock market. This study is aimed at identifying the impact of macroeconomic variables on the performance of the stock market in Sri Lanka. The five macroeconomic variables: real gross domestic production (RGDP), inflation (wholesale price index), money supply (M2), exchange rate (LKR/USD) and interest rate (Average weighted prime lending rate) were selected as independent variables for the study. The dependent variables were All Share Price Index (ASPI) and the market capitalization (MC) of Colombo Stock Exchange (CSE), all data collected quarterly for the period 2004-2016. Johansen co-integration test, Vector Error Correction Model (VECM), and Granger causality models were utilized to derive conclusions. Co-integration was observed between the macroeconomic variables and the stock market performance. Long run causal relationship was noticed between the macroeconomic variables and the ASPI, and the long run equilibrium could be reached at a speed of 17.700%. Significant Short term causality was running from macroeconomic variables such as RGDP, inflation, money supply and interest rate to ASPI at 5% significance level, and inflation and exchange rate were the variables which had a positive influence on ASPI. Long term relationship was evidenced between the macroeconomic variables RGDP, inflation, money supply, exchange rate, interest rate and the market capitalization of CSE with the speed of adjustment of 19.500%. Significant short term causality was running from inflation and money supply to market capitalization of CSE at a significance level of 5%, and macroeconomic variables RGDP, money supply and interest rate had a negative influence on the market capitalization of CSE. Causality between, money supply and ASPI, inflation and ASPI, money supply and market capitalization, inflation and market capitalization were the observed bidirectional causalities. Unidirectional causalities were running from RGDP to ASPI and from interest rate to ASPI. The lower R-square values of 26.888% and 22.656% of the VECM models implied the performance of the stock market of Sri Lanka is affected by other macroeconomic factors in addition to the five selected macroeconomic variables taken for the study: firm specific factors and industry specific factors.

Keywords: ASPI, MC, Macro Economic Variables, VECM

Jel Codes:

Introduction

The introduction of the open economy to Sri Lanka in 1977 brought forth outward economic policies, thus the stock market was revived in 1982 with the intention of attracting more foreign investments to Sri Lanka. The government regulations were also revised in favour of increased investments, because the policy of the government was to develop the country by investing in large projects. Foreign investors were invited to invest in Sri Lanka through number of different BOO and BOOT Public Private Partnership programmes.

Sri Lanka is a developing country which requires more Foreign Direct Investments (FDI) in

addition to the national investments to achieve a sustainable economic growth. The national investment in Sri Lanka as a percentage of GDP was only 30.1% in 2015(Central Bank Annual Report 2015), and the domestic participants in the CSE was, only 2.3%, compared to other developed nations (Glannetti and Koskinen, 2010). Portfolio investment through the stock market is one of the main ways to attract and retain foreign investors in Sri Lanka. However, before making the investment decision, the volatility of the stock market prices, it is important to identify the factors that affect the performance of the stock market.

The performance of the stock market is affected by firm specific, industry specific and macroeconomic factors. Broadly, all of these factors that bring volatility to the stock return can be divided into two risk categories, those are, systematic risk and unsystematic risk. Unsystematic risk or firm specific risk can be diversified away through portfolio investment; however the systematic risk cannot be diversified. Macroeconomic factors are one of the main causes of systematic risk. However the level of impact differs from one firm to the other. Inflation, exchange rate, money supply, gross domestic production, gold price, silver price, oil price, unemployment are some of the examples for macroeconomic factors. When the market is efficient fluctuations in the macroeconomic variables will be reflected in share prices. As these fluctuations can favourably or unfavourably affect the performance of the stock market, the impact should be considered by policy formulators and investors in formulating the policies as well as in making investment decisions, which can lead to sustainable economic growth and increase in the wealth. This study is aimed at identifying the impact of macroeconomic variables RGDP, inflation, money supply, exchange rate, and interest rate on the performance of the CSE, where the performance was measured by two variables ASPI, and market capitalization.

2.2. Colombo Stock Exchange (CSE)

Colombo Stock Exchange (CSE) was established under the Companies Act No.17 of 1982. CSE is the only authorized stock exchange in Sri Lanka, limited by guarantee, and responsible for providing a transparent and regulated environment where companies and investors come together. The Exchange is regulated by the Securities Exchange Commission of Sri Lanka (SEC). Central Depositary System (Pvt) (Ltd) (CDS) acts as the clearing house for the transactions of CSE. According to CSE, it consists of 295 listed companies relating to 20 business sectors as at 30 September 2016, with the market capitalization of LKR 2785.68 Billion. The two main price indices in the CSE are the ASPI and the S&P 20. Sri Lankan stock market was identified as an emerging stock market during the post internal conflict period with an increase in the ASPI. This is further illustrated in figure 1,

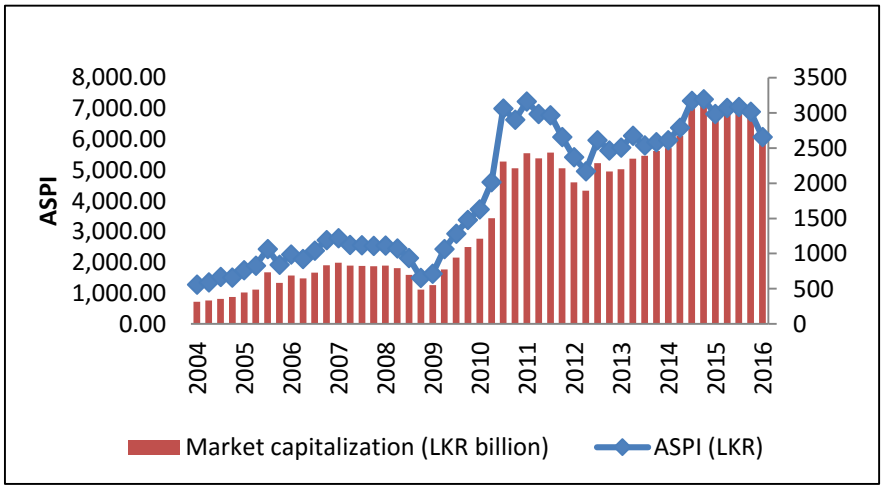

Figure 1: ASPI & Market Capitalization of CSE

Source: Author's own estimations

According to Figure 1 market capitalization was in line with the movements of the ASPI. It is observable that the performance of stock market was low till 2009 mainly because of the internal conflict in Sri Lanka. ASPI commenced to increase during 2009 which resulted an increase in the market capitalization. The ASPI grew from 1683 in 2009:1 to 7299 in 2014:4, however the increasing trend was not continued for a longer period of time which needed to be analysed further to identify the reasons.

Review of Literature

Chen et al. (1986) were the first to employ specific macroeconomic factors as proxies for undefined variables in the APT. They examined equity returns relative to a set of macroeconomic variables and found that the set of macroeconomic variables which can significantly explain stock returns includes growth in industrial production, changes in the risk premium, twists in the yield curve, measures of unanticipated inflation and changes in expected inflation during periods of volatile inflation.

Masuduzzaman (2012) studied the short-run and long-run relationship among macroeconomic fundamentals and the stock market returns of Germany and the United Kingdom (UK) by incorporating data on consumer price index (CPI), interest rate, exchange rate, money supply and industrial production during the period 1999-2011. Unit root test, Johansen co-integration test, VECM based Granger causality, variance decomposition analysis and impulse response analysis were the methodological designs used in the study. VECM was used as all the variables were I(1), and the findings of Johansen co-integration test identified that all five chosen macroeconomic variables were co-integrated with the stock returns in Germany and UK, where each case had been tested individually. Further, the findings ensured that there were short and long run causal relationship between stock return and macroeconomic variables in both countries. However, the number of short and long run causal relationships between variables were different for Germany and the UK. Different signs of Correlations were observed between macroeconomic variables and the stock return indices of Germany (LDAX30) and of the UK (LFTSE100), i.e. in the UK, consumer price index, and money supply had a negative relationship with LFTSE100 whereas a positive co-relation was observed between remaining three variables and the LFTSE100. In Germany negative correlation was observed only between LDAX30 and interest rate, where as this was positive in the UK.

The impact of changes in the macroeconomic variables: inflation, currency depreciation, interest rate, and money supply, on Stockholm Stock Exchange market had been tested considering the time period from 1993-2012 (Talla 2013). All the variables except money supply were stationary at the first difference. Ordinary Least Square (OLS) was used to identify the relationship after taking the first difference and second difference of the respective variables. The findings suggested, inflation and currency depreciation had significant impact on stock price, where as the impact of interest rate and money supply were insignificant. No unidirectional Granger Causality was found between stock prices and the above macroeconomic variables except a unidirectional Granger Causal relation from stock prices to inflation.

As per studies related to Sri Lanka, Menike (2006) studied the effects of macroeconomic variables on the stock prices of the companies listed in the CSE. Data for the study was collected on a sample of 34 listed companies out of 242 from eight sectors which resulted a sample size of 136 monthly observations. All the data on variables had been converted to natural logarithm to smoothen the data. Using multiple regression analysis it was found that most of the selected variables significantly associated with the stock

prices of the CSE where exchange rate was the most influential variable. One of the selected macroeconomic variables, money supply, had less predictability of the stock price of selected companies. In addition to four selected macroeconomic variables such as money supply, exchange rate, inflation rate and interest rate, some lag variables were included in the study to identify the lagged effect, which is strength of the study. Further, the researcher has identified research gaps for future research, such as include more variables, use a different methodology, and increase the number of observations that is, use weekly or daily data, which is also one of the strengths. Even though the research utilize time series data, in this study the stationary of the data had not been tested which is a limitation.

Senanayake and Wijayanayake (2010) utilized macroeconomic variables such as interest rate, inflation (Colombo Consumer Price Index), exchange rate, money supply and GDP to identify the impact of macroeconomic variables on the performance of the stock market. The performance was measured using ASPI, Milanka, and five major sector indices. The findings revealed that there was a significant impact from interest rate, inflation, GDP, and money supply on the stock market performance. However, the exchange rate was identified as insignificant in explaining the stock return which was contradicting to the findings of Menike (2006).

Jahufer and Irfan (2014), studied the contribution of four macroeconomic variables such as inflation, exchange rate, money market rate, and money supply of Sri Lanka on the performance of CSE. Johansen co-integration test and the VECM framework were the models used to identify the long and short run relationship between macroeconomic variables and the stock market returns. Akaike Information Criterion was used to select the optimal lag structure and 3 lags were utilized in Johensan Co-integration test. The findings of Johansen Co-integration specified that there was a long run equlibrium relationship existed between variables. The results of VECM ensured a short run relationship between the stock market index and macroeconomic variables such as money market rate and money supply. The results of ADF test specified all the variables were integrated in the same order I(1). One of the strengths of this parer is, the researcher has recommended some suggestions for ivestors on the impact of macroeconomic variables on portfolio diversification gains.

Kulathunga (2015), using descriptive statistics and multiple regression analysis found that the stock market development was affected by all macroeconomic variables that had been included in the study. Data for the study had been collected on a monthly basis from 2002-2014. The macroeconomic variables used in the study were inflation volatility, deposit interest rate, lending interest rate, exchange rate volatility and GDP. One of the strengths of this paper is, the researcher has identified research gaps for further research. The research gap was, include other factors such as institutional factors, industry specific factors, country specific factors, etc. in addition to macroeconomic factors in analyzing the impact.

Nijam, Ismail and Musthafa (2015), studied the impact of macroeconomic variables on the stock market performance (ASPI) of Sri Lanka employing data from 1980-2012. The macroeconomic variables utilized were GDP, inflation (wholesale price index), interest rate, balance of payment and exchange rate. OLS method had been employed to estimate the parameters of the regression model, with the application of log-log model. The results revealed the macroeconomic variables and the ASPI were significantly related. GDP, inflation, interest rate and exchange rate were significant whereas balance of payment was insignificant in determining the stock performance. Strength of the paper includes identification of the research gaps for future research. Research gap identified for further research was, include more macroeconomic variables and other indices of CSE, and conduct the study for a longer time

International Journal of Research
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e-ISSN: 2348-6848
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Volume 05 Issue 20
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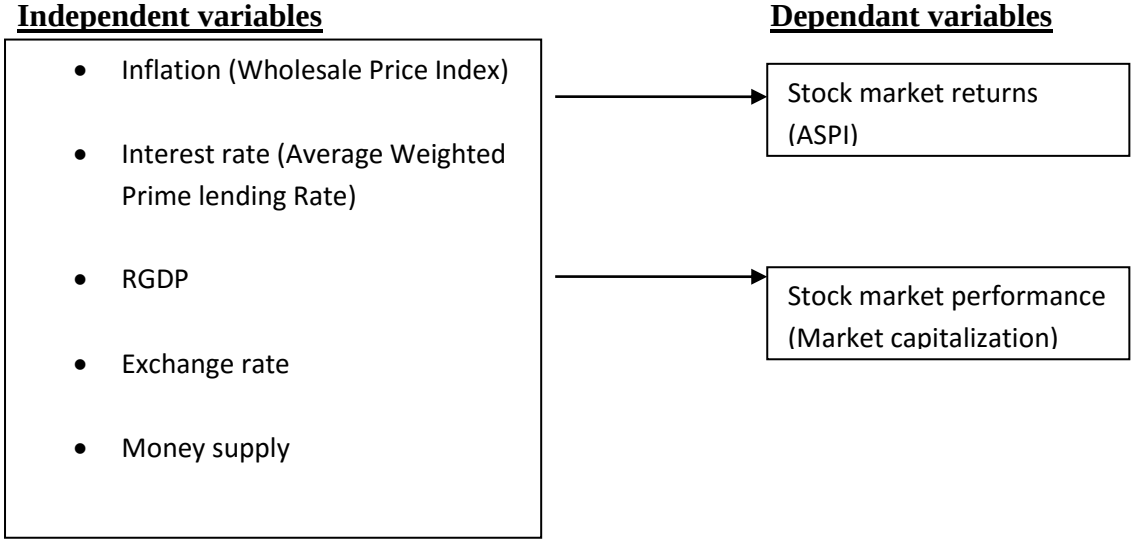
period. This study includes only 32 years the data which is a limitation, therefore inclusion of more observations could improve the results. Further, even though the data was a time series, the stationary of the variables had not been checked which is another limitation of the study.

Conceptual framework of the study

Figure 2: Conceptual Framework of the Study



Financial system stability is one of the core objectives of Central Bank of Sri Lanka (Central Bank of Sri Lanka), and the stability plays an important role in determining the sustainable economic growth of the country. The financial system stability is affected by the performance of the stock market of the economy. Stock market plays an important role in determining the economic growth as it transfers fund from the surplus unit to the deficit unit, and lead to efficient utilization of resources by transferring resources to most profitable investments.

Sri Lankan capital market had undergone a tremendous change after the liberalization of the economy in 1977, and after the end of thirty years of internal conflict in 2009. These changes brought number of changes to the macroeconomic variables and created a need to identify the impact of the macroeconomic variables on the performance of CSE (Nijam, Ismail & Musthafa 2015). Macroeconomic factors as an important factor in determining the stock market performance, this paper intended to identify 'Do macroeconomic factors affect the performance of CSE in Sri Lanka?'

1.4. Research objectives

To answer the above question, the research question was further divided into number of research objectives.

1.4.1. Main objectives

- Identify the impact of macroeconomic variables on the performance of the stock market in Sri Lanka.

1.4.2. Sub objectives

- Identify the impact of macroeconomic variables on the stock market return. Identify the impact of macroeconomic variables on the overall performance of the stock market. The proxy for overall stock market performance was market capitalization of CSE.

Methodology

Data

The method of data collection for the study was via secondary data source. Quarterly data on macroeconomic variables and stock market performance indicators were collected from Monthly Bulletins of the Central Bank of Sri Lanka from 2004:1-2016:1, these resulted in 49 observations. Explanatory variables included in the study were real GDP, inflation, money supply, exchange rate and interest rate, and ASPI and market capitalization were the stock market indicators. Natural logarithm of all the variables was taken into consideration to smoothen the variables (Menike 2006).

Table 1: Variables & Sources

Variable	Abbreviation	Data source
ASPI	ASPI	Central Bank monthly bulletin
Market capitalization	MC	Central Bank monthly bulletin
Real GDP	RGDP	Central Bank monthly bulletin
Inflation (wholesale price index)	INF	Central Bank monthly bulletin
Exchange rate (against USD)	ER	Central Bank monthly bulletin
Money supply	MS	Central Bank monthly bulletin
Interest rate (AWPR)	IR	Central Bank monthly bulletin

Source: Author's own source

Independent variables for the study had been identified based on the literature and a simple regression analysis (Appendix 1). Initially data on variables such as nominal GDP, real GDP, inflation, average weighted prime lending rate (AWPR), average weighted deposit rate (AWDR), money supply, exchange rate, real effective exchange rate (REER), total saving, government net cash surplus/ deficit, and crude oil prices were collected. Government net cash surplus/ deficit were dropped due to the incomplete data, and AWDR and REER were dropped due to insignificant relationship with the ASPI and MC in simple regression. Total saving was dropped due to multi-co-linearity problem (Appendix 2). Even though the AWPR had a R^2 of 33% with ASPI and 34% with MC in simple regression, it was included because interest rate was one of the important variables that affect the performance of stock market. RGDP was preferred to Nominal GDP because RGDP excluded the inflation impact.

Descriptive statistics

Descriptive statistics of the study explains on the central tendency and the measures of variability on the variables of the study. Central tendency includes mean, median and mode, and the measures of variability include standard deviation, minimum and maximum, and the kurtosis and skewness. Descriptive statistics were supported with graphical representation in explaining the relationship between the macroeconomic variables and the stock market performance.

Correlation analysis

The objective of the correlation analysis is to identify whether there is a positive or negative relationship between the variables. This includes the correlation among ASPI and the selected macroeconomic variables, and correlation among MC and the selected macroeconomic variables. The existence of correlation implies that there is a high chance that the macroeconomic variables can be used to predict the stock market performance.

Unit root test

The study employed time series data, therefore it is important to test the stationary of the data set. If the null hypothesis of unit root test cannot be rejected, then it could be concluded that the data set contain unit root. Using time series data with unit root provides 'spurious' regression results. Therefore it is important to ensure the stationary of the data set before they are been used in the regression analysis. Further, the type of the regression to be used in the analysis will be determined based on the results of the unit root test. The unit root was tested using two methods such as ADF test (Dickey & Fuller 1979) and PP test (Perron 1989).

Hypothesis for unit root test is,

Null hypothesis (H0): There is a unit root

Alternative hypothesis (H1): There is no unit root

Johansen Co-integration test

Co-integration is the situation where the non stationary time series of the same order, I (1), exist a long run relationship (Masuduzzaman 2012). After determining the order of integration, Johansen Co-integration test is performed to identify the existence of long term co-integrating relationship between stock return (ASPI) and macroeconomic variables, and between overall stock market performance (MC) and the five macroeconomic variables. Hypothesis for Johansen Co-integration test is,

H0 : There is no significant long term co-integration among the variables

H1: There is a significant long term co-integration among the variables

It is important to determine the optimal number of lag length to be used in the study. The methods available to select the optimal lag length are Akaike information criterion (AIC), Schwarz information criterion (SC), Sequential modified LR test statistic (each test at 5% level) (LR), Final prediction error (FPE), and Hannan-Quinn information criterion (HQ). All the methods are equally use full, however AIC and SC are the widely used methods in selecting optimal lag length.

Table 2: Lag Length Criteria for LASPI

Number of lags	LR	FPE	AIC	SC	HQ
0	NA	1.61e-10	-5.52	-5.28	-5.43
1	552.14	3.96e-16*	-18.45	-16.76*	-17.82*
2	51.66*	4.25e-16	-18.46	-15.33	-17.3
3	42.28	5.25e-16	-18.49*	-13.91	-16.78

4	29.05	1.01e-15	-18.34	-12.32	-16.1

Source: Author's own estimation

The optimal lag length of 1 was selected by minimizing the Schwarz Information Criterion (SC). Further, according to table 2 three methods such as FPE, SC and HQ suggest using 1 lag. Therefore the optimal lag length of 1 by minimizing the SC criterion had been used throughout the study.

Table 3: Lag Length Criteria for LMC

Number of lags	LR	FPE	AIC	SC	HQ
0	NA	1.66e-10	-5.493	-5.253	-5.404
1	552.089	4.08e-16	-18.422	-16.736*	-17.793*
2	-55.615*	3.88e-16*	-18.560	-15.428	-17.393
3	41.785	4.88e-16	-18.567*	-13.990	-16.861
4	30.222	8.90e-16	-18.478	-12.456	-16.233

Source: Author's own estimation

The optimal lag length of 1 was selected by minimizing the SC criterion when LMC was the independent variables.

Vector Error Correction Model

Using the VECM model it is possible to identify the long run and short run causality between the variables. If the variables are stationary at first difference and are co-integrated in the long run then the VECM model is recommended. If the null hypothesis of Johansen Co-integration test, there is no co-integration among the variables, is accepted then it implies that there is no long term co-integration, therefore unrestricted VAR model should be used. The findings of the stationary tests and co-integration test revealed that the variables were stationary at first difference, and there was a long run co-integration among variables. Therefore VECM model was employed to identify the long term and short term relationship between the dependent variables and macroeconomic variables. The generated eviews system equations to be used in the regression were,

D(LASPI) = C(1)*(LASPI(-1) + 0.657916616951*LRGDP(-1) + 4.21069398519*LWPI(-1) - 6.26000340145*LMS(-1) + 11.7717116861*LER(-1) - 0.731810259778*LAWPR(-1) + 57.8659758187) + C(2)*D(LASPI(-1)) + C(3)*D(LRGDP(-1)) + C(4)*D(LWPI(-1)) + C(5)*D(LMS(-1)) + C(6)*D(LER(-1)) + C(7)*D(LAWPR(-1)) + C(8). ..... (Eq5)

LASPI - Log ASPI; LRGDP - Log RGDP; LWPI - Log MS; LMS - Log MS; LER - Log ER; LAWPR - Log AWPR.

D(LMC) = C(1)*(LMC(-1) + 0.555891049664*LRGDP(-1) + 4.26831336453*LWPI(-1) - 6.51762004528*LMS(-1) + 12.0411662116*LER(-1) - 0.798405743457*LAWPR(-1) + 46.3554943507) + C(2)*D(LMC(-1)) + C(3)*D(LRGDP(-1)) +

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 20
September 2018

C(4)*D(LWPI(-1)) + C(5)*D(LMS(-1)) + C(6)*D(LER(-1)) + C(7)*D(LAWPR(-1)) + C(8). ..... (Eq6)

LMC - Log MC; LRGDP - Log RGDP; LWPI - Log MS; LMS - Log MS; LER - Log ER; LAWPR - Log AWPR.

Hypothesis for long term relationship

H0: There is no significant long term relation between the independent variables and the dependent variables

H1: There is a significant long term relation between the independent variables and the dependent variables.

Wald test

This section of the study explains the short term causal relationship between the independent variables and the dependent variables. If the null hypothesis of the Wald test is accepted then it could be concluded that there is no short run relationship between the particular independent variable and the dependent variable. Hypothesis for short term relation/ Wald test is,

H0: Coefficients of a independent variable = 0

H1: Coefficients of a independent variable =| 0

Granger Causality test

This was done to identify the causal relationship between the variables, unidirectional or bidirectional or no causal relationship between the variables. Rejection of the null hypothesis implies that there is a causal relationship between the variables. Hypothesis for Granger Causality is,

If there are 2 variables such as X and Y,

Descriptive statistics of variables

Table 4: Descriptive statistics

H0: X does not Granger Cause Y ⟶ Null hypothesis (1)

HO: Y does not Granger Cause X ⟶ Null hypothesis (2)

If both of the null hypothesises (1) and (2) could be rejected, then it could be concluded there is a bidirectional causal relation between X and Y. If only one these null hypothesis could be rejected, then there will be unidirectional relation, and if both the null hypothesis are accepted, then there is no causal relation between X and Y.

The main hypothesis of this study were,

a. H0: There is no impact from the selected macroeconomic variables on the stock returns of the CSE.

H1: There is an impact from the selected macroeconomic variables on the stock returns of the CSE.

b. H0: There is no impact from the selected macroeconomic variables on the overall performance of the CSE.

H1: There is an impact from the selected macroeconomic variables on the overall performance of the CSE.

Data Analysis and Discussion

Descriptive statistics

These statistics provide an overview of the sample and also describe and discuss on the general characteristics of the sample. Mean and median of the data had been considered under the central tendency. Standard deviation, minimum, maximum, kurtosis, and skewness were considered under measures of variability.

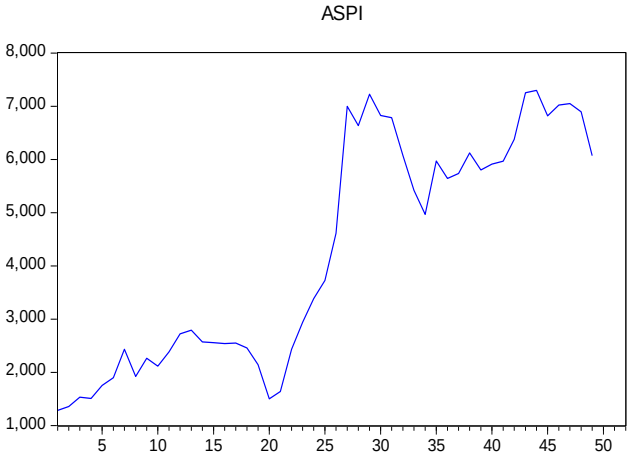
	ASPI	MC	RGDP	WPI	MS	ER	AWPR
Mean	4242.714	1.56e+12	9.27e+11	3701.363	1.90e+12	116.748	0.119
Median	3724.600	1.21e+12	6.39e+11	3781.100	1.60e+12	113.471	0.111
Maximum	7299.000	3.10e+12	2.39e+12	5193.300	4.21e+12	144.062	0.198
Minimum	1284.200	3.14e+11	2.23e+11	1777.900	6.06e+11	97.418	0.063
Std. Dev.	2155.779	9.47e+11	6.83e+11	1119.940	1.06e+12	12.968	0.037
Skewness	0.077	0.189	1.046	-0.303	0.605	0.525	0.543
Kurtosis	1.318	1.426	2.464	1.728	2.125	2.102	2.314
Jarque-Bera	5.821	5.346	9.526	4.050	4.547	3.895	3.364
Probability	0.054	0.069	0.008	0.132	0.103	0.143	0.186
Sum	207893	7.62e+13	4.54e+13	181366.8	9.30e+13	5720.661	5.860
Sum Sq. Dev.	2.23e+08	4.31e+25	2.24e+25	60204735	5.37e+25	8072.263	0.067
Observations	49	49	49	49	49	49	49

Source: Author's own estimation

All Share Price Index (ASPI)

ASPI had a mean value of 4242.714 with a maximum of 7299.000 and a minimum of 1284.200. This showed heavy variation in ASPI during the period from 2004-2016 where the range was 6014.800. This high value of ASPI was recorded in the post internal conflict period due to the positive expectations of the investors on the performance of the stock market and the economy. Higher level of variation in ASPI could also be ensured through the standard deviation of 2155.779.

Figure 3: Trend of ASPI



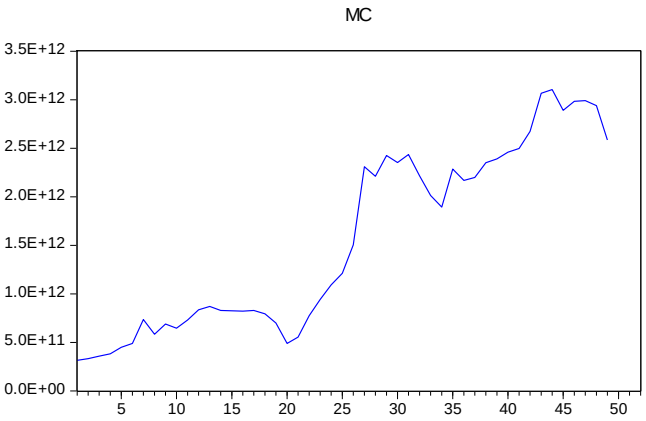
Source: Author's own estimation

Market Capitalization (MC)

The average MC of LKR 1560 Billion was recorded during the period from 2004:1-2016:1 with the number of observations of 49. The maximum of LKR 3100 Billion and a minimum of LKR 314 Billion were identified with the standard deviation of 947 Billion. MC is the multiplication of the market price of the share and the number of stocks outstanding. Therefore ASPI and MC move in the same pattern which could be

evidenced through figure 3 and 4 that had moved in the same pattern.

Figure 4: Trend of MC

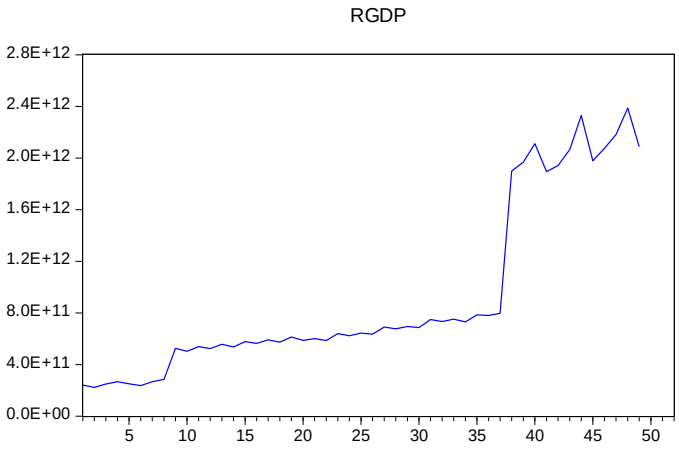


Source: Author's own estimations

Real Gross Domestic Product (RGDP)

The maximum RGDP recorded during the period from 2004:1- 2016:1 was LKR 2390 Billion and the minimum of LKR 223 Billion with the mean value of LKR 927 Billion. Standard deviation of 683 Billion and a range of 2167 Billion indicated that the values had deviated drastically from the mean value. The skewness of RGDP was 1.046, higher than1 therefore it could be concluded that the distribution was highly skewed. As per the figure5, in 2013 there was a drastic increase in the RGDP. This was mainly due to the increase in the net exports of Sri Lanka (Shiran & Ashini 2013).

Figure 5: Trend of RGDP



Source: Author's own estimations

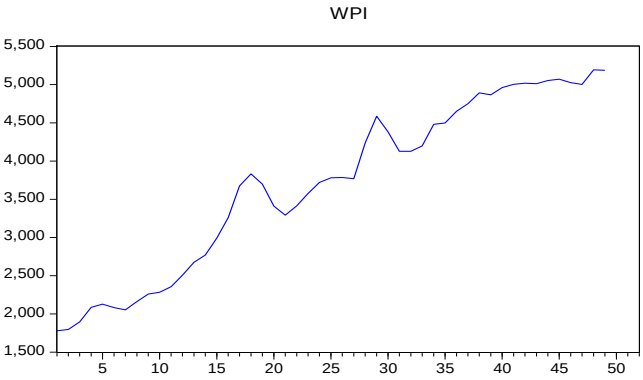
Inflation (Wholesale Price Index) (WPI)

Inflation had a mean value of 3701.363 and a median value of 3781.100 as a measure of central tendency. The maximum inflation recorded during the observed period was 5193.300 and a minimum of 1777.900. Having a standard deviation of 1119.940 and a range of 3415.400 indicated that

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 20
September 2018

there was a higher level of variation. The skewness was -0.303, WPI was the only variable which was negatively skewed or left skewed among the identified independent and dependent variables. WPI had a kurtosis of 1.728; therefore the distribution had heavier tails and was called a leptokurtic distribution.

Figure 6: Trend of WPI

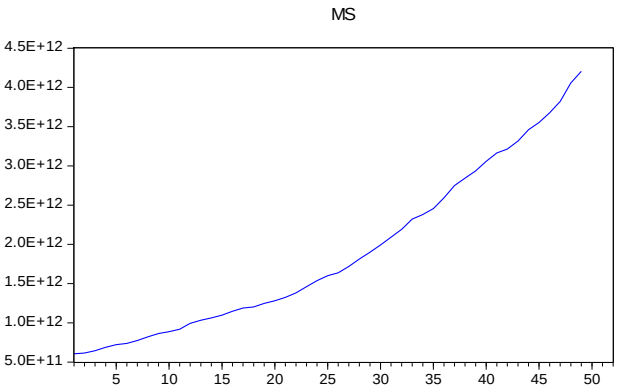


Source: Author's own estimations

Money Supply (MS)

Money supply had an average of LKR1900.000 Billion and a range of LKR3604.000 Billion during the period 2004-2016 with 49 observations. This showed a higher variation during the observed period with a standard deviation of 1060.000 Billion. MS had a skewness of 0.605, positively skewed, and a kurtosis of 2.125 implied that the distribution was a leptokurtic distribution.

Figure 7: Trend of MS



Source: Author's own estimations

Exchange rate (ER/ LKR/USD)

The average value of exchange rate (LKR/USD) was 116.748 was driven by a maximum of 144.062 and a minimum of 97.418 during the sample period with a standard deviation of 12.968. The distribution was moderately positively skewed and was a leptokurtic distribution. The exchange rate system of Sri Lanka became a free floating system in 2015 which led to record a maximum ER value of 144.062.

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
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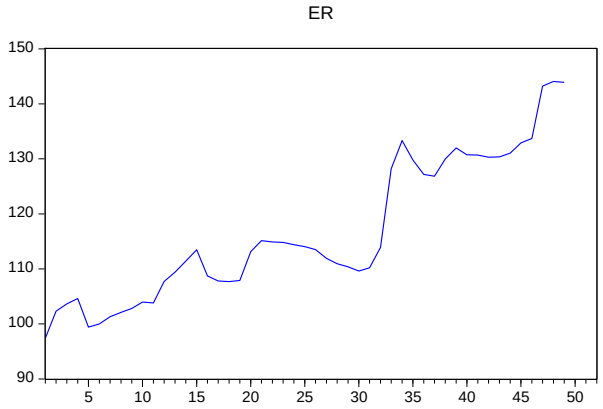
Figure 8: Trend of ER

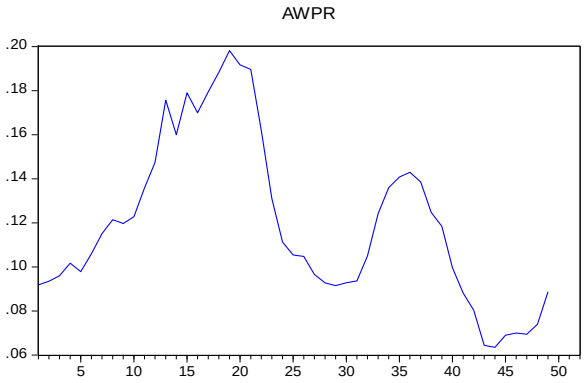


Source: Author's own estimations

Interest rate (Average Weighted Prime Lending Rate) (AWPR)

The AWPR recorded a maximum of 19.800% and a minimum of 6.300% with a mean value of 11.900% during the observed period. This higher level of AWPR was recorded in 2008; the reasons for this could be the global financial crisis and internal conflict in the Country. The distribution was positively skewed, and leptokurtic distribution, with a standard deviation of 0.037

Figure 9: Trend of AWPR



Source: Author's own estimation

Relationship between independent variables and dependent variables.

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
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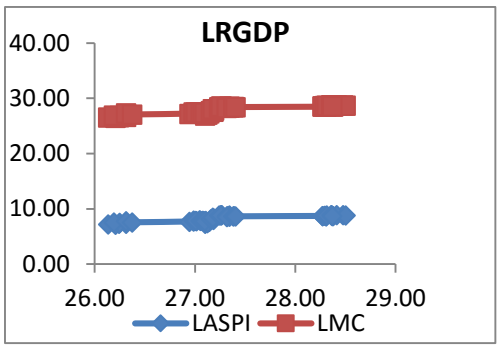
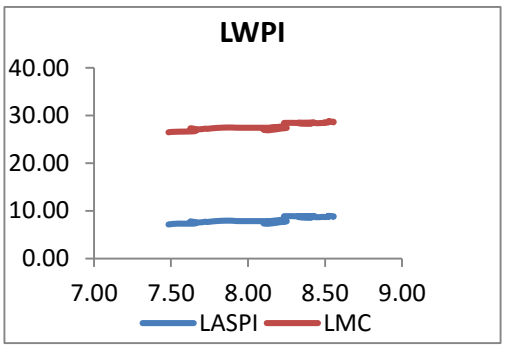
Figure 10: LRGDP with LASPI & LMC



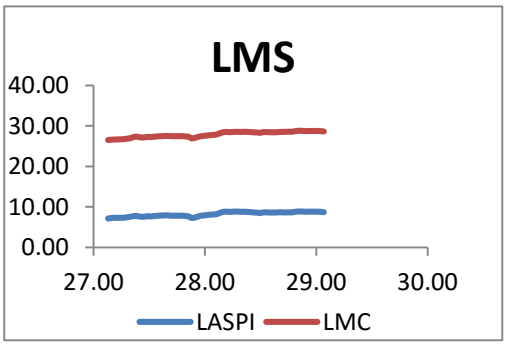
Source: Author's own estimations

Figure 11: LWPI with LASPI & LMC



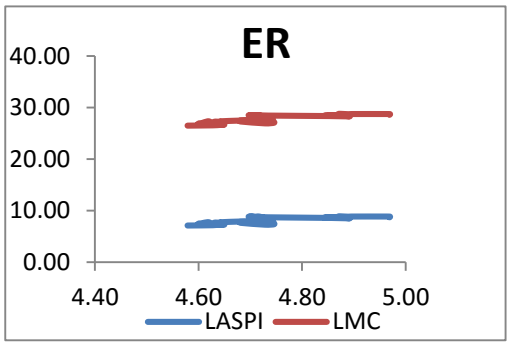
Source: Author's own estimations

Figure 12: LMS with LASPI & LMC



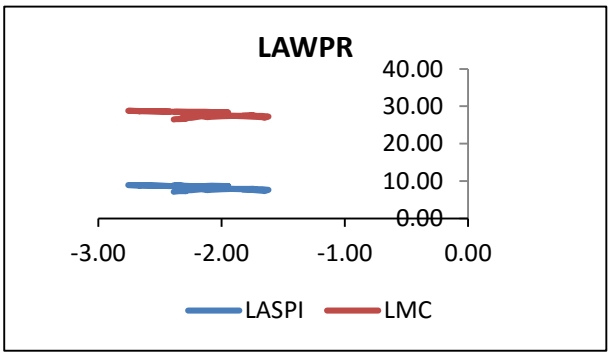
Source: Author's own estimations

Figure 13: LER with LASPI & LMC



Source: Author's own estimations

Figure 14: LAWPR with LASPI & LMC



Source: Author's own estimations

According to the figures above other than AWPR, all the independent variables RGDP, WPI, MS, and ER had a positive relationship with the ASPI and MC.

Correlation analysis

A correlation analysis was done to identify the relationship between the independent variables and the dependent variables. The correlation between the macroeconomic variables and the stock market performance had been done separately for ASPI and MC.

Correlation analysis - LASPI

Table 5: Correlation Matrix (LASPI)

	LASPI	LAWPR	LER	LMS	LRGDP	LWPI
LASPI	1.000					
LAWPR	-0.519	1.000				
LER	0.763	-0.365	1.000			
LMS	0.907	-0.440	0.938	1.000		
LRGDP	0.810	-0.421	0.904	0.939	1.000	
LWPI	0.880	-0.270	0.858	0.958	0.886	1.000

Source: Author's own estimations

Correlation analysis - LMC

Table 6: Correlation Matrix (LMC)

	LMC	LAWPR	LER	LMS	LRGDP	LWPI
LMC	1.000					
LAWPR	-0.485	1.000				
LER	0.817	-0.365	1.000			
LMS	0.944	-0.440	0.938	1.000		
LRGDP	0.862	-0.421	0.904	0.939	1.000	
LWPI	0.914	-0.270	0.858	0.958	0.886	1.000

Source: Authors own estimations

According to tables 5 and 6 LAWPR was the only variable which had a negative correlation with the LASPI and LMC. There was a strong positive correlation between the independent variables LRGDP, LWPI, LMS, LER and the dependent variables LASPI and LMC. These findings were in line with the findings of the descriptive statistics of the study. It could be concluded that the selected macroeconomic variables could predict the performance of the stock market of Sri Lanka as there was a high correlation between the macroeconomic variables and the performance of the stock market.

Unit Root test

The methods that had been used to test the stationary were ADF test which is a parametric test and PP test which is a non-parametric test. In ADF and PP tests the null hypothesis of unit root to be rejected; the absolute value of test statistic should be greater than the absolute value of the critical value and the test statistic should be negative. The PP test does Heteroskedasticity and Autocorrelation Consistency correction to DF test statistic. However PP test is optimum for the large sample.

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
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Table 7: Unit Root Test Output

Variable	ADF test				PP test			
	Level		First difference		Level		First difference	
	t-statistic	Critical value	t-statistic	Critical value	t-statistic	Critical value	t-statistic	Critical value
LASPI	-1.65	-2.92	-5.67*	-2.92	-1.62	-2.92	-5.70*	-2.92
LMC	-1.68	-2.92	-5.96*	-2.92	-1.68	-2.92	-5.96*	-2.92
LRGDP	-0.88	-2.92	-7.34*	-2.92	-0.79	-2.92	-7.41*	-2.92
LWPI	-2.13	-2.92	-5.67*	-2.92	-3.18*	-2.92	-3.67*	-2.92
LMS	-0.58	-2.92	-6.17*	-2.92	-0.60	-2.92	-6.17*	-2.92
LER	-0.48	-2.92	-5.26*	-2.92	-0.22	-2.92	-5.30*	-2.92
LAWPR	-2.70	-2.92	-3.51*	-2.92	-1.63	-2.92	-3.50*	-2.92

* Stationary at 5% significance level.

Source: Author's own estimations

As per table 7 LASPI, LMC, LRGDP, LWPI, LMS, LER, and LAWPR were stationary at first difference. Based on the outcome of the ADF test, none of the variables were stationary at level. However, at the first difference of all the variables the null hypothesis of unit root, H0: There is unit root (data are non-stationary), could be rejected at 5% significance level.

Johansen test of Co-integration

Johansen test of Co-integration was conducted to identify the long run co-integration among the variables. This method is to be used when all the variables are integrated of same order. According to table 7 all the variables were non-stationary at level, and were stationary at first difference which implied all the variables were integrated of same order. Therefore it was possible to use the Johansen test of Co-integration. The optimal lag length of 1 was used and the output of the test is as follows,

Table 8: Johansen Co-integration Output

	H0	Trace test statistic	5% Critical Value	Maximum Eigen values test	5% Critical value
LASPI	r = 0	101.130*	95.754	46.511*	40.077
	r ≤ 1	54.619	69.819	25.452	33.877
	r ≤ 2	29.166	47.856	15.331	27.584
	r ≤ 3	13.835	29.797	8.907	21.132
	r ≤ 4	4.928	15.495	4.877	14.265
LMC	r = 0	104.898*	95.754	48.270*	40.077
	r ≤ 1	56.628	69.819	26.705	33.877
	r ≤ 2	29.923	47.856	16.296	27.584
	r ≤ 3	13.627	29.797	8.785	21.132
	r ≤ 4	4.842	15.495	4.825	14.265

* indicates that the test statistics are significant at 5% significance level.

Source: Author's own estimations

If the decision of the Johansen Co-integration test is to be made based on the Trace statistic; the null hypothesis of the test could be rejected only when the Trace test statistics is higher than the critical value. If the decision is based on the Maximum Eigen value, the null hypothesis is to be rejected when the Max-Eigen statistic is higher than the critical value. When r = 0 (r - number of co-integration), the null hypothesis could be rejected as the Trace stat and the Max-Eigen values are higher than the critical values at 5% significance level. The null hypothesis of at most one co-integrating equation (r =1) should be accepted as the Trace stat and the Max-Eigen vales were less than the critical value at 5% significance level. Both Trace statistic and the Max-Eigen value statistic stated there was 1 co-integrating equation at 5% significance level. Therefore it could be concluded that the macroeconomic variables and the stock market performance were co-integrated in the long term. The results were same for both dependent variables LASPI and LMC.

Long term co-integrating equations were,

LASPI = 57.866 + 0.658 LRGDP +4.211 LWPI - 6.260 LMS + 11.772 LER - 0.732 LAWPR ..... (Eq7)

LMC = 46.355 + 0.556 RGDP + 4.268 LWPI - 6.518 LMS +12.041 LER - 0.798 LAWPR ..... (Eq8)

According to the equations (7) and (8), LRGDP, LWPI, and LER had a positive relationship with the LASPI and LMC. Increase in LRGDP increases the level of performance of companies and lead to higher LASPI and LMC as expected. This is in line with the findings of Sikalao and Raymond (2014), Nijam, Ismail and Musthafa (2015). Inflation had a positive impact, therefore it could be concluded that inflation in Sri Lanka was an expected inflation. Jahufer and Irfan (2014), Tangjitprom (2012), Kumar (2013), Sikalao and Raymond (2014), Tripathi and Seth (2014), Ouma and Muriu (2014) had also found a positive impact from inflation to stock market performance. Exchange rate had a positive impact; therefore depreciation of LKR against the USD had increased the ASPI and MC of the stock market of Sri Lanka. The findings of Nijam, Ismail and Musthafa (2015), Gatuhi, Gekara and Muturi (2015), revealed a positive impact from exchange rate to stock market performance.

Money supply had a negative impact on the ASPI and the MC of the CSE; this was opposed to the expected results. Alam and Rashid (2014), Sikalao and Raymond (2014), Nader and Alraimony (2012) had also found a negative relationship. The interest rate had a negative impact as expected. Increase in the interest rate leads to increase the discount rate and a decrease in the present value of the future expected cash flows. The findings of Jahufer and Irfan (2014), Alam and Rashid (2014) also supported a negative relationship.

Vector Error Correction Model (VECM)

As there was a long term co-integration among the variables it was possible to use the VECM model.

The VECM output

Table 9: VECM Regression Output

	Variables	**Coefficient**	**t-Statistic**	**Prob.**
	ECT_1	-0.177	-2.077	0.044
	D(LASPI(-1))	0.239	1.498	0.142

LASPI	D(LRGDP(-1))	-0.256	-2.071	0.045
	D(LWPI(-1))	1.521	2.145	0.038
	D(LMS(-1))	-3.689	-2.184	0.035
	D(LER(-1))	1.202	1.371	0.178
	D(LAWPR(-1))	-0.531	-2.136	0.039
	C	0.138	2.179	0.035
LMC	ECT_2	-0.195	-2.107	0.042
	D(LMC(-1))	0.214	1.308	0.198
	D(LRGDP(-1))	-0.218	-1.687	0.099
	D(LWPI(-1))	1.582	2.084	0.044
	D(LMS(-1))	-3.946	-2.195	0.034
	D(LER(-1))	1.193	1.292	0.204
	D(LAWPR(-1))	-0.498	-1.946	0.059
	C	0.155	2.341	0.024

Source: Author's own estimations

ECT - Speed of Adjustment; D(LASPI(-1)) - First difference of Lag 1 of LASPI; D(LRGDP(-1)) - First difference of Lag 1 of LRGDP; D(LWPI(-1)) - First difference of Lag 1 of LWPI; D(LMS(-1)) - First difference of Lag 1 of LMS; D(LER(-1)) - First difference of Lag 1 of LER; D(LAWPR(-1)) - First difference of Lag 1 of LAWPR; C - Constant (Intercept); D(LMC(-1)) - First difference of Lag 1 of LMC.

The regression equation when D (LASPI) was the dependent variable,

$Y = \alpha + \beta x_n + \epsilon$

D(LASPI) = 0.138 - 0.177*(LASPI(-1) + 0.658*LRGDP(-1) + 4.211*WPI(-1) - 6.260*LMS(-1) + 11.772*LER(-1) - 0.732*LAWPR(-1) + 57.866) + 0.239*D(LASPI(-1)) - 0.256*D(LRGDP(-1)) + 1.521*D(LWPI(-1)) - 3.689*D(LMS(-1)) + 1.202*D(LER(-1)) - 0.531*D(LAWPR(-1)) .....(Eq9)

D (LASPI) - First difference of LASPI; -0.177*(LASPI (-1) + 0.658*LRGDP (-1) + 4.211*WPI (-1) - 6.260*LMS (-1) + 11.772*LER (-1) - 0.732*LAWPR (-1) + 57.866) - Co-integrating equation.

The regression equation when D (LMC) was the dependent variable,

D(LMC) = 0.155 - 0.195*(LMC(-1) + 0.556*LRGDP(-1) + 4.268*LWPI(-1) - 6.518*LMS(-1) + 12.041*LER(-1) - 0.798*LAWPR(-1) + 46.355) + 0.214*D(LMC(-1)) - 0.218*D(LRGDP(-1)) + 1.582*D(LWPI(-1)) - 3.946*D(LMS(-1)) + 1.193*D(LER(-1)) - 0.498*D(LAWPR(-1)) ..... (Eq10)

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Available at https://pen2print.org/index.php/ijr/
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D(LMC) - First difference of LMC; -0.195*(LMC(-1) + 0.556*LRGDP(-1) + 4.268*LWPI(-1) - 6.518*LMS(-1) + 12.041*LER(-1) - 0.798*LAWPR(-1) + 46.355) - Co-integration equation; D(LMC) - First difference of LMC; LMC(-1) - Lag 1 of LMC; D(LMC(-1)) - First difference of lag 1 of LMC.

Long term relationship

LASPI

The findings revealed that there was a three months lag effect in determining the LASPI of a particular quarter. ECT, the speed of adjustment towards the long run equilibrium was 17.700%, to ensure the long run causality running from the macroeconomic variables to LASPI, the coefficient of ECT should be negative and significant at 5% significance level. According to the table 9, ECT_1 was significant as the P-value was less than the significance level of 5% and the coefficient was negative. It could be concluded that there was a long run causality running from the macroeconomic variables LRGDP, LWPI, LMS, LER and LAWPR to LASPI. The long run equilibrium could be reached at a speed of 17.700%. A detailed VECM output had been included in Appendix 3.

LMC

There was a three months of lag effect in determining the first difference of LMC of a particular quarter. The speed of adjustment, ECT_2, was 19.500%, i.e., the long run equilibrium could be reached at a speed of 19.500% at 5% significance level. It could be concluded that a long run causality running from LRGDP, LWPI, LMS, LER and LAWPR to LMC.

Short term relationship - Wald test

The short run causality from the macroeconomic variables to stock market performance in the VECM model had been tested using the Wald Test Statistic. Rejection of null hypothesis (H0) implies that there is a short run causality running from the particular independent variable to dependent variable. The outcome of the Wald test is given bellow,

Table 10: Wald test Output

	Variable	H0	Chi-square	Probability	Accept/ Reject H0 at 5% significance
LASPI	LRGDP (C3)	C(3) = 0	4.290	0.038	Reject
	LWPI (C4)	C(4) = 0	4.600	0.032	Reject
	LMS (C5)	C(5) = 0	4.769	0.029	Reject
	LER (C6)	C(6) = 0	1.879	0.170	Accept
	LAWPR (C7)	C(7) = 0	4.562	0.033	Reject
LMC	LRGDP (C3)	C(3) = 0	2.847	0.091	Accept
	LWPI (C4)	C(4) = 0	4.345	0.037	Reject
	LMS (C5)	C(5) = 0	4.817	0.028	Reject
	LER (C6)	C(6) = 0	1.669	0.196	Accept
	LAWPR (C7)	C(7) = 0	3.786	0.052	Accept

Source: Author's own estimations

According to table 10 there was a significant short run causality running from LRGDP, LWPI, LMS and LAWPR to LASPI at a 5% significance level. Significant short run relationship was also observed between LWPI and LMC and between LAWPR and LMC at 5% significance level. There was no short run causality running from LER to LASPI, LRGDP to LMC, LER to LMC, and LAWPR to LMC.

International Journal of Research
Available at https://pen2print.org/index.php/ijr/
e-ISSN: 2348-6848
p-ISSN: 2348-795X
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Further LRGDP, LMS and LAWPR were lagged by 1 period and had a negative influence whereas LWPI and LER lagged by 1 period had a positive influence on the LASPI and LMC. Explanatory variables such as RGDP and LMS were expected to have a positive relationship with the stock market performance; however the findings were not in line with the expectation. LWPI had a positive influence, therefore it can be concluded that the inflation in the Sri Lankan market is an expected inflation. LER had a positive impact that is depreciation of the domestic currency (LKR) had a positive impact on the performance of the CSE. LAWPR had a negative influence on the stock market performance which is in line with the expectation.

Validity of the Model - LASPI

Validity of the model could be tested through R-square (R^2), Serial correlation test and Heteroskedasticity test on the residual of the model. The model had an R square of 26.888%, which implied, c.27.000% of the variation in the response variable, LASPI could be explained utilizing the above identified macroeconomic variables LRGDP, LWPI, LMS, LER and LAWPR.

Residual analysis

Serial Correlation test

Serial correlation of the residuals had been tested using the Breusch-Godfrey Serial Correlation LM Test. The null hypothesis (H0) of the test is 'There is no serial correlation' and the null hypothesis could be rejected when the P-Value of the test is less than the significance level of 5%. The output of the test is as follows,

Table 11: Serial Correlation (LASPI)

Breusch-Godfrey Serial Correlation LM Test	
F-Statistic	1.574
Obs*R-squared	1.869
Prob. F (1,38)	0.217
Pro. Chi-Square (1)	0.172

Source: Author's own estimations

The P-value was 17.200% which was more than 5%, therefore the null hypothesis could not be rejected and it could be concluded that the model had no serial correlation problem.

Heteroskedasticity test

Heteroskedasticity of the model had been tested using Breusch-Pagan-Godfrey test. The null hypothesis (H0) is, the model does not contain heteroskedasticity, and it could be rejected when the calculated P-value is less than 5% significance level. The output of the Breusch-Godfrey test is as follows,

Table 12: Heteroskedasticity (LASPI)

F-Statistic	1.353	Prob. F (12,34)	0.236
Obs*R-squared	15.189	Prob. Chi-Square (12)	0.231
Scaled explained SS	15.792	Prob. Chi-Square (12)	0.201

Source: Author's own estimations

The calculated P-value was 23.100% which is higher than the significance level of 5%, the null hypothesis of no heteroskedasticity could not be rejected at 5% significance level and it could be concluded that the model had no heteroskedasticity.

Residual analysis

Serial Correlation test

Table 13: Serial Correlation (LMC)

Breusch-Godfrey Serial Correlation LM Test	
F-Statistic	0.832
Obs*R-squared	1.007
Prob. F (1,38)	0.367
Pro. Chi-Square (1)	0.315

Source: Author's own estimations

The probability value was 31.570% which is more than 5%; therefore the null hypothesis could not be rejected at a significance level of 5%. It could be concluded that the model had no serial correlation.

Heteroskedasticity test

Table 14: Heteroskedasticity (LMC)

Breusch-Pagan-Godfrey test			
F-Statistic	1.996	Prob. F (12,34)	0.057
Obs*R-squared	19.425	Prob. Chi-Square (12)	0.079
Scaled explained SS	18.125	Prob. Chi-Square (12)	0.112

Source: Author's own estimations

The P-value was 7.900% which is more than 5%; therefore the null hypothesis of no heteroskedasticity in the model could not be rejected at a significance level of 5%. Therefore the residuals of the model had no heteroskedasticity.

Granger Causality test in VECM Environment

Granger Causality Output - VECM (LASPI)

Table 15: Granger Causality Output (LASPI)

Validity of the Model - LMC

The R-square of the model was 22.656% that is c. 23.000% of the variations in the dependent variable; LMC could be explained using the model.

Granger Causality test was done to identify the causal relationship between the variables, unidirectional or bidirectional or no causal relationship. The null hypothesis (H0) is, there is no causal relationship between 2 variables. The null hypothesis can be rejected when the probability value is less than the significance level of 5%.

Null hypothesis (HO)	Probability value	Accept/ Reject the H0 at 5% significance level
D(LRGDP) does not cause D(LASPI)	0.038	Reject
D(LASPI) does not cause D(LRGDP)	0.740	Accept
D(LWPI) does not cause D(LASPI)	0.032	Reject
D(LASPI) does not cause D(LWPI)	0.007	Reject
D(LMS) does not cause D(LASPI)	0.029	Reject
D(LASPI) does not cause D(LMS)	0.007	Reject
D(LER) does not cause D(LASPI)	0.170	Accept
D(LASPI) does not cause D(LER)	0.978	Accept
D(LAWPR) does not cause D(LASPI)	0.033	Reject
D(LASPI) does not cause D(AWPR)	0.506	Accept

Source: Author's own estimations

According to the table 15 two bi-directional causal relationship were observed, i.e., between D (LWPI) and D (LASPI), and between D (LMS) and D (LASPI). The ASPI was affected by the changes in the inflation and money supply, and at the same time ASPI acted as the leading indicator in determining the inflation and money supply. Some unidirectional causalities were running from D (LRGDP) to D (LASPI) and D (LAWPR) to D (LASPI). No causality was observed between LER and LASPI.

Granger Causality Output - VECM (LMC)

Table 16: Granger Causality Output (LMC)

Null hypothesis (HO)	Probability value	Accept/ Reject the H0 at 5% significance level
D(LRGDP) does not cause D(LMC)	0.091	Accept
D(LMC) does not cause D(LRGDP)	0.681	Accept
D(LWPI) does not cause D(LMC)	0.037	Reject
D(LMC) does not cause D(LWPI)	0.008	Reject
D(LMS) does not cause D(LMC)	0.028	Reject
D(LMC) does not cause D(LMS)	0.008	Reject
D(LER) does not cause D(LMC)	0.196	Accept
D(LMC) does not cause D(LER)	0.803	Accept
D(LAWPR) does not cause D(LMC)	0.052	Accept
D(LMC) does not cause D(LAWPR)	0.433	Accept

Source: Author's own estimations

According to the table above there were two bidirectional causalities; between D (LWPI) and D (LMC), and between D (LMS) and D (LMC). There were no unidirectional causalities observed between the independent variables and the LMC.

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4.8. Testing of Hypothesis

Null hypothesis (H0): There is no impact from the selected macroeconomic variables on the stock returns of the CSE (ASPI).

Alternative hypothesis (H1): There is an impact from the selected macroeconomic variables on the stock returns of the CSE (ASPI).

The null hypothesis (H0) could be rejected as there were significant long term and short term relationship between the macroeconomic variables and the stock market return. Significant short term relationship was observed between LRGDP, LWPI, LMS, LAWPR and LASPI at 5% significance level; however LER was not significant at the confidence level of 95%.

H0: There is no impact from the selected macroeconomic variables on the overall performance of the CSE (MC).

H1: There is an impact from the selected macroeconomic variables on the overall performance of the CSE (MC).

The null hypothesis was rejected; there were significant short term and long term relationship between the macroeconomic variables and the overall performance of the CSE. Significant short term relationship was observed between macroeconomic variables LWPI, LMS and LMC at a significance level of 5%.

H0: There is no significant long term relation between the independent variables and the dependent variables.

H1: There is a significant long term relation between the independent variables and the dependent variables.

e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 20
September 2018

The null hypothesis had been rejected for both dependent variables such as LASPI and LMC at significance level of 5%. The speed of adjustment was significant at 5% significance level and negative in the VECM models of LASPI and LMC. Therefore it was concluded there was a long term relationship between the macroeconomic variables and the performance of the CSE.

H0: There is no significant short term relationship between the independent variables and the dependent variables.

H1: There is a significant short term relationship between the independent variables and the dependent variables.

The null hypothesis (H0) was rejected at 5% significance level for macroeconomic variables LRGDP, LWPI, LMS, and LAWPR when LASPI was the dependent variable.

There was a significant short term relationship between the LMC and LMS, and between LMC and LWPI at a confidence level of 95%. However the null hypothesis was accepted for other macroeconomic variables such as LRGDP, LER, and LAWPR at 5% significance level.

H0: There was no causal relationship between the variables.

H1: There was causal relationship between the variables.

The null hypothesis was rejected at a significance level of 5% as there were number of bidirectional and unidirectional Granger Causalities were observed between the independent variables and the dependent variables.

Conclusion

This study is on the impact of macroeconomic variables on the performance of the stock market in Sri Lanka. The macroeconomic variables selected for the study were Real GDP, inflation (WPI), money supply (M2), exchange rate (LKR/USD), and interest rate (AWPR). The performance of the stock market was proxied by two variables ASPI and market capitalization. ASPI was to represent the stock return, and market capitalization was to overall stock market performance. The data on the above variables were collected from the monthly bulletins of Central Bank of Sri Lanka (CBSL) on a quarterly basis from 2004: 1 to 2016:1. Quarterly data had been used because data on Real GDP had been calculated on a quarterly basis by CBSL.

Data analysis was initiated with the descriptive statistics supported with graphical explanations. A correlation analysis was done to identify the relationship between the variables. Then the Variables were tested for unit root and identified none of the variables were stationary at level, however all the variables were stationary at the first difference. Therefore all the variables were integrated at the same order, I (1), and the Johansen Co-integration test was performed to identify the long run co-integration among the variables. As there was one co-integration equation among the variables, it was possible to use the VECM model. The optimal lag length of 1

was selected by minimizing the Schwarz Information Criterion (SC). The VECM model was performed to identify the long run and short run causalities among the variables with the support of Wald test to identify the short term relationship between the macroeconomic variables and the stock market performance. Finally Granger Causality test was conducted to identify the direction of the causality, unidirectional; bidirectional or no causality, between the independent variables and the dependent variables.

The findings of the descriptive statistics and the correlation analysis revealed that the macroeconomic variables LRGDP, LWPI, LMS and LER had a positive influence on the stock market performance, and the relationship was negative between the LAWPR and the stock market performance. The results of the VECM revealed that LRGDP, lagged by 1 period had a negative relationship with the LASPI, which is contradicting with the expected results. LWPI and LER, lagged by one period had a positive impact whereas LMS and LAWPR, lagged by one period had a negative impact in determining the ASPI. In addition to the macroeconomic factors it was observable that the ASPI lagged by 1 period also impacted in determining the stock return of CSE. The speed of adjustment was negative and significant at 5% significance level, therefore it was concluded that there was a long run causality running from the macroeconomic variables to LASPI and the long run equilibrium could be reached at a speed of 17.700%. The results of the Wald test identified that there were short run causalities running from LRGDP to LASPI, LWPI to LASPI, LMS to LASPI, and LAWPR to LASPI at 5% significance level. However, the R-square was only 26.888%; therefore c. 73.000% of the variations in the LASPI had been explained by some other variables. There were two bidirectional causalities observed between macroeconomic variables and the ASPI, the causality between LMS and LASPI and the causality between LWPI and LASPI. Some unidirectional causalities running from LRGDP to LASPI and LAWPR to LASPI were also identified.

The results of the VECM model when LMC as the dependent variable revealed there was a long run and short run causality running between the independent variables and the dependent variable. LRGDP, LMS, LAWPR; lagged by 1 period had a negative impact whereas LWPI and LER; lagged by 1 period had a positive impact on the LMC of CSE. The long run equilibrium could be reached at a speed of 19.500% as the speed of adjustment was significant at 5% significance level and the coefficient of ECT was negative. Short run relationship existed between the LWPI and LMC, and between LMS and LMC. The R-square of the model was c.23.000%; therefore c. 77.000% of the variations in the LMC of CSE had been explained by other macroeconomic variables not accounted for this study, firm specific factors and industry specific factors. LWPI and LMS had bidirectional causality with LMC and there were no unidirectional causalities observed between the macroeconomic variables and the LMC.

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