Dynamic Relationship between Macroeconomic Variables and Stock Returns: Empirical Evidence in Case of Sri Lanka

N. Rajeshwaran[a,*]

[a] Department of Commerce, Faculty of Commerce and Management, Eastern University, Sri Lanka

ABSTRACT

Linkages between macroeconomic variables (MV) and stock return are still obscure in developing counties as mixed results were observed by various researchers in different time intervals. Therefore, the objectives of the study are (i) to identify the relationship between MV (exchange rate, interest rate, inflation rate, money supply) and all share total returns (ASTRI) of listed companies in Colombo Stock Exchange (CSE) in Sri Lanka during 2010 to 2017 and (ii) to examine whether long run or short run causality running from MV to ASTRI of listed companies in CSE. Period of research data covers from 2010 to 2017. ASTRI of this period was collected from Data Library of CSE. Inflation rate, three-month primary market Treasury bill yield rate, Broad money supply (M2) and Exchange rate were collected from website of Central Bank of Sri Lanka. Descriptive, ADF test for unit root, Johnson co-integration test and VECM are used to analyse the collected data. Results show that ADF variables are stationary $I(1)$. Johansen tests for co-integration reveals that there is one co-integration between MV and ASTRI. It is also noted that there is no significance short run causality from MV to ASTRI. However, it observed that out of four MV, exchange rate is notable negative impact on ASTRI in short run. It is concluded that in the long run, Interest rate and Money Supply have a positive impact on ASTRI whereas Exchange rate and Inflation rate have a negative impact on ASTRI. Findings of the study help to existing and prospective investors, mangers of the company and policy makers how MV to be considered to make decision as those variables impact on the stock return.

Keywords: Macroeconomic variables, All Share Total Return Indices, Johnson co-integration, VECM, Colombo Stock Exchange

*Corresponding Author: rajesheusl@gmail.com

1. Background of the research

The Colombo Stock Exchange (CSE) is a company that is limited by guarantee and licensed by the Securities and Exchange Commission of Sri Lanka to provide a transparent and regulated environment where companies and investors can come together to trade their shares. As at 31st December 2018, 297 public limited companies were listed at CSE representing 20 business sectors with a Market Capitalization of Rs. 2,919.7 Bn. (Colombo Stock Exchange, 2019). Even though share price is fixed automatically according to demand and supply, still it is not clear on what basis share price is decided by the investors to exchange.

There are number of studies conducted to examine the relationship between financial performance (such as earning per share, dividend per share, etc.) and stock price (Dissabandara, 2001; Ramesh and Nimalathasan, 2011; Mgbame and Ikhatua, 2013). Similarly, the relationship between stock price and macroeconomic variables has been studying since 1970s in developed as well as emerging countries. The investigation of interdependence between share market and real economy is vital to economist and investors. Because, movement of share price helps to predict economic growth. On the other hand, investors may decide whether invest on shares or retain the bought shares or sell bought shares, based on the movement of macroeconomic variables like exchange rate, interest rate, inflation rate, money supply (Mazuruse, 2014).

A study was conducted how accounting variables, such as earning per share, divided per share and book value of share, impact on share price by considering 100 companies over the period 2008–2012 (Menike and Prabath, 2014). The study showed that a significant and positive impact of accounting variables on the stock price. Compared to the results of the developed market and developing market EPS showed less impact to the price in the CSE. Moreover, DPS and BVPS showed significant impact to the share price. Moreover, recently, Rajeshwaran and Krishanthini (2017) examined the relationship between accounting information and share price based on the collected data during 2010 – 2015 by observing 800 annual reports. Results of simple separate regressions as well as fixed effects panel data regression analysis reported that the individual independent variables were having positive relationship with share price. Pooled ordinary least square regression showed dividend per share and book value per share were positively related with the stock price whereas earning per share was negatively related with the share price. However, fixed effects model showed that earning per share, dividend per share and book value per share were positively related with the share price while earning per share was not significant at 5% level.

The both studies did not consider economic information like exchange rate, interest rate, inflation rate which can influence changes in stock return. Menike (2006) found inflation rate and exchange rate reacted mainly negatively to stock prices in the Colombo Stock Exchange (CSE). The negative effect of Treasury bill rate implies that whenever the interest rate on Treasury securities rise, investors tend to switch out of stocks causing stock prices to fall. However, lagged money supply variables do not appear to have a strong prediction of movements of stock prices while stocks do not provide effective hedge against inflation in the

CSE. However, their findings cannot be generalised to Sri Lankan stock market as sample size of the study was not sufficiently reflect the population of the listed companies in Sri Lanka.

Elangkumaran and Jenitta (2014) investigated the linkages between macroeconomic variables and stock prices of CSE. It was noted that GDP and exchange rate were positively correlated with ASPI. Moreover, interest rate was negatively correlated with ASPI. Multiple regression analysis also showed that macroeconomic variables significantly impact on ASPI. In 2015, relationship between MV and ASPI was examined by Nijam, Ismail, and Musthafa (2015). It was identified that ASPI was positively associated to gross domestic production, exchange rate, and interest rate. However, it was pointed out that ASPI was negatively related with inflation rate which was measured by wholesale price index. Moreover, balance of payment was not significantly on the stock index.

The study period of Menike (2006) was covered pre-ethnic war, because ethic war was ended in 2009. Elangkumaran and Jenitta (2014) and Nijam, Ismail, and Musthafa (2015) focused data from pre-war and early part of post war. Therefore, the study period is not actually revealed real contemporary economic phenomenon after war as radical change occurred in the country. Further, it is noted that above studies were not analysed using sophisticated techniques like VAR, Granger causality test, VECM, ARDL, etc. to gain more insights of scenario of CSE. In addition, it is observed that Menike (2006) used stock price as dependent variable to link the macroeconomic variables and Elangkumaran and Jenitta (2014) and Nijam, Ismail, and Musthafa (2015) used ASPI. But, dividend announcement is also impact the share price. Practically investors consider total return i.e. capital gain and dividend from their investment of stock market. In order to understand the real macroeconomic impacts on share value, it would be better to consider total stock return i.e. ASTRI instead of stock price or ASPI.

Therefore, the lack of studies in the context of developing countries lead to this research, which attempts to fill the gap by adding the existing body of knowledge about the relationship between macroeconomic and variables all share total returns in emerging counties like Sri Lanka. The remainder of the research paper commences with research questions and objectives. It then moves to reviewing trends in stock price and stock return reaction to macroeconomic and accounting variables. This is followed by methods of the study is given. Penultimately, results are discussed. Finally, conclusion and future study opportunities are presented.

Research Questions

- What is the relationship between macroeconomic variables (exchange rate, interest rate, inflation rate, money supply) and all share total returns of listed companies in Colombo Stock Exchange in Sri Lanka during 2010 to 2017?

- How do macroeconomic variables impact on all share total returns of listed companies in Colombo Stock Exchange in Sri Lanka either in long run or short run?

Research objectives

Purpose of the study is to further contribute the literature on linkages between stock exchange market and macroeconomics variables for developing countries, particularly for the Sri Lankan case. Objectives of the research are,

- To identify the relationship between macroeconomic variables (exchange rate, interest rate, inflation rate, money supply) and all share total returns of listed companies in Colombo Stock Exchange in Sri Lanka during 2010 to 2017.

- To examine whether long run or short run causality running from macroeconomic variables to all share total returns of listed companies in Colombo Stock Exchange in Sri Lanka.

Significance of the study

Findings of the study help to existing and prospective investors which factors to be focussed to buy and sell shares. In addition, the study facilitates to policy makers how macroeconomic variables to be considered to make decision as those variables impact on the share price. Moreover, the study helps to managers of the company for better planning the activities.

2. Literature Review

Afzal (2011) conducted an empirical investigation of the relationship between macroeconomic variables and stock prices in Bangladesh using co-integration and the Granger causality test. The results indicated that co-integration exists between share prices with money supply values, M1 and M2, and inflation rate. This indicated the existence of a long-run relationship between them. Unidirectional causality was identified to exist from the stock market to the exchange rate. Using linear regression models, Cakmarh et al. (2010) revealed that economic information has useful information for predicting monthly US excess stock returns and volatility over the period 1980-2005.

Gjrde and Saettem (1999) investigated the causal relation between share returns and economic forces in Norway. Results showed that a positive link exists between oil price, real activity and share returns. Nevertheless, the study failed to show a significant relationship between stock returns and inflation. Further, Flannery and Protopapadakis (2002) examined the effect of some series announcements on stock returns. Among these series, six economic activities, such as, balance of trade, housing starts, employment, consumer price index, money supply and producer price index affected stock returns. On the other hand, two popular measures of aggregate economic activity (real gross national product and industrial production) were not related to stock returns. Sharma et al. (2002) analysed the relationship between stock prices and some macroeconomic factors in five Asian countries, namely, Indonesia, Malaysia, Philippines, Singapore and Thailand. Results suggested that in the long run, share prices will be positively related to growth and output. In the short run, share prices are identified to be functions of past current values of macroeconomic

variables. By using cointegration and VAR model, Mansor and Hassanuddeen (2003) pointed out that there were short and long run interaction between macroeconomic variables and share price. Exchange rate was negatively related with the share price whereas money supply positively influenced in short run and negatively influence on stock price in long run.

Menike (2006) found inflation rate and exchange rate react mainly negatively to stock prices in the Colombo Stock Exchange (CSE). The negative effect of Treasury bill rate implies that whenever the interest rate on Treasury securities rise, investors tend to switch out of stocks causing stock prices to fall. However, lagged money supply variables do not appear to have a strong prediction of movements of stock prices while stocks do not provide effective hedge against inflation specially in Manufacturing, Trading and Diversified sectors in the CSE. Khan et al. (2012) explained that accounting variables such as Dividend Yield (DY), Earnings Yield (EY) and Book Value per Share (BVPS) has direct and positive association with the stock return in the Karachi Stock Exchange in Pakistan for the period 2005 to 2011. Further the study found that BVPS has more explanatory power than the EY and DY. Wang, Fu and Luo (2013) investigated the share price reactions to the accounting information in the Chinese Stock Exchange for the period of one year in 2011. This study analyzes the relationship between accounting information and the stock price with a few accounting information indexes. The author used EPS and ROE to explain the stock price reactions to accounting information. The study reveals that a positive relationship exists between accounting information and stock price, but the significant degree varies; earnings per share and return on equity have the most significant correlation. Emamgholipour et al. (2013) examined the effect of performance evaluation market ration on the stock return of companies listed in the Tehran Stock Exchange from 2006 to 2010. He found that earnings per share have significant and positive effect on stock return and price earnings ratio and market value to book value ration statistically have significant and negative effect on the stock return of the current year.

The above studies reveal that there are relationships between accounting and economic information with share price. However, the relationship between macroeconomic variables on stock returns is not recently examined after the ethnic war in Sri Lanka with appropriate statistical techniques. Therefore, there is a necessity to examine impact of macroeconomic variables on stock returns in developing countries like Sri Lanka.

3. Methodology

Research design

Nature of the research is descriptive and explanatory which examine impact of macroeconomic variables on total stock returns in Sri Lanka. The extent of researcher interference is minimal and study setting is non-contrived (natural). Time horizon is cross sectional where data collection is done over a period of several months. Unit of analysis is monthly macroeconomic variables and ASTRI. Secondary data are used to carry out the study.

Population and Sample

The Colombo Stock Exchange (CSE) has 297 companies representing 20 business sectors as at 31st December 2018, with a Market Capitalization of Rs. 2,919.7 Bn. (Colombo Stock Exchange, 2019). To generalize the finding to Colombo Stock Exchange in Sri Lanka, All Share Total Return Indices (ASTRI) were selected at the end of each month from January 2010 to December 2017 for representing all the companies' share total returns which covered capital gain and dividend.

Data collection and analysis

ASTRI was collected from Data Library of CSE. Inflation is measured by changes in the Colombo Consumer Price Index (CCPI). The study used three month primary market Treasury Bill Yield Rate as a measure of nominal interest rate. Broad money supply, i.e. M2, was considered as money supply. Exchange rate was calculated Sri Lankan rupees (Rs.) against per unit of US dollar. The Macroeconomic variables were collected from Statistic page of Central Bank of Sri Lanka website from January 2010 to December 2017 (Central Bank of Sri Lanka, 2019).

Descriptive, Augmented Dickey-Fuller test for unit root, Johnson co-integration test and VAR (Vector Autoregression) or VECM (Vector Error Correction Model) are used to analyse the collected data. Based on the model employed by Mansor and Hassanuddeen (2003), the following VECM is developed.

$$\Delta ASTRI_t = \sigma + \sum_{i=1}^{k-1} \gamma_i \,\Delta ASTRI_{t-i} + \sum_{j=1}^{k-1} \delta_j \,\Delta EX_{t-j} + \sum_{m=1}^{k-1} \alpha_m \,\Delta INT_{t-m} + \sum_{n=1}^{k-1} \beta_n \,\Delta INF_{t-n}$$

$$+ \sum_{p=1}^{k-1} \varphi_p \,\Delta lnMS_{t-p} + \omega CE1_{t-1} + u_t$$

Where
ASTRI$_t$ = All Share Total Returns Indices at time t
EX$_t$ = Exchange rate at time t
INT$_t$ = Interest rate at time t
INF$_t$ = Inflation rate at time t
MS$_t$ = Money supply at time t
CE1 = Error correction term at time t
u$_t$ = error term
σ = Constant
Δ = First difference
$\gamma, \delta, \alpha, \beta, \varphi, \omega$ are coefficient of the variables

4. Results and Discussion

Descriptive statistics

Table 1 displays descriptive statistics of ASTRI and Macroeconomic variables. Mean value of ASTRI is 7,926.2 with standard deviation 1,234.03. Exchange rate is ranged from Rs.109.48 to Rs.153.76. Average interest rate (three months Treasury bill yield rate) is 8.19%. It is also noted that average inflation rate is around 5% from January 2010 to December 2017. During the period, average money supply is Rs. 3,198,622 million.

Table 1: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
ASTRI	96	7,926.2	1,234.038	4241.23	9642.21
Exchange Rate	96	130.8689	13.85341	109.4881	153.7652
Interest Rate	96	8.194479	1.739747	5.74	13.07
Inflation Rate	96	5.24375	2.600316	-0.3	9.8
Money Supply	96	3,198,622	1,170,817	1,551,744	5,665,313
ln money supply	96	14.9107	0.3729983	14.25489	15.54987

Unit Root Test

H0: Variable is non-stationary

H1: Variable is stationary

Augmented Dickey-Fuller test for unit root is conducted to check the stationary. According to the ADF results shown in Table 2, all share total return indices is non-stationary at 1% significance level and other variables, namely, Exchange Rate, Interest, Inflation, natural log of money supply are also non-stationary at 5% significance level.

Table 2: ADF test results

Variable	P value	t-statistics	Critical values			Alternative Hypothesis	Results
			1%	5%	10%		
ASTRI	0.0273	3.090	-3.517	-2.894	-2.582	Rejected at 1%	ASTRI is non-stationary
Exchange Rate	0.9569	-0.019	-3.517	-2.894	-2.582	Rejected at 5%	Exchange Rate is non-stationary
Interest Rate	0.6574	-1.237	-3.517	-2.894	-2.582	Rejected at 5%	Interest Rate is non-stationary
Inflation Rate	0.3627	-1.836	-3.517	-2.894	-2.582	Rejected at 5%	Inflation Rate is non-stationary
ln money supply	0.8870	-0.525	-3.517	-2.894	-2.582	Rejected at 5%	Natural log of money supply is non-stationary

As there is a unit root problem, first deference should be taken to all the variables to test the stationary. ADF output is given in the Table 3, after taking the first difference for all the variables. It clearly shows that

all the variables are stationary at first difference as critical value is higher than t-statistics at 1% significance level. Moreover, it is confirmed that these variables are not fallen in a trend.

Table 3: ADF test results after taking first difference

Variable	P value	t-statistics	Critical values			Alternative Hypothesis	Results
			1%	5%	10%		
ASTRI	0.0000	-9.158	-3.518	-2.895	-2.582	Accepted	ASTRI is stationary
Exchange Rate	0.0000	-7.011	-3.518	-2.895	-2.582	Accepted	Exchange Rate is stationary
Interest Rate	0.0000	-6.795	-3.518	-2.895	-2.582	Accepted	Interest rate is stationary
Inflation Rate	0.0000	-8.424	-3.518	-2.895	-2.582	Accepted	Inflation rate is stationary
In money supply	0.0000	-9.723	-3.518	-2.895	-2.582	Accepted	Natural log of money supply is stationary

Since all variables are stationary at $I(1)$, it is appropriate to apply Johnson co-integration test and VAR (Vector Autoregression) or VECM (Vector Error Correction Model). Lag length selection criteria should be performed to determine the lag level.

Table 4: Lag order selection

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-1249.36				1.7e+06	28.5081	28.5648	28.6488
1	-622.513	1253.7	25	0.000	1.89936*	14.8298*	15.1701*	15.6744*
2	-604.261	36.504	25	0.064	2.22641	14.9832	15.607	16.5315
3	-579.309	49.904	25	0.002	2.25998	14.9843	15.8916	17.2364
4	-561.281	36.056	25	0.071	2.71905	15.1428	16.3336	18.0987
5	-544.473	33.616	25	0.116	3.42234	15.3289	16.8033	18.9886
6	-518.354	52.238	25	0.001	3.56709	15.3035	17.0614	19.667
7	-497.071	42.567	25	0.016	4.27535	15.388	17.4295	20.4553
8	-461.552	71.038*	25	0.000	3.85262	15.1489	17.4739	20.92

As per the Table 4, lag one is ideal lag order selection as asterisk mark is appeared in the first lag in four methods such as FPE, AIC, HQIC, SBIC.

Johansen tests for cointegration

Johansen cointegration test is run to identify whether cointegration exists between total stock return and macroeconomic variables as per the following hypothesis.

H0: There is no cointegration in total stock return and macroeconomic variables.

H1: There is cointegration in total stock return and macroeconomic variables.

Table 5: Johansen tests for cointegration (Trace statistic)

Maximum rank	Parms	LI	Eigenvalue	Trace statistic	5% critical value
0	5	-707.824	.	74.8749	68.52
1	14	-690.255	0.30918	39.7365*	47.21
2	21	-680.21	0.19061	19.6461	29.68
3	26	-671.866	0.1611	2.9581	15.41
4	29	-670.749	0.02324	0.7243	3.76
5	30	-670.387	0.00759		

Table 6: Johansen tests for cointegration (Max statistic)

Maximum rank	Parms	LI	Eigenvalue	Max statistic	5% critical value
0	5	-707.824	.	35.1383	33.46
1	14	-690.255	0.30918	20.0904	27.07
2	21	-680.21	0.19061	16.688	20.97
3	26	-671.866	0.1611	2.2339	14.07
4	29	-670.749	0.02324	0.7243	3.76
5	30	-670.387	0.00759		

Johansen tests for cointegration shows that there is one cointegration as Trace statistic (39.73) is smaller than the critical value (47.21) at maximum rank one (Table 5). Similarly, same result is obtained in Johansen tests for cointegration of Max statistic where Max statistic (20.09) is smaller than the critical value (27.07) at maximum rank one (Table 6). Therefore, Vector Error Correction Model (VECM) is appropriate to investigate the long run causality or short run causality among the variables than unrestricted Vector Autoregression (VAR).

Vector error-correction model

There is a condition that If coefficient of ce1L is negative sign with significant at 5% level, it could be decided that there is long run causality running from independent variables to dependent variable. According to the Table 7, coefficient of ce1L is negative sign. However, significant value is 72.9%. It means that around only 27% is possible to have long run causality running from Exchange, Interest, Inflation and Money Supply to ASTRI. Further, there is no short run causality towards ASTRI as significance values of Exchange LD, Interest LD, Inflation LD, In Money Supply LD are higher than 0.05. Nevertheless, out of the study period from 2010 to 2017, exchange rate negatively influences on ASTRI around 70% (P value 0.3020) of periods (months). R^2 is 3.65%, that is 3.65% of variation of ASTRI is explained by encompassed all independent variables Exchange Rate, Interest Rate, Inflation Rate, Money Supply and previous month ASTRI.

Table 7: Vector error-correction model

		Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
D_ASTRI	ce1 L1.	-0.01251	0.036076	-0.35	0.7290	-0.08322	0.058193
	ASTRI LD.	0.020963	0.113851	0.18	0.8540	-0.20218	0.244107
	Exchange Rate LD.	-32.3592	31.37011	-1.03	0.3020	-93.8435	29.12506
	Interest Rate LD.	-3.33314	112.1799	-0.03	0.9760	-223.202	216.5355
	Inflation Rate LD.	-7.02045	47.13985	-0.15	0.8820	-99.4129	85.37196
	In Money Supply LD.	4250.55	5893.135	0.72	0.4710	-7299.78	15800.88
	Constant	-0.0261	90.92468	0	1.0000	-178.235	178.183

$$\Delta ASTRI_t = -0.0261 + 0.02\Delta ASTRI_{t-1} - 32.35\,\Delta EX_{t-1} - 3.33\,\Delta INT_{t-1} - 7.02\,\Delta INF_{t-1}$$
$$+ 4250.55\,\Delta lnMS_{t-1} - 0.012 CE1_{t-1}$$

The adjustment term (-0.012) suggesting that previous year's errors (or deviation from long run equilibrium) are corrected within the current year at a convergence speed of 1.2%.

Table 8: Cointegrating equations

	Parms	chi2	P>chi2
_ce1	4	81.5696	0.0000

Table 8 reveals that cointegrating equation is significant. Johansen normalization restriction imposed is desirable which is given below.

Table 9: Johansen normalization restriction imposed

Beta	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
_ce1						
ASTRI	1	.	.	.	.	.
Exchange Rate	407.8544	70.10504	5.82	0.0000	270.4511	545.2578
Interest Rate	-841.944	211.9182	-3.97	0.0000	-1257.3	-426.592
Inflation Rate	594.5691	121.2442	4.9	0.0000	356.9347	832.2034
In Money Supply	-15220.04	2516.631	-6.05	0.0000	-20152.6	-10287.5
Constant	169629.9	.	.	.	.	.

$$EC1_{t-1} = 1.000 ASTRI_{t-1} + 407.85\,EX_{t-1} - 841.94\,INT_{t-1} + 594.84\,INF_{t-1}$$

$$- 15220.04\,lnMS_{t-1} + 169629.9$$

Table 9 shows results of Johansen normalization restriction imposed where ASTRI is positioned as the dependent variable. It is also noted that signs of the coefficients are reversed in the long run to interpret the results as they are in the matrix form. In the long run, Interest Rate and Money Supply have a positive impact on ASTRI while Exchange Rate and Inflation Rate have a negative impact on ASTRI. The coefficients are statistically significant at the 1% level.

Autocorrelation

H_0: There is no autocorrelation at lag order

H_1: There is autocorrelation at lag order

Table 10: Autocorrelation at lag order

lag	chi2	df	Prob > chi2
1	35.6692	25	0.07677

Lagrange-multiplier test reports that there is no autocorrelation at lag order at 5% significance level (Table 10).

Discussion

Finding of the study pertaining to exchange rate is negatively associated with ASTRI. This is consistent with previous results of Menike (2006), Mansor and Hassanuddeen (2003). This may be reason that foreign investors withdraw the funds from stock market. However, it is contradicted to the findings of Elangkumaran and Jenitta (2014) and Nijam, Ismail, and Musthafa (2015).

Similarly, finding of inflation (negative sign) is matched with Menike (2006) and Nijam, Ismail, and Musthafa (2015) in Sri Lankan context. This result is opposite to the findings of Peter (2014) in Zimbabwe. Khaled and Le (2009) identified in Vietnam that interest rate was positively affect the stock prices. Likewise, Majid and Yusof (2009) recognized that interest rate was positively affect the Islamic stock retuns. Same result is explored in CSE in the current study as well as Nijam, Ismail, and Musthafa (2015). This is theoretically contradiction when interest rate is risen rational investors leave from stock market and deposit in banks to earn higher interest without risk.

Findings of positive relationship of money supply with total stock return of current research is mostly match with other previous research conclusions such as Mansor and Hassanuddeen (2003), Afzal (2011), Peter (2014). Afzal (2011) also noted that money supply has a long run relationship with stock prices while Mansor and Hassanuddeen (2003) reported that money supply positively influenced in short run and negatively influence on stock price in long run.

5. Conclusions

Conclusions are derived by applying well standard and accepted methods of Johnson co-integration test and or VECM (Vector Error Correction Model). First objective of the study is to identify the relationship between four macroeconomic variables (exchange rate, interest rate, inflation rate, money supply) and

ASTRI. It is concluded that Interest Rate and Money Supply have a positive impact on ASTRI while Exchange Rate and Inflation Rate have a negative impact on ASTRI.

Second objective is to examine long run or short run causality running from macroeconomic variables to ASTRI. It is noted that there is no significance short run causality from macroeconomic variables to ASTRI. However, it observed that exchange rate negatively impacts on ASTRI in short run. Furthermore, in the long run, Interest Rate and Money Supply have a positive impact on ASTRI whereas Exchange Rate and Inflation Rate have a negative impact on ASTRI. It is concluded that Exchange Rate, Interest Rate, Inflation Rate and Money Supply have asymmetric effects on ASTRI in the long run, on average, ceteris paribus (all other things held constant).

Ethics of the research

Saunders, Lewis and Thornhill (2011, p.184) noted that "research ethic relates to questions how we formulate and clarify our research topic, design our research and gain access, collect data, process and store our data, analysis data, write up our research findings in a moral and responsible way". In these aspects, the study considers ethic as the paper is written such a way without criticising and showing name of the any individual company. The research is undertaken in a holistic view as stock market and four macroeconomic variables as whole.

Future research Opportunities

The study only focused the effect of four macroeconomic variables on ASTRI. As per the limitation of the current study, following future studies are necessary to gain more insight about stock prices. Firstly, same model could be applied by encompassing more macroeconomic variables. Secondly, the macroeconomic variables will be linked with S&P TRI. Thirdly, the similar model will be used for covering more months. Fourthly, another study could be undertaken with the same model to analyse sector wise. Finally, the research could be upgraded with the latest technique of ARDL (Autoregressive Distributed Lag) to uncover new insights.

References

Afzal, N., and Hossain, S. S. (2011), "An analysis of the relationship between macroeconomic variables and stock prices", Bangladesh Development Studies, Vol. 34 No. 5 pp. 95-105.

Central Bank of Sri Lanka. (2019). Central Bank of Sri Lanka, www.cbsl.gov.lk

Colombo Stock Exchange. (2019), Industry sector, [Online]. Available: http://www.cse.lk/welcome.htm

Dissabandara, D. B. P. H. (2001), "Dividend signalling market response to dividend change and capital market efficiency: An empirical analysis". Annual research session, Faculty of Management and Commerce, University of Sri Jayewardenepura.

Emamgholipour, M., Pouraghajan, A., Tabari, N. A. Y., Haghparast, M., and Shirsavar, A. A. A. (2013), "The effect of performance evaluation market ratios on the stock return: evidence from the Tehran stock exchange". International Research Journal of Applied and Basic Sciences, Vol. 4.

Flannery, M.J., and Protopapadakis, R. H. (2002), "Macroeconomic factors do influence aggregate stock returns", Review of Financial Studies, Vol. 15 No. 3, pp. 751-782.

Gjrde and Saetten, F. (1999), "Causal relation among stock returns and macroeconomic variables in a small, open economy", Journal of International Financial Markets, Institutions and Money, Vol. 9, pp. 61-74.

Khaled Hussainey, and Le Khanh Ngoc, (2009), "The impact of macroeconomic indicators on Vietnamese stock prices", The Journal of Risk Finance, Vol. 10, No. 4, pp.321-332, https://doi.org/10.1108/15265940910980632

Khan, M. B., Gul, S., Rehman, S. U., Razzaq, N., & Kamran, A. (2012), "Financial ratio and stock return predictability", Research Journal of Finance and Accounting, Vol.3.

Majid, M. S. A. and Yusof R. M. (2009), "Long-run relationship between Islamic stock returns and macroeconomic variables: An application of the autoregressive distributed lag model", Humanomics, Vol. 25, No. 2, pp.127-141, https://doi.org/10.1108/08288660910964193

Mansor, H. I., and Hassanuddeen A., (2003), "Macroeconomic variables and the Malaysian equity market: A view through rolling subsamples", Journal of Economic Studies, Vol. 30 Issue: 1, pp.6-27, https://doi.org/10.1108/01443580310455241

Mazuruse, P. (2014), "Canonical correlation analysis Macroeconomic variables versus stock returns", Journal of Financial Economic Policy, Vol. 6 No. 2 pp. 179 – 196

Menike M. G. P. D., and Prabath U. S. (2014), "The Impact of Accounting Variables on Stock Price: Evidence from the Colombo Stock Exchange, Sri Lanka", International Journal of Business and Management; Vol. 9, No. 5, Published by Canadian Center of Science and Education

Menike, L.M.C.S (2006), "The Effect of Macroeconomic Variables on Stock Prices in Emerging Sri Lankan Stock Market", Sabaragamuwa University Journal, Vol. 6, No. 1, 50-67

Mgbame, C. O., and Ikhatua, O. J. (2013), "Accounting information and stock volatility in the Nigerian capital markets: a garch analysis approach", International Review of Management and Business Research, Vol. 2.

Rajeshwaran. N. and Kirushanthini, V. (2017), "The Impact of Accounting Information on Share Prices: Evidence from Colombo Stock Exchange", 6th International Conference of Sabaragamuwa University of Sri Lanka (ICSUSL 2017), Sabaragamuwa University of Sri Lanka.

Ramesh, S., and Nimalathasan, B. (2011), "Bonus issue announcement and its impact on share price of Colombo Stock Exchange in Sri Lanka", 8th International conference of Business Management, University of Jaffna, Sri Lanka.

Sharma, J., Buckle, R.A., Kim, K., Kirkham, H. and McLellan, N. (2002), "A Structural VAR Model of the New Zealand Business Cycle".

Wang. J, Fu1, G. & Luo, C. (2013), "Accounting Information and Stock Price Reaction of Listed Companies - Empirical Evidence from 60 Listed Companies in Shanghai Stock Exchange", Journal of Business and Management, Vol. 2, No. 2, pp.11-21, Published by Science and Education Centre of North America