Impact of Macroeconomic Variables on Stock Market Performance in Sri Lanka

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ABSTRACT

The aim of this paper is to investigate the impact of macro-economic variables on stock market performance in Sri Lanka. This study employed All Share Price Index (ASPI) as a proxy to represent the stock market performance and inflation, interest rate, exchange rate, foreign direct investment, gross domestic product and broad money supply were used as the macro economic variables. Secondary data was collected for the period of 1997 to 2019. Autoregressive Distributed Lag (ARDL) Bound test procedure was adopted to investigate the effects of macroeconomic determinants on ASPI and to investigate the existence of a co-integration among the variables. Error Correction representation of ARDL mechanism is adopted to determine the short run dynamics relationship between the variables and long run adjustment of the model. The study showed that there is a long and short run relationship exist among the ASPI and macro-economic variables. Gross Domestic Product has significantly and positively impact on ASPI in the long run while current value of GDP does not affect ASPI in the short run. In contrast, past value of GDP affect ASPI negatively in the short run. Further there is a negative relationship between M2 and ASPI in the long run while positive correlation between these two variables in the short run. The findings of this paper will hold practical implications for stock market analysts, investors and policy makers.

KEYWORDS: ASPI; Macro economic variables; Sri Lanka

Introduction

The stock market in any country leads to economic growth and development of that nation since it mobilize the domestic resources in the country and lead them to productive investments. After the liberalization in 1977, the financial market in Sri Lanka was developed to a greater extent. The Colombo Stock Exchange (CSE) is a major part of the financial market in Sri Lanka. It has 290 companies representing 20 businesses sectors as at 30 June 2019, with a market capitalization of Rs. 2.52338 x 10^3.CSE has two main price indices called, All Share Price Index (ASPI) and Standard and Poor's Index (S & P SL 20). These index values are calculated an ongoing basis during the trading session. ASPI measures the movement of share prices of all listed companies. ASPI recorded decreasing trend in Sri Lanka from 1997 to 2020 while it shows, increasing pattern from 2000 to 2005. However, there can be seen fluctuations in the ASPI from 2010 to 2020.

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The performance of the stock market in any country depends on various macro-economic factors. Menike (2006) found a negative relationship between Treasury bill rate and stock market prices. Balagobei (2017) found that exchange rate and Gross Domestic Product has a positive relationship with ASPI. Addy and Yakubu (2014) identified the relationship between macro-economic variable in Ghana stock exchange which was revealed that there is a long run relationship between some of the macro economic variables and the stock market. Caroline et al. (2011) studied the relationship between stock market, expected inflation rate, unexpected inflation rate, exchange rate, interest rate and GDP in the case of Malaysia, US and China.

There are several studies have been carried out to examine the relationship between macro-economic variables and stock market performances. But there is no in depth studies that investigates the association between macro-economic variables and stock market performance in the context of Sri Lanka. Thus, this study attempts to bridge this gap by examining the connection between macro-economic variables and the stock market performance in order to make economic policy implications and to have a proper understanding of the stock market in Sri Lanka and its subsequent status.

Literature Review

Theoretical Literature Review

Efficient Market Hypothesis

When setting securities prices, a capital market is said to be efficient if it accurately and completely reflects all pertinent information. The EMH in its weakest form claims that prices accurately reflect the information found in the historical sequence of prices. The semi-strong variant of EMH claims that current stock prices represent all publicly accessible information relevant to a company's securities, in addition to historical price information and historical price information. The strong form of EMH states that market prices fully represent all information about a company that is known to any market participant (Malkiel, 1989).

Arbitrage Pricing Theory

Ross was the person who primarily developed the Arbitrage Pricing theory. It is a one-period model in which each investor assumes that a factor structure is consistent with the stochastic features of capital asset returns (Huberman and Wang, 2005).The idea is backed by the fact that estimated expected returns are dependent on estimated factor loadings, and that factors like one's own standard deviation, despite having a strong correlation (simply) with expected returns, do not provide any further explanatory power (Roll and Ross, 1980).

Empirical Literature Review

This section is based on the related research articles, which has been done by different researchers in different countries using different methodologies in different time periods to investigate the relationship between stock market performance and macro-economic variables using empirical data.

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Badullahewage and Jayawardenepura (2018) analyze the vital impact of macroeconomic factors on the stock market performance in Sri Lanka. This study have used inflation, interest rate, exchange rates, gross domestic product and money supply as the macro economic variables. Using secondary data from 1990-2012 and utilizing linear-log model, log-log and log-linear models, revealed that all these factors have an inseparable impact over the performance of the stock market and Sri Lankan stock market performance has eventually over gone through many ups and downs because of them as well. It has been revealed that among all the factors that have been discussed, inflation and exchange rates have comparatively higher effects on the stock market performance.

Menike (2006) investigates the effect of macro-economic variables on stock prices using monthly data from the period September 1991 to December 2002. By using four concurrent macro-economic variables as money supply, exchange rate, inflation rate and interest rate and four lagged variables and by employing a multiple regression model, this study found that all the variables are significant at 5% level rejecting the null hypothesis. Further, the results suggest that the macroeconomic variables representing lagged inflation rate and lagged money supply have only limited ability to explain the variation in equity prices.

Nanayakkara and Darshi (2015) examine the impact of macroeconomic variables on stock market performance in CSE in Sri Lanka based on time series data from 2004 to 2014.The Linear Regression analysis was applied to examine the impact of macroeconomic variables on All Share Price Index (ASPI). This study reveals that selected macroeconomic variables have a high explanatory power in explaining stock market performance. Further, it is found that Interest Rate (IR), Exchange Rate (ER), Inflation Rate (IFR) and Fiscal Deficit (FD) have a negative impact on ASPI.

Rathnayaka and Senevirathna (2018) examines the equilibrium relationships between the stock market indices and macro-economic factors in Sri Lankan during the period from January 2009 to December 2016. By using Vector Autoregressive Regression and Vector Error Correlation Model. Estimated co-integration rank test and Max-eigenvalue test suggested that there are two co-integration equations exist at the 0.05 level of significance. Furthermore, findings revealed that macroeconomic variables have direct effect on high volatility in Stock Market fluctuations.

Rashid (2008) investigates the dynamic interactions between four macroeconomic variables as nominal exchange rate, market rate of interest, manufacturing output index, consumer price index and stock prices in Pakistan, using co-integration and granger causality tests that are robust to structural breaks. The results of this study strongly suggest that there is a co-integration between the stock prices and macroeconomic variables. Estimates of bivariate error-correction models reveal that there is long run bidirectional causation between the stock prices and all the said macroeconomic variables with the exception of consumer prices that only lead to stock prices.

Etale and Eze (2019) examined the impact of some selected macroeconomic variables on stock market performance in the Nigerian Stock Exchange (NSE).

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This study uses all share index (ASI) as the proxy for stock market performance and the dependent variable, while the selected macroeconomic variables included broad money supply (BMS), interest rate (ITR), inflation rate (IFR), and exchange rate (EXR) used as the independent variables. Secondary data was obtained for the period from 1985 to 2017. This study employed multiple regression technique, Augmented Dickey-Fuller unit root test, Johansen co-integration test and Error Correction Model (ECM) based on the E-views 9.0 software as methods of data analysis. The analysis of data revealed that a long-run equilibrium and short-run dynamic relationships existed between the selected macroeconomic variables and stock market performance in the Nigerian Stock Exchange.

Abdelbaki (2013) investigates the relationship between macroeconomic variables and Bahraini stock market development by using the Autoregressive Distributed Lag model. This paper focuses on the time period from 1990- 2007. The main findings of this paper are that income level, domestic investment, banking system development; private capital flows and stock market liquidity are important determinants of Bahraini stock market development.

Hypotheses

Using the above literature review, the following hypothesis was developed:

Null Hypothesis (H0)	:	There is no association between Stock Market Performances (ASPI) and macro-economic variables
Alternative Hypothesis (H1)	:	There is an association between Stock Market Performances (ASPI) and macro-economic variables

Methodology

All Share Price Index (ASPI) was used as a proxy variable for stock market performance which is the dependent variable of this study. Inflation rate (INF), Exchange Rate (ER), Interest Rate (IR), Gross Domestic Product (GDP), Foreign Direct Investment (FDI) and Broad Money Supply (M2) are employed as macroeconomic (independent) variables. Therefore, the conceptual framework can be developed as follows (Figure 1).

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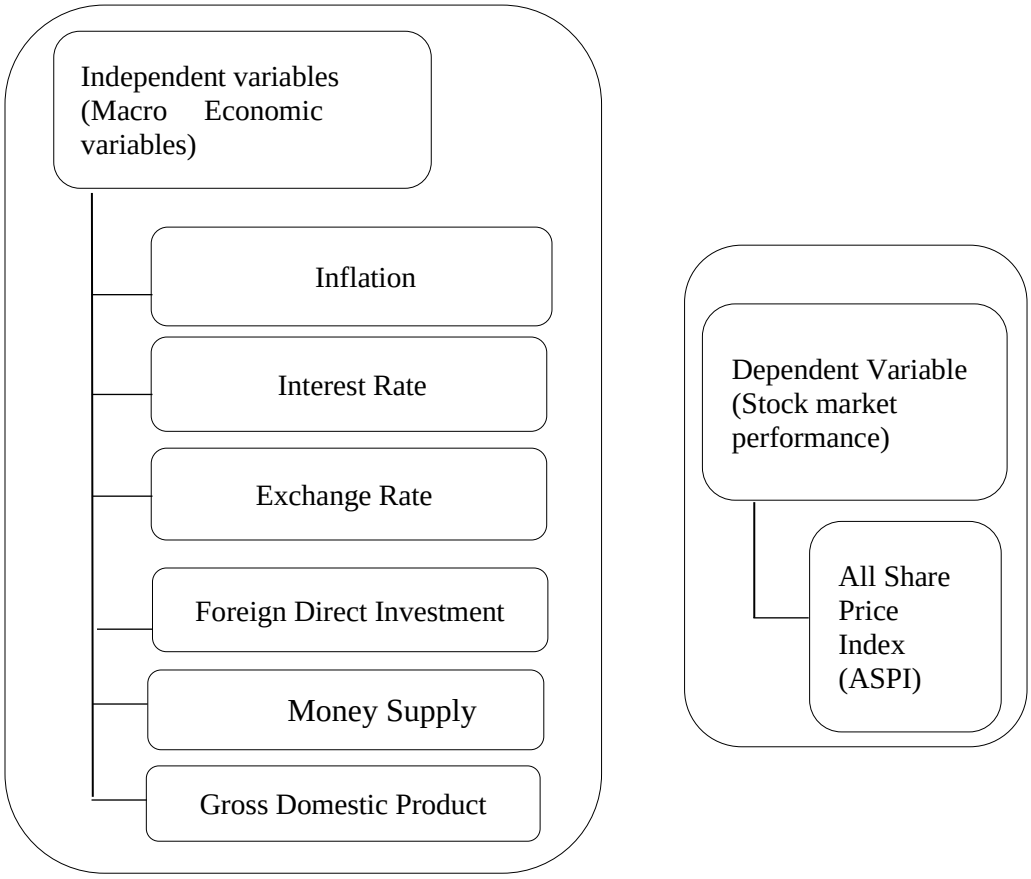

Figure 1: Conceptual Framework

Source: Prepared by author

This study uses the time series data from the World Bank database and Central bank of Sri Lanka over the period of 1997 – 2019. All variables except INF and IR are transformed to natural logarithm form. Following a study conducted by Paudel (2009), the functional model of this study is given below:

$$LASPI_t = \alpha_0 + \alpha_1 INF_t + \alpha_2 IR_t + \alpha_3 LER_t + \alpha_4 LFDI_t + \alpha_5 LGDP_t + \alpha_6 LM2 + \mu_t \quad [1]$$

Where $\alpha_1, \ldots\ldots, \alpha_6$ are coefficients of determinant variables; μ_t is error term and subscript t is time period.

The All Share Price Index (ASPI) is the broad market index of the CSE, and is designed to measure the movements of the overall market price. The index is calculated in real-time as a market capitalization weighted index, which constitutes all voting and non-voting ordinary shares listed on the CSE.

The study adopted Augmented Dickey Fuller (ADF) unit root test method to test the order of integration of variables and Akaike Information Criterion (AIC) was adopted to determine the optimal lag length of each series.

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Since the series are stationary with mixed orders of I (0) and I (1). Autoregressive Distributed Lag (ARDL) Bound test procedure which was developed by Pesaran et al. (2001) is adopted to investigate the effects of macroeconomic determinants on ASPI and to investigate the existence of a co-integration among the variables. Error Correction representation of ARDL mechanism is adopted to determine the short run dynamics relationship between the variables and long run adjustment of the model. These tests were conducted through E- views 10 statistical software.

Results and Discussion

The ADF test confirmed that, IR is stationary at level while the other variables are stationary at their 1st difference implying that variables are mixed order. Akaike Information Criteria (AIC) suggested the use of ARDL (1, 2, 0, 2, 2, 2, 2) model for this analysis. Table 1shows the results of ARDL Bounds test.

Table 1: Results of F-Bound Test

F-Bound Test	**95% Level of Confidence**		**90% Level of Confidence**	
F- Statistics	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound
7.37	2.27	3.28	2.88	3.99

Source: E Views output

Above results reveal that there exists co-integration among the variables since we reject the null hypothesis of no co-integration as calculated F- statistics (7.3743) greater than the I(1) critical value at 5% level of significance (3.28). Since, we confirmed the co integrating relationship between the variables through the Bound test, there should be a long run association among the variables. The result is given below in the table 2:

Table 2: Long run Results of ARDL (1, 2, 0, 2, 2, 2, 2) Model

Constant	**INF**	**IR**	**LER**	**LFDI**	**LGDP**	**LM2**	**R^2**
0.24	0.16**	-0.09***	4.69**	0.13	4.31***	-2.79**	1.00
(0.02)	(0.03)	(0.01)	(0.01)	(0.16)	(0.01)	(0.02)	

*Note: probability values are given in parenthesis, *, **, *** show variables are significant at 10%, 5% and 1% level respectively.*

Source: E Views output

The value of R-squared illustrates that approximately 99 percent of the variation in ASPI in Sri Lanka is explained by the explanatory variables included in this study. As expected to theory and some of the existing empirical literature (Balagobei, 2017) Inflation, Exchange Rate and Gross Domestic Product affect ASPI significantly and positively whereas Interest rate and Money Supply have a negative effect on ASPI in the long run. However, FDI does not have statistically significant impact on ASPI in the long run.

The table 3 represents the results of short run dynamics and long run adjustment.

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Table 3: Results of Error Correction version of ARDL (1, 2, 0, 2, 2, 2, 2) Model

Panel A: Results of Short run							
Lag Order	**ΔLASPI**	**ΔINF**	**ΔIR**	**ΔLER**	**ΔLFDI**	**ΔLGDP**	**ΔLM2**
0		-0.08*	-0.18**	2.31*	0.14	0.85	5.45*
		(0.05)	(0.03)	(0.06)	(0.12)	(0.20)	(0.06)
1	2.90**	-0.14**	0.16*	-4.16		-0.81	11.12**
	(0.04)	(0.04)	(0.05)	(0.10)		(0.28)	(0.04)
2		-0.04**	0.17	-9.51**		-8.47**	-13.87**
		(0.04)	(0.03)	(0.05)		(0.03)	(0.04)
Panel B: Long run Adjustment Coefficient							
ETC(-1)	-0.65**	(0.07)					

Source: E Views output

*Note: probability values are given in parenthesis, *, **, *** show variables are significant at 10%, 5% and 1% level respectively.*

Accordingly, as expected, coefficient of error correction term [ETC (-1)] is negative weakly significant, which indicate that there should be an adjustment towards steady state line at the speed of 64.91 % in each year one period after the exogenous shocks. The current and past year (lagged 1 and 2) inflation, current year interest rate past year exchange rate (lagged 1 and 2), past year GDP (lagged 1 and 2) and past year money supply (lagged 2) have significant and negative impact on ASPI in the short run whereas last year ASPI, past year interest rate, current year exchange rate, current and last year money supply have positive and significant impact on ASPI in the short run.

Conclusions

The results of this study have shown that there exists a long run and short run relationship between macro-economic variables and All Share Price Index (ASPI). Gross Domestic Product has significantly and positively impact on ASPI in the long run while current value of GDP does not affect ASPI in the short run. In contrast, past value of GDP affect ASPI negatively in the short run. Further there is a negative relationship between M2 and ASPI in the long run while positive correlation between these two variables in the short run.

These finding consisted with Balagobei (2017) and Rathnayaka and Senevirathna (2018) they concluded that Colombo Stock Exchange (CSE) is highly sensitive to the macroeconomic variables such as real gross domestic product and broad money supply. Next Interest rate has a negative effect on ASPI in both long run and short run while past value of interest rate affect ASPI positively in the short run. This finding is consistent with (Menike, 2006) and (Balagobei, 2017) and they confirmed that there is a negative relationship between interest rate and stock market returns. Moreover, there is a positive and significant relationship exists between these two variables in the short run. Exchange rate affects the ASPI positively and significantly both in the short run and in the long run while past value of exchange rate affect negatively on it in the short run.

Therefore, this study suggest that the government should consider about stock prices and other macro-economic variables when implementing government policies such as privatization, foreign exchange control and monetary policy.

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Also the findings of the study may be useful to public and economy especially stock market investors to focus the macroeconomic variables for making their effective decisions in order to enhance their stock market returns.

References

Abdelbaki, H. H. (2013). Causality relationship between macroeconomic variables and stock market development: Evidence from Bahrain. *The international journal of business and finance research*, 69-84.

Addy, F. M., & Yakubu, A. S. (2014). Relationship between stock market performance and macroeconomic variables in Ghana, Issues in Business management and Economics. 46-53.

Badullahewage, S. U., & Jayawardenepura, C. (2018). The effects of macroeconomic factors on the performance of stock market in Sri Lanka. *International journal of innovation and economic development.*

Balagobei, S. (2017). Macroeconomic variables and stock market returns in Sri Lanka. *Asian Journal of Finance and Accounting*, 206-218.

Caroline, G., Rosle, M., Vivin, V. C., & Victoria, C. (2011). The relationship between inflation and stock market: evidence from Malaysia, United States and china. *International journal of Economics and Management Science,* 1-16.

Etale, L. M., & Eze, G. P. (2019). Analysing stock market reaction to macroeconomic variables: evidence from Nigerian stock exchange (NSE). *Global journal of arts, humanities and social sciences*, 14-28.

Huberman, G., & Wang, Z. (2005). Arbitrage pricing theory.

Malkiel, B. G. (1989). Efficient market hypothesis. 127-134.

Menike, L. C. (2006). The effect of macroeconomic variables on stock prices in emerging Sri Lankan stock market. *Sabaragamuwa university journal*, 50-67.

Nanayakkara, M. S., & Darshi, G. N. (2015). The impact of macroeconomic variables on stock market performance in Sri Lanka. *International conference on contemporary management.*

Perold, A. F. (2004). The capital asset pricing model. *Journal of economic perspectives*, 3-24.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of applied econometrics, 16(3), 289-326.

Rashid, A. (2008). MAcroeconomic variables and stock market performance: Testing for dynamic linkages with a known structural break. *Savings and Development*, 77 - 102.

Rathnayaka, R. K., & Senevirathna, D. K. (2018). Impact of macroeconomic variables on stock market returns: a case study of colombo Stock Exchange. *Kelaniya Journal of Management.*

Roll, R., & Ross, S. A. (1980). An empirical investigation of the arbitrage pricing theory. *The journal of finance*, 1073-1103.

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