The Effect of Macro-Economic Variables on Stock Prices in Sri Lankan Stock Market

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ABSTRACT

This study investigates the effects of macroeconomic variables on stock prices in Sri Lankan stock market using monthly data for the period from January 2011 to December 2013. The multivariate regression was run using three macroeconomic variables for common stocks. The null hypothesis which states that exchange rate and interest rate collectively do not impact on stock prices is rejected at 0.05 level of significance in all stocks and the null hypothesis which states that inflation rate does not impact on stock prices is accepted at 0.05 level of significance in all stocks. The results indicate that the higher R Square value which justifies higher explanatory power of macroeconomic variables in explaining stock prices. Consistent with similar results of the developed as well as emerging market studies, interest rate and exchange rate react mainly negatively to stock prices in the Colombo Stock Exchange. 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, inflation rate does not appear to have a strong prediction of movements of stock prices in the Colombo Stock Exchange. These findings hold practical implications for policy makers, stock market regulators, investors and stock market analysts.

KEYWORDS: *Colombo Stock Exchange, Macroeconomic variables, Stock Prices.*

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1 Introduction:

Economic stability in a country could be measured by macroeconomics variables. Inflation, interest rate, exchange rate and Money Supply are some macroeconomics variables that show economic condition in Sri Lanka. Normally political changes, changes of Board of Directors of the company, policy changes, inflation rate**,** interest rate, war, monetary policy, exchange rate and some other factors can affect the share prices changes.

The impact of macro-economic variables on share prices is uncontrollable. It provides some indication about the impact of macroeconomic variables on stock prices. This study is focused on the matters regarding the effect of macroeconomic variables on Stock prices in Sri Lankan Stock Market. Although there are a number of macroeconomic variables affecting the Stock Price changes, this study focuses on the effect of interest rate, inflation and exchange rate. The effect of macroeconomic variables on stock prices may differ from one country to another. The main objective of this study is to investigate the effect of selected macroeconomic variables on stock prices in Sri Lankan Stock Market.

The effect of macroeconomic variables on stock prices have been examined by various researchers of various countries around the world and those studies revealed the relationship between macro-economic variables on stock prices. Numerous studies have been conducted to determine the effect of macroeconomic variables on stock price movements such as Menike, L (2006), Yogaswari et al (2012), Haroon and Jabeen (2013), Kalyanaraman & Tuwajri (2014), Kpanie et al (2014), Kuwornu, Nantwi and Victor(2012), Patrick, A (2011), and Pramod, K & Puja (2012) these researchers revealed that strong relationships exist between macroeconomic variables and stock prices.

There are a large number of investors that have invested in both domestic and international stock market in Sri Lankan context. The observation of the effect of macroeconomic variables on stock prices in Sri Lanka would benefit not only for portfolio managers, but also economic policy makers. Also the effect on macroeconomic variables on stock prices is useful to evaluate, how a portfolio manager invests in stock to hedge against macroeconomic variables. Moreover, this study investigates connection between macroeconomic factor and capital market which induce an economic policy maker to pay attention when making decisions.

1.1 Statement of the problem:

The Colombo Stock Exchange acts as the most important market for capital. Well-developed capital market is essential to promote economic development. Capital market plays an important role in the economy and also companies listed in Colombo Stock Exchange are already involved in the development of infrastructure. Hence, Sri Lankan government has been offering various incentives to boost the stock market. Accordingly the result of this type of study will be important for local and foreign investors, policy makers, stock market regulators, stock market analysts etc. As mentioned earlier there is paucity of literature on the effect of macroeconomic variables on stock prices and little attention of the responsible parties and the lack of knowledge of this issue in the Sri Lankan context could not be added to the information set available to the above parties. Hence, this type of study is very essential to promote the stock market. Previous research findings relate to international context Mousa et al. (2012), Khan and Muhammad, R (2013), Nopphon, T (2012), Dharmendraj, S (2010), Kumar and Puja (2012), Haroon and Jabeen (2013) found out contra version relationship of macroeconomic variables on stock prices. In relate to Sri Lankan context Lalith, P (1996)found that stock returns are positively related to expected inflation and negatively related to unexpected inflation and Menike, L (2006) found out negative and positive effects of macroeconomic variables on stock prices are found from that study. Hence this study is focus to identify macroeconomic variables effect on share prices in Sri Lankan Stock Market.

Hence the problem statement addressed in the present study is:
Do macroeconomic variables effect on share prices in Sri Lankan Stock Market?

1.2 Objectives of the study:

The aim of this research is to determine, the effect of macroeconomic variables on stock prices in Sri Lankan Stock Market. The related specific objectives are as follows.

-To identify what is the impact of inflation rate on Stock prices in Sri Lankan Stock Market.

-To identify what is the impact of interest rate on Stock prices in Sri Lankan Stock Market.

-To identify what is the impact of exchange rate on Stock prices in Sri Lankan Stock Market.

1.3 Review of Literature:

Yogaswari, Nugroho and Astuti (2012) investigated the Effect of Macroeconomic Variables on Stock Price Volatility of Jakarta Composite Index, Agriculture, and Basic Industry Sector. This research has examined the effect of macroeconomic variables on the stock price movement in Indonesia Stock Exchange .Those selected macroeconomic variables are inflation, interest rate and exchange rate. Researchers have used the monthly time series data gathered from Bank Indonesia and Yahoo Finance over the period of January 2007- December 2011 and multiple regression is used for the data analysis. According to the findings it proved that macroeconomics bring significant impact to the stock price. In its train these researchers have revealed that, increase in inflation lead to higher stock price which is higher rate of return. In contrast, increase in interest rate and exchange rate causing lower price of stock which result in lower return.

Kuwornu, Nantwi and Victor (2011) examined the relationship between macroeconomic variables and stock market returns using monthly data over period January 1992 to December, 2008. According to findings of this study there is a positive significant effect of inflation rate, while exchange rate and interest rate had negative significant influence on stock market returns.

Kpanie, Vivian and Awudu (2014) examined the dynamic connection between macroeconomic variables such as money supply, interest rate, inflation rate, exchange rate and oil prices and the Ghana stock market. The main findings of this study revealed that there is a long run relationship between some of the macro-economic variables and the stock market.

Kumar and Puja (2012) examined the relationships between the Indian stock market index (BSE Sensex) and five macroeconomic variables, namely, industrial production index, wholesale price index, money supply, treasury bills rates and exchange rates over the period from April 1994 to June 2011. Accordingly this study had found that the stock prices negatively relate to inflation and the exchange rate and the short-term interest rate are found to be insignificant in determining stock prices.
Khan and Yousuf (2013) studied the influence of a selective set of macroeconomic forces on stock market prices in Bangladesh. They have found that the interest rate is positively related to stock price but exchange rate is negatively related to stock prices. According to their findings, relationship between inflation and stock prices is insignificant.

Lalith, P (1996) investigated the relationship between stock returns and inflation in Sri Lanka using monthly and quarterly data for the period January 1985 to August 1996 and found that stock returns are positively related to expected inflation and negatively related to unexpected inflation.
Menike, L (2006) examined the Effect of Macroeconomic Variables on Stock Prices in Emerging Sri Lankan Stock Market using monthly data for the period from September 1991 to December 2002. Researcher has selected macroeconomic variables such as money supply, exchange rate, inflation rate and interest rate for this study and multivariate regression has been used for data analysis. The strong relationships between macroeconomic variables and stock prices have been revealed by the fitted regression model.

According to findings of past research effect of macro-economic variable on stock prices are contra-version, hence in this study try fulfill that gap.

1.4 Methodology:

1.4.1Conceptual framework

There are three independent variables and one dependent variable of this study. Accordingly the dependent variable which is the stock prices of companies listed in Colombo Stock Exchange, will tested against three independent variables namely inflation, interest rate and exchange rate. The conceptual framework of this study as follows.

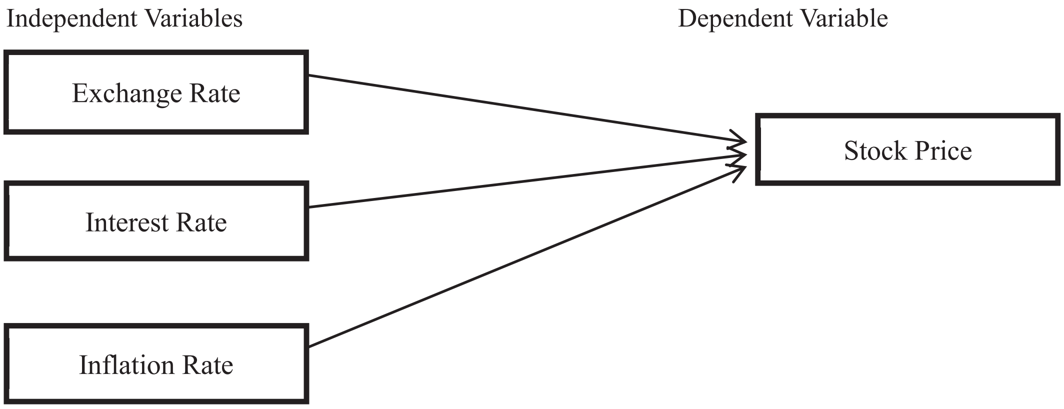

Figure 1: Conceptual framework (Source: Developed for the research purpose)

1.4.2 Population and Sample

The population of this study includes all the companies listed in Colombo Stock Exchange. Accordingly 295 companies representing 20 business sectors as at 30th July 2014 include of the population of this study. The population of this study has been taken as the sample. Accordingly 295 companies representing 20 business sectors as at 30th July 2014 and three years from January 2011 to December 2014 have been taken as the sample of this study.

1.4.3 Method of data collection

This research study mainly depends upon secondary data collection method. The empirical analysis is carried out by using monthly data and the sample period spans from January 2011 to December 2013. This study was carried out by using 36 monthly observations.

This study uses stock prices which are collected from the Colombo Stock Exchange after identifying the last trading day of each month. The All Share Price Index used for the stock prices as taken by Lalith, P (1996) Accordingly other required data regarding inflation, interest rate and exchange rate were collected from following sources. Inflation is measured by changes in the Colombo Consumer Price Index (CCPI) which was collected from Annual Reports of the Central Bank of Sri Lanka, and publications of the Department of Census and Statistics.

Interest rate is measured by three month primary market Treasury bill yield rate as used by Menike, L (2006) and Haroon and Jabeen (2013). Primary market Treasury bill rates data were collected from the Monthly Bulletin of the Central Bank of Sri Lanka. The researcher used the nominal exchange rate as the measurement of exchange rate variable and nominal exchange rate is defined as domestic currency units (Rs.) per unit of US dollar as used by Menike, L (2006). The Exchange rate data were collected from the Monthly Bulletin of the Central Bank of Sri Lanka.

1.4.4 Data analysis

Data collected for this study is time series data because it is a set of observations on the values that a variable takes at different times (2011-2013). The variables are Ratio scale in nature. They possess all characteristics of being, it can be state as a ratio, there is a meaningful distance, there is a natural ordering, and the comparison is meaningful. Therefore multiple regression analysis would be carried out.

1.5 Results and Discussion:

1.5.1 Results of Descriptive Statistics

Table 1: Summary of the variables characteristics

	Exchange Rate	Interest Rate	Inflation rate	Stock Price
Mean	1.22	8.93	7.07	6061.85
Std. Deviation	9.29	1.60	1.82	744.32

(Source: Secondary data 2011-2013)

According to descriptive statistic average monthly exchange rate is Rs 1.22 for a USD and average monthly T. Bill rate is 8.93%. The average monthly inflation rate is 7.07% and average monthly stock price is Rs: 6061.85. Also there is a highest standard deviation of stock price and lower standard deviation of interest rate.

1.5.2 Results of Correlation Analysis

Researcher tries to determine the relationship among each independent variable and dependent variable by using the correlation coefficient. Correlation concept determines the basic relationship across two variables. Correlation measures whether the two variables have the tendency to increase together or to change in opposite directions and measure the degree of the relationship in terms of value of the correlation.

Researcher has used the bivariate correlation to measure the relationship of the independent and dependent variable. Bivariate correlation calculates the correlation coefficient between two variables at a time by ignoring the effect of the other variables. Researcher has used one tailed test because researcher looking specifically for the significance in one direction.

1.5.2.1 Exchange Rate

Table 2: Correlations of the Exchange Rate

		SP	Exchange Rate
Pearson Correlation	SP	1	-0.77
	Exchange Rate	-0.77	1
Sig. (1-tailed)	SP	.	0
	Exchange Rate	0	.

(Source: Secondary data 2011-2013)

First element of the correlation coefficient needs to look at the significance. Accordingly findings are significant at 0.05 correlation coefficient is greater than zero which is (-0.77) which implies that independent variable (Exchange Rate) and Stock Prices which is the dependent variable change in the different direction. If the Exchange Rate is positive it will affect negatively to the Stock Prices. The value of (-0.77) is statistically significant at the 0.05 level, a 95% degree of confidence. Higher the value of the correlation coefficient interprets the high relationship among the variable. (-0.77) suggest that there is strong relationship among the variables.

1.5.2.2 Interest Rate

Table 3: Correlations of the Interest Rate

		SP	Interest Rate
Pearson Correlation	SP	1	-0.853
	Interest Rate	-0.853	1
Sig. (1-tailed)	SP	.	0
	Interest Rate	0	.

(Source: Secondary data 2011-2013)

Above table indicate the relationship among the Interest Rate and the Stock Prices. According to the findings correlation coefficient is significant level at 0.05. Pearson Correlation coefficient value is (-0.853) indicate that there is a negative relationship among the two variables. The value of (-0.853) is statistically significant at the 0.05 level, at 95% degree of confidence. There is a relatively high negative relationship among Interest Rate and the Stock Prices than the Exchange Rate on the Stock Prices.

1.5.2.3 *Inflation Rate*

Table 4: Correlations of the Inflation Rate

		SP	Inflation Rate
Pearson Correlation	SP	1	-0.071
	Inflation Rate	-0.117	1
Sig. (1-tailed)	SP	.	0.341
	Inflation Rate	0.341	.

(Source: Secondary data 2011-2013)

According to the above table correlation coefficient is significant level at 0.05. Pearson Correlation takes the value of the (-0.071) and the sig. value is greater than the significant level. Therefore it not represented a significant relationship between inflation rate and the Stock Prices.

1.5.3 Regression Analysis

1.5.3.1 Result of Model Summary

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.912[a]	.832	.817	318.70428
a. Predictors: (Constant), Inflation Rate, Exchange Rate, Interest Rate				

(Source: Secondary data 2011-2013)

The Adjusted R-squared value of 0.817 implies that about 81.7 % of the variations in the stock prices are explained by variations in the macroeconomic variables.
According to Result of Coefficient Analysis, Exchange Rate significantly influences to the stock prices, with and an elasticity Of -27.725.This means 1 % rise in the Exchange rate will lead to a 28 % decrease in the stock prices. The exchange rate and the Stock Prices are significantly and negatively related. This was not hypothesized since, theoretically, it is expected that increasing exchange rates (Sri Lankan Rupee against the U.S. Dollar) will result in money inflows, and, consequently higher investment in the stocks.

According to Result of Coefficient Analysis interest rates and Stock Prices are negatively related and impact of interest rates is statistically significant at 5%. Theoretically, high deposit interest rates lead investors to invest less in risky assets and, consequently, lower stock prices are expected. But according to Result of Coefficient Analysis inflation rates and Stock Prices are not significantly related statistically significant at 5%.

1.5.4 Result of Coefficient Analysis

Table 6: Coefficients

	Coefficient	Std. Error	t-Statistic
(Constant)	11558.204	780.723	14.804
Exchange Rate	-27.725	8.497	-3.263
Interest Rate	-318.175	49.851	-6.383
Inflation Rate	104.454	31.44	3.322

(Source: Secondary data 2011-2013)

According to the table, the actual long-run relationship can be represented by:

$$SP = 11,558.204 - 27.725\ ER - 318.175\ Int + 104.454\ Inf + \mu$$

Where,

SP= Stock Price at time t

ER= Exchange Rate at time t

Int= Interest Rate at time t

Inf= Inflation rate at time t

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1.6 Conclusion and Recommendations:

1.6.1 Conclusion

This study investigated the effects of macroeconomic variables on stock prices in Sri Lanka using monthly data for the period from January 2011 to December 2013. The Multiple regression model was used to find out relationships and for examining the impact of macroeconomic variables on stock prices. The fitted regression model reveals strong relationships between macroeconomic variables and stock prices. The key finding is that the null hypotheses which suggest the coefficients of the variables do not make any impact on stock prices is rejected for Exchange rate and Interest rate. Alternative hypothesis which suggest the coefficients of the variables do make impact on stock prices is rejected for Inflation rate. The stock prices mainly appear to have an inverse relation to exchange rate and Treasury bill rate in the Colombo Stock Exchange. The most significant variable-the exchange rate- is mainly negatively related to stock prices supporting the findings of Menike, L (2006), Dwijayanti et al (2012), Pramod K & Puja (2012), Kuwornu, J and Nantwi and Victor (2011), Khan et al (2013). On the other hand, the relationship between the Inflation and the stock prices provided is inconclusive. This finding is compatible with the results of Patrick A (2011), Khan, Mashrur, M and Yousuf, A (2013), Kullaporn, L and Lalita, R (2010).

1.6.2 Recommendation

The results of this study are based on the data sets, which are high quality. Future researchers can investigate the effect of macroeconomic variables on stock prices using alternative methodologies and using sector share price indices and individual company share prices as well. Further, they can use data of various frequencies such as daily and weekly and examine whether the results are sensitive to the frequency of data. Other aspects on which future researchers can concentrate on longer time periods, larger sample sizes with other macroeconomic and non-macroeconomic variables.

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