

The Relationship between Interest Rate and Stock Price: Empirical Evidence from Colombo Stock Exchange

By

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ABSTRACT

This study examines the relationship between stock price and the interest rate by using daily data for the period from July 2012 to December 2015. Two variables were considered in the stock price used in the Colombo Stock Exchange and the SLIBOR. All Share Price Index (ASPI) and the Standard and Poor Price Index (S & P) were taken to evaluate the Stock price as dependent variables. The study had two dependent variables which are evaluating the individual with the consideration of the independent variables. The results, regression and the correlation show that the interest rate is a significant negative relationship with ASPI and S&P.

Key Words: All Share Price Index (ASPI), Standard and Poor Price Index (S&P), Sri Lanka Inter Bank Offer Rate (SLIBOR), Stock Price, Interest Rate

Introduction

There is a dynamic relationship between the interest rate and the stock process in the financial market. Stock exchange and interest rate are two crucial factors of economic growth of a country (Md. Mahmudul Alam, Md. Gazi Salah Uddin, 2009). The policy makers and the other relevant investigators are attempting to understand the relationship of this dynamic interaction among the interest rate and the stock price. Therefore, the researcher examines the dynamic relationship between the interest rate and stock prices in order to identify the impact of interest rate changes on stock prices with special reference to the Colombo Stock Exchange. In the concern of the interest rate and the stock prices have a negative relationship. The research question is based on the, "What is the relationship between interest rate and stock prices?". The major objective of the study is to identify the relationship between interest rate and stock prices. The relationship of interest rate and stock price not only considers about the economic benefits and theories, but also it concerns about the investor's perspective also. Basically the rate will concern with regards to the asset allocation and market timing on decision making. Investors are mainly concerned in the interest rate in the financial market while they are taking the investment decisions. Investors are highly impressed to investing, which gives more expected returns on their investment. In this scenario, they investigate the banking interest rate and the stock price for the best selection to have the highest expected return. The fundamental principle of the relationship between interest rate and stock market returns is that stock prices and interest rates are negatively correlated. Higher interest rate resulting from tightening monetary policy usually has negative effects on stock market returns (Williams, 2014)

Literature Review

Finance theory explains the interest rate as a measurement of time value of money, which is one of the main determinants in stock prices. It plays a major role in any economy as a key macroeconomic variable which is defined as the cost of money. Thus, any change in interest rate can cause difficulty for the investors and can affect the profitability of firms, thereby fluctuating stock prices due to any change in this variable (Amarasinghe, 2015).

The modern financial theory assumes that any firm generates a stream of future cash flows and the stock price of that firm is equal to the present value of all expected future cash flows discounted at the appropriate discount rate (Pablo Moya-Martínez *et al*, 2015).

Investors are more concern on the future cash flows that what they are investing. Pablo Moya-Martínez *et al* (2015) explain the way interest rate impact on the stock price is, "Interest rates affect stock prices through two primary channels. First, movements in interest rates have a direct effect on the discount rate used in equity valuation. Second, interest rate changes affect firms' expectations about future cash flows by altering the cost of financing, mainly in the highly indebted companies. Consequently, it is expected that interest rates will be a significant determinant of stock prices".

The impacts of interest rate on stock exchange provide important implications for monetary policy, risk management practices, financial securities valuation and government policy towards financial markets (Alam, and Uddin, 2009)

Therefore, the researchers' objective is to investigate the relationship between the interest rate and stock price in Sri Lanka. Interest Rate is an important macroeconomic factor that affects Stock Prices of Listed Companies in Sri Lanka (Manike, 2006).

The end of the nearly three-decade, terrorism in Sri Lanka has shown improvements in key macroeconomics indicators. In the year 2009 the International Monetary Fund has named Sri Lanka as a middle income emerging market as per the Gross Domestic Product (GDP) at the purchasing power parity (PPP) per capita. Similarly, as an emerging stock market Colombo Stock Exchange (CSE) is breaking its own records being the best performer in the Asia region in the year 2009 (Chutang, and Kumara, 2010).

Previous research findings also explain the relationship between interest rate and stock price. Perera, (2016) highlighted in research finding as "there is a negative relationship between Interest Rate and Stock Prices of Banks Finance and Insurance companies in Sri Lanka. Also the Changes in Interest Rate will negatively affect Stock Returns of Banks, Finance and Insurance companies in Sri Lanka. Even though there is a negative relationship, due to lack of strength in relationships, prediction of Stock Prices merely based on Interest Rate becomes challenging. Furthermore, a small proportion (8.8%) of Stock Prices is determined by Interest Rate".

Most of the research findings explain the negative relationship between the interest rate and the stock prices. P.R.M.R. Perera, (2016) concluded that there is a negative relationship between Interest Rate and Stock Prices of Banks Finance and Insurance companies in Sri Lanka.

All Share Price Index (ASPI)

The Colombo All-Share Index is a major stock market index, which tracks the performance of all companies listed on the Colombo Stock Exchange in Sri Lanka. It is a capitalization weighted index. The Colombo All-Share Index has a base value of 100 as of 1985.

Standard and Poor Price Index (S & P)

The S&P Sri Lanka 20 aims to provide investors with an easily replicable, yet representative benchmark of the Sri Lankan equity market. The index is designed to measure the performance of 20 leading Sri Lankan companies and was developed in partnership with the Colombo Stock Exchange (CSE).

Sri Lanka Inter Bank Offer Rate (SLIBOR)

Sri Lanka Inter Bank Offer Rate (SLIBOR) stands for Sri Lanka Inter Bank Offered Rate. SLIBOR is an average of interest rates quoted by select commercial banks at which they are willing to offer funds for different maturities in the call money market. The interest rate has a wide and varied impact upon the economy. When it is raised, the general effect is a lessening of the amount of money in circulation, which works to keep inflation low. It also makes borrowing money more expensive, which affects how consumers and businesses spend their money; this increases expenses for companies, lowering earnings somewhat for those with debt to pay. Finally, it tends to make the stock market a slightly less attractive place for investment (Williams, 2014).

Interest Rate is an important macroeconomic factor that affects Stock Prices of Listed Companies in Sri Lanka (Manike, 2006). There are some other variables also which affect the changes of stock prices. The number of researchers has been investigating the macroeconomic factors which affects to the stock prices. Manike, (2006) concluded in the research finding that, the exchange rate variable is clearly the most

influential macroeconomic variable, which displays mainly a negative relation to stock prices. The implication of this finding is that, for an export dominant economy, (export companies listed on the CSE), the currency appreciation has a negative effect on the stock market of which the currency appreciation boosts the stock market for an import dominant economy (import companies listed on the CSE).

Interest rate and Stock Market

Companies are more willing to increase their revenue in the business activities. Most of the organizations are moving on the other investment activities with the purpose of increasing profits. When the organizations look forward for investment, the interest rate and the stock price will be a major two options for businessmen in making the decision of investment. Commonly organizations prefer for more profit. Therefore, the best interest or profit will be given the priority to be selected. Stock prices will be compared with the key price indexes, Dow Jones Industrial Average or the S&P 500 in global trade. Key price index used in Sri Lanka is All Share Price Index (ASPI) and S & P 20 (Standard and Poor Price Index). The interest rate will be considered as Sri Lanka Inter Bank Offer Rate (SLIBOR).

Organizations are making the investment of considering the basic key price index on their investment decision. At that time high stock price or higher interest rate will be given the opportunity to be selected. Therefore, the not selected index will be go down automatically. The theory explains that the stock price and the interest rate have a negative relationship. If the stock price will go up, people prefer in investing in equity and the interest rate will go down. If the interest rate will go up, people prefer in investing in treasury bills and the stock price will go down.

Methodology

Study Frame Work

The main objective of this study is to investigate the relationship between interest rate and stock prices in Sri Lanka. The data used in this study was sampled on a daily basis over the period from July 2012 to December 2015. All Share Price Index (ASPI) and the Standard and Poor Price Index (S & P) taken as the dependent variables. Sri Lanka Inter Bank Offer Rate (SLIBOR) is the independent variable and interest rates that are hypothesized to influence stock prices are obtained from the publications of the Central Bank of Sri Lanka. The fundamental principle of the relationship between interest rate and stock market returns is that stock prices and interest rates are negatively correlated. Higher interest rate resulting from tightening monetary policy usually has negative effects on stock market returns. This is due to the fact that higher interest rate reduces the value of equity as indicated by the dividend discount model and consequently, makes fixed income securities more attractive as an alternative to holding stocks (Williams, 2014).

Conceptual Framework

Study of the relation between interest rate and the stock price can be explained as follows:

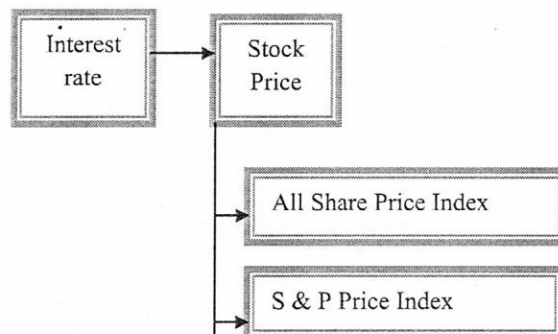


Figure 1. Conceptual Framework

For the purpose of investigating the dynamic relation between the interest rate and the stock price has been based on the variable-of dependent and independent. There are two dependent variables explain, such as

ASPI and S&P. The changes in the stock prices have been evaluated through the ASPI and S&P price indexes.

Development of Hypotheses

In order to find the relationship between the interest rate and stock prices the following hypothesis is formed.

H0: $\beta_i = 0$

H1: $\beta_i \neq 0$

β_i = the coefficients of interest rate

In the same manner the hypothesis, we can explain the following way to consider;

H0: There is no relationship between interest rate and the stock prices

H1: There is a relationship between interest rate and the stock price

Based on the results of the research most of the new investors can take their investment decisions. They can manage their positions and portfolios, if they can use news on interest rate changes as reliable information can be gathered from the research. And also it will benefit for the Investment analysts, fund managers and marginal investors can devise fundamentals based investment strategies.

Data Analysis and Discussion

The data used in this study was sampled on a daily basis over the period from July 2012 to December 2015. The relationship in between the interest rate and the stock process was analyzed using the correlation and the regression of the variables. Simple linear regression was used to analyze the relationship between the variables individually.

S & P and ASPI price indexes have the higher volume numbers in stock markets. When the investor is deciding to invest in the stock market investors consider the stock prices and the interest rate in the market for better decision on the investment.

Numeric Summary

Following graph in figure 2 explains the behavior of stock price index (S & P and ASPI) in Colombo stock market in Sri Lanka.

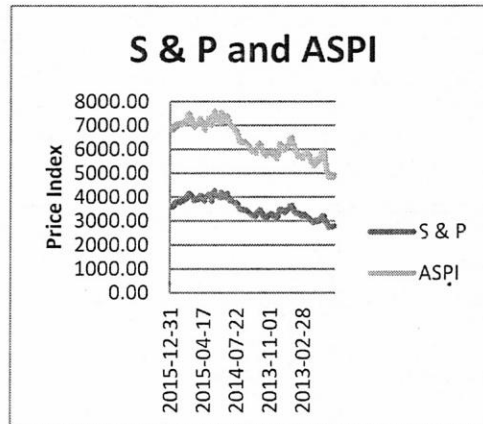


Figure 2. Stock Price Indexes

Sri Lanka Inter Bank Offer Rate (SLIBOR) for the selected time period has been growing up. Figure 3 explains the behavior of SLIBOR

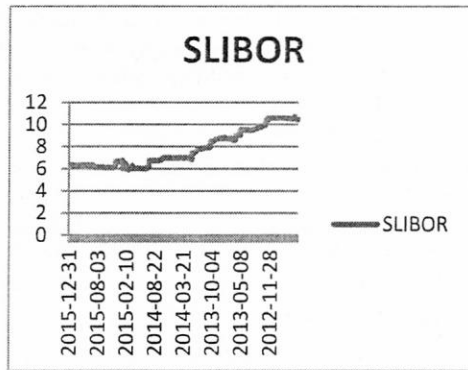


Figure 3. Sri Lanka Inter Bank Offer Rate (SLIBOR)

Based on the above two figures shows that SLIBOR has been growing up and the S & P and ASPI has been going down. In the senior explain that the SLIBOR and S & P and ASPI have the negative relationship. The following figure explains the negative relationship between interest rate and stock price in an economy.

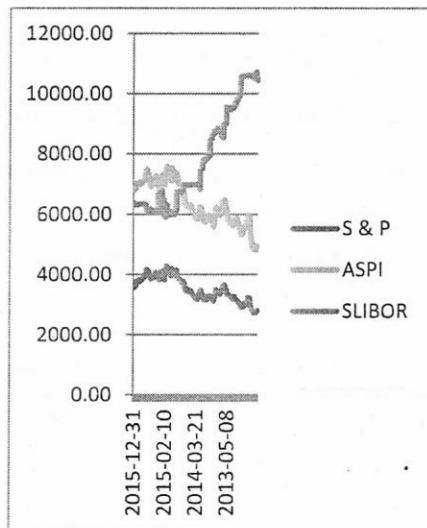


Figure 4. Relationship between Stock Price and Interest Rate

Validity

Based on the KMO and Bartlett’s Test relates to both “S & P and SLBIOR” and “ASPI and SLBIOR” indicate 0.500, therefore we can consider the sample is adequate to run the factor analysis. Bartlett’s Test of Sphericity explains the sig 0.00 < 0.05 the β value. Therefore the date is adequate to analyze the correlation relates to both: S & P and SLBIOR.” And “ASPI and SLBIOR”

Table 2. KMO Table

S & P and SLBIOR		ASPI and SLBIOR	
KMO and Bartlett’s Test	0.500	KMO and Bartlett’s Test	0.500
Bartlett’s Test of Sphericity	Sig 0.000	Bartlett’s Test of Sphericity	0.000
			Sig

Factor loading explains the for S & P and SLBIOR higher rating of validity with negative relationship by -0.964. Due to cumulative variation, one variable id explains by 92.941% on S & P and SLBIOR. Factor loading explains the for ASPI and SLBIOR higher rating of validity with negative relationship by -0.970. Due to cumulative variation, one variable id explains by 94.097% on ASPI and SLBIOR.

Table 3. Data Validity

Component Matrix for S & P and SLBIOR		Component Matrix for ASPI and SLBIOR	
	Component		Component
S & P	.964	ASPI	.970
SLIBOR	-.964	SLIBOR	-.970
Variation	92.941%	Variation	94.097%

Reliability

Based on the Cronbach's Alpha indicates the 0.683 is higher than the 0.6. Therefore the model has the highest reliability and lower errors.

Table 4. Data Reliability

Cronbach's Alpha	.683
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Correlation

Correlation explains the strength of the relationship between the variables. Table 5 explains the correlation among the variables.

Table 5. Correlation between variables

		Correlations		
		S & P	ASPI	SLIBOR
S & P	Pearson Correlation	1	.987**	-.859**
	Sig. (2-tailed)		.000	.000
	N	816	816	816
ASPI	Pearson Correlation		1	-.882**
	Sig. (2-tailed)			.000
	N		816	816
SLIBOR	Pearson Correlation			1
	Sig. (2-tailed)			
	N			816

Based on the results explain that there is negative relationship between the interest rate and the stock prices. Correlation among the S & P and SLIBOR in -0.859, explain that the variables have the strong negative relationship because of the correlation value is closer to the -1. And also ASPI and the SLIBOR also display the strong and negative relationship. The relationship in between S & P and ASPI is strong and positive is 0.987. The conceptual model and the variables of the model are significant due the sig. value of the model is .000 is less than the 0.05. The negative relationships explain that when the interest rate increases investors will invest their money in deposits, debentures and treasury bills. So the price of the stocks will be decreased. When the price of the stocks increases the interest rate of the deposits will be decreased. Based on the analysis of the data the relationship between stock and the price and the interest rate is highly negative.

Regression

Simple linear regression has been used to explain the regression among the variables due to the two dependent variables in the conceptual model. S & P and ASPI are the dependent variables in the independent variable of SLIBOR.

Table 6. S & P Price Index and SLIBOR

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.859 ^a	.738		.737	203.64905	
Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	5179.621	35.119		147.489	.000
	SLIBOR	-210.983	4.411	-.859	-47.833	.000

Predictors: (Constant), SLIBOR

Dependent Variable: S & P

The variables of independent are significant because of less value than the 0.05 significance level. The model is significant and be acceptable. According to the model explain the R² is 73.8%. The model explains the efficiency of the variable by 73.8%. As the R² is having the higher value, mode is more significant and efficient. The relationship between SLIBOR and S & P price index is negative and significant. Based on the results estimated model can be formed as follows;

$$Y^{\wedge} = 5179.621 - 210.983_{(S \& P)}$$

Table 7. ASPI and SLIBOR

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.882 ^a	.778		.778	334.60825	
Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	9393.161	57.702		162.787	.000
	SLIBOR	-386.891	7.247	-.882	-53.384	.000

a. Predictors: (Constant), SLIBOR

b. Dependent Variable: ASPI

Based on the results of the simple linear regression, model is significant and acceptable due to the sig. value is less than 0.005. R² is 77.8% and the efficiency of the model of the variables is highly efficient. The

relationship among the variable are significant and highly negative. The efficiency of the model explains by the 77.8%. Estimated model for the regression as follows;

$$Y^{\wedge} = 9393.161 - 386.891_{(ASPI)}$$

Hypothesis Testing

Research hypothesis testing was formulated as follows,

$$H_0: \beta_{i1} = \beta_{i2} = 0$$

$$H_1: \beta_{i1} \neq 0$$

β_{i1} = S & P Price Index , β_{i2} = ASPI

Based on the regression discussed in each dependent variable and the correlation of the variables can be summarized as follows;

Table 8. Decision Table

H0	β	P value	Decision	Correlation	Conclusion
$\beta_{i1} = 0$	$\beta_{i1} \neq 0$	0.000	Reject H0	-0.859	There is a negative relationship between S & P and SLIBOR
$\beta_{i2} = 0$	$\beta_{i2} \neq 0$	0.000	Reject H0	-0.882	There is a negative relationship between ASPI and SLIBOR

Conclusion and Limitation

Conclusion

Analyzed data to conclude that there is a negative relationship in between interest rate and the stock price based on the data on a daily basis over the period from July 2012 to December 2015. Model of the variables is significant and the acceptable. Results explain the high efficiency of the variables of both dependent variables. Regression and the correlation of the variable explain the higher negative relationship of the variables. Based on the evidence of results analyzed can be concluded that there is a strong negative relationship between stock price and interest rate.

Limitation of the Research

There might be some obstacles in collecting relevant needed data for this study and some of these are as follows.

- > There is only a few previous research has been done based on the Sri Lankan market
- > Time factor is another serious constraint.

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