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Nexus of Interest Rates and Stock Market Performance: A Case Study on Sri Lanka

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ABSTRACT

Several studies have been conducted to determine whether or not changes in interest rates affect the stock market. Stock markets are expected to respond to interest rates at a high level in the short term because they significantly impact financial market stability and conditions. Therefore, investors in central banks are considered efficient if all other factors are held constant. CB's macroeconomic goals, such as economic and inflation targets, are unlikely to be met if interest rate changes have an impact on stock market returns. The Colombo Stock Exchange's interest rate was the focus of this research, which aimed to find out how it affected stock market returns. The independent variable was the Weekly Central Bank Sri Lanka's Treasury bill rate. Using the ASPI and S&PSL20, weekly stock market returns were calculated for the study's dependent variable, the stock market return (ASPI and S&PSL20 weekly). Our ten-year secondary data collection process began in August of 2009. (August 2009-April 2019). The study used a descriptive research design and a linear regression model to examine the relationship between the variables. ASPI had an R square value of 0.712196 when analyzed using Microsoft Excel and SPSS statistical software packages. Independent variables account for roughly 71% of the variation in stock market returns at the CSE; however, other factors accounted for 29% of the variation. According to the findings, ASPI's R squared was 0.712196. In this study, the CSE stock market returns can be explained by an independent variable 71% of the time, whereas only 29% of the variation can be explained by other factors that were not included. S&PSL 20 produced an R square value of 0.699409 as a result of the research. While an independent variable accounted for 70% of the CSE stock market returns, other factors that were not included in this study accounted for 30%. Independent variables were found to have a strong correlation with ASPI and S&PSL20 in the study. The F statistic of 1192.751 for ASPI and 1121.5 for S&PSL20 was significant in the ANOVA at a level of 99 percent. Because of this, the CSE's stock market returns could be explained by the model. The results showed that the Treasury bill rate significantly impacts stock market returns. Because interest rates have an impact on stock market returns, Sri Lanka's central bank should regulate them.

INTRODUCTION

Returns on the stock market are useful indicators of the economy's future health, including its financial and economic status (Hamrita & Trifi, 2011). The stock market's performance has an impact on the economy's resource allocation. Investors' expectations for the market and attitudes toward risk can be gleaned from their stochastic behaviour. Various factors, including new information, affect the stock market's return. This type of influential information relies heavily on information about changes in

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interest rates (Chen, Roll, & Ross, 1986; Gupta & Modise, 2013). For investors, risk free interest rates are an important consideration because they are seen as the rate of investment return that can be guaranteed or nearly guaranteed. Investors use a risk-free rate, such as the treasury bill rate, to benchmark investment decisions. So, an increase in the Treasury Bill rate should also lead to an increase in the required rate of return, which in turn should lead to a rise in stock market returns (Sharpe, 1965). Reduced capital costs and increased shareholder wealth are common goals for businesses. Lenders are likely to lend more money and issue fewer new shares if interest rates are lower, which would reduce capital costs while minimizing the risk of diluting existing shares. As a result, higher stock market returns are expected as lending rates decline (Kganayago & Gombo, 2015). Firms may be forced to issue more stock to raise investment capital if interest rates are too high. This could lead to a decrease in stock market returns as a result. Raising borrowing costs and decreasing cash flow as well as stock market returns are all possible outcomes of increasing lending rates. An interest rate is defined by Keynes (1936) as the cost of borrowing capital for a specific period of time. Devereux and Yetman (2002), said that interest rates are the price that a borrower pays for borrowing money or capital that they don't own. The supply and demand of capital usually sets interest rates. Another thing that affects the interest rates in a given economy is the country's monetary policy. (Khan, Johl, Akhtar, et al., 2022). There is a lot of demand for capital, which means that interest rates go up. On the other hand, when there isn't a lot of demand for capital, interest rates will go down.

Any problem experienced on one side of the world due to the impact of globalization easily affects lives in other geographies; the benefits of globalization can spread rapidly if the right policies are developed for the opportunities brought about by globalization (Uygun, 2022). Early studies related to the relationship between internationalization of enterprises and foreign investment performance tended to support the linear positive correlation. However, studies in recent
years have indicated the relationship may also present an inverted U-shaped curve or U-shaped curve. Moreover, some studies have verified S-curve relationship (Zhang & Chien, 2020).

Market prices are a measure of the value of all shares traded on a stock market (Masila, 2010). Kitati, Evusa, and Maithya (2015) say that a company's stock price is based on how much its future cash flows are worth now. The price of a single share of stock in a company is referred to as the "share price." When you add up all of a company's stock prices, you get its true worth as a whole. The total market value of all publicly traded companies is known as market capitalization (Mun, Siomg &Thing, 208).

The price of securities and assets is a good way to describe interest rates. One way to think about the rate of return is to think about how much it costs to borrow money from an investor (Aggarwal, 5 2010). Using the law of demand and supply and from an investor's point of view, changes in interest rates (returns) lead to an increase in interest rates (returns) and a decrease in interest rates (return) leads to a decrease in interest rates (returns). People who want to buy stocks in a competitive market will have to pay more for them if bond interest rates go up or down (Shamim & Salar).

On the Colombo Stock Exchange, Amarasinghe (2015) looked into how interest rates and stock prices change over time. A study by Amarasinghe found that a rise in interest rates had a big impact on stock prices and returns (2015). ASPI, a stock market index, was used to measure the relationship between interest rates and stock prices, and it found that there was a link. If you raise interest rates, stock and asset prices go down. This is what Amarasinghe (2015) says. In the opposite way, when interest rates go down, publicly traded securities and shares go up.

Objectives of the Study

To ascertain the effect of interest rates on the Colombo Securities Exchange (CSE) stock market returns. Scholars, students, and researchers may use the findings of this study to guide future research in the same field. Researchers and academics alike will benefit from the study's findings, which will serve as a springboard for further investigation.

Colombo Securities Exchange (CSE) listed companies benefit from this study because it provides useful information and recommendations to help them make more informed management decisions, which in

turn helps shareholders maximize their wealth. In order to help both CSE listed companies and companies looking to improve their performance (Khan & Johl, 2020) (Johl & Toha, 2021; Toha et al., 2020)and ensure sustainability (Khan, Johl, & Akhtar, 2021, 2022; Khan, Johl, & Johl, 2021),(Khan, Johl, Singh, et al., 2021) the study has increased the pool of knowledge that is available. Government and other organizations such as the Central Bank and capital market participants, in the formulation and implementation of monetary policies to promote economic growth, this will help the growth of the economy and the growth of monetary development.

Literature Review

According to financial theory, interest rates are a key determinant of stock prices because they are a measure of the time value of money. The cost of money is a critical variable in every economy, and this one is no exception. When the interest rate fluctuates, it creates a lot of confusion for investors and can impact industry profits and stock prices because of this. According to many researchers, stock prices are affected by changes in interest rates by using a single factor framework and a multivariate approach, which are shown in the following sections. Zumwalt and Lynge, respectively (1980), Short-term versus long-term interest rate sensitivity changed, as did bank stock returns, as did non-financial stock returns, but there were still a lot of market and interest rate effects that were not explained. They also discovered that the sensitivity of bank stock returns had changed over time. They did a more in-depth study of Flannery and James (1984). They found that stock returns are negatively correlated with interest rates of all kinds, even if they are short-term or long-term. It turns out that stock prices are very sensitive to changes in interest rates because of the way a company has assets and liabilities. Interest rates' term structure can be used to predict stock returns, according to Campbell (1985). Bashir and Hassan studied the United Arab Emirates' interest-rate sensitivity and stock returns in 1997 say there is some evidence that commercial bank stock returns are sensitive to changes in the interest rate (Akhtar et al., 2020). During their study, Sri Lankan researchers looked at weekly and monthly data from January 1990 to December 1995 to see how stock returns and interest rates were linked. Premawardane (1997) published his findings. Geske and Roll (1983) and Balmash and Trivoli (1991) found that stock returns were very intrinsically correlated to each other and one-year T-bill yield and yield spread, the empirical results contradict these findings. In his research, he found that investors' reactions to changes in the interest rate structure take longer than they should to get through to them, which suggests that the process of disseminating market information is inefficient. Hasan, Samarakoon, and Hasan (2000) investigate the ability of interest rates, as measured by Treasury bill rates for all three maturity periods, to track expected monthly, quarterly, and annual returns in the Sri Lankan stock market for the period 1990-1997. In contrast to most previous studies on foreign markets, short-term interest rates in Sri Lanka appear to positively impact future returns. Their ability to accurately forecast the returns of all three return horizons is a major advantage. Longer maturity periods and quarterly return horizons greatly impact future returns from interest rates. Except in the case of annual returns, the explanatory power increases as the return horizon lengthens.

According to Bulmash and Trivoli (1991), the current US stock price has a positive correlation with the stock price from the previous month and a negative correlation with the Treasury bill rate. The empirical literature has recently become more interested in this issue, resulting in a new signal of additional evidence for a significantly negative relationship between stock returns and interest rate changes. According to Abdullah and Hayworth, short and long-term interest rates have a negative impact on stock returns in the United States (1993). Interest rates have a negative and statistically significant effect on stock prices in the Kuwait Stock Exchange (KSE) between 1981 and 1997, indicating that the KSE market behaves with some features of semi-strong efficiency, as demonstrated by AI-Qenee, Carmen, and Bob (2002). According to some theories, stock prices and interest rates have a long-term negative relationship. Liu and Shrestha (2008) used heteroscedastic cointegration analysis for the long-term relationship between interest rates and Chinese stock indices. They found that interest rates and stocks are intertwined. Pilinkus and Boguslankas (2009) concluded that short-term interest rates have a negative impact on stock market prices after conducting a study of short-term relationships.

Alam and Uddin (2009) found a significant negative relationship between the stock index and interest rate for fifteen developed and developing countries, and for six countries, interest rate changes have a

significant negative relationship with share price changes. Another factor that will have an impact on the stock exchanges of these countries is if the interest rate in these countries is significantly regulated. This will encourage both investment and growth for these countries' businesses.(Salar & Shamim, 2017) Few studies have found correlations between short- and long-term interest rates. There is a negative correlation between long-term interest rates and stock prices in the US and Japan, according to Humpe and Macmillan (2007).

Conceptual Framework

According to this study's hypothesis, the (Interest Rates) Treasury bill rate and stock prices are linked. The independent variable is the interest rate on Treasury bills, and the dependent variable is the stock market price. An alternative to stock market prices is suggested in the study: Treasury bill rates, which are risk-free assets. This relationship is as shown in Figure 1 below.

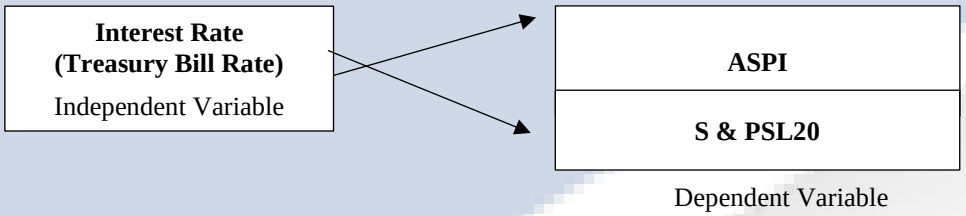

Figure 1. Conceptual Framework

Data Gathering and Analysis

This study relied solely on data from a third-party source. For companies with a Colombo Stock Exchange listing (CSE), the capital market authority requires that they submit their annual financial reports. For a period of ten years, weekly data was gathered and analyzed. There were no exceptions to this rule because the research focused on the ASPI index and S & P SL20 as a proxy for Treasury bill rates between August 2009 and April 2019. The Central Bank provided the data for the independent variable, stock return, which the Treasury Bill Rate referenced. Using the ASPI and S&P SL20, the study looked at the blue-chip companies that are listed on the stock exchanges and have a high level of profitability and dividends.

Sorted, coded, and tabulated data was made available for analysis. Descriptive and inferential statistics were used to examine the data (Khan & Johl, 2019). Excel was used because it is more user-friendly than other spreadsheet programs. A descriptive and correlative analysis was performed on the data entered into Microsoft Excel. The study relied on mean and standard deviation, two concepts common in descriptive statistics. Multivariate regression analysis, which is used to make inferences, found that the stock market return and T-Bill interest rates were linked.

Data Sources

From August 2009 to April 2019, data were gathered for this study. The stock market and average Treasury bill rates from the previous week were examined. The Central Bank of Sri Lanka website gathered weekly Treasury bill rates. The Colombo Securities Exchange (CSE) provided weekly data on the performance and stock prices. All share Price Indexes and S & PSL20 were used to measure stock prices.

Analytical Model

This study's regression analysis used weekly stock prices and weekly Treasury bill rates. This study looked for a link between interest rates and stock prices by putting forward the following theories:

$H0: \beta I = 0$
$H1: \beta I \neq 0$

Where are the $\beta 1$ coefficients in the regression model?

Various econometric models have been used to evaluate the association between stock prices and interest rates. Nevertheless, scholars such as Akbar et al. (2012) and Amarasinghe have adopted the testing for stationarity in the data as an important step (2015).
The researcher performed a regression analysis on the collected data to ascertain the degree to which interest rates and stock market returns are related. The following regression models were used in the study:

$$(1) \quad CASE\ \ Y1 = \beta 0 + \beta 1 X1 + e$$
$$(2) \quad CASE\ \ Y2 = \beta 0 + \beta 2 X1 + e$$

Where,
$Y1$ = ASPI weekly returns are used as a measure of stock market performance.
$Y2$ = The return on the stock market, as measured by the S & P weekly returns
$\alpha = y$ the regression equation's intercept.
$\beta 1$ and $\beta 2$, = the regression line's slope.
$X1 = T$ Bill rate as determined by the CB on a weekly basis
$e =$ error term

Data Analysis and Interpretations

Tests of Significance

The F – test at 99 percent (1 and 2) confidence levels determine the statistical significance of the data. Each equation's statistical significance was determined using the F statistic, and the study coefficients' statistical significance was determined using the t statistic. ASPI values are concentrated to the left of the mean and are not normally distributed. The high standard deviation of ASPI in relation to the mean indicates that the volatile stock market. Other macroeconomic variables that are used as proxies for the real economy do not have a normal distribution with negative skewness.

Table 1. Descriptive Statistics

Descriptive Analysis (ASPI & Tbill)			
	ASPI	**C**	**TBILL**
Mean	5455.486	1	10.57023
Median	6086.425	1	9.99
Maximum	7711.62	1	19.96
Minimum	1526.76	1	0
Std. Dev.	1727.934	1	3.737657
Skewness	-1.006386	NA	1.054956
Kurtosis	2.600563	NA	3.427604

The study needed to establish a general description of the study variables, such as the minimum (Min), maximum (Max), Mean, standard deviation (Std. Dev), Skewness, and Kurtosis. The findings analysis results are shown in the table below. In this study, descriptive statistics are used to present the mean, maximum, and minimum values of variables and their standard deviation.

The descriptive statistics for the variable used in Case 01 are shown in Table 1 the average weekly stock market return was 5455.49, with a standard deviation of 1727.93, according to an analysis of all variables conducted using e-views over ten years (2009–2019).

The descriptive statistics for the variable used in Case 02 are shown in Table 2 the average weekly stock market return was 3020.179, with a standard deviation of 915.5887, based on an analysis of all variables over ten years (2009–2019). Skewness analysis revealed that lending rates and spreads are asymmetrical to the right of their mean, whereas Treasury bill rates and S & PSL20 are skewed to the left.

Table 2. Descriptive statistics S & PSL20

Descriptive Analysis (S & PSL & Tbill)			
	S & PSL20	C	TBILL
Mean	3020.179	1	10.57023
Median	3334.181	1	9.99
Maximum	4272.496	1	19.96
Minimum	847.938	1	0
Std. Dev.	915.5887	0	3.737657
Skewness	-0.968811	NA	1.054956
Kurtosis	2.658177	NA	3.427604

According to the study, kurtosis analysis revealed that T bill rates and S & PSL20 had positive kurtosis of 2.658177. A low standard supported these findings.

Correlation Analysis

In order to determine if two variables have a strong negative correlation (-) or a perfect positive correlation (+), one uses correlation analysis. Correlative methods were used to study the relationship between Treasury bill rates and stock market returns.

Table 3. Correlations (ASPI)

Correlations (ASPI)		
	ASPI	TBILL
ASPI	1	-0.843917
TBILL	-0.843917075	1

From correlation analysis, there was a strong correlation between T Bill rates and ASPI (Stock Market Return) or ASPI (P = -0.8439).

There is no correlation between the current interest rates in the country and the stock market returns (ASPI).

Table 4. Correlations (S & PSL)

Correlations (S & PSL)		
	S & PSL20	TBILL
ASPI	1	-0.836307
TBILL	-0.836306524	1

We found a strong and negative correlation between S & PSL20 and T bill rate. For example, Theis asserts that movement in the stock market return (S and PSL20) is correlated negatively to stock market returns in a significant way.

T bill rate is strongly correlated with the ASPI and S and PSL20, while all other real economic variables have no correlation with the T bill rate.
Aside from ASPI and S & PSL20, the main branches of the economy are not correlated with the inflation rate, exchange rate, or interest rate. ASPI may positively correlate even if the money supply is extremely limited.

Regression Analysis

A comparison was made between the return on the stock market and the yield on a treasury bill. At a 1% significance level, the regression analysis was conducted. F-table critical values were compared to regression analysis critical values. The research team came up with the model summary statistic depicted in the following table. The coefficient of determination, R squared, indicated the deviation in the response variables due to predictor variables have changed. According to the results in Table 1, the value of R square or R square was 0.712196, indicating that 71 percent of stock market return (ASPI) deviations at the CSE are caused by changes in ASPI. Another 28.7 percent of the CSE stock market returns variation is attributable to variables not included in the model. R square was 0.699409 in S & PSL20. According to the report, the S & PSL20 are responsible for 70% of stock market return deviations. ASPI Index and selected independent variable (T Bill Rate) have a weak correlation coefficient based on the correlation coefficient. A Durbin Watson statistic of 1192.751 showed that the variable residuals were not serially correlated because the value was higher than 1.5.

Table 5. Regression Analysis

	R Square	Adjusted R Square	SE	Durbin Watson	F – Statistic	Probability
ASPI	0.712196	0.712196	927.9523	0.10667	1192.751	0
S & PSL20	0.699409	0.698785	502.5031	0.101935	1121.506	0

Models Coefficients
The relationship between market returns at CSE (ASPI, S & PSL20) and T bill rates was measured using determination coefficients. The P-value in the sig column indicates the relationship between the independent and dependent variables. P-values under 0.01 were interpreted as statistically significant at 95% confidence. A P – value greater than 0.05 indicates that the dependent and independent variables are not related statistically. The following are the outcomes:

Table 6. ASPI Output

	Coefficient	Std. Error	t-Statistic	Prob.
	9579.421	126.6397	75.6431	0
	-390.1463	11.29673	-34.53623	0

According to the above findings, a p value of less than 0.01 indicates that all T Bill rates are significant determinants of stock market returns (ASPI). The regression equation below was calculated.

$Y1 = 9579.42 - 390.1463 \times 1$

Where,

$Y1 =$ Returns on the stock market, as measured by ASPI weekly returns
$Y1 =$ T Bill rate as determined by the CB on a weekly basis

According to the estimated regression models, the ASPI market return would be 9579.42 and the S & PSL20 return would be 5185.642 if the selected independent variable (T Bill) were rated zero. A 390.1463 increase in T Bill rate would result from a unit increase in market returns.

Table 7. S & PSL20 Output

	Coefficient	Std. Error	t-Statistic	Prob.
	5185.642	68.57773	75.617	0
	-204.8644	6.117383	-33.48889	0

The T Bill rate significantly affects stock market returns (ASPI) as p value is below 0.01, as shown by the above finding. The regression equation below was calculated.

$Y1 = 5185.642 - 204.8644 \times 1$

Where,

$Y1 =$ The weekly returns from S & PSL20 are used to calculate stock market returns.
$Y1 =$ T Bill rate as determined by the CB on a weekly basis.

According to the coefficients in the estimated regression models, if the selected independent variable (T Bill) were rated zero, the S & PSL20 market return would be 5185.642 and the S & PSL20 return would be 5185.642. A 204.8644 increase in T Bill rate would result from a unit increase in market returns.

ANOVA

ANOVA statistics were computed in order to determine the regression model's fitness in predicting the relationship between the Treasury bill rate and the predictors (ASPI and S & PSL20). The results of the analysis of the findings are presented in Table 9. below.

Table 9. Analysis of Variance (ANOVA)

	Sum of Squares	DF	Mean Square	F	Sig
Regression	1027072483	1	1027072483	1192.751	0.0
Residual	4115048001.1	482	861095.438		
Total	5142120484				

In the F Test, the population parameter had a significance level of 0.0, according to the results of the analysis.

Table 10. Analysis of Variance ASPI

	Sum of Squares	DF	Mean Square	F	Sig
Regression	283190667.7	1	283190667.7	1121.5	0.0
Residual	121709510.9	482	252509.3587		
Total	404900178.6				

The level of significance is 0.00, which is less than the cutoff of p=0.01 for statistical significance. In other words, the model correctly predicted the CSE stock market's return on S and PSL20. The significance level is set at 1%. Also, the linear regression model explains how the selected independent variables affect CSE stock market returns statistically.

Summary, Conclusions and Recommendations

Despite the influence of stock markets, a number of factors influence their performance and, more importantly, their contribution to economic growth and development (Hahm, 2004). The research purpose was to see how interest rates affected stock market prices at the Colombo Stock Exchange. Changes in the interest rate had a significant impact on securities prices, according to Aggrawal (2010). Data for this study was collected for a period of 10 years from August 2009 – to April 2019. A time-series study was conducted because the data was collected over a period of time (Almaqtari et al., 2021). Time series analysis is often descriptive in nature, according to Webb, Campbell, Schwartx, and Sechrest (1966).

The overall regression model was significant, indicating a significant relationship between Treasury bill rates and stock market return using ASPI and S7PSL20. Using correlation analysis, the study discovered a strong negative correlation between T Bill rates and ASPI (Stock Market Return) and ASPI (P=0.8439). This demonstrates that the current interest rates in the country have no and significant relationship with stock market returns (ASPI). S& PSL20 and T bill rate were found to have a strong and negative relationship.

This means that changes in stock market returns (S & PSL20) are significantly negatively correlated with stock market returns. The coefficient of determination, R squared, represents the deviation in the response variables caused by changes in the predictor variables. The value of R square was 0.712196, indicating that Change in ASPI is responsible for 71 percent of stock market return (ASPI) deviations at the CSE. Other variables not included in the model are responsible for 28.7% of the variation in CSE stock market returns. R square was 0.699409 in S & PSL20. According to the report, the S & PSL20 are responsible for 70% of stock market return deviations.

The correlation coefficient also revealed that there is a weak relationship between the selected independent variable (T Bill Rate) and the ASPI Index. Because the value was greater than 1.5, The variable residuals were not serially correlated, according to a Durbin Watson statistic of 1192.751. At a 95 percent confidence level, a P – value of less than 0.01 was interpreted as a measure of statistical significance. As a result, a P – value greater than 0.05 indicates that the dependent and independent variables have a statistically insignificant relationship.

Conclusion

According to the study, ten-year share index rate spreads. Depending on the nature of the variables, macroeconomic variables have a positive or negative impact on stock price. Interest rates and the CSE share index (ASPI & S & PSL20) have a strong negative relationship. The ASPI, S & PSL20, and interest rate spreads have a strong, statistically significant negative relationship.

Recommendations

Government policy on interest rates should be favourable to support stock market price movements because of the stock exchange's role in the economy and the importance of the stock market. Stock prices may suffer if interest rate spreads balloon out of control, and the government should address this issue. In order to prevent investors from preferring risk-free returns from government securities to those offered by corporate securities, the government's excessive use of Treasury bills should be curtailed even further. If the private sector is to remain competitive, the government's monetary and fiscal policy positions must be reviewed. It is possible to boost economic growth by setting lending interest rates to stimulate money supply and growth in the economy via stock market movements. Providing favourable deposit rates encourages surplus spending units to place their savings with financial intermediaries, which also helps to bolster this theory.

Limitations of the Study

Between June 2009 and June 2019, the study covered ten years. The stock market underwent a slew of institutional and technological changes that were left out of the analysis during this time period. These unresolved issues could have influenced the study's findings in some way. Secondary data from a ten-year period was used in the study. The data were collected on a weekly basis because the timeframe was so condensed. Because of the shorter time frame and the use of weekly data, it's possible that longer-term trends will go unnoticed. And the results are as accurate and up to date as the secondary data sources that were used.

Stock prices and macroeconomic variables were assumed to be linked in a linear fashion in the study. There is a good chance that the limitations of regression models taint the results. Defining the dependent and independent variables was a crucial step in the development of the regression model. Using a linear regression model reduces the study's ability to verify its relationships, especially if those relationships are curvilinear or cyclical. Other types of relationships were not examined in this study.

Because of the limited time and resources available, this study was unable to examine all of the potential predictor variables that could significantly impact stock prices. Stock prices are influenced by a variety of factors, including macroeconomic indicators and the characteristics of individual companies. An important part of Sri Lanka's economy, non-listed companies, was left out of the study.

Suggestions for Further Studies

In order to figure out how interest rates affect Sri Lanka's CSE stock market prices, a study was required. Further research should incorporate the effects of other institutional and technological changes that occur in the stock market.

There should be an investigation into a longer period of time in which structural changes can be observed over longer periods of time. Analyzing panel and time-series data using modern data analysis techniques will be required.

Nonlinear regression assumptions and analytical approaches should be used in a new study on the relationship between stock prices and macroeconomic variables. Defining and measuring the dependent and independent variables at the firm and economy-wide levels is critical when building models.

Curvy or cyclic relationships between market prices and macroeconomic indicators and firm-specific attributes should be explored further in future studies. Non-listed companies' performance should be examined to see if there is a link between interest rates and it. A focus on specific industries and companies is required in order to examine how interest rate variables affect other industries and companies.

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