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Abstract

This study examines the causal relationship between macroeconomic variables and returns in the banking sector. Interest rate, exchange rate, and money supply are selected as macroeconomic variables because they are highly related with the activities of banks. Data on macroeconomic variables is collected from the publications of the Central Bank of Sri Lanka from January 2006 to December 2015. The Bank, Finance and Insurance (BFI) sector index is taken from the Colombo Stock Exchange website to calculate stock returns. The Augmented Dickey Fuller Test is used to check the stationary value of the time series data set. Results show that share returns are stationary at level and all macroeconomic variables are stationary at first difference. The Granger Causality Test is used to determine causality among variables. The results indicate a one way causality between share returns and exchange rate, a one way causality between money supply and share returns, and no causality between share returns and interest rate. Using causality results, variables are identified as independent and dependent to run regressions to identify the effects of each variable. Regression results show that there is a significant impact of exchange rate on stock returns as well as a significant impact of share returns on money supply. Investors are advised to key in on exchange rate changes when investing money in banking sector companies.

Keywords: banking sector, exchange rate, interest rate, money supply

1. Introduction

Investment management is the professional management of assets of various securities (shares, bonds, and other securities) in order to meet specified investment goals for the benefit of the investors. Therefore, good managers always try to invest money in sources that yield higher returns to the investor. Making decisions on investing cash in various sources is a crucial skill of managers. A sound understanding of the real economic situation of the country will ease investment decision-making for managers.

The Colombo Stock Exchange (CSE) is the main Stock Exchange in Sri Lanka and is one of the exchanges in South Asia where investors can invest their money. It was established under the Companies Act No.17 of 1982 and was licensed by the Securities and Exchange Commission of Sri Lanka. It includes 297 companies representing 20 business sectors. At present, The CSE functions as a market operator, a central depository system, and as a clearing and settlement system facilitator.

The banking sector is one of the important sectors in the CSE. A bank is a financial intermediary and money creator that creates money by lending money to a borrower, thereby creating a corresponding deposit on the bank's balance sheet. In addition to their main business activities, they engage in pawning, leasing and facilitating international transactions, and maintaining savings and current accounts. Due to their importance in the financial system and influence on normal economics, banks are highly regulated in most countries.

Investors generally invest cash in banking and finance sector companies expecting higher returns than from other sectors. In the context of this paper, the researcher attempts to identify the important macroeconomic factors that control the banking and finance sector index in the stock market. Investors largely respond to the intricacies of macroeconomic fundamentals which affect to the movements of stock market performance. This phenomenon has generated much attention in the literature on the relationship between macroeconomic variables and stock market returns. Therefore, identifying the causal relationship between selected macroeconomic variables and banking sector stock returns is important for all investors interested in investing their cash in the banking sector expecting higher returns. Hence, the researcher formulated the following question: Is there a causal relationship between selected macroeconomic variables (interest rate, exchange rate, and money supply) and banking and finance sector stock returns?

2. Objectives of the study

The main objective of this study is to identify the causal relationship between selected macroeconomic variables (interest rate, exchange rate, and money supply) and banking sector share returns. A regression model is developed in the course of this study for the selected variables in order to identify the relationship between them.

3. Hypothesis Development

Previous literature and theoretical views confirm that there is a relationship between macroeconomic variables and stock returns. Based on such an observation of the variables selected, the following hypotheses were developed. They are tested using statistical tests applied to observed data. The Granger Causality Test is used to test the causality between variables and regression is used to test the effect of each variable on banking sector share returns.

H_{0A} - There is no significant causality between microeconomic factors and banking sector share returns.

H_{1A} - There is a significant causality between microeconomic factors and banking sector share returns.

H_{0B} - There is no significant effect of macroeconomic variables on banking sector share returns.

H_{1B} - There is a significant effect of macroeconomic variables on banking sector share returns.

4. Significance of the Study

Economic growth plays an important role in stock market development. It is important to initiate policies to foster growth and development as countries liberalize their financial systems. The development of a well-developed banking sector is also important for stock market development in emerging markets. Developing the banking sector can promote stock market development.

The stock exchange serves two critical functions: it provides a link between companies (that need funds to set up new business or to expand their current options) and investors that have excess funds (to invest in such companies); and it provides a regulated marketplace for buying and selling at prices determined by supply and demand. If most people start buying, prices will increase, and if people start selling, prices will go down. Government policies, and firms' and industry performance and potential have certain effects on the demand behaviour of investors both in primary and secondary markets. Factors affecting the price of an equity share can be viewed from macro and micro economic perspectives. Therefore, understanding the empirical relationship between exchange rates, interest rates, money supply, and stock prices is important and useful to policy makers, professional investors, and academics.

5. Literature Review

There are numerous studies that examine the relationship between macroeconomic variables and stock returns, while there are fewer studies which examine the relationship between macroeconomic variables and banking sector stock returns. Therefore, the following selected studies are being cited even though they provide a sketch of the global

understanding of the relationship between macroeconomic variables and stock returns in general rather than between macroeconomic variables and banking sector stock returns.
Menike (2006) examines the relationship between macroeconomic variables and stock prices. According to her findings, the relationship between exchange rate movements and stock prices is based on the rise in the domestic interest rate that leads to capital inflows. Making an exchange rate appreciation for export dominant industries has a negative effect on stock prices because of a reduction in exports while a currency appreciation boosts the stock market (positive effect on stock prices) for import dominant industries due to an increase in imports. Numerous studies have been conducted in developed capital markets with regard to the relationship between stock prices and interest rates and the results of most studies suggest that stock and bond returns are predictable and that one may be used to forecast the other. Whenever the interest rate on treasury securities rises, investors tend to switch out of stocks, causing stock prices to fall.

Samarakoon (1996, 1998), considering the relationship between stock prices and macroeconomic variables in the emerging Sri Lankan Stock Market, investigates the effect of selected macroeconomic variables such as money supply, exchange rate, inflation rate, and interest rate on stock prices. The findings imply that there exists a significant association between most of the macroeconomic variables and stock prices in the CSE.

As mentioned by Ayub & Masih (2013), any variations of exchange rate, interest rate and inflation may have an impact on the movement of banks' stock return. Theoretically, macroeconomic factors such as money supply, industry production index, exchange rate, interest rate, and inflation are considered to be the sources of volatility of the stock market and would be regarded as the leading indicators of banks' stock returns. In this case, the sensitivity of banks' stock return is intended to identify against the changes of interest rate and exchange rate.

Foreign exchange rate and interest rate risks are important financial and economic factors affecting the value of common stocks according to Joseph (2006). There are important reasons why the stock returns of banks might be responsive to interest rate and exchange rate changes. The volatility transfer hypothesis suggests that random shocks can induce higher volatility in financial markets, and because of contagion effects, which are highest in more volatile markets, investors as well as banks may look abroad to invest in alternative

financial assets. If international portfolio diversification also results in an increase in the volatility of those returns, then greater exposure to interest rate and exchange rate risks is likely to affect the stock returns of banks, if indeed such information is impounded into their stock prices (Joseph, 2006). So the implications of the Arbitrage Pricing Theory (APT) will apply if indeed interest rates and exchange rates are priced factors that constitute important elements in the equilibrium price of stocks. In equilibrium, the stock price of financial institutions, including banks, would differ according to their sensitivity to interest rate and exchange rate changes.

Shubiri (2010) demonstrates that the relations between exchange rate movements and stock prices are based on the rise in the domestic interest rate that leads to capital inflows and an appreciation of the exchange rate. Using regression analysis, the study finds a highly positive significant relationship between the market price of stock and net asset value per share market price of stock dividend and percentage gross domestic product, and a negative significant relationship on inflation and lending interest rate for Amman Stock Exchange in Jordan.

Buyuksalvarei (2010) investigates the relationship of seven macroeconomic factors and ISE index returns in the APT framework by using a multiple regression model. His study is another contribution to the literature on risk-returns relationships. The results of this study indicate that some macroeconomic factors make a great contribution to raising the index of ISE and some macroeconomic forces play no role in determining the returns of ISE. The factors which contribute to determining the prices of stock are interest rate, oil price, foreign exchange rate, and industrial production. Inflation rate and gold price did not show any significant impact on the returns of ISE.

Saeed & Akhter (2012) studied the macroeconomic climate (from June 2000 to June 2010) which is comprised of money supply, exchange rate, industrial production, short term interest rate, and oil prices along with the banking index which includes twenty nine listed banks in the Karachi Stock Exchange. Diagnostic tests such as multicollinearity, normality, heteroscedasticity, and autocorrelation were performed, and the data indicate that there are no econometric problems. Regression results indicate that exchange rate and short term interest rate have a significant impact on the banking index. Macroeconomic variables like

money supply, exchange rate, industrial production, and short term interest rate affect the banking index negatively.

Mustafa (2013) investigates the relationship between money supply, interest rate, and stock prices. This study uses monthly data from January 1992 to June 2009. The study applied an error correction model, co-integration and the Granger Causality Test to check the relationship between money supply and share prices. His findings suggest that there is a unidirectional association between share prices and the supply of money. There results also reveal that money supply is negatively affected by share prices in a short run relationship. According to these research findings, money supply is not the strong determinant of stock prices. There is no long term relationship between money supply and stock prices. Interest rates are seen to affect share prices, which gives some idea about the effects of monetary policy.

All the selected studies provide insights into the relationship between macroeconomic variables and stock returns. Therefore, a space exists for the present study that aims to explore the causal relationship between macroeconomic variables and banking sector stock returns.

6. Methodology

6.1. Data Collection Methods

This study utilizes secondary data for the purpose of achieving the research objectives. Monthly data from January 2006 to December 2015 were used. The banking sector Index of the Colombo Stock Exchange is considered in calculating share price returns. Interest rates, exchange rates, and money supply that are hypothesized to influence share price returns are obtained from the publications of the Central Bank of Sri Lanka.

6.2. Model

Prior to deciding on the appropriate model, the stationary value of the variables are tested using unit root testing. In this study, the Augmented Dickey Fuller Test was used to investigate the stationary value.

The Granger Causality Test (Granger 1988) is applied to explore any causal relationship between stock prices and interest rates. Fairly sophisticated statistical tools were also used to analyse the collected data. One such tools is multiple regression analysis. Regression

analysis is a statistical process for estimating the relationships among variables. This model includes many techniques for modelling and analysing several variables. Its focus is on the relationship between a dependent variable and one or more independent variables. In this study, the following regression model has been used for data analysis:

$$SRT = \beta_0 + \beta_1^{IR} + \beta_2^{ER} + \beta_3^{MS} + e_t$$

SRT indicates banking sector share returns, IR represents interest rate, ER is for exchange rate and MS stands for money supply. It is considered that $\alpha = 0.05$ indicates that the p-value is between 0.01 and 0.05. A 95% confidence level was expected.

7. Results

Data on stock prices and the three other selected variables are time series variables. Therefore, the stationary value was checked using the Augmented Dickey Fuller Test before applying other statistical analysis methods. Results showed that share returns were stationary at level and all macroeconomic variables were stationary at first difference, which rejects the null hypothesis that the data has a unit root. The results of the test are given in Table 1 below.

Table 1: Unit Root Test results

Variables	Augmented Dickey Fuller	
	Level	First Difference
	Test Statistics	
Stock returns	-9.355804*	
Exchange rate	-1.074050	-6.971896*
Interest rate	-0.759709	-9.671827*
Money supply	0.097406	-12.91888*
	Critical Values	
1 percent	-3.486551	-3.487046
5 percent	-2.886074	-2.886290
10 percent	-2.579931	-2.580046

Notes: * indicates stationary at 1% level

After determining the stationary value of the data sets, the stationary data were used for the Granger Causality Test to explore any causal relationship between stock returns and the other selected variables. The pair-wise causality results in Table 2 indicate a one-way causality between share returns and exchange rate, a one-way causality between money supply and share returns, and no causality between share returns and interest rate.

Table 2: Granger Causality Test results

Null Hypothesis:	F-Statistic	Probability
DER does not Granger Cause SRT	1.06246	0.3491
SRT does not Granger Cause DER	5.29716	0.0063
DIR does not Granger Cause SRT	2.62012	0.0773
SRT does not Granger Cause DIR	0.33196	0.7182
DMS does not Granger Cause SRT	5.63005	0.0047
SRT does not Granger Cause DMS	1.29162	0.2789

The causality between stock returns and exchange rate is significant because the p-value is <0.05 (0.0063). It rejects the null hypothesis accepting the alternative hypothesis (H_{1A}) that "There is a significant causality between microeconomic factors and banking sector share returns". There is no significant causality (p = 0.0773, 0.7182 > 0.05) between stock returns and interest rate, accepting the null hypothesis. Money supply and stock returns have a significant causality (p = 0.0047) accepting the alternative hypothesis (H_{1A}).

Using causality results, variables are identified as independent and dependent to run regressions to explore the effects of each variable. The suggested multiple linear regression model is not applicable when the causal relationship is considered. All three macro variables do not have the same type of relationship. Therefore, two relationships were identified separately using two separate regression models: one between stock returns and exchange rate and other between stock returns and money supply.

For the first regression model, the exchange rate was taken as X and share returns was taken as Y. Results in Table 3 show that a linear relationship between exchange rate and stock returns is significant and it shows a significant positive relationship. This finding indicates an acceptance of the alternative hypothesis (H_{1B}) that "There is a significant effect of macroeconomic variables on banking sector share returns". The results in the ANOVA table indicates that the fitted model is significant as the p-value corresponding to F is 0.000 (<5%).

The fitted model is able to explain 97% of the variability of returns (R^2 = 96.7%).

Table 3: Regression Result for Model 01

The regression equation is

SRT = - 30448 + 332 ER

S = 723.282 R-Sq = 96.7% R-Sq (adj) = 96.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	971486563	971486563	1857.04	0.000
Error	63	32957610	523137		
Total	64	1004444173			

For the second regression model, stock returns was taken as X and money supply was taken as Y, which is a different proposition compared to previous studies. The one-way causality between stock returns and money supply shows that though stock returns affect money supply, money supply has no impact on stock returns. Results in Table 4 demonstrate that a linear relationship between stock returns and money supply is significant and it shows a significant positive relationship. These results give enough evidence to accept the null hypothesis (H_{0B}) rejecting the alternative one (H_{1B}). The results in the ANOVA table indicate that the fitted model is significant as the p-value corresponding to F is 0.000 (<5%). The fitted model is able to explain 99% of the variability of returns (R^2 = 99.3%).

Table 4: Regression Result for Model 02

The regression equation is

MS = 129708 + 26.2 SRT

S = 8910.53 R-Sq = 99.3% R-Sq (adj) = 99.3%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	6.79022E+11	6.79022E+11	8552.17	0.000
Error	60	4763855894	79397598		
Total	61	6.83785E+11			

Regression results show that there is a significant impact of the exchange rate on stock returns as well as a significant impact of share returns on money supply.

8. Conclusion

The Augmented Dickey Fuller Test was used to check the stationary value of the time series data sets. Results showed that share returns were stationary at level and all macroeconomic variables were stationary at first difference rejecting the null hypothesis that data have a unit root. The Granger Causality Test was used to explore the causal relationship among variables. The results indicate a one-way causality between share returns and exchange rate, a one-way causality between money supply and share returns, and no causality between share returns and interest rate. Using causality results, variables were identified as independent and dependent to run regressions to explore the effects of each variable. Two regression models were used separately to identify the impact of independent variables on the dependent variable. The first regression result showed that there is a significant positive impact of exchange rate on stock returns, and the second regression result showed a significant positive impact of share returns on money supply.

Investors are advised to key in on exchange rate changes when investing money in banking sector companies because changes in the exchange rate impact share prices of the banking, finance, and insurance sector companies. Good managers aim for the success of their organizations by achieving their targets through correct decision-making at the right time. Highly volatile economic indicators show that economic changes have a high impact on a company's performance. Therefore, managers strive constantly to manage the impact of economic changes on their companies through sound decision-making. The findings of this study will help company managers to adopt best practices for future success.

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