

Macroeconomic Variables Effect on Financial Sector Performance in Emerging Sri Lankan Stock Market

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Abstract: *The objectives of this paper is to examine the degree and pattern of effect of macroeconomic variables on sectoral share price indices in Sri Lanka over the period from January 2008 to December 2012 from employing macroeconomic factor model for monthly data. The findings from multiple regression analysis reveal that exchange rate, treasury bill rate and inflation rate are common variables to explain the variability of all sectoral share prices for the period of 2008 to 2012 except of Telecom sector which has only R^2 less than 50%. The exchange rate and inflation rate have significant effect on all sectoral share prices in line with negative and positive respectively while treasury bill rate has significant negative weak influence on all sectors except of Information Technology and Telecom. Among the selected variables in this study, the exchange rate and inflation have greater importance on most of the sectors further among these two important variables, inflation rate has more powerful variable than exchange rate to explain the variability of share prices of most of the sectors. This pattern of impact is used as a consideration for interested parties in Sri Lankan Stock Market.*

Keywords: Inflation Rate, Exchange Rate, Sectoral Share Price Indices, Macroeconomic Factor Model, Sri Lankan Stock Market.

1. Introduction

The internal and external factors are total determination of stock prices which of this internal factors can only be controlled by management of a firm unless avoid external factors particularly macroeconomics which influence on whole economy. Thus external factors are more risky than internal factors. As a result, firms have to give more attention on predictability of macroeconomics trends for organizational health.

It has been proved in previous researches that most of the researchers believed stock price is highly sensitive to macroeconomic events such as exchange rate, inflation, and interest rate. Thus interested parties of stock market such as investors, governments, policy makers, stock market analysts, stock market regulators and multinational corporations, wish to care on what factors and at which level its impact on stock prices to make decisions regarding to their field.

The effect of macroeconomic variables on stock prices has been sufficiently documented in developing countries including Sri Lanka as well as developed countries. However, there is no study on effect of macroeconomic variables on sectoral share price indices in Sri Lankan context. Besides, Menike (2006) and Shafana (2013) mentioned in their research articles that future researchers can investigate the effect of macroeconomic variables on sectoral share price indices. Considering this matter, the objectives of this study is to investigate the degree and pattern of effect of some fundamental macroeconomic variables exchange rate (RS / US Dollar), inflation rate (Colombo Consumer's Price Index

(CCPI) and treasury bill rate (91 days treasury bill rate) on sectoral share price indices in Sri Lanka over the period from

January 2008 to December 2012 from employing macroeconomic factor model for monthly data.

2. Literature Review

The majority of researches have well been concentrated on financial markets of developed countries. However the recent studies mainly investigate and sufficiently documented the emerging stock markets. The recent findings of emerging stock markets by Jasra, Azam and Khan (2012) examined the impact of macroeconomic variables on selected industries stock prices for 24 quarters in Pakistan. The selected industries are oil and gas, chemical, cement and insurance industry. The results from regression analysis show that interest rate has insignificant on oil and gas, chemical and cement industry, while it has significant effect on insurance industry. On other hand consumer price index has significant effect while exchange rate has significant negative effect on all 4 industries. At the same year and same country, Nauman Khan and Sharif Zaman (2012) investigated same study in Karachi Stock Exchange (KSE) for the period of 1998 to 2009 from using multiple regression analysis with fixed effects model. The results show that GDP and exchange rate have significantly positive and consumer price index has significantly negative impact on stock prices. However export, money supply (M2), foreign direct investment and oil prices have insignificant on stock prices.

Yogaswari, Nugroho and Astuti (2012) examined this topic in Indonesia Stock Exchange from using multiple regression analysis for the period of January 2007 to December 2011. The change in inflation has positive and change in interest rate and inflation have negative impact on stock prices in Jakarta composite index, agriculture sector, and basic industry sector. Sharma and Mahendru (2010) investigated long term relationship in India for the period January 2008 and January 2009. The findings from multiple regression model reveal that exchange rate and gold prices highly affect

the stock prices on other hand the effect of foreign exchange reserves and inflation on the stock prices is up to limited extend only.

In Sri Lankan context, Shafana (2013) examined the degree and pattern of impact of macroeconomic variables on stock price indices namely All Share Price Index and Milanka Price Index over the period from January 2008 to December 2012. The findings from multiple regression analysis reveal that all selected macroeconomic variables exchange rate, Treasury bill rate and inflation rate explain 85.5% of the variation in ASPI and 75.2% of the variation in MPI. The exchange rate and Treasury bill rate have a significant negative impact on both stock prices while inflation rate significant positive influences the both stock prices.

Menike (2006) investigated the impact of macroeconomic variables on stock prices for selected companies in emerging Sri Lankan stock market by employing eight macroeconomic variables. As a result of multiple regression model, the findings reveal that inflation rate, treasury bill rate and exchange rate react negatively to stock prices while money supply positively influence on stock prices in the Colombo Stock Exchange. However, lagged money supply variables do not appear to have a strong prediction of movements of stock prices while stocks do not provide effective hedge against inflation especially in Manufacturing, Trading and Diversified sectors in the Colombo Stock Exchange. Abeyratna Gunasekarage, Anirut Pisedtasalasai and David M Power (2004) examined the long-run and short-run relationships between the stock market index and the economic variables by using a battery of tests, which include unit roots, co-integration, vector error correction models (VECM), impulse response functions (IRFs) and variance decompositions (VDCs). The VECM analyses provide some support for the argument that the lagged values of macroeconomic variables such as the consumer price index, the money supply and the treasury bill rate have a significant influence on the stock market. The treasury bill rate demonstrates the strongest influence on return changes compared to other variables. However, the share price index does not have any influence on macro-economic variables except for the treasury bill rate.

Even though there have been studies in acceptable level in Sri Lankan context {e.g., Samarakoon (1996); Nimal (1997); Premawardena (1997); Bandara and Gunasekarage (1998); Gunasekarage, Pisedtasalasai and Power (2004); Menike (2006); Shafana (2013)}, there is no study on effect of macroeconomic variables on sectoral share price indices in Sri Lankan context. Besides, Menike (2006) and Shafana (2013) mentioned in their research articles that future researchers can investigate the effect of macroeconomic variables on sectoral share price indices. Considering this matter, this study investigates the effect of some fundamental macroeconomic variables exchange rate, inflation and treasury bill rate on sectoral share price indices over the period from January 2008 to December 2012. The macroeconomic variables are selected from dominant literature.

3. Methodology

In order to objectives of this study, the following multiple regression model has been used after monthly data of all selected variables are transformed into natural logarithm.

$$\ln SSPI_t = \beta_0 + \beta_1 \ln EXR_t + \beta_2 \ln TBR_t + \beta_3 \ln CCPI_t + \varepsilon_t \quad (1)$$

Where: \ln is the natural logarithm, $SSPI_t$ is the sectoral share price indices at time t , EXR_t is the exchange rate at time t , TBR_t is the 91 days treasury bill rate at time t , $CCPI_t$ is the inflation rate at time t , β_0 is the intercept of the regression, β_1, β_2 , and β_3 are the coefficient of variables and ε_t is the error term of regression.

Base on above, the following hypotheses have been generated.

- H₁:** Exchange rate has significant effect on sectoral share price indices in Sri Lanka.
- H₂:** Treasury bill rate has significant effect on sectoral share price indices in Sri Lanka.
- H₃:** Inflation rate has significant effect on sectoral share price indices in Sri Lanka.
- H₄:** Exchange rate, treasury bill rate and inflation rate together have significant effect on sectoral share price indices in Sri Lanka.

The dataset of all above selected variables were collected from annual report of Central Bank of Sri Lanka and all estimations have been performed in SPSS software package, whereas the ordinary calculations were done in Excel.

4. Empirical Results

In this section, as a first step, correlation analysis between selected independent variables is presented in Table 1 in order to check for the existence of multicollinearity. Then analysis the degree and pattern of effect of macroeconomics on sectoral share prices indices from multiple regression summary output is presented Table 2.

4.1 Correlation Coefficients (r)

Table 1 Presents correlation coefficient among independent variables.

Table 1: Correlation Coefficients

Variables	EXR _t	TRB _t	CCPI _t
EXR _t	1		
TRB _t	-0.015	1	
CCPI _t	0.695**	-0.402**	1

** Correlation is significant at the 0.01 level.

An assumption of the multiple regression model is that there is no exact linear relationship between any of the independent variables. Thus, Pearson's correlation analysis has been performed here to check the existence of multicollinearity. A suggested rule of thumb is that if the pair wise correlation between two regressors is very high, in excess of 0.8, multicollinearity may pose serious problem (Ahmet.B, 2010). According to Table 1, treasury bill rate has no significant correlation with exchange rate. On other hand,

inflation rate has significant correlation with exchange rate and treasury bill rate. However the significant correlations are lower than 0.8. Thus, the results of correlation between selected independent variables clearly show that no multicollinearity exist amongst selected independent variables.

4.2 Multiple Regression Summary Output

The below table 02 reports that except of Telecom sector, the values of R² are more than 50% for all sectors which imply that the variability of sectoral share prices are highly explained by the variation of all selected macroeconomic variables in Sri Lanka for the period of 2008 to 2012 except in the case of Telecom sector. It means that exchange rate, treasury bill rate and inflation rate are common variables to all sectors except of Telecom sector to explain the variability of sectoral share prices rather than non-selected variables which are determined the variability of sectoral share prices by remaining position of coefficient of determinations. Especially the fundamental selected macro-economic variables have higher explanatory power on share prices of Beverage, Food and Tobacco sector with value of 91.8% while lower explanatory power on Telecom sector with value of 35.0% which indicates that 35.0% of variability of share prices of Telecom sector is explained by the variation of all selected macroeconomic variables for the study periods. Remaining 65% is attributed to other non-selected variables. It is clearly show that three selected macro-economic variables are not much important on variability of share prices of Telecom sector.

The F value is significant at the 0.05 level for all sectors. Therefore at 5% significance level, it can be statistically concluded that the model fits to explain the effect of selected macroeconomic variables on sectoral share prices. The hypotheses of the present study are tested with beta coefficients and significant values. H₁ posits that exchange rate has significant effect on sectoral share prices in Sri Lanka. The beta coefficients of exchange rate are significantly negative to all sectors at the 0.05 significant level with range of values between -1.316 and -8.896. It means that when the exchange rate rises by one unit the sectoral share prices will drop by the contribution of the coefficient when other variables are held constant. The exchange rate has higher influence on stores and supplies sector, second on trading and next on motors sector with significant coefficient of -8 while it has very lower impact on healthcare sector with significant coefficient of -1.316. But the range of coefficients of exchange rate is greater than one in all sectors.

H₂ posits that treasury bill rate has significant effect on sectoral share prices in Sri Lanka. At the 0.05 significant level, the beta coefficients of treasury bill rate are significantly negative with all sectors except of Information Technology and Telecom sectors. The range of coefficients of treasury bill rate is less than one between -0.081 and -0.749. It indicates that it is not powerful variable on all sectors and when the treasury bill rate rises by one unit the sectoral share prices will drop by less than one unit when other variables are held constant. The treasury bill rate has maximum influence on Construction Engineering sector with

significant coefficient of -0.749 while it has minimum influence on Power and Energy sector with significant coefficient of -0.081.

H₃ posits that inflation rate has significant effect on sectoral share prices in Sri Lanka. The beta coefficients of inflation rate show that it has significant positive determination on all sectors at the 0.05 significant level and is greater important variable rather than other two selected variables from range of coefficient between 1.181 and 13.45. The beta coefficients imply that when the inflation rate rises by one unit the sectoral share prices will rise by the contribution of the coefficient when other variables are held constant. The range of coefficients of inflation rate is greater than one in all sectors. The inflation rate has higher influence on Trading sectors with significant coefficient of 13.45 while it has lower impact on Telecom sector with significant coefficient of 1.181.

Among the selected variables, the exchange rate and inflation rate have greater importance to most of the sectors while interest rate has lower important to all sectors. Further among two important variables, inflation rate has more powerful variable than exchange rate to explain the variability of share prices of most of the sectors.

H₄ posits that exchange rate, treasury bill rate and inflation rate together have significant effect on sectoral share prices in Sri Lanka. At the 0.05 significant level, three selected macroeconomic variables altogether have significant impact on sectoral share prices except of Information Technology and Telecom sectors because of only treasury bill rate has insignificant on both sectors.

Table 2: Multiple Regression Summary Output

Sectors	R ²	F-value (sig)	Coefficients (sig)		
			EXR _t	TRB _t	CCPI _t
Bank, Finance and Insurance	86.9 %	123.552 (0.000)	-4.265 (0.000)	-0.404 (0.000)	6.279 (0.000)
Beverage, Food and Tobacco	91.8 %	207.618 (0.000)	-1.575 (0.007)	-0.299 (0.000)	6.283 (0.000)
Chemicals and Pharmaceuticals	90.4 %	175.162 (0.000)	-4.739 (0.000)	-0.458 (0.000)	6.678 (0.000)
Construction Engineering	78.2 %	66.791 (0.000)	-2.265 (0.027)	-0.749 (0.000)	4.443 (0.000)
Diversified	85.3 %	108.036 (0.000)	-3.609 (0.000)	-0.433 (0.000)	6.027 (0.000)
Footwear and Textile	67.6 %	38.945 (0.000)	-4.221 (0.000)	-0.158 (0.014)	3.161 (0.000)
Healthcare	84.6 %	102.155 (0.000)	-1.316 (0.002)	-0.239 (0.000)	3.029 (0.000)
Hotels and Travels	83.1 %	92.042 (0.000)	-2.148 (0.005)	-0.603 (0.000)	4.209 (0.000)
Investment Trust	76.9 %	62.259 (0.000)	-5.153 (0.000)	-0.598 (0.000)	4.261 (0.000)

Information Technology	72.6 %	49.492 (0.000)	-7.424 (0.000)	-0.048 (0.587)	6.001 (0.000)
Land and Property	81.7%	83.502 (0.000)	-2.486 (0.000)	-0.230 (0.000)	3.870 (0.000)
Manufacturing	89.1 %	153.352 (0.000)	-3.904 (0.000)	-0.368 (0.000)	5.062 (0.000)
Motors	91.4 %	199.037 (0.000)	-7.803 (0.000)	-0.525 (0.000)	10.993 (0.000)
Oil Palms	89.7 %	162.515 (0.000)	-6.418 (0.000)	-0.298 (0.003)	10.725 (0.000)
Plantations	64.1 %	33.310 (0.000)	-4.648 (0.000)	-0.242 (0.003)	3.267 (0.000)
Power and Energy	86.4 %	118.272 (0.000)	-3.834 (0.000)	-0.081 (0.014)	3.223 (0.000)
Services	89.0 %	151.756 (0.000)	-4.149 (0.000)	-0.427 (0.000)	6.811 (0.000)
Stores and Supplies	84.0 %	98.309 (0.000)	-8.896 (0.000)	-0.382 (0.001)	8.969 (0.000)
Telecom	35.0 %	10.062 (0.000)	-2.774 (0.000)	0.014 (0.809)	1.181 (0.006)
Trading	88.6 %	144.362 (0.000)	-8.347 (0.000)	-0.575 (0.000)	13.457 (0.000)

5. Conclusions and Recommendations

The values of R^2 show that the selected fundamental macroeconomic variables have higher explanatory power on all sectoral share prices except of Telecom sector which has only R^2 less than 50%. Thus it implies that the exchange rate, treasury bill rate and inflation rate are common variables to all sectors except of Telecom sector for the period of 2008 to 2012 to explain the variability of sectoral share prices rather than non-selected variables which are determined the variability of sectoral share prices by remaining position of coefficient of determinations. The main activity of Telecom sector provides communication services. Thus, exchange rate, treasury bill rate and inflation rate are not much important variables on this business.

The exchange rate has significant negative effect on all sectoral share prices with beta coefficients of all sectors more than one. Stores and Supplies, Trading, and Motors sectors mainly involve on import and export activities. Thus exchange rate is highly influence on these businesses then occurs higher changes on share prices. On other hand Healthcare sector provide medical services. Patients desire to get best treatment wherever without care about changes in exchange rate. Thus exchange rate has very lower effect on Healthcare sector.

The finding of negative effect of exchange rate on share prices is consistent with the results of Solnik (1987), Kryzanowski and Zhang (1992), Soenen and Hernigar (1998), Bilson, Brailsford and Hooper (2001), Ibrahim and Aziz (2003) and Kim (2003). Also this finding is consistent

with similar result of Menike (2006) and Shafana (2013) in Sri Lankan context, inconsistent with other Sri Lankan findings Bandara and Gunasekarage (1998) and Gunasekarage, Pisedtasalasai and Power (2004). Overall, this result is acceptable in Sri Lankan economy because of Sri Lanka highly depend on international trade. Imports increase the currency outflows and exports decrease the currency inflows in currency appreciation situation. Thus currency appreciation reduces the net inflow from international business. Hence, it falls down the share prices, vice versa. In another word, increase in exchange rate leads to lower share prices.

The treasury bill rate has significant negative effect on all sectoral share prices except of Information Technology and Telecom. Further, beta coefficients show that it is not important variable on all sectors. Overall, the finding of negative effect on share prices is consistent with the results of Geske and Roll (1983), French, Kenneth, Schwert and Stambaugh (1987), Wasserfallen (1989), Aspren (1989), Bulmash and Trivoli (1991) and Gjerde and Sættem (1999). In Sri Lankan context, Bandara and Gunasekarage (1998), Menike (2006) and Shafana (2013) also report negative effect of treasury bill rate on stock prices. Overall, when raising the interest rate on treasury securities, investors wish to switch off the investment in shares and invest in treasury securities causing the stock prices fall. It means that increase in interest rate leads to lower stock price.

The inflation rate has significant positive determination in all sectors with range of coefficient between 1.181 and 13.45 and is greater important variable among three selected variables in this study. It can be acceptable if inflation has higher and lower influence on Trading and Telecom sectors respectively regarding this nature of business. The finding of positive impact is consistent with the results of Yogaswari, Nugroho and Astuti (2012) and Mohi-u-Din Sangmi and Mohd. Mubasher Hassan (2013). Also the finding is consistent with similar results of Samarakoon (1996) and Shafana (2013) in Sri Lankan context. Besides this finding is inconsistent with Menike (2006) who reported negative impact. The result indicates that increase in inflation leads to higher share prices. The general price level change is more powerful variable on business activities. It leads to changes in exchange rate. Besides, most of the sectors involve on import and export activities. Thus exchange rate and inflation have greater importance on most of the sectors. On other hand, treasury bill rate is not much important on all sectors.

Some areas for future researchers are evident from the analysis of these results. The stock price is not only affected by macroeconomic variables but also affect firm specific variables. Thus, future researchers can investigate the determinates of stock prices by employing macroeconomic variables and firm specific variables together, separately and compare the effects of these two sides of factors on stock prices. Further, they can use the alternative methodologies, various frequencies data set such as daily and weekly and stock price of individual companies.

References

- [1] B.Ahmet, "The Effects of Macroeconomics Variables on Stock Returns: Evidence from Turkey," *European Journal of Social Sciences*, 14(3), pp.404-415, 2010.
- [2] M.Asprem, "Stock Prices, Asset Portfolios and Macroeconomic Variables in ten European Countries," *Journal of Banking and Finance*, 13 (4/5), pp. 589–612, 1989.
- [3] G.Bandara, and A.Gunasekarage, "Casual Nexus between Stock Market Indices and Macro-economic Variables," *First Annual Research Sessions*, 1998.
- [4] C.M. Bilson, T.J.Brailsford, and V.J.Hooper, "Selecting Macroeconomic Variables as Explanatory Factors of Emerging Stock Market Returns," *Pacific Basin Finance Journal*, 9(4), pp.401–426, 2001.
- [5] S.B.Bulmash, and G.W.Trivoli, "Time-Lagged Interactions between Stock Prices and Selected Economic Variables," *Journal of Portfolio Management*, 17 (4), pp.61–6, 1991.
- [6] French, R. Kenneth, G.W.Schwert, and R.F.Stambaugh, "Expected Stock Returns and Variance," *Journal of Financial Economics*, 19, pp.3-29, 1987.
- [7] R.Geske, and R.Roll, "The Monetary and Fiscal Linkage between Stock Returns and Inflation," *Journal of Finance*, 38, pp.1–33, 1983.
- [8] O.Gjerde, and F.Saettem, "Causal Relations among Stock Returns and Macroeconomic Variables in a Small Open Economy," *Journal of International Financial Markets, Institutions and Money*, 9, pp.61-74, 1999.
- [9] A.Gunasekarage, A.Pisedtasalasai, and D.M.Power, "Macroeconomic Influence on the Stock Market: Evidence from an Emerging Market in South Asia," *Journal of Emerging Market*, 3, pp.285-304, 2004.
- [10] M.H.Ibrahim, and H.Aziz, "Macroeconomic Variable and the Malaysian Equity Market: A View through Rolling Sub Samples," *Journal of Economic Studies*, 30(1), pp. 6-27, 2003.
- [11] J.M.Jasra, R.I.Azam, and M.A.Khan, "Impact of Macroeconomic Variables on Stock Prices: Industry Level Analysis," *Actual Problems of Economics (Impact Factor: 0.04)*, 08/2012, 134(8), pp.403 – 412, 2012.
- [12] M.N. Khan, and S.Zaman, "Impact of Macroeconomic Variables on Stock Prices: Empirical Evidence from Karachi Stock Exchange, Pakistan," *Business, Economic, Financial Sciences, and Management Advance in Intelligent and Soft Computing*, 143, pp.227-233, 2012.
- [13] K.H.Kim, "Dollar Exchange Rate and Stock Price: Evidence from Multivariate Cointegration and Error Correction Model," *Review of Financial Economics*, vol.12 (3), pp.301-313, 2003.
- [14] L.Kryzanowsk, and H.Zang, "Economic Forces and Seasonality in Security Returns," *Review of Quantitative Finance and Accounting*, Vol.2, pp.227-244, 1992.
- [15] L.M.C.S.Menike, "The Effect of Macroeconomic Variables on Stock Prices in Emerging Sri Lankan Stock Market," *Sabaragamuwa University Journal*, pp.50-67, 2006.
- [16] P.D.Nimal, "Relationship between Stock Returns and Selected Fundamental Variables, Evidence from Sri Lanka," *Sri Lankan Journal of Management*, 2.No.3, pp.269-287, 1997.
- [17] V. Premawardhana, "The Relationship between Stock Returns and Interest Rates in Sri Lanka," *Sri Lankan Journal of Management*, 3, pp.251-263, 1997.
- [18] L.P.Samarakoon, "Stock Market Returns and Inflation: Sri Lankan Evidence," *Sri Lankan Journal of Management*, 1, pp.293-311, 1996b.
- [19] M.Sangmi, and M.M.Hassan, "Macroeconomic Variables on Stock Market Interactions: The Indian Experience," *IOSR-JBM* 11(3), pp.15-28, 2013.
- [20] M.A.C.N. Shafana, "Macroeconomic Variables on Stock Prices: Evidence from All Share Price Index and Milanka Price Index," *International Conference on Business & Information 2013*, ISBN 978-955-4563-17-9, 2013.
- [21] G.D.Sharma, and M.Mahendru, "Impact of Macroeconomic Variables on Stock Prices in India," *Global Journal of Management and Business Research*, 10(7), 2010.
- [22] L.A. Soenen, and E.S.Henniger, "An Analysis of Exchange Rates and Stock Prices: the US Experience between 1980 and 1986," *Akron Business and Economic Review*, 19, pp. 71-76, 1998.
- [23] B.Solnik, "Using Financial Prices to Test Exchange Rate Models: A Note," *Journal of Finance*, 42, pp.141-149, 1987.
- [24] W. Wasserfallen, "Macroeconomic News and the Stock Market," *Journal of Banking and Finance*, 13 (4/5), pp.613–626, 1989.
- [25] D.D.Yogaswari, A.B.Nugroho, and N.C.Astuti, "The Effect of Macroeconomic Variables on Stock Price Volatility: Evidence from Jakarta Composite Index, Agriculture, and Basic Industry Sectors," *IPEDR* 46(18), 2012.