Impact of Macro-economic Variables on Stock Price on Nepal Stock Exchange

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Abstract.

The purpose of this study is to investigate the relationship between macroeconomic variables and stock prices in Nepal Stock Exchange (NEPSE) Nepal. To find the impact of macro-economic variables on stock price the analytical research is conducted. Secondary data were used in this study and the study considers annual data of several macroeconomic variables from 2001 to 2018. Stock price is considered as dependent variable and gross domestic product, exports, consumer price index, money supply, exchange rate, foreign direct investment and oil prices are treated as independent variable. The stationary of data is checked through Augmented Dickey Fuller test. All variables are stationary at zero lag. For the statistical result, descriptive statistics, correlation and, multiple regression analysis are used. The overall results revealed that oil price and money supply have significant positive impact on the stock price while other variables have adversely affects the stock price.

Keywords: *Stock Prices, Gross Domestic Product, Consumer Price Index, Exports, Money Supply, Exchange Rate, Foreign Direct Investment.*

Introduction

Domestic economic fundamentals play determining role in the performance of stock market (Ho & Iyke, 2017). Economic growth and prosperity is possible only when capital market works efficiently and the stock prices are fully reflecting the current position of macroeconomics variables (Mohammad, Hussain, Jalil, & Ali, 2009). Knowledge of stock market sensitivity to macro- economic behavior of key variables and vice-versa is important in many areas of investments and finance. Movement of stock indices is responsive to changes in macroeconomic forces. The relationship between share prices and macroeconomic variables is well documented for the United States and other major economies. However, what is the relationship between share prices and economic activity in developing country Nepal? This study helps to examine the impact of macroeconomic variables and stock prices. The objective of the study is to examine the impact of different macroeconomic variables and stock price in Nepalese context.

By the efficient market theory an efficient market, current as well as past information on the growth of macroeconomic variables are fully reflected in stock prices, so that investors are unable to make some profitable trading rule using the available information. Mohammad et al., (2009) explore that foreign exchange rate and foreign exchange reserve greatly affect stock prices. Hassan and Javed (2009) also found that the long term dynamic relationship between monetary variables with equity prices and stock prices were negatively related. Adam and George (2008) examine that there was co-integration between macroeconomic variables and in stock prices. Nadeem and Ali (2008) examined the relationship between stock market development and economic growth in case of developing economy Pakistan and the results of the study indicate that there is a long run relationship between economic growth and stock market development for Pakistan.

Robert (2008) examined the relationship between stock prices and macro economics variables effects on four emerging economies India, Russia, Brazil and China. The study found no significant

relationship among the variables. The Indian economy shows causal relationships of stock prices with key macro economic variables (Ahmed, 2008). The results of the study revealed that stock market in India are demand driven and industry led. Akmal (2007) examined the impact of inflation and black economy on stock market prices in Pakistan. The results revealed that stocks hedges against inflation in log run but not in short, while black economy promotes the stock market prices to heave both in long runs as well as in short run.

Mehrara (2006) examined the relationship between stock prices and macroeconomic variables in Iran. It was argued that stock price variability was fundamentally linked to economic variables, though the change in stock price lags behind those economic activities. Dimitrova (2005) studied that there is a link between the foreign exchange and stock markets which findings shows weak relation. Nishat and Shaheen (2004) investigated relationship between a group of macroeconomic variables and stock price in the Karachi Stock Exchange index in which study macroeconomic variables Granger-caused stock price movements. Adrangi, Chatrath, and Sanvicente, (2002) study reported that negative relationship between real stock returns and inflation for a major emerging market, Brazil. The results of the study back the negative relationship between inflation and real stock returns.

Research frame work and methods

This study is based on descriptive and causal-comparative research design. The required information is collected from secondary sources- central bureau of statistics, ministry of finance, trade promotion center and Nepal Rastra Bank. Descriptive statistics, correlation and regression analysis tools are used for the purpose of data analysis. The data used for the study is annually from 2001 to 2018 (18 years). Annual average final index of Nepal stock exchange is considered as stock price for the study purpose

Hypothesis

Null Hypothesis: H0: no impact of macroeconomic variables on stock prices

Alternate Hypothesis: H1: impact of macroeconomic variables on stock prices

H11: GDP is positively related to stock prices.

H12: Exports is positively related to stock prices.

H13: inflation is negatively related to stock prices.

H14: monetary growth is negatively related to stock prices.

H15: exchange rate is negatively related to stock prices.

H16: foreign direct investment is positively related to stock prices.

H17: oil prices are negatively related to stock prices.

Econometric Model

Regression model is used here to analyze the effects of macro-economic indicators on dependent variable – stock price. Following regression equation is formulated for the test.

$SP = \alpha + \beta 1\ GDP + \beta 2\ Export - \beta 3\ CPI - \beta 4\ M1 - \beta 5\ ER + \beta 6\ FDI - \beta 7\ OP + U$ ……(1)

Where:

U is normally distributed error term, α and βi's are unknown population parameters, α is the intercept,

β1, β2 …, βk are regression coefficients for variables GDP, Export, CPI, M, ER, FDI and OP are macro-economic indicators treated as independent variables and stock price (SP) is the variable considered as dependent.

Conceptual frame work

The following conceptual framework is developed on the basis of the different literature and theories.

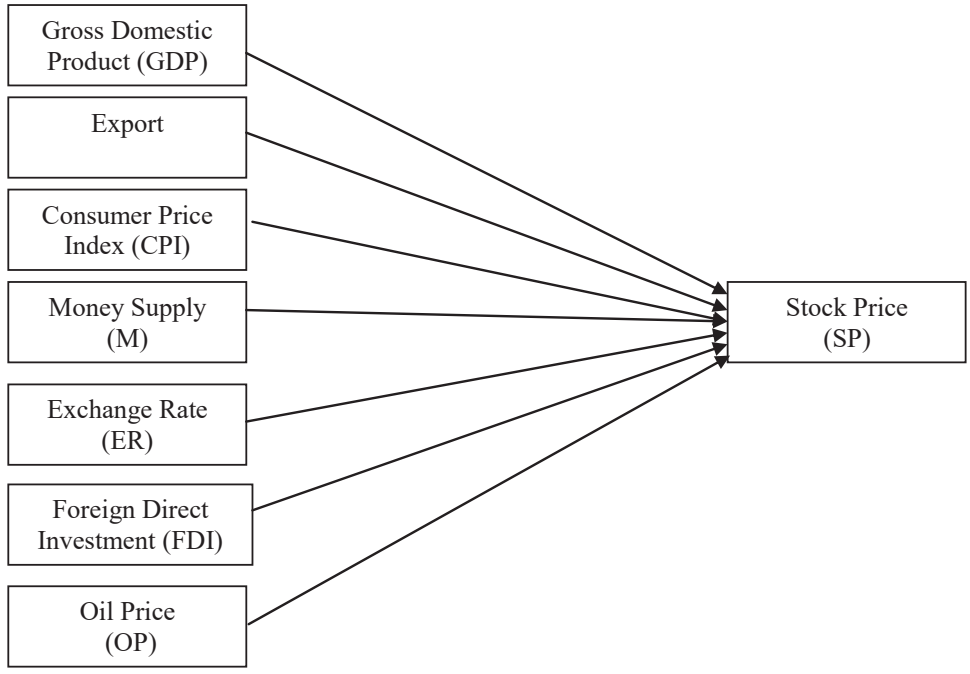

Figure 1 Graphical representation of conceptual framework

Data Analysis

Stationary of Data

Augmented Dickey fuller test was used for checking stationary of variables at various difference levels. The results of ADF test for GDP, exports, CPI, money supply, exchange rate, FDI and oil prices shows that the series is stationary at 1% level at zero lag.

Autocorrelation and Multi co linearity

There are 7 regressors and there is an intercept term in the model. The Durbin Watson test statistic value is 0.291. Null hypothesis is rejected of non-auto correlated errors in favor of the hypothesis of positive first-order autocorrelation. R2 value is 18% which is a small variation in the dependant variables but there are few significant t ratios. Multi-collinearity exists but it is small.

Descriptive statistics

Table 1. Characteristics of variables.

	Unit	Mean	Median	Std. Deviation	Minimum	Maximum
Stock price	Share price in Rs.	685	498	467	205	1718
Money supply	In Million of Rs.	187910	149876	136628	52412	488193
CIP	% Per annum	70	63	28	37	120
Exchange rate	US dollar/ Rs.	83	77	14	65	106
Export	In Million of Rs.	66121	62581	12437	46945	91991
GDP	In Million of Rs	615479	604318	142593	410789	881798
FDI	In Million of Rs.	4160	2341	5221	-470	17513
Oil price	Us dollar/Barrel	67	64	30	24	112

N=18

Mean (S.D.) of logarithm of change in price of Nepal stock exchange index (stock price) is 685 (467), minimum and maximum values are 205 and 1718 respectively. Mean (S.D.) of logarithm of change in money supply is 187910 (136628) and its minimum and maximum values are 52412 and 488193 respectively. Similarly mean (S.D) of logarithm of change in CIP is 70 (28) and its minimum and maximum values are 37 and 120 respectively. Furthermore, mean, standard deviation, minimum and maximum values of rest variables also reflected in the table-1.

Correlation Analysis

Table 2 Relationship Analysis

Variable	Stock price	Money supply	CPI	Exchange rate	Export	GDP	FDI	Oil price
Stock price	1							
Money supply	.841*	1						
CPI	.819*	.984*	1					
Exchange rate	.766*	.920*	.908*	1				
Export	.598***	.774*	.838*	.758*	1			
GDP	.791*	.965*	.987*	.852*	.863*	1		
FDI	.552**	.868*	.850*	.740*	.627**	.852*	1	
Oil price	.068****	.201****	.320****	.018****	.507**	.422***	.349****	1

Note: *= significant at 1%, **= significant at 5%, ***= significant at 10% and ****= insignificant.

Pearson correlation

Table 2 presents the result of correlation analysis of strategic variables which are the logarithm of change in stock price, money supply, CPI, exchange rate, export, GDP, FDI and oil price. Correlation between logarithm of change in stock price and logarithm of change in GDP, exchange rate, CPI and money supply are strong degrees of positive at a 1% level of significant. Similarly correlation of FDI is moderate degree with stock price at 5% level of significant whereas, Export also has the moderate degree of correlation with stock price but at 10% level of significant. Whereas, oil price have poor relationship with stock price and not shows the significant result.

Multiple Regressions

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.943[a]	.860	.813	201.86422307	2.10

Table 4 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3300696.534	7	471528.076	11.571	.000[b]
	Residual	407491.646	10	40749.165		
	Total	3708188.180	17			

a. Dependent Variable: SP

b. Predictors: (Constant), OP, ER, FDI, Export, GDP , MS, CPI

Table 5 Summary of regression result

Variables	Coefficients	Std. Error	t-statistics	Toler-ance	VIF	Sig.
Constant	1725.382	1727.510	.999			.341
Money supply	.010	.004	2.493	.007	135.072	.032
CPI	-3.499	22.132	-.158	.006	164.451	.878
Exchange rate	-3.999	16.018	-.250	.048	20.958	.808
Export	-.011	.012	-.946	.109	9.208	.367
GDP	-.003	.004	-.639	.006	158.725	.537
FDI	-.094	.025	-3.796	.144	6.942	.004
Oil price	6.343	4.667	1.359	.126	7.919	.204

Model summary of Table 3 indicate that the strategic variables considered into model explain 86 % of dependent variable stock price with 0.000 significant values of F-statistics11.571. Table 5 summary of regression result revealed that the CPI, exchange rate, export rate, GDP and FDI caused the negative impact on stock price with -3.499, -3.999, -.011, -.003 and -.094 beta coefficient

respectively. Whereas money supply and oil price caused positive impact on stock price with positive beta value 0.10 and 6.343 respectively.

Discussion and Conclusion

The result of the study revealed that GDP, ER positively affect stock prices while consumer price index negatively affect stock prices which result is consistence with study of Ghana Stock Exchange (Kyereboah-Coleman & Agyire-Tettey, 2008). The results of Export, Money supply, FDI and oil prices were insignificant which indicate that these variables do not have significant relationship with stock prices. The result is similar with the study of Istanbul Stock Market (Rjoub, Tursoy, & Gunsel, 2009). The correlation analysis found strong correlations between stock prices and macro economic variables.

Share price has a weak correlation with CPI while with other variables it has relatively stronger which suggests that these variables have influenced stock prices and investors should aware themselves on information regarding these variables. But Barakat, Elgazzar, & Hanafy (2016) explored that there is a causal relationship in Egypt between stock price and consumer price index (CPI), exchange rate, money supply, and interest rate. The same goes for Tunisia except for CPI, which had no causal relationship with the stock price. Affect of macroeconomic variables on stock prices is an international phenomena and it cannot be forecasted easily. Stock exchange performance is affected by the constant tightening of the monetary policy by the government. These policies should be revised to make them effective. Rise in oil prices and inflation plays an important part in determining the stock market trends, with these results it is important to highlight that there is the need to implement prudent macroeconomic policies in order for a country to derive maximum benefits from stock markets. In order to enable the capital market in general and stock market in particular to take full advantage of the various opportunities and cope with challenges, variation in CPI must be reduced.

Hunjra, Chani, Shahzad, Farooq, & Khan (2014) explore the negative relationship between exchange rate with stock price which goes reverse result with this study. Furthurmore, Dhaoui & Khraief (2014) found that there is a strong negative connection between oil price and stock market returns in developed countries whereas it revealed positive relationship in this study. Likewise, Forson & Janrattanagul (2014) find the strong positive relationship between money supply and stock price in SET Index whereas no relationship is found in this study.

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