Relationship Between Macroeconomic Variables and Stock Market Price of Nepalese Insurance Companies

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Abstract

This study has examined the relationship between selected macroeconomic variables and the stock market of price of Nepalese insurance companies listed on Nepal Stock Exchange [NEPSE] for the period of July 2003 to June 2018. Monthly stock market index of Nepalese insurance companies of Nepal Stock Exchange has been taken as proxy of stock market price of insurance companies and interest rate, gold price, money supply, equity market capitalization, are taken as proxy of macroeconomic variables. This study has used cointegration test to examine the long-run relationship between variables and stock market of price of Nepalese insurance companies. The stationarity of the variables has been examined by applying Augmented Dickey-Fuller [ADF] test and Phillips-Perron [PP] test. When variables are found to be same order of integration then cointegration test is used to determine long-run relationship. This study concluded that there exists long-run equilibrium among the macroeconomic variables and stock market of price of Nepalese insurance companies listed on Nepal Stock Exchange. Similarly, this study has also followed vector error correction model to capture the short-run dynamics.

Keywords: macroeconomic variables, Nepal stock exchange, Nepalese insurance companies

Introduction

The performance of stock market is influenced by so many firm specific attributes such as size of the firm, book to market equity, dividend yield, earning yield, leverage ratio (Bhandari, 1988; Fama and French; 1992, Pradhan, 2003) etc. and so many macroeconomic variables such as inflation, money supply, exchange rate, interest rate, industrial production import payment, export, remittance (Aggarwal, 1981; Naka, Mukherjee and Tufte, 1998; Chen, Roll and Ross, 1986) etc. The relationship between macroeconomic variables and stock return has been extensively studied in developed capital market (e.g.Chen et al., 1986; Fama and French, 1988; Mayasmi, & Koh, 2000;

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Joseph, 2012) over the last few decades. In the context of emerging capital market, Izedonmi and Abdullahi, 2011; Rostamy, Hosseini, Bakhshitakanlou, 2013; Hussin et al., 2013; Geete, 2016 have conducted the study. The studied conducted on developed as well as emerging capital market confirmed that some macroeconomic variables such as interest rate, GDP, industrial production, import payment, money supply, exchange rate, foreign remittance, wholesale price index and inflation rate etc. plays significant role for explaining stock return. Therefore, it is important to explore which macroeconomic variables makes significant impact on stock market performance in the context of Nepal.

The impact of macroeconomic variables in Lahore Stock Exchange has been analyzed by Sohail and Hussain (2009). Sohail and Hussain used consumer price index, industrial production index, real effective exchange rate, money supply and treasury bills rate as proxy of macroeconomic variables. Using the monthly data from December 2002 to June 2008 the study of Sohail and Hussain found a significant negative impact of consumer price index on stock returns, whereas they found a significant positive impact of industrial production index, real effective exchange rate, money supply had on the stock returns in the long-run. Finally, Sohail and Hussain concluded that CPI had greater forecast error for stock index (LSE25).

In another study, Ali (2011) analyzed the effect of macroeconomic variables on Dhaka all share price index. Ali used consumer price index (CPI), GDP, foreign remittance and import payment as proxy of macroeconomic variable. The study of Ali investigated the long-run equilibrium, short-run dynamics adjustment and causal relationship between macroeconomic variables and Dhaka stock index all share price index. Ali concluded that variables are cointegrated and there exist unidirectional causality from CPI and foreign remittance to stock price index and bi-directional causality between import payment and stock price index. Finally, Ali concluded that there exit no causational relation between GDP and stock price index.

Similarly, the effect of macroeconomic factors on the Nigerian sock returns is observed by Izedonmi and Abdullahi (2011). Using the data for the period 2000 to 2004 Izedonmi and Abdullahi analyzed the effect of macroeconomic variables such as inflation, exchange rate and market capitalization on stock return. Izedonmi and Abdullahi found the probability value for market capitalization 0.12, for the exchange

rate 0.16 and for the inflation 0.29. Since, they found probability values of all variables greater than 0.05 therefore, they concluded that macroeconomic factors have no significant influence in the Nigerian Stock Exchange market.

Using the monthly data for the period of November 2003 to November 2007 the impact of macroeconomic variables such as market return, oil price, and exchange rate and interest rate changes on stock returns in Tehran Stock Exchange (TSE) has been analyzed by Rostamy, Hosseini, Bakhshitakanlou (2013). They have used multivariate regression model and autoregressive distributed lag (ARDL) model and concluded that market return, oil price, exchange rate and interest rate changes have significant impact on some industries returns.

Similarly, the effect of macroeconomic variable on stock return on Saudi perspective is evaluated by Samontaray, Nugali, and Sasidhar (2014). They used Saudi index (TASI) as dependent variable and three independent variables; the Oil WTI, Saudi Exports and the PE Ratio. Using the monthly data from 2003 to 2013, they concluded that TASI is positively correlated with the three economic variables considered, Oil WTI, Saudi Exports and Price Earnings ratio. They further confirmed that all these independent variables (Oil WTI, Saudi Exports and the PE Ratio) have significant importance in predicting the TASI and these three variables explain about 93% of variation in TASI.

Furthermore, Venkatraja (2014) investigated the relationship between macroeconomic variables and the Indian stock market performance (BSE Sensex). Venkatraja used index of industrial production, wholesale price index, gold price, foreign institutional investment and real effective exchange rate over the period of April 2010-June 2014. Venkatraja concluded that the coefficients of all the variables except index of industrial production are statistically significant thus, inflation, inflow of foreign institutional investment, exchange rate and gold price has significant impact the Indian stock market performance.

Likewise, the impact of macroeconomic variables on stock markets of emerging markets has been analyzed by the study of Barakat, Elgazzar, and Hanafy (2016). To observed the impact of macroeconomic variables on stock markets Barakat et al. used the data of two emerging markets Egypt and Tunisia from January 1998 to January 2014. They concluded that all the macroeconomic variables used in the study (interest rate,

exchange rate, CPI and money supply) have a relationship with the stock market either a long run or a causal in both Egypt and Tunisia. Thus, Barakat et al. concluded that there is a relationship between stock market and these macroeconomic factors and the macroeconomic factors play a great role in the stock market fluctuations and can be used to explain them. The result of Barakat et al. further concluded that the macroeconomic variables are co-integrated with the stock market in both countries.

Alomari and Azzam (2017) analyzed the effect of micro and macro factors on the performance of insurance companies listed on Amman Stock Exchange, Jordan for the period of 2008 to 2014. Alomari and Azzam has utilized panel data of 24 insurance companies listed on Amman Stock Exchange, Jordan and concluded that that liquidity, leverage and under writing risks have significant negative effect whereas size of the company, market share and GDP have significant positive effect on the profitability of the Jordanian insurance industry. Furthermore, the study of Alomari and Azzam concluded that inflation has no significant effect on the profitability of the insurance industry.

To analyze the impact of macroeconomic variables on the stock market performance of Sri Lanka, Betulaceae (2018) conducted a study. Betulaceae analyzed the impact of inflation, gross domestic product, interest rates and exchange rate on stock market performance of Sri Lankan stock market. The study of Betulaceae concluded that among the all these macroeconomic variables inflation and exchange rates have higher effects on the stock market performance.

Most of the above-mentioned studies concluded that the macroeconomic variables make significant effect on stock market price and the different variables are important in different stock market for predicting stock market price. In the context of Nepal more studies have not been conducted to evaluate the explanatory power of macroeconomic variable for stock market price.

In the context of Nepal, Shrestha and Subedi (2014) has conducted a study to examine the determinants of the stock index (NEPSE) in Nepal. They used the monthly data of annual real GDP, consumer price index, broad money and Treasury bill rate as macroeconomic variables for the period of August 2000 to July 2014. Further they also used and two dummies' variables d1 and d2 to capture the impact of political uncertainty

and NRB's policy changes. Shrestha and Subedi concluded that NEPSE index respond positively to inflation and broad money growth and negatively to Treasury bill rate. Similarly, Sharestha and Subedi found that Nepalese stock market respond significantly to change in political environment and the policy of NRB.

Likewise, Phuyal (2016) has used Johansen's cointegration method to observe the long-term association between macroeconomic variables and stock price in the context of Nepal. Phuyal used monthly data for the period of January 2003 to December 2012. Foreign exchange rate, inflation rate, money supply, interest rate, remittance income was used as proxy of macroeconomic variables and NEPSE index as proxy to calculate market return. The study of Phuyal concluded that CPI, interest rate and remittance income have long-run equilibrium relation with stock market index and their changes are also the cause of changes in stock price. On the other hand, the study of Phuyal concluded that foreign exchange rate and money supply have no relationship with stock market index. The study further concluded that there was a significant negative relation between consumer price index and NEPSE index whereas significant positive relationship between remittance income and NEPSE index.

Finally, Bhattarai (2018) examined the effect of the firm specific variables and macroeconomic variables on share price of Nepalese commercial banks and insurance companies. Bhattarai included seven banks and six insurance companies for the period of 2009/10 to 2014/15. Bhattarai concluded that firm specific variables such as return on equity, return on assets, dividend per share, price earnings ratio, size and macroeconomic variables such as money supply, GDP growth rate, exchange rate and interest rate are the important variables that effect the share price of bank and insurance companies.

This study aims to examine the long-run relationship between macroeconomic variables and stock market index of Nepalese insurance companies. The variables under investigation are gold price (GP), short-term interest rate (interest rate of 91-days treasury bills), broad money supply (M2), market capitalization (MC), and market index of insurance companies (IID) as proxy for the stock market price of insurance Nepalese insurance companies. Other macroeconomic variables such as consumer price index (CPI), GDP, industrial production, oil price etc. have not been included in this study. Furthermore, firm specific variable such as size, equity market capitalization, earning yield, cash flow

yield, and dividend yield etc. which also affects the stock return are not incorporated in this study.

Thus, this paper empirically examines the long-run relationship between macroeconomic variables (gold price, interest rate, broad money supply and market capitalization) and stock market index of insurance companies listed on Nepal Stock Exchange. It is an empirical question whether there exists long-run equilibrium relationship between stock market price and macroeconomic variables or not in the context of Nepal. The rest of the paper is organized as follows: *Section 2* presents the objective of the study. An overview of Nepalese insurance sector has been presented in *Section 3*. *Section 4* looks briefly methodology used in this study. The empirical results are presented in *Section 5* and the summary and conclusion of the study is presented in *Section 6.*

Objective of the Study

The basic objective of this study is to analyze the relationship between macroeconomic variables and stock market price of Nepalese insurance companies. The other specific objectives are as follows:

- To identify the long-run relationship between macroeconomic variables and stock market index of insurance companies listed on NEPSE using Johansen cointegration test, and

- To capture the short-run dynamics using vector error correction model.

An Overview of Nepalese Insurance Sector

There is no long history of insurance industry in Nepal. The first insurance company of Nepal is "Nepal Insurance and Transport Company Ltd" which was established in 1947. It is converted into Nepal Insurance Co. Ltd since 1991. Since the liberalization of 1999, the government has taken a number of initiations in the area of financial sector reforms including insurance sector and insurance industry became a fastest growing industry of Nepal. As a result of liberalization 22 insurance companies are listed in Nepal Stock Exchange till Mid-July 2018 out of them, one insurance company (Rastriya Beema Sansthan) is both life and non-life insurance company, 7

companies are life insurance company and 14 companies are non-life insurance company. Insurance Board of Nepal is an apex regulatory body of insurance companies in Nepal. It regulates all the activities of all insurance companies of Nepal.

The market capitalization of insurance companies in mid-July 2018 was Nepalese Rupees 223921.77 million out of the total market capitalization of Nepal Stock Exchange (NEPSE) Nepalese Rupees 1435137.67 million which is 15.60 percent of total market capitalization of Nepal Stock Exchange and it is the 2nd largest market capitalization of NEPSE and insurance sector has the highest market price index among the other sector of NEPSE (6199.45 in mid-July, 2018).

Methodology

Research Methods

This study has adopted descriptive analysis, which is generally used to describe the situation and event occurring at present. To describe the nature of macroeconomic variables i. e. gold price (GP), interest rate (IR), broad money supply (M2), market capitalization (MC) and stock market index of Nepalese insurance companies' descriptive analysis has been followed. Furthermore, in this study an attempt has been made to examine the long-run equilibrium between stock market index of Nepalese insurance companies and selected macroeconomic variables. Thus, this study has observed long-run equilibrium relationship among the variables by using Johansen cointegration test. Similarly, this study has also adopted vector error correction model to capture the short-run dynamics.

This study has adopted Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test to check the stationarity of the data and order of integrations. When variables are found to be same order of integration then Johansen cointegration test is used to observe the long-run equilibrium relation among the variables and vector error correction model (VECM) has been used analyze the short-run dynamics of the model.

Nature and Sources of Data

This study is basically based on secondary data. The required data for this study is collected from various sources. The data for stock market index of insurance sector of

Nepalese insurance companies (IID) and market capitalization (MC) is collected from Nepal Stock Exchange. Similarly, the necessary data of macroeconomic variable such as interest rate (IR), broad money supply (M2) is collected from the quarterly economic bulletin published by Nepal Rastra Bank. Finally, the data related to gold price (GP) is collected from the website of Index Mundi. This study has used monthly data from July 2003 to June 2018 which generated 180 observations.

In this study stock market index of insurance sector of Nepalese insurance companies is used as dependent variable and gold price, interest rate of 91-days Treasury bill, broad money supply and market capitalization is used as independent variable. The definition of these dependent and independent variables are as follows:

Ln(IID) = Natural log of stock market index of insurance sector of Nepalese insurance   companies,
Ln(GP) = Natural log of gold price in Nepalese rupees Troy ounce,
Ln(IR)   = Natural log of interest rate of 91-days Treasury bill,
Ln(M2) = Natural log of broad money supply in millions of Nepalese rupees, and
Ln(MC) = Natural log of market capitalization in millions of Nepalese rupees

Data Analysis Techniques

The collected data has been analyzed using the EViews 10 software. The output of EViews provided descriptive statistics, unit root statistics Johansen cointegration test, and Granger causality test. Augmented Dickey-Fuller test and Phillips-Perron test has been used to test the stationarity of the time series data. Before conducting the Johansen cointegration test the lag length of the variables has been selected using VAR Lag selection criterion. After determining the optimum lag length of the variables Johansen cointegration test is used to observe the long-run equilibrium of macroeconomic variables and stock market index of Nepalese insurance companies. Similarly, vector error correction model (VECM) has been used to analyze the short-run dynamics of the model and the stability of the model is observed through Recursive CUSUM test. Finally, serial correlation of the model is checked through Breusch-Godfry Serial Correlation LM test.

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Empirical Results

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Descriptive Statistics

As this study has employed descriptive research design, among others, it is used to describe the characteristics of variables during the study period. Table 1 presents the summary statistics of dependent variable index of insurance (IID) and independent variables [gold price (GP), interest rate (IR), broad money supply (M2) and market capitalization (MC)] used for the study. It shows number of observations, measures of central tendency (mean), measure of dispersion (standard deviation), minimum and maximum values, skewness, Kurtosis, and Jarque-Bera statistics of the variables under the study.

Table 1
Descriptive Statistics

Variables	No.	Min.	Max.	Median	Mean	Std. Dev.	Skewness	Kurtosis	J.B.
Log(IID)	180	5.4459	9.1684	6.4795	6.9225	1.2055	0.6254	1.9070	20.6927
Log(GP)	180	10.1808	11.9342	11.5045	11.2728	0.5723	-0.5777	1.8019	20.7782
Log(IR)	180	-4.6052	2.2039	0.8775	0.4884	1.3664	-1.2936	4.4398	65.7460
Log(M2)	180	12.3679	14.8964	13.4949	13.5820	0.7909	0.0449	1.6696	13.3355
Log(MC)	180	10.4606	14.5336	12.8528	12.7415	1.1886	-0.3871	2.1547	9.8541

Note: The table exhibits descriptive statistics (mean, median, standard deviation, minimum, maximum values, skweness, kurtosis and Jarque-Bera) of the variable being studied for the period of July 2003 to June 2018. Log(IID) is the log of index of the monthly index value of insurance companies listed on Nepal Stock Exchange. Log(GP) is the log of gold price, Log(IR) is the log of interest rate of 91-days treasury bill, Log(M2) is the log of broad money supply, log(MC) is the log of equity market capitalization.

It is evident from table 1 that Log(IID), Log(GP), Log(M2), Log(MC) have positive mean and median value. The result indicates that index of the monthly index value of insurance companies [Log(IID)] has mean value of 6.9225, minimum value of 5.449 and maximum value of 9.1684 and standard deviation is 1.2055. Similarly, mean value of gold price [Log(GP)] has mean value of 11.278, minimum value of 10.1808 and maximum value of 11.9342 with standard deviation of 0.5723.

Likewise, the mean, minimum, maximum value and standard deviation of interest rate of 91-days treasury bill [Log(IR)] is 0.4884, -4.6052, 2.2039 and 1.3664 respectively. The mean value of broad money supply [Log(M2)] is 13.5820 with minimum value of 13.3679, maximum value of 14.8964 and standard deviation of 0.7909. Finally, market capitalization [Log(MC)] showed a mean value of 12.7415,

minimum value of 10.4606, maximum value of 14.5336 with standard deviation of 1.1886. The descriptive statistics of Table 1 also depicts that Log(IID), Log(M2) and Log(MC) has positively skewed where as variable Log(GP) and Log(IR) has negatively skewed.

Test for Stationarity

The test of stationarity and unit root is extremely important in time series analysis before proceeding for cointegration test and establishing long-run relationship. To confirm the stationarity of the data this study has applied widely used Augmented Dickey-Fuller test and Philip-Perron test using EViews 10 software. Table 2 shows the result of unit root test of all variables at their level and in 1st order difference. Panel (a) shows the result of Augmented Dickey-Fuller test at level data and at 1st difference data. Similarly, Panel (b) shows the result of Phillips-Perron test at level data and at 1st difference data.

Table 2
Unit Root Test at Level and 1st Difference

Variables	ADF t-stat	p-value	ADF t-stat	p-value
	Panel (a) Augmented Dickey-Fuller Test			
	Data at level		Data at 1st Difference	
Log(IID)	-0.3106	0.9196	-10.9435	0.0000
Log(GP)	-1.92441	0.3205	-12.6576	0.0000
Log(IR)	-2.69335	0.0772	-11.2459	0.0000
Log(M2)	-1.66686	0.4464	-12.0835	0.0000
	Panel (b) Phillips-Perron Test			
	Data at level (PP t-stat)	p-value	Data at 1st Difference (PP t-stat)	p-value
Log(IID)	-0.27835	0.9243	-10.9382	0.0000
Log(GP)	-1.92069	0.3222	-12.6477	0.0000
Log(IR)	-3.17372	0.0232	-13.7579	0.0000
Log(M2)	-1.69134	0.4339	-12.0199	0.0000

As depicted in Table 2 the p-values of the variable Log (IID), Log (GP), Log (IR), Log(M2) and Log (MC) in both test is more than 5 percent so we failed to reject the null hypothesis of unit root at their level data. Moreover, the P-values of all these variables are less than 5 percent in both Augmented Dickey-Fuller test and Phillips-Perron test thus; they reject the null hypothesis of unit root at their 1st difference. Since, both the test concluded that all the variables are integrated of same order i. e. I(1); thus, this study can

use Johansen cointegration technique to explore the long-run relationships among these variables.

Lag Selection

The second step for multivariate cointegration analysis is the selection of appropriate lag length of the variables. This study has used Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) for the selection of appropriate lag length. The result of various lag selection criterion is presented in Table 3. All the criterion suggested the appropriate lag length of 1.

Table 3
VAR Lag Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-485.2682	NA	0.000206	5.700794	5.792290	5.737916
1	1000.856	2868.566	8.61e-12*	-11.28903*	-10.74004*	-11.06629*
2	1010.611	18.26171	1.03e-11	-11.11176	-10.10529	-10.70341
3	1022.604	21.75569	1.20e-11	-10.96052	-9.496566	-10.36655
4	1047.916	44.44316*	1.20e-11	-10.96414	-9.042709	-10.18457
5	1067.241	32.80726	1.29e-11	-10.89815	-8.519234	-9.932965
6	1076.974	15.95714	1.55e-11	-10.72063	-7.884223	-9.569825
7	1087.596	16.79713	1.85e-11	-10.55344	-7.259549	-9.217022
8	1103.105	23.62448	2.10e-11	-10.44308	-6.691706	-8.921051

Note: indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)

Cointegration Analysis

As evident in table 2 all the variables are integrated of 1st order i.e. I(1), the study thus, applied the Johansen cointegration technique to explore the long-run relationships among these variables. Both Trace Statistics and Maximum Eigen Value have been used to identify the cointegration equations. The result of both Trace statistics and Maximum Eigen Value are presented in table 4. Panel (a) of table 4 shows the result of Trace Statistics and Panel (b) shows the result of Maximum Eigen Value.

The primary results of Johansen cointegration tests showed that there exists one cointegrating equation. This result of cointegration test confirms that the market index of Nepalese insurance companies has long-run equilibrium with the macroeconomic

variables [interest rate (IR), gold price (GP), broad money supply (M2), and market capitalization (MC)].

Table 4

Cointegration Test

Panel (a): Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE (S)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.210114	79.75453	69.81889	0.0065
At most 1*	0.106777	37.77026	47.85613	0.3121
At most 2	0.048856	17.67075	29.79707	0.5905
At most 3	0.038814	8.754713	15.49471	0.3886
At most 4	0.009551	1.708189	3.841466	0.1912
Panel(b): Unrestricted Cointegration Rank Test (Maximum Eigen Value)				
Hypothesized No. of CE (S)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Probability
None*	0.210114	41.98427	33.87687	0.0044
At most 1*	0.106777	20.09950	27.58434	0.3343
At most 2	0.048856	8.916040	21.13162	0.8391
At most 3	0.038814	7.046524	14.26460	0.4837
At most 4	0.009551	1.708189	3.841466	0.1912

Note: Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
*denotes the rejection of the hypothesis is at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The long-run effect of macroeconomic variables [interest rate (IR), gold price (GP), broad money supply (M2), and market capitalization (MC)] on market index of insurance sector (IID) has been observed through the normalized co-integrating coefficient of co-integrated equation or the long-run equation of Johansen test. Table 5 shows the coefficient of normalized cointegrating coefficients.

Table 5

Normalized Cointegrating Coefficients

LogIID	LogGP	LogIR	LogM2	LogMC
	2.041981	0.427558	-1.162367	-0.914503
S. E.	0.27961	0.05528	0.31345	0.16889
t-value	7.60296	7.73441	- 3.370831	- 5.41477

The above estimated cointegration relationship of equation shows that macroeconomic variables have significant relationship with the market index of Nepalese insurance companies (IID). This result is consistent with the results provided by Chen et al. (1986), Naka et al. (1998).

Since the normalized cointegrating coefficients are presented in matrix form we should inverse the sign of each coefficient to determine the relationship of dependent and independent variables. Thus, the result of this study implies that there exist negative and

significant relationship between gold price (GP) and market index of Nepalese insurance companies (IID). Similarly, this study also confirms the negative and significant relationship between interest rate (IR) and market index of Nepalese insurance companies (IID). Furthermore, positive and significant relationship between broad money supply (M2) and market index of Nepalese insurance companies (IID) has been observed. This finding of positive relationship between money supply and market index of Nepalese insurance companies is similar to the finding of Naka, Mukherjee and Tufte (1998). Thus, this finding concludes that monetary policy in Nepal has positive impact on stock prices of insurance companies. Finally, market capitalization (MC) has also showed a positive and significant relationship with market index of Nepalese insurance companies (IID).

Vector Error Correction Model (VECM)

In order to capture the short-run dynamics of the model, this study has applied vector error correction model. When given variables are cointegrated, then error correction model (ECM) can be applied to explain the short-run dynamics or adjustments of the cointegrated variables towards their equilibrium values. The results of vector error correction model are reported in Table 6.

Table 6
Vector Error Correction Estimates

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.060594	0.015851	-3.822681	0.0002
C(2)	0.073141	0.084846	0.862044	0.3899
C(3)	0.113937	0.163349	0.697510	0.4864
C(4)	0.004108	0.009939	0.413347	0.6799
C(5)	0.155615	0.377970	0.411713	0.6811
C(6)	0.064426	0.086262	0.746867	0.4562
C(7)	0.012058	0.008427	1.430819	0.1543

Adjusted R-squared 0.091855		Durbin-Watson stat 1.970153		
F-statistic 3.983813		Prob(F-statistic) 0.000930		

The coefficients of VECM (-1) i. e. C(1) is negative and significant at 1 percent level of significant which showed the speed of adjustment of disequilibrium in the period of study. The results of vector error correction model (VECM) depicted that the adjustments in Log (IID) were due to the error correction term VECT (-1).

The statistically significant and negative sign of Vector Error Correction Term (VECT), indicates the existence of cointegration among the variables under investigation.

The VECT coefficient is -0.06059 with P value of 0.0002. This implies that above 6 percent of last month disequilibrium is corrected in current month. In other words, the deviation from the long-run equilibrium is adjusted about 6 percent of the disequilibrium is corrected within a month.

Equation presented as below explains the empirical estimates from the VEC model for market index of Nepalese insurance companies.

$$D(LogIID) = 0.012058 \; + \; 0.073141 \; D(LogIID(-1)) \; + \; 0.113937 \; D(LogGP(-1)) \; + 0.004108 \; D(LogIR(-1))$$
$$+ \; 0.155615 \; D(LogM2(-1)) \; + \; 0.064426 \; D(LogMC(-1)) - \; 0.060594 \; Vecm \; (-1)$$

Stability Test of the Model

It is important to investigate whether the estimated relationship is stable or not during the study period. To test the stability of the model Recursive CUSUM test at 5 percent level of significance was used. If the plots of CUSUM statistics study with in the critical bounds at 5% level of significance all co-efficient in the given regression are stable.

Figure 1
Plot of Recursive Residual (CUSUM)
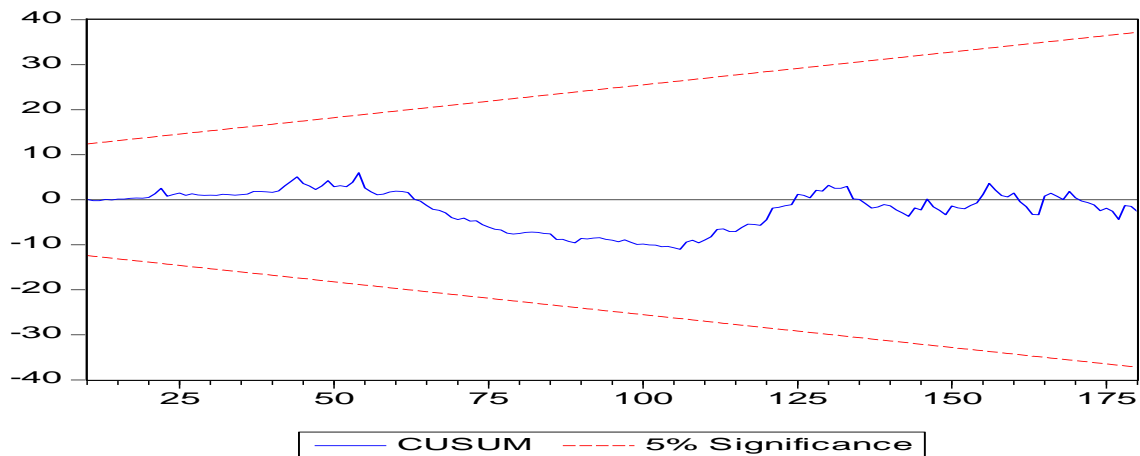
In figure 1 straight lines represent critical bounds at 5% significance level. Figure 1 depicts that the CUSUM plots lie within the bound (straight line). Thus, it has provided the evidence that all the parameters include in the model were stable over the study period.

Serial Correlation Test

This study has applied Breusch-Godfrey Serial Correlation LM Test to examine the problem of serial correlation in the model. The result of Breusch-Godfrey Serial Correlation LM Test is presented in table 7. The result of table 7 confirms that there was no evidence of serial correlation in the model.

Table 7
Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.562895	Prob. F(2,169)	0.5706
Obs*R-squared	1.177898	Prob. Chi-Square(2)	0.5549

Summary and Conclusion

This study has examined the long-run relationship between macroeconomic variables and the stock market of price of Nepalese insurance companies listed on Nepal Stock Exchange. This study has used Johansen cointegration technique to explore the long-run relationships among these variables. Monthly Stock market index of Nepalese insurance companies of Nepal Stock Exchange (NEPSE) has been taken as proxy of stock market price of insurance companies and interest rate, gold price, money supply, equity market capitalization are taken as proxy of macroeconomic variables. This study is based on the monthly data for the period of July 2003 to June 2018.

Stationarity of data has been examined through unit root test. For this purpose, the study has used Augmented Dickey-Fuller test and Philip-Perron test. Data were found to be non-stationary at their level and become stationary at their 1st difference. Since all the variables were found to be stationary at 1st difference Johansen cointegration technique was applied to examine the long-run relationship.

The Johansen cointegration showed one cointegrating equations. It is, therefore be concluded that the stock market of price of Nepalese insurance companies has long-run equilibrium with the macroeconomic variables (gold price, interest rate, broad money supply and market capitalization). The first normalized equation showed the negative and significant coefficient of gold price, interest rate and positive and significant of broad money supply and market capitalization.

Similarly, vector error correction model (ECM) has been used to capture the short-run dynamics of the model. The coefficient of vecm(-1) found to be negative and significant. Thus, this study concluded that the adjustments in stock market price of

insurance companies were due to the error correction term Vecm (-1).

Finally, to test the stability of the model Recursive CUSM test, and to test serial correlation Breusch-Godfry Serial Correlation LM test was used. Recursive CUSM test concluded that the model is stable for the study period and Breusch-Godfry Serial Correlation LM test showed that there is no evidence of serial correlation.

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