Asymmetric Impact of Interest Rate, Exchange Rate and Oil Prices on Stock Price of BRICS

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PAPER INFO	ABSTRACT
	The degree of variance in the stock price over time is known as volatility. Many factors influence the stock price, including demand, supply, and macroeconomic policy. Stock traders take more risks while investing in a tumultuous market. This study envisages the asymmetric impact of interest rate, exchange rate and oil price on stock price in the case of BRICS economies. Asymmetric ARDL approach is employed to unveil the asymmetric long-run connection among the variables from 1990 to 2017. The findings revealed that there is an asymmetric relationship between interest rate and stock prices in all of the economies studied. However, it has been confirmed that a negative interest rate has a greater impact on stock prices than a positive interest rate. Furthermore, the results indicate that in all of the selected economies an asymmetric link exists between the exchange rate, oil price, and stock prices. It is also established that a negative change in the exchange rate and the oil price has a greater impact on stock prices than a positive change in the exchange rate and the oil price. The results of the study confirmed the existence of an asymmetry link between interest rates and stock prices in BRICS countries, indicating that positive and negative interest rates have different effects on stock price volatility, which must be taken into account when developing a policy.

1. Introduction

The stock market development plays a crucial role for predicting the economic growth and survival of firms. Stock markets are less volatile, highly concentrated, more liquid, and associated with high stock market capitalization. Stock market is affected by stock market capitalization and trading volume. Stock market also increase the performance of the firms (Sulong et al., 2018). Researchers and policy makers give their best to the study of link among stock prices exchange rate, interest rate and oil prices. Stock price assumes a significant role in the prosperity of the commerce, trade and ultimately. These variables have an important impact on the country's system of economy. Different studies of stock prices show that stock price plays a significant role in promoting financial prosperity in emerging markets. BRICS is a group of five merging and well developing economies of Brazil, Russia, India, China, and South Africa. They are known as fast growing economies and have

significant political and economic influence at world wise. In 2014, these BRICS merging economies represent 20 % of world's nominal GDP and 40% of world's population. In this scenario stock market plays vital role in BRICS and other emerging economies by using superior provision of rare monetary resources for their most creative usage, sustain economic growth, facilitating price discovery of financial assets, capitalizing businesses, improving liquidity, and serving as investment avenue for investors, providing risk management tool like lowering transaction costs and derivatives. To increase the importance of the overall financial system and role in economic development, the focus has to be shifted to identify those features that show the effect of interest rate, exchange rate and oil price on stock market especially in emerging markets like BRICS. In this scenario macroeconomic variables such as exchange rate, interest rate and oil price have significantly affect stock market performance (Tripathi & Kumar, 2015). BRICS countries are recognized as a force of calculated in international market. China and India are Asian giants, closely outweigh Brazil, Russia, and South Africa in positions of importance, population, and the size of their economies. The recent stock markets of China are now not considered to be international. The salient function of Chinese economic model is to preserve the State's management in all areas of social and economic life, which is also the case in Russia. However, the steep rate of increase of Chinese stock market considering that 2000 has attracted urge FPI (Foreign Portfolio Investment) interest globally. As a result of liberal monetary reforms over the previous 20 years, Brazil has made a huge progress in socio-economic areas and has delivered success to its inventory market (Bhatia, 2015).

Zhou et al. (2014) managers are reluctant to invest in the stock market in those international locations where there is rotten political instability and corporate governance standards. Therefore, higher conditions of domination can increase shareholders income, reduce business transaction expenses and costs. The basic concept is to strengthen the stock market which is based on correct policies that emerge from higher governance. Consequently, there is a complete understanding of institutional factors that suggest the South Asia stock market performance. The performance of stock market is a most important component for assessing of monetary situation of the country. According to Alajekwu, Bernard, Achugbu and Austin (2012) in a developing economy the improvement and increase of stock markets have been widespread in recent times. Despite the extent and illiquid nature of stock market, its endured existence and improvement may want to have necessary implications for financial activity.

According to Olweny and Kimani (2011) a major role on economic foundation played by stock market that is able to improve the efficiency in capital formation and allocation. It gives permit to each company and authorities to make investments in long term capitals that allows them to finance in new initiatives and spread their operations. In this way, the overall performance of financial system will boost when capital is provided to monetary units. Moreover, the continuous development in economy; the more cash is needed for the fast growth of economy and for the growth of stock market therefore serves as tremendous tool in organizing and dealing the financial saving for the effectiveness of economy. It is in this light that the stock trade market acts as an indicator for economic overall performance in the sense that, it assists to allocate the imperative capital need for the constant growth of an economy. In a later study, the determination of the standard growth of an economy relies upon on how effectively the stock market performs in its allocative features of capital. When the stock market mobilizes savings, it simultaneously allocates a larger element of the equal to companies with distinctly high possibilities as indicated by their returns and stage of risk. The magnitude of this function is that capital assets are channeled via the mechanism of the forces of demand and furnish to these firms with rather excessive and growing productivity as a consequence improving monetary growth and growth.

Stringham, Boettke and Clark (2008) stock market is affecting the monetary and economic growth of the country. At the same time, over a last decade investigator have studied the overall performance of stock market which are affect by different factors of economy such as inflation and deflation,
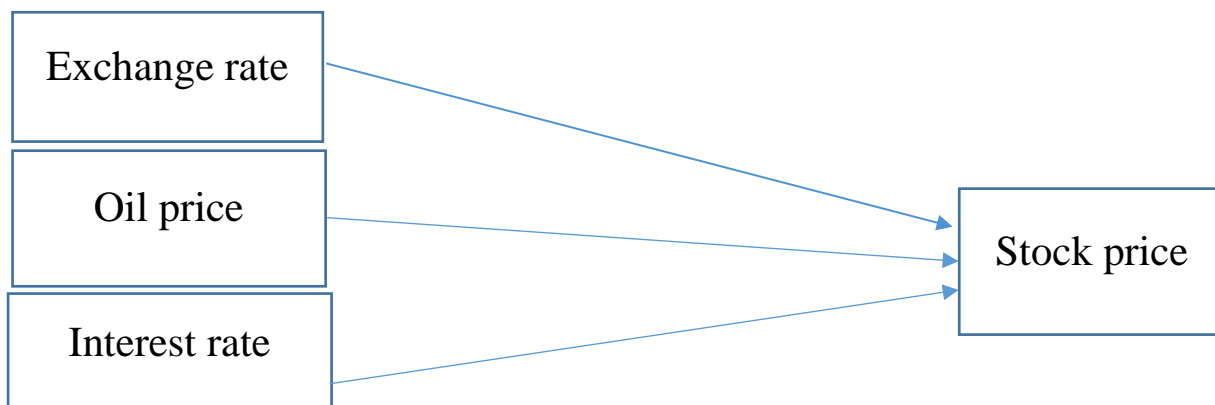
exchange rates, interest rates, oil prices, foreign market movements, cash, and many other macroeconomic variables. This is usually reflected in stock prices affect the expected cash flows generated by the company's assets. Moreover, stock market performance is encountered by other factors, such government qualities, governance, and political stability in a country. The risk of political events, Government policies and corruption consistently present in developing nations due to adverse political conditions and affect to stock market in developing countries. Stock markets can be operated those people who want to raise money in cash with the help of those individuals who want to withdraw freely. Furthermore, the stock market can increase the effectiveness of economic instruments through competition between financial instruments directives. This can save financial savings and reduce the cost of rising dollars to borrowers. Stock markets can improve accounting and tax standards as it is requiring more information to evaluate their company's performance. It logically follows that, as a result, it would be in the corporation's pleasant pastime to provide that information to facilitate thorough comparisons between competing corporations. One amazing gain of the existence of stock markets is the manageable imposition of increased self-discipline in the area of economic management: being touch to policy changes, especially financial policy, stock markets, through their very existence, help to make coverage creditability.

In contemporary economy, stock market plays a crucial role in link between the lenders and the borrowers. Stock markets are presumed to boost savings by way of offering incentives and assets to the savers/households that cover up their risk expectations and liquidity necessities. The Stock market provides important information to the investors, as the share price in the market signifies the status and overall performance of a corporation, which are displayed on stock exchange. This charge formation machine helps in efficient utilization of monetary assets accessible to the financial system as in unprofitable businesses have to incur more price of capital than the profitable companies.

For instance Pardy (1992) has referred to that even in less developed nations capital markets are in a position to assemble domestic savings and able to allocate cash greater efficiently. Thus, stock markets can play a position in inducing economic increase in less developed countries via channeling investment where it is wanted from public. Mobilization of such resources to quite a number of sectors without a doubt helps in economic development and growth. Stock market improvement has assumed a developmental function in world economics and finance due to the fact of their have an effect on they have exerted in company finance and financial activity. The main objective of our study is to examine the long-run asymmetric impact of interest rate, exchange rate and oil prices on stock price. The following is how the paper is structured: We'll go through conceptual framework, model, data, and methodology in the next section. The empirical findings are discussed in section three. Finally, in section four, we make some closing observations.

2.   Conceptual Framework

According to literature we have discussed above there were long run and short run connection among stock price, exchange rate, oil price and interest rate and positive and negative impact of interest rate, oil price and exchange rate on stock price.

2.1.   Variables, Data and Methodological Issues

Total four variables are using in this study (stock price, exchange rate, interest rates and oil prices). This study is using the dataset of BRICS economies including (Brazil, Russia, India, Russia, and South Africa) the analysis is done under time series of each country. The data is collected as panel from 1990 to 2017. The purpose of this study is to check interaction among stock price, exchange rate, oil prices and interest rate. The dependent variable in this study is stock prices and independent variables of this study are exchange rates, oil prices and interest rates. There are different studies in world which emerged these variables. Liu, Pan, Hu, Chen and Chen (2008); Cheah et al. (2017); Obi, Oluseyi, & Evans, (2018) are some writers to study the emerged variables discussed above.

2.2   Econometric Methodology

In this section we will discuss the econometric methodology which includes the functional form of the model, linear and non-linear form of model as well as the variables sources and description of the variables of our study.

2.2.1   Functional Form of the variables

The function of our model as follows:

$$Stock\ Price = f(Interest\ Rate, Exchange\ Rate, Oil\ Price)$$

$$SP_t = f(INT, EXC, OP)$$

Log-log form of the model

$$lnSP_t = f(lnINT, lnEXC, lnOP)$$

2.2.2   Linear Form of the Model

The linear form of the log-log model is as follows

$$lnsp_t = \beta_0 + \beta_1 lnint_t + \beta_2 lnexc_t + \beta_3 lnop_t + \mu_t$$

2.2.3   Nonlinear Form of the Model

The specific nonlinear long run log-log with signs of equation of stock price is as follows.

$$lnsp_t = \alpha_0 + \alpha_1 lnint_t^+ + \alpha_2 lnint_t^- + \alpha_3 lnexc_t^+ + \alpha_4 lnexc_t^- + \alpha_5 lnop_t^+ + \alpha_6 lnop_t^- + \varepsilon_t$$

Whereas lnSp shows the stock price, lnint refers the interest rate, lnexc refers the exchange rate, lnop refers the oil price and $\alpha = (\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6)$ is vector cointegrated for estimation. In the above equation of nonlinear long run equation $int_t^+ + int_t^- + exc_t^+ + exc_t^- + op_t^+ + op_t^-$ are partial sum of exchange rate, oil price and interest rate on stock price in form of positive and negative change.

According to NARDL, augmented dickey fuller used to calculate stationarity, long term connection among independent and dependent variables. With the help of these models, we can get time nature of asymmetries in time series date. On that basis the symmetric connection between independent and dependent variables are calculated through linear regression but flop nonlinear behavior of independent and dependent variables. Shin, Yu, and nimmo (2014) explained his ARDL Frame work of (Pesaran, Shin and Smith, 1999) to NARDL method has been utilized. This method is used to get the short terms instabilities and structural breaks (nonlinear). The following study is using asymmetric relations among stock price, exchange rate, oil price and interest rate for long term purpose.

3   Results on Descriptive Statistics

This section is allocated for the results on descriptive statistics as well as variables sources and description on each of the selected country.

Table 1

Variables Sources and Description

Variables	Descriptions	Units	Source
SP	**Stock price**	Volatility Index	FRED
Int	**Interest rate**	Real interest rate (%)	WDI
Exc	**Exchange rate**	U.S. Foreign Exchange Rate	FRED
OP	**Oil price**	(% of GDP)	WDI

The current study is using annual data from 1990 to 2017 with the population of following countries (Brazil, China, Russia, India, and South Africa). This study is using panel data, but the analyzing is doing in form of time series. The NARDL model is being used to check the associations among stock price, exchange rate, oil price and interest rate.

Results of the descriptive statics of our model is given below which shows the mean, median, maximum, and minimum values of the selected variables of BRICS for the study.

TABLE 2

Descriptive Statistics of BRICS (Brazil, Russia, India, China, and South Africa

		SP	INT	EXC	OP
Brazil	Mean	3.405	3.653	0.804	0.377
	Median	3.307	3.712	0.772	0.549
	Maximum	4.118	4.351	1.248	0.918
	Minimum	3.058	2.917	0.148	-1.372
	Std. Dev.	0.293	0.335	0.279	0.533
	Skewness	0.933	-0.139	-0.205	-1.868
	Kurtosis	3.038	3.271	2.733	6.823
	Jarque-Bera	2.904	0.126	0.200	23.819
	Probability	0.234	0.938	0.904	0.000
Russia	Mean	3.523	2.793	3.434	2.171
	Median	3.479	2.978	3.396	2.303
	Maximum	4.558	3.678	4.205	2.673
	Minimum	2.703	0.000	2.272	0.500
	Std. Dev.	0.509	0.775	0.399	0.472
	Skewness	0.569	-2.432	-0.485	-2.351

	Kurtosis	2.591	9.606	5.544	8.943
	Jarque-Bera	1.219	56.098	6.179	47.875
	Probability	0.543	0.000	0.045	0.000
India	Mean	3.114	1.546	3.900	-0.174
	Median	3.114	1.665	3.841	-0.081
	Maximum	3.778	2.218	4.207	0.467
	Minimum	2.546	1.00	3.717	-1.448
	Std. Dev.	0.325	0.606	0.157	0.530
	Skewness	0.123	-1.238	0.836	-1.070
	Kurtosis	2.161	3.790	2.267	3.161
	Jarque-Bera	0.636	5.633	2.779	3.840
	Probability	0.727	0.059	0.249	0.146
China					
	Mean	3.201	1.066	1.988	0.104
	Median	3.150	1.226	1.983	0.254
	Maximum	3.713	1.994	2.116	0.822
	Minimum	2.851	-0.802	1.816	-1.359
	Std. Dev.	0.265	0.665	0.121	0.635
	Skewness	0.506	-1.086	-0.129	-1.099
	Kurtosis	2.160	4.339	1.306	3.268
	Jarque-Bera	1.443	5.431	2.445	4.089
	Probability	0.485	0.066	0.294	0.129
South Africa					
	Mean	2.936	1.501	2.117	-3.025
	Median	2.929	1.446	2.063	-2.496
	Maximum	3.537	2.564	2.686	-1.582
	Minimum	2.593	0.792	1.712	-5.278
	Std. Dev.	0.245	0.455	0.273	1.227

Skewness	0.543	0.711	0.652	-0.736
Kurtosis	2.996	3.149	2.438	2.231
Jarque-Bera	0.983	1.707	1.681	2.300
Probability	0.611	0.425	0.431	0.316

3.1   Empirical Results

This study displays 4 variables Stock price, exchange rate, oil price and interest rate. Whereas outcome displayed in form of descriptive statistics, Unit root, VAR, Bound test and time series NARDL of this study.

3.1.1   Result of the Unit Root Test

ADF unit root test is used as suggested by Dickey & Fuller (1981) to check the stationarity of the variable taken for regression analysis, the result of the ADF (Augmented Dickey Fuller) is given in table 2.

TABLE 3

Augmented Dickey Fuller Unit Root Test BRICS

Countries	Variables	ADF test static at level	Remarks	ADF test static at first difference	Remarks
Brazil	**LnSP**	0.023**	I(0)	0.012*	I(1)
	LnINT	0.177	—	0.023**	I(1)
	LnEXC	0.046**	I(0)	0.013*	I(1)
	LnOP	0.009*	I(0)	0.031**	I(1)
Russia	**LnSP**	0.074***	I(0)	0.050**	I(1)
	LnINT	0.001*	I(0)	0.006*	I(1)
	LnEXC	0.032**	I(0)	0.000*	I(1)
	LnOP	0.000*	I(0)	0.000*	I(1)
India	**LnSP**	0.332	—	0.012*	I(1)
	LnINT	0.289	—	0.004*	I(1)
	LnEXC	0.886	—	0.023**	I(1)
	LnOP	0.168	—	0.027**	I(1)
China	**LnSP**	0.095***	I(0)	0.018*	I(1)
	LnINT	0.071***	I(0)	0.005*	I(1)

	LnEXC	0.405	—	0.053***	I(1)
	LnOP	0.328	—	0.027**	I(1)
South Africa	**LnSP**	0.307	—	0.041**	I(1)
	LnINT	0.037**	I(0)	0.000*	I(1)
	LnEXC	0.205	—	0.007*	I(1)
	LnOP	0.218	—	0.022**	I(1)

Note: * is the probability value at one percent level of significance. ** is the probability value at five percent level of significance. *** is the probability value at ten percent level of significance

3.1.2   Bound Test Results

Table 4

Bound test Specification of BRICS

Countries	Model	F-Statistic	Lower Bound	Upper Bound
Brazil	LNSP/(LNINT_POS, LNINT_NEG, LNEXC_POS, LNEXC_NEG, LNOP_POS, LNOP_NEG)	52.923		
	Critical value			
	10%		2.12	3.23
	5%		2.45	3.61
	2.5%		2.75	3.99
	1%		3.15	4.43
Russia	LNSP/(LNINT_POS, LNINT_NEG, LNEXC_POS, LNEXC_NEG, LNOP_POS, LNOP_NEG)	9.488		
	Critical value			
	10%		2.12	3.23
	5%		2.45	3.61
	2.5%		2.75	3.99
	1%		3.15	4.43
India	LNSP/(LNINT_POS, LNINT_NEG, LNEXC_POS,	3.982		

	LNEXC_NEG, LNOP_POS, LNOP_NEG)			
	Critical value			
	10%		2.12	3.23
	5%		2.45	3.61
	2.5%		2.75	3.99
	1%		3.15	4.43
China	LNSP/(LNINT_POS, LNINT_NEG, LNEXC_POS, LNEXC_NEG, LNOP_POS, LNOP_NEG)	23.236		
	Critical value			
	10%		2.12	3.23
	5%		2.45	3.61
	2.5%		2.75	3.99
	1%		3.15	4.43
South Africa	LNSP/(LNINT_POS, LNINT_NEG, LNEXC_POS, LNEXC_NEG, LNOP_POS, LNOP_NEG)	2.384		
	Critical value			
	10%		2.12	3.23
	5%		2.45	3.61
	2.5%		2.75	3.99
	1%		3.15	4.43

Note: Calculated by authors using statistical software EViews.

The table 4 shows the bound test which indicate the existence of cointegration between variables. If we see the bound test results of Brazil, the value of F-statistic which is greater than upper bound indicates at 10% so we can say that there is cointegration exist among these variables. It means in long term the variables can move together. So, there is a rejection in null hypothesis. As we talk about the bound test of Russia the value of F-statistic which is greater than upper bund indicates at 10% so we can say that there is cointegration exist among these variables. It means in long term the variables can move together. So, the null hypothesis is rejected. Moreover, the bound test results of India also shows that there is cointegration exist because as compared to the value of F-statistic and upper bound the value of F-statistic is greater which shows at 10% so that in long run relationship these variables can move together. So, there is a rejection in null hypothesis. So, in China the bound test displays that by comparing the value of F-statistic and upper bound the value of F-statistic is greater which is seen at

10% so variable can move together in long run. Now in South Africa bound test the F-statistic value occur in between lower bound and upper bound so we cannot say that the cointegration exist or not so the inconclusive state is developed. For that we see Coineq probability 0.0256 which is less than 10% so there is cointegration exist among these variables and can for long purpose.

3.1.3 Empirical Results of Asymmetric Relationship

Table 5

Long Run Asymmetric Relation Ship

Countries	Variables	Coefficient Statistics	Std. Errors	t-statistic
Brazil	LNINT_POS	0.059	0.097	0.614
	LNINT_NEG	0.240*	0.054	4.402
	LNEXC_POS	-0.136*	0.155	- 7.292
	LNEXC_NEG	0.494*	0.111	4.453
	LNOP_POS	-0.119	0.100	1.185
	LNOP_NEG	0.653*	0.042	-15.558
	C	4.386*	0.093	47.044
Russia	LNINT_POS	-0.306***	0.135	2.257
	LNINT_NEG	0.639**	0.179	3.562
	LNEXC_POS	1.229	0.628	1.954
	LNEXC_NEG	6.738***	2.498	-2.696
	LNOP_POS	0.177	0.673	0.262
	LNOP_NEG	0.885	0.620	1.427
	C	4.325*	1.113	3.882
India	LNINT_POS	- 0.313**	0.107	- 2.920
	LNINT_NEG	1.257*	0.150	8.346
	LNEXC_POS	- 3.661*	0.965	3.790
	LNEXC_NEG	9.627*	1.823	-10.762
	LNOP_POS	-0.385	0.256	1.505
	LNOP_NEG	0.945*	0.086	-10.973
	C	3.928*	0.233	16.824
China	LNINT_POS	1.309	0.736	- 1.777

	LNINT_NEG	2.733*	0.458	5.960
	LNEXC_POS	- 2.127*	12.992	- 4.012
	LNEXC_NEG	-10.842	6.110	- 1.774
	LNOP_POS	- 3.448*	0.292	11.805
	LNOP_NEG	3.922*	1.115	-3.515
	C	4.462*	0.1092	4.0234
South Africa	LNINT_POS	- 6.697**	1.851	3.618
	LNINT_NEG	7.605**	1.872	- 4.062
	LNEXC_POS	- 9.416**	2.627	- 3.583
	LNEXC_NEG	20.354**	5.560	3.660
	LNOP_POS	- 3.221**	0.710	- 4.531
	LNOP_NEG	0.912**	0.269	3.389
	C	4.453*	0.358	12.409

Note: * is the probability value at one percent level of significance. ** is the probability value at five percent level of significance. *** is the probability value at ten percent level of significance

Brazil Results

Results in the Table 5 of the study confirms that LNINT_POS has positive and insignificant effect on LNSP. It means if there is 1 percent point increase in LNINT_POS in this response there will be a positive change 0.05% in LNSP. While this study also finds inverse and significant relationship between LNINT_NEG and LNSP. It means 1% decrease in LNINT will also increase to LNSP by 0.24%

This study also confirms that LNEXC_POS has inverse and significant effect on LNSP. It means that if there is 1% increase in LNEXC_POS in this response there will be negative change -0.13% in LNSP. On the other hand, this study also finds the inverse and significant relationship between LNEXC_NEG and LNSP. It means 1% decrease in LNEXC will also increase to LNSP by 0.49%.

The study confirms that LNOP_POS has inverse and insignificant effect on LNSP. It means that if there is increase 1% in LNOP_POS in this response there will be negative change -0.11% in. While this study also observes the inverse and significant relationship between LNOP_NEG and LNSP. It means 1% decrease in LNOP will increase to LNSP by 0.65%.

Russia Results

The study confirms that LNINT_POS has inverse and significant effect on LNSP. It means if there is 1% increase in LNINT_POS in this response there will be a negative change -0.31% in LNSP. While the current study also finds inverse and significant relationship between LNINT_NEG and LNSP. It means 1% decrease in LNINT will increase to LNSP by 0.63%.

This study also confirms that LNEXC_POS has direct and insignificant effect on LNSP. It means that if there is 1% increase of LNEXC_POS in this response there will be positive change 1.22% in LNSP.

On the other hand, the present study also discovers the inverse and significant relationship between LNEXC_NEG and LNSP. It means 1% decrease in LNEXC will increase to LNSP by 6.73%.

This study confirms that LNOP_POS has direct and insignificant effect on LNSP. It means that if there is 1% increase in LNOP_POS in this response there will be positive change 0.17% in LNSP. While this study also finds the inverse and insignificant relationship between LNOP_NEG and LNSP. It means 1% decrease in LNOP will increase to LNSP by 0.88%.

India Results

This study confirms that LNINT_POS has inverse and significant effect on LNSP. It indicates if there is 1 percent increase in LNINT_POS in this response there will be a negative change -0.31% in LNSP. While this study also discloses inverse and significant relationship between LNINT_NEG and LNSP. It means 1% decrease in LNINT will increase to LNSP by 1.25%.

This study also confirms that LNEXC_POS has inverse and significant effect on LNSP. It means that if there is increase in 1% of LNEXC_POS in this response there will be negative change -3.66% in LNSP. On the other hand, this study also finds the inverse and significant relationship between LNEXC_NEG and LNSP. It means 1% decrease in LNEXC will increase to LNSP by 9.6%.

The study confirms that LNOP_POS has inverse and insignificant effect on LNSP. It means that if there is 1% increase in LNOP_POS in this response there will be negative change of LNSP -0.38%.while this study also find the inverse and significant relationship between LNOP_NEG and LNSP. It means 1% decrease in LNOP will increase to LNSP by 0.94%.

China Results

The study confirms that LNINT_POS has direct and insignificant effect on LNSP. It means if there is 1 percent increase in LNINT_POS in this response there will be a positive change 1.3% in LNSP. While the current study also unveils an inverse and significant relationship between LNINT_NEG and LNSP. It means 1% decrease in LNINT will increase to LNSP by 2.7%.

This study also confirms that LNEXC_POS has inverse and significant effect on LNSP. It means that if there is increase in 1% of LNEXC_POS in this response there will be negative change -2.12% in LNSP. On the other hand, the present study also finds the direct and insignificant relationship between LNEXC_NEG and LNSP. It means 1% decrease in LNEXC will decrease to LNSP by 10.84%.

The study confirms that LNOP_POS has inverse and insignificant effect on LNSP. It means that if there is 1% increase in LNOP_POS in this response there will be negative change -3.44% in LNSP. While this study also finds the inverse and insignificant relationship between LNOP_NEG and LNSP. It means 1% decrease in LNOP will increase to LNSP by 3.92%.

South Africa Results

The study confirms that LNINT_POS has inverse and significant effect on LNSP. It means if there is 1% increase in LNINT_POS in this response there will be a negative change -6.69% in LNSP. While this study also finds inverse and significant relationship between LNINT_NEG and LNSP. It means 1% decrease in LNINT will increase to LNSP by 7.6%.

This study also confirms that LNEXC_POS has inverse and significant effect on LNSP. It means that if there is increase in 1% of LNEXC_POS in this response there will be negative change -9.4% in LNSP.

On the other hand, the present study also discovers the inverse and significant relationship between LNEXC_NEG and LNSP. It means 1% decrease in LNEXC will increase to LNSP by 20.35%.

The study confirms that LNOP_POS has inverse and significant effect on LNSP. It means that if there is 1% increase in LNOP_POS in this response there will be negative change -3.22% in LNSP. While the current study also finds the inverse and significant relationship between LNOP_NEG and LNSP. It means 1% decrease in LNOP will increase to LNSP by 0.9%.

Table 6

Short Run Asymmetric Relation ship

Countries	Variables	Coefficient Statistics	Std. Errors	t-statistic
Brazil	D(LNSP(-1))	1.288	0.128	10.029
	D(LNINT_POS)	0.138	0.225	0.615
	D(LNINT_NEG)	1.361	0.123	11.020
	D(LNEXC_POS)	-1.259	0.318	- 3.953
	D(LNEXC_NEG)	0.749	0.273	2.745
	D(LNOP_POS)	0.088	0.128	0.688
	D(LNOP_NEG)	-0.942	0.143	- 6.590
	CointEq(-1)	0.320	0.018	17.777
Russia	D(LNSP(-1))	0.405	0.131	3.087
	D(LNINT_POS)	0.705	0.140	5.019
	D(LNINT_NEG)	- 0.112	0.159	- 0.707
	D(LNEXC_POS)	1.501	0.711	2.110
	D(LNEXC_NEG)	- 1.611	1.983	- 0.812
	D(LNOP_POS)	- 0.763	0.935	- 0.816
	D(LNOP_NEG)	1.081	0.685	1.577
	CointEq(-1)	0.221	0.017	13.000
India	D(LNINT_POS)	1.000	0.130	7.662
	D(LNINT_NEG)	0.197	0.055	3.581
	D(LNEXC_POS)	1.035	0.568	1.820
	D(LNEXC_NEG)	- 2.084	1.053	- 1.978
	D(LNOP_POS)	0.357	0.235	1.515
	D(LNOP_NEG)	- 0.707	0.081	- 8.694
	CointEq(-1)	0.925	0.077	11.930

	D(LNINT_POS)	0.137	0.171	0.801
	D(LNINT_NEG)	0.376	0.125	2.988
	D(LNEXC_POS)	-10.199	5.662	- 1.801
China	D(LNEXC_NEG)	- 7.285	1.713	- 4.252
	D(LNOP_POS)	1.662	0.227	7.295
	D(LNOP_NEG)	- 0.631	0.131	- 4.813
	CointEq(-1)	0.361	0.058	6.171
	D(LNSP(-1))	0.610	0.407	1.499
	D(LNINT_POS)	3.138	1.912	1.641
	D(LNINT_NEG)	- 4.677	2.705	- 1.728
South Africa	D(LNEXC_POS)	- 3.083	3.372	- 0.914
	D(LNEXC_NEG)	14.841	8.480	1.750
	D(LNOP_POS)	- 2.586	1.329	- 1.945
	D(LNOP_NEG)	0.874	0.582	1.500
	CointEq(-1)	- 0.516	0.071	- 7.267

Note: * is the probability value at one percent level of significance. ** is the probability value at five percent level of significance. *** is the probability value at ten percent level of significance

Table 6 shows the short run asymmetric relationship of our regression model used in this study. In case of South Africa, CointEq (-1) is correctly signed and significant.

Conclusion and Recommendations

This study objective is to examine the connection among proposed variables for long term. By applying NARDL model on macroeconomic and stock price by using annual data from1990 to 2017. This study checks the tests for long run relationship. On the basis of widespread literature review and data availability, the macroeconomic variables such as exchange rate, interest oil price and interest rate are checked by this study. The NARDL model is used to identify the positive and negative connection between dependent and independent variables for long- and short-term purpose. Unit test applied on each variable that show the stationarity at first difference I (1) and at level I (0). In this study the bound test is applied which represents the cointegration among variables.

On the basis of our results policy makers should implement a different economic policy reaction towards negative and positive relation among stock price, exchange rate oil price and interest rate. This provides opportunities to central bankers to recruit suitable policy for justifying volatility of stock market. Also, investor should consider the existence of an asymmetric benefit loss structure of their expected returns when dealing with the risk management strategies in stock market. The investors can also make appropriate decisions about which is the best place for investment by seeing these results either in short run or in long run.

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