International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

http://TuEngr.com

COINTEGRATION AND CAUSALITY BETWEEN STOCK PRICES AND EXCHANGE RATES: EMPIRICAL EVIDENCE FROM DEVELOPED & DEVELOPING ECONOMIES

Rabia Luqman [a,b*], Rehana Kouser [a*]

[a] *Department of Commerce, Bahauddin Zakariya University Multan, PAKISTAN.*
[b] *Department of Management Sciences, COMSATS Vehari Campus, PAKISTAN.*

ARTICLEINFO

Article history:
Received 04 March 2019
Received in revised form 15 May 2019
Accepted 27 May 2019
Available online 03 June 2019

Keywords:
Exchange Rates, Johansen Cointegration Test; Unit Root Tests; Granger Causality Test.

ABSTRACT

To predict the volatility and unexpected changes between the currency and equity markets is one of the prime focus for the academicians as it leads towards changes in country wealth. Relationship between these two variables has gained much importance in last era from both theoretical and empirical perspective. This study aims to investigate that either stock price affects the exchange rate and exchange rate affect the stock price. Daily data of stock indices and real exchange rate for 14 countries includes Canada, France, Germany, Italy, Japan, UK, USA, Russia, Brazil, China, India, Mexico and South Africa and Pakistan has been considered as sample data for this study. There is no study conducted for daily data by using these countries for 2000-2016-time period. Unit root test (ADF & PP), Johansen's Cointegration test, Error Correction Model and Granger Causality is applied to test the short and long run relationship between the variable of study. Study find the long run relationship between the variables in all the countries but there is less evidence of short run relationship between stock price and exchange rate for the selected countries.

1. INTRODUCTION

From the past years global environment has changed due to financial crisis and by the increasing tendency of liberalization, free trade and deregulation concepts all over the world. Due to these problems, different policies emerged such as prices of a good are set on the basis of demand and supply of that product and integration between foreign and domestic market has substantially increased. Moreover, speedily developments in technology and innovation lead towards the quick access to international markets. Due to different financial crisis, volatility has been increased in the stock and foreign exchange market. Foreign exchange rate changed rapidly due to financial crisis and this increased the risk of international investment securities. Exchange rate has been considered as the main factor of the country's economic condition as if exchange rate changes, it will directly affect

*Corresponding author (R.Luqman and R. Kouser). E-mail: rabia@ciitvehari.edu.pk and rehankousar@bzu.edu.pk.

the stock market of that country. Relationship among these financial markets has been studied from past decades and employed to predict the future condition of these markets (Habibullah and Law, 2006 and Stavarek, 2005). Exchange rate volatility has been increased by the time and it also impacts the stock market. According to flow approach by Dornbusch and Fisher (1990), exchange rate leads stock prices. Granger, Huang and Yang (2000) also studied that in South Korea exchange rate affects the stock price. According to portfolio approach, changes in stock prices affect the exchange rate. Tabak (2006) reported that stock prices led exchange rate with negative relationship. Stavarek (2005) resulted in unidirectional causality running from stock market prices to exchange rate.

For policy makers, forecasting about the stock market and exchange rate is much important to make decisions about the fiscal and monetary policies. Thus, it is significant to recognize how these two marketplaces are integrated and the direction of causality between these markets (Parsva, 2012). Policy makers may establish such policy as decreasing the currency value that will increase the exports of that country because the goods will be cheaper for all other states. They also take care that how it will affect to stock market of that country (Dimitrova, 2005; Gavin, 1989).

For regulators, to know about currency and equity market relationship is helpful in forecasting the future crisis and steps taken to forecast the future crisis. In 1980, financial crisis was considered as events that will affect only the economy where they are originated. But the crisis of the European Mechanism of Exchange Rates (1992), the Mexican crisis (1994), the Asian crisis (1997), the Russian crisis (1998), the Brazilian crisis (1999) and subprime financial crisis (2007) spread all over the world and bring strong decline in stock prices of the countries and shaken the exchange rate as well. So, to know about the transmission of shocks between these financial markets are meaningful (Kumar, 2010; Dimitrova, 2005).

Speculation has also increased due to high volume and value of stocks and currencies traded all over the world. So, market contributors and investors can use the information of relationship between the stock market and exchange rate to gauge abnormal profit. Mutual fund managers need to estimate variance of portfolio which is dependent on the exchange rate and stock market volatility. So, it is essential to estimate the association among the stock indices and exchange rates (Kumar, 2010; Dimitrova, 2005). This will help the fund manager to efficiently manage the portfolio risk.

Some firms operate domestically and internationally so their operations depend on the variations in the economic wealth of the domestic country as well foreign country, Currency appreciation and depreciation will affect the stock price of that firm. So, to have knowledge about the relationship between the stock market and exchange rate will help to better manage their risk, short term financing and investment.

This study aims to investigate the long-term relationship between currency and equity through Johansen's cointegration and short-term relationship through Vector Error Correction Method(VECM) and also emphasize on the causal relationship among the currency and equity market which is tested by the Granger Causality. Empirical results will also help in strengthening the theoretical background of the stock market and exchange rate relationship from the G8 plus 5 countries including Pakistan.

2. LITERATURE REVIEW

After implementation of floating exchange rate system, academicians in 1970s start to examine the volatility of exchange rate market and stock market and further to check the relationship among these markets. Studies were conducted on both emerged and emerging economies but no exact relationship is still confirmed. Relationship of stock market and exchange has been considered for achieving the profit and predictions are made on the basis of researches that has been done. According to flow approach by Dornbusch and Fisher (1990), exchange rate leads stock prices. Granger et al. (2000) also studied that in South Korea exchange rate affects the stock price. According to portfolio approach, changes in stock prices affect the exchange rate. Tabak (2006) reported that stock prices led exchange rate with negative relationship. Stavarek (2004) resulted in unidirectional causality running from stock market prices to exchange rate.

According to Aggarwal (1981), there is negative association among the variables by implying the monthly data of US from 1974-1978. On the contrary basis, Soenen and Hennigar (1988) showed the inconsistent results with Aggarwal (1981). Due to 1997 financial crisis, relationship among the stock market and exchange rate has been changed and studied by Granger et al. (2000) and concluded the mixed results by using the nine East Asian counties i.e., Hong Kong, Japan, Malaysia, Indonesia, South Korea, Singapore, Thailand, Philippines and Taiwan as samples with the cointegration and causality techniques. Different countries have different relationship among the variables. Nieh and Lee (2001) concluded short run relationship among the variables by using the sample of G-7 countries. Same relationship has been studied and show that there is no long run relationship among the variables by using the sample of Bangladesh, India, Pakistan and Sri Lanka and used the same techniques (Smyth &Nandha, 2003).

According to Obben et al., 2006), there exists bi-directional causality among the vaiables by applying the VAR approach on the sample data of New Zealand. Same relationship has been proved by applying the data of Bangladesh, Sri Lanka, Taiwan and Japan (Yau & Nieh, 2006). Granger causality has been applied in 13 countries by using the same variables from 1997 to 2012. Results has been proved that stock market causes the exchange rate in some countries and in other countries exchange rate causes the stock market. Due to the impact of financial crisis, relationship among these variables has been changes and shows no long run relationship among the stock market and exchange rate by using the seven countries data from 1988 to 1998 (Pan et al., 2007). Same conclusions have been drawn by Ismail and Isa (2009); Rahman and Uddin (2009); Kutty (2010); Zhao (2010); Alagidede et al. (2011); Wickremasinghe (2012); Buberkoku (2013); and Unlu (2013) by using Johansen cointegration test and Granger Causality test.

From the last decade, many researches have been conducted on the relationship between exchange rate and stock price by using the causality test. Researches has been conducted to test the long run relationship by using the Johansen cointegration test and short run test by using the Granger causality test.

Bahmani-Oskooee and Sohrabian (1992) test the long run and short run relationship among the stock market and exchange rate by using the cointegration and Granger causality test.

*Corresponding author (R.Luqman and R. Kouser). E-mail: rabia@ciitvehari.edu.pk and rehankousar@bzu.edu.pk.
 Volume 10 No.7 ISSN 2228-9860 eISSN 1906-9642 http://TUENGR.COM/V10/887.pdf DOI: 10.14456/ITJEMAST.2019.83

VECM (vector error correction model) has been applied by using the less developed countries i-e- India, Korea, Pakistan, and Philippines and concluded the unidirectional link between the exchange rate and stock market. In India there is unidirectional relationship found but in case of Philippines there exist no relationship among the variables Sohrabian (1992). Other researchers also supported the results of Bahmani-Oskooee and Sohrabian (1992) and Sohrabian (1992) and concluded that there exists no long run relationship among the variables by using the G-7 economies Nieh and Lee (2001). Phylaktis and Ravazzolo (2005) concluded that there exists no long run relationship by using the sample data of six Pacific Basin countries. Abdelaziz et al. (2008) examined the relationship among the stock indices and exchange rate and found no support for cointegration between the variables.

There are studies that used the international data to test the relationship among stock market and exchange rate like Zhao (2010) employed the monthly data and used VAR and MGARCH model to test the volatility of these variables and concluded that if there comes change in stock market then it will affect the exchange rate volatility as well. Kutty (2010) also concluded that exchange rate was led by the stock price and there is no cointegration vector among these variables. Abdulla et al; (2010) examined the same relationship and found the unidirectional causality that exchange rate granger cause stock price.

Sinha et al. (2016) employed the OLS regression to test the relationship among the stock market and exchange rate and concluded the negative relationship among the variables. Basher et al. (2012) employed the VAR model to check the association among the variables and resulted that stock prices lead the exchange rate as stock price changes then exchange rate will also be affected. Agrawal et al. (2010) and Abdalla et al. (2010) examined the relationship and concluded with the negative association between the variables by using the granger causality test.

Rahman and Uddin (2009) tested the relationship and found no causal association among the variables by using the granger causality test.

Based on the previous discussion, there is no conclusive remarks about the relationship between stock market and exchange rate. In our study, we focus on daily data of stock indices and real exchange rate by using the sample of 24 countries from 2000-2016.The main objective is to check the long term and short run relationship among the variables of study by employing the unit root test, cointegration, causality and VECM (vector error correction model).

3. RESEARCH METHODOLOGY

Daily data of exchange rate and stock indices will be used to check the relationship among the variables for the sample countries i-e- G-8 Countries (Canada, France, Germany, Italy, Japan, UK, USA and Russia), five emerging economies (Brazil, China, India, Mexico and south Africa) and Pakistan. ADF and Ng-Perron Test for Unit Root, Johansen Cointegration test, Vector Error Correction Model(VECM) and Granger causality test will be applied to check the long run and short run relationship for the selected countries. Equations are given in Table 1.

Table 1: Methods and Formula

Sr.N	Methods Employed	Model/Formula	Purpose
1	Unit Root Tests(ADF)	$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-i} + u_t$ $\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-i} + u_t$ $\Delta Y_t = \alpha_0 + a_1 t + \delta Y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-i} + u_t$	It is used to check whether the data selected for this study are stationary or non-stationary.
2	Unit Root Tests (Ng-Perron Test)	$\Delta \tilde{y}_t = \sum_{i=0}^{p} \alpha_i t^i + \delta \tilde{y}_{t-1} + \sum_{i=1}^{k} \beta_i \Delta \tilde{y}_{t-i} + u_t$	It is used to check whether the data selected for this study are stationary or non-stationary.
3	Johansen's Cointegration Test	Trace Test Statistic $\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i)$ Maximum Eigenvalue Test Statistic $\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1})$	It is applied to test the presence of long-run equilibrium relationship between the selected time series data.
4	Granger Causality Test	$y_t = \alpha_0 + \sum_{i=1}^{m} a_i y_{t-i} + \sum_{j=1}^{n} \beta_j x_{t-1} + \varepsilon_t$ $x_t = \omega_0 + \sum_{i=1}^{m} \gamma_i y_{t-i} + \sum_{j=1}^{n} \theta_j x_{t-1} + \varepsilon_t$	It is applied to find the direction of causality and short-run relationship between selected time series data.

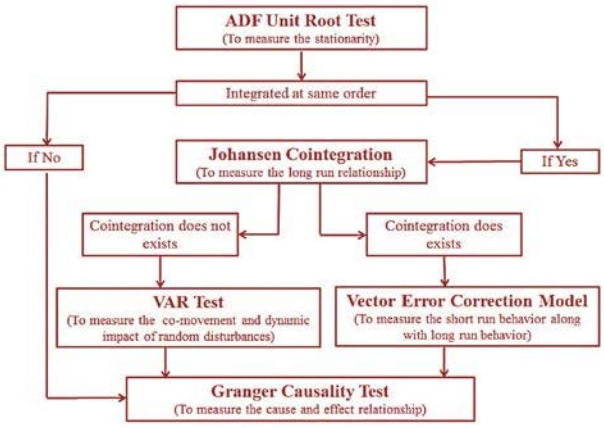

Figure 1: Flow Diagram of Research Methodology (after Attari et. al, 2014).

4. RESULTS

4.1 UNIT ROOT TEST

Dickey and Fuller (1979) and Phillips and Perron (1988) test applied to check the stationary of sample data and results have shown that all series of stock indices and exchange rate for 14 sample countries from 2000 -2016 data are non-stationary at level but both series are stationary at first difference with one percent significance level. These results are supported by Sinha et al; (2015) and Nieh et al; (2001). Results are given in table 2 for stock indices and in table 3 for the exchange rate series.

*Corresponding author (R.Luqman and R. Kouser). E-mail: rabia@ciitvehari.edu.pk and rehankousar@bzu.edu.pk.
 Volume 10 No.7 ISSN 2228-9860 eISSN 1906-9642 http://TUENGR.COM/V10/887.pdf DOI: 10.14456/ITJEMAST.2019.83

Table 2: UNIT ROOT ANALYSIS Stock Price

Countries	Level ADF test statistics	1st Difference ADF test statistics	Level PP test statistics	1st Difference PP test statistics
BRAZIL	-1.389	-68.838***	-1.307	-69.034***
CANADA	-1.320	-32.139***	-1.173	-66.801***
CHINA	-1.961	-30.475***	-1.892	-63.589***
FRANCE	-2.498	-68.845***	-2.266	-69.683***
GERMANY	-0.641	-66.308***	-0.563	-66.369***
INDIA	-0.438	-63.242***	-0.363	-63.161***
ITLAY	-2.271	-68.544***	-2.248	-68.576***
JAPAN	-1.802	-68.749***	-1.730	-68.792***
MEXICO	-2.929	-2.929***	-2.538	-58.901***
PAKISTAN	-0.150	-67.081***	0.318	-69.331***
RUSSIA	-1.614	-65.253***	-1.586	-65.276***
UK	-2.352	-42.306***	-2.098	-69.351***
USA	-0.044	-71.198***	0.113	-71.570***
SOUTH_AFRICA	-2.375	-5.559***	-2.405	-5.557***

Table 3: Unit Root Exchange rate

Countries	Level ADF test statistics	1st Difference ADF test statistics	Level PP test statistics	1st Difference PP test statistics
BRAZIL	-0.453	-51.120***	-0.5406	-65.132***
CANADA	-1.394	-75.666***	-1.371	-76.068***
CHINA	-1.327	-34.989***	-1.330	-71.278***
FRANCE	-1.615	-65.595***	-1.632	-65.595***
GERMANY	-1.615	-65.595***	-1.632	-65.595***
INDIA	-0.187	-12.832***	0.074	-68.857***
ITLAY	-1.615	-65.595***	-1.632	-65.595***
JAPAN	-1.353	-54.370***	-1.417	-81.714***
MEXICO	0.044	-70.262***	0.176	-70.521***
PAKISTAN	-0.182	-12.592***	-0.426	-119.335***
RUSSIA	-0.928	-9.255***	-0.200	-69.922***
UK	-0.549	-49.907***	-1.181	-64.312***
USA	-1.154	-64.348***	-1.293	-67.088***
SOUTH_AFRICA	-1.298	-67.089***	-0.356	-68.813***

4.2 JOHANSEN'S COINTEGRATION TEST

Johansen (1988) and Johansen & Juselius (1991) has given this test to check the long run relationship among the variables. Because all series are integrated at order one so we can apply cointegration test to further examine the long run relationship. Results on the basis of trace test statistics and maximum eigenvalue shows that null hypothesis is rejected which means that both study variables are long term correlated. Trace and maximum eigenvalue test values are greater than their critical values which shows that there is long term association between the variables and these variables can be predicted on the basis of their past values. You & Nieh (2006) also supported the results but Rahman & Uddin (2009) gave the contradictory results as they do not find any long run relationship among these variables. Table 4 shows the results of Johansen's Cointegration.

Table 4: Cointegration Analysis.

Country	No. of Hypothesized CE(s)	Trace Test			Maximum Eigenvalue Test		
		Test Stat	Crit. Value	Prob**	Test Stat	Crit. Value	Prob**
BRAZIL	None	1700.172	12.321	<0.0001	865.348	11.225	0.0001
	At Most 1	834.824	4.130	0.0001	834.824	4.130	0.0001
CANADA	None	1800.566	12.321	<0.0001	938.131	11.225	0.0001
	At Most 1	862.435	4.130	0.0001	862.435	4.130	0.0001
CHINA	None	1454.065	12.321	<0.0001	750.670	11.225	0.0001
	At Most 1	703.395	4.130	0.0001	703.395	4.130	0.0001
FRANCE	None	1743.285	15.495	<0.0001	948.356	14.265	0.0001
	At Most 1	794.929	3.841	0.0001	794.929	3.841	<0.0001
GERMANY	None	1684.481	12.321	<0.0001	891.104	11.225	0.0001
	At Most 1	793.378	4.130	0.0001	793.378	4.130	0.0001
INDIA	None	1729.871	12.321	<0.0001	912.627	11.225	0.0001
	At Most 1	817.244	4.130	0.0001	817.244	4.130	0.0001
ITLAY	None	1651.576	12.321	<0.0001	853.843	11.225	0.0001
	At Most 1	797.733	4.130	0.0001	797.733	4.130	0.0001
JAPAN	None	1726.045	12.321	<0.0001	903.095	11.225	0.0001
	At Most 1	822.950	4.130	0.0001	822.950	4.130	0.0001
MEXICO	None	1915.478	12.321	<0.0001	1005.546	11.225	0.0001
	At Most 1	909.932	4.130	0.0001	909.932	4.130	0.0001
PAKISTAN	None	2327.148	12.321	<0.0001	1423.621	11.225	<0.0001
	At Most 1	903.527	4.130	0.0001	903.527	4.130	0.0001
RUSSIA	None	1785.867	12.321	<0.0001	918.124	11.225	0.0001
	At Most 1	867.743	4.130	0.0001	867.743	4.130	0.0001
UK	None	1785.082	12.321	<0.0001	946.505	11.225	0.0001
	At Most 1	838.577	12.991	0.0001	838.578	4.130	0.0001
USA	None	1671.600	12.321	<0.0001	888.781	11.225	0.0001
	At Most 1	782.819	4.130	0.0001	782.819	4.130	0.0001
SOUTH_AFRICA	None	2646.926	12.321	<0.0001	1779.128	11.225	<0.0001
	At Most 1	867.798	4.130	0.0001	867.798	4.130	0.0001

4.3 VECTOR ERROR CORRECTION MODEL (VECM)

Vector error correction model (VECM) is applied to check the short run relationship between the stock indices and real exchange. ECM shows the speed of adjustment and it is negative and statistically significant in all the countries that shows that these two variables are having the short run relationship and having short term cointegration between these two variables. Table 5 shows the results of Vector error correction model (VECM).

Table 5: Vector Error Correction Method

	Brazil	China	India	Mexico	South Africa	Pakistan	Canada
CONSTANT	11.980*	0.404*	5.043*	4.344*	-0.096*	10.213*	1.559*
ECM (-1)	-0.06**	-0.001***	-0.003***	-0.003***	-0.368***	-0.01***	-0.002***

	Germany	Italy	Japan	UK	USA	Russia	France
CONSTANT	0.847*	-5.592*	0.049*	5914.544*	1.931*	0.409*	0.847*
ECM (-1)	-0.004***	-0.001***	-0.001***	-0.997***	-0.001***	-0.001***	-0.004***

(10% level is identified by * and at the 5% level by ** and 1% by ***)

4.4 GRANGER CAUSALITY TEST

Test is used to check the causal relationship among the variables and to further examine that either one variable can be used to forecast the other variable. Results have shown that there is unidirectional causality exists among some countries but there is no evidence of bi directional causality among the variables. Uni-directional Causality exists in Brazil, India and USA from stock

*Corresponding author (R.Luqman and R. Kouser). E-mail: rabia@ciitvehari.edu.pk and rehankousar@bzu.edu.pk.
 Volume 10 No.7 ISSN 2228-9860 eISSN 1906-9642 http://TUENGR.COM/V10/887.pdf DOI: 10.14456/ITJEMAST.2019.83

price to exchange rate. But from exchange rate to stock price causality also exists for the Japan. Canada, France, Germany, Italy, UK, Russia, China, Mexico and Pakistan show no causality among the study variables. These results are also supported by Kutty (2010), Pan et al. (2007) and Ajayi& Morgue (1996). But some studies provide the contradictory results as Granger et al. (2000) and Bahmani Oskooee & Sohrabian (1992). Results for the granger causality test are given in table 6.

Table 6: Causality Analysis

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
BRAZIL ER does not Granger Cause DBRAZIL_SP	4426	0.22013	0.8024
DBRAZIL_SP does not Granger Cause DBRAZIL	4426	26.4136	<0.001
DCANADA does not Granger Cause DCANADASP	4426	0.24829	0.7801
DCANADASP does not Granger Cause DCANADA	4426	0.13737	0.8716
DCHINA does not Granger Cause DCHINASP	4426	0.39766	0.6719
DCHINASP does not Granger Cause DCHINA	4426	0.32109	0.7254
DFRANCE does not Granger Cause DFRANCESP	4426	0.34469	0.7085
DFRANCESP does not Granger Cause DFRANCE	4426	0.06901	0.9333
DGERMANY does not Granger Cause DGERMANYSP	4426	0.03197	0.9685
DGERMANYSP does not Granger Cause DGERMANY	4426	0.63843	0.5282
DINDIA does not Granger Cause DINDIASP	4426	1.32177	0.2668
DINDIASP does not Granger Cause DINDIA	4426	3.18437	0.0415
DITLAY does not Granger Cause DITLAYSP	4426	0.16341	0.8493
DITLAYSP does not Granger Cause DITLAY	4426	0.54335	0.5808
DJAPAN does not Granger Cause DJAPANSP	4426	4.64203	0.0097
DJAPANSP does not Granger Cause DJAPAN	4426	1.59993	0.202
DMEXICO does not Granger Cause DMEXICOSP	4426	1.33277	0.2639
DMEXICOSP does not Granger Cause DMEXICO	4426	1.66342	0.1896
DPAKISTAN does not Granger Cause DPAKISTANSP	4426	0.26977	0.7636
DPAKISTANSP does not Granger Cause DPAKISTAN	4426	0.01851	0.9817
DRUSSIA does not Granger Cause DRUSSIASP	4426	0.49331	0.6106
DRUSSIASP does not Granger Cause DRUSSIA	4426	0.28887	0.7491
DUK does not Granger Cause DUKSP	4426	0.65414	0.5199
DUKSP does not Granger Cause DUK	4426	1.01173	0.3637
DUSA does not Granger Cause DUSASP	4426	0.38189	0.6826
DUSASP does not Granger Cause DUSA	4426	18.4097	<0.001

5. CONCLUSION

This study tested the unit root, cointegration and causality test for G-8 Countries (Canada, France, Germany, Italy, Japan, UK, USA and Russia), five emerging economies (Brazil, China, India, Mexico and South Africa) and Pakistan and used the daily data for 2000-2016. Series of daily stock indices and real exchange rate have found non-stationary at level, but both are stationary at first difference. Cointegration test shows the existence of long run relationship among all the countries for both series. After the cointegration test, Vector Error Correction Method (VECM) is applied to test the short run relationship as in our sample data short run relationship can be changed due to financial crisis of 2007-2008. Results of VECM shows that there is short run relationship exists among all the countries. Granger causality test is also applied to check the causal relationship among the variables of study and results have shown less evidence for bi directional causality and found no causal relationship among the variables from the Canada, France, Germany, Italy, UK, Russia, China, Mexico and Pakistan. Uni-directional Causality exists in Brazil, India and USA from stock price to exchange rate. But from exchange rate to stock price causality also exists for the Japan. Based on the results, we can conclude that investors can make predictions based on the previous information.

To sum up, this relationship of stock price and exchange in developed and developing economies can be used by fund managers, portfolio manager, policy makers, government officials and investors that how risk can be minimized by investing in different economies whose economies are stable. In developed economies, crisis also create impact but not that extent as it affects to developing economies because their economy is not stable to persist against the shocks. In emerging markets, volatility among the stock market and exchange rate market has high and this information can be used by investors to predict the future scenario of the invested market.

6. DATA AVAILABILITY STATEMENT

The used or generated data and the result of this study are available upon request to the corresponding author.

7. REFERENCES

Aggarwal, R. (1981), "Exchange rates and stock prices: a study of the US capital markets under floating rates", *Akron Business and Economic Review*, 12:7-12.

Ajayi, R. A., & Mougouė, M. (1996). On the dynamic relation between stock prices and exchange rates. *Journal of Financial Research*, 19(2): 193-207.

Alagidede, P., Panagiotidis, T., & Zhang, X. (2011). Causal relationship between stock prices and exchange rates. *Journal of International Trade & Economic Development*, 20(1): 67-86.

Attari, M. I. J., Taha, R., & Farooq, M. I. (2014). Tax Revenue, Stock Market and Economic Growth of Pakistan. Acta Universitatis Danubius. *Œconomica*, 10(5).

Bahmani-Oskooee, M., & Sohrabian, A. (1992). Stock prices and the effective exchange rate of the dollar. *Applied economics*, 24(4): 459-464.

Basher, S. A., Haug, A. A., & Sadorsky, P. (2012). Oil prices, exchange rates and emerging stock markets. *Energy Economics*, 34(1): 227-240.

Buberkoku, O. (2013). The Relationship Between Stock Prices and Exchange Rates Evidence from Developed and Developing Countries. *Istanbul Stock Exchange Review*, 13(52): 1-16.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(3): 427-431.

Dimitrova, D. (2005). The relationship between exchange rates and stock prices: Studied in a multivariate model. *Issues in Political Economy*, 14(1), 3-9.

Dornbusch, R., & Giovannini, A. (1990). Monetary policy in the open economy. *Handbook of Monetary Economics*, 2: 1231-1303.

Gavin, M. (1989). The stock market and exchange rate dynamics. *Journal of international money and finance*, 8(2): 181-200.

Granger, C. W., Huangb, B. N., & Yang, C. W. (2000). A bivariate causality between stock prices and exchange rates: evidence from recent Asianflu. *The Quarterly Review of Economics and Finance*, 40(3): 337-354.

Huang, B. N., Yang, C. W., & Hu, J. W. S. (2000). Causality and cointegration of stock markets among the United States, Japan and the South China Growth Triangle. *International Review of Financial Analysis*, 9(3): 281-297.

Ismail, M. T., & Bin Isa, Z. (2009). Modeling the interactions of stock price and exchange rate in Malaysia. *The Singapore Economic Review*, 54(04): 605-619.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control*, 12(2-3): 231-254.

*Corresponding author (R.Luqman and R. Kouser). E-mail: rabia@ciitvehari.edu.pk and rehankousar@bzu.edu.pk.

Volume 10 No.7 ISSN 2228-9860 eISSN 1906-9642 http://TUENGR.COM/V10/887.pdf DOI: 10.14456/ITJEMAST.2019.83

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica: *Journal of the Econometric Society*, 1551-1580.

Kutty, G. (2010). The relationship between exchange rates and stock prices: the case of Mexico. *North American Journal of Finance and Banking Research*, 4(4): 1.

Lean, H. H., & Parsva, P. (2012). Performance of Islamic indices in Malaysia FTSE market: Empirical evidence from CAPM. *Journal of applied Sciences*, 12(12): 1274-1281.

Nieh, C. C., & Lee, C. F. (2001). Dynamic relationship between stock prices and exchange rates for G-7 countries. *The Quarterly Review of Economics and Finance*, 41(4): 477-490.

Obben, J., Pech, A. and Shakur, S. (2006), Analysis of relationship between the share market performance and exchange rates in New Zealand: a cointegrating VAR approach", *New Zealand Economic Papers*, 40(2): 147-180.

Pan, M. S., Fok, R. C. W., & Liu, Y. A. (2007). Dynamic linkages between exchange rates and stock prices: Evidence from East Asian markets. *International Review of Economics & Finance*, 16(4), 503-520.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346.

Phylaktis, K., & Ravazzolo, F. (2005). Stock prices and exchange rate dynamics. *Journal of International Money and Finance*, 24(7), 1031-1053.

Rahman, M. L., & Uddin, J. (2009). Dynamic relationship between stock prices and exchange rates: Evidence from three South Asian countries. *International Business Research*, 2(2), 167.

Smyth, R., & Nandha, M. (2003). Bivariate causality between exchange rates and stock prices in South Asia. *Applied Economics Letters*, 10(11), 699-704.

Soenen, L. A., & Hennigar, E. S. (1988). An analysis of exchange-rates and stock-prices-the united-states experience between 1980 and 1986. *Akron Business and Economic Review*, 19(4): 7-16.

Stavarek, D. (2005). Stock prices and exchange rates in the EU and the United States: evidence on their mutual interactions.

Tabak, B. M. (2006). The dynamic relationship between stock prices and exchange rates: Evidence for Brazil. *International Journal of Theoretical and Applied Finance*, 9(08): 1377-1396.

Unlu, U. (2013). Oil price, exchange rate and stock market in ASEAN-5 countries. The Empirical Economics Letter: *A Monthly International Journal of Economics*, 12(5): 551-557.

Wickremasinghe, G. B. (2012). Stock prices and exchange rates in Sri Lanka: Some empirical evidence. *Investment Management & Financial Innovations*, 9(4): 8-14.

Yau, H. Y. and Nieh, C.C. (2006). Interrelationships among stock prices of Taiwan and Japan and NTD/Yen exchange rates. *Journal of Asian Economics*, 17(3): 535-552.

Zhao, H. (2010). Dynamic relationship between exchange rate and stock price: Evidence from China. Research. *International Business and Finance*, 24(2), 103-112.

Rabia Luqman is a PhD Scholar at Department of Commerce, Bahauddin Zakariya University Multan, Pakistan. She is a Lecturer at Department of Management Sciences, COMSATS Vehari Campus. Her researches are related to International Finance, Financial Crisis, Financial Management, Corporate Governance, and Dividend Payout Policy.

Dr. Rehana Kouser is a Professor at Department of Commerce, Bahauddin Zakariya University Multan, Pakistan. Her researches encompass Financial Analysis, Corporate Finance, Financial Reporting, Corporate Governance.