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THE LINKAGE BETWEEN EXCHANGE RATES AND STOCK PRICES: EVIDENCE FROM VIETNAM

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ABSTRACT

This study researches the causal relationship between exchange rates and stock prices during pre and post financial crisis in Viet Nam, based on the collected daily data from 2005 to 2015. The paper investigates the long-run relationship between above-mentioned two variables using Johansen and Juselius (1990) co-integration test and short - run dynamic causal relationships by using Toda and Yamamoto (1995) procedure. Variance decompositions (VDCs) analysis expresses the predictable portion of exchange rates (stock prices) changes on the forecast error variance in stock prices (exchange rates). In this study, it was found that exchange rates and stock prices were non-normally distributed. Through unit root test, it was also established that both the time series, exchange rates and stock prices, were stationary at the level form itself. Further investigation into the causal relationship between the two variables using Granger Causality test not only finds a unidirectional causal relationship from stock prices to exchange rates, but also supports the traditional approach in post crisis case.

Keywords: Exchange rates, Stock prices, Johansen-Juselius co-integration test, Granger-causality test, Toda-Yamamoto's procedure, VDCs, Vietnam.

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Contribution/ Originality

This study contributes to the existing literature in several ways. The research points out the existence of significant interactions between exchange rates and stock prices, and a unidirectional causality between exchange rates and stock prices in Vietnam market.

1. INTRODUCTION

Interactive relations between stock markets and foreign exchange markets have got attention of reviewers and academics since the beginning of 1990s. The first study was researched by Franck and Young (1972) and they found no significant interaction. Another author, Solnik (1987) pointed out a weak relationship between changes in the stock returns and changes in the real exchange rates… The previous literature also mentioned many factors that influence the behavior of stock prices and exchange rates, which attract the attention of economists, policy makers, and investment community for a long time. Kurihara (2006) found that enterprise performance, dividends, stock prices of other countries, GDP, exchange rates, interest rates, money supply, employment, and information among

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others, impact on daily stock prices. All the mentioned features extend the variety of investment opportunities, but they also increase the movement of exchange rates and add a substantial portion of risk to the overall investment decision and portfolio diversification process. Studying the relationship between foreign exchanges and stock markets has therefore become more complex and has received more attention.

The relationship between exchange rates and stock returns has been used in anticipating the future flows for each other by investors. In addition, the changes of exchange rates directly influence the international competitiveness of firms, given their impact on input and output price (Joseph, 2002). The increasing world trade and capital movements support exchange rates as one of the main determinants of business profitability and equity prices, according to Kim (2003).

"Flow-oriented" and "Stock-oriented" models might show the existence of relationship between stock prices and exchange rates. Flow models point out that the exchange rates is determined largely by a trade balance performance. Dornbusch and Fisher (1980) assumed that a country's current account and trade balance performance are two important factors of exchange rates determination in the Flow-oriented models. Stock prices and exchange rates are hence positively related. Stock price, which expresses a present value of future cash flows of firms, should be adjusted to the economic perspectives. Thus, models of flow oriented examine a positive relationship between exchanges rates and stock prices. They show the direction of causation running from exchange rates to stock prices. For instance, domestic currency depreciation makes the local firms more competitive. It means that their costs of exports are cheaper in international trade comparison. Higher exports are leading to higher incomes and increase firms' stock prices. On the other hand, Stock-oriented models emphasize the capital account as the major determinant of exchange rates. These models often distinguish on the monetary models. In literature, Frankel (1983) found a negative relationship between stock prices and exchange rates with portfolio balance models. He concluded that stock prices have impact on exchange rates. According to the monetary approach, Gavin (1989) concluded that there is no relationship between two above-mentioned variables except that exchange rates and stock prices are influenced by some common factors.

There are some literatures study the causal relationship between exchange rates and stock prices of other countries. In particular, Abdalla and Murinde (1997) gave the results for India, Korea and Pakistan, which suggested the effect of exchange rates on stock prices. However, the stock prices in turn Granger-cause exchange rates in the case of the Philippines. The findings of this relationship in foreign exchange and stock exchange markets lend great significance in policy matters. Pan *et al.* (2007) found that the daily exchange rates Granger-cause daily stock prices based on the data from seven East Asian countries over the period 1988 to 1998, namely Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand. Their signal showed that the impact was stronger after the Asian currency Crisis.

In the difference, this paper will focus mainly on finding the direction of the interdependence of exchange rates and stock prices between Viet Nam and the U.S, with the expectation that these empirical findings can give out the useful information to the policy makers. I examine the impact Vietnam (VND) and the U.S (USD), using USD converts to VND for foreign exchange rates. The purpose in using USD/VND for foreign exchange rates is to examine the direct shock from the US to Vietnam. From this method, the paper determines and proves that there is directional causal relationship between USD/VND for foreign exchange rates. This study also conducts an in-depth analysis on how the exchange rates of both countries are related to the stock prices (vice versa). If interest rates are rising, both businesses and consumers will cut back on spending. This will cause earnings to decrease, stock prices to drop, and national economy to fall. According to risks of national economy, government should issue policies to stabilize the economy, to protect investor's profits, to save stock market. In addition, the main concern of domestic economic policies is to stabilize stock market when there is a lead of stock market to exchange market.

This paper attempts to examine how changes in exchange rates and stock prices are related to each other over the period January 2005-December 2015 based on daily data. Go further, the study aims to investigate the relationship between exchange rates (USD/VND) and stock prices (Vietnam's stock price, namely Vn-index) in the long-run by employing Johansen's multivariate co-integration test, as well as to study the dynamic causal relationship between these two variables and to examine the momentum of adjustment in this causal relationship through variance decompositions. The organization of the paper is done as follows: Section 2 contains a brief literature review. Section 3 is Theoretical framework. Methodology and empirical results are presented in Section 4 and 5 respectively. Concluding remarks take place in Section 6.

2. LITERATURE REVIEW

According to the reports on financial crisis, various studies have studied the relationship between stock prices and exchange rates for both developed countries and developing countries. The empirical causal relationship between exchange rates and stock prices is still debated by many researchers, market regulators and policy-makers, because of its relevant for policy implications. In fact, investors, who invest directly into share markets and financial markets, are interesting in the interaction between the exchange rates and stock prices, which can create profit for their investments.

Current studies have used Granger causal relationship between exchange rates and stock markets. The results indicate that traditional and portfolio approaches are supportive evidences. Abdalla and Murinde (1997) found that exchange rates lead stock prices in India, Korea, Pakistan, but the result of the Philippines pointed out that stock prices Granger cause exchange rates. Hatemi and Irandoust (2002) found that stocks market changes lead to foreign exchange market in Sweden. Bahmani-Oskooee and Sohrabian (1992); Nieh and Lee (2001) failed to show the relationship between the exchange rates and the stock market in the long-run. In another study, Granger *et al.* (2000) found that whether falling currency led to lower stock prices or whether decreasing stock prices led to depreciating exchange rates during the Asian Crisis of 1997. They did not only find that a strong trend between exchange rates and stock prices, but also showed that the causality was a unidirectional in some cases and bidirectional in the others, from data of Hong Kong, Malaysia, Singapore, Thailand, Taiwan, Indonesia and Japan. Nieh and Lee (2001) examined that there is no long-run equilibrium relationship between stock prices and exchange rates in the G-7 countries, and short-run significant relationship has only been found for one day in certain G-7 countries, but no significant correlation in the United States. These results may be explained by economic stages, government policies, and expectation patterns.

Bahmani-Oskooee and Sohrabian (1992) and Granger *et al.* (2000) focused on the importance of the portfolio approach to examine the trends between stock prices and exchange rates. These suggest that a higher stock price increases the domestic wealth of investors, facilitating a rise in the demand for money. It may be explained that the rise (decline) of stock prices would lead to an appreciation (depreciation) in exchange rates. In addition, foreign investment flows in domestic equities could boost over time due to benefits of international diversification that foreign investors would earnings. Moreover, changes in stock prices may effect on exchange rates and money demand because investors' wealth and liquidity demand could depend on the signal of the stock market.

The asset market approach, at other extreme, examines no relationship at all between exchange rates and stock prices as it treats exchange rates as an essential part of the price of an asset in terms of foreign currency. The main elements that change current exchange rates may not be the same for future exchange rate movements (for install, currently exchange rate movement may be affected by performance of exports of a country, but in some future year exchange rates may be affected by some sudden supply shock, political events, productivity loss, war, stock market crash, hyperinflation or by other policy variables). Thus there should not be any causal relationship between these two

above variables, by Muhammad and Rasheed (2003).

In retrospect of the literature, a number of hypotheses support the existence of a causal relation between stock prices and exchange rates. For instance, 'goods market approaches', Dornbusch and Fisher (1980) suggested that changes in exchange rates affect the competitiveness of a firm, wherein the fluctuations in exchange rates affect value of the its earnings and cost, which this firm borrow in foreign currencies to fund its operations, and hence affect its stock prices. Ma and Kao (1990) explained the differences among countries by the nature of their economies, primarily by the export or import orientation. Ajayi and Mougoue (1996) found significant interactions between foreign exchange rates and stock markets for eight countries by using daily data from April 1985 to July 1991. Their findings found that an increase in aggregate stock prices has a negative short-run effect on local currency value because of inflation expectations, but the rise in domestic stock prices induces local currency appreciation in the long-run.

3. THEORETICAL FRAMEWORK

The theoretical explanations on whether exchange rates Granger-cause the stock prices or vice versa have been attempted through traditional and portfolio approaches. According to the traditional approach, changes in exchange rates lead changes in stock prices and vice versa for the latter. From the view of traditional approach, the appreciation (depreciation) of local currency increase (decrease) indebtedness in foreign currency and increase (decrease) in production cost, particularly in developing economies. Developing economies means that the country's production is relying greatly on imported raw materials. A simple explanation is that appreciation (depreciation) of the exchange rates affects the performance of firms on domestic as sell as international markets, and this in turn affects the share price of the firm (Aggarwal, 1981).

Portfolio balance approaches focus on the role of capital account transaction. Exchange rates are determined by market mechanism as like all commodities. In the portfolio approach, rising (failing) of the stock prices would attract capital flows from foreign investors which may cause an increase in the demand for a country's currency. A rise (fall) in stock prices will change an appreciation (depreciation) in exchange rates due to an increase in the demand (supply) of local currency. In other words, an exogenous increase in domestic stock prices will create an increase in domestic wealth and this, in turn, will result in an increase in the demand for money, thus an increase in interest rates. High interest rates will cause capital inflows resulting in an appreciation of the domestic currency (Krueger, 1983).

4. DATA AND METHODOLOGY

4.1. Data

The daily data for exchange rates and stock prices are retrieved from Hochiminh Stock Exchange (HOSE) and Oanda site, covering the sample period from January 4, 2005 to December 31, 2015. The closing stock price used in this study covers the Vn-index for Vietnamese stock market. The exchange rates data are end-of-period nominal exchange rates using USD/VND exchange rates. All the series are transformed into natural logarithm form. To examine the impact of financial crisis (2007-2008) on the relationship of the variables on these two countries, sample period that is divided into two sub periods that covers from 4 January 2005 to 3 December 2007 (pre-crisis) and 25 February 2009 to 31 December 2015 (post-crisis).

4.2. Normality Test

The Jarque-Bera (JB) test (Gujarati, 2003) is examined whether stock returns and exchange rates individually follow the normal probability distribution. The JB test of normality is an asymptotic, or large-sample, test. This test uses the skewness and kurtosis measures and uses the following test statistic:$JB = n [S^2 /6 + (K-3)^2/24]$

Where n = sample size, S = skewness coefficient, and K = kurtosis coefficient. For a normally distributed variable, S = 0 and K = 3. Therefore, the JB test of normality is a test of the joint hypothesis that S and K are 0 and 3 respectively.

4.3. Unit Root Test

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests have been examined for unit roots and evaluated the robustness of the integration properties of exchange rates and stock prices. This paper firstly tests the stationary and the order of integration of the variables, at levels as well as first differences. More specifically, this paper tests whether SP and EX are integrated of order zero, I(0), that is, whether they are stationary. This was achieved by performing the ADF test, based on a standard regression with a constant and a time trend as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 T + \alpha_2 Y_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta Y_{t-1} + \varepsilon_t \quad (1)$$

where α_2 = p-1, Δ= the first difference operator, T = time trend and $\mathcal{E}_t$ = white noise error. The lag length k is selected based on Akaike Information Criterion (AIC) so that all the residuals $\mathcal{E}t$ is white noise. The null hypothesis is that Y_t has unit root (non-stationary), that is H_0: α_2=0, versus the alternative hypothesis that Y_t is stationary or H_1: α_2<0. The test is done by MacKinnon (1996) test statistic at the 1% and 5% significant levels.

4.4. Johansen's Approach for Co-Integration

This paperexamined the co-integration between the exchange rates and stock prices by using the maximum-likelihood approach of Johansen and Juselius (1990). This test is appropriated for investigating the number of co-integrating relations among the involved variables involved. In most previous studies the variables are integrated of the same order. The results of the test maybe sensitive to the lag length. The most common procedure is to estimate a vector auto-regression using the indifference data. Then use the same lag-length tests as in a traditional VAR. Estimate the model and determine the rank of π.

The Johansen (1991) model can be written in error-correction form, as follow:

$$\Delta Y_t = \delta + \sum_{i=1}^{k-1} \Gamma_1 \Delta Y_{t-1} + \Pi Y_{t-k} + u_t \quad (2)$$

Where Y_t is a column vector of the n variables, Γ and Π represent the coefficient matrices, Δ is a difference operator, and δ is the constant. If Π has zero rank, then there is no linear combination that is stationary between the variables. However, if Π is of rank $r > 0$, there are r possible linear combinations. Π can then be decomposed in to two matrices, α and β, that is $\Pi = \alpha\beta'$. In this representation, β contains the coefficients of the r co-integrating vectors that render $\beta' Y_t$ stationary, even though Y_t is non-stationary, and α contains the speed adjustment coefficients. Before performing the JJ approach, the model has to be specified with regard to the inclusion of a constant or a trend, and the number of lags. It is unlikely that a time trend would be necessary for most financial markets, however, since there is some trend in the data (see Figure 1 to 4), a constant is included. The Akaike Information Criterion (AIC) is used to determine the number of lags for each series. Given that stock prices and exchange rates tend up-downward over time, a linear deterministic trend is assumed for the tests.

4.5. Causality Test

This step tests the causality between stock prices and exchange rates, using Toda and Yamamoto (1995) procedure. The Toda and Yamamoto (1995) procedure suggests the determination of the d-max, i.e., the maximal order of integration of the series in the model we suspect might occur in the process, and to intentionally over-fit the

causality test underlying model with additional d-max lags. So that the VAR order is now p=k+d-max, where k is the optimal lag order. The coefficient matrices of the last d-max lagged vectors in the model are ignores (since these are regarded as zeros), and we can test linear or nonlinear restrictions on the first k coefficient matrices using the standard asymptotic theory.

4.6. Variance Decompositions (VDCs)

This study practices the variance decompositions (VDCs) approach as analytical tool. VDCs analysis is named as out-of-sample causality test, which used to provide an indication of the dynamic properties of the system. VDCs analysis is a convenient method to partition the variance of forecast error of a certain variable into proportions attributable to innovations or shocks in each variable in the system. A vector auto-regression (VAR) can be written as a vector moving average (VMA). Where, equation (3) can be iterated backward infinite times to obtain equation (4).

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i \Delta X_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta Y_t = \mu_0 + \sum_{j=0}^{\infty} \alpha_1^j \varepsilon_{t-j} \quad (4)$$

Where $\mu = (i + \alpha_1 + \alpha_2 + \ldots)$. α_0 is the unconditional mean of X_t. The fact in equation (4) is the VMA representation of Equation (3) in that variables (Y_{it}) are expressed in terms of the current and past values of the various types of shocks (ε_{it}). The VMA representation of equation (3) is an essential feature of Sims (1980) methodology which allows a tracing out of the time path of the various shocks on the variables contained in the VAR system.

5. EMPIRICAL RESULTS

5.1. Normality Test

According to normality test was applied on two series to determine the nature of their distributions. For this purpose, Jarque-Bera statistics were computed, which are shown in Table 1 and Table 2 along with descriptive statistics for the two series. Skewness value 0 and kurtosis value 3 indicate that the variables are normally distributed. Chou (1969) showed the skewness coefficient in excess of unity is taken to be fairly extreme. Parkinson (1987) found that the high or low kurtosis value indicates extreme leptokurtic or extreme platykurtic. From the obtained statistics in pre-crisis and post- crisis, the result point out that both the variables are non-normally distributed, as the skewness values for Vn-index and exchange rates are 0.611022 (-0.918382) and -0.935778(-1.073447), respectively and the kurtosis values are 2.408942(4.606558) and 2.660799 (3.072218), respectively.

Table-1. Descriptive Statistics of Pre- crisis period

	Exchange rates	Vn-index
Mean	9.661053	5.968661
Median	9.667132	5.784901
Maximum	9.677966	7.065357
Minimum	9.616139	5.44846
Std. Dev.	0.014309	0.450362
Skewness	-0.935778	0.611022
Kurtosis	2.660799	2.408942
Jarque-Bera	81.40009	41.46173
Probability	0	0
Sum	5216.968	3223.077
Sum Sq. Dev.	0.110358	109.3234
Observations	540	540

Source: Author's calculation based on the data from HOSE

Table-2. Descriptive Statistics of Post crisis period

	Exchange rates	Vn-index
Mean	9.912712	6.183919
Median	9.940557	6.201523
Maximum	10.01949	6.462717
Minimum	9.730181	5.486869
Std. Dev.	0.068293	0.167543
Skewness	-1.073447	-0.918382
Kurtosis	3.072218	4.606558
Jarque-Bera	328.9658	424.5225
Probability	0	0
Sum	16960.65	10580.69
Sum Sq. Dev.	7.975266	48.0008
Observations	1711	1711

Source: Author's calculation based on the data from HOSE

5.2. Unit Root Test

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests' results are presented in Table 3 and Table 4, respectively. Both of the test shows that all variables are stationary at first difference at 1% significance level. The ADF and PP test statistics are able to reject the null hypothesis at 1% significance level for all series in first-difference form. Putting all these results into perspective, all the variables are integrated of order one or I(1), and allow this paper to proceed with the co-integration tests.

Table-3. Result of the Augmented Dickey-Fuller test (H0: unit root, HA: no unit root)

Variable	Levels		1st difference	
	No trend	Trend	No trend	Trend
Pre-crisis period				
Exchange rates	-3.985936(3)***	-4.445525(3)***	-9.644916(13)***	-9.635467(13)***
Vn-index	1.312641(5)	-1.184488(5)	-8.066494(4)***	-8.292983(4)***
Post crisis period				
Exchange rates	-2.104019(21)	-2.055645(21)	-8.904177(20)***	-8.997801(20)***
Vn-index	-4.05057(1)***	-3.996395(1)***	-34.29688(0)***	-34.32923(0)***

Source: Our own

Table-4. Results of the Phillips-Perron test (H0: unit root, HA: no unit root)

Variable	Levels		1st difference	
	No trend	Trend	No trend	Trend
Pre-crisis period				
Exchange rates	-13.92157(14)***	-15.31325(14)***	-68.30346(17)***	-68.21911(17)***
Vn-index	1.720785(11)	-0.98380(11)	-19.83805(11)***	-19.83552(10)***
Post crisis period				
Exchange rates	-2.210934(17)	-2.783104(8)	-93.36759(22)***	-94.5016(23)***
Vn-index	-3.968064(14)**	-3.922332(14)*	-34.44731(13)***	-34.4346(12)***

Source: Author's calculation based on the data from HOSE

5.3. Johansen-Juselius'sApproach for Co-Integration

According to Table 5, the results suggest the presence of co-integration among the variables in both sample periods. Evidence from both trace and maximal eigenvalue test suggests that there is at most one and at most two co-integrating vector as the null hypothesis is reject in pre-crisis and post crisis. In the pre-crisis period the t- statistic of

trace test is 47.73994 (3.079874) and it is significant at both 1% and 5%. In the post-crisis period the t- statistic of trace test is 22.03918 (5.28845), and it is statistic significant at 5% and 10% respectively.

Table-5. Johansen-Juselius Co-integration Tests

Hypothesized No. of CE(s)	Trace Statistic	Max-Eigen Statistic	Critical Value 5%	
			Trace	Max-Eigen
Pre- crisis period				
r=0	47.73994	44.66007	15.49471***	14.2646***
r<=1	3.079874	3.079874	3.841466**	3.841466**
Post crisis period				
r=0	22.03918	16.75073	15.49471**	14.2646*
r<=1	5.28845	5.28845	3.841466*	3.841466*

Note: *, ** and *** denote significant at 10%, 5% and 1% level

Source: Author's calculation based on the data from HOSE

5.4. Causality Test

The results of tests of restrictions from a VAR estimated by the procedure prescribed by Toda and Yamamoto (1995) are summarized in Table 6.

For the pre-crisis period, the results show that exchange rates does not cause stock prices whereas stock prices is found to lead exchange rates at 1% level. This indicates that it is unidirectional causality relationship between stock prices and exchange rates. It means that pre-crisis case in Vietnam supports the portfolio approach.

Results for post crisis period, the results show that exchange rates found to lead stock prices at 10% level. There is a unidirectional causality from exchange rates to stock prices in Vietnam. This result supports the traditional approach in post crisis in Vietnam.

Table-6. Test for Granger-causality applying the Toda-Yamamoto modified Wald test

Dependent variable	Independent variable	
	Vnindex	Exchange rates
	F-statistic	
Pre-crisis period		
Vn-index	-	3.839173
Exchange rates	16.61487***	-
Post-crisis period		
Vn-index	-	8.978261*
Exchange rates	0.823333	-

Source: Author's calculation based on the data from HOSE

5.5. Variance Decompositions (VDCs)

The variance decomposition results are presented in Table 7 for pre-crisis and Table 8 for post-crisis, for eighteen different accumulative days to 500 days.

In the short run of pre-crisis period, that is 30 days, the exchange rates shock account for 98.92 percent variation of the fluctuation in exchange rates, innovation to Vn-index can cause 1.07 percent in exchange rates. VDCs explained that Vn-index shocks itself for 95.09 percent variation of the fluctuation in stock prices and shock to exchange rates is 4.90 percent in stock prices in 30 days. However, in the long-run, that is 500 days, the result explained that the shock to exchange rates can contribute 36.83 percent variation of the fluctuation in exchange rates, impulse to Vn-index can cause 63.16 percent in exchange rates. In addition, the results suggest that the shock to Vn-index can contribute 5.89 percent in exchange rates, and 94.1 percent variation of the fluctuation in stock prices.

Table-7. Decomposition of variance for pre-crisis model

Period	Variance Decomposition of Exchange rates		Variance Decomposition of Vn-index	
	Exchange rates	Vn-index	Exchange rates	Vn-index
1	100	0	0.063052	99.93695
30	98.92889	1.071106	4.909632	95.09037
60	97.24427	2.755727	5.465499	94.5345
90	95.25084	4.749159	5.644968	94.35503
120	92.9116	7.088398	5.732203	94.2678
150	90.19301	9.806992	5.78289	94.21711
180	87.06885	12.93115	5.815432	94.18457
210	83.52466	16.47534	5.837682	94.16232
240	79.56235	20.43765	5.853556	94.14644
270	75.20438	24.79562	5.865228	94.13477
300	70.49654	29.50346	5.874003	94.126
330	65.50838	34.49162	5.88071	94.11929
360	60.33058	39.66942	5.885901	94.1141
390	55.0692	44.9308	5.889959	94.11004
420	49.83731	50.16269	5.893156	94.10684
450	44.74553	55.25447	5.895688	94.10431
480	39.89281	60.10719	5.897705	94.1023
500	36.83102	63.16898	5.898819	94.10118

Source: Author's calculation based on the data from HOSE

VDCs, which is useful in quantifying causal linkages, is employed to examine the post-crisis analysis. The results are shown in Table 5.2. Over post crisis sample, the results indicate that the exchange rates in term of its relative variance being explained by its own innovations increase from 36.83% in pre-crisis to 96.88% in post-crisis in the long-run. It also pointed out that innovation to Vn-index decreased from 63.16 percent in exchange rate to 3.11% in post crisis.

Table-8. Decomposition of variance for post-crisis model

Period	Variance Decomposition of Exchange rates		Variance Decomposition of Vn-index	
	Exchange rates	Vn-index	Exchange rates	Vn-index
1	100	0	0.083965	99.91604
30	99.95315	0.046846	0.26069	99.73931
60	99.75949	0.240514	0.174828	99.82517
90	99.47733	0.522671	0.235201	99.7648
120	99.1584	0.841603	0.417631	99.58237
150	98.83503	1.164974	0.689841	99.31016
180	98.5264	1.473597	1.018208	98.98179
210	98.24301	1.756988	1.372409	98.62759
240	97.98968	2.010315	1.728096	98.2719
270	97.76769	2.232313	2.067741	97.93226
300	97.57611	2.423889	2.380198	97.6198
330	97.41281	2.587186	2.659569	97.34043
360	97.27503	2.724975	2.903865	97.09614
390	97.15975	2.840251	3.113759	96.88624
420	97.06401	2.935992	3.291565	96.70844
450	96.98499	3.015007	3.44047	96.55953
480	96.92014	3.07986	3.564008	96.43599
500	96.88363	3.116365	3.634023	96.36598

Source: Author's calculation based on the data from HOSE

6. CONCLUSION

This paper examines the dynamic linkages between exchange rates and stock prices for exchange rate (USD/VND) and Vn-index (Vietnam). As many previous studies suggested the existence of significant interactions between the two markets, this paper found the results which support for both of traditional approach and portfolio approach. The major finding is robust with respect to various statistical tests, including the Johansen-Juselius co-integration test, the Granger causality test, and a VDCs analysis.

According to results, this paper finds that Granger causality is unidirectional causality between exchange rates and stock prices. In the case of pre-crisis, this paper supported the theory of the portfolio approach, which suggests a unidirectional causal relationship from stock prices to exchange rates. However, this paper also shown the traditional approach was supported in post crisis case.

This study only focuses on the linear relationship, thus, further study could be to predict the non-linear trends between two above variables, and present effect of policy events in post crisis.

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