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Araştırma Makalesi

An Analysis on the Relationship between Exchange Rate and Stock Prices in the Short-Run and Long-Run: NARDL Model Results for the Kuwait Economy[1]

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Abstract

The aim of this paper is to search for a possible asymmetric effect of the exchange rate on the stock market by Nonlinear Autoregressive Distributed Lag Model using the data spanning June 2002 – March 2018 for an oil producer country, Kuwait, while controlling consumer prices, interest rate, money supply and oil prices. Results are statistically preferable compared to linear models and there is a weak form of efficiency in the stock market. Appreciation of the local currency has a negative effect on stock prices in the long-run but depreciation has not a statistically significant effect so there is a case of *long-run asymmetry*. However, in the short-run, the exchange rate has no statistically significant effect on stock prices and there is no *asymmetric causality*.
Keywords: Exchange Rate, Stock Price, NARDL, Kuwait.
JEL Classification Codes: F31, E44.

Döviz Kuru ve Hisse Senedi Fiyatları Arasındaki İlişkinin Kısa ve Uzun Dönemde İncelenmesi: Kuveyt Ekonomisi için NARDL Modeli Bulguları

Öz

Bu çalışmanın amacı Doğrusal Olmayan Gecikmesi Dağıtılmış Otoregresif Model ile petrol üreticisi Kuveyt ekonomisinde döviz kurunun hisse senedi fiyatları üzerindeki olası asimetrik etkilerini Haziran 2002 – Mart 2018 tarihleri arasında tüketici fiyatları, faiz oranı, para arzı ve petrol fiyatları kontrol edilerek araştırmaktır. Bulgular doğrusal modellerle karşılaştırıldığında istatistiki olarak tercih edilebilirdir ve hisse senedi piyasasında zayıf türde etkinlik söz konusudur. Yerli paranın değer kazanması, uzun dönemde hisse senedi piyasasında negatif etkiye yol açarken, yerli paranın değer kaybetmesinin etkileri istatistiki olarak anlamlı bulunmamıştır, dolayısıyla *uzun dönem asimetriden* söz edilebilir. Ancak kısa dönemde döviz kurunun hisse senedi fiyatları üzerinde istatistiki olarak anlamlı bir etkisi yoktur ve *asimetrik nedensellikten* bahsedilemeyecektir.
Anahtar Kelimeler: Döviz Kuru, Hisse Senedi Fiyatı, NARDL, Kuveyt.
JEL Sınıflandırma Kodları: F31, E44.

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1. Introduction

The efficient market hypothesis claims that the other macroeconomic and financial variables do not have any effect on stock prices, and behavior dynamics relies on residual terms. To test this hypothesis, within the glaring literature, there are papers trying to estimate the randomity or effects of the macro-financial variables both using linear and non-linear models. Symmetric models benefit from explanatory variables such as exchange rate, interest rate, inflation, money supply, oil price, commodity prices, output and news effect (see Bahmani-Oskooee and Sohrabian, 1992; Abdala and Murinde, 1997; Ibrahim and Aziz, 2003 and other examples within Table 1). Considering the nonlinear models, and specifically the exchange rate, studies estimate paramaters using variety of techniques. These papers explore asymmetric effects of the exchange rate on stock prices (see Shin et al., 2014; Koutmas and Martin, 2003; Ismail and Bin Isa; 2009 and other cases in Table 2).

The contribution of this paper is to estimate effects of the exchange rate on stock prices for an oil producer Kuwait economy using the data spanning June 2002 – March 2018 by the Classical Linear Regression (CLR) Model, Autoregressive Distributed Lag (ARDL) Model and the Nonlinear Autoregressive Distributed Lag (NARDL) Model and to compare their findings. We found it essential to analyze the Kuwait economy since during the period from January 2003[2] to May 2007, Kuwaiti Dinar (KD) was pegged to the United States dollar (USD) by Central Bank of Kuwait (CBK). Benefiting from this methodology would be interesting for Kuwait since following May 2007, Kuwait Dinar was pegged against an undisclosed weighted basket of foreign currencies.[3] As shown in Figure 1 during these dates, the exchange rate fluctuated substantially unlike traditional

[2] See Decree No. 266/2002. Kuwati Dinar (KD) had pegged against the US dollar on January 5, 2003 until May 19, 2007 by the Decree No. 266/2002 indicating the margins of upper limit with +3.5% and lower limit with -3.5% (Press Releases, 2003). Note that Central Bank of Kuwait (CBK) aimed to stabilize its domestic currency against foreign currencies by the margin that allows to anticipate the highest and lowest movements in the exchange rate. This foreseeing advantage mitigates brittle unspecified threads around the exchange rate and also adopted by Facebook's Libra cryptocurrency which had been planned to be circulated in the market within the year 2020 (The Economist, 2019, p. 9). Since Kuwait has high reserves of oil and buys US bonds which boost confidence to the currency; Facebook also aims to defend the Lira by zero risk Treasury bonds. Note that if the foreign currency reserves of the country are not adequate to mitigate external shocks, pure fixed exchange rate regime may collapse as in the case of Turkish 2000 Currency Crisis. In 2000, Central Bank of the Republic of Turkey (CBRT) aimed to adopt a fixed exchange rate regime until July 2001 and would turn to pegged exchange rate regime that would have an increasing band until December 2002 (Arat, 2003, p.44-45). CBRT could not adopt pegged exchange rate regime but taking into account this economic forecasting failure, starting from 2002, CBRT has started to adopt managed floating exchange rate regime and accumulate foreign currency reserves to defend the economy against the shocks and obtained flexibility.

[3] See Decree No. 147/2007. On May 20, 2007 CBK announced that they would infringe and turn back to the policy adopted before January 05, 2003 and pegged KD to a special basket of currencies again (Press Releases, 2007).

fixed exchange rate regime and its volatility seems high that allowed us to utilize it in our analysis.

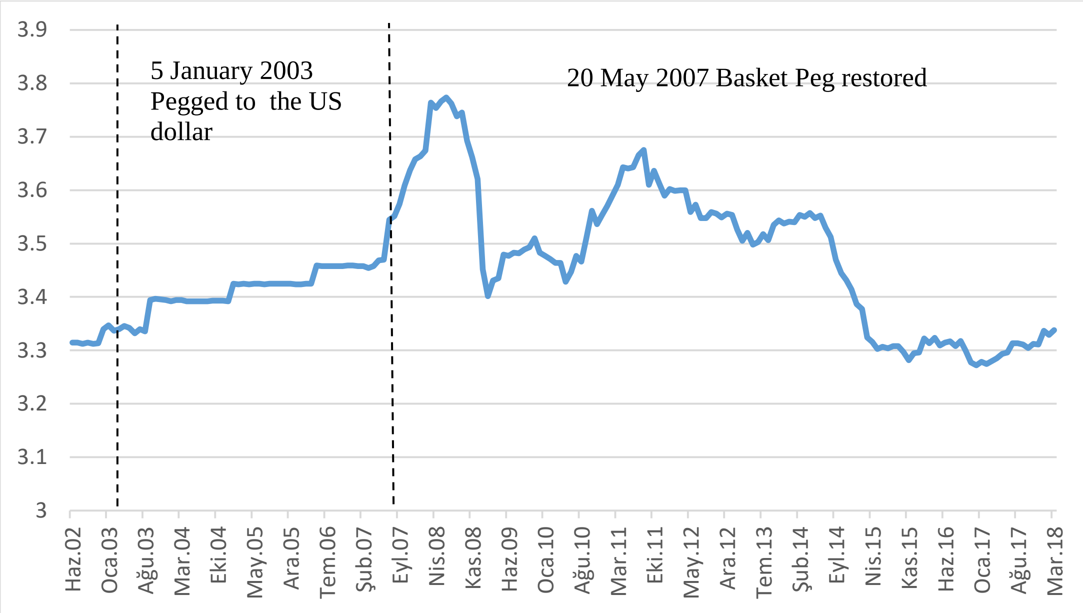

Figure 1: Evolution of the KD Exchange Rate 2002:06 – 2018: 03

Source: International Financial Statistics, "IMF Data," 2019. [Online]. Available at the website https://data.imf.org/IFS and author calculation. *Notes:* The price of the dollar against one dinar.

The aim of this paper is to focus on the prompting role of the exchange rate on stock prices for an oil-producing country, Kuwait, breaking it into negative and positive magnitudes and investigate for a possible asymmetry. The stock market in Kuwait has thriving premier, main and market auctions segments. Kuwait economy is highly depended on oil production and export, and there is a need for auspices against the volatility of oil price changes. Depreciation of the local currency is expected to increase profits of these firms thus the total income of the economy may surpass a certain level, which is consistent with the Gordon Growth Model where the expected constant growth rate in dividends would increase following the ascending export of oil (see Mishkin, 2013 for the Gordon Growth Model, p. 185-188). The following section is for the brief literature review and the next describes the data and methodology. The fourth section is devoted to results. The fifth section discusses results obtained from linear and nonlinear ARDL models, and the last section concludes the paper.

2. Literature Review

When we go over the previous literature about the effects of macroeconomic and financial variables on stock prices, we observe two broad methodological aspects as partially mentioned in the introduction section. The first category benefits from symmetric methods such as Engle Granger (EG), Johansen Cointegration (JH) Tests for integrated series and Granger Causality (GR) and Vector Autoregressive Model (VAR) for the ones escalating around the mean more frequently. Table 1 summarizes some of these papers' methods and stresses explanatory variables in the last column. As seen here, specifications for developing countries benefit more from the exchange rate variable that is essential for their economic dynamics and external balance. It has substantial role in the macroeconomic stability where some central banks try to control it for external and near term mutual affects. Basic macroeconomic variables such as the interest rate, the inflation and the money supply are highly inherited within models as explanatory variables. Since stock prices reflect the future movements and expectations of the overall economy, it is considered within signaling and leading indicators. Economic literature and contemporary observations consider these macroeconomic variables to test random walk or efficient market hypothesis and determine its level of weakness.

Table 1: Symmetric Models Used in the Studies

Study	Method	Abbreviation	Explanatory Variable
Bahmani-Oskooee and Sohrabian (1992)	Engle and Granger	EG	Exchange Rate
Abdalla and Murinde (1997)	Engle and Granger	EG	Exchange Rate
	Granger Causality Test	GR	Exchange Rate
Ibrahim and Aziz (2003)	Johansen Cointegration Model	JH	Exchange Rate
	Vector Autoregressive Model	VAR	Exchange Rate
Pan et al. (2007)	Vector Autoregressive Model	VAR	Exchange Rate
	Johansen Cointegration Model	JH	Exchange Rate
	Granger Causality Test	GR	Exchange Rate
Huy (2016)	Johansen Cointegration Model	JH	Exchange Rate
	Granger Causality Test	GR	Exchange Rate

Table 1: Symmetric Models Used in the Studies (continued)

Study	Method	Abbreviation	Explanatory Variable
Sahin (2016)	Engle and Granger	EG	Exchange Rate
	Johansen Cointegration Model	JH	Exchange Rate
	Classical Linear Regression	CLR	Exchange Rate
	Smooth Transition Regression	STR	Exchange Rate
Turksoy (2017)	Autoregressive Distributed Lag Model.	ARDL	Exchange Rate
Inegbedion (2012)	Cochran-Orcutt Autoregressive Model	CO	Interest Rate
Parsva and Lean (2011)	Johansen Cointegration Model	JH	Inflation
	Granger Causality Test	GR	Inflation
Sahin (2011)	Vector Autoregressive Model	VAR	Money Supply
Boonyanam (2014)	Vector Error Correction Model	VAR	Money Supply
	Granger Causality Test	GR	Money Supply
Basher et al. (2012)	Structural Vector Autoregressive Model	SVAR	Oil Price
Sahin (2014)	Quantile Regression	QR	Oil Price
Groenwold and Paterson (2013)	Johansen Cointegration Model	JH	Commodity Prices
	Granger Causality Test	GR	Commodity Prices
Al-Sharkas (2004)	Johansen Cointegration Model	JH	Output
Arslan (2017)	Event Study	ES	News Effect

In the past, symmetric methods were popular among researchers but recent papers benefit more from nonlinear techniques. Table 2 presents some of these methods using the exchange rate as an explanatory variable. Markov-Switching and threshold spirit were included to traditional linear models or nonlinearity is tried to be captured by asymmetry coefficients. This paper adopted the latter one because of its advantages which will be accounted for in the following section. Exchange rate and its role through nonlinear concept is applied to both developed and developing countries. That takes attention since depreciation and appreciation of the local currency may change the behavior in the stock market and investors may want to observe the positive and negative incidences. If nonlinearity is valid and could not be rejected, they would consider it in their asset price forecasts. Resistance and support points would be watched with this substitute of the local currency. Especially for the countries dealing with dollarization, observation may turn to a concern. Besides for oil producing countries another variable is incorporated to the situation where its price shifts the equilibrium where we may determine an unstable balance.

Table 2: Asymmetric Models using Exchange Rate as an Explanatory Variable

Study	Method	Abbreviation	Countries
Shin et al. (2014)	Nonlinear Autoregressive Distributed Lag Model	NARDL	US Canada Japan
Koutmas and Martin (2003)	Asymmetric Exposure Model	AEM	Germany Japan UK US
Ismail and Bin Isa (2009)	Markov-Switching Vector Autoregressive Model	MS-VAR	Malaysia
Yau and Nieh (2009)	Threshold Error Correction Model	TECM	Taiwan Japan
Cuestas and Tang (2015)	Nonlinear Autoregressive Distributed Lag Model	NARDL	China
Bahmani-Oskooee and Saha (2016)	Nonlinear Autoregressive Distributed Lag Model	NARDL	US
Cheah, Yiew and Ng (2017)	Nonlinear Autoregressive Distributed Lag Model	NARDL	Malaysia

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This literature section briefly provided widely used methods and their applied areas for several countries and explanatory variables. Within the discussion section, results of other papers are collated and debated with this study's findings. So the literature review section did not retell findings of these papers.

3. Data and Methodology

Intending to avoid omitted variable bias and do not fell into gap of correlation between an explanatory variable and residuals (see Greene, 2012, p. 219), we included all possible variables to explain variability in stock prices. Monthly data is collected for the Kuwait Stock Exchange Index (KSE) premier market[4], spot exchange rates as US dollars against one Kuwaiti dinar denoted by (*EXC)*[5], Consumer Price Index (*CPI*), Money Supply (*M2*), Crude Oil Prices (*OILP*) are measured in dollars per barrel[6], discount rate which is the monetary policy rate (*INT*) for Kuwait.

Table 3: Source of the Variables for ARDL and NARDL Model

Variable	Definition	Source	Time Span
SP	Kuwait Stock Exchange Index (KSE)	Investing	June 2002-March 2018
EXC	Exchange Rates, Domestic Currency Per US Dollar, Period Average Rate	International Financial Statistics	June 2002-March 2018
M2	Money Supply, M2, Domestic Currency	Central Bank of Kuwait	June 2002-March 2018
CPI	Prices, Consumer Price Index, All items	International Financial Statistics	June 2002-March 2018
OILP	Crude Oil Price	Energy Information Administration	June 2002-March 2018
INT	Central Bank Policy Interest Rate	International Financial Statistics	June 2002-March 2018

All variables are transformed into their natural logarithm forms except for the interest rate. The available data span is from June 2002 to March 2018. Table 3

[4] We used this index since it targets the best medium and high sized companies which has high liquidity.
[5] Note that we used an indirect quotations definition such as the number of dollars per currency. So an increase in the Kuwait Dinar (KDW) to United States Dollar (USD) reflects appreciation of the Kuwait Dinar.
[6] We used spot market prices of Brent oil but the results also do not change by West Texas Intermediate as utilized in Kisswani and Elian (2017) where they stress changing coefficients with a different type. We think that Brent oil price is more essential for Kuwait in terms of foreign trade.

summarizes variables used in the paper and Table 4 presents the descriptive statistics.

Table 4: Descriptive Statistics of Variables Used in Models

Statistics	*CPI*	*EXC*	*INT*	*M2*	*OILP*	*SP*
Mean	4.5672	1.2399	3.4461	9.9927	4.1528	8.8271
Median	4.5954	1.2393	2.7500	10.1344	4.1423	8.8163
Maximum	4.8314	1.3280	6.2500	10.5227	4.8882	9.6458
Minimum	4.2768	1.1855	2.0000	9.1675	3.1814	7.5942
Std. Dev.	0.1891	0.0352	1.4901	0.4461	0.4531	0.3903
Skewness	-0.2128	0.4331	0.8716	-0.5433	-0.3069	-0.6768
Kurtosis	1.5789	2.4896	2.2305	1.8507	2.1330	4.6205
Jarque-Bera	17.42***	8.01**	28.74***	19.80***	8.93**	35.29***
Probability	[0.0002]	[0.0183]	[0.0000]	[0.0001]	[0.0115]	[0.0000]
Obs	190	190	190	190	190	190

Notes: Jarque- Bera Test for normality: Null is that it is normally distributed. ***, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.

Variables in models are chosen following Chen, Roll et al. (1986), Mukherjee and Naka (1995), Ibrahim and Aziz (2003), Tian and Ma (2010), Bahmani-Oskooee and Saha (2015) except for the output since it is not available in the monthly frequency for Kuwait. Augmented Dickey-Fuller (ADF, Dickey and Fuller, 1981), Phillips and Perron test (PP, Phillips and Perron, 1988) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS, 1992) tests are used to examine the unit root and stationarity hypothesis. ADF test indicates that we cannot reject the null hypothesis of a unit root for all variables, which means that all variables are not stationary at this particular level. KPSS test also indicated that variables are not stationary at the level except for stock prices with constant. However, after taking their first differences, variables become stationary.[7]

3.1. CLR Model

CLR model is presented in Equation (1) has strict assumptions. Basically, to talk about a short-run robust relationship and reliable *t*- statistics, all variables should be stationary. On the other hand, for a pure long-run analysis such as Engle-Granger cointegration, all variables should be integrated of order one to avoid frailty.

$$SP_t = Constant + \alpha_2 EXC_t + \alpha_3 M2_t + \alpha_4 CPI_t + \alpha_5 OILP_t + \alpha_6 INT_t + \varepsilon_t \qquad (1)$$

[7] Unit root and stationarity test results will be provided if demanded.

3.2. ARDL Model

Next from the CLR model in Equation (1), the following Equation (2) is obtained that is the Long-Run Equation in an Error-Correction Model Form representing the full model which is estimated by the ARDL method. As mentioned by Bahmani-Oskooee and Ghodsi (2018), one could benefit from the short-run causality test (Granger, 1969) and the long-run causality test (Granger, 1988) but we cannot benefit from these types of the test if the order of integration of variables is variety. Pesaran et al.'s (2001) ARDL approach may be benefited for such cases.

$$\Delta SP_t = Constant + \sum_{i=1}^{m1} a_{1i}\Delta SP_{t-i} + \sum_{i=0}^{m2} a_{2i}\Delta EXC_{t-i} + \sum_{i=0}^{m3} a_{3i}\Delta M2_{t-i} + \sum_{i=0}^{m4} a_{4i}\Delta CPI_{t-i} + \sum_{i=0}^{m5} a_{5i}\Delta OILP_{t-i} + \sum_{i=0}^{m6} a_{6i} INT_{t-i} + b_1 SP_{t-1} + b_2 EXC_{t-1} + b_3 M2_{t-1} + b_4 CPI_{t-1} + b_5 OILP_{t-1} + b_6 INT_{t-1} + \mu_t \qquad (2)$$

Here Δ indicates the first difference for the natural logarithm of variables and *Constant* is also included. The number of optimal lags is denoted by *m*. Note that as mentioned by Bahmani-Oskooee and Maki-Nayeri (2019), Equation (2) does not include an error-term ε_t as in the Equation (1) and the new transformation allows one to analyze short-run and long-run parameters at the same time. μ_t is white noise residuals that are assumed to have a zero mean and a constant variance equal to one. Equation (2) allows to test both short-run and long-run effects simultaneously.

3.3. NARDL Model

Non-linear Autoregressive Distributed Lag (NARDL) is developed from ARDL specifications by Shin et al. (2014). This methodology employs partial sum decompositions to implement nonlinearity by examining the possible asymmetric effects in the long and short-run. The main advantages of NARDL model is that, one can examine the non-linear integration relationship between variables in the model with the ability to estimate both short and long-run effects. So it is superior to ARDL if the topic and data is appropriate to the methodology.

In the NARDL model, we focus on the asymmetric relationship between *EXC* and *SP* and we include other macroeconomic variables (*M2, CPI, OILP, INT*) to avoid a misspecification problem. In addition, it is easily compared with the linear version. A negative shock to *EXC* may affect *SP* more in magnitude compared with a positive shock. Therefore, in order to deal with cointegrating variables, it is more suitable to employ a non-linear model focusing on asymmetries. Lately, NARDL has become one of the best approaches to show asymmetric effects between variables. Following Shin et al. (2014) and Sahin and Berument (2019) the asymmetric long-run equation between *EXC* and *SP* is written as:

$$SP_t = Constant + \alpha_1 EXCP_t + \alpha_2 EXCN_t + e_t \quad (3)$$

Here again SP_t is stock prices, EXC_t is the nominal exchange rate (number of dollars against one dinar). $EXCP_t$ and $EXCN_t$ denote partial sums of positive and negative changes in EXC_t. *Constant*, α_1, α_2 are long run parameters, and e_t is the white noise and it follows an independent and identically distributed process with a zero mean and finite variance. *n* is the number of lags for the NARDL model. Since our concern is to test the effects of exchange rate movement, our assumption suggests that an increase and decrease in the *EXC* does not have the same influence on *SP*.

From Equation (3), the long-run relationship between *EXC* increases (appreciation of the domestic currency) and *SP* is captured by α_1 while α_2 is for the long-run relationship between *SP* and *EXC* decreases (depreciation of the domestic currency). It is further expected that increases in *EXC* affects *SP* differently in terms of magnitude compared to exchange rate decreases and thus $\alpha_2 \neq \alpha_1$. For more details about the asymmetric long-run relationship between exchange rate and stock prices one can refer to Bahmani- Oskooee and Saha (2015), Bahmani-Oskooee and Saha (2016), Saha (2017) and Cheah et al. (2017).

Values of *EPOS* and *ENEG* are created by a simple mathematical calculation provided in Equation (4). *Max* operator is just the command in the *Excel* extracting positive numbers from zeros. *Min* does the same but reckons among negative numbers.

$$\begin{aligned} EPOS_j &= \sum_{j=1}^{t} \Delta EXCP_j = \sum_{j=1}^{t} \max(\Delta EXC_j, 0) \\ ENEG_j &= \sum_{j=1}^{t} \Delta EXCN_j = \sum_{j=1}^{t} \min(\Delta EXC_j, 0) \end{aligned} \quad (4)$$

Here *POS* indicates positive changes, which reflects the appreciation of the local currency whereas *NEG* indicates negative changes, reflecting the depreciation in local currency. In order to test asymmetric relationships for short and long-terms, we benefited from Pesaran et al.'s (2001) bounds testing approach. This approach is based on the error-correction model given in Equation (5) that is modified by Shin et al. (2014).

$$\Delta SP_t = Constant + \sum_{i=1}^{n1} \beta_i \Delta SP_{t-i} + \sum_{i=0}^{n2} \lambda_i^+ \Delta EPOS_{t-i} + \sum_{i=0}^{n3} \lambda_i^- \Delta ENEG_{t-i} + \sum_{i=0}^{n4} \phi_i \Delta M2_{t-i} + \sum_{i=0}^{n5} \eta_i \Delta CPI_{t-i} + \sum_{i=0}^{n6} \delta_i \Delta OILP_{t-i} + \sum_{i=0}^{n7} \psi_i \Delta INT_{t-i} + \rho_0 SP_{t-1} + \rho_1 EPOS_{t-1} + \rho_1 ENEG_{t-1} + \rho_2 M2_{t-1} + \rho_3 CPI_{t-1} + \rho_4 OILP_{t-1} + \rho_5 INT_{t-1} + \mu_t \quad (5)$$

Using Equation (5) we can test some assumptions about the asymmetric effects of changes on stock prices. The *short-run adjustment process asymmetry* as called by Bahmani-Oskooee and Saha (2019a) will be observed if *EPOS* and *ENEG* have nonhomogeneous lag orders. If the adjustment asymmetry hypothesis is rejected, the adjustment time of *SP* to the long-run equilibrium level would be different in terms of the depreciation of the local currency and the appreciation of the local currency. See Bahmani-Oskooee and Maki-Nayeri (2019) for this interpretation. *Short-run asymmetry* that is named by Bahmani-Oskooee and Saha (2019a), for every lag *i* if the estimate of λ^+ is different than the estimate of λ^- the effect becomes asymmetric. They call *short-run cumulative asymmetry* if $\sum \lambda_i^+$ that measures the cumulative short-run effect of exchange rate increases in stock prices is significantly different than $\sum \lambda_i^-$ that measures the cumulative short-run impact of exchange rate decrease on stock prices.

Lastly, the *long-run asymmetry* will be observed as mentioned by Bahmani-Oskooee and Saha (2019a) if the normalized coefficient estimate of the *EPOS* is significantly different than the normalized coefficient estimates of the *ENEG* exchange rate. Thus long-run asymmetric effects of the exchange rate will be determined by a Wald Test for the hypothesis ($-\rho_1^+ / \rho_0 \neq -\rho_1^- / \rho_0$). This will show whether the long-run effect of *EXC* increase and *EXC* decrease on *SP* is different or not. We can also capture the asymmetric short-run effect as well as the long- run effect of *EXC* changes on *SP*. The main advantage of this error-correction model is that one can estimate both the short-run and the long-run effects of the independent variables simultaneously (see also Bahmani-Oskooee and Maki-Nayeri, 2018).

4. Empirical Results

4.1. CLR Model Results

Although we have prior information about the problematic parts of the CLR model, we estimate coefficients and report statistics to convene with ARDL and NARDL results. Table 5 presents CLR results which are estimated by the Ordinary Least Squares (OLS) method. Adjusted R^2 value is found to be 0.83 and an *F*- statistics is 190. *M2, CPI, OILP, INT* on *SP* are significant at the one percent significance level but the *p*-value for *EXC* is not statistically significant. However, the Durbin Watson statistic (DW) is equal to 0.18, which is less than the Adjusted R^2 indicating that regression may be spurious. (See Gujarati, 2011, Chapter 14). Moreover, the DW statistic is less than two and close to zero which might indicate a positive serial correlation in the series. According to ACF and LM statistics[8] test, residuals of the CLR Model[9] exhibits an autocorrelation problem. Breusch-Pagan-Godfrey[10] ARCH test[11] , White test[12], and Harvey Test[13] indicate heteroscedasticity in the residuals (see Sahin, 2018).

Table 5: CLR Model Results

Variables	Coefficient		*p*- value
Constant	3.5306	***	[0.0010]
EXC_t	0.0385		[0.9548]
$M2_t$	1.6105	***	[0.0000]
CPI_t	-2.7271	***	[0.0000]
$OILP_t$	0.2175	***	[0.0005]
INT_t	0.2052	***	[0.0000]
R^2	0.8381		
Adjusted R^2	0.8337		
Standard Error of Regression	0.1591		
Sum of Squared Residuals	4.6595		
Log likelihood Ratio	82.6733		
F- statistic	190.550	***	
p- value	[0.0000]		
Mean of *SP*	8.8271		
Standard Deviation of *SP*	0.3903		
Akaike Information Criterion	-0.8071		
Durbin-Watson Statistics	0.1822		
***Notes*: ***, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.**			

[8] Breusch-Godfrey Serial Correlation LM Test's Null Hypothesis: Residuals are serially uncorrelated.

[9] Authors will provide full tables and statistics if demanded.

[10] Breusch-Pagan-Godfrey Test has a null hypothesis of no heteroscedasticity and it is tested by a Lagrange Multiplier test.

[11]The autoregressive conditional heteroscedasticity (ARCH) test is about residuals and itsnull hypothesis that there is no ARCH up to a certain order in the residuals.

[12] White Test (White) has a null of no heteroscedasticity in the residuals.

[13]Harvey Test (Harv) has a null of homoscedasticity in the residuals.

4.2. ARDL Results

As mentioned in the preceding section, although we presented its results for a comparison, the CLR model is not appropriate for the data employed in this study considering its statistical properties. The second alternative is the ARDL model that is proposed by Pesaran and Shin (1998) and Pesaran et al. (2001) having advantages compared to CLR, Engle and Granger (1987) and Johansen (1991) in terms of appropriated in small samples and integration order. We followed the ARDL model steps defined in Bahmani-Oskooee and Maki-Nayeri (2019). Unit root tests ensured that the dependent variable is I(1) and no series of the explanatory variables are I(2). The optimum number of lags for the ARDL model was selected by the Akaike's Information Criterion (AIC) among maximum of twelve lags and AIC indicated a lag order of twelve.

We use more than one independent variable to increase the explanatory power and minimize the error term. We have two choices for reporting long-run coefficients. Either we can directly report *Eviews 10* output lagged level as an independent coefficient like in Qamruzzaman and Jiaguo (2018, Table 7). This may be chosen for the ones benefiting from Stepwise Regression with different *p*- value alternatives. Or we may follow Bahmani-Oskooee's style and report long-run coefficients by including asymmetric terms to the linear ARDL in *Eviews 10* and estimate NARDL. Long-run results of the ARDL model are given in the following Table 6. Eviews now will give such that long-run coefficients normalized by lagged *EXC* coefficient and also their *p*- values. In this paper we choose the latter style to benefit from the exact comparison of ARDL and NARDL results.

Table 6: Long-Run Results of the ARDL Model

Variables	Coefficient		*p*- value
Constant	2.4023	***	[0.0000]
EXC	-6.7004	***	[0.0022]
M2	0.6084		[0.3302]
CPI	-1.4871		[0.2537]
OILP	0.5551	***	[0.0008]
INT	0.0629	*	[0.0808]

Notes: *****, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.**

In order to test the existing of long-run relationship between *SP, EXC, M2, CPI, OILP, INT,* the bound test approach is used following Pesaran et al.'s (2001) procedure. The bound testing approach depends on the *F*- test of lagged level variables. This test examines the null hypothesis, which indicates no cointegration between variables against the alternative that is the existence of cointegration between variables. We should also look also for *t*- bound test to ensure that the cointegrating relationship is valid. Results from the ARDL bound testing approach to co-integration under unrestricted constant and no trend specification by using the *F*-statistics indicates a co-integration relationship between variables[14] with a value of 7.97 which is higher than the upper bound of critical value. Moreover, the absolute value of the *t* bound is -4.72 which is greater than the absolute value of either the I(0) or I(1) and thus we should reject the null hypothesis of *t* bound test, and conclude that the cointegrating relationship is valid. In order to ensure that the ARDL model is a good fit, we apply both diagnostic and stability tests for the residuals. The serial correlation test was tested because if error terms have autocorrelation, then estimators will not be efficient which would lead us to incorrect findings. Ramsey's Regression Specification Error Test (RESET) checks if the functional form used in the regression model is misspecified or not. The stability test was used the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of the squares of recursive residuals (CUSUMSQ)[15]. With the ARDL model, residuals have no series correlation problem according to ACF and Breusch-Godfrey Serial Correlation LM Test. Besides Breusch-Pagan-Godfrey ARCH test, White test, and Harvey Test indicate no heteroscedasticity problem.

Table 7 provides short-run estimates of the linear ARDL model plus the error correction specification coefficients.

As shown in Table 7, the coefficient of the lagged ECM term (ECM_{t-1}) is statistically significant and negative, which supports the adjustment towards the long-run equilibrium. So nearly 16.05% of instability is corrected within a month. According to Bahmani-Oskooee and Saha (2019a) ρ_0 coefficient in Equation (5) is the ECM_{t-1} term in the Engle and Granger (1987) error correction specification. Besides according to Bahmani-Oskooee and Saha (2019b) ARDL error correction representation inherits the linear combination of lagged level of variables and Engel and Granger model is similar accept for the ECM_{t-1} term in Engle and Granger. R^2 is 0.59 and the variation in stock prices can be explained by some variations and thus it can be predictable.

[14] Numbers for *F*- bound test are obtained from Pesaran et al. (2001, Table CI (iii) Case III on page 300) and for the critical value bounds of the *t*- statistic report in Table CII (iii) Case III on page 303. We will provide full details of test results if demanded.

[15] The CUSUM and CUSUMSQ figures and other diagnostic, stability tests will be proved if demanded.

Table 7: Short-Run Results of the ARDL Model

Variables	Coefficient		Probability
ΔSP_{t-1}	0.2395	***	[0.0004]
ΔSP_{t-2}	0.0381		[0.5722]
ΔSP_{t-3}	-0.0889		[0.1917]
ΔSP_{t-4}	0.0241		[0.7166]
ΔSP_{t-5}	0.0352		[0.5923]
ΔSP_{t-6}	0.0667		[0.3110]
ΔSP_{t-7}	-0.1118	*	[0.0978]
ΔSP_{t-8}	0.0657		[0.3308]
ΔSP_{t-9}	0.1303	**	[0.0504]
ΔSP_{t-10}	0.0979		[0.1153]
ΔEXC_{t}	1.0671	**	[0.0327]
$\Delta M2_{t}$	0.0450		[0.8048]
$\Delta M2_{t-1}$	-0.0707		[0.6978]
$\Delta M2_{t-2}$	0.7000	***	[0.0001]
$\Delta M2_{t-3}$	0.5446	***	[0.0032]
$\Delta M2_{t-4}$	0.0368		[0.8412]
$\Delta M2_{t-5}$	0.6075	***	[0.0013]
$\Delta M2_{t-6}$	0.4702	**	[0.0167]
$\Delta M2_{t-7}$	0.7751	***	[0.0001]
$\Delta M2_{t-8}$	-0.1509		[0.4474]
$\Delta M2_{t-9}$	0.3747	**	[0.0571]
$\Delta M2_{t-10}$	0.8589	***	[<0.001]
$\Delta M2_{t-11}$	0.4542	**	[0.0272]
ΔCPI_{t}	0.6912		[0.3692]
ΔCPI_{t-1}	0.8360		[0.2812]
ΔCPI_{t-2}	1.0862		[0.1569]
ΔCPI_{t-3}	0.9958		[0.1987]
ΔCPI_{t-4}	2.1925	***	[0.0044]
ΔCPI_{t-5}	1.5270	**	[0.0466]
ΔCPI_{t-6}	1.0510		[0.1818]
ΔCPI_{t-7}	1.4258	**	[0.0593]
ΔINT_{t}	0.0718	***	[0.0004]
ECM_{t-1}	-0.1605	***	[<0.001]
R^2	0.5952		
Adjusted R^2	0.5024		
Standard Error of Regression	0.0373		
Sum of Squared Residuals	0.2001		
Log likelihood Ratio	351.79		
F- statistic	6.4155	***	[<0.001]
Mean of *SP*	0.0032		
Standard Deviation of *SP*	0.0528		
Akaike Information Criterion	-3.5708		
Durbin-Watson Statistics	1.9741		

Notes: ***, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.

4.3. Empirical Results for the NARDL Model

During the phase of reporting NARDL parameters, we could follow papers such as Sahin and Berument (2019) and conduct bivariate analysis. However, here we want to include other independent variables. Second, we may use general to the specific approach of stepwise regression but this would not allow us to obtain normalized long-run coefficients with *p*- values. Here we simply follow Bahmani's suggestion and included nonlinear coefficients to linear ARDL. NARDL model's residuals have no series correlation problem according to ACF and Breusch-Godfrey Serial Correlation LM Tests. Hypothesis of no heteroscedastic residuals could not be rejected by the Breusch-Pagan-Godfrey ARCH Test, White Test, and Harvey Test. Moreover, RESET, CUSUM and CUSUMSQ indicate no coefficient stability problem.[16] Following Shin et al. (2014), we used the cointegration bound test of Pesaran et al. (2001) for testing the joint significance of lagged level variables (see also Bahmani-Oskooee and Saha, 2019a for more explanations). The test rejects the null hypothesis where the computed *F*-statistic is equal to 8.07 which is greater than the upper bound critical value and we can claim that there is a long-run relationship between the macroeconomic and financial variables and stock prices.

Table 8: Long-Run Results of the NARDL Model

Variables	Coefficient		*p*-value
Constant	2.9015	***	[<0.001]
EPOS	-5.2292		[0.1187]
ENEG	-6.9838	***	[0.0023]
M2	0.8778		[0.2598]
CPI	-3.1596		[0.3377]
OILP	0.5285	***	[0.0019]
INT	0.0749	*	[0.0663]
***Notes*: ***, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.**			

[16] Figures from cumulative sum of recursive residuals will be provided if demanded.

Table 9: Short-Run Results of the NARDL Model

Variables	Coefficient		*p*- value
ΔSP_{t-1}	0.2350	***	[0.0006]
ΔSP_{t-2}	0.0381		[0.5740]
ΔSP_{t-3}	-0.0850		[0.2253]
ΔSP_{t-4}	0.0241		[0.7178]
ΔSP_{t-5}	0.0344		[0.6027]
ΔSP_{t-6}	0.0642		[0.3305]
ΔSP_{t-7}	-0.1116	*	[0.0992]
ΔSP_{t-8}	0.0645		[0.3416]
ΔSP_{t-9}	0.1287	**	[0.0540]
ΔSP_{t-10}	0.0973		[0.1198]
$\Delta EPOS_{t}$	1.2358		[0.1475]
$\Delta ENEG_{t}$	0.9321		[0.2298]
$\Delta M2_{t}$	0.0423		[0.8175]
$\Delta M2_{t-1}$	-0.1190		[0.5184]
$\Delta M2_{t-2}$	0.6569	***	[0.0003]
$\Delta M2_{t-3}$	0.5184	***	[0.0051]
$\Delta M2_{t-4}$	0.0145		[0.9377]
$\Delta M2_{t-5}$	0.5741	***	[0.0023]
$\Delta M2_{t-6}$	0.4496	**	[0.0232]
$\Delta M2_{t-7}$	0.7666	***	[0.0001]
$\Delta M2_{t-8}$	-0.1649		[0.4059]
$\Delta M2_{t-9}$	0.3510	*	[0.0742]
$\Delta M2_{t-10}$	0.8538	***	[<0.001]
$\Delta M2_{t-11}$	0.4641	**	[0.0264]
ΔCPI_{t}	0.5483		[0.4765]
ΔCPI_{t-1}	0.9387		[0.2299]
ΔCPI_{t-2}	1.2271		[0.1163]
ΔCPI_{t-3}	1.1166		[0.1544]
ΔCPI_{t-4}	2.2783	***	[0.0036]
ΔCPI_{t-5}	1.6631	**	[0.0324]
ΔCPI_{t-6}	1.2211		[0.1259]
ΔCPI_{t-7}	1.5458	**	[0.0427]
ΔINT_{t}	0.0687	***	[0.0009]
ECM_{t-1}	-0.1620	***	[<0.001]
R^2	0.5961		
Adjusted R^2	0.5000		
Sum of Squared Residuals	0.1997		
Log Likelihood Ratio	351.991		
F- statistic	6.2061	***	[<0.001]
Mean of *SP*	0.0032		
Standard Deviation of *SP*	0.0528		
Akaike Information Criterion	-3.5617		
Durbin-Watson stat	1.9665		

Notes: ***, ** and * indicates statistical significance level at 1%, 5% and 10% level respectively.

5. Discussion

Results of this study are summarized in Table 10 indicating that NARDL can be preferred in terms of authenticity compared to CLR and ARDL where there is a higher coefficient of determination, *F*- bounds test and a higher forecasting performance with lower RSS. Kuwait stock market appears to be in weak form of efficiency because of that it does not follow the random walk theory. This result is supported by Sultan et al. (2013) where they test the weak form of the efficient market of the KSE and results indicate that the stock market in Kuwait is in weak form and thus an investor can use a historical data and news about the market to obtain an extra profit.[17] In this discussion section, significant coefficients obtained from NARDL models and presented in the below table will be interpreted in terms of economics and finance. For this purpose considering coefficients and their signs, five hypothesis will be mentioned and discussed which are extracted from the models. Initially the hypothesis tested by the coefficient will be provided and next their financial and economic meanings will be discussed. Substantial amount of empirical literature was scanned and their results were provided to compare with this study's findings.

Table 10: Summary of the Results

	Long-Run	Long-Run	Short-Run	Short-Run	
Coefficients	ARDL	NARDL	ARDL	NARDL	CLR
EXC_t	-		+ (0)		NS
$EPOS_t$		NS		NS	
$ENEG_t$		-		NS	
$M2_t$	NS	NS	+ (2,3,5,6,7,9,10,11)	+ (2,3,5,6,7,9,10,11)	+
CPI_t	NS	NS	+ (4,5,7)	+ (4,5,7)	-
$OILP_t$	+	+	NE	NE	+
INT_t	+	+	+ (0)	+	+

***Notes*: NS: Not significant. NE: There is no effect. The numbers in the parenthesis are significant lag orders.**

First, the sign and magnitude of the coefficient of the exchange rate α_2 depends on whether firms are an exporter or an importer in the economy. If the majority of firms are an exporter and benefit from the depreciation of the local currency, then we would expect α_2 to be positive. The relationship between *EXC* and *SP* is negative in the long run as reported in Table 6. 1 % increase in *EXC* (appreciation of the local currency) causes 6.70 % decrease in *SP*. This result is supported by

[17] See Chapter 8 of Bodie, Kane and Marcus (2018) for a broad definition and an explanation of efficient market hypothesis.

Abouwafia and Chambers (2015) where they find that a depreciation of the real exchange rate leads to an increase in stock prices in Kuwait. In this case, they assume that there is a negative relationship in the long run because depreciation of the currency can attract portfolio inflows that partly invested in stocks, causing their prices to rise. Results for the short-run previously reported in Table 7 indicate that *EXC* changes have a short-run positive effect on *SP*. The nominal exchange rate for Kuwait carries a positive and significant coefficient in the short-run which implies that firms in Kuwait gain from domestic currency appreciation, a 1 % increase in *EXC* leads to an increase the *SP* by 1.07 %. Therefore, we can say that an appreciation of the dinar can be beneficial for import oriented firms in the short-run and thus it makes imports cheaper and exports expensive. As we expected, the appreciation of the dinar will increase the earning of firms and hence stock prices because most of the firms in Kuwait are domestic and they import more in the short-run. Therefore, the cost will decrease and cause a more profit. Meanwhile, depreciation of the dinar will hurt firms due to the increased cost of imported inputs which leads to a decrease in profitability as result stock prices decline. In the next step, with the existence of cointegration we examine the asymmetric relationship between *SP* and *EXC* by using the Wald test, the null hypothesis in the Wald test is that there is no long and short-run asymmetric relationship. In the long- run, results normalized by the lagged *SP* coefficient indicating that the *EXC* reduction (depreciation of the domestic currency) has a negative and a significant effect on *SP* with a coefficient of -6.98 revealing that a 1% decrease in the EXC would lead to an approximately a 6.98% decrease in SP, the *EXC* increase has a non-significant coefficient in the long-run (Table 8). Based on these results we can see that the deprecation of the local currency (dinar) could have negative effects on *SP* by declining prices in the long-run. These results are consistent by Oyinlola and Oloko (2018). As most of firms listed on the Kuwaiti stock market work domestically and thus the domestic currency depreciation leads firms to pay more for imported. Therefore, domestic firms that are importing raw materials will face an increase in the cost, which leads to a decrease in firms' profits that cause a decline in their share prices. Bahmani-Oskooee and Saha (2019a) explore that the sign of the effect of nominal exchange rate on stock prices depends whether on the country is export or import oriented. In our case, Kuwait is an exporter country but for an oil importer country such as Turkey, according to Benli et al.'s (2019) normalized coefficients for Istanbul Stock Exchange-100, an appreciation of the local currency increases stock prices in the long-run, whereas depreciation of the local currency decreases stock prices insignificantly. In absolute terms, appreciation of the local currency's coefficient is higher than depreciation. Besides in the short-run, depreciation of the local currency decreases stock prices but appreciation increases it. Table 9 presented results for the short-run NARDL model. Bahmani and Ghodsi (2018) call this as asymmetric causality if the Wald Test rejects the short-run causality of increase or decrease. For the asymmetric short-run relationship, empirical results show that *EXC* does not have a statistically significant effect on *SP*. Bahmani-Oskooee focuses on the asymmetric relationship between *EXC* and *SP* in different countries. For instance, Bahmani-Oskooee and Saha (2015) employ two models: the linear (multivariate models) and non -linear model (a bivariate model). They use a linear model (ARDL) to investigate the relationship between *SP* and *EXC*, *M2*, *CPI* and industrial production as a proxy for domestic economic activity for monthly data from 1973 to 2014 in the US, while NARDL method is employed to capture the asymmetric relationship between the stock price index and exchange rate. They indicated that the exchange rate movement has an asymmetric effect on stock prices. Bahmani-Oskooee and Saha (2016) extend their study by including several more countries. Using monthly data, results indicate that the exchange rate has a significant effect on stock markets in the long-run term for Brazil and Korea. Moreover, the exchange rate movement has asymmetric effects on stock prices. Although the effect was mostly in the short run. Tiryaki et al. (2019) use Turkish data and benefit from NARDL to investigate effects of real exchange rate on stock returns. They find an asymmetry in the long-run. In the long-run while the positive real exchange rate has no statistically significant effect on stock prices, the negative real exchange rate has a positive effect on stock prices. In the short-run negative real exchange rate has a positive effect and a positive real exchange rate has a positive effect on stock prices for the full sample. However their results change when the 2002 structural break was considered.

The second hypothesis is tested related to liquidity in the economy where Gordon Growth Model is assumed a positive relationship between money supply and stock prices through increasing dividends rate and low interest rate. Besides empirical studies such as Mukherjee and Naka (1995) explore a positive relationship between monetary expansion and stock prices, through drumming up the investment and output. However, other studies such as Fama (1981) keeps in sight the inflation concerns and claims a case of negative effect of money supply on stock prices. Thus, based on previous findings, we expect α_3 to be either positive or negative. According to CLR results, the effect of money supply on the exchange rate is statistically positive and significant. ARDL and NARDL results reveal that the relation between *M2* and *EXC* is not significant in the long-run. However, in the short-run both ARDL and NARDL results imply that *M2* carries a positive and significant relationship with *SP* in substantial lags. Results are supported by Mukherjee and Naka (1995); Al-Sharkas (2004); Tian and Ma (2010); Eita (2012); Boonyanam (2014); Hussain et al. (2013), where they assume that when money supply increases, interest rates decrease which in turn causing an increase in investment and output and hence stock prices will increase. So, in the case of Kuwait, we can conclude that an increase in *M2* leads to economic expansion by an increase in corporate profits and thus *SP* will increase. From these results, we may say that the CBK can use money supply as a monetary policy tool to affect stock prices in the short-run to bolster confidence. Al-Sharkas (2004); Tian and Ma (2010); Eita (2012) and Boonyanam (2014) also find a positive relationship between monetary expansion and stocks prices, they expect that when the money supply increases which leads to a decrease in interest rates and thus an increase in investment and output causing an increase in stock prices. However, Fama (1981) assumes a negative relationship between money supply and stock prices (a negative sign) due to an increase in the money supply may lead to inflation causing a decrease in stock prices. Ibrahim (2000) also finds a negative relationship between money supply and stock prices in Malaysia.

The third hypothesis focuses on prices where there is a debate on the literature about the sign. For instance, Fama (1981) and Chen et al. (1986) expect a negative relationship between *CPI* and *SP* because a plague of the inflation leads to an increase in input prices that used to produce goods by firms and thus future profit will decline as well as the *SP*. Mukherjee and Naka (1995, Japan), Al-Sharkas (2004, Jordan), Eita (2012, Namibia) also find a negative relationship between inflation and stock prices. However, Ibrahim (2000, Malaysia) and Boonyanam (2014, Thailand) find a positive relationship between stock prices and inflation. Therefore, we may either obtain a positive or negative sign for α_4 which is supported by Bahmani-Oskooee and Saha (2019a) claiming that the sign of the effect of inflation on stock prices will depend on the effect of inflation on cost and profit structure or stocks are bought to be used as a hedge against inflation. The relationship between *CPI* and *SP* is not statistically significant in the long-run according to the ARDL and NARDL results. However, *CPI* has a positive and significant effect in the short-run according to ARDL and NARDL specifications. This result is supported by Fisher (1930). Therefore, according to this result in the case of Kuwait, a positive relationship between *CPI* and *SP* suggests that equities could hedge against inflation in the short run. Ibrahim (2000, Malaysia) and Boonyanam (2014, Thailand) also find a positive relationship between stock prices and inflation.

The fourth hypothesis is based on that Kuwait which is one of essential oil producers and its economy is highly dependent on oil prices. If oil price ascends, this would be reflected in oil exporter firms' and government's revenues, expected dividends would go up and *SP* would be stimulated through infusion channel. Oil prices are also essential for the oil producing countries such as Nigeria where Nwani and Bassey (2016) find a positive long-run and short-run effect of oil price on real economic growth. Therefore, we expect α_5 to be positive. The effect of *OILP* on *SP* is statistically positive in the long-run both using ARDL and NARDL models. Therefore, we can say that an increase in *OILP* improves the trade balance and thus an increase the current account surplus in Kuwait. Meanwhile, higher *OILP* increases income of the economic actors. This income is also being reflected in the *SP*. Chortareas et al., (2011) also suggest that there is a long-run relationship between stock and oil prices in Kuwait. In the short-run, we explore that the effect of *OILP* on *SP* is not statistically significant. Since Kuwait is an oil exporter this result is expected cost advantages and future positive expected cash flows of firms. Besides, an increase in the oil prices improve the gap between exports and imports. Meanwhile, higher oil prices pep up private disposable income and profitability in firms, which in turn reflect in stock prices. In addition, an increase in the oil price is good news for oil-exporting countries, but not for oil-importing countries and thus if oil price decrease it has a reverse effect on the economy of oil-exporting countries. However, Sahin (2014) indicates that in the case of net importer countries such as Turkey, an increase in oil prices leads to an increasing overall price. In addition to these foreign prices also increase and thus the profits of firms diminish. Park and Ratti (2008) find a positive relationship between oil prices and stock returns for exporter countries such as Norway while it is negative for the United States (US) and European Union (EU) countries. Chortareas et al. (2011) find a positive relationship between oil prices and stock prices in Egypt, Oman, Saudi Arabia, and Kuwait. Basher et al. (2012) explore a negative relationship between oil prices and stock prices in emerging markets. Sahin (2014) also finds that the interrelation between real oil prices and real stock returns in Turkey is significantly negative. Moreover, when the real oil price moves to higher quantiles, the negative impact increases in absolute terms. The distinction was due a trade off between being an oil exporter or an importer country. Elafif et al. (2017) use data of Turkey and Saudi Arabia, benefit from NARDL method, and explore that an increase in oil prices also increase the output and the decrease in oil prices also increase the output for Saudi Arabia where an increase in oil prices has a higher coefficient. In the short-run although an increase in oil prices stimulate the output, a diminish in oil prices reduces it. But for Turkey they report a negative effect of oil price increases and oil price decreases on the output in the long-run where the latter has a higher impact in terms of absolute values. Cheikh et al. (2018) examine the asymmetric relationship between oil prices and stock return in Kuwait and find that negative oil price changes have larger impacts on stock returns than positive oil prices. Kisswani and Elian (2017) find a positive long-run effect of Brent oil prices on stock prices using NARDL where the decreases are more dominant in terms of absolute values. In the short-run, for most of the sectors the coefficient is also positive that is supporting our results. Hu et al. (2018) explore a negative long-run effect of oil price increases and decreases on Shanghai Composite Index but the normalized coefficient is higher for a decrease in absolute terms. Their short-run results are not statistically significant. Khan et al. (2019) also find a statistically significant negative effect of oil price increases on Shanghai Stock Exchange and positive effect of oil price decreases in the long-run and negative effect has a higher coefficient in terms of absolute value. According to their results, in the short-run the positive effect of oil price on stock prices is not statistically significant but the coefficient is statistically significant and positive for the reverse case.

The fifth hypothesis focuses on the relationship between *INT* and *SP* and according to papers such as Mukherjee and Naka (1995) and Sahin (2014), there exists a negative relationship between these two. Slashing interest rates would expect to stimulate investment expectations so the growth rate. Since stock prices are a harbinger of the economy, we expect α_6 to be negative. However unexpectedly the relationship between *INT* and *SP* is statistically significant and positive in the long-run and short-run according to all models. The other papers such as Inegbedion (2012) finds that the relationship between stock prices and an interest rate is not significant in Nigeria. Al-Naif (2017) does not find a cointegration between interest rate and stock prices for Kuwait and fails to find a causality relationship among these two either direction. Subburayan and Srinivasan (2014) fail to find a causality from interest rate to stock prices for India. Wongbampo and Sharma (2002) explore a positive effect of interest rate on stock prices for Malaysia and Indonesia. However they find it negative for Philippines, Singapore and Thailand in the long-run using Johansen's method. Rahman et al. (2009) benefit from Johansen's methodology and find a negative effect of interest rate on stock prices for Malaysia in the long-run. However, in the short-run the effect is positive. Their CLR estimates provide a positive effect of interest rate on stock prices. Mutuku and Ngeny (2015) explore a positive effect of interest rate on stock prices in Kenya. *INT* has a non-significant effect on *SP* in the long-run and but not in the short-run. This result is not supported by Mukherjee and Naka (1995) who find a negative relationship between the interest rate and stock returns in Japan considering opportunity costs. In addition, Jayashankar and Rath (2017) use the data of India and apply wavelet correlation and find ruinous effect of interest rate on stock prices.

6. Conclusion

To sum up and concentrate on the title of the paper, in terms of economic interpretation, it is clear that there is an essential role of the exchange rate on the stock price for Kuwait in the long-run but not in the short-run. A decrease in the exchange rate has a stark effect compared to an increase over stock prices so there is a case of asymmetry for Kuwait economy. Related to the literature, it is also expected to see a non-linear relationship between stock prices and exchange rate. When the exchange rate changes frequently, the supply side of the economy would not certain about plight of their future cash flows (Bartam, 2004). This study is delimited to a small open economy which produces oil, Kuwait. Results cannot be generalized to all countries so there are limitations and boundaries. The research was limited to a country which uses pegged exchange rate regime and results for a country using a flexible regime may be different. Results are essential for policy makers trying to avoid fraying where precarious exchange rate movements have potential to crimp the financial market.

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