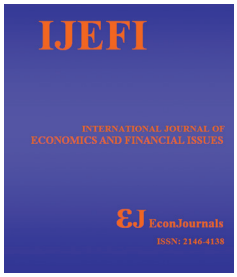

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Stock Prices and Real Exchange Rate Movements in the Gulf Cooperation Council

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ABSTRACT

In this paper, we examine the interaction between stock prices and the real and nominal exchange rates in the Gulf Cooperation Council (GCC) economies (including only Kuwait (KW) and Saudi Arabia (SA). We consider the real and the nominal exchange rates of US dollar in terms of the Saudi Riyal and Kuwait Dinar and the values of Saudi and Kuwait exchange stock exchange indexes. The purpose is to investigate relationship between the volatility in stock prices in these markets and the large swings in global currencies given their alternative exchange rate arrangements. Real exchange rate appears to be insignificant in the case of Kuwait but significant in the case of Saudi Arabia.

Keywords: Stock Prices, Exchange Rate, Real Exchange Rate
JEL Classifications: F32 G15

1. INTRODUCTION

In this study, we first compare the real exchange rate persistence profile for two oil-exporting economies Saudi Arabia and Kuwait. While the Saudi exchange rate has been constant against the dollar since 1986, the Kuwaiti exchange rate is pegged against a basket of currencies. Given the nature of the two countries foreign trade regimes the long swings in the dollar may lead to persistent real exchange deviations for a country that follow strict dollar peg. The study attempts to quantify the impact of the strict peg on the real exchange for the two economies and discusses the potential impact on portfolio allocation and on the stock market.

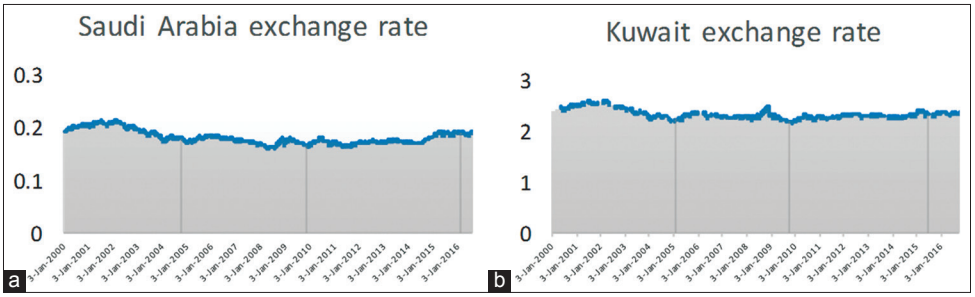
Countries are likely to link their currencies deliberately to those of their most important trading partners, in order to capture gains associated with greater exchange rate stability. To give a simple illustration for the impact of this type of arrangement, both countries Saudi Arabia and Kuwait trade partners include in addition to the US, Japan, Germany the UK and china among others. This implies that any Gulf Cooperation Council (GCC) exchange rate arrangement that ignores the yen and the Euro and the British pound is currently not optimal and also ignoring China may not be optimal in the future.

For the GCC countries that maintain strong peg the dollar volatility can potentially cause serious volatility problems, (internal and external disequilibria). Exports of these countries are dollar dominated while their imports are not, as a result, dollar fluctuation causes great disparities between imports and exports, and budgetary accounts (oil revenue make up for about 75% of budgetary revenues). Given the dollar peg, deviation from precise point positioning (PPP) can only be eliminated through goods market arbitrage (Figure 1).

Studies by Engel and Morley, (2001) and Cheung et al. (2003). Sheds new light on the issue of PPP convergence. These researchers observe that the root of the PPP puzzle may lie in the possibility of different speeds of convergence for nominal exchange rates and prices. In contrast to the standard rational-expectations sticky-price models, which impose the same reversion speed for nominal exchange rates and prices, they examine an empirical model that allows those variables to adjust at different speeds.

The methodology used in these studies allowed them to conclude that the slow speed of adjustment of the real exchange rate is largely due to the slow speed of adjustment of nominal exchange rates and not relative prices. This implies faster speed of adjustment with

Figure 1: Standard deviations: (a) Saudi Arabia exchange rate (0.01), (b) Kuwait exchange rate (0.9)



flexible rather than fixed nominal exchange rate. This can be used to explain the relatively faster speed of adjustment of the Kuwaiti real exchange rate see Hassanain, (2004) for results for the GCC and Hassanain (2003; 2004; 2005) for more general results.

Causality between exchange rates and stock prices can potentially be in both directions. For example, exchange rate may lead stock price through exchange rate fluctuation which affect firm's value, changes competiveness and changes the value of the firm's assets and liabilities denominated in foreign currency, ultimately affecting profits and therefore the value of equity. Alternatively, changes in stock prices may influence movements in exchange rates via portfolio adjustments (inflows/outflows of foreign capital). A persistent upward trend in stock prices would increase foreign capital inflows. Changes in stock prices may influence movements in exchange rates via portfolio adjustments (inflows/outflows of foreign capital). A persistent upward trend in stock prices would increase foreign capital inflows.

2. LITERATURE REVIEW

Many researchers have studied the relationship between stock market indexes and exchange rates and reached different results. Broadly speaking some the studies that come with results in support of some form of relationship between the two markets include Aggarwal (1981), Giovannini and Jorion (1987), Soenen and Hennigar (1988), Roll (1992), Ajayi and Mougoue, (1996) and Granger et al. (2000). The studies that did find some form of relation include Solnik (1987). Jorion (1990), Bahmani and Sohrabian (1992), Nieh and Lee (2001) and Bhattacharya and Mukherjee (2003) to mention some of them. In this study, the focus is on the GCC economies and the emphasis is on the impact of fixed versus flexible exchange rate on the real exchange rate movement and stock market movements.

The rest of this paper is organized as follows: Sections 3-6 are on the econometric analysis of the real exchange rate and stock market behavior. Section 7 is on the error-correction model (ECM). Section 8 is the conclusion.

3. REAL EXCHANGE RATE AND STOCK MARKET DATA AND EMPIRICAL RESULTS

In this section, we first attempt to detect the relationship between real exchange rate and the stock market. Real exchange rate is estimated as (foreign consumer price index [CPI]/domestic CPI) × nominal exchange rate after which we inverted it to get the real in USD. Stock market index is not estimated as a percentage change from the previous closing index. It is estimated with regards to a base period which is 2010M01. From this the estimated percentage change is then (current closing price/base price) × 100. The data used is the monthly from 2005 up to 2015.

We made preliminary for Kuwait. First real exchange rate in both Saudi and Kuwait does not explain stock index changes at all. Oil prices however explain changes in the stock index because of mostly oil companies listed on these exchanges. We did a simple ordinary least square (OLS) estimation, the result shows for the Saudi data OLS fits well without serial correlation but no serial correlation is rejected in the Kuwait data. The preliminary results suggest that we cannot explain changes in the stock index with real exchange rate.

4. AUTOREGRESSIVE DISTRIBUTED LAG (ADL) RESULTS

We finally fit an ADL model to the data. We initially fit a vector autoregression but none of the relationships was significant and because the stock index and oil price is non-stationary we instead, fit an ADL model. We had to difference the oil data twice in the case of Kuwait because there was still unit root in the first differenced data see the result in Table 1 the raw series with difference series and the ADL estimates. Tables 2 and 3 show robustness check results.

ADL model is just a model with both lags of the dependent and independent variables. It is the best model that fits the Kuwait data with no serial correlation. A test on the individual coefficients and a joint F-test indicates that the coefficients are significant in explaining stock index in Kuwait. Therefore, we can say there is a long run relationship between the oil price and stock index in Kuwait but real exchange rate is not significant.

5. ROBUSTNESS CHECKS

Q test of white noise shows no evidence that the residuals deviate from white noise.

Test shows no evidence of arch errors in residuals. Conclusion; ADL (3, 2) model is robust.

6. DYNAMIC CONDITIONAL CORRELATION (DCC) GARCH

For Saudi we could not apply ADL because the errors are not iid and so ADL will be inefficient. We, therefore, apply a DCC Garch and we found that the correlation between stock index and real exchange rate and oil price are significant.

Therefore, we use the DCC MGarch since it captures the nonlinear relationship between the variables and also model the error term. It is also good for forecasting. See the Table 4 with these results.

The output table first presents results for the mean or variance parameters used to model each dependent variable. Subsequently, the output table presents results for the conditional quasicorrelations. For example, the conditional quasicorrelation between the standardized residuals for stockindex and oilprice is estimated to be 0.987. The lamdas represent the time-varying adjustment parameters.

7. ECM

In search for the adjustment pattern between the stockindex and real exchange rate we estimate an ECM and for that two variables have to be cointegrated. We test for cointegration between stock index and real exchange rate for Saudi Arabia. The null hypothesis is zero cointegrating vectors. As we can see, the null of zero cointegration vector (r = 0) is rejected at the 5% level but the hypothesis that there is one cointegrating vector cannot be rejected at the 5% level. Therefore, both variables are non-stationary over the estimation period (Tables 5 and 6).

Table 1: ADL regression

Variable	Difference stock index
LD stock index	0.142 (1.49)
L2D stock index	−0.111 (−1.19)
L3D stock index	−0.209*** (−3.18)
Difference oil price_dubai	1.074*** (9.43)
LD oil price_dubai	−0.345** (−2.03)
L2D oil price_dubai	0.151 (0.88)
Logfx	−8.851 (−0.56)
Constant	10.65 (0.55)
Observations	117

t statistics in parentheses. +P<0.1, **P<0.05, ***P<0.01. ADL: Autoregressive distributed lag, LD: Lag difference of stock index

Table 2: Results for portmanteau test for white noise

Portmanteau (Q) statistics=31.0537	
P=0.8438	

+P<0.1, **P<0.05, ***P<0.01

Table 3: LM test for ARCH

Lag	Chi-square statistic	P value
1	0.009	0.9242
2	0.045	0.9776
3	1.113	0.7740
4	1.232	0.8727

Null hypothesis is no ARCH effects at lag order. ARCH: Autoregressive conditional Heteroscedasticity, LM: Lagrange multiplier

To estimate an ECM two variables have to be cointegrated. This is a test of cointegration between stockindex and real exchange rate for Saudi Arabia. The null hypothesis is zero cointegrating vectors. As we can see, the null of zero cointegration vector (r = 0) is rejected at the 5% level but the hypothesis that there is one cointegrating vector cannot be rejected at the 5% level. Therefore, both variables are non-stationary.

The coefficient on the lag difference of stock index (LD, L2D, L3D) captures the short run relationship. We see that all these lags are negative and significant; meaning that up to previous 3 months lag difference of the stockindex have a significant negative impact

Table 4: DCC Garch results

Variable	Stock index
ARCH_stock index	
L. arch	0.611*** (5.57)
L. Garch	0.501*** (7.68)
Constant	118.8 (0.29)
ARCH_oilprice_dubai	
L. arch	0.752*** (6.50)
L. Garch	0.344*** (4.67)
Constant	465.8+ (1.82)
ARCH_logfx	
L. arch	2.118*** (3.30)
L. garch	−0.568 (−1.54)
Constant	−0.351 (−0.49)
Correction (stock index, oilprice_dubai)	0.987*** (81.93)
Correction (stock index, logfx)	−0.992*** (−122.03)
Correction (oilprice_dubai, logfx)	−0.984*** (−64.06)
Adjustment	
λ1	0.287*** (4.95)
λ2	0.663*** (15.96)
Observations	121

t statistics in parentheses +P<0.1, **P<0.05, ***P<0.01

Table 5: Results from Johansen test for cointegration

Null hypothesis	Test statistic	5% critical value
r=0	19.55	15.41
r=1	1.28**	3.76

t statistics in parentheses +P<0.1, **P<0.05, ***P<0.01

Table 6: Error-correction regression

Explanatory variable	Coefficient
LD stock index	−0.243 (0.812)**
L2D stock index	−0.230 (0.080)**
L3D stock index	−0.520 (0.761)***
LD real exchange rate	−919.58 (681.879)
L2D real exchange rate	−216.77 (692.623)
L3D real exchange rate	−239.06 (678.955)
Error correction term	−0.139 (0.054)*
Number of lags	3
SBIC	1.110
AIC	0.708
HQIC	0.871
Log-likelihood	−24.43
Number of observations	117

t statistics in parentheses +P<0.1, **P<0.05, ***P<0.01. SBIC denotes Schwartz Bayesian Information Criterion, AIC; Akaike Information Criterion and HQIC: Hannan-Quinn Information Criterion

on current stockindex. The coefficients on the lags of real exchange rate are not significant so we conclude that there is no short run relationship between the stockindex and real exchange rate %. The coefficient on the error correction term (which measures the long-term relationship) is −0.139 and significant at the 10% level. This implies that in the long run when the average stockindex is too high it quickly falls back towards the average real exchange rate at an adjustment speed of 139%.

A test of serial correlation to check the robustness of the ECM model show that there is no serial correlation Table 7.

Null hypothesis rejected at the 1% level. We conclude there is no significant serial correlation.

Overall, we conclude that there exist a statistically significant long run relationship between the stock index and real exchange rate but there is no short run relationship.

In all the equations, we fail to reject the null of no Granger causality; that the coefficients in the equations we are testing are zero. None of the variables Granger causes any variable see Table 8.

8. CONCLUSION

In this paper, we examine the interaction between stock prices and the real and nominal exchange rates in the GCC economies (including only Kuwait [KW] and Saudi Arabia [SA]). We consider the real and the nominal exchange rates of US dollar in terms of the Saudi Riyal and Kuwaiti Dinar and the values of Saudi and Kuwaiti exchange stock exchange indexes. The purposes is to attempt to explain the volatility in stock prices in some of these markets by the large swings in global currencies given their alternative exchange rate arrangements. We have shown before that real exchange rate adjustment towards equilibrium will be faster in case of Kuwait with non-strict dollar peg (Hassanain, 2004). We used ADL model to in case of Kuwait and found a long run relationship between oil price and stock index. Real exchange rate appear to be insignificant in this case. We applied DCC Garch model in case of Saudi Arabia and found that the correlation between stock index and real exchange rate and oil price are significant.

We also concluded that there is no short run relationship between the stock index and real exchange rate in case of Saudi Arabia. The coefficient on the error correction term (which measures the long-term relationship) is −0.139 and significant at the 10% level. This implies that in the long run when the average stockindex is too high it quickly falls back towards the average real exchange rate at an adjustment speed of 139%.We also failed to reject the null of no Granger causality; that the coefficients in the equations we are testing are zero. None of the variables Granger causes any variable.

Table 7: LM test of serial correlation

Lag	Chi-square statistic	P-value
1	4.551	0.336
2	2.009	0.734
3	5.679	0.224
4	4.985	0.289

Null hypothesis is zero autocorrelation at lag order. t statistics in parentheses. +P<0.1, **P<0.05, ***P<0.01. LM: Lagrange multiplier

Table 8: Granger causality test results

Variables	Difference oil price	Difference real exchange rate	Difference stock index
Difference oil price	-	1.074 (0.783)	1.679 (0.642)
Difference real exchange rate	0.440 (0.932)	-	1.055 (0.788)
Difference stock index	0.974 (0.808)	1.126 (0.771)	-

P values are in parenthesis. +P<0.1, **P<0.05, ***P<0.01

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