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IMF Working Paper

Saudi Arabia's Growth and Financial Spillovers to Other GCC Countries: An Empirical Analysis

by Olumuyiwa S. Adedeji, Sohaib Shahid, and Ling Zhu

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IMF Working Paper

Middle East and Central Asia (MCD)

Saudi's Growth and Financial Spillovers to Other GCC Countries: An Empirical Analysis

Prepared by Olumuyiwa S. Adedeji, Sohaib Shahid, Ling Zhu¹

Authorized for distribution by Tim Callen

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Abstract

This paper examines real and financial linkages between Saudi Arabia and other GCC countries. Growth spillovers from Saudi Arabia to Bahrain are found to be sizeable and statistically significant, but those to other GCC countries are not found to be significant. Equity market movements in Saudi Arabia are found to have significant implications for other GCC countries, while there is no evidence of co-movements in bonds markets. These findings suggest some degree of interdependence among GCC countries.

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Author's E-Mail Address: oadedeji@imf.org; sshahid@imf.org; lzhu@imf.org

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I. INTRODUCTION

“One of the major challenges of the interconnectedness of the global economy is that, when one major player gets a virus, the rest of us tend to catch it too”². Saudi Arabia is a major regional player. It experienced slower economic growth during 2015–17 following the decline in oil prices, although some recovery is now underway. After a decade of strong economic activity from 2004–14 during which real non-oil GDP growth averaged about 7.5 percent, non-oil growth decelerated during 2015–17 to about 2 percent, and is projected to pick-up to 2.3 percent this year. This has prompted the question of how growth performance in the largest GCC economy would impact other countries in the region.³ This paper tackles this question by identifying and quantifying growth spillovers from Saudi Arabia to other GCC countries.

Spillovers through financial channels in GCC countries have tended to focus on equity markets (Suliman (2011); Sedik and Williams (2011); and Alotaibi and Mishra (2015)). Assessing GCC sovereign bond market spillovers is important and extremely relevant, given the nascent but fast-expanding GCC sovereign bond market.

This paper makes the following contributions. To add to the existing literature, we focus on the non-oil real GDP spillovers from Saudi Arabia to other countries in the region instead of the total real GDP. This approach allows for a cleaner identification of the regional real spillovers, given the oil component of the GDP is largely driven by oil production decisions (instead of the regional spillovers). The paper also extends analysis of financial market linkages by examining the sovereign bond spreads.

The results point to the following conclusions:

- There is evidence of non-oil growth spillovers. Growth spillovers from Saudi Arabia appear to be strong. A one percentage point change in Saudi Arabia’s growth is associated with about 0.6 percentage point change in growth on average in the region, controlling for other factors.
- Spillovers through the equity market are relatively small—a 1 percent increase in Saudi equity market returns is associated with a 0.06 percentage point increase in the returns in the other GCC equity markets. Bond market spillovers from Saudi to other GCC countries are found to be insignificant, which is consistent with previous findings (IMF, 2016b) that bond spreads are largely influenced by global factors.

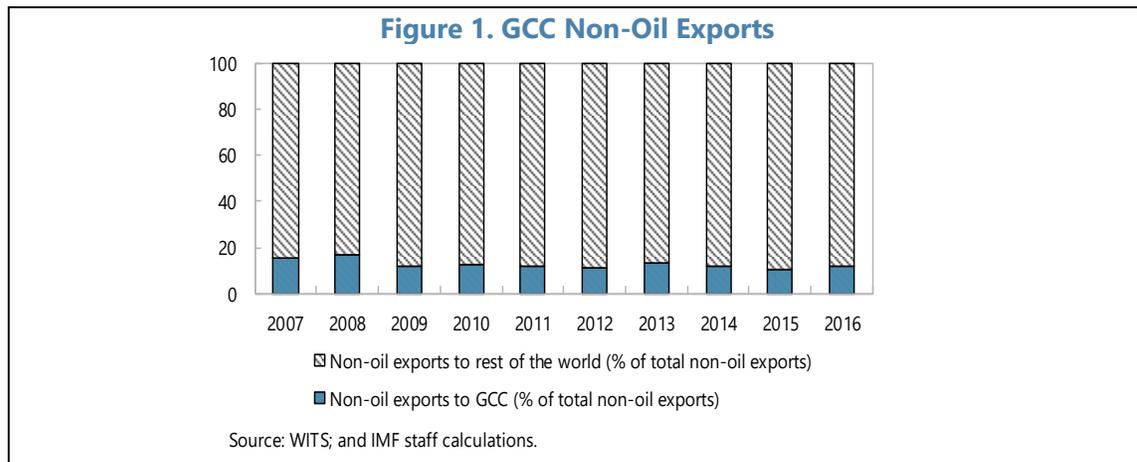
² John C. Williams (President and CEO, Federal Reserve Bank of San Francisco). Remarks at the 2017 Asia Economic Policy Conference: Monetary Policy Challenges in a Changing Global Environment, November 2017 (<https://www.frbf.org/our-district/press/presidents-speeches/williams-speeches/2017/november/when-the-united-states-sneezes/>).

³ GCC comprises of the following countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates (UAE).

The rest of the paper is organized as follows: Section II focuses on stylized facts related to financial and trade linkages between Saudi Arabia and other GCC countries. Section III discusses empirical evidence on growth spillovers. Section IV presents empirical analysis of financial markets co-movements. Section IV concludes and offers policy recommendations.

II. STYLIZED FACTS: TRADE AND FINANCIAL LINKAGES WITHIN GCC

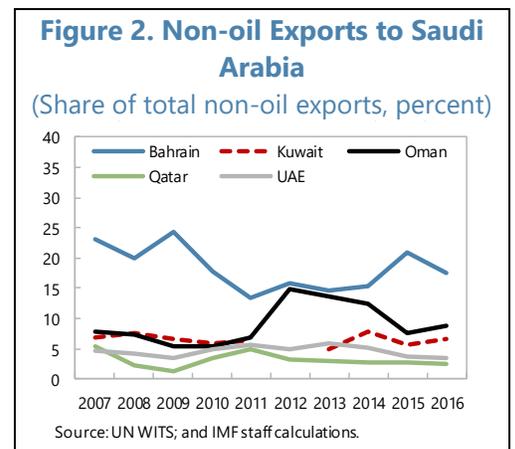
Most of the external trade of GCC countries is with countries outside the region. Intra-GCC non-oil exports as a share of total non-oil exports (excluding SITC Section 3 which comprises mineral fuels, lubricants, natural gas and related materials) averaged about 13 percent during 2007–2016 (Figure 1).



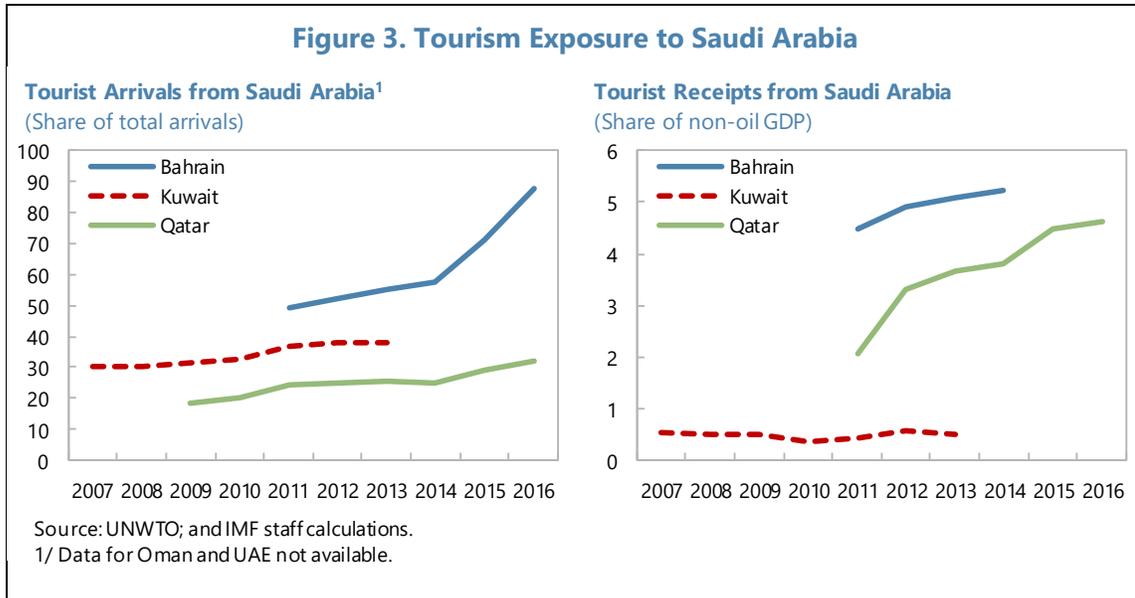
GCC countries' dependence on imports from Saudi Arabia is sizeable. Saudi Arabia's exports to the GCC were more than \$12 billion in 2016 (Figure 2), including transport equipment, machinery, electronics, and metals. Bahrain's dependence on the GCC countries for its exports, mainly from Saudi Arabia, is quite significant (over 20 percent of non-oil GDP).

There are other potential spillover channels at country levels:

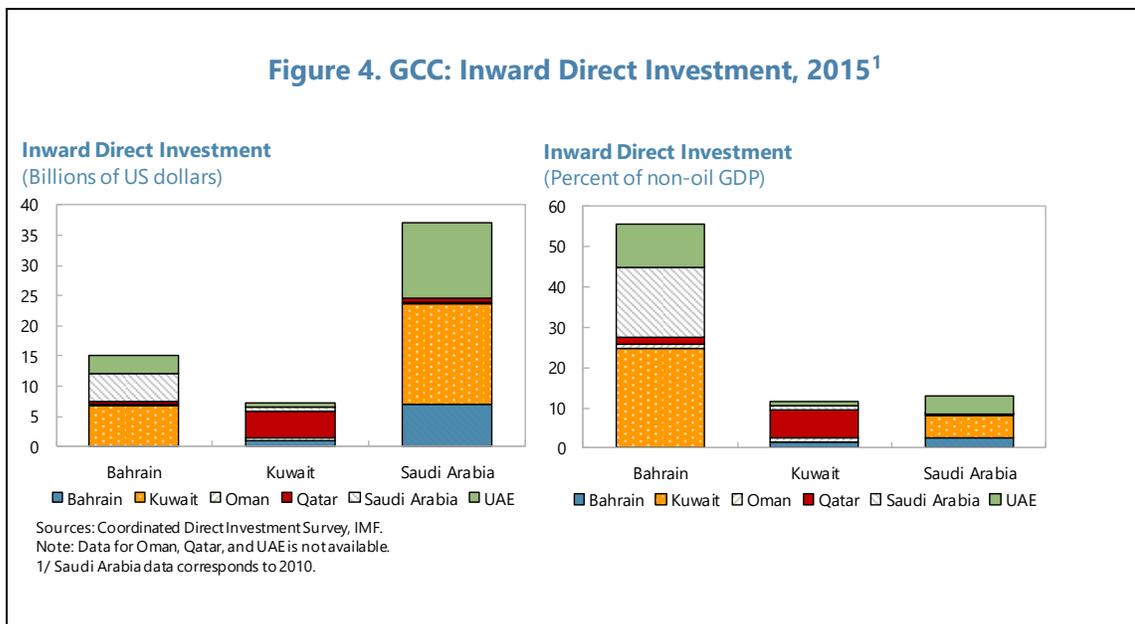
- Bahrain relies heavily on the Saudi market, with more than a quarter of its total non-oil exports going to Saudi Arabia in 2016 (Figure 2). Therefore, developments in the Saudi economy could have significant impact on Bahrain. Oman and Kuwait also rely on the Saudi market but to a lesser extent, with 11 percent and 9 percent of their non-oil exports, respectively being destined for Saudi Arabia. Saudi Arabia's share in UAE's total non-oil exports is low (about 3 percent).



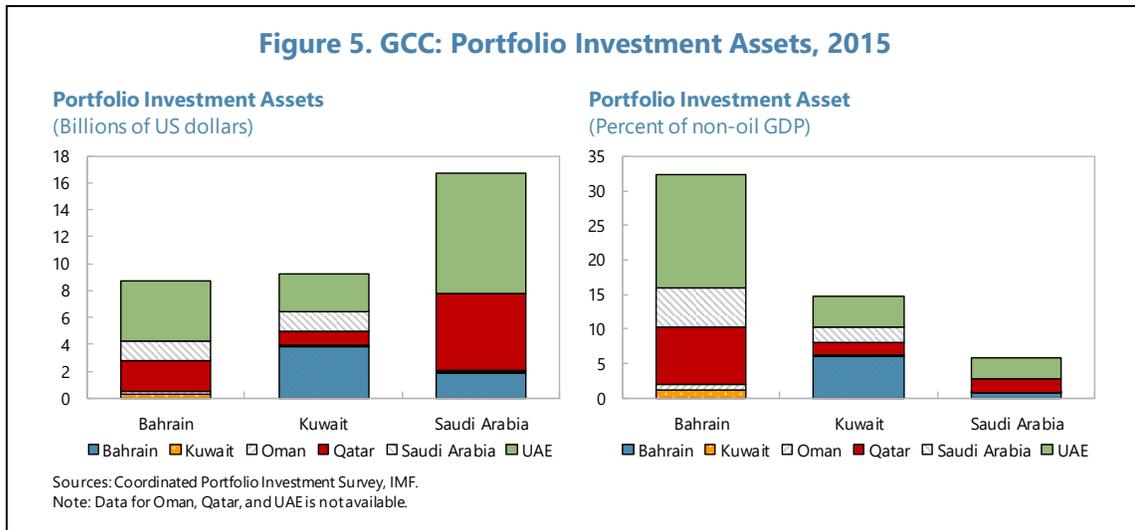
- A number of GCC countries depend on Saudi Arabia for tourism, although data availability in this area is limited. Bahrain relies significantly on Saudi Arabia for tourism: Saudi Arabia's tourist represented about 90 percent of Bahrain's total tourist arrivals in 2016 and 5 percent of its non-oil GDP in 2014 (Figure 3).



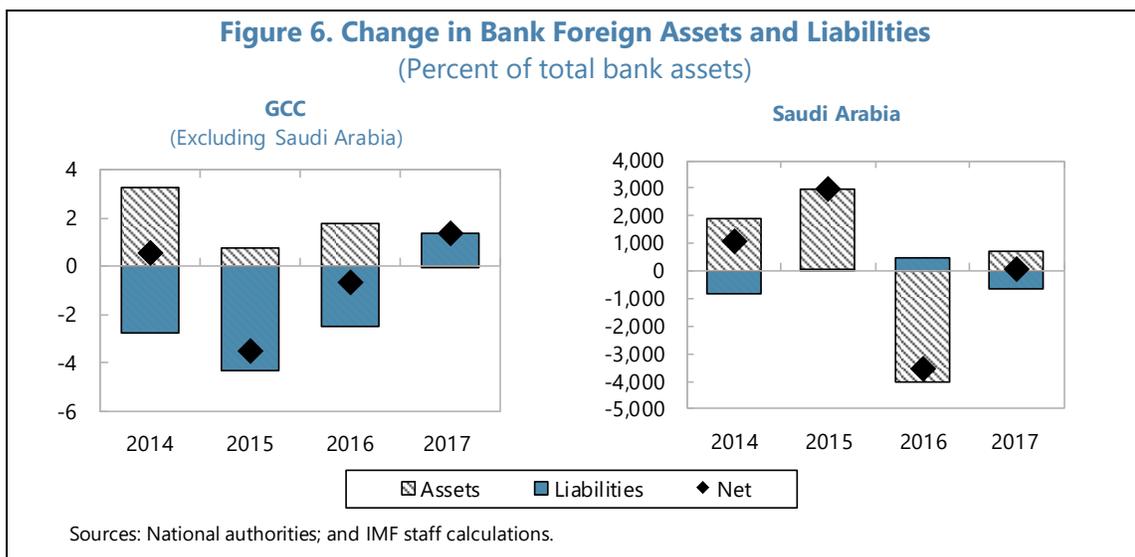
- Intra-GCC FDI is mostly driven by Saudi Arabia (see Figure 4). The stock of inward FDI in Saudi Arabia from other GCC countries accounted for more than \$35 billion in 2015 (about 10 percent of non-oil GDP), with most of this investment coming from Kuwait and UAE. Saudi Arabia is also the major source for inward FDI in Bahrain together with Kuwait.



- Both UAE and Qatar have exposure to the Saudi equity market through their portfolio investments of \$9 billion (3.2 percent of non-oil GDP) and \$6 billion (6 percent of non-oil GDP), respectively, in 2015 (Figure 5). This exposure of GCC countries to Saudi Arabia implies that any shocks to the Saudi economy – either financial or non-financial– could potentially have implications for both Qatar and the UAE. The availability of fiscal and external buffers, however, limits the potential economic and financial impact of such adverse shocks.



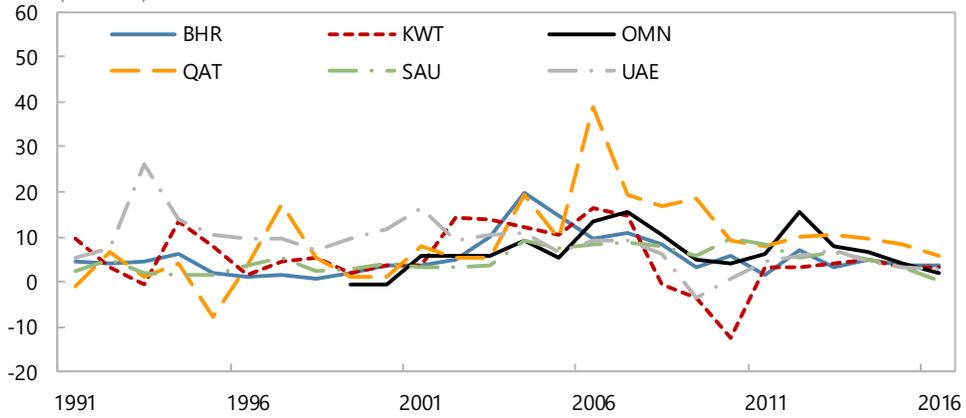
In view of the afore-mentioned financial linkages, changes in the liquidity position of banks in Saudi Arabia could bring about changes in holdings of foreign assets by resident banks, resulting in liquidity changes in other GCC countries (Figure 6). This is particularly relevant in countries that their banking systems depend significantly on foreign funding (non-resident deposits and wholesale funding) for credit operations (IMF 2016a, 2017a, 2017b, and 2017c).



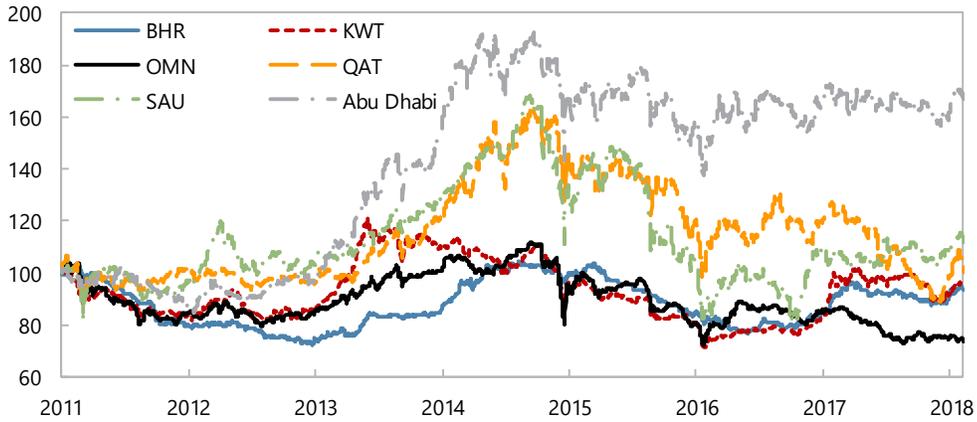
Overall, GCC countries' real and financial sector variables have witnessed considerable co-movement over time (Figure 7). Real non-oil GDP growth rates in the six GCC countries tend to fluctuate in tandem. Similarly, their stock market indices and 10-year sovereign bond prices have also co-moved in recent years. Saudi Arabia is the largest economy in the GCC (46 percent of the GCC non-oil GDP) and it is plausible that real and financial developments in Saudi Arabia tend to have economic and financial implications for the other GCC countries. Of course, common shocks, particularly those to oil revenues, are also likely to contribute significantly to these co-movements. The next section empirically explores the potential linkages.

Figure 7. Real and Financial Sector Co-Movements Within GCC

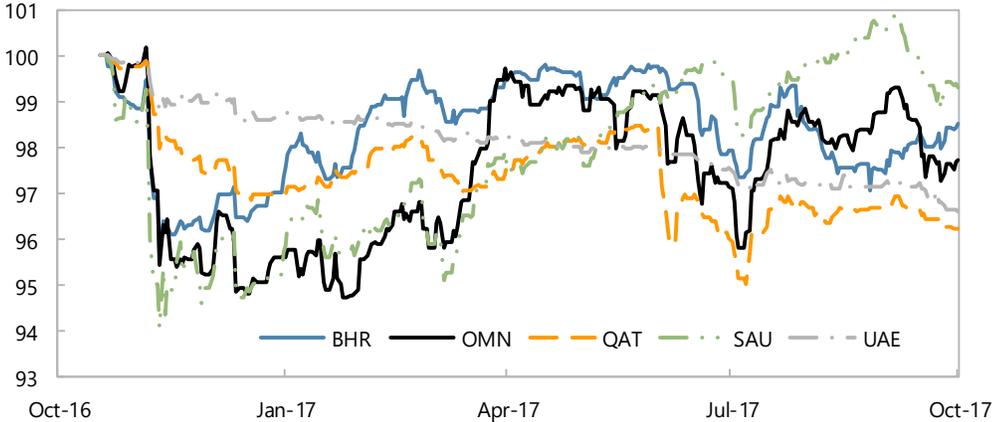
Real Non-oil GDP Growth Rates
(Percent)



Stock Market Indexes
(Index; Jan 1 2011 =100)



10 Year Sovereign Bond Prices
(Index; Oct 21 2016 =100)



Source: National authorities; Bloomberg; and IMF staff calculations.

III. EMPIRICAL EVIDENCE OF REAL SPILLOVERS

A. Empirical Strategy

This section analyzes real spillovers from Saudi Arabia to the rest of the GCC countries. Specifically, we examine the impact of non-oil real GDP growth in Saudi Arabia on non-oil real GDP growth in the rest of the GCC using a panel regression with fixed effects, controlling for the U.S. real interest rate and the U.S. real GDP growth.

Recent studies have found significant real spillovers from Saudi Arabia to other countries in the region. For example, Al-Mawali (2015) finds significant impact of Saudi Arabia's real GDP growth on the real GDP growth in the rest of the GCC. However, a significant share of total GDP in the GCC countries relates to oil production, and hence could be significantly driven by OPEC agreements and other global factors.⁴ To address this concern, we focus on the non-oil real GDP growth in our empirical analysis.

To investigate spillovers from the real non-oil GDP growth in Saudi Arabia on the rest of the GCC countries, we combine the empirical approaches of IMF (2013) that examines the impacts of shocks from the major economies on the rest of the world and that of di Giovanni and Shambaugh (2008).⁵ Specifically, we consider the following fixed-effects panel regression specification:

$$ny_{i,t} = \alpha_i + \beta_1 ny_{sau,t-1}^\perp + \beta_2 oil_t + \beta_3 r_t^{US} + \beta_4 y_t^{US} + \varepsilon_{i,t} \quad (1)$$

where $ny_{i,t}$ denotes the non-oil real GDP growth in country i in year t . $ny_{sau,t}^\perp$ denotes Saudi Arabia's non-oil real GDP growth shock that is orthogonal to all the other variables, computed as residuals from regressing Saudi Arabia's non-oil real growth shocks—detrended non-oil growth rates—on all the other control variables.⁶ The orthogonalization helps reduce multicollinearity, as Saudi Arabia's non-oil real GDP growth is highly correlated with the real oil price and U.S. real GDP growth rate. Saudi Arabia's non-oil real GDP growth shock is then lagged to alleviate potential endogeneity problem and to allow for a lag in the transmission of potential spillovers.⁷

⁴ In 2016, oil and gas production constituted on average about 42 percent of total real GDP in GCC countries.

⁵ As a robustness check, a linear time effect is included as an additional control variable as in IMF, 2013. We find its coefficient to be insignificant, and other results continue to hold.

⁶ A quadratic time trend is assumed. The key findings are robust to using alternative measures of Saudi Arabia's non-oil real GDP growth shock, including the HP filtered and Baxter-King filtered logged non-oil real GDP. In fact, these computed alternative measures are highly correlated with our baseline measure. The oil price is the only significant explanatory variable of Saudi Arabia's non-oil real GDP growth.

⁷ The endogeneity problem between Saudi non-oil real GDP growth shock and the dependent variable could arise from omitted variable bias. Specifically, there could be other factors that drive the comovements in the

Continued

Other controls include: α_i captures the country fixed effects. r_t^{US} denotes the U.S. real interest rate. oil_t denotes the real oil price, which is computed by first taking the simple average of three spot prices (Brent, West Texas Intermediate, and the Dubai Fateh), all in U.S. dollars per barrel, and then deflated by the U.S. CPI. The real oil price is then logged for an easier interpretation of its coefficient size (its coefficient can be interpreted as elasticity). y_t^{US} denotes the U.S. real GDP growth rate. $\varepsilon_{i,t}$ denotes the standard error.⁸

Our key variables of interest is β_1 , the coefficient on Saudi Arabia's non-oil real GDP growth shock. We expect β_1 to be positive as a favorable shock to Saudi Arabia's non-oil GDP could have a positive spillover effect on the non-oil real GDP growth in the rest of the GCC. Similarly, we expect β_4 , the coefficient on the U.S. real GDP growth to be positive. We also expect β_2 to be positive, since a higher oil price will boost consumption, confidence, and aggregate demand.⁹ We expect β_3 to be negative because domestic interest rates will move with U.S. interest rates because of the exchange rate pegs.

B. Empirical Findings

Regressions are estimated on a panel of five GCC countries (Saudi Arabia is excluded since its non-oil real GDP growth rate is included as one of the control variables) using annual data from 1991–2016.¹⁰ The panel is unbalanced because Oman's non-oil real GDP data has a structural break in 1998, hence we use its growth rates starting from 1999–2016.¹¹ The data are from national authorities and Haver. Summary statistics are presented in Table 1.

non-oil real GDP growth rates across the GCC, but not included in the specification. Lagging Saudi Arabia's non-oil real GDP growth shock does not entirely solve this endogeneity problem, as the growth shocks could be correlated over time. As an additional robustness check, lagged dependent variable is included as an additional control to capture potential lagged GCC common shocks, and the findings continue to hold.

⁸ To control for both cross-country and cross-time correlations in the error terms, Driscoll-Kraay (1998) standard errors are computed. The error structure is assumed to be heteroskedastic, autocorrelated, and possibly correlated between panels. Driscoll-Kraay standard errors are robust to very general forms of cross-sectional and temporal dependence, especially when the time dimension becomes large.

⁹ If government spending is countercyclical to the oil price—governments spend more when oil price is lower—oil price could have ambiguous impact on non-oil output. As a robustness check, we include the lagged real government spending growth rate as an additional control. The key findings remain the same and the coefficient on real government spending is positive and insignificant. β_2 is found to be insignificant (Table 2), one reason could be oil prices are correlated with US real interest rate and real growth. When we regress real non-oil growth on only oil prices, the coefficient on oil prices becomes significant.

¹⁰ Quarterly GDP data is only available for Bahrain, Qatar, and Saudi Arabia. The time coverage is limited by the starting point of the Saudi quarterly GDP data—2011 Q1—and hence the year-on-year growth rate, which could be used for the regression, only starts in 2012Q2.

¹¹ Prior to 1998, a different methodology was used to measure Oman's non-oil GDP—it was computed as a residual term of the GDP.

Continued

Table 2 reports panel regression and individual country regression results.¹² Though the panel regression finds positive and significant real spillovers from Saudi Arabia to the rest of the GCC, individual country regression results reveal that the real spillover only exists in Bahrain. Specifically, a one percent positive shock to Saudi Arabia's non-oil real GDP is associated with a 0.8 percent increase in Bahrain's non-oil real GDP in the subsequent year. For the other four GCC countries, the coefficient of Saudi non-oil growth is correctly signed, but not significant. This finding is consistent with the strong linkage between Bahrain and Saudi Arabia found in Section II.

Table 1. Summary Statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum	Sample period
GCC non-oil real GDP growth rate ¹	122	6.98	6.40	-12.54	38.72	1991-2016
Saudi Arabia's non-oil real GDP growth rates	26	4.86	2.70	0.23	9.55	1991-2016
US real interest rate	26	0.46	1.85	-2.95	3.75	1991-2016
real oil price	26	55.87	31.26	19.25	110.98	1991-2016
US real GDP growth rate	130	2.43	1.68	-2.78	4.69	1991-2016
GCC equity daily returns ¹	22,026	0.02	0.98	-11.45	12.98	Jan 2004-Aug. 2018
GCC 10-year government bond spreads (bpt) ²	9,353	241.04	116.38	2.94	699.03	Oct. 2016-Aug. 2018
Saudi Arabia equity daily return	3,692	0.01	1.15	-9.81	9.47	Jan 2004-Aug. 2018
Saudi Arabia 10-year government bond spread	679	121.72	15.28	91.70	175.95	Oct. 2016-Aug. 2018
US equity return	3,692	0.03	1.15	-9.03	11.58	Jan 2004-Aug. 2018
VIX index	3,692	18.49	8.87	9.12	78.67	Jan 2004-Aug. 2018
EMBI global bond spread	679	335.92	25.96	287.00	398.00	Jan 2004-Aug. 2018

Notes: 1. Exclude Saudi Arabia. 2. Exclude Saudi Arabia and Kuwait.

Table 2. Determinants of the GCC Non-Oil Real GDP Growth

VARIABLES	GCC-Panel	Bahrain	Kuwait	Oman	Qatar	UAE
<i>Saudi non-oil real GDP growth shock (lagged)</i>	0.593*** (0.176)	0.794** (0.286)	0.444 (0.338)	0.339 (0.246)	0.838 (0.531)	0.461 (0.416)
Global variables						
<i>US real interest rate</i>	0.350 (0.869)	-0.716 (0.836)	0.517 (1.211)	0.420 (0.913)	1.948 (1.563)	-0.532 (0.838)
<i>Logged real oil price</i>	2.540 (2.780)	1.011 (1.989)	-0.262 (4.328)	6.460** (2.598)	12.46** (4.899)	-5.308 (3.547)
<i>US real GDP growth</i>	0.442 (0.393)	0.558 (0.446)	0.551 (0.942)	0.0137 (0.642)	0.0936 (0.846)	0.833 (0.764)
<i>Constant</i>	-4.312 (11.08)	0.367 (7.801)	4.758 (17.85)	-19.96* (10.70)	-40.74* (19.81)	26.85* (15.14)
Country FE	Yes	No	No	No	No	No
Number of countries	5	1	1	1	1	1
R-squared	0.088	0.334	0.087	0.433	0.392	0.342
Observations	122	26	26	18	26	26
Sample coverage	1991-2016	1991-2016	1991-2016	1999-2016	1991-2016	1991-2016

Notes: 1. *** p<0.01, ** p<0.05, * p<0.1; 2. Driscoll-Kraay standard errors are reported in the parentheses in the first column; 3. Robust standard errors are reported in the parentheses in the second-sixth columns; 4. Saudi non-oil real GDP growth shocks are orthogonalized to the global variables to reduce multicollinearity.

¹² As a robustness check for the individual country regression results, the interactions of Saudi Arabia's non-oil real growth shock and Kuwait, Oman, Qatar, and UAE country dummies are included as additional controls in the panel regression, and we continue to find only a significant Saudi spillover in Bahrain.

IV. EMPIRICAL EVIDENCE OF FINANCIAL MARKETS COMOVEMENTS

This section examines the impact of developments in Saudi Arabia's equity and bond markets on the rest of the GCC.

A. Empirical Strategy

We follow the approach of IMF (2016b) that studies the impact of shocks from the major emerging markets on equity markets in the rest of the world. Specifically, for equity market spillovers, we consider the following panel regression specification:

$$e_{i,t} = \alpha_i^e + \beta_1^e G_t^e + \beta_2^e e_{SAU,t-1} + \sum_{k=1}^{30} \beta_{3+k}^e e_{i,t-k} + \varepsilon_{i,t}^e \quad (2)$$

where $e_{i,t}$ is the daily equity market return (computed from the respective stock market index) in country i at date t , so $e_{i,t-k}$ is the k -period lagged dependent variable. G_t^e is a vector of global variables including the daily change in the oil price, U.S. equity market returns (computed from the S&P500 index), and the VIX, which captures global uncertainties).¹³ $e_{SAU,t}$ is Saudi Arabia's daily equity market return that is orthogonal to the global variables G_t^e to reduce multicollinearity (computed as the residuals by regressing Saudi Arabia's daily equity market returns on its 30 lags and the vector of global variables G_t^e). $e_{SAU,t}$ is lagged to alleviate the potential endogeneity problem. And finally α_i^e capture the country fixed effects and $\varepsilon_{i,t}^e$ is standard error term.¹⁴

Similarly, we investigate the impact of Saudi Arabia's bond market on the rest of the GCC using the following regression specification:

$$s_{i,t} = \alpha_i^s + \beta_1^s G_t^s + \beta_2^s s_{SAU,t-1} + \sum_{k=1}^{30} \beta_{3+k}^s s_{i,t-k} + \varepsilon_{i,t}^s \quad (3)$$

where $s_{i,t}$ is the 10-year government bond spread (over the 10-year U.S. government bond yield) in country i on date t , so $s_{i,t-k}$ is the k -period lagged dependent variable. We look at spreads instead of interest rates to eliminate the impact of US interest rates and to focus on the risk premium. G_t^s is a vector of global variables including daily change in oil price, the

¹³ US variables are lagged to account for the time differences. Additionally, to account for the difference in weekends (weekends are on Friday and Saturday in the GCC), US Friday data is used as RHS variable for the GCC Sunday and Monday LHS variable.

¹⁴ In line with Section III, Driscoll-Kraay standard errors are computed to control for both cross-country and cross-time correlations in the error terms for both regressions (2) and (3).

Continued

EMBI global spread, and VIX. $s_{SAU,t}$ is Saudi Arabia's 10-year government bond spread shocks that is orthogonal to the global variables G_t^S (computed as the residuals by regressing Saudi Arabia's 10-year government bond spread on its 30 lags and the vector of global variables G_t^S) to reduce multicollinearity. $s_{SAU,t}$ is lagged to alleviate potential endogeneity problem. And finally α_i^S captures country fixed effects and $\varepsilon_{i,t}^S$ is standard error term.¹⁵

Our key variables of interest are β_2^e and β_2^s , the coefficients on Saudi Arabia's equity market return and bond spread shocks. We expect them to be positive as positive shocks to Saudi Arabia's equity market returns and bond spreads are likely to have a positive impact on the equity market returns and bond spreads in the rest of the GCC.

B. Empirical Findings

The equity market returns regression is run on a panel of GCC countries excluding Saudi Arabia (because its equity return is a control variable) using daily frequency data from January 1, 2004 to August 30, 2018. The panel is unbalanced as Bahrain's daily equity index is only available from the end of 2005 onwards.¹⁶ The sample is smaller for 10-year government bond spreads because Kuwait has not issued any 10-year government bonds and hence is not in the sample. The sample period for bond spreads is also shorter because Saudi Arabia did not issue any 10-year government bonds in international markets until October 2016, which determines the starting point of the sample (the last data point is August 30, 2018). All the data used in this section are from Bloomberg and the summary statistics are presented in Table 1 (See Section III.B). Tables 3 and 4 present the regression results of specifications (2) and (3).

¹⁵ In line with Section III, Driscoll-Kraay standard errors are computed to control for both cross-country and cross-time correlations in the error terms for both regressions (2) and (3).

¹⁶ There were structural changes in the construction of VIX at end-2003 and the Bahrain stock index in 2005.

Table 3. Determinants of the GCC Equity Returns

VARIABLES	GCC-Panel	Bahrain	Kuwait	Oman	Qatar	Dubai	Abu Dhabi
<i>Saudi equity return shock (lagged)</i>	0.064*** (0.014)	0.036*** (0.009)	0.058*** (0.012)	0.061*** (0.017)	0.071*** (0.023)	0.114*** (0.030)	0.060*** (0.023)
<i>Δoil price</i>	0.032*** (0.008)	0.002 (0.006)	0.023*** (0.008)	0.055*** (0.011)	0.039*** (0.014)	0.037** (0.016)	0.034*** (0.012)
<i>US equity return</i>	0.140*** (0.024)	0.026** (0.012)	0.045*** (0.014)	0.119*** (0.024)	0.241*** (0.030)	0.247*** (0.041)	0.169*** (0.027)
<i>VIX</i>	-0.006* (0.004)	-0.006** (0.003)	-0.007** (0.003)	-0.005 (0.005)	-0.005 (0.007)	-0.011 (0.008)	-0.004 (0.005)
<i>Constant</i>	0.039 (0.117)	0.210*** (0.064)	0.156** (0.068)	0.126 (0.089)	0.267** (0.127)	0.467*** (0.156)	0.217** (0.098)
Country fixed effects	Yes	No	No	No	No	No	No
R-squared	0.07	0.06	0.08	0.14	0.11	0.09	0.09
Observations	21,276	3,433	3,572	3,572	3,572	3,555	3,572
Number of stock markets	6	1	1	1	1	1	1

Note: 1. Driscoll-Kraay standard errors in parentheses in the first column; 2. Robust standard errors in parentheses in the second-sixth columns; 3. *** p<0.01, ** p<0.05, * p<0.1; 4. All regressions include 30 lagged dependent variables and year fixed effects, whose coefficients are omitted here to save space.

Table 4. Determinants of the GCC Bond Spreads

VARIABLES	GCC-Panel	Bahrain	Oman	Qatar	UAE
<i>Saudi 10-year government bond spread shock (lagged)</i>	-0.017 (0.026)	-0.037 (0.074)	-0.031 (0.032)	-0.012 (0.018)	-0.009 (0.026)
<i>Δoil price</i>	-0.363** (0.141)	-0.463 (0.419)	-0.342* (0.177)	-0.259* (0.135)	-0.505*** (0.164)
<i>EMBI Global Spread</i>	0.020* (0.011)	0.049 (0.038)	0.048*** (0.016)	0.003 (0.009)	0.084*** (0.019)
<i>VIX</i>	0.017 (0.084)	0.125 (0.136)	0.017 (0.106)	-0.162** (0.077)	-0.019 (0.093)
<i>Constant</i>	-1.515 (3.970)	-13.175 (11.770)	7.637 (4.999)	6.688 (5.943)	-22.785*** (5.497)
Country fixed effects	Yes	No	No	No	No
R-squared	0.94	0.98	0.94	0.99	0.95
Observations	1,464	366	366	366	366
Number of countries	5	1	1	1	1

Note: 1. Driscoll-Kraay standard errors in parentheses in the first column; 2. Robust standard errors in parentheses in the second-sixth columns; 3. *** p<0.01, ** p<0.05, * p<0.1; 4. All regressions include 30 lagged dependent variables, whose coefficients are omitted here to save space; 5. Kuwait does not have any outstanding 10-year government bond.

First, we find that Saudi Arabia's equity market movements have a statistically significant impact on the equity markets in the rest of the GCC, after controlling for oil prices and global market developments. Specifically, a one percentage point increase in Saudi equity market returns is associated with a 0.06 percentage point increase in the rest of the GCC equity returns in the subsequent day.¹⁷ Global variables including oil price and VIX play an important role in explaining the GCC equity market movements. Higher oil prices improves equity returns, probably because it lifts investor confidence. A higher VIX, implying higher global uncertainties, lowers equity returns—possibly because global institutional investors would sell their holdings in the GCC equity markets.

Movements in Saudi Arabia's 10-year government bond spreads do not seem to affect those of the rest of the GCC, as indicated by the statistically insignificant coefficient. In fact, most of the movements in the spreads are explained by their own lags, and oil prices, and EMBI global spreads.¹⁸ A larger oil price increase narrows the GCC bond spreads, while wider EMBI global spreads are related to wider GCC bond spreads. These results are consistent with previous findings in the literature (IMF, 2016b) that financial spillovers from major emerging economies are significant in the equity markets, but not in the bond markets; and most of the movements in the bond markets are explained by the global factors. Of course, the sample period for the bond market regressions is also very short.

V. CONCLUSION

This paper has examined real and financial spillovers from Saudi Arabia to other GCC countries. Growth spillovers from Saudi Arabia to Bahrain are sizeable and statistically significant, but those to other GCC countries are not significant. Small, but statistically significant, spillovers from the Saudi equity market to the other GCC equity markets were also found, but no regional spillovers were found in the bond markets which are influenced by global indicators. Increased intra-GCC trade and financial linkages in the context of diversification initiatives could provide stronger outcomes in the future.

¹⁷We also find significant spillover from Dubai stock market—a regional financial center—to the stock markets in the rest of the GCC, and the size of the spillover is half of that from the Saudi stock market. We find no significant spillovers from any other GCC stock market—an evidence that the spillovers from Saudi and Dubai stock markets are not capturing omitted GCC-specific factors.

¹⁸ The key findings continue to hold when we use change in bond spreads as the dependent variable.

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