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White elephants on quicksand: Low oil prices and high geopolitical risk

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Abstract

We investigate the effects of low oil prices and heightened geopolitical risks on economic growth and investment in Middle East and North Africa (MENA) countries. We find that negative shocks to oil prices and positive shocks to geopolitical risk have adverse effects on GDP and investment. Moreover, we find that the impact of investment on GDP in MENA countries is muted when oil prices are low and/or geopolitical risk level is high. These findings cast doubts on the prospects of mega-project economic transformation plans as envisioned in 2030 visions for several MENA countries.

KEYWORDS

economic growth, geopolitical risk, global VAR, mega investment projects, MENA, new normal, oil price shock

1 | INTRODUCTION

A sharp decline in oil prices in Spring 2014 may have heralded the dawn of a new era of relatively low oil prices – occasional short-lived rallies notwithstanding. A structural shift has occurred in oil markets – due to alternative sources of supply, declining energy-intensity of output and muted demand due to global economic deceleration and fear of impending global recession. Thus, Brent prices have declined from their 2014 peak of $115 per barrel to a level of around $60–$70 in 2019 and near $50 by the end of 2020. New waves of geopolitical strife have failed to bring oil prices above these levels, and we can argue that current prices include a geopolitical risk premium that may be excessive. In the event, the OPEC cartel's oil-market power has declined substantially, even in cooperation with Russia, in large part due to actual and potential tight oil production from North America. Setbacks in global environmental reforms notwithstanding, the effects of climate change and rising awareness in civil society are likely further to contribute to increased energy efficiency in production and pursuit of cleaner sources of energy. Thus, despite heightened geopolitical risk and futures market speculation fueled by massive financial liquidity injections from central banks, oil prices have remained below the levels required for major oil producers to balance their budgets. Even major oil supply disruptions during 2019, which have affected Saudi Arabia, Iran, and Venezuela,[1] have merely led to temporary blips in oil prices.[2]

Therefore, there is little doubt that the golden age of oil has passed, and major oil exporters are thus finding new urgency to diversify their economies. This urgency is not new in itself, as the need for diversification, and plans to bring it about, have been a staple of MENA oil-exporter policy programs for decades. An old joke from the 1990s was popular among analysts: At $40 per barrel, MENA exporters said that "reform was essential and urgent," at $70 per barrel, they thought that "reform was important but had to wait," and at $90 per barrel, they asked "what reform?" However, MENA oil exporters recognize that this episode of low oil prices is different from earlier ones: While estimates of the year that oil demand will peak may differ, they all agree that the peak is not too far into the future, and even if oil prices were to rise dramatically due to major synchronized production disruptions, such episodes will likely be mild and short lived.

Unfortunately, earlier attempts to diversify MENA economies, which were initiated during low-oil-price episodes, have resulted mainly in construction-intensive "white elephant" projects, which have left behind hugely underutilized industrial and educational cities, and the like. A new wave of economic reform and transformation plans have been announced in various MENA countries. Those plans are best known as 2030 visions in Saudi Arabia, Bahrain, Qatar and United Arab Emirates (and vision 2035 in Kuwait). The objectives of those plans have been admirable: Bahrain's 2030 vision aims to double household disposable income and diversify the economy. In addition to aiming to achieve sustainable growth rates, Qatar's 2030 vision aims also to reduce the country's dependence on hydrocarbon industries gradually. Likewise, Kuwait's 2035 aims to develop a diversified economy to reduce the country's dependence on oil export revenues. Saudi Arabia aims to reduce the rate of unemployment from 11.6 to 7 percent and increase the share of non-oil exports in GDP. UAE's 2030 vision aims to reduce GDP volatility through diversification. Egypt, a relatively more diversified economy but still dependent on petrodollars recycled through real-estate investment and remittances from oil-rich countries, has also announced its own 2030 economic development plan.

The main ingredient in most of these economic development plans, like all preceding ones during the 1990s and earlier, has been to boost growth and wean economies away from oil dependence through massive investments, mainly in infrastructure mega-projects. Like the white elephant projects of previous decades, there has been virtually no coordination to develop regional diversification that may lead to greater intra-regional trade that enhances growth prospects, c.f. El-Gamal (2016). Without the latter, the hope to attract foreign investors in sectors that are not directly or indirectly tied to oil and gas is likely to prove as fanciful as it had in the past. Without high oil prices, availability of cheap capital is declining in the region, which reduces the incentive for foreign investors to bring their funds to the region with expectations of cheap leverage to boost returns. Simultaneously, heightened geopolitical risk and potential for political instability have been push factors driving investors away from the region, c.f. Abdel-Latif (2019).

In this paper, we provide quantitative assessments of the prospects for mega investment projects to boost economic growth in the MENA region.[3] We use a quarterly dataset of 53 countries, including 15 MENA countries, over the period 1979Q1–2017Q2. We build on our earlier work, c.f. Abdel-Latif and El-Gamal (2020), using a global

[1]The US sanctions on crude sales from Venezuela cut its oil exports by a third in 2019; see https://www.reuters.com/article/us-venezuela-oil-exports-idUSKBN1Z627P.

[2]Average crude oil price in 2019 was US$64/bbl which is $7/bbl lower than that of 2018. The 2019 Brent oil price has also evolved within narrower price ranges (between $55/bbl and $75/bbl) compared to recent years, and price by the end of 2020 was near $50/bbl.

[3]Many of the world's most oil-reliant countries reside in the MENA region, and these include Saudi Arabia, Qatar, Kuwait, Libya, Iran.

vector autoregression (GVAR) model in which countries are linked through bilateral trade, and in which we had modelled spillovers and common shocks explicitly. In the current study, focused on shorter-term effects of low oil prices and heightened geopolitical risk, we use a different set of sign restrictions to identify differentially oil price reductions that are due to increased supply or reduced demand, which we describe in detail in the next section. Specifically, we study how investment and GDP in MENA countries are affected by the likely events of negative shocks to oil prices and/or positive geopolitical shocks.

We further study the direct relationship between investment and GDP growth in MENA countries in order to assess the likelihood of vision 2030 mega-projects producing the non-energy-sector growth that they promise. Toward that end, we supplement the analysis of traditional impulse response functions (IRFs) from the global VAR model with a set of regime-specific local projections IRFs (LPIRFs), fusing the methodology outlined in Jordà (2005) by estimating the parameters sequentially at each point of interest. This technique is known to be robust to model misspecification and can accommodate model nonlinearity, c.f. Barnichon and Brownlees (2019). We use it to divide the data into two regimes each of low versus high oil prices and/or low versus high geopolitical risk. Of particular interest will be the LPIRFs that allow us to study the effects of investment on GDP growth during periods of low oil price and high geopolitical risk.

We have argued substantively that the effect of investment on GDP growth is enhanced during periods of high oil prices by low cost of capital that invites foreign investors, and depressed during periods of low oil prices when capital is not as cheap in local markets. We have further argued that periods of heightened geopolitical risk and potential political instability are likely to drive foreign investors away from regional markets. Thus, we expect that periods of low oil prices and heightened geopolitical risk will be particularly bad for the return on the mega-project investments envisioned in various countries' visions 2030. Our empirical findings confirm that a negative shock to oil prices causes GDP and investment levels to fall, regardless whether the price decline was driven by demand or supply forces. A positive shock to the level of geopolitical risk has the same effect, leading to decline in GDP and investment in MENA countries. Furthermore, a positive shock to country-level investment has no effect on GDP for any MENA country if it coincides with a simultaneous incidence of negative shock to oil prices and positive shock to geopolitical risk. Finally, our LPIRFs show that the effects of investment changes on GDP growth are likely to be muted during sustained periods of low oil prices and/or high geopolitical risk. Therefore, empirical evidence suggests that potential success of MENA countries' visions 2030 is highly unlikely.

2 | DATA AND METHODOLOGY

Our dataset consists of quarterly data from the first quarter of 1979 to the second quarter of 2017 for the 53 countries listed in Table A1. The variables of interest are GDP, investment, oil price, oil production and a measure of geopolitical risk described below. While GDP and investment are country level series, the rest of the variables are at the global level. We used industrial production as a proxy for GDP. For country level investment series, we used gross capital formation. To construct the weighting matrix described in Section 2.1, we used official bilateral trade data from the directions of trade statistics (DOTS) of the IMF. For oil price, we used Brent price of crude oil (in USD per Barrel). To measure geopolitical risk, we used the GPR index constructed by Caldara and Iacoviello (2016) based on news article data.

We construct a multi-country GVAR model to study the effects of oil price and geopolitical shocks on country GDP and investment levels. We impose a set of sign restrictions to differentiate between oil price declines resulting from supply versus demand factors, and study the effects of geopolitical risk changes. GVAR models have been used in several studies to model spillover effects as well as oil price shocks – see, for example, Bettendorf (2017); Abdel-Latif and El-Gamal (2019), and the references therein. In addition to the GVAR results, we also estimate a set of non-linear IRFs to study the effects of investment changes on GDP in four distinct regimes of low versus high oil prices and low versus high geopolitical risk. This modeling approach was used in Barnichon and

Brownlees (2019) to investigate the impacts of monetary shocks on economic growth. In this section, we summarize the main features of our GVAR model and non-linear LP-IRFs approach. Empirical results from estimating these models are reported in Section 3.

2.1 | Global VAR model

We employ a global VAR model that accommodates country-specific domestic and foreign variables along with common shocks to oil prices or geopolitical risk. The model is built upon a sequence of $N+1$ country-specific VARX models, where X represents a set of weighted averaged foreign variables in addition to any global variables. A typical VARX model for country i includes the following variables: Real GDP and investment (as domestic variables), weighted averages of GDP and investment in other countries in the system, and unweighted global (common) variables, which are oil price, oil production, and geopolitical risk. Country-specific foreign variables and global variables are assumed to be weakly exogenous in country i model. Country i VARX models can be presented formally as follows:

$$\mathbf{x}_{it} = \sum_{j=1}^{p} \mathbf{A}_{ij}\mathbf{x}_{it-j} + \sum_{s=0}^{q} \mathbf{B}_{is}\mathbf{x}^{*}_{it-s} + \xi_{it} \tag{1}$$

where $\mathbf{A}_{ij},\ (j=1,\ldots,p)$ are $k_i \times k_i$ coefficient matrices, $\mathbf{B}_{is},\ (s=0,\ldots,q)$ are $k_i \times k_i^*$ coefficient matrices associated with the weakly exogenous variables in the model, and ξ_{it} are $k_i \times 1$ vectors of idiosyncratic serially uncorrelated country-specific shocks with a variance-covariance matrix $\sum_{it}$. Country-specific foreign variables are constructed using a bilateral trade based weight matrix ω_{it} as follows:

$$\mathbf{x}^{*}_{it} = \sum_{j=0}^{N} \omega_{ij}\mathbf{x}_{it}, \quad \text{for} \quad i \in 0,\ldots,N \tag{2}$$

We assume that geopolitical risk and oil prices are endogenous in the US model and that oil production is endogenous in the Saudi model. As possessor of the world's largest economy and military, the US foreign policy can unilaterally affect global economics and politics.[4] The active role the US plays in shaping the geopolitics of the MENA region is another reason for our chosen specification.[5] Thus, it is reasonable to include geopolitical risk as an endogenous variable in the US model while treating it as weakly exogenous in other countries' models. Moreover, the US is the world's top oil consumer (see Figure A1 in the Appendix A) and therefore has a significant influence on oil demand and prices. Cashin et al. (2014) incorporate oil price as endogenous in the US model of their GVAR application for the same reason. On the oil supply front, Mohaddes and Pesaran (2016) show that a negative shock to Saudi oil output would have significant impacts on global real output and financial markets. They show that a disruption to Saudi oil supply can not be compensated by other producers who are producing at or near capacity. Therefore, we treat oil production as an endogenous variable in the Saudi model. The GVAR model is estimated on a country-by-country basis, and parameter estimates are stacked, based on the weight matrix, into a single 'global' VAR model,[6] which can be used to study the effects of different shocks in the system, which are summarized graphically in the paper using impulse response function plots (IRFs).

[4] The state power index, which ranks 168 countries according to different dimensions (security policy, diplomacy, defense, and culture), places the US as the most powerful country in the world, c.f. http://index.ineuropa.pl/en/.

[5] The US has military bases and deployed troops across the MENA region (in Bahrain, Djibouti, Iraq, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Turkey and United Arab Emirates). The recent unilateral US decision to kill Iranian Major General Soleimani, which continues to fuel geopolitical risk a year later, is a clear example of how US foreign policy and actions can shake up the whole region and elevate geopolitical risk.

[6] In this sense, the GVAR model can be seen as a massive (or global) VAR model.

IRFs obtained from the GVAR model offer a powerful analytical tool that tracks the responses of a system's variables to 'impulses' that are one-time shocks to other variables. In this regard, it is essential to identify the shocks correctly in order to interpret the IRFs meaningfully. Moreover, previous research has emphasized the importance of disentangling supply- and demand-driven shocks when studying oil price impacts. For the sake of identification, several research papers have relied on a priori assumptions either concerning contemporaneous dynamics (zero restrictions) or qualitative outcomes (sign restrictions). For example, Kilian (2009) estimated a structural VAR model imposing zero restrictions on instantaneous effects to identify supply and demand shocks assuming a vertical short-run supply curve. In another study, Kilian and Murphy (2014) employed a structural VAR with a combination of theoretically motivated sign restrictions and bounds on price elasticities to disentangle different types of oil price shocks. To differentiate between oil demand and supply shocks, Herwartz and Plödt (2016) adopted a different identification approach based on a priori assumptions concerning the shock generating distributions (i.e., statistical identification). In this paper, structural IRFs were found to be similar to those produced using zero and sign restrictions.[7]

Cashin et al. (2014) introduced the approach that we follow in this paper. They showed that sign restrictions can be used for shock identification within a GVAR framework. We apply sign restrictions to the IRFs obtained from our GVAR model to craft four scenarios and trace their impacts on country-level GDP and investment: (i) a positive shock to geopolitical risk; (ii) a supply-driven negative oil price shock; (iii) a demand-driven negative oil price shock, and (iv) a positive shock to country-level investment. Our primary focus is on scenarios in which oil prices fall and geopolitical risk rises. Thus, the first set of sign restrictions includes (a) a rise in geopolitical risk ($GPR > 0$), (b) a fall in oil production ($qoil < 0$), and (c) an increase in the oil price ($poil > 0$). The second group of sign restrictions is constructed as (d) an increase in oil supply ($qoil > 0$) and (e) a drop in the oil price ($poil < 0$). The third shock is identified as a result of the demand curve shift to the left where (e) oil price falls ($poil < 0$) and (f) oil production falls ($qoil < 0$). Finally, the fourth set of restrictions mimic a situation where country-level investment increases (> 0) while the level of geopolitical risks increase ($GPR > 0$) and oil price falls ($poil < 0$). The last scenario is similar to the recent and continuing environment in which 2030 visions have been formed and pursued. In plotting our results, we follow the example of Fry and Pagan (2011) by reporting the single model for which IRFs are closest to median values of the impulse vector (i.e., median target).

2.2 | Country-specific state-dependent IRFs

We investigate the asymmetric impacts of investment on GDP growth in times of low oil prices and high geopolitical risk. We estimate a set of local projection (LP) IRFs proposed by Jordà (2005). The LP-IRFs are more robust even when a (linear) VAR is misspecified. They also allow for a regime change either by using dummy variables or by computing state probabilities with a logistic function. The LPIRFs in their linear from can be obtained by estimating the following set of OLS regressions for each forecast horizon.

$$\mathbf{x}_{t+h} = \delta^h + \Lambda_1^h \mathbf{x}_{t-1} + \ldots + \Lambda_p^h \mathbf{x}_{t-p} + \mathbf{u}_{t+h}^h,\ h = 0, 1, \ldots, H-1 \tag{3}$$

where Λ are parameter matrices for lag p and forecast horizon h. $\mathbf{u}_{t+h}^h$ are autocorrelated and/or heteroscedastic disturbances. Λ_1^h is the slope coefficients matrix which represents the response of $\mathbf{x}_{t+h}$ to a reduced form innovation in time t. The structural IRFs are then estimated as follows:

$$\widehat{IR}(t, h, \mathbf{d}_i) = \Lambda_1^h \mathbf{d}_i \tag{4}$$

[7]Herwartz and Plödt (2016) find weak global demand and reduced precautionary demand for oil explain the drop in oil prices in 2008 and 2014.

where $\mathbf{d}_i = \Lambda_0^{-1}$. The shock matrix $\mathbf{d}_i$ can be identified from a linear VAR model. Since that the errors $\mathbf{u}_{t+h}^h$ are serially correlated, we estimate robust standard errors using the approach of Newey and West (1987).

Because we are interested in comparing the effects of investment on GDP growth in times of low oil prices and heightened geopolitical risk, we apply the nonlinear form of the LPIRFs. The framework in Equations (3) and (4) can be extended easily to accommodate a non-linear form. We follow Auerbach and Gorodnichenko (2012) who compute state probabilities using the following logistic function:

$$\begin{aligned} F(z_t) &= \frac{e^{(-\gamma z_t)}}{(1-e^{(-\gamma z_t)})'} \\ var(z_t) &= 1, E(z_t) = 0 \end{aligned} \tag{5}$$

z_t is normalized so that $\gamma > 0$ is scale-invariant. The observations for the two regimes are the product of the transition function and the endogenous variables:

$$\begin{aligned} &\text{Regime1} \quad (R1) : \mathbf{x}_{t-\ell} \times (1 - F(z_{t-1})), \quad \ell = 1, \ldots, p, \\ &\text{Regime2} \quad (R2) \quad : \mathbf{x}_{t-\ell} \times F(z_{t-1}), \quad \ell = 1, \ldots, p. \end{aligned} \tag{6}$$

The nonlinear structural IRFs are then estimated as follows:

$$\begin{aligned} \widehat{I}R^{R1}(t, h, \mathbf{d}_i) &= \widehat{\Gamma}_{1,R_1}^h \mathbf{d}_i, \quad h = 0, \ldots, H-1 \\ \widehat{I}R^{R2}(t, h, \mathbf{d}_i) &= \widehat{\Gamma}_{1,R_2}^h \mathbf{d}_i, \quad h = 0, \ldots, H-1 \end{aligned} \tag{7}$$

where $\widehat{\Gamma}_{1,R_1}^0 = I$ and $\widehat{\Gamma}_{1,R_2}^0 = I$. The coefficients matrices $\widehat{\Gamma}_{1,R_1}^h$ and $\widehat{\Gamma}_{1,R_2}^h$ are obtained from the following LPs:

$$\begin{aligned} \mathbf{x}_{t+h} &= \delta^h + \widehat{\Gamma}_{1,R_1}^h \mathbf{x}_{t-\ell} \cdot (1 - F(z_{t-1})) + \ldots + \widehat{\Gamma}_{p,R_1}^h \mathbf{x}_{t-\ell} \cdot (1 - F(z_{t-1})) \\ &+ \widehat{\Gamma}_{1,R_2}^h \mathbf{x}_{t-\ell} \cdot F(z_{t-1}) + \ldots + \widehat{\Gamma}_{p,R_2}^h \mathbf{x}_{t-\ell} \cdot F(z_{t-1}) + \mathbf{u}_{t+h'}^h \end{aligned} \tag{8}$$

with $h = 0, \ldots, H - 1$.

3 | EFFECTS OF POSITIVE GEOPOLITICAL AND NEGATIVE OIL PRICE SHOCKS

While the GVAR estimation that we conducted for this paper has included data for the 53 countries listed in Table A1, we report only the IRFs and LP-IRFs for the 15 MENA countries in our sample, which are the substantive focus of our study: Algeria, Bahrain, Egypt, United Arab Emirates, Iran, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia and Turkey. Clearly, this list includes both major energy exporters and others. In this regard, we have seen in our earlier GVAR analysis that oil prices and geopolitical risk have significant effects on GDP and investment in both oil exporting and other regional economies, c.f. Abdel-Latif and El-Gamal (2020).

We first report IRF results on the effects of positive shocks to geopolitical risk on GDP and investment in MENA countries. The IRFs for the effect of heightened geopolitical risk on GDP are plotted in Figure 1. They show that a one-time shock to geopolitical risk has a statistically significant adverse effect on GDP for all countries in the region for roughly five quarters, with some exceptions, such as Oman, for which the negative effect seems to be more persistent. Moreover, the negative effect on GDP is generally stronger in magnitude for oil exporting countries, albeit also substantial in secondary recipients of petrodollar receipts through workers' remittances, e.g. in Egypt, Jordan and Lebanon.

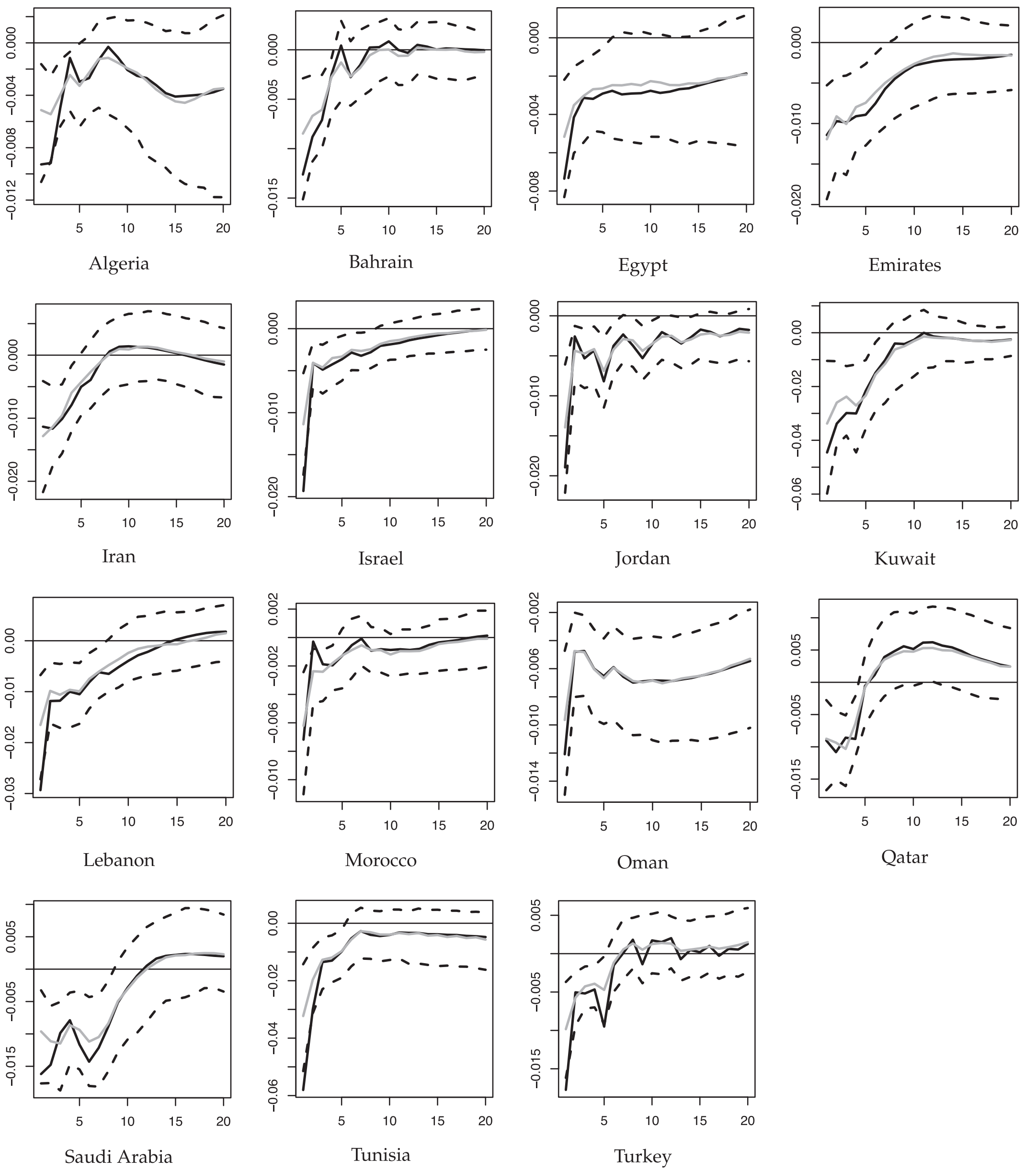

FIGURE 1 GDP response to a positive GPR shock. Figure shows the (sign restricted) GDP impulse response function to a one standard deviation shock to geopolitical risk index. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

The next set of IRFs, showing the effect of a positive shock to geopolitical risk on investment for each country, are shown in Figure 2. The pattern is generally similar to the effect of geopolitical shock on GDP, with statistically-significant negative effects on investment lasting approximately between 5 and 10 quarters in most countries. The notable exception to this duration of the negative effect is Israel, for which the statistically-negative impact on investment lasts longer than 10 quarters. It is also notable that the magnitude of the negative effect on investment is relatively small in major oil exporters, such as Saudi Arabia, reflecting the pattern that we have discussed

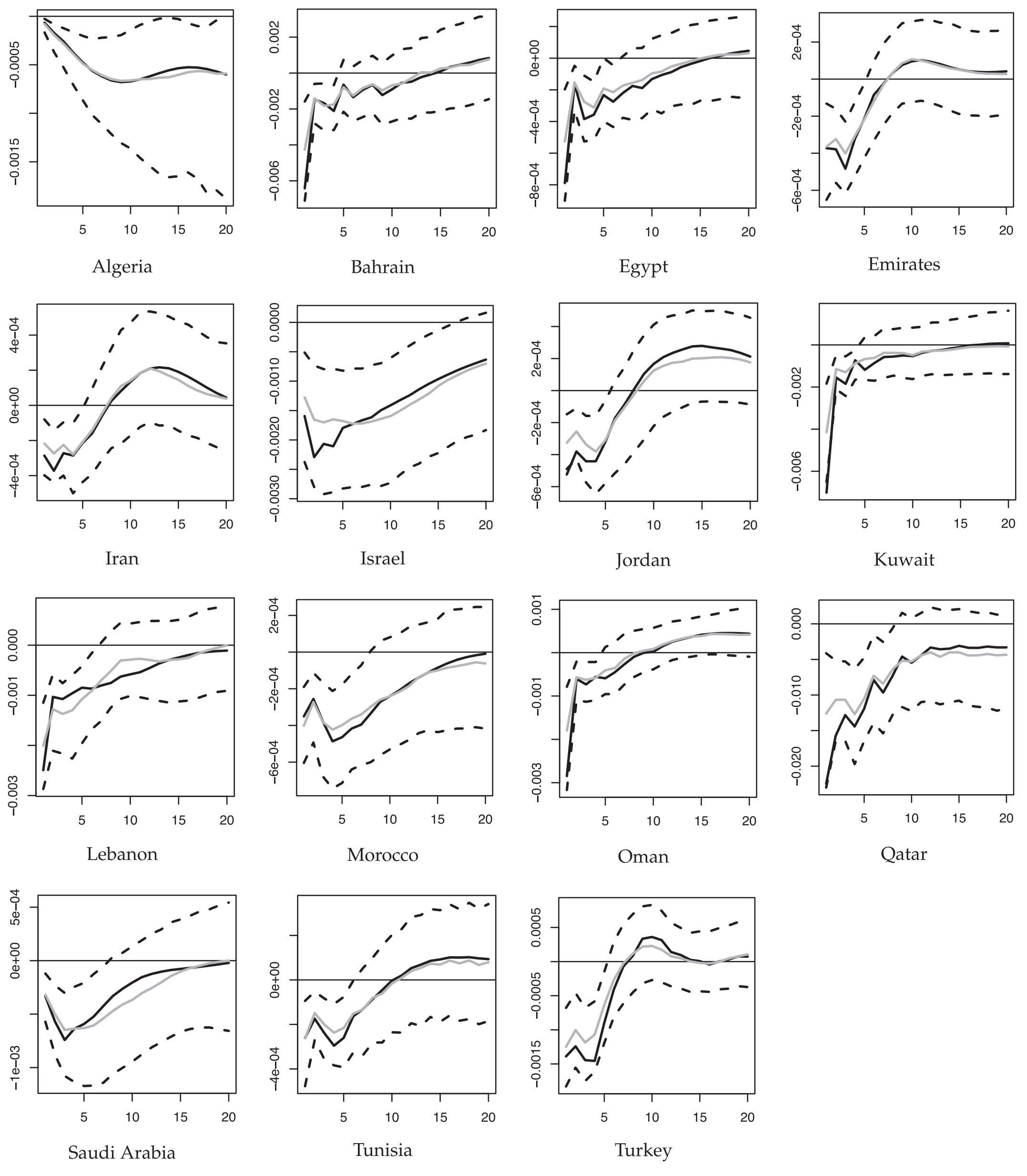

FIGURE 2 Investment response to a positive GPR shock. Figure shows the (sign restricted) investment impulse response function to a one standard deviation positive shock to geopolitical risk index. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

in the introduction, for those countries to boost investment in the hope of boosting non-oil GDP. This is the same pattern that is now being replicated at a larger scale in vision 2030 mega-project plans.[8]

[8]It should be noted that the GPR shock documented here is a global (common) geopolitical shock. It would have been interesting to include country-specific geopolitical risk and implement a shock to individual country GPR equations and trace its effects on other countries in the region. However, country-level GPR indices for MENA region countries are only available for Saudi Arabia and Turkey. As a sensitivity analysis, we have re-estimated our GVAR model, including country-specific GPR index in Turkey and Saudi Arabia equations while treating this variable as missing in other individual country equations. We found that country-specific GPR shocks in Saudi Arabia and Turkey did not seem to result in statistically significant growth or investment impacts in other countries in the region. We attribute these results to the modest levels of intra-region trade linkages. We omit plots from this analysis for space consideration, but they are available upon request.

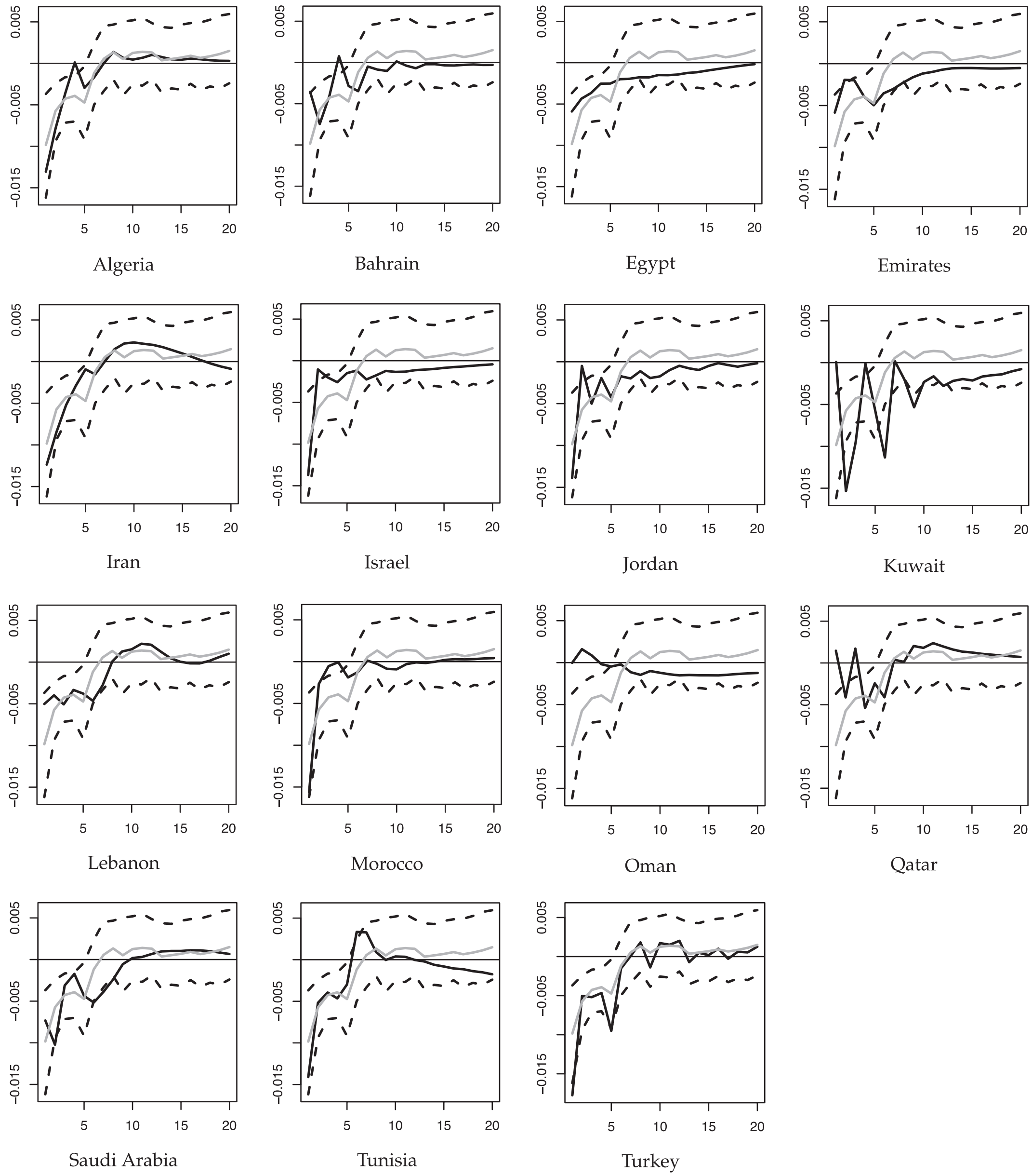

FIGURE 3 GDP response to a demand-driven negative oil shock. Figure shows the (sign restricted) GDP impulse response function to a one standard deviation (demand-driven) oil price negative shock. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

We now turn to the IRFs for the effects of a negative oil price shock on MENA country GDP and investment levels. The first set of results, plotted in Figure 3, show the effect of a demand-driven negative oil shock on GDP. The effect is again systematic throughout the region: Approximately 5 quarters of statistically-significantly lower GDP following a demand-driven negative shock to oil prices. Moreover, the magnitude of this effect is approximately the same, percentage-wise, for all countries in the region.

Next, we consider the IRFs for the effects of a negative oil price shock on investment, which are plotted in Figure 4. Again, we find that the effect of a negative oil price shock on investment is uniformly negative and statistically significant for about 5–10 quarters in all MENA countries in the sample. Moreover, the magnitude of the negative response of investment to demand-driven negative oil price shock is approximately the same, percentage-wise, for most regional countries, with the notable exception of Qatar, for which the percentage impact is approximately double that for other countries.

We now turn to supply-driven negative shocks to oil prices. Figures 5 and 6, respectively, show plots of the IRFs of GDP and investment to such shocks. The results in those two figures are generally very similar to their counterparts for demand-driven negative oil-price shocks, which are shown in Figures 3 and 4, respectively. This is consistent with the results of Caldara et al. (2019), who find that supply and demand shocks play an equally important role in explaining oil price and quantity changes.

We conclude that the negative effects on regional countries' GDP and investment levels do not vary by the type of oil shock (demand vs. supply driven), which is consistent with our explanation in Abdel-Latif and El-Gamal (2020) – that the effect works in large part through petrodollars and their marginal effect on global financial liquidity. Combining the sets of results for IRFs for positive geopolitical risk or negative oil price shock thus yields the result that both investment and GDP have suffered from either shock, and, therefore, the effects on investment and GDP are likely to be particularly severe in the current regime of low oil prices and heightened geopolitical risk, both of which contribute negative disincentives for international investors.

Finally, we use the IRFs obtained from our GVAR model to examine the impact of a shock to country-specific investment on its GDP growth. We are particularly interested in a case where investment increases, oil prices fall, and geopolitical risk rises. Figure 7 shows the GDP impulse response functions for a positive shock to country-level investment subject to negative sign restrictions on oil prices and positive sign restrictions on geopolitical risk. The GDP responses seem to be statistically insignificant, albeit positive, in all MENA countries except Lebanon.

The current regime, however, is characterized less by negative shocks to oil prices and positive shocks to geopolitical risk, and more by prolonged periods of low oil prices and heightened geopolitical risk. Moreover, previous research has shown evidence of asymmetric impacts of oil price shocks (Çatık and Önder (2013), Malikov (2016), and Abdel-Latif et al. (2018)). For example, Malikov (2016) used a nonparametric IRF-density-based test to study asymmetries in dynamic impulse responses of macroeconomic aggregates to positive and negative oil price shocks. Therefore, we need to supplement our analysis by conducting local projections, as discussed in Section 2, for regimes of sustained low oil prices and heightened geopolitical risk. We turn to this exercise in the following section.

4 | COUNTRY-SPECIFIC REGIME SWITCHING IRFS

We first report the local projection IRFs (LPIRFs) for the effect of a boost in investment on GDP under low versus high oil price regimes. The LPIRFs for MENA countries under the two regimes are shown in Figure 8. For each country, the two plots represent LPIRFs under high oil prices in the top graph and low oil prices in the bottom graph.

For Algeria, Bahrain, UAE, Kuwait, and to some extent Iran, a positive shock to investment results in a significant and sustained jump in GDP during times of high oil prices. For Egypt, Israel, Jordan, Lebanon, Oman, Tunisia and Turkey, the effect of a positive investment shock on GDP is still positive during periods of high oil prices, but much more muted than the effect shown in the previous group of oil exporters. During periods of low oil prices, the effect of a positive shock to investment on GDP is mostly statistically insignificant, and negative for the few cases where it is significant (e.g. in the case of Egypt with long lag or Saudi Arabia, Oman, and Qatar with short

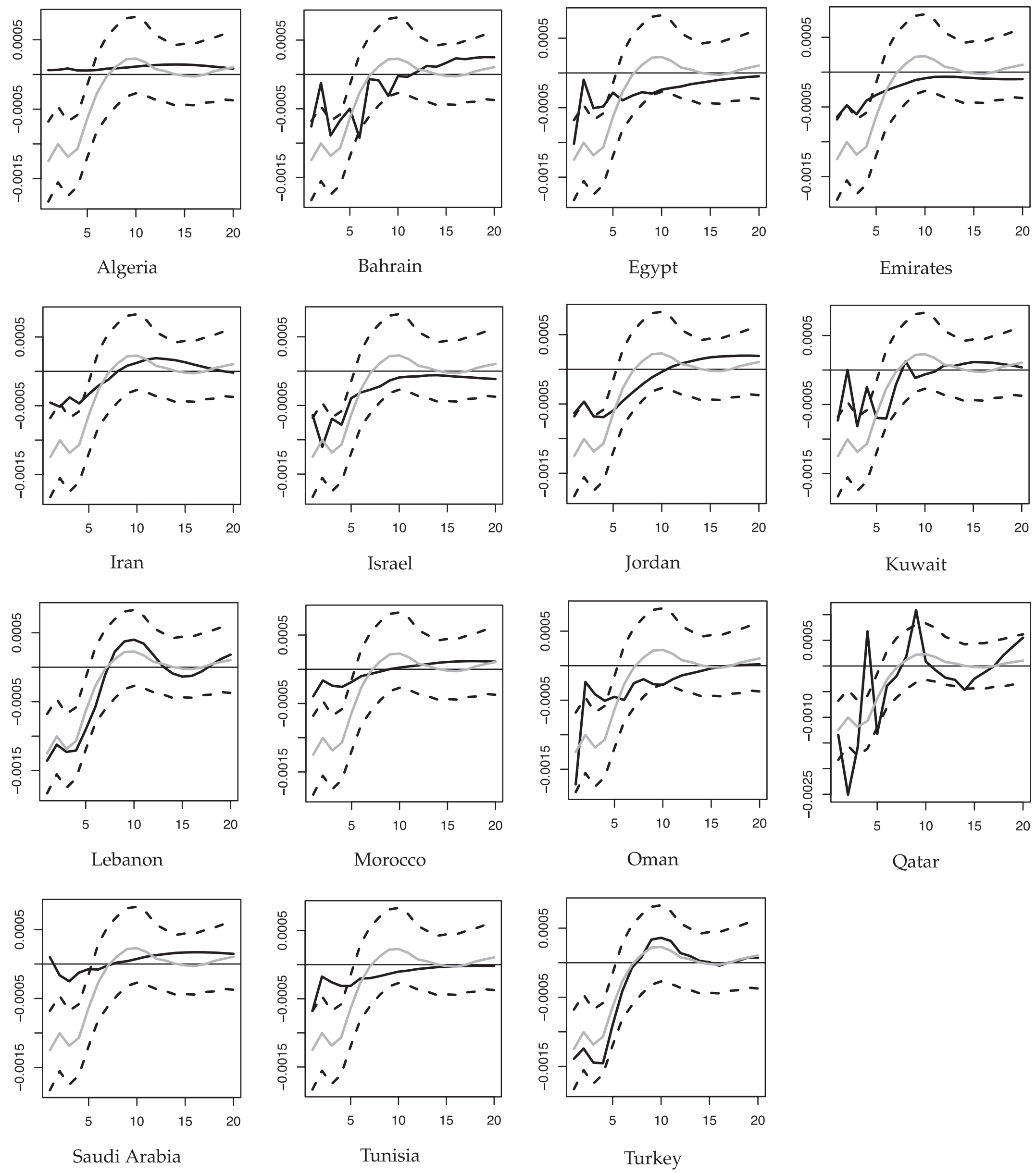

FIGURE 4 Investment response to a demand-driven negative oil shock. Figure shows the (sign restricted) investment impulse response function to a one standard deviation (demand-driven) oil price negative shock. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

lags). Consequently, we can conclude that countercyclical boosts to investment during periods of low oil prices have not had a positive effect on GDP, as vision 2030 plans had hoped they would.

The LPIRFs for responses of GDP to positive shocks in investment for each country under low (bottom graph) and high (top graph) levels of geopolitical risk are shown in Figure 9. The results show that during periods of low geopolitical risk, a positive shock to investment can have a statistically significant positive effect on GDP in

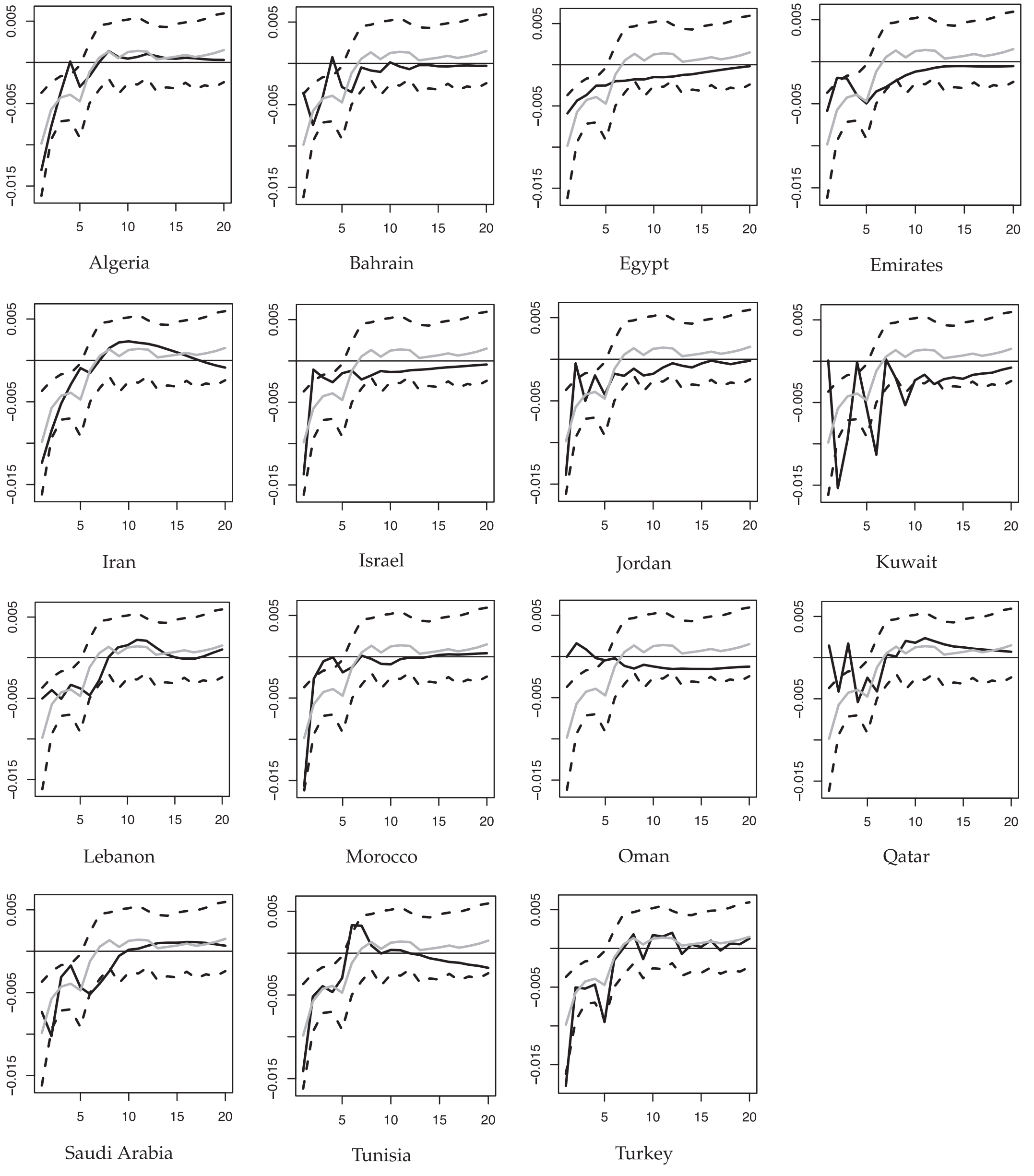

FIGURE 5 GDP response to supply-driven negative oil price shock. Figure shows the (sign restricted) GDP impulse response function to a one standard deviation (supply-driven) oil price negative shock. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

Algeria, UAE, Iran, Kuwait, Morocco, Oman, Saudi Arabia, and Turkey. However, during periods of high geopolitical risk, all countries with the exception of Israel show either negative or statistically insignificant effects of a positive shock to investment on GDP.

Therefore, combining the results from Figures 8 and 9, we conclude that boosts in investment during periods of low oil prices and/or high geopolitical risk are most likely ***not*** to result in the positive effect on GDP that

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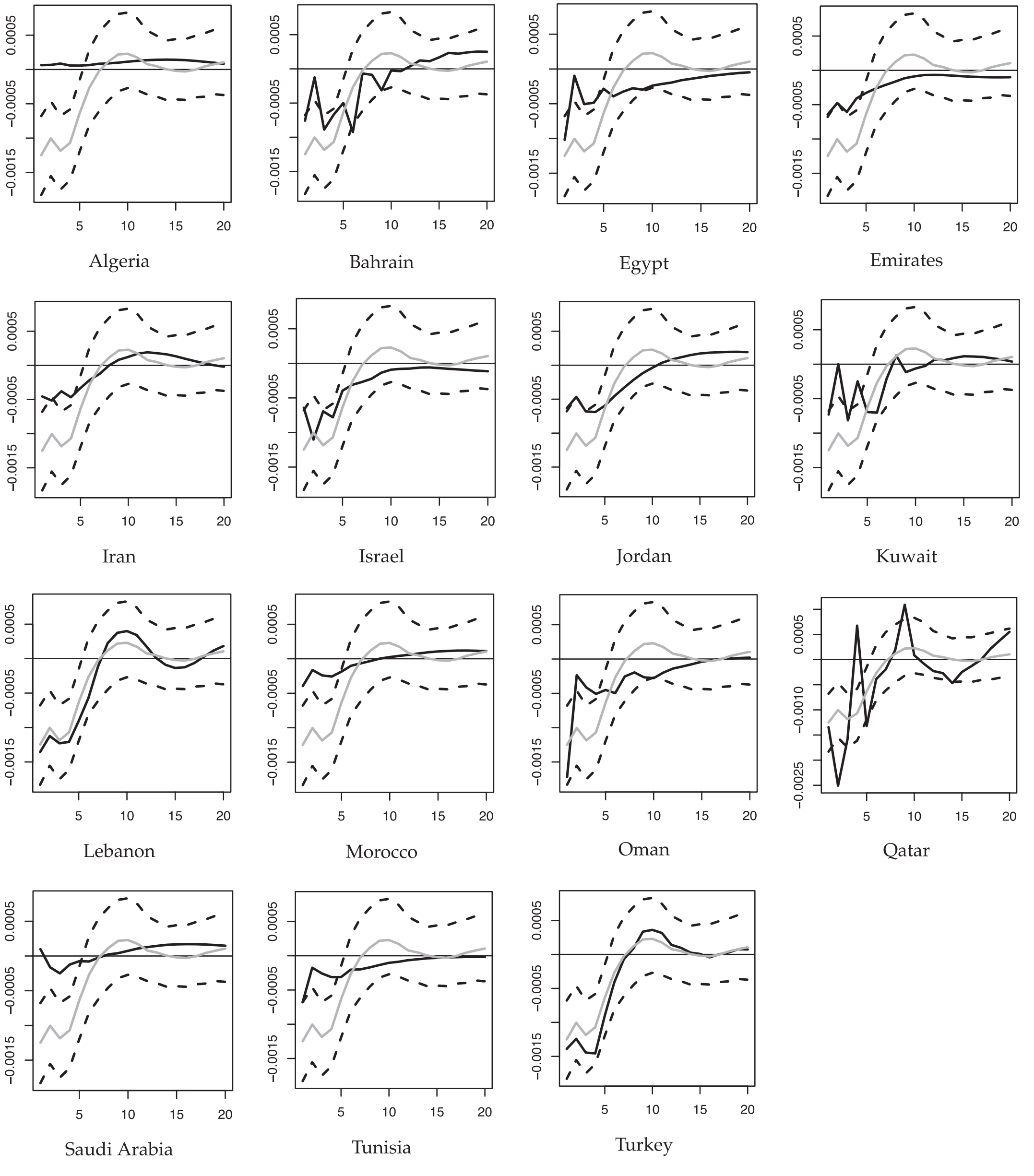

FIGURE 6 Investment response to a supply-driven negative oil price shock. Figure shows the (sign restricted) GDP impulse response function to a one standard deviation (supply-driven) oil price negative shock. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

vision 2030 plans of various countries suggest they would. Given that the most likely scenario in the short to medium term is a combination of relatively low oil prices and heightened geopolitical risk, we have shown that the results from our estimated GVAR model support our substantive argument in the introduction that artificially boosting investment in MENA countries is highly unlikely to succeed in generating diversified economic growth.

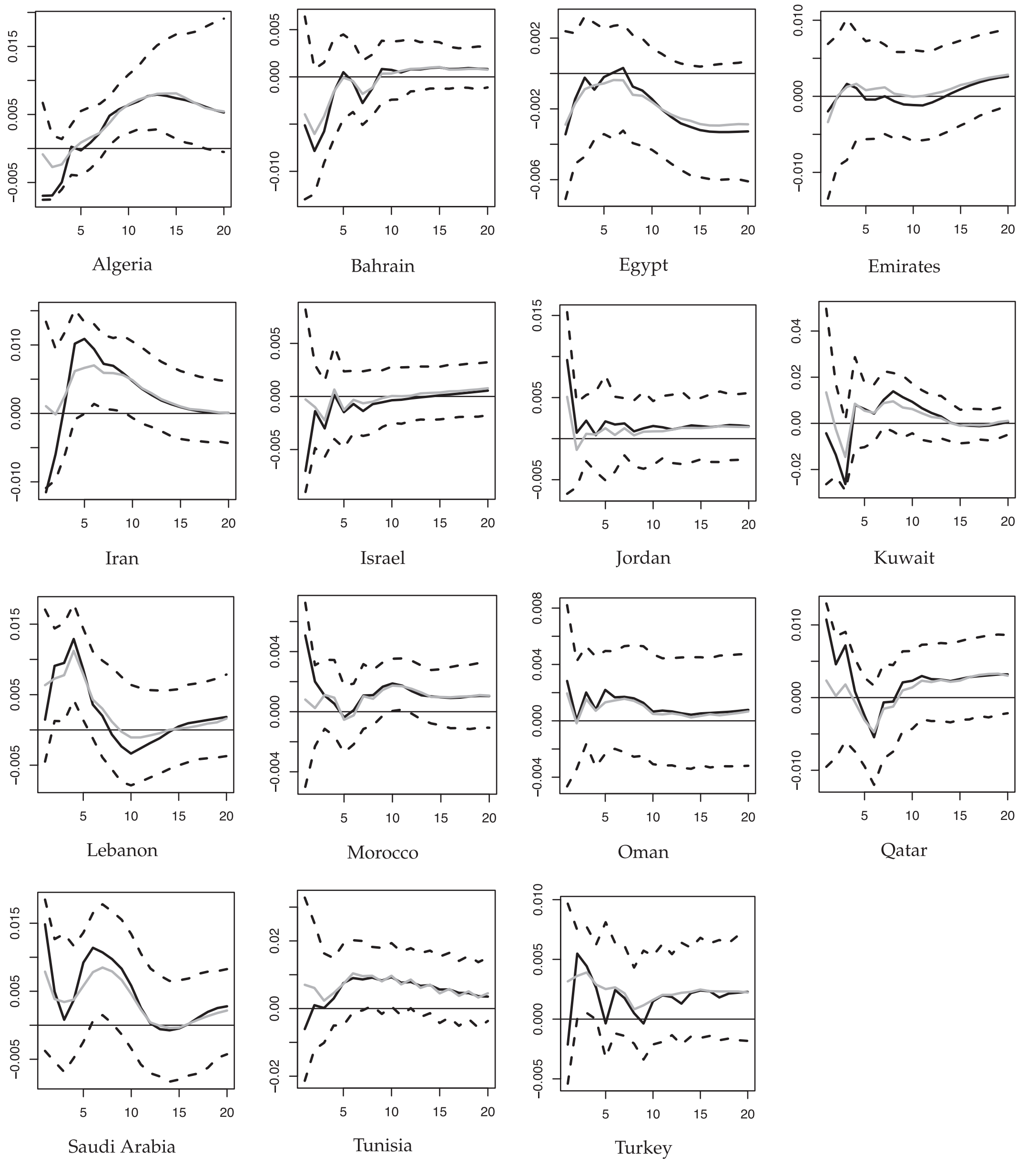

FIGURE 7 GDP response to a positive shock to country level investments. Figure shows the country-level GDP impulse response function to a one standard deviation shock to country level investment. The solid lines depict median (black color) and median target (gray color) impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

5 | CONCLUDING REMARKS

This paper has aimed to assess the economic prospects of 2030 economic transformation visions through mega-investment projects under the current regime of low oil prices and heightened geopolitical risk. Unfortunately, many countries in the MENA region continue to subscribe to the long-discredited idea that it is sufficient to boost investment in any form in order to generate growth. This misguided hope ignores diminishing returns, crowding

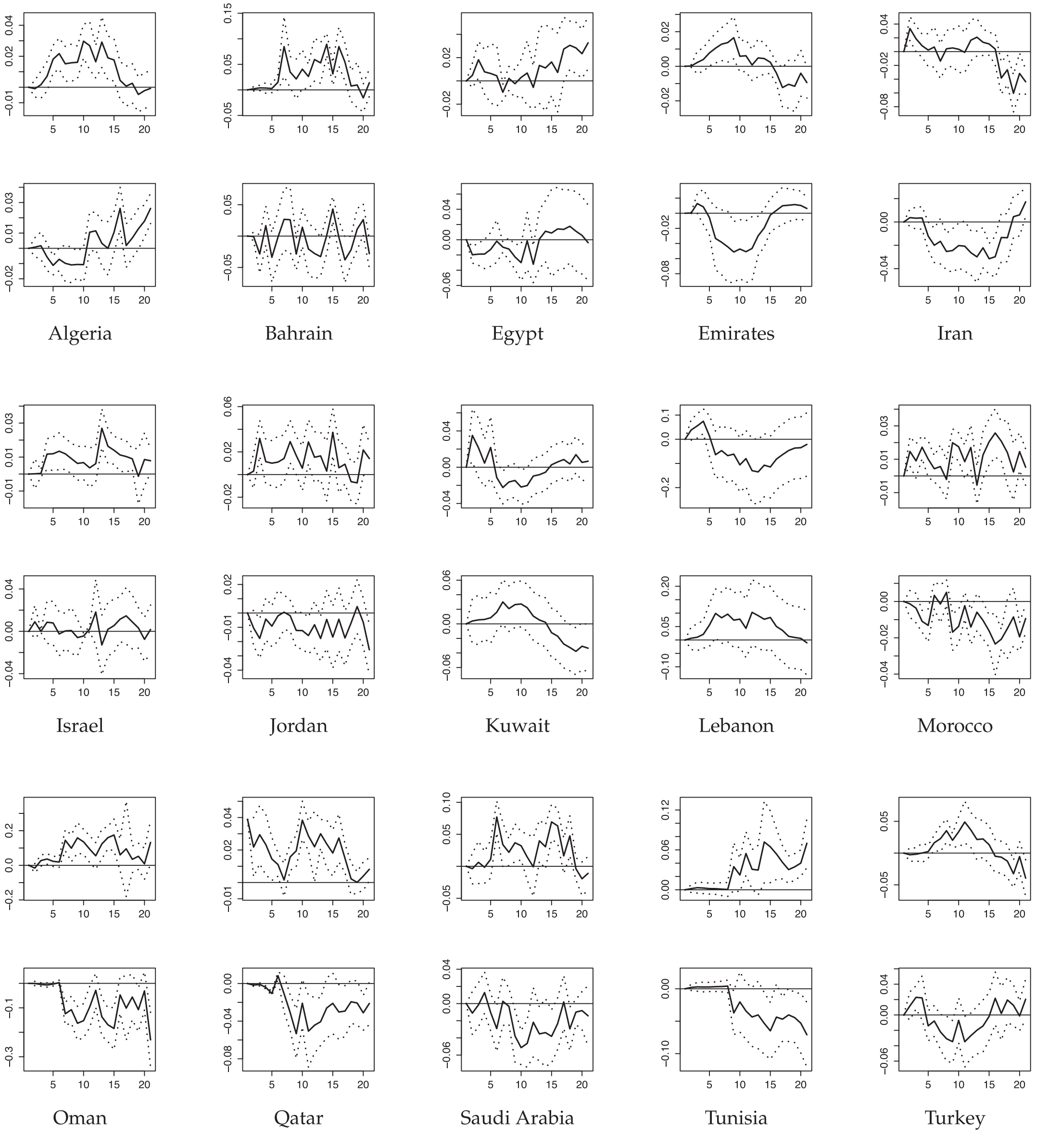

FIGURE 8 LPIRFs of GDP in response to 1SD investment shock - high versus low oil price regimes. Figure shows nonlinear local projection IRFs (LPIRFs) for the effect of a boost in investment on GDP under high (top panel) versus low (bottom panel) oil price regimes. The solid line depicts median impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

out of private investment, and a host of other well understood principles of economic development (see Easterly, 2001). It may be tempting as political rhetoric to convince regional populations that they do not have to get poorer in the medium term, but it does, in fact, make matters worse. In a recent blog post, we have argued that the current mega-project agendas are similar to someone kicking frantically while caught in quicksand.[9] Thus, we have argued that regional countries would be advised better to conserve their savings, instead of squandering

[9]See https://theforum.erf.org.eg/2018/01/16/youre-stuck-quicksand-stop-kicking/.

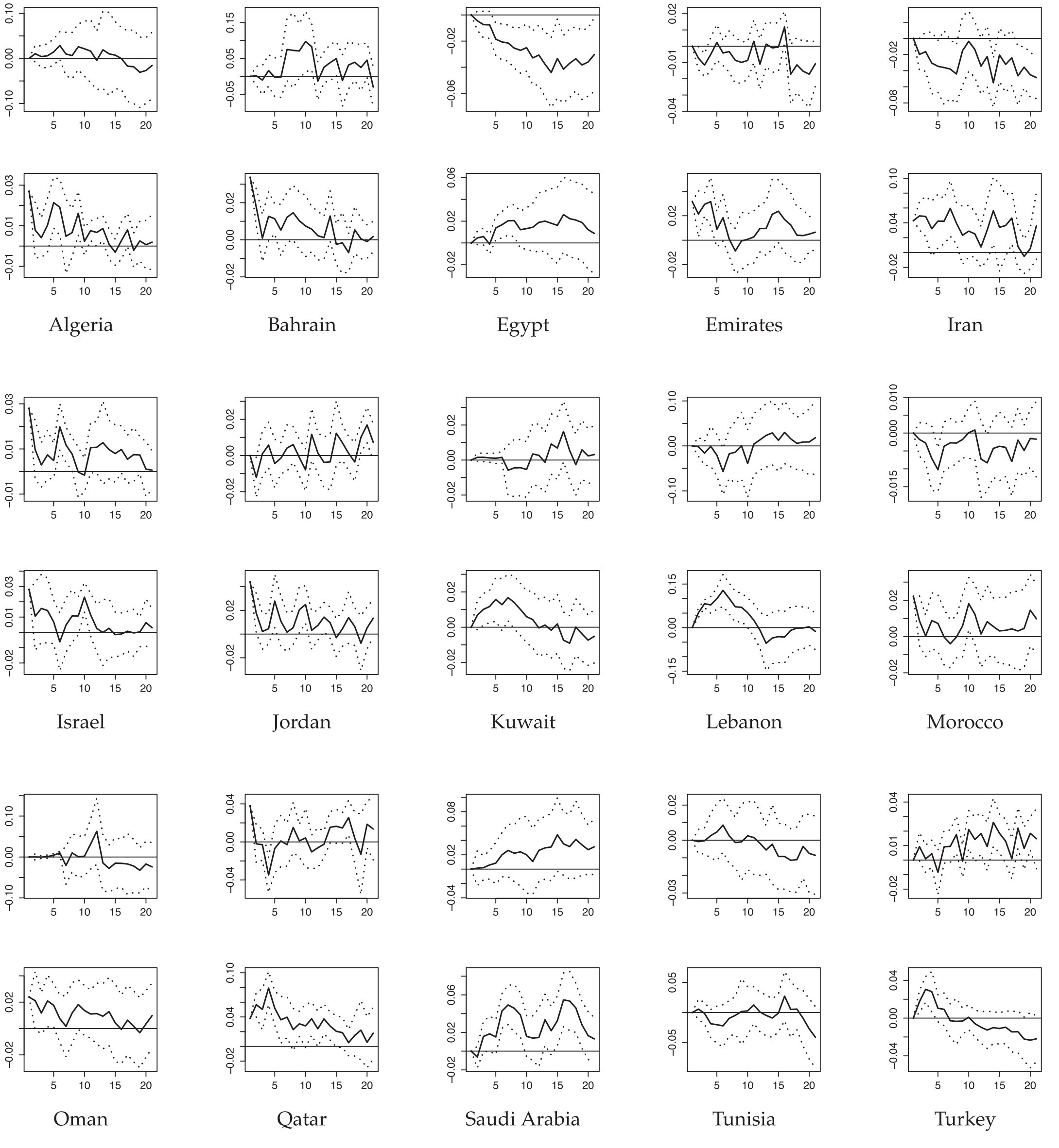

FIGURE 9 LPIRFs of GDP in response to 1SD investment shock - high versus low geopolitical risk regimes. Figure shows nonlinear local projection IRFs (LPIRFs) for the effect of a boost in investment on GDP under high (top panel) versus low (bottom panel) geopolitical risk regimes. The solid line depicts median impulse responses with 95% bootstrapped confidence bounds over quarterly time horizon. The impacts are in percentage points

them on another round of white-elephant projects similar to those of the past few decades, and instead to invest their limited resources in longer-term human capital and institutional reforms.

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APPENDIX A

TABLE A1 Country list

Algeria*	Denmark	Indonesia	Mexico	South Korea
Argentina	Ecuador	Iran*	Morocco*	Spain
Australia	Egypt*	Ireland	Netherlands	Sweden
Austria	El Salvador	Israel*	New Zealand	Switzerland
Bahrain*	Emirates*	Italy	Norway	Thailand
Belgium	Finland	Japan	Oman*	Tunisia*
Brazil	France	Jordan*	Philippines	Turkey*
Canada	Germany	Kuwait*	Portugal	UK
Chile	Greece	Lebanon*	Qatar*	US
China	Hungary	Luxembourg	Saudi Arabia*	
Colombia	India	Malaysia	Singapore	

Note: Table presents a list of 53 countries in our GVAR model, including 15 countries from the Middle East and North Africa region (denoted by *).

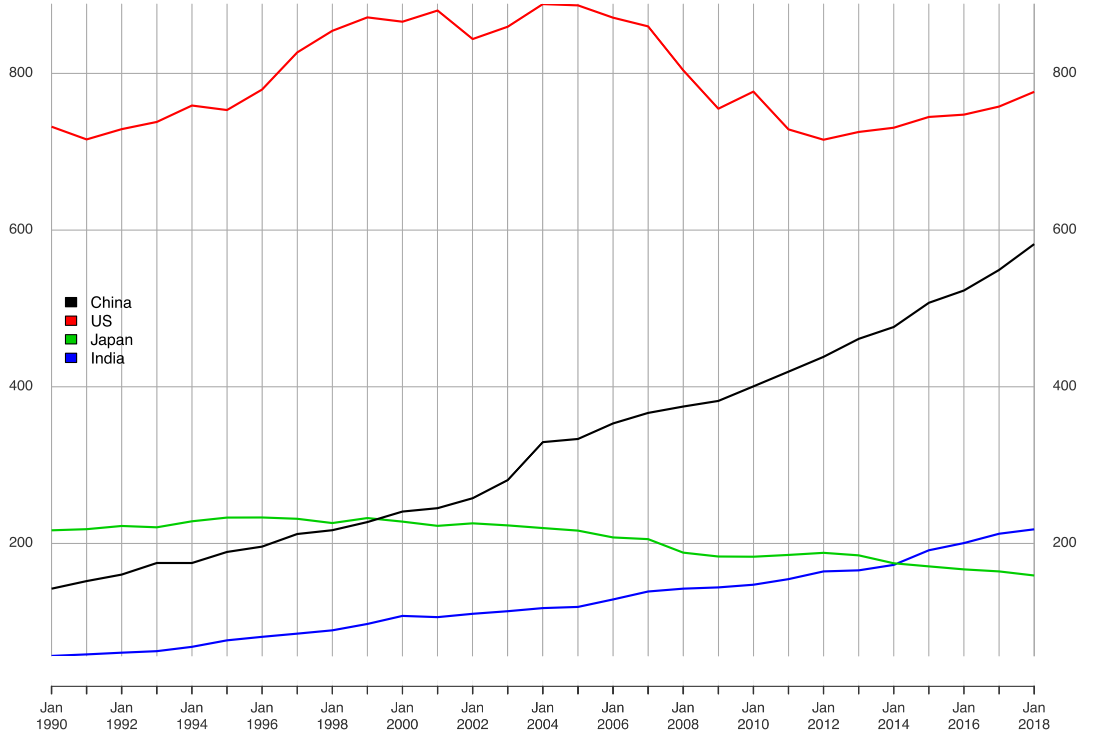

FIGURE A1 Oil consumption by country 1990–2018. Source: Enerdata Energy Statistical Yearbook 2019

TABLE A2 Oil price regimes diagnostics - Algeria

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	1.000	1.000	2,059.190	.000
h2	.990	.990	509.070	.000
h3	.990	.980	387.510	.000
h4	.980	.980	269.510	.000
h5	.980	.970	197.170	.000
h6	.970	.960	148.120	.000
h7	.960	.950	118.510	.000
h8	.950	.940	93.780	.000
h9	.940	.930	80.940	.000
h10	.930	.920	66.090	.000
h11	.920	.910	55.880	.000
h12	.910	.900	49.670	.000
h13	.910	.880	44.480	.000
h14	.900	.870	39.900	.000
h15	.890	.870	36.820	.000
h16	.880	.860	34.710	.000
h17	.880	.850	32.810	.000
h18	.870	.850	30.990	.000
h19	.870	.840	29.130	.000
h20	.870	.840	28.320	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A3 Oil price regimes diagnostics - Bahrain

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.960	.960	139.400	.000
h2	.960	.950	128.920	.000
h3	.950	.930	88.100	.000
h4	.950	.930	86.950	.000
h5	.930	.920	71.540	.000
h6	.930	.920	65.500	.000
h7	.930	.910	61.230	.000
h8	.920	.910	57.840	.000
h9	.920	.900	52.220	.000
h10	.900	.880	44.020	.000
h11	.890	.860	36.930	.000
h12	.870	.840	31.060	.000
h13	.850	.820	27.230	.000
h14	.840	.810	24.290	.000
h15	.840	.800	23.660	.000
h16	.840	.800	23.470	.000
h17	.820	.770	19.870	.000
h18	.790	.750	17.030	.000
h19	.760	.710	14.080	.000
h20	.740	.680	12.390	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A4 Oil price regimes diagnostics - Egypt

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.930	.910	65.990	.000
h2	.940	.920	74.140	.000
h3	.920	.900	57.760	.000
h4	.900	.880	46.170	.000
h5	.900	.880	46.620	.000
h6	.860	.840	31.300	.000
h7	.870	.850	33.590	.000
h8	.860	.830	29.680	.000
h9	.840	.810	25.990	.000
h10	.830	.800	23.650	.000
h11	.810	.770	20.670	.000
h12	.790	.750	18.110	.000
h13	.780	.730	16.620	.000
h14	.770	.730	15.870	.000
h15	.760	.710	14.620	.000
h16	.750	.690	13.480	.000
h17	.740	.680	12.930	.000
h18	.730	.670	12.250	.000
h19	.710	.650	10.890	.000
h20	.700	.630	10.230	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A5 Oil price regimes diagnostics - Emirates

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.980	.980	281.150	.000
h2	.970	.960	159.000	.000
h3	.950	.950	106.430	.000
h4	.940	.930	77.700	.000
h5	.930	.910	63.880	.000
h6	.920	.910	58.540	.000
h7	.920	.900	54.270	.000
h8	.910	.900	52.130	.000
h9	.910	.890	50.180	.000
h10	.910	.890	48.210	.000
h11	.910	.890	45.860	.000
h12	.900	.880	41.730	.000
h13	.880	.860	34.450	.000
h14	.870	.840	30.470	.000
h15	.850	.820	27.010	.000
h16	.830	.800	22.860	.000
h17	.830	.790	21.950	.000
h18	.830	.790	21.680	.000
h19	.830	.790	21.400	.000
h20	.830	.790	21.210	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A6 Oil price regimes diagnostics - Iran

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.980	.980	278.400	.000
h2	.970	.960	149.110	.000
h3	.950	.940	90.950	.000
h4	.920	.900	56.770	.000
h5	.900	.880	43.710	.000
h6	.870	.850	34.490	.000
h7	.850	.810	26.830	.000
h8	.820	.780	22.310	.000
h9	.790	.750	18.720	.000
h10	.770	.730	16.270	.000
h11	.750	.690	14.050	.000
h12	.740	.680	13.080	.000
h13	.730	.670	12.720	.000
h14	.730	.670	12.210	.000
h15	.720	.660	11.880	.000
h16	.720	.660	11.590	.000
h17	.720	.660	11.560	.000
h18	.720	.660	11.680	.000
h19	.720	.660	11.500	.000
h20	.720	.660	11.210	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A7 Oil price regimes diagnostics - Israel

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	1.000	1.000	10,722.650	.000
h2	1.000	1.000	3,974.400	.000
h3	1.000	1.000	1874.240	.000
h4	1.000	.990	1,047.480	.000
h5	.990	.990	645.270	.000
h6	.990	.990	440.710	.000
h7	.990	.980	338.680	.000
h8	.980	.980	283.840	.000
h9	.980	.980	247.690	.000
h10	.980	.970	226.050	.000
h11	.980	.980	232.570	.000
h12	.980	.980	243.900	.000
h13	.980	.980	262.520	.000
h14	.980	.980	264.440	.000
h15	.980	.980	249.750	.000
h16	.980	.980	220.040	.000
h17	.980	.970	180.350	.000
h18	.970	.970	156.090	.000
h19	.970	.960	144.750	.000
h20	.970	.960	131.620	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A8 Oil price regimes diagnostics - Jordan

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.980	396.500	.000
h2	.970	.970	186.060	.000
h3	.950	.940	92.690	.000
h4	.920	.910	59.720	.000
h5	.900	.880	46.950	.000
h6	.890	.870	39.380	.000
h7	.880	.860	35.930	.000
h8	.880	.850	34.680	.000
h9	.870	.840	32.750	.000
h10	.870	.840	32.330	.000
h11	.880	.850	33.870	.000
h12	.880	.850	34.650	.000
h13	.880	.850	34.040	.000
h14	.870	.850	32.310	.000
h15	.870	.840	31.400	.000
h16	.860	.830	29.020	.000
h17	.870	.840	29.820	.000
h18	.880	.850	31.860	.000
h19	.890	.860	34.040	.000
h20	.900	.870	37.810	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A9 Oil price regimes diagnostics - Kuwait

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.950	.940	94.660	.000
h2	.950	.940	97.110	.000
h3	.930	.920	72.940	.000
h4	.940	.920	73.640	.000
h5	.930	.910	62.200	.000
h6	.920	.910	58.880	.000
h7	.920	.900	54.070	.000
h8	.910	.890	49.020	.000
h9	.900	.880	45.290	.000
h10	.890	.870	38.910	.000
h11	.880	.850	34.460	.000
h12	.870	.840	30.540	.000
h13	.860	.830	27.970	.000
h14	.840	.810	24.870	.000
h15	.840	.800	23.560	.000
h16	.830	.790	22.330	.000
h17	.820	.780	20.200	.000
h18	.810	.760	18.530	.000
h19	.790	.750	16.850	.000
h20	.780	.730	15.370	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A10 Oil price regimes diagnostics - Lebanon

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.920	.900	56.160	.000
h2	.870	.840	33.910	.000
h3	.780	.740	18.530	.000
h4	.700	.640	11.720	.000
h5	.650	.580	9.130	.000
h6	.590	.510	7.220	.000
h7	.550	.460	6.060	.000
h8	.540	.440	5.660	.000
h9	.510	.410	5.110	.000
h10	.510	.410	5.080	.000
h11	.520	.410	5.060	.000
h12	.540	.440	5.420	.000
h13	.550	.460	5.750	.000
h14	.570	.470	6.050	.000
h15	.590	.500	6.540	.000
h16	.600	.510	6.700	.000
h17	.610	.520	6.920	.000
h18	.620	.540	7.420	.000
h19	.630	.550	7.610	.000
h20	.640	.560	7.930	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A11 Oil price regimes diagnostics - Morocco

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
hi	.990	.990	836.620	000
h2	.990	.990	538.120	.000
h3	.990	.980	363.870	.000
h4	.980	.980	273.280	.000
h5	.980	.980	235.400	.000
h6	.980	.970	211.060	.000
h7	.980	.970	201.560	.000
h8	.970	.970	182.040	.000
h9	.970	.960	146.560	.000
h10	.960	.960	128.810	.000
h11	.960	.950	114.190	.000
h12	.950	.940	92.400	.000
h13	.940	.930	77.070	.000
h14	.940	.920	68.990	.000
h15	.930	.920	64.950	.000
h16	.930	.910	59.540	.000
h17	.920	.910	55.340	.000
h18	.920	.900	51.070	.000
h19	.910	.890	47.050	.000
h20	.910	.890	44.110	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A12 Oil price regimes diagnostics - Oman

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.940	.930	85.220	.000
h2	.940	.930	87.140	.000
h3	.930	.920	69.940	.000
h4	.940	.930	78.350	.000
h5	.930	.920	66.420	.000
h6	.930	.910	63.170	.000
h7	.920	.910	58.020	.000
h8	.910	.890	50.210	.000
h9	.910	.900	52.000	.000
h10	.900	.880	45.190	.000
h11	.900	.880	43.330	.000
h12	.890	.870	39.560	.000
h13	.890	.860	36.060	.000
h14	.880	.850	33.050	.000
h15	.880	.850	32.230	.000
h16	.890	.870	37.010	.000
h17	.890	.860	35.600	.000
h18	.880	.850	32.320	.000
h19	.870	.840	29.280	.000
h20	.860	.830	26.570	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A13 Oil price regimes diagnostics - Qatar

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.950	.940	93.670	.000
h2	.940	.920	75.250	.000
h3	.920	.900	55.770	.000
h4	.880	.860	37.710	.000
h5	.880	.850	35.820	.000
h6	.870	.840	32.510	.000
h7	.850	.820	28.020	.000
h8	.830	.800	24.610	.000
h9	.820	.780	21.940	.000
h10	.800	.760	19.640	.000
h11	.790	.750	18.190	.000
h12	.780	.740	17.170	.000
h13	.780	.730	16.410	.000
h14	.770	.720	15.780	.000
h15	.770	.720	15.230	.000
h16	.760	.710	14.670	.000
h17	.760	.710	14.300	.000
h18	.760	.700	13.990	.000
h19	.760	.700	13.790	.000
h20	.750	.700	13.310	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A14 Oil price regimes diagnostics - Saudi Arabia

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	840.640	.000
h2	.990	.990	448.910	.000
h3	.980	.980	268.410	.000
h4	.970	.970	185.230	.000
h5	.970	.960	146.140	.000
h6	.960	.950	123.540	.000
h7	.950	.950	103.900	.000
h8	.950	.940	91.160	.000
h9	.950	.930	83.310	.000
h10	.940	.930	75.810	.000
h11	.930	.920	64.230	.000
h12	.920	.910	56.590	.000
h13	.920	.900	52.720	.000
h14	.910	.890	45.820	.000
h15	.900	.870	39.770	.000
h16	.880	.850	33.440	.000
h17	.870	.840	29.380	.000
h18	.850	.820	25.880	.000
h19	.840	.800	22.730	.000
h20	.820	.780	20.010	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A15 Oil price regimes diagnostics - Tunisia

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	735.170	.000
h2	.990	.990	485.480	.000
h3	.980	.980	324.430	.000
h4	.980	.970	228.550	.000
h5	.970	.970	168.600	.000
h6	.960	.960	131.650	.000
h7	.960	.950	106.650	.000
h8	.950	.940	90.810	.000
h9	.940	.930	75.420	.000
h10	.930	.910	62.950	.000
h11	.920	.900	52.850	.000
h12	.910	.890	47.370	.000
h13	.900	.880	44.140	.000
h14	.890	.870	38.910	.000
h15	.890	.860	35.890	.000
h16	.880	.860	34.310	.000
h17	.880	.850	32.020	.000
h18	.870	.840	29.860	.000
h19	.870	.840	28.630	.000
h20	.860	.830	27.200	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A16 Oil price regimes diagnostics - Turkey

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	451.200	.000
h2	.980	.980	313.210	.000
h3	.970	.970	194.440	.000
h4	.960	.950	126.330	.000
h5	.960	.950	110.450	.000
h6	.950	.940	97.720	.000
h7	.950	.940	93.900	.000
h8	.940	.930	80.530	.000
h9	.930	.920	68.970	.000
h10	.930	.910	61.440	.000
h11	.930	.910	60.600	.000
h12	.930	.910	60.990	.000
h13	.930	.910	58.890	.000
h14	.930	.910	57.310	.000
h15	.920	.910	56.120	.000
h16	.920	.910	55.750	.000
h17	.930	.910	57.480	.000
h18	.930	.910	57.740	.000
h19	.930	.910	58.130	.000
h20	.920	.910	53.080	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A17 Geopolitical risk regimes diagnostics - Algeria

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	1.000	1.000	2,149.640	.000
h2	.990	.990	490.950	.000
h3	.990	.980	375.590	.000
h4	.980	.980	260.120	.000
h5	.970	.970	187.990	.000
h6	.970	.960	140.400	.000
h7	.960	.950	109.560	.000
h8	.950	.930	84.720	.000
h9	.940	.930	73.080	.000
h10	.930	.910	62.110	.000
h11	.920	.900	51.950	.000
h12	.910	.890	45.640	.000
h13	.900	.880	41.220	.000
h14	.890	.860	37.040	.000
h15	.880	.860	34.620	.000
h16	.880	.850	32.600	.000
h17	.870	.840	30.800	.000
h18	.870	.840	29.010	.000
h19	.860	.830	27.780	.000
h20	.860	.830	26.910	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A18 Geopolitical risk regimes diagnostics - Bahrain

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.970	.970	175.290	.000
h2	.970	.960	150.150	.000
h3	.960	.950	110.340	.000
h4	.940	.930	84.660	.000
h5	.940	.920	72.630	.000
h6	.920	.900	55.370	.000
h7	.910	.890	48.840	.000
h8	.900	.880	44.280	.000
h9	.890	.870	40.360	.000
h10	.870	.850	33.520	.000
h11	.850	.820	27.990	.000
h12	.830	.790	22.820	.000
h13	.810	.770	20.500	.000
h14	.800	.760	18.500	.000
h15	.790	.740	17.020	.000
h16	.780	.730	15.960	.000
h17	.770	.710	14.710	.000
h18	.760	.710	14.060	.000
h19	.760	.700	13.740	.000
h20	.740	.680	12.280	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A19 Geopolitical risk regimes diagnostics - Egypt

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.930	.920	72.060	.000
h2	.930	.920	70.440	.000
h3	.930	.920	73.000	.000
h4	.900	.880	45.180	.000
h5	.910	.900	52.160	.000
h6	.860	.840	31.710	.000
h7	.870	.840	31.810	.000
h8	.850	.820	28.500	.000
h9	.830	.800	24.260	.000
h10	.820	.780	21.600	.000
h11	.800	.760	19.400	.000
h12	.790	.740	17.350	.000
h13	.770	.720	15.540	.000
h14	.760	.710	14.990	.000
h15	.760	.700	14.230	.000
h16	.750	.700	13.910	.000
h17	.750	.690	13.420	.000
h18	.740	.680	12.690	.000
h19	.720	.660	11.300	.000
h20	.700	.640	10.400	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A20 Geopolitical risk regimes diagnostics - Emirates

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.980	.980	319.590	.000
h2	.970	.970	179.820	.000
h3	.960	.950	111.610	.000
h4	.940	.930	80.800	.000
h5	.930	.920	66.560	.000
h6	.920	.910	60.910	.000
h7	.920	.900	56.520	.000
h8	.920	.900	53.770	.000
h9	.910	.890	49.700	.000
h10	.910	.890	47.120	.000
h11	.910	.890	45.810	.000
h12	.900	.880	41.230	.000
h13	.890	.860	36.540	.000
h14	.880	.850	32.620	.000
h15	.870	.840	29.500	.000
h16	.850	.820	26.380	.000
h17	.850	.810	24.800	.000
h18	.840	.810	24.000	.000
h19	.840	.810	23.530	.000
h20	.840	.800	22.640	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A21 Geopolitical risk regimes diagnostics - Iran

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.980	.980	266.500	.000
h2	.960	.950	118.120	.000
h3	.930	.920	70.590	.000
h4	.900	.880	43.420	.000
h5	.860	.830	30.120	.000
h6	.830	.800	24.240	.000
h7	.800	.750	19.210	.000
h8	.760	.710	15.680	.000
h9	.730	.670	13.000	.000
h10	.700	.640	11.450	.000
h11	.680	.620	10.330	.000
h12	.660	.590	9.130	.000
h13	.660	.580	8.890	.000
h14	.650	.570	8.540	.000
h15	.640	.560	8.150	.000
h16	.640	.560	8.030	.000
h17	.640	.550	7.840	.000
h18	.640	.560	7.950	.000
h19	.650	.580	8.370	.000
h20	.660	.580	8.450	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A22 Geopolitical risk regimes diagnostics - Israel

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	1.000	1.000	9,778.080	.000
h2	1.000	1.000	4,023.020	.000
h3	1.000	1.000	2,002.070	.000
h4	1.000	1.000	1,380.010	.000
h5	.990	.990	821.810	.000
h6	.990	.990	584.430	.000
h7	.990	.990	422.900	.000
h8	.990	.980	342.460	.000
h9	.980	.980	294.970	.000
h10	.980	.980	239.800	.000
h11	.980	.980	225.980	.000
h12	.980	.970	207.890	.000
h13	.980	.970	193.270	.000
h14	.980	.970	194.970	.000
h15	.980	.970	200.200	.000
h16	.980	.970	189.890	.000
h17	.970	.970	171.290	.000
h18	.970	.970	161.530	.000
h19	.970	.960	149.440	.000
h20	.970	.960	137.580	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A23 Geopolitical risk regimes diagnostics - Jordan

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.980	373.850	.000
h2	.970	.970	178.580	.000
h3	.950	.940	89.920	.000
h4	.910	.900	53.050	.000
h5	.890	.870	40.360	.000
h6	.880	.850	35.700	.000
h7	.870	.850	33.450	.000
h8	.870	.850	33.670	.000
h9	.880	.850	34.250	.000
h10	.880	.860	35.570	.000
h11	.880	.860	35.970	.000
h12	.890	.860	36.540	.000
h13	.880	.850	34.310	.000
h14	.870	.840	31.530	.000
h15	.870	.840	30.210	.000
h16	.860	.830	27.450	.000
h17	.860	.830	27.480	.000
h18	.870	.840	29.460	.000
h19	.880	.850	31.040	.000
h20	.880	.860	33.000	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment

TABLE A24 Geopolitical risk regimes diagnostics - Kuwait

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.960	.950	109.960	.000
h2	.950	.940	103.350	.000
h3	.950	.930	88.090	.000
h4	.940	.920	73.720	.000
h5	.930	.920	68.110	.000
h6	.920	.900	54.720	.000
h7	.910	.890	48.440	.000
h8	.900	.880	42.700	.000
h9	.890	.870	40.230	.000
10	.880	.850	33.560	.000
11	.860	.840	30.260	.000
12	.850	.810	25.730	.000
13	.840	.800	23.900	.000
14	.820	.780	21.340	.000
15	.810	.770	20.180	.000
16	.800	.750	17.930	.000
17	.790	.750	17.390	.000
18	.780	.730	15.940	.000
19	.780	.730	15.870	.000
20	.770	.720	14.780	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A25 Geopolitical risk regimes diagnostics - Lebanon

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.930	.910	65.790	.000
h2	.900	.880	45.920	.000
h3	.830	.800	25.300	.000
h4	.770	.720	16.490	.000
h5	.710	.650	12.150	.000
h6	.650	.580	9.360	.000
h7	.620	.540	8.030	.000
h8	.590	.510	7.130	.000
h9	.570	.490	6.510	.000
h10	.550	.450	5.810	.000
h11	.540	.440	5.570	.000
h12	.550	.450	5.720	.000
h13	.560	.470	5.970	.000
h14	.560	.460	5.880	.000
h15	.560	.460	5.760	.000
h16	.540	.440	5.350	.000
h17	.560	.460	5.690	.000
h18	.540	.440	5.300	.000
h19	.550	.450	5.370	.000
h20	.580	.490	6.130	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A26 Geopolitical risk regimes diagnostics - Morocco

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	839.240	.000
h2	.990	.990	537.590	.000
h3	.990	.980	334.530	.000
h4	.980	.980	249.970	.000
h5	.970	.970	193.020	.000
h6	.970	.960	164.490	.000
h7	.970	.960	143.220	.000
h8	.960	.950	123.450	.000
h9	.960	.950	103.350	.000
h10	.950	.940	86.050	.000
h11	.940	.930	74.350	.000
h12	.930	.920	62.670	.000
h13	.920	.910	56.430	.000
h14	.920	.900	51.530	.000
h15	.910	.900	48.720	.000
h16	.910	.890	43.870	.000
h17	.900	.880	41.840	.000
h18	.900	.870	39.160	.000
h19	.890	.870	36.250	.000
h20	.890	.870	35.750	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A27 Geopolitical risk regimes diagnostics - Oman

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.950	.940	98.800	.000
h2	.950	.940	93.840	.000
h3	.940	.930	86.120	.000
h4	.940	.930	81.510	.000
h5	.940	.930	80.730	.000
h6	.920	.900	53.520	.000
h7	.900	.880	45.970	.000
h8	.890	.870	41.440	.000
h9	.890	.860	38.220	.000
h10	.880	.850	33.730	.000
h11	.870	.840	31.280	.000
h12	.850	.820	26.950	.000
h13	.850	.810	25.460	.000
h14	.830	.800	23.380	.000
h15	.820	.780	20.800	.000
h16	.820	.780	20.850	.000
h17	.830	.790	21.520	.000
h18	.820	.780	19.890	.000
h19	.820	.780	19.720	.000
h20	.820	.770	19.470	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A28 Geopolitical risk regimes diagnostics - Qatar

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.960	.960	136.910	.000
h2	.950	.940	104.250	.000
h3	.940	.930	82.060	.000
h4	.890	.870	40.890	.000
h5	.860	.840	31.620	.000
h6	.840	.800	25.160	.000
h7	.820	.780	21.930	.000
h8	.800	.760	20.060	.000
h9	.790	.750	18.240	.000
h10	.780	.740	17.400	.000
h11	.780	.730	16.490	.000
h12	.770	.720	15.840	.000
h13	.760	.710	15.010	.000
h14	.760	.710	14.810	.000
h15	.760	.700	14.220	.000
h16	.750	.700	13.810	.000
h17	.760	.700	14.140	.000
h18	.770	.720	14.950	.000
h19	.780	.730	15.400	.000
h20	.770	.720	14.660	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A29 Geopolitical risk regimes diagnostics - Saudi Arabia

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	908.140	.000
h2	.990	.990	451.920	.000
h3	.980	.970	237.700	.000
h4	.970	.960	142.290	.000
h5	.950	.940	102.640	.000
h6	.940	.930	80.480	.000
h7	.930	.910	64.260	.000
h8	.910	.900	52.420	.000
h9	.900	.880	44.750	.000
h10	.890	.860	37.520	.000
h11	.870	.840	31.690	.000
h12	.850	.820	27.020	.000
h13	.830	.800	23.290	.000
h14	.810	.770	19.950	.000
h15	.790	.740	17.090	.000
h16	.770	.710	14.820	.000
h17	.740	.690	13.030	.000
h18	.720	.660	11.450	.000
h19	.700	.630	10.130	.000
h20	.670	.600	8.920	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A30 Geopolitical risk regimes diagnostics - Tunisia

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	797.470	.000
h2	.990	.990	522.870	.000
h3	.990	.980	346.480	.000
h4	.980	.980	239.310	.000
h5	.970	.960	165.330	.000
h6	.960	.960	132.440	.000
h7	.950	.950	102.970	.000
h8	.950	.930	83.800	.000
h9	.940	.920	70.360	.000
h10	.920	.910	59.040	.000
h11	.910	.900	51.050	.000
h12	.910	.880	44.930	.000
h13	.900	.880	41.150	.000
h14	.890	.870	37.310	.000
h15	.880	.850	33.670	.000
h16	.870	.840	31.050	.000
h17	.870	.840	28.850	.000
h18	.860	.830	27.020	.000
h19	.850	.820	25.350	.000
h20	.850	.820	24.750	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.

TABLE A31 Geopolitical risk regimes diagnostics - Turkey

	R-sqrd	Adj. *R*-sqrd	*F*-stat	*p*-value
h1	.990	.990	532.260	.000
h2	.980	.980	303.530	.000
h3	.970	.970	177.430	.000
h4	.960	.950	107.700	.000
h5	.950	.940	91.830	.000
h6	.940	.930	85.010	.000
h7	.940	.930	79.120	.000
h8	.940	.930	77.110	.000
h9	.940	.920	70.650	.000
h10	.930	.920	65.440	.000
h11	.930	.910	60.150	.000
h12	.920	.910	57.340	.000
h13	.920	.900	51.450	.000
h14	.910	.890	48.880	.000
h15	.910	.890	47.360	.000
h16	.920	.900	50.470	.000
h17	.920	.900	51.700	.000
h18	.930	.910	55.240	.000
h19	.930	.910	54.690	.000
h20	.920	.900	50.760	.000

Note: The table shows OLS diagnostics for 20 quarters horizon for a shock to country level investment.