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THE US SHALE OIL REVOLUTION REQUIRES MAJOR REFORMS IN THE MACROECONOMIC POLICY FRAMEWORKS AND INSTITUTIONS IN THE MENA REGION

Kamiar Mohaddes and Mehdi Raissi

The shale oil revolution in the United States, contributing to lower global oil prices, has important macroeconomic implications for the Middle East and North Africa (MENA) region. In response to a U.S. supply-driven fall in oil prices, energy-exporters in the region face a decline in economic activity, mainly because lower oil prices weaken domestic demand as well as external and fiscal balances in these countries. Negative growth effects (albeit smaller) are also observed for energy-importers which have strong economic ties with oil exporters, through spillover effects. For the MENA countries the current low oil-price environment provides an opportunity for further subsidy and structural reforms.

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What Are the Implications of the US Oil Supply Revolution for the Oil Market?

The technological advancements over the last decade have not only reduced the costs associated with the production of unconventional oil, but also made extraction of tight oil resemble a manufacturing process in which one can adjust production in response to price changes with relative ease. This is in stark contrast to other extraction methods (e.g. offshore extraction), which require large capital expenditure and involve relatively long lead times, and more importantly, once the process is operational changing the quantity produced can be difficult. This is in fact nicely demonstrated by Figure 1, which shows a rapid increase in U.S. oil production when prices were high (2008-2014), but then a relatively quick drop in production once investors started to believe that the low oil price environment was long-lived: U.S. production having peaked in April 2015 (at 9.45 million barrels per day, b/d) dropped to 8.46 million b/d in the first week of September 2016. It is also expected that once

About the authors



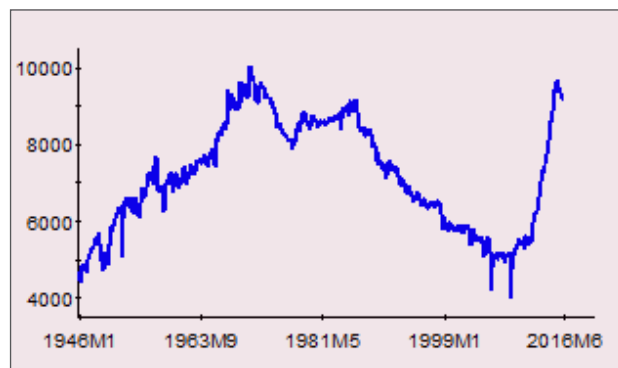
Kamiar Mohaddes is a Senior Lecturer and Fellow in Economics at Girton College, University of Cambridge. He is also a member of the ERF advisory committee, an ERF Research Fellow, a Research Associate at the Centre for Applied Macroeconomic Analysis at the Australian National University, and an Associate Fellow of the USC Dornsife Institute for New Economic Thinking at the University of Southern California.



Mehdi Raissi is an economist in the European Department of the IMF. He joined the IMF in 2010 and worked in the Middle East and Central Asia, the Strategy, Policy and Review, and Asia and Pacific Departments on several multilateral surveillance issues and a range of countries. He is also a Research Associate of the Globalization and Monetary Policy Institute at the Federal Reserve Bank of Dallas.

oil prices start to rise again above certain thresholds, production from US unconventional oil will start to increase again, which could limit any price spikes. Therefore, one of the implications of the recent oil revolution is that U.S. production can play a significant role in balancing global demand and supply, and this in turn implies that the current low oil price environment could be persistent.

Figure 1. United States Oil Production (1000 barrels/day)



What Are the Effects of the Low Oil Price Environment on MENA Oil Exporters?

To analyze the international macroeconomic transmission of the U.S. oil revolution and the current low oil price environment, we need to have a model of the oil-macroeconomy relationship in a global context. To this end we integrate an oil price equation within a compact quarterly model of the global economy using the Global VAR (GVAR) framework. The resulting GVAR-Oil model takes into account both the temporal and cross-sectional dimensions of the data; real and financial drivers of economic activity; interlinkages and spillovers that exist between different regions; and the effects of unobserved or observed common factors. This is crucial as the impact of the recent oil revolution cannot be reduced to just the United States (where the shock originates) but rather involves multiple regions, and may be amplified or dampened (through a number of channels) depending on the degree of openness of the countries and their trade structure. Note that this multi-country modeling approach is in stark contrast to most papers in the literature which analyze the implications of oil shocks in a single-country framework, usually only considering the United States, assuming it represents the global economy. This strategy could clearly be improved as it does not allow one to take into account the heterogeneity which exists across oil exporting and importing countries and within regions and does not allow for spillover effects across and within regions.

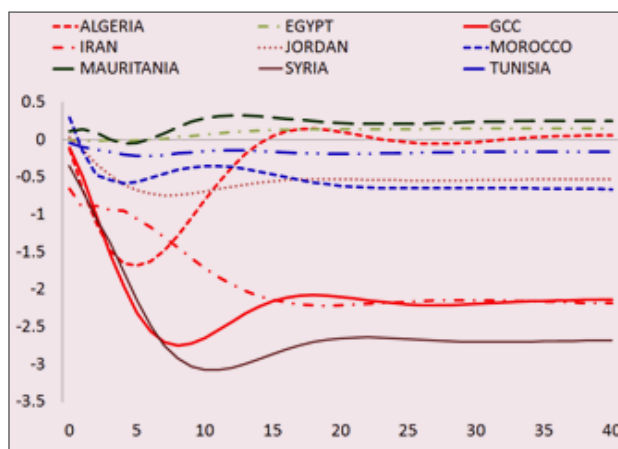
Using this multi-country model, we quantify the responses of individual countries in the MENA region to a U.S.-driven fall in oil prices (equivalent to one standard deviation). In particular, we show that the Gulf Cooperation Council (GCC) countries and Iran face a long-lasting fall in their real output (more than -2% over the long-run) following a positive U.S. oil-supply shock as lower oil prices weakens the external and fiscal balances in these countries,

see Figure 2. For Algeria, an OPEC member, the response is negative for the first 14 quarters before stabilizing around zero over the long-run reflecting its strong trade linkages with Europe (a region that tends to benefit from low oil prices). While buffers and available financing allow most oil exporters in the region to avoid sharp cuts in government spending in the near-term (limiting the impact on short-term investment and growth), the long-term impact depends on their medium-term fiscal plans and capital spending. Note that the fiscal breakeven price for all major oil exporters in 2015/16 is substantially above current prices.

Through Which Channels Will these Negative Effects Manifest themselves in the Long Run?

Given that oil exporters in the region (except for Saudi Arabia) are producing at (or near) capacity, they cannot readily increase their production levels in response to lower oil prices to offset the sub-

Figure 2. Impact of the U.S. Oil Supply Revolution on Real Output in the MENA Region



Notes: These are country responses to a one standard deviation fall in the price of oil, equivalent to an annualized drop of 51% in year 1 and 45% in year 2. The impact is in percentage points and the horizon is quarterly.

Data sources: See Mohaddes and Raissi (2015)

stantial drop in oil revenues following the U.S. oil supply revolution. Even if they were able to increase production, this would only lead to an increase in global supply, which would in turn depress prices even further; at least in the short-run and until current projects from high-cost fields are completed. The question is whether the long-run growth effects of sustained lower oil revenues for major oil exporters can be modeled and empirically tested at the country level and based on a growth theory? If so this would allow one to explore the channels through which the fall in oil revenue affects these economies. Unfortunately, most macroeconomic analyses of oil revenues/shocks tend to take a short-term perspective. They usually focus on the effects of oil revenues on the real exchange rate (Dutch disease) and government budget expansion, thus failing to consider their effects on long-run growth.

This approach makes sense for countries with a limited amount of oil reserves and those facing temporary shocks, but not for major oil exporting countries such as Iran, Kuwait and Saudi Arabia for which oil income should be treated more as a part of the steady state growth outcome and not as a transient state. While it is clear that the oil and gas reserves will be exhausted eventually, this is likely to take place over a relatively long period. Given that there is little evidence to suggest that for the MENA oil exporting economies oil production will be diminishing any time soon one can utilize the empirical growth model for major oil exporting countries recently developed in Esfahani et al. (2014) to empirically investigate the direct effect of a fall in oil revenue for these economies. Using their model, we find that, as predicted by the theory, real output for MENA oil exporters (Algeria, Iran, Kuwait, Libya, Oman, Qatar, Saudi Arabia, and the UAE) in the long run is shaped by: (1) oil revenue through its impact on capital accumulation, and (ii) technological spillovers.

Therefore, oil revenue shocks (such as those from the low oil price environment we are currently experiencing) have a large, long-lasting and significant impact on these economies' growth paths, operating through the capital accumulation channel. Moreover, the results suggest that these countries will be adversely affected whenever the international price of crude oil declines and will benefit whenever it rises. Therefore, macroeconomic and structural policies should be conducted in a way that the vulnerability of these countries to oil revenue (not just price) disturbances is reduced, see also Cavalcanti et al. (2015).

These results have strong policy implications. Oil exporters in the MENA region and beyond are faced with substantial losses in government revenues as a result of a seemingly long-lasting oil price fall. With buffers eroding over the medium-term, most countries will need to re-assess and re-align their medium-term spending plans. Improvements in the conduct of macroeconomic policies, better management of resource income volatility, and export diversification can all have beneficial growth effects; as do policies which increase the return on investment, such as public infrastructure developments and human capital enhancing measures.

Moreover, the creation of commodity stabilization funds, or Sovereign Wealth Funds, in case of countries in the Persian Gulf, might be one way to offset the negative effects of commodity booms and slumps (provided the low oil price environment does not last for more than 2-3 years). Finally, recent academic research has placed emphasis on institutional reform (see, for instance, El Anshasy et al., 2015). By establishing the right institutions, one can ensure the proper conduct of macroeconomic policy and better use of resource income revenues, thereby increasing the potential for growth.

Note that the resulting low oil-price environment

has also political economy implications. For instance, negative and sustained oil price shock, by reducing oil rents per capita, could weaken the government's effectiveness in managing the economy and maintaining civil peace (making the ruling elite more vulnerable to popular uprisings), thereby changing the developmental and sustainable political equilibrium in the GCC countries. See Elbadawi 2015 for more details.

What Are the Macroeconomic Implications of Low Oil Prices for MENA Oil Importers?

While it is no surprise that MENA oil exporters are affected negatively by lower oil prices, the overall long-term output effect for MENA oil importers is not clear cut, considering the direct and indirect effects of lower oil prices for these economies. While a fall in oil prices initially implies lower import costs for these economies, it also reflects a slowdown in oil-exporting countries (see the discussion above), which in turn negatively impact these economies through trade, remittances, grants, and foreign direct investment (FDI) channels. Overall, Figure 2 shows that the direct positive effect of lower oil price for all oil importers (except Egypt and Mauritania) is dominated by the indirect negative impact of spillovers from the exporters (in particular from the GCC).

More specifically, for most oil-importers in the MENA region, gains from lower oil prices are offset by a decline in external demand/financing by oil-exporters over the medium-term given the strong linkages between the two groups through the various channels mentioned above. The resulting estimated long-run negative growth effects on these countries, although being non-trivial, are much smaller than those on oil-exporters—about -0.5%, -0.7%, and -0.2% for Jordan, Morocco and Tunisia, respectively. For Egypt (despite having a relatively large subsidy bill) and Mauritania responses are positive and about

0.2% in the medium-term. In general, low pass-through from global oil prices to domestic fuel prices limits the impact on disposable income of consumers and profit-margins of firms in MENA oil importers, and thereby reduces the direct positive impact on economic growth in these countries.

To give a concrete example, we focus on Jordan, where both remittances and external income (the sum of FDI, remittances, and grants) account for a significant share of its output, with the share of the former being around 15-20% of GDP over 1979-2009, and the latter being on average 30%. Given that the majority of Jordanian migrant workers reside in the neighboring GCC countries and that most of the official government transfers (grants) are received either from Saudi Arabia or the United States, any economic/political developments in the oil-exporting states of the region would significantly affect the flow of external income to Jordan. Therefore, even though the country is an oil importer, as long as external income from the oil-exporting economies are maintained, we expect lower oil prices to have a long-run negative growth effect on the Jordanian economy. That is, the direct positive effect of lower oil prices is dominated by the indirect negative impact; see also Mohaddes and Raissi (2013). Quantitatively, following a negative oil price shock (based on a historical quarterly standard deviation of 18.6%), steady state output falls by about 4%. Similar results can also be obtained for other oil importers in the region which have strong economic ties with oil exporters.

However, it is important to note that for Jordan as well as other labor exporting country that receives large inflows of external income in the region, given a low oil price environment, external income cannot be relied upon to provide growth stimuli in the future (as it did over the last 10 years), and therefore it will be important to diversify the sources of growth in order to achieve a high and sustained level of income.

Where to Now?

The sensitivity of MENA countries (both oil exporters and importers) to oil market developments raises the question of which policies and institutions are needed in response to such shocks. While countercyclical fiscal policies (using existing buffers) are key to insulate the exporters from commodity price fluctuations, the other priority for commodity exporters should be to enhance their macroeconomic policy frameworks and institutions (such as more autonomy in conducting the monetary and exchange rate policies). Oil importers in the region should not overestimate the positive impact of the decline in oil prices on their economies given considerable uncertainty about the persistence of lower oil prices and the availability of external financing and weak demand growth in oil-exporting trade partners. For the MENA countries the current low oil-price environment provides an opportunity for further subsidy and structural reforms.

References

- Cavalcanti, T. V. D. V., K. Mohaddes, and M. Raissi (2015). "Commodity Price Volatility and the Sources of Growth". *Journal of Applied Econometrics* 30 (6), 857-873.
- El-Anshasy, A., K. Mohaddes, and J. B. Nugent (2015). *Oil, Volatility and Institutions: Cross-Country Evidence from Major Oil Producers*. Cambridge Working Papers in Economics 1523.
- Elbadawi, I. A. (2015). "Thresholds Matter: Resource Abundance, Development and Democratic Transition in the Arab World". In I. Diwan and A. Galal (Eds.), *The Middle East Economies in Times of Transition*. Palgrave Macmillan.
- Esfahani, H. S., K. Mohaddes, and M. H. Pesaran (2014). "An Empirical Growth Model for Major Oil Exporters". *Journal of Applied Econometrics* 29 (1), 1-21.
- Mohaddes, K. and M. Raissi (2013). "Oil Prices, External Income, and Growth: Lessons from Jordan". *Review of Middle East Economics and Finance* 9:2, 99-131.
- Mohaddes, K. and M. Raissi (2015), "The U.S. Oil Supply Revolution and the Global Economy," IMF Working Paper WP/15/259.

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ERF Contact Information

Address: 21 Al-Sad Al-Aaly St., Dokki, Giza, Egypt
Telephone: 00 202 333 18 600 - 603 | **Fax:** 00 202 333 18 604
Email: erf@erf.org.eg | **Website:** <http://www.erf.org.eg>

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21 Al-Sad Al-Aaly St. Dokki, Egypt

P.O.Box: 12311

Tel: (202) 333 18 600 - 603

Fax: (202) 333 18 604

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