

Migration Response to Oil Price Volatility: A Dynamic Simulation of Migration from South and Southeast Asia to the GCC

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Abstract

The possible end of the commodity price super-cycle could entail low oil prices for several decades to come affecting growth in many economies. Net oil importers in South and South-East Asia could benefit from lower intermediate inputs and higher real incomes. Yet they could also experience lower remittance flows due to fewer migrants being demanded by the GCC, where potentially lower labor demand due to low oil prices dampening welfare prospects in the migrant-sending countries due to loss of remittance income and lower domestic wages. Indeed, it is possible that faster economic growth in the migrant-sending countries may also reduce the push factors to migrate. Keeping in mind the threat of lower remittance income to development prospects in these Asian economies, a scenario analysis finds that low oil prices provide a net benefit to South and South-East Asian migrant sending countries over the next 15 years. This is because of the boost to domestic production through lower inputs costs. The anticipate welfare loss due to lower migration flows to the GCC are found to be modest in the long term due to the relatively robust migration flows; most Asian economies maintain stable migrant flows into the GCC region.

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1. Introduction

The global economy recently faced the third largest oil price drop in the past thirty years. Oil prices climbed throughout the early 2000's with increasing demand in emerging economies and peaked in 2008. However, from 2008 through 2009, oil prices were subject to the widespread commodity price collapse due to declining demand, future uncertainty, and constrained liquidity (Baffes et al. 2015). Following the 2008/2009 oil price collapse, oil prices climbed at the end of 2009, surpassing 100 USD/bbl in 2011. Prices fluctuated around 105 USD/bbl until plummeting from mid-2014 to a 13-year low of 37 USD/bbl in early 2016 (World Bank 2016). This drop has been the culmination of sustained over-production by the Organization of the Petroleum Exporting Countries (OPEC), resumption of exports by Iran and weak growth in emerging market economies.

These dramatic shifts in oil prices have growth implications for both net oil importers as well as net oil-exporters. Net oil importing economies can experience lower import bills, lower inflation, and a boost to real income through lower fuel prices, as was expected for many South Asian economies (World Bank 2015a). It was anticipated that the higher spending in importers would support global growth, even though there could be lower incomes and consumptions in net exporters. In 2015, the International Monetary Fund (IMF) suggested that even though the oil price gains and losses across producers and consumers sum to zero, the net effect on global growth would be positive.

Aside from the direct impact of lower fuel prices in net oil importing developing countries, low oil prices can have an indirect effect on development prospects through its impact on migration flows. Gulf Cooperation Council (GCC) economies are not only major oil exporters, but also a major destination for migrant workers from South and South-East (SSE) Asia.² For example, approximately 24 million non-nationals are resident in the GCC, representing about half the total population of the region.³ When oil prices are low, putting pressure on revenue, there is a possibility of lower demand for migrant workers. Such was the case during the 2008-09 recession, for example, when oil price volatility was characterized by a rapid rise in early 2008, followed by a swift drop, bottoming out in 2009 (Baffes et al. 2015). There were several large-scale construction project delays and cancellations, with some estimating that, on average, 18 percent of projects valued at 10 million USD or more in GCC countries were delayed or cancelled in 2009 (Rajan and Naraya 2011; Steinmayer 2012).

The recession-induced project cancellations in the GCC led to job loss for migrant workers, extended unpaid leave, and reduced recruitment of new migrant workers (Rajan and Narayana 2011, Steinmayer 2012). Migrant workers who lost their jobs, were faced with either returning to their home countries, or remaining in the GCC to find a new job. Rajan and Narayana (2011) estimate that, between 2008 and 2009, over 250,000 South Asians returned from the Gulf and

² The Gulf Cooperation Council includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).

³ Gulf Labor Markets and Migration database. Data for various years for different countries – mid-2014 for Bahrain, March 2015 for Kuwait and Oman, April 2010 for Qatar, mid-2014 for Saudi Arabia, and mid-2010 for the UAE.

another 170,000 unemployed South Asian workers remained in the Gulf to seek alternative work opportunities. Indeed, a 2009 survey of South Asian migrant workers revealed that remittances accounted for 80 percent of income in South Asian households with migrant workers in the Gulf, meaning that return migration would put the family unit in a financial predicament. Those that did find employment saw a 46 percent decline in monthly earnings on average (Abraham and Rajan 2012).

With the possible end of the commodity price super-cycle, low oil prices could persist for several decades to come, with implications for growth in many commodity dependent economies (Johnson and Sharenow 2013; World Bank 2015b). For the case of many SSE Asian economies, it is unclear if a protracted period of low oil prices would have a net beneficial or harmful impact on welfare. While these economies could benefit from lower intermediate inputs and higher real incomes, they could also experience lower remittance flows due to fewer migrants being demanded. Indeed, it is even possible that faster economic growth in the sending countries may also reduce the push factors to migrate. An analysis that accounts for the general equilibrium effects of a global oil price reduction would thus be critical in understanding the net effect on the major developing migrant-sending economies.

This paper thus presents a nuanced examination of how a sustained drop in oil prices might affect migrant workers hosted by net oil exporters, such as the GCC economies, through long-run structural adjustments of both the host and home countries. Beyond migration, it examines what the growth implications of the low oil prices might be for SSE Asian migrant sending countries. This is done through the application of a global dynamic-recursive global economic simulation model that accounts for bilateral migration flows that are responsive to changes in wages. Counterintuitively, it finds that lower oil prices increase the demand for migrant workers in the GCC. This is due to low oil prices leading to real exchange rate depreciation in those economies, making non-oil tradeable sectors become more competitive internationally, and increasing the demand for migrant workers in those sectors. More migrant workers are thus demanded. At the same time, the low oil prices benefit the sending countries by reducing the cost of intermediate inputs and boosting economic activity.

The following section highlights some of the key historical patterns of migration to the GCC while Section 3 presents the analytical approach. Section 4 discusses the key results, followed by concluding remarks.

2. Historical context

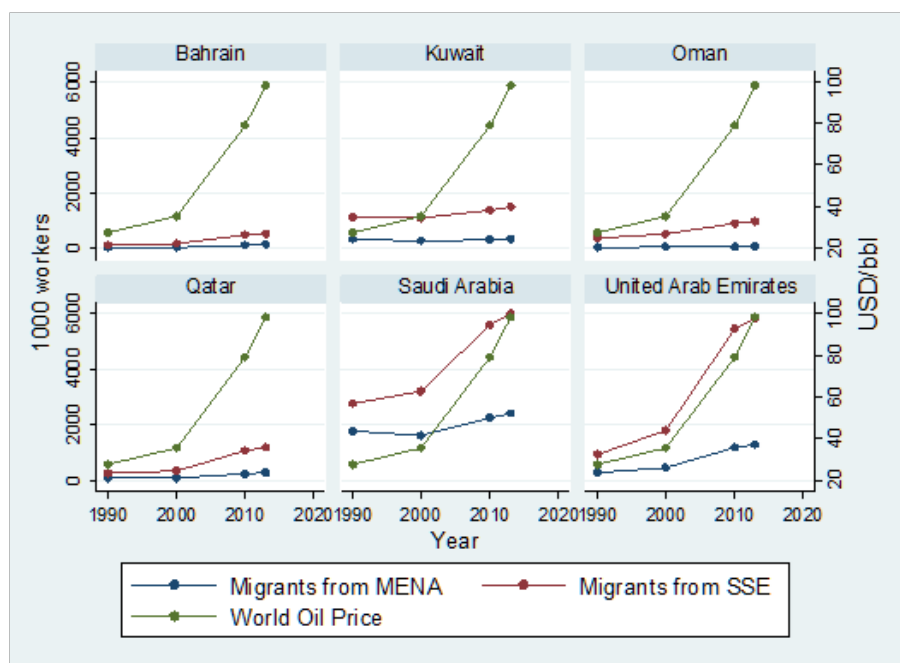
Migrants account for a large share of workers in GCC economies, and have been rising since the 1960s. In 2008, migrant workers were estimated to comprise 65 percent of the labor force on average across GCC countries, with 93 percent of Qatar's labor force being migrants – the highest share in the region. This is an increase from 1975, when the average labor force share of migrants was 51 percent across countries, with Bahrain, Oman, and Saudi Arabia hosting a minority of foreign workers in their labor forces (Winckler 2010).

The composition of migrant workers in the Gulf has also changed over time. In 1975, 68 percent of foreign workers in the GCC were Arab non-nationals. By 1983, this dropped to 53 percent, and, by 2010, only 42 percent of foreign workers in the GCC were Arab non-nationals (Naufal 2011; Thiolett 2011). In parallel, migrant workers from SSE Asia have accounted for rising shares of the labor force. As of 2010, migrant workers from SSE Asia comprise 54 percent of all foreign workers in the GCC.

The gradual shift towards migrant workers from SSE Asia has been driven by a complex set of factors. When the oil boom of the 1970s prompted rampant development projects throughout the GCC, the domestic labor supply was insufficient in number and skill to meet demand, requiring the recruitment of migrant workers (Winckler 2010). Coupled with the increasing political uncertainty in the Gulf, workers from SSE Asia became preferable alternates to Arab non-national workers for GCC countries because Asian workers were interested in neither political involvement nor permanent residency in the GCC (Naufal 2011, Thiolett 2011). Further, Asian workers tend to demand lower wages than Arab workers, take jobs unwanted by Arab workers, and relocate as individuals, instead of as families.

The increases in the GCC's migrant stock and shift towards migrants from developing SSE Asia is paralleled by the trends in oil prices. In the 1960s, oil prices were less than 20 USD/bbl but rose as high as almost 60 USD/bbl before the oil price shock of the late 1970s, after which it fell in the 1990s before beginning a long period of rapid growth. Between the 1960s and 2013, it can be seen that migrants stocks have grown in all six GCC economies, with some of the smallest stock in Bahrain and the largest stocks in Saudi Arabia and the UAE, and with the current stock of SSE Asian migrants being double and sometimes triple that of migrants from the Middle-East and North African (MENA) economies (Figure 1).

Figure 1: GCC migrants stocks have risen in parallel with oil prices, with increasingly proportions of South and South-East Asians, 1990-2013.



Source: Authors' estimates

Note: Data from United Nations (2015) MENA refers to economies in the Middle-East and North Africa and SSE refers to economies in South and South-East Asia, as defined by the United Nations Population Division.

3. Analytical Framework

There are several channels by which low oil prices may affect growth in SSE Asian migrant-sending economies, and the net effect is ambiguous from a purely analytical approach. Lower oil prices can mean lower costs of production in these net oil-importing economies and hence greater production that would increase demand for factors. At the same time, the lower oil prices could lead to lower consumer prices and subsequently higher real incomes. These effects, however, could be qualified by general equilibrium effects in both migrant sending and receiving countries. For example, the incomes of non-migrant natives in SSE Asian economies depends very much on how oil prices influence migration flows. If lower oil prices reduce the demand for migrant workers in the GCC, then real wages workers could be lower in SSE Asia due to the greater supply of workers. At the same time, there could be lower remittances that reduce incomes. The lower wages and remittances could dampen consumption, and possibly overwhelm the growth boost from lower input costs. In turn, it is not clear how lower oil prices will affect the demand for migrant workers in the GCC.

These myriad and potentially opposing effects need to be all considered holistically and in a way that accounts for the general equilibrium effects. For these reasons, a computable general

equilibrium (CGE) model that links macroeconomic data with trade and migration flows between multiple countries is used in order to analyze the effect that oil price volatility has on cross border migration into the GCC. This analytical framework is able to comprehensively capture the economy-wide response to a given shock, in this case sustained low oil prices.⁴ A global CGE model is especially appropriate in this case because oil price volatility and international migration response are global in nature, and global general equilibrium effects, such as changing real effective exchange rates, can be substantial and also difficult to predict through purely theoretical approaches.

Therefore, using a CGE model, this paper considers two possible future scenarios. The first is a baseline business-as-usual scenario where the global economy is assumed to grow under a set of estimates for productivity growth, demographics, and oil prices that track the current best set of GDP projections. The second scenario is an alternative scenario which is identical to the baseline scenario except for the world price of oil which is assumed to be lower than in the baseline. The alternative oil prices lead to national and global economies reaching alternative equilibria, and a comparison between the latter “low oil price” scenario with the baseline will provide some insight on impacts on migration flows between SSE Asia and the GCC economies, growth, and economic structure. The remainder of this section describes the data, model, and baseline scenarios.

3.1 Model and Data

This paper uses the dynamic recursive CGE model of Aguiar and Walmsley (2014) and Walmsey, Aguiar and Ahmed (2015).⁵ The underlying data used in this study are the economic flows in the GTAP Data Base (Narayanan et al., 2015), the bilateral remittance and labor flows of Walmsley et al. (2016) and the foreign ownership of capital of Golub, 2016. For computational purposes, the database has been aggregated to 12 countries and regions and 5 sectors.⁶

The model is based on neoclassical theory, and, as such, economic growth is driven by changes in labor supply, capital and productivity. It is a multi-sectoral and multi-factor model, with multiple agents. The model assumes perfect competition such that both consumers and producers are maximizing their respective objective functions. As goods and services are differentiated following Armington assumptions, domestically produced goods and services are different from imports whereas, among imports, goods and services are differentiated by their

⁴ Several studies related to international migration have relied on CGE frameworks including: Ahmed, Go, and Willenbockel (2016); Tyers and Shi (2007), Walmsley, Winters, and Ahmed (2011), Walmsley, Aguiar, and Ahmed (2015), and World Bank (2006).

⁵ The model is based on the dynamic migration model (GMig2Dyn) which combines the features of dynamic GDyn model of Ianchovichina and McDougall (2012), and the comparative static bilateral migration model (GMig2) of Walmsley et al. (2009), and further introduces migration flows that are endogenous to relative wages changes.

⁶ The regions are GCC, Indonesia, Philippines Bangladesh, India, Pakistan, Sri Lanka, United States, China, Russia, EU28, and Rest of the World. The sectors considered are Agriculture and Food, Oil, Manufactures, Construction and Services.

country of origin. Production in the various sectors is modeled using a multi-nested Constant Elasticity of Substitution (CES) function. At the upper-most nest, an intermediate inputs bundle is aggregated with a value added bundle under Leontief assumptions. In turn, the intermediate inputs bundle is an aggregate of different inputs, each of which are differentiated under Armington assumptions. The value added bundle is an aggregate of capital, land, and labor, where labor is differentiated by country of origin and skill.

The model considers the cross border movement of labor, and their impact on growth, remittances and the real incomes of migrants and permanent residents. The movement of labor can be determined exogenously, for example through changes in quotas, or endogenously in response to changes in relative real wages as it is used in this analysis. For endogenous migration, workers (or labor supply) are assumed to respond to changes in the expected real wages between the home and potential host regions according to equation (1):

$$LF_{i,c,r} = A_{i,c,r} \times \left[\frac{RW_{i,c,r}}{RW_{i,c,c}} \right]^{ESUBMIG_{i,c,r}} \quad (1)$$

LF is the labor force of labor type i (skilled or unskilled), from country of origin c , in host country r ; A is a coefficient that takes into account other drivers of migration (e.g. language, distance, etc.) and is calibrated from the underlying bilateral migration data base from Walmsley et al. (2016); RW is the real wage and $ESUBMIG$ is a parameter reflecting the extent to which migration responds to changes in relative expected real wages.⁷

This formulation is consistent with the most basic economic interpretation of migration in the labor-flow model where the individual worker chooses location in order to optimize the returns on their labor. Shields and Shields (1989) captured this formulaically as $M_{ij} = B_{ij}(W_j - W_i)$, where migration from i to j depends on the wage differential, as well as barriers B_{ij} , between i and j (Bodvarsson and Van den Berg 2013). Recent gravity models of migration aim to capture, in aggregate, the worker's decision to migrate based on income differences net of migration costs, as in Gaston and Nelson (2013) where per capita GDP was used as a proxy for relative wages in different markets.

In the model, migrants are assumed to send a constant proportion of their income back home as remittances. Thus, if the number of migrants or their wages increase, remittances will increase. This will also affect the current account balance in our model:

$$CAB = X - M + NREM + NFC \quad (2)$$

⁷ The extent to which migration is endogenous is dependent on this parameter. Increasing this parameter increases the number of migrants moving, but does not change the directions of their movements. This parameter is set to one for the scenarios presented in subsequent sections. However, sensitivity analysis was conducted to examine the responsiveness of the main results to the value of the parameter, and while the magnitude of the effects change, the qualitative results remain the same.

where CAB is the current account balance, X represents total exports, M represents total imports, NREM are net remittances and NFC are net capital flows.

3.2 Baseline development

The business as usual scenario captures the expected economic and demographic growth of the world. The policy scenario shares many aspects of the baseline scenario. Policy shocks should, in general, be focused in order to be able to be tractable. In this section we discuss the development of the baseline scenario.

For this analysis, we define four time periods: a historic time period from 2011 to 2014 and three projected periods from 2015 to 2020, from 2021 to 2025, and from 2026 to 2030. The base data on which the model is initially calibrated is the 2011 GDyn data based on GTAP version 9 Golub (2016). Thus, during the historic period, we use the model to calibrate the data to 2014. Then, for the remaining three periods, forecasted data is used to develop the expected business as usual scenario through year 2030.

In both historic and projected periods, gross domestic product (GDP), population, labor force, and oil price shocks are used to calibrate the model to match historic trends and forecasts. For the historical period, macroeconomic variables (e.g., GDP and gross fixed capital formation (GFCF)) were retrieved from the World Bank's World Development Indicators (WDI). For the projected periods, we used the Shared Socioeconomic Pathways (SSP) projections for scenario 2 based on the team from the Organization for Economic Co-operation and Development (OECD).⁸

Oil price data was retrieved from the World Bank's Commodity Market Outlook. The historical Commodity Price Data and the Commodities Price Forecast. Since the projected data is only available until 2025. Therefore, for the period of 2026-2030 in this study, we assume the same oil price growth as was computed for 2021-2025.

From the UNPD World Population Prospects 2015 revision, we acquired total population data for all age groups. We consider the growth of the working age population, consisting of the population between years of age 15 and 64 and assumed that there will be equal growth across skilled and unskilled labor.⁹

For exemplary purposes of the historical calibration, we will discuss the GDP from the WDI data and the output GDP of the historical period for the model. Table 1 reports the GDP collected from WDI and the growth between 2011 and 2014. We can see that Bangladesh and China experienced the greatest growth during this time period, with percentage changes over 35 percent. Following, Sri Lanka and the Philippines reported growth of nearly 27 percent during

⁸ The Integrated Assessment scenarios define five SSPs representing different combinations of climate challenges to mitigation and adaptation. We have chosen the one addressing the intermediate challenges, or middle of the road.

⁹ The projected data acquired was computed according to the medium fertility variant.

this time period. Indonesia, Pakistan, and the US reported growth between 12 and 16 percent. The GCC and the EU faced low growth, below 3 percent. Indonesia, Russia, and the Rest of the World faced contraction.

We implement WDI GDP growth rates to replicate historical growth patterns using our model. That is, although the base year GDP for 2011 from the GTAP Database is not precisely the same as the GDP data for 2011 from WDI, the growth observed in WDI data from 2011 to 2014 is matched so that the model data reported in 2014 has grown by this same amount.

3.3 Policy scenario

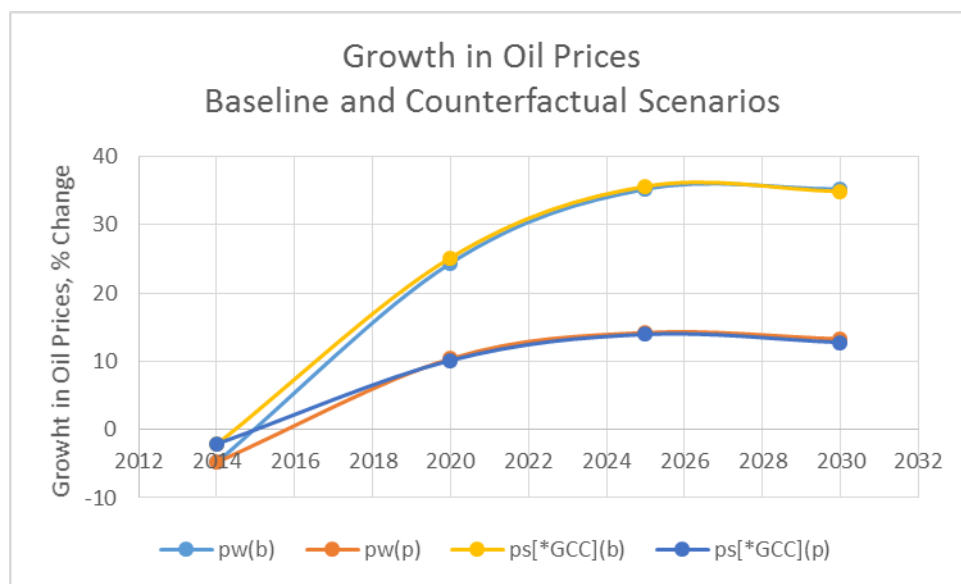
In this study we set to analyze the effect of sustained drop in oil prices on migrant workers hosted by net oil exporters, such as the GCC economies. The causes for lower oil prices include both supply and demand forces. In terms of supply forces we have the sustained over-production by OPEC, resumption of exports by Iran, and the resilience of US supply of shale oil. In addition, global demand is slowing down due to growth crises in the Eurozone, China's rebalancing, and generally weak growth in emerging market economies.

In our model, quantity and prices are determined endogenously via market clearing conditions. Our stylized policy scenario targets lower world oil prices by forcing higher production via a technology shock, and allows the demand-side to be adjusted by our growth projections alone. The next section examines the effects of the policy scenario on migrant workers hosted by the GCC economies and beyond migration, it examines what the growth implications of the low oil prices might be for SSE Asian migrant sending countries.

4. Analysis

In this section, we examine the effects of lower-than-anticipated world oil prices on migration from SSE Asia to the GCC countries. As previously discussed, World Bank projections anticipated oil prices to grow by 24 percent between 2015 and 2020 and by 35 percent between 2020 and 2025. We then assumed that between 2025 and 2030 would also grow by 35 percent. This is our 'baseline scenario', against which we compare a scenario in which world oil prices face lower than anticipated levels of growth, hereon referred to as the 'low oil price scenario'. Specifically, we consider that oil prices grow only 10 percent from 2015 to 2020, another 14 percent by 2025, and 13 percent further by 2030 (see Figure 2 depiction).

Figure 2. Growth in Oil Prices (baseline and counterfactual scenarios)



Increasing the productivity of factors in the production of oil to achieve lower prices causes our model to change the factor demands in all sectors of the GCC. The real GDP growth in the GCC declined in comparison with the baseline (Figure 3). This is due to reduced growth in consumer prices (Figure 4) as well as in export prices from the GCC, as compared with the baseline scenario.

Figure 3. Growth in GCC's GDP (baseline and counterfactual scenarios)

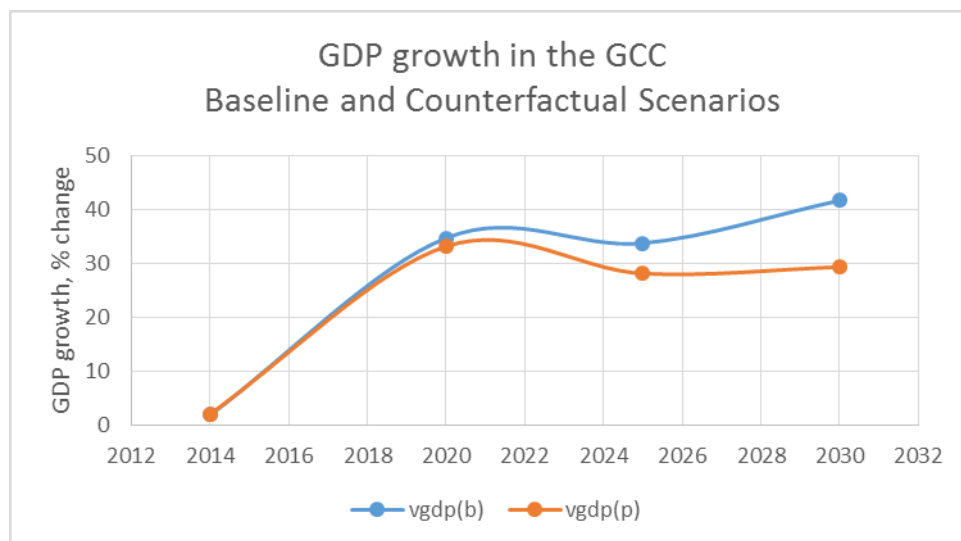
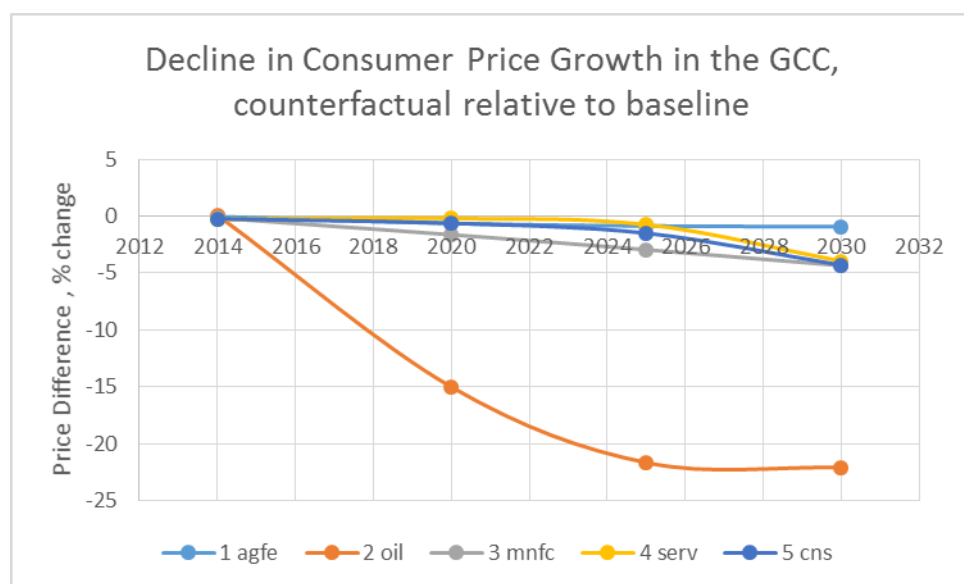


Figure 4. Consumer price growth in the GCC (relative to the baseline)



While GDP gains for the GCC diminish, migration may be anticipated to diminish as well, in comparison with the baseline scenario. However, migration inflows increase during the first several periods of the model, only decreasing during the final period, relative to the baseline. In Figure 5, we observe the baseline growth of skilled and unskilled migration in the GCC, which lessens with time, as relative wage growth flattens by 2030 (Figure 6). In the low oil scenario, although migration flows initially increase from the baseline, over time, the flows decrease in comparison with the baseline (Figure 7).

Figure 5. Migration inflows for skilled and unskilled workers (baseline)

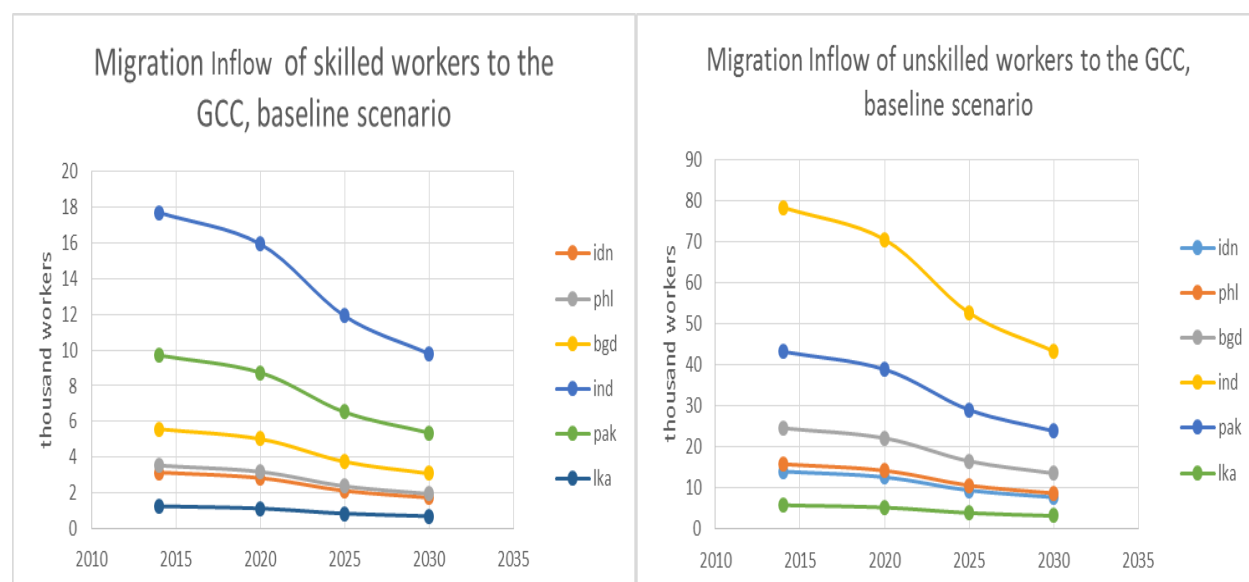


Figure 6. Relative wage growth for skilled and unskilled workers (baseline)

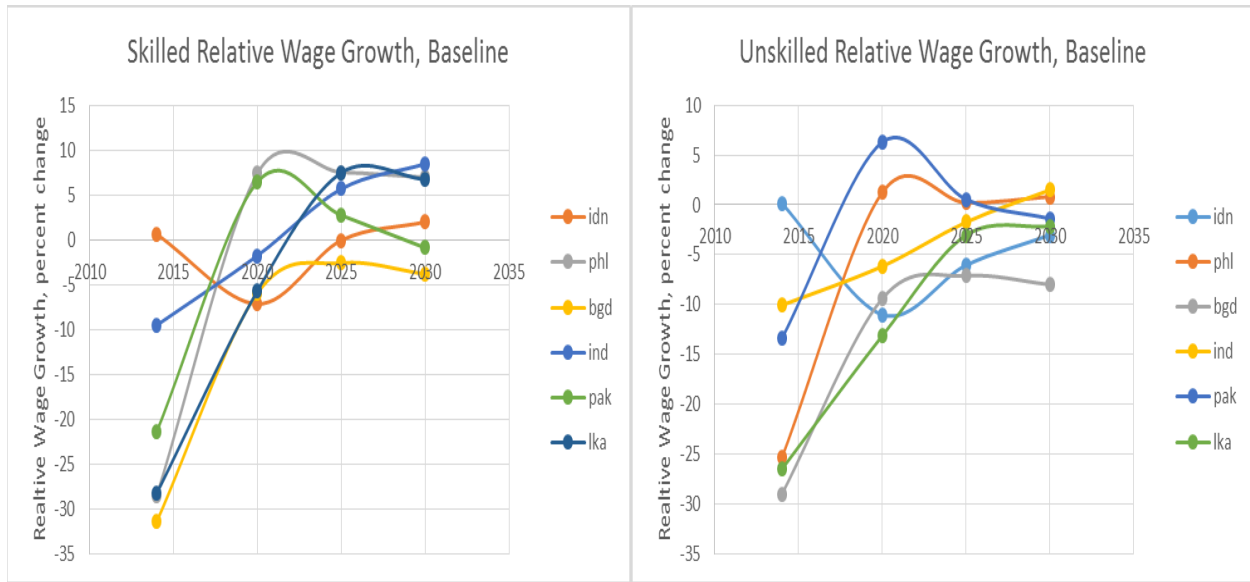
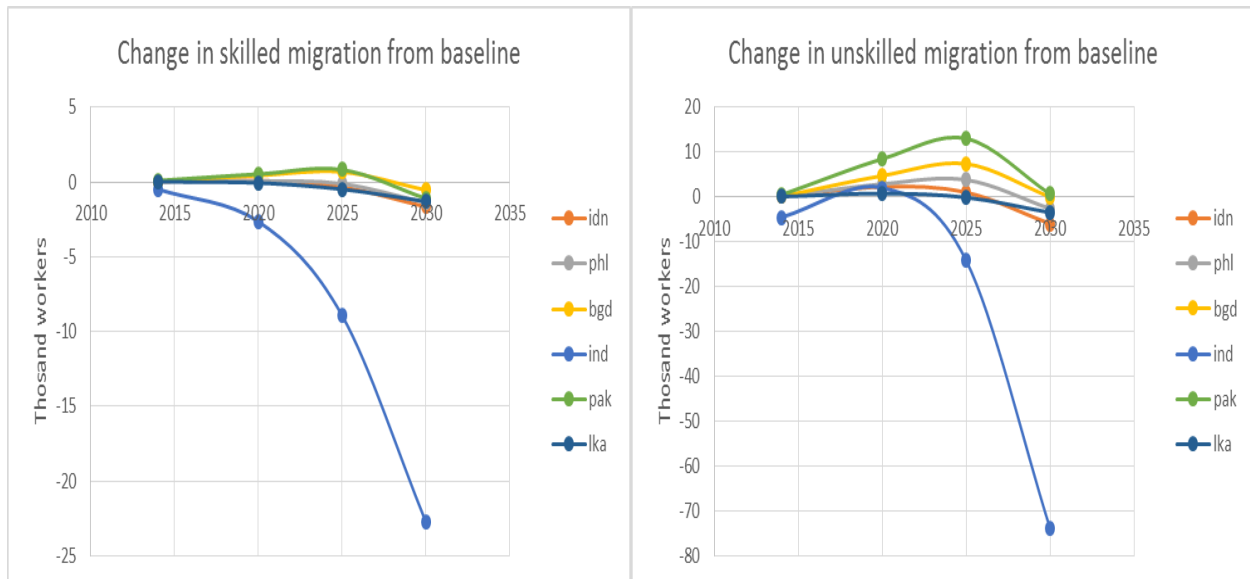


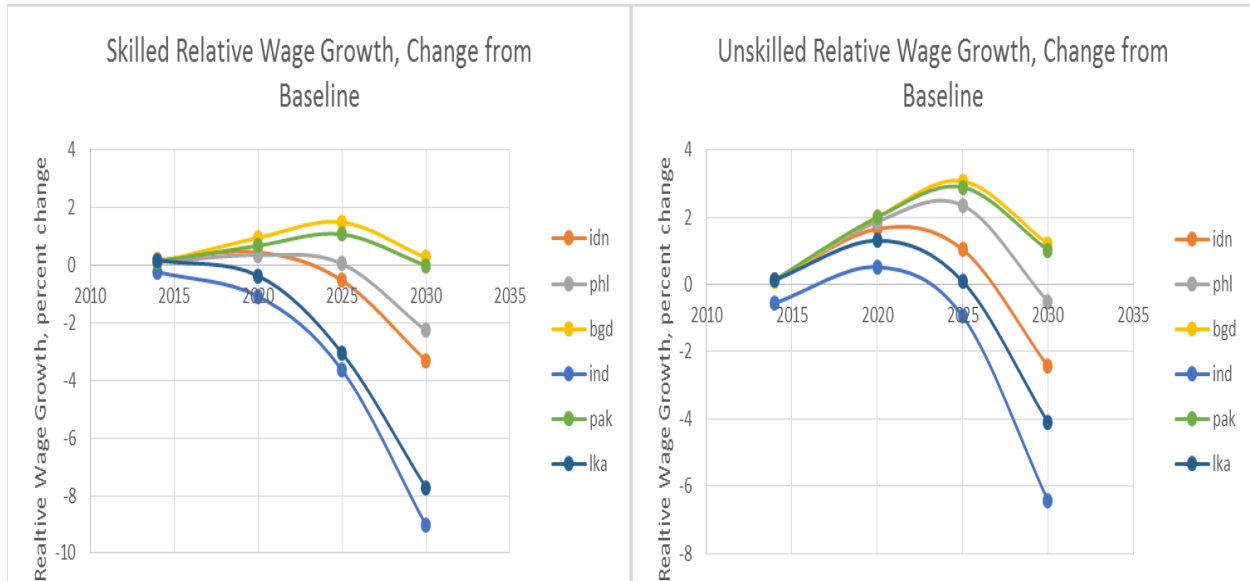
Figure 7. Change in migration for skilled and unskilled (relative to baseline)



The change in the migration flows in the low oil price scenario must be considered in the context of the change in relative wage growth as compared with the baseline, per Figure 8. Recall that the relative wages is the wage of a foreign worker in the GCC compared to the wage offered in the worker's country of origin. In Figure 8, we observe that, with the exception of India, relative wages of workers from each SSE country grow faster than in the baseline for years 2014 through 2025. However, in 2030, relative wage growth declines compared with the baseline, and foreign workers who migrate to the GCC earn less relative to their home wages. This diminished relative

wage growth incentivizes less workers to migrate to the GCC, which is reflected in the contracted migration flows to the GCC in the low oil scenario as compared with the baseline (Figure 7).

Figure 8. Relative wage growth for skilled and unskilled workers (relative to baseline)



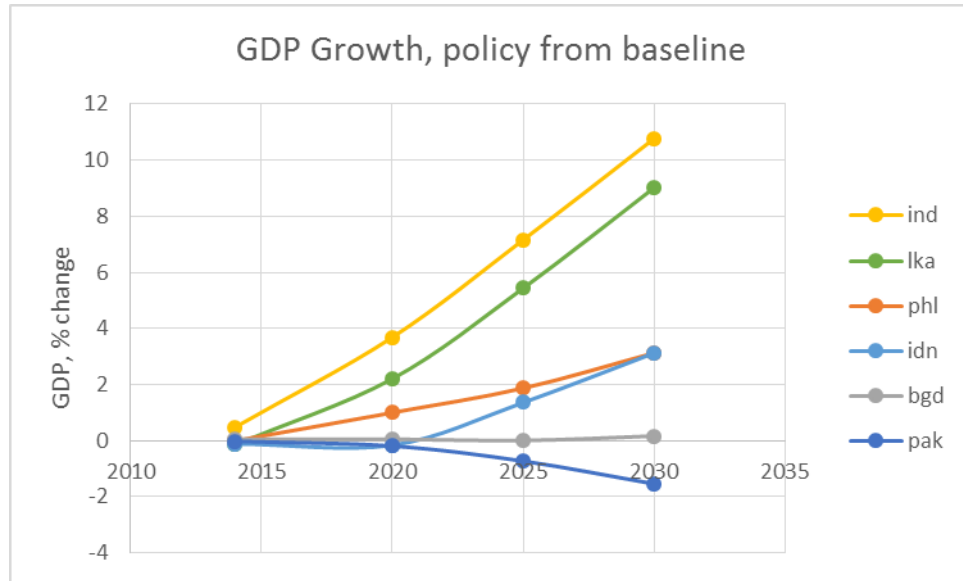
Exceptions include India, Pakistan, and Bangladesh. Migrants from India face lower relative wages from 2025 (Figure 8), which explains the dip in migration flows from India to the GCC in Figure 7. Migrants to the GCC from Pakistan and Bangladesh, however, experience growth in relative wages between 2025 and 2030, relative to the baseline. These higher relative wages in the GCC provide higher incentive for migration from Pakistan and Bangladesh, explaining the slight increase in migration and stagnation for Pakistan and Bangladesh, relative to the baseline (Figure 7).

We can consider the analogous situation for skilled migration to the GCC. Figure 7 shows the change in skilled migration flows to the GCC in the low oil price scenario relative to the baseline scenario. Again, these migration flows may be linked to change in relative wage growth of migrants working in the GCC, in comparison with the baseline (Figure 8).

Changes migration flows to the GCC, as determined by relative wage growth, can be linked back with the overall relative macroeconomic health of the GCC in comparison with migration source countries. While real GDP growth falls by 2025 for the GCC, internal expansion such as in manufacturing continues to drive labor force demand and, in turn, encourage migration. However, lower world oil prices induce global growth, as seen in real GDP growth (Figure 9), particularly for oil importing countries such as the SSE Asian countries which are predominant sources of migrants to the GCC. This growth in turn supports the higher relative wages which attract more would-be migrants to remain in their home countries, as opposed to migrating to work in the GCC. In turn, migrants from Bangladesh and Pakistan, the countries with the lowest changes

in GDP growth from the baseline, face slightly higher wages in the GCC compared with their home countries, explaining the observed migration growth in 2030.

Figure 9. Real GDP Growth (relative to the baseline)



5. Conclusion

In light of the recent oil plunge from 2014, in this paper, we considered the long-run effects of structural economic change from sustained low oil prices on migration flows from South and Southeast Asia to the GCC. We discussed how, historically, demand for migrant workers in the GCC was instigated by labor demand in the oil industry out-pacing national labor supply. While this demand was initially met ‘locally’, by Arab non-nationals from the MENA region, sociopolitical occurrences influenced the shift towards South and Southeast Asian countries. Based on literature of oil price shock transmission and international migration, we hypothesized that sustained lower oil prices would discourage migrant flows from SSE Asia to the GCC. Using a dynamic CGE model, we confirmed our expectations, demonstrating how the economic consequences for the GCC and gains for SSE Asia combine to reduce the relative wage growth for workers from SSE Asia in the GCC, decreasing migrant flows in the long run.

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