Asymmetric Economic Responses to Petroleum Price Shocks: 

The Case of Kuwait*

Manal R. SHEHABI**

The University of Western Australia

ABSTRACT

Petroleum prices volatility has significant implications on the Middle East and North Africa (MENA) region. Petrostates—countries that rely heavily on revenues from petroleum exports—are subject to boom-bust shocks resulting from petroleum-price volatility and the exhaustibility of petroleum resources, and these shocks in turn impact regional non-petrostates. Since mid-2014, Kuwait has experienced a substantial drop in its petroleum export price, foreshadowing exchange rate instability, fiscal pressures and real negative implications for overall economic performance. If and when a petroleum price recovery occurs, it will be expansionary, reversing the negative implications of the recent slump. The subtle implication of some writings on this reversal is that upswings are symmetrical with downswings, yet recent work on the resource-exporting Australian economy suggests that there is substantial asymmetry. This paper quantifies the transmission to the economy of petroleum-price volatility and the associated asymmetry in economic performance in the context of Kuwait through constructing a computable general equilibrium model. This model explicitly represents external financial flows, domestic fiscal policy, oligopoly industrial structures, government regulation, the labor market, and oil prices. An important contribution is the construction of a model database in the form of an augmented social accounting matrix depicting Kuwait’s economic structure and energy-labor linkages. This is the first country-wide model of Kuwait to measure economic efficiency and the impact of oligopolies. In Kuwait, asymmetry depends on pricing behavior by domestic oligopolies; the levels of self-sufficiency in other markets; the composition and flexibility of labor contracts with foreign workers; and access to assets invested in the country’s sovereign wealth funds (SWF). While Kuwait’s relatively specialized economy might possibly experience less asymmetry than larger, more diversified ones, downside performance risks can be lessened by the control of oligopoly rents, reverse Dutch Disease effects, and the judicious combination of fiscal policy with Kuwait’s SWF.

Keywords: petroleum; asymmetry; price volatility; general equilibrium; oligopoly; sovereign wealth fund; Kuwait.

* Technical analysis for the paper is performed using the GEMPACK (General Equilibrium Modelling PACKage) modeling software.
** Manal R. Shehabi, Economics Department, Business School, University of Western Australia.

Special thanks to Dr. Rodney Tyers, Dr. Rony Gabbay, Dr. Peter Hartley and to participants in the UWA Business School Doctoral Research Conference for helpful comments. I gratefully acknowledge the hospitality of the Techno-Economics Division at Kuwait Institute for Scientific Research, Kuwait and its assistance with data collection during my time as a visiting academic. I extend thanks to the hospitality of the Economics Department at Kuwait University. My participation in the Middle East Economic Association 15th International Conference was made possible through a Travel Grant for Young Scholars from the MEEA.

Corresponding author: Manal R. Shehabi, Economics Department, University of Western Australia, 35 Stirling Highway, Crawley WA 6009 Australia. E-mail: manal.shehabi@research.uwa.edu.au
ASymmetric Economic Responses to Petroleum Price Shocks: Kuwait

Shehabi, O

1. Introduction

Petroleum has been shown to be the most volatile of all traded commodities (Plourde & Watkins, 1998; Regnier, 2007), and this volatility has significant implications on the Middle East and North Africa (MENA) region as it harms economic performance and output growth in both petroleum importing and exporting countries (Ramey & Ramey, 1995; Van der Ploeg & Poelhekke, 2009). In the former, volatility impacts economic activity directly through consumption, and cost of living, and production, and indirectly through intermediates. It also impacts non-petrostates in MENA through remittances, foreign aid, or foreign direct investments. In oil-exporting countries, also called petrostates, petroleum price volatility leads to boom and bust cycles, real exchange rate volatility, and comparatively high investment risk, the management of which poses policy challenges. Therefore, petrostates face unique policy challenges stemming from shocks caused by petroleum-price volatility and the exhaustibility of petroleum resources. Challenges include, but are not limited to, fiscal sustainability and efficient allocation of rent and resources to harness oil rent windfalls during revenue booms and cushion downturns during busts, while simultaneously maintaining long-term growth and development. This paper helps to fill existing gaps in the understanding of the economic impacts of petroleum price changes in MENA by modeling and quantifying the effects of petroleum-price volatility in petrostates through constructing a general equilibrium analysis in the context of Kuwait.

In Kuwait, a small open petroleum-exporting economy, petroleum exports generated over 56% of its gross domestic product (GDP) and 92% of its government revenue in 2013 (Kuwait Central Statistical Bureau [CSB], 2013). This high dependence on petroleum exports makes Kuwait an extreme example among resource exporting economies. That said, the high levels of petroleum rent to date have seen the country enjoy great wealth, impressive foreign savings abroad, and enviable redistribution to its citizens via a generous domestic welfare system. Despite such considerable advantages, the currently low petroleum price represents a substantial negative shock to the Kuwaiti economy that will demand the best of its wealth management to navigate. Figure 1 illustrates the association between movements in Kuwait’s GDP,
petroleum production, and petroleum prices. This association was clearly recognized in Kuwait early on, as evidenced by the establishment of the Kuwait Investment Board (which subsequently became Kuwait Investment Authority, (KIA)) in 1953 (KIA, n.d., para. 1).

Since mid-2014, Kuwait has experienced substantial drops in its petroleum export price, foreshadowing exchange rate instability, fiscal pressures, and negative implications for overall economic performance. For instance, by mid-January 2015, when the average price of exported Kuwait petroleum fell to $39/barrel (bl), compared to an average price of $103/barrel the previous year, the government’s petroleum-dependent revenues were expected to drop by 60%. By January 2016, as the price collapsed to $30/bl, estimations of the budget drop reached approximately 75%, and Kuwait has been withdrawing from its sovereign wealth fund (SWF) savings abroad to cover the consistent budget deficit. The fiscal pressures exposed by the drop of the petroleum price are worrying due to expectations of recent trends in petroleum price declines to persist, largely impacted to two main factors. First is the shale oil and gas revolution which decreased GCC countries’ market share and revenue sources; and second are anticipated increases in global supply from Iran following the 2015
Iran nuclear agreement, adding further downward pressures on oil prices. As such, understanding the impact of the price volatility for purposes of managing the ensuing challenges is paramount.

If and when a petroleum price recovery occurs, it will be expansionary, reversing the negative implications of the recent slump. The subtle implication of some economic writings on this reversal is that the economy’s performance after price upswings will be symmetrical to that following recent petroleum price downswings. Nonetheless, existing literature on the impact of petroleum price changes in industrialized mostly petroleum-importing countries show non-linear relationships between petroleum prices and output and asymmetric responses to price shocks. Moreover, recent work on the Australian economy, a resources-exporting country, suggests that there is substantial asymmetry (Tyers, 2014). The economies in which such asymmetry is examined are industrialized, usually net-importers of petroleum that are also larger and more diversified than petroleum exporters in the MENA region. As such, existing analyses do not offer insights on the nature and reasons of responses to energy price shocks in the MENA region. In this context, this paper helps to fill existing gaps in economic research about petroleum prices’ impact in MENA and about Kuwait by identifying and quantifying the asymmetric transmission to the Kuwaiti economy of petroleum-price volatility through a computable general equilibrium (CGE) model of the Kuwaiti economy. A CGE model has been chosen because economy-wide models such as CGE ones capture the major structural features of an economy such as that of Kuwait, and have been shown to be the best economic tool for policy testing and formation.

This paper describes the CGE model and its features. A key contribution of this model is that it fills existing gaps in economy-wide model of the Kuwaiti economy. There are few published CGE models of Kuwait; Khorshid (1990) offers a dynamic model that is now dated, while the recent model of Gelan (2014) focuses on reducing electricity subsidies without accounting for export revenue volatility and some key structural elements of Kuwait’s economy. As such, the CGE model described in this paper fills existing gaps in country-wide analysis of the Kuwaiti economy by taking into account specific details of the Kuwaiti economy and its structure, incentives for efficiency in non-oil sectors, as well as the management of non-
petroleum oligopoly rents. Second, the contribution of the model is that it is unique and innovative in that it involves the preparation of a recent database constructed specifically for Kuwait to represent the structure of the Kuwaiti economy in the form of an augmented social accounting matrix (SAM). This is a critical contribution as there is no official published SAM for Kuwait. Further, to our knowledge, this is the first CGE model in the Middle East and the first model of the Kuwaiti economy to incorporate oligopoly behavior and its regulation explicitly and to explore the further effects of coordination between regulatory competition policies and the management of foreign labor contracts to highlight labor-energy linkages. The model builds upon and extends an economy-wide analysis approach of Asano & Tyers (2015), and it also extends conventional CGE representation by including labor market dichotomy and firms’ profit maximization pricing rules.

This paper is motivated, first, by the substantial effects of export volatility and the challenges they pose on attaining sustainable long-term development and growth in Kuwait and, consequently, MENA. It is also motivated by a goal for offering an evaluation range of those effects in a manner not yet available in the policy literature. The research herein is further motivated by the importance of oligopoly behavior and the potential role of its pricing regulation in small economies like Kuwait in moderating the impact of petroleum volatility on employment and the overall economic activity. A final motivation is the opportunity to compare the short and long run implications of, and interactions amongst, energy, trade, labor, and macroeconomic policies in the Kuwaiti context in light of petroleum volatility. This model is part of a larger research project that also examines the impacts of a variety of possible policy reforms to address the impact of volatility. Section 2 of this paper reviews asymmetric responses to petroleum-price volatility and the sources of the asymmetric responses to them in Kuwait. Section 3 outlines the construction of the SAM, while section 4 details the model. General conclusions are presented in the final section.
2. **Literature Review of Asymmetry**

The 1973 petroleum price shocks and the subsequent recessions in the economy of the United States of America (U.S.) ignited attention to the relationship between petroleum prices and economic output. An influential contribution was that of Hamilton (1983) in which he showed that all eight except one of the U.S. recessions following World War II were preceded by rising petroleum prices and could not be explained by other business cycle variables. Notably, the U.S. was a net importer of petroleum during the period examined. Subsequently, various economic studies have shown that petroleum price changes have asymmetric effects on the U.S. economy whereby the effects of price upswings are unequal to the corresponding effects of price downswings (Lardic & Mignon, 2008; Brown & Yücel, 2002; Ferederer, 1996; Mory, 1993; Mork, 1989). Lee, Ni & Ratti (1995) supported this similar result and attributed it to price uncertainty.

In addition to analyses in the U.S. context, analyses of international data found a similar negative correlation between oil prices and economic output in industrialized nations, but to lesser degrees than those in the U.S. (Darby, 1982; Burbidge & Harrison, 1984). Further, Mork, Olsen & Mysen (1994) found that similar asymmetry in response to petroleum price shocks existed for seven industrialized OECD countries, but that the asymmetry varied depending on the whether the country is a net-importer or a net exporter of petroleum. The United Kingdom, although switched from a net importer to a net exporter position for the examined period, showed results similar to those of the net oil-importer countries where higher petroleum prices caused lower growth. For Norway, however, which also switched from a net importer to a net-exporter position, Mork et al. showed that its economy benefited greatly from price increases and was hurt, albeit less significantly, during petroleum price declines. This result is not surprising given the relatively large size of the Norwegian petroleum industry to that of its economy. More recently and importantly, recent work on Australia’s resource-exporting developed economy shows evidence of asymmetry in responses to commodity price shocks, with the asymmetry
depending on the structure of the whole economy and government policy responses (Tyers, 2014). It is worth noting that Australia is an exporter of resources, but the energy and resources industry contributed approximately one-third of the country’s GDP. In an examination of the Australian economy, Tyers (2014) showed that positive terms of trade shocks yield improvements in economic performance that are larger than the losses occurring when equiproportional negative shocks occur. This asymmetry had been shown to depend on the structure of the whole economy; pricing behavior by domestic oligopolies; the rules of regulatory policy as applied to service prices; the levels of self-sufficiency in other product and service markets; and the target of monetary policy.

3. **Sources of Asymmetry in Kuwait**

Asymmetric responses of the Kuwaiti economy to energy price shocks are consistent with analyses and observations of existing studies in the industrialized economies, as outlined above. Nonetheless, the transmission of petroleum price shocks to Kuwaiti economy is unique given that Kuwait is an oil exporting economy that is highly dependent on the petroleum industry in its GDP and budget revenues. It also a large consumer of its locally-produced petroleum (both crude and refined products) supplied at generally fixed prices below cost and below the international shadow price. It also has a unique structure and mechanisms. This asymmetry has significant implications on the formation of policy that aids adjustments. In Kuwait, it stems from five main sources, described below.

3.1. **Neoclassical Forces**

The first one is the neoclassical forces emerging from gains from trade. In small open economies, an autarky price occurs if the international terms of trade and the relative local price levels are equal, so trade does not occur and national welfare is minimized. Departures from autarky price following a terms of trade shock toward a given export sector, such as a rise in the price of petroleum in a petrostates, causes improvements in welfare, increases that sector’s value add, and enlargements in the gains to and from export industries. The larger the departures of the international terms of trade are from the autarky level,
the greater is domestic welfare. Similarly, negative terms of trade shocks from the viewpoint of the exported commodity (i.e., drops in the petroleum price in a petrostate) reduce welfare while keeping it at a level higher than that during autarky. If the magnitude of a negative terms of trade shock is large enough, the shock can reverse the pattern of trade and make a net gain possible, reflecting the gains from trade. As is the case with modeling the Kuwaiti economy, the following sections show that this behavior persists even with additional generalisation of the neoclassical model of trade to include differentiated products, saving, investment, fixed costs, and oligopolistic industries.

3.2. Dutch Disease

The second source of asymmetry in a petrostate is the Dutch Disease. It refers to instances when a boom in natural resources’ exports lead to a significant appreciation of nominal (and real) exchange rates (or inflation in countries with fixed exchange rates regimes), which in turn adversely affect the non-resources tradable sectors and cause a boom in nontraded services sectors (Corden, 1984, 2012; Corden & Neary, 1982; Venables & van der Plee, 2010; Tyers & Walker, 2016). In the case of Kuwait, there is strong evidence for Dutch Disease effects following episodes of export price hikes (Al-Sabah, 1988; Alsabah, 1985; Looney, 1991). Boom shocks cause factor movements to the booming sectors and deindustrialization and the loss of comparatively labor-intensive production, with the effects differing depending on labor market structures and international labor mobility. Similarly, bust shocks bring contractions in the resource-intensive activity, but their wider impacts depend on real depreciations and revivals of other tradable activity. Therefore, they can reverse some of the Dutch Disease effects and, consequently, moderate the net effect of resource revenue declines on the economy.

3.3. Oligopolies

The third source of asymmetry is oligopolies’ mark ups. In Kuwait, I found strong evidence of the pervasiveness of oligopolies which, in resource economies, have been shown to contribute directly to asymmetry following terms of trade shocks (Tyers, 2014). In general terms, economic theory has accepted the assertion that competition induces innovation, and the rent it confers in the short run is destroyed in the
long run by subsequent innovation, thus maintaining efficiency and acting as a source of successive innovation and, therefore, real growth (Schumpeter 1911, 1942). This idea has thus become central to modern research on economic growth, as shown by Segerstrom, Anant, & Dinopoulos (1990), Aghion & Howitt (1992), and Aghion, Akcigit, & Howitt (2013). Oligopolies distort markets and prices and their sustained rents engender strategic behavior that detracts from growth-enhancing innovation (Grossman & Helpman, 2014). Tyers (2015) shows, in general equilibrium, that the full exploitation of oligopoly market power in Australia would cause a reduction of real GDP by as much as a third in the long run. This effect is moderated in practice by pricing surveillance and price-cap regulation in service industries. The core idea is “creative destruction,” which entails that innovation is induced by competitive forces and that, while any single innovation confers rents in the short run, subsequent competitive innovations “destroy” those rents, maintaining efficiency (Schumpeter, 1942).

In economies that depend on the exportation of natural resources like Kuwait, oligopolies play an additional role by contributing to the asymmetry in advanced resource economies (Tyers 2014). During booms, oligopoly behavior raised rents impairing economic performance, while during busts they reduced rents which moderated the overall downside effects of the shocks on the economy. A key mechanism through which oligopoly rents affect growth performance is by raising the cost of intermediate services and, therefore, appreciating the real exchange rate; thus reducing the economy’s overall competitiveness. The relative decline in tradable input costs during booms due to the appreciated exchange rate cause oligopoly firms’ average costs curves to shift down, leading to higher rents (Menezes 2009), even if price-cap regulation is imposed. The inverse occurs during busts. Inefficient changes in scale efficiency in network oligopolies that carry very large fixed costs could also contribute to observed differences in measured productivity between booms and busts. The implications of this contribution to asymmetry are that busts following booms do not necessarily place all boom gains at risk.

It is not surprising that a small economy like that of Kuwait should have its markets supplied by monopolies and oligopolies. This is especially the case because it has no significant agriculture, and
because its domestic demand is small compared with minimum efficient scale in its manufacturing and network service industries. Using data on listed companies from the Kuwaiti Stock Exchange, Figure 2 depicts the concentration of industries’ capital within a few companies. For instance, two out of a total of 61 financial services firms own over 50% of the total industry’s listed share.

![Figure 2. Cumulative Kuwaiti firm shares of industry calculated based on total industry revenue data, except for financial services which are calculated based on net profit (due to the lack of revenue data). Data source: Author’s analyses bases on data from the Kuwaiti Stock Exchange. Note: The vertical axis shows the cumulative share, and the horizontal axis shows the number of total firms n.]

Similar concentration trends are evident when examining listed firms’ market capitalization across industries. Further, a preliminary examination of aggregate representative data of all Kuwaiti companies across industries suggests similar concentration among a few firms. These results are consistent with experience with other regions suggests that the levels of concentration amongst non-listed companies is at least as large as amongst listed firms. As evidence of the pervasiveness of oligopolies, Kuwait’s Ministry of Commerce and Industry passed Law 10/2007 for the Protection of Competition, which established the Competition Protection Authority to regulate and reduce imperfect competition.
3.4. Flexibility of Foreign Labor Contracts

The Kuwaiti labor market is dichotomous. Foreign labor dominate the private sector, are employed at lower wages, and have flexible employment contacts. Their employment level, thus, is endogenous and reacts to shocks in the economy. During a petroleum price shock that leads to declines in the economy’s GDP, the shock will be contractionary, and the industries whose performance and profits are impacted accordingly will be forced to cut costs. Typically, as wages tend to be sticky in the short-run, employment levels will adjust instead. As most Kuwaitis are employed by the public sector where contracts are rigid, their level of employment will not be affected. Nonetheless, the flexibility of foreign labor contracts entails that the foreign labor market will adjust accordingly, so foreign labor employment levels drop. As foreign labor wages are less than those of Kuwaitis, their exiting the labor market contributes to the adjustment of the production side, but typically has a relatively smaller impact on the consumption side. Indeed, it is worth noting that the impact of the shock and the magnitude of the exiting foreign labor (and whether the exiting labor are in Kuwait with their families) determines the magnitude of the ensuing impacts of their exit on consumption levels in Kuwait. If impacted, consumption levels might have a further indirect effect of reducing demand for other nontrable industries. Therefore, the fourth contributor to the asymmetry is the flexibility of labor market contract which allows them to exist, acting as a cushion to absorb the negative impact of the petroleum shock. This factor is unique to Kuwait and other MENA petrostates that have similar labor composition.

3.5. Kuwait Investment Authority Funds

One of the most important factors in Kuwait’s ability historically to weather the negative declines in petroleum prices (as well as its ability to recover swiftly from destructions of the Iraqi invasion in 1990-1991) is its foreign investments held abroad in the two funds of the KIA. SWFs are
government-owned investment funds commonly established during periods of government surplus. In resource-rich states, they are established to reduce the impact of volatile petroleum windfall on exchange rates. They also offer a mechanism to reinforce fiscal discipline and diversify government portfolios. Established in 1953, eight years prior to Kuwait’s independence, the KIA is the oldest country-owned fund in the world. The KIA manages the General Reserve Fund (GRF) and the Future Generations Fund (FGF). In 1960, as Kuwait was preparing for its independence from British protection, the GRF was established to serve as a government holding fund for revenues and assets. Budget surpluses are invested in the GRF, which serves a macro-stabilization objective to smooth out short-run governmental expenditures. The FGF is a long-term intergenerational fund established in 1976 as an alternative source of government revenue to petroleum, which was recognized by the Emir as exhaustible (KIA). Both KIA funds employ diversified investment strategies in various industries and across various geographical regions, and invest in assets typically diversified away from petroleum.

The Kuwaiti constitution requires the government to invest twenty-five percent (formerly ten percent until 2012) of all petroleum exports into the FGF. Any remaining budget surpluses are invested in the GRF in diversified assets that invested away from petroleum. During episodes of drops of petroleum prices followed by budget deficits, the Kuwaiti government withdraws funds from the GRF to rebalance the budget, thus shielding economy from otherwise negative impacts of the petroleum price drops on its economy, acting as a stabilizer. The KIA was successful in acting as a financing alternative to revenue shortages. In 1986, revenues of the SWF are estimated to have

---

1 For further reading: Collier, Spence, van der Ploeg & Venables, 2010; van der Ploeg & Venables, 2012.
2 It also holds other assets including those from Kuwait’s participation in public enterprises such as the Kuwait Fund for Arab Economic Development and KPC.
3 The FGF was established in 1976 by transferring 50 per cent of the funds within the GRF to this new fund to act “as an alternative to oil wealth” and income for future generations (KIA, n.d., para. 1). It also manages Kuwaiti liabilities to multilateral and international organizations such as the World Bank, International Monetary Fund, and the Arab Fund. Expenditures are strictly controlled: the law does not permit any governmental body to either reduce the investment rates or withdraw any amount from the FGF except in extreme circumstances and with the approval of the National Assembly and the government. The Gulf War was the first of these extreme circumstances.
exceeded those generated from petroleum whose prices have crashed in that same year. The contributions of the KIA, its investment strategies, and rules governing the use of its returns provided funds to reinvest, even during high petroleum prices and revenue volatility. This offered a means through which to govern large account surpluses without exchange rate pressure and provided a stable buffer for volatile government revenue. Therefore, in Kuwait, the GRF provides a source of government funds in the event of a petroleum price shock, acting as another cushion to the economy.

4. **SAM AND ITS REPRESENTATION OF BOARD ECONOMIC STRUCTURE**

CGE models require the use of an appropriate database that depicts all agents in an economy as well as the transactions among them within a given time period. An ideal framework is the Social Accounting Matrix (SAM), which extends input-output models to organize and consistently display the transactions as a circular flow of an economy’s incomes and expenditures. It is a matrix presentation of the combined national income and product account, government accounts and balance of payments accounts, as well as the country’s input-output table. This is an important contribution of this analysis because there is no official SAM published for Kuwait. The entry for Kuwait included in the GTAP IIIIV database of the Global Trade Analysis Project (GTAP) of Purdue University, a leading project in CGE modeling and policy analysis, exhibits major flaws in representing the Kuwaiti economy and lacks details on very important fiscal features such as industry subsidies. Furthermore, the existing CGE models of Kuwait do not reveal details of intra-sectoral industrial structure. Therefore, I constructed the flow data for the model to include a SAM for Kuwait using 2013 data, which is the latest available data from. The construction of this database drew from the following data sources, which I obtained from the Kuwaiti government:

- *Input and Output tables 2013*, prepared by Kuwaiti CSB (2013);
- Kuwait’s national accounts, prepared by Kuwait’s Ministry of Planning;
• Kuwait’s balance of payments, prepared by the Central Bank of Kuwait;
• Kuwait’s oil production and information, prepared by KPC;
• Sectoral revenue and costs, prepared by Kuwaiti CSB; and
• Kuwaiti labor market data, prepared by CSB and PACI.

The constructed SAM combines detailed bilateral trade, transport and protection data characterizing economic linkages among regions, together with individual country national accounts, government accounts, balance of payments data and input-output tables which enable the quantification of inter-sectoral flows within and between regions. Factor shares and input output coefficients from these 2007 data are combined with national accounts and balance of payments data to construct the complete social accounting matrix. Key structural elements are evident from Table 1.

Table 1. Economic structure 2013

<table>
<thead>
<tr>
<th>Sector</th>
<th>Share of GDP$^\text{FC}*$</th>
<th>Share of total exports</th>
<th>Export share of output</th>
<th>Net exports over output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Agriculture</td>
<td>0.3%</td>
<td>0.0%</td>
<td>1.3%</td>
<td>-63.3%</td>
</tr>
<tr>
<td>2 Mining</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>3 Crude oil</td>
<td>48.9%</td>
<td>42.1%</td>
<td>50.5%</td>
<td>50.3%</td>
</tr>
<tr>
<td>4 Gas &amp; petro-services</td>
<td>0.9%</td>
<td>1.3%</td>
<td>50.5%</td>
<td>50.3%</td>
</tr>
<tr>
<td>5 Oil refining</td>
<td>5.4%</td>
<td>38.6%</td>
<td>72.6%</td>
<td>72.2%</td>
</tr>
<tr>
<td>6 Chemical</td>
<td>1.1%</td>
<td>3.4%</td>
<td>37.4%</td>
<td>-1.7%</td>
</tr>
<tr>
<td>7 Light manufacturing</td>
<td>0.8%</td>
<td>0.4%</td>
<td>4.1%</td>
<td>-56.0%</td>
</tr>
<tr>
<td>8 Heavy manufacturing</td>
<td>0.8%</td>
<td>1.9%</td>
<td>8.1%</td>
<td>-72.0%</td>
</tr>
<tr>
<td>9 Electricity</td>
<td>0.6%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>10 Other network services</td>
<td>4.6%</td>
<td>4.6%</td>
<td>32.3%</td>
<td>31.4%</td>
</tr>
<tr>
<td>11 Construction</td>
<td>2.2%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sector</td>
<td>Share of GDP(^{FC})*</td>
<td>Share of total exports</td>
<td>Export share of output</td>
<td>Net exports over output</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>12 Transport</td>
<td>3.4%</td>
<td>5.7%</td>
<td>38.9%</td>
<td>14.1%</td>
</tr>
<tr>
<td>13 Financial services</td>
<td>7.8%</td>
<td>0.7%</td>
<td>4.1%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>14 Other services</td>
<td>21.7%</td>
<td>1.2%</td>
<td>1.8%</td>
<td>-15.6%</td>
</tr>
</tbody>
</table>

* GDP\(^{FC}\) is GDP at factor cost, which is the sum of value added in each industry.

Data Source: Model database (social accounting matrix) constructed by author for 2013.

5. **MODELING THE KUWAITI ECONOMY**

Once prepared, the SAM is used to calibrate an economy-wide CGE model of the Kuwaiti economy that represents oligopoly behavior and its regulation explicitly due to the pervasiveness of oligopolies in the Kuwait industry. These representations are embedded largely in a conventional general equilibrium setting.

5.1. **Genesis**

The model employs an "almost small" economy assumption (following Harris (1984)) for Kuwait, with endogenous saving and investment and open capital and current accounts. Financial flows and real exchange rate changes are endogenous, while external economic conditions, as represented by yields on investments abroad and petroleum prices, are exogenous and readily shocked. The model adopts neoclassical features in the characterization of consumption preferences and the variable costs of production, including optimizing agent behavior, full input substitutability, and flexible product and factor prices. It is also prepared in the spirit of structuralist economics, taking into account the “stylized” facts characterizing an economy (Ocampo et al., 2009). By focusing on the links between the economic structure, policy and growth, the approach in the model is appropriate for policy formation in developing and resource-exporting countries. The model includes standard features of other CGE models, such as Armington\(^5\) elasticities of subnational product differentiation (Balistreri & Markusen, 2009), and asset and

---

\(^4\) Robinson (1989) explains structuralist approach considers unique characteristics of developing countries including limited substation possibilities. He distinguishes three categories of structuralist CGE models—(a) elasticity structuralist models, (b) micro-structuralist models, and (c) macro-structuralist models.

\(^5\) According to Armington (1969) theory, home and foreign goods (i.e., imports) are imperfect substitutes in the aggregate production of a given industry. Thus, tariff reduction or exchange rate appreciations will make foreign goods less expensive
petroleum resource arbitrage (Arora & Tyers, 2012). Changing global petroleum market trends, due to geopolitical factors or technological shifts (such as shale gas and electric transport), are accounted for in the construction of external scenarios.

Uniquely, the model emphasizes oligopoly rents and their effects on industry policies. This incorporation is done in the spirit of Blanchard & Giavazzi (2003) who, in a closed-economy general equilibrium model, found that increased competition is beneficial to an economy because it forces firms to lower their mark ups, which in turn leads to lower prices as well as increased output and exports economy-wide. The model incorporates oligopoly rent and pricing regulations as applied by Tyers (2014) in analyzing the Australian economy and by Asano & Tyers (2015) in recent work analyzing the complex Japanese economy.6

5.2. Model Extensions

This model builds upon much of work done in Asano & Tyers (2015), but it breaks away from existing and traditional frameworks to embody additional factors unique to Kuwait. The following subsections summarize those four extensions made to the economy-wide modeling approach of Asano & Tyers (2015).

5.2.1. Kuwaiti economic structure

Kuwait is a petroleum-dependent economy with a relatively small non-petroleum production sector. Beyond this, however, its economy has various unique features. First, the public sector is dominant over the private sector throughout the non-petroleum industries. Second, in the petroleum sector which dominates the economy, Kuwait Petroleum Company (KPC) is a national company monopolized by the public sectors, but operates independently. This public dominance has implications for total welfare. It is well known in economic literature that, by comparison with private firms, publicly-owned firms are monitored by the government and managed in a manner to favor relative to home goods, thus shifting the composition of the aggregate output towards imports. The Armington specification in the model allows the economy to produce, import, and export products of the same sector.

6 In spirit, these two models follow work on the representation of oligopoly by Gunasekera & Tyers (1990), Harris (1984), and Horridge (1987).
domestic consumer surplus and domestic employment (Hartley & Medlock, 2008; Hartley & Trengove, 1986). While the effects of public dominance are controversial, evidence has been put forward that it has impaired efficiency and performance in Kuwait (Ramadhan & Al-Musallam, 2014). In response to this structure, the Kuwaiti government adopted attempts to enlarge the private sector through the Privatization Plan adopted in 2010 and the Five-Year Development Plan in 2015 (Ministry of Planning and Development, 2015).  

The SAM database is constructed to show this unique structure, which is summarized in Table 1; however, the study does not address the public-private contrast directly. Rather, it offers some representation of this contrast in the analysis. In particular, given that KPC operates as a large and independent corporation, the model represents the petroleum sector as a separate monopoly firm with its own factor demand and output. It also treats the government as the residual owner of the additional rent payment (profits) generated by the petroleum industry after payments to fixed and variable capital and labor.

5.2.2. Labor market

The second extension is the incorporation of the dichotomous labor composition in Kuwait, of which 83% are foreign. Incorporating the labor composition of the Kuwaiti economy is paramount because the flexibility of this market, particularly in relation to immigration and temporary worker policies, is an essential safety valve in the face of export volatility. Further, although omitted from the literature, this feature is particularly important for small economies like Kuwait with high dependence on temporary foreign labor. It also has various economic, social, political, and even cultural implications to Kuwait and MENA countries home of the foreign labor. Non-Kuwaitis represent two-thirds of the country’s residential population and 83% of its labor force. Table 2 below, shows the

---

7 This is based on the five-year development plans first adopted in 1984-1985 and lastly in 2015. The Privatization Plan was adopted under law 37/2010 is also designed to increase the role of the private sector in the economy, both as an employer of Kuwaiti labor and a contributor to GDP.
breakdown of the labor force in Kuwait by sector and by nationality, as of December 2014, based on data from the Public Authority for Civil Information (PACI) in Kuwait (2015).

Table 2. Breakdown of labor force in Kuwait by nationality and sector as of January 2015

<table>
<thead>
<tr>
<th>Sector</th>
<th>Kuwaitis</th>
<th>Non-Kuwaitis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numbers of employees</td>
<td>Percentage of total by sector</td>
<td>Numbers of employees</td>
</tr>
<tr>
<td>Public</td>
<td>326,271</td>
<td>70%</td>
<td>139,594</td>
</tr>
<tr>
<td>Private</td>
<td>93,195</td>
<td>5%</td>
<td>1,934,240</td>
</tr>
<tr>
<td>Unemployed</td>
<td>10,692</td>
<td>33%</td>
<td>21,255</td>
</tr>
<tr>
<td>Total</td>
<td>430,158</td>
<td>17%</td>
<td>2,095,089</td>
</tr>
</tbody>
</table>

Data Source: Public Authority for Civil Information (PACI), Population and labor force data, January 2015.

A large part of public sector employment is restricted mostly to Kuwaiti citizens, who, in 2015, held 70% (and up to 90% in prior years) of public sector positions. These positions offer salaries that exceed those in the private sector for similar levels of education and technical training (Al-Kaisi, 1993). The private sector continues to be dominated largely by foreign workers, despite numerous attempts to increase the employment of Kuwaitis in this sector. Further, more than three-quarters of foreign labor in the country occupies low-skilled positions in construction, sales, machinery, and trades (based on data from PACI, 2015). This labor composition is important as it has various economic, social, political, and even cultural implications for Kuwait. This emphasizes the economic merit of a flexible low-skill labor force, and how the distributional contrasts are affected by export price volatility and non-labor policy regimes.

To represent this structure in the model, I expand the labor factors of production from the conventional breakdown of skilled and unskilled labor in general CGE models to include labor by nationality. An ideal representation would disaggregate labor by the private and public sectors and by
nationality; however, based on data examined thus far, this disaggregation cannot be reliably constructed. Therefore, and absent additional data not examined at the time of the preparation of this proposal, the model expands production functions for all industries to include four types of labor (by skill level and nationality). This disaggregation allows the examination of the impact of export price shocks and policy interventions on employment, wages, and the temporary worker population. The model assumes rigidities in the labor market especially as pertains to public sector employment and low-skill wages.

5.2.3. Welfare system, transfers, and subsidies

Kuwait’s large public transfers in the forms of various subsidies, lump sum transfers, and other welfare payments to both firms and households motivate the third extension through a representation of government accounts. Kuwait’s government offers very generous welfare payments and subsidies for fuel as well as electricity, water, and a wide range of products and services. Taxes are also applied at almost negligible rates on labor income. For firms, a low flat rate of 15% is applied on the profits of Kuwaiti firms. By contrast, foreign firms, while a small proportion of the total firms, face internationally comparable rates of higher company tax in some instances. Further, all publicly traded and closed Kuwaiti shareholding companies pay 1% tax as zakat, and shareholding activities are required to pay 1% of total profits in support of scientific research undertaken by KFAS. Overall, tax revenue represented less than 1% of the government revenue.

In 2014, government transfers and subsidies represented more than half of the government’s total spending. Such large commitments have reduced the scope and flexibility of other public expenditures. Recently, following petroleum prices slumps since mid-2014, large subsidies have come to the forefront of economic policy as they have foreshadowed fiscal deficits. In this environment, the government lifted diesel and kerosene subsidies, raising their price by more than 200% from KWD 0.055 ($0.23) to KWD 0.17 ($0.736) per liter, and discussed removing other subsidies on petrol, water,
and electricity. As it happened, some of these subsidies were reinstated only a month later for companies following strong local opposition, and the retail price was set to the international (shadow) price. Following further drops in the volatility of the petroleum price to $30/barrel, the Kuwaiti government announced in January 2016 plans to remove subsidies on water, electricity, and fuel. Should these be implemented, said reforms would contribute to the curbing of energy consumption and conversation, and increase the available petroleum available for exportation.

The above-detailed features are included in the model through a representation of government accounts. By including taxes and subsidies (as negative taxes), the model facilitates the examination of the trade-offs between fiscal balance and cost of living stability during periods of high and low petroleum price.

5.2.4. **Kuwait Investment Authority**

The fourth important extension of the model concerns external financial flows to represent that flows to and from Kuwait Investment Authority (KIA), the country’s sovereign wealth fund (SWF) to mimic, to the greatest extent possible, the role of KIA as a source of government funds following petroleum price shocks. An important element of the modeling concerns external financial flows. While this model is national in scope and, therefore, it cannot represent the portfolios managed by KIA, the analysis ensures that flows to and from KIA are appropriately represented in the analysis. Although data on KIA funds are confidential by Kuwaiti law, the contributions of petro-revenue to each of the two KIA funds (the Future Generation Fund and the General Reserve Fund (GRF)) can be estimated. Those contributions are used to mimic, to the greatest extent possible, the role of KIA as it affects the response of the overall economy to export price volatility. In the SAM described below, both funds receive payments from the government directly, rather than from the petroleum sector, but withdrawals

---

8 Kuwaiti Law No. 47 of 1982, Clauses 5 and 8-9, bind the KIA to nondisclosure. Detailed data are provided to the Council of Ministers with strict restrictions on public access.
are allowed only from GRF in the form of government borrowing. Thus, the GRF provides a source of
government funds in the event of a petroleum price shock.

5.3. **Model Structure**

The model represents the behavior of households that supply labor and skill and own capital; of
firms that rent capital and hire workers; and of government. There are also financial agents who
manage portfolios of home and domestic assets. On the supply side, the various economic activities of
the Kuwaiti economy (which were grouped into 50 sectors in the original data from the Kuwaiti
government), are aggregated into 14 different economic sectors, in which all private and state-owned
firms are oligopolistic in their product pricing behavior, with each holding calibrated conjectural
variations. These represent the degree of price-setting collusion between the firms, and can be set to
account for the degree of regulatory surveillance. Each firm also bears fixed capital and labor costs,
enabling the representation of unrealized economies of scale. To incorporate in the model the realistic
feature that larger firms are subject to regulation and pricing surveillance, I analyzed data on industry
structure, conduct, and performance to determine cost and pricing behavior, which are then represented
in the model through parameterization. Firms in each industry have oligopoly power in product and
input markets but no oligopsony power in input or factor markets.

Conventional assumptions are made about consumption of home products in each sector, where
products are differentiated by variety via constant elasticity of substitution (CES) nests. Production
technology in the Kuwaiti economy is Cobb-Douglas in variable factors and intermediate inputs with
CES substitution between home and imported inputs. The key departures of the model from general
CGE convention are that firms adopt profit-maximizing pricing rules and each carries fixed costs,
leading to occurrence of pure (economic) profits or losses in all industries. There are be seven primary
factors: physical capital, skilled Kuwaiti labor, skilled non-Kuwaiti labor, unskilled Kuwaiti labor,
unskilled non-Kuwaiti labor, arable land, and energy resources (petroleum in the ground). Unit input
demands are Leontief input-output coefficients, except that their values depend on product and input prices. On the demand side, expenditure elasticities in final consumption are determined with reference to an econometric studies by Al-Mutairi & Burney (1993) and Burney & Al-Mutairi (2002) on the relationship between income and expenditure in Kuwait.

In the model, the government is fully represented, collecting revenue from direct taxes on capital and labor income as well as land and resource rents, and from indirect taxes on trade and consumption expenditure. In the particular case of Kuwait, some of these potential sources of government revenue are not active, though their inclusion in the modelling widens the scope for the analysis of potential reforms. Company taxes and subsidies are industry specific to account for government interventions at the firm level and a system of direct transfers to households is also represented. Fiscal expansions that necessitate government deficits require government borrowing at the home interest rate, though funds are modeled as also being available from abroad (through withdrawals from KIA) at a different rate (representing the opportunity cost). The government can fix either spending or deficits, borrowing or saving. Government spending is often be endogenous in the simulations where it is assumed that the government maintains a fixed fiscal surplus (including by withdrawals from the GRF of KIA). Nonetheless, the model allows the application of a fiscal policy shock with exogenous government spending. The links between foreign ownership, trade policy, domestic market structure, and “x-efficiency” (Markusen & Stähler, 2011) are not directly explored in this model, though efficiency gains from increased lengths of run in the presence of fixed costs are an important behavioral element. The capital account is open, driven by endogenous savings and investments. Home assets are differentiated from foreign assets with private financial flows motivated
by departures from interest parity. The household saving rate is fixed, and firms retain net earnings at rates of corporate saving that are industry specific.\(^9\)

### 5.4. Short Run Macroeconomic Behavior

Short run model closures fix productive capital use in all industries but allow investment that would affect production in the future. Central to the analysis is the open economy capital market which is built around the market clearing identity that includes inward and outward private financial flows. Thus, investment is determined as follows:

\[
I(r^{ce}, r) = S_D(Y_{DH}, \pi, G) + FI_{Inward}(r, r^*, \hat{\epsilon}_R^e) - FI_{Outward}(r, r^*, \hat{\epsilon}_R^e),
\]

where \(r^{ce}\) is the expected average net rate of return on installed capital; \(r\) is the home real financing rate (bond yield); \(r^*\) is the real (after foreign tax) yield on bonds abroad (home and foreign assets being differentiated and so offering different yields); \(\pi\) is accounting profit; and \(\hat{\epsilon}_R^e\) is the expected proportional change in the real exchange rate. \(S_D\) is total domestic saving, which is the sum of saving by households \(S_H\), corporations \(S_C\) and government. Therefore, total domestic savings is represented as

\[
S_D = S_H(Y_{DH}) + S_C(\pi) + (T - G),
\]

where \(Y_{DH}\) is home household disposable income, \(T\) is the government tax revenue and \(G\) is government expenditure. The household saving rate \(s_H\) is assumed fixed, so that \(S_H = s_H Y_{DH}\). Retained earnings, or corporate saving, \(S_C\), is assumed to remain a fixed proportion of pre-tax accounting profit at rates that are industry specific, calibrated separately for each industry.

The expected average net rate of return on installed capital \(r^{ce}\) is the expected average net rate of return on installed capital, which takes the following form at the industry level:

\[
r^{ce}_i = \frac{P_{ik}^i MP^k_i}{p^k} - \delta_i,
\]

\(^9\) Financial capital that is either domestically or foreign owned can flow into the economy in the long run but there is no endogenous distinction between FDI as green-field investment or acquisition.
where $P^K$ is the current price of capital goods, $^{10}P^r_t$ is the product price level expected to prevail upon gestation in industry $i$; $MP^K_i$ is the marginal productivity of capital; and $\delta$ is the depreciation rate. An average of the sector-specific expected rates, $r^{ce}_i$, is taken that is weighted by the value added in each industry to obtain the economy-wide level $r^{ce}$. Investment expenditure, $I$, is thus determined by the following equation, with $I_0$ being the initial level of $I$:

$$I = P^K I_0 \left( \frac{r^{ce}}{r} \right)^{\varepsilon_F}.$$  \hspace{1cm} (3)

This relationship is representative of “Q” theory in the sense that the numerator $r^{ce}$ embodies the present value of assets while the denominator $r$ represents current financing costs. This relationship also constrains the investment response to a change in either the rate of return or the financing rate, offering a reduced form representation of either gestation costs or expectations over short run consequences of installation for the rate of return. I note that in this model of the Kuwaiti economy, there is no adjustment for the domestic company tax rate, given that it is assumed that all elements of domestic firms’ portfolios generate income subject to the same tax rate.

Inward and outward financial flows are motivated by changes in the level of an interest parity function that incorporates the difference between the home and foreign real bond yields and real exchange rate expectations. The model uses two relationships to allow for reversals of the direction of net flow in response to shocks and for differences in policy obstructions as between inward and outward flows. They also are a recognition that outward flows are portfolio management decisions made at home, with a positive elasticity $\varepsilon_{FI}$, while inward flows are divided between home and foreign portfolio decisions with a negative elasticity $\varepsilon_{FO}$. Inward flows take the following form:

$$FI_{\text{Inward}} = FI_{\text{Inward}}^0 \left( \frac{r^{ce}}{P^K} + \varepsilon_{FI} \right)^{\varepsilon_{FI}} \quad , \quad \varepsilon_{FI} > 0 ,$$  \hspace{1cm} (4)

$^{10}$This is a composite of the prices of all products acquired for investment.
where $F^0_{\text{inward}}$ is the initial inward inflow level; $\varepsilon_{FO}$ is the elasticity $\bar{r^{ce}}$ is the average expected rate of return on home capital, weighted across industries by gross revenue; and $\bar{\tau}_K$ is the average tax rate on capital income, also weighted across industries by gross revenue. $\varepsilon_{FO}$ Correspondingly, outward flows are:

$$F^0_{\text{outward}} = F^0_{\text{inward}} \left( \frac{r/\bar{\tau}_K + \varepsilon_r}{p^*} \right)^{\varepsilon_{FO}}, \quad \varepsilon_{FO} < 0,$$

(5)

where the more liberal the capital account, the larger is the magnitude of the elasticity $\varepsilon_{FO}$. Notably, the home yield driving these flows is the interest—or financing—rate, and not the expected rate of return on home capital, as in equation (2). This relationship reflects our assumption that outward investment is rebalancing away from assets that earn the home yield on average, while inward investment is motivated by longer run expectations about rates of return.

The capital market clearing identity expressed in (1) then determines the home real interest rate and the magnitude of the external financial deficit ($F^0_{\text{outward}} - F^0_{\text{inward}} = S_D - I$). This difference is then equal in magnitude to the current account surplus ($X - M + N$, where $N$ is net factor income from abroad$^{11}$).

The model is essentially Walrasian in that shocks originating in saving and investment, and therefore in external flows, cause home (relative to foreign) product prices (and consequently the real exchange rate) to adjust sufficiently to clear home markets and preserve the balance of payments.

### 5.5. Capital Use in the Long Run

While the home capital stock is fixed in the short run, flows such as those represented in (4) and (5) cause an eventual change in the level of home capital use in long run closures. Behavior is then required to determine the level of total home capital use on the one hand ($K^T$) and the home-owned component of it on the other ($K^D = K^T - K^F$). The level of $K^D$ is significant for Kuwait since its

$^{11}$ As modeled, $N$ comprises a fixed net private inflow of income from assets abroad and fixed aid to the government, less endogenous repatriated earnings from foreign-owned physical capital.
considerable external holdings do not justify the assumption that it is constant in the long run. Total capital use in the long run is set to equate a fixed external (after tax) rate of return on capital to home after tax “market” yields, defined net of pure profits. This ensures that capital moves to equate market after-tax rates of return at home and abroad while allowing oligopoly behavior to generate rents in the home economy.

\[
\frac{R_i/\tau^K}{P_K} = \delta^* ,
\]

where the home capital rental rate is \( R_i = P_i^\rho MP^K_i \) as per (2), where \( MP^K \) is a function of total capital use, and \( \tau^K_i \) is the power of the industry-specific capital income tax (net of subsidy) rate. These relationships ensure that reductions to the rate of capital income taxation or increases in subsidies see falls in the required pre-tax rate of return demanded domestically and increases in capital use. The home-owned share of this capital use responds in the long run as follows:

\[
K_D = K^0_D \left( \frac{RGNP}{RGNP_0} \right)^{e_{KDY}} \left( \frac{K^T}{K^T_0} \right)^{e_{KDY}} , \quad 1 > e_{KDY}, e_{KDY} > 0 .
\]

This relationship allows long run accumulation of home-owned capital to respond to rises in real home income as well as to chase returns in the manner of the overall level of capital use. Of course, changes in \( K_D \) do not change capital use in the economy but they do change repatriated capital income and therefore affect the levels of GDP and the real exchange rate.\(^{12}\)

5.6. Oligopoly Representation

The oligopolistic behavior is a key element of the model. Pricing behavior assumes that firm in industry \( i \) supplies a differentiated product -thus each is regarded as producing a unique variety of its product and it faces a downward-sloping demand curve with elasticity \( \epsilon_i (< 0) \) and sets its price to maximize profit by applying the Lerner mark-up formula:

\[\text{values for the two elasticities in equation (9) are tabulated in Appendix 3, available on application from the authors.}\]
The demand curve each oligopoly firm faces is an aggregate of five different sources of demand. They are final demand \((F)\), investment demand \((V)\), intermediate demand \((I)\), export demand \((X)\) and government demand \((G)\). The elasticity of the total demand facing each oligopoly firm is thus a weighted average of the elasticities of the five sources of demand, as follows:

\[
\varepsilon_i = S_i^F \varepsilon_i^F + S_i^V \varepsilon_i^V + S_i^I \varepsilon_i^I + S_i^X \varepsilon_i^X + S_i^G \varepsilon_i^G \quad \forall i ,
\]

where \(S_i^j\) denotes the volume share of the home product in market \(j\) for each source of demand \(j\). The shares are fully endogenous parameters while the elasticities depend on component elasticities of substitution, firm numbers and the conjectural variations parameter in industry \(i\) \((\mu_i)\), which indicates the degree of pricing collusion between oligopoly firms. It is, more precisely, the influence of pricing choices by any individual firm \(k\), on the price set by of firm \(j\): \(\mu_i = \partial p_i / \partial p_k\). These relationships are complex. Their analytics are detailed in Tyers (2014).

Most oligopolistic (network) services have tended to be comparatively little exported and primarily used as domestic intermediate inputs. This means that, while distortionary pricing by oligopolies has modest direct effects (on final product markups), it has very substantial indirect effects (via markups on intermediates) that build on one another economy-wide. A key consequence of this is that, when initial markups are large, more competitive pricing yields effects on overall economic activity that are very much greater than the neoclassical gains in allocative efficiency from changes in taxes, tariffs, or even the terms of trade. This is the case especially in long run closures (detailed below) where improvements in efficiency encourage enlargement of the capital stock. In Kuwait’s case this would represent a rebalancing its asset portfolios away from foreign toward domestic productive assets.
5.7. **Closures**

The modeling is be comparative static, but employs two main closures to represent the response of the economy in the short and the long runs. For each closure, there are alternative sub-closures to represent oligopoly, as Table 3 below details.

*Table 3. Model closures*

<table>
<thead>
<tr>
<th>Variable/ Closure</th>
<th>Long Run</th>
<th>Short Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical capital</td>
<td>Homogeneous and is internationally and sectorally mobile at a fixed external rate of return (^a)</td>
<td>Productive capital use levels are fixed in each industry</td>
</tr>
<tr>
<td></td>
<td>Foreign capital being supplied elastically at a common, after tax, external rate of return</td>
<td>Investment responds to the average of rates of return that differ by industry. It adds to demand but not yet to the productive capital stock</td>
</tr>
<tr>
<td>Fiscal</td>
<td>Fiscal policy is constrained to retain constant the governmental surplus</td>
<td>Fiscal policy is constrained to retain constant the governmental surplus</td>
</tr>
<tr>
<td>Employment</td>
<td>Standard closure: Labor supplies are fixed; all factor rewards are endogenous. Flexible foreign worker policy suggests a fixed real production wage is also a long run alternative.</td>
<td>Fixed real production wage and endogenous (variable) production employment</td>
</tr>
<tr>
<td><strong>Subclosures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligopoly</td>
<td>Fixed numbers of firms, (n)</td>
<td>Fixed numbers of firms, (n)</td>
</tr>
<tr>
<td></td>
<td>Endogenous pure profits</td>
<td>Endogenous pure profits</td>
</tr>
<tr>
<td>Free entry and exit</td>
<td>Chamberlinian oligopoly: (n) endogenous, pure profits exogenous</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\): The total stock of physical capital varies in the long run and the home-owned share of it depends on corresponding long run changes in domestic real income and the share of wealth that is held abroad. The home-owned share of domestic capital is important because it affects the level of factor income outflow associated with profit repatriation.

In all closures physical capital is fully employed, with total capital demand having variable and fixed components. In the short run labor can be unemployed if the real production wage is held fixed.
Flexible foreign worker policies eliminate this, however, given that the stock of foreign workers can fall with labor demand even in the short run.

6. Analysis and Conclusions

The SAM sheds light on sectoral data and labor-energy linkages in Kuwait. Model simulations show that positive terms of trade shocks yield improvements in performance that are larger than the losses that occur when equiproportional negative shocks occur. Such asymmetry has been shown to depend on the structure of the economy, pricing behavior by domestic oligopolies; the rules of regulatory policy; the levels of self-sufficiency in other markets; and the target of monetary policy. In Kuwait, asymmetry also depends on the composition and flexibility of labor contracts with foreign workers and access to assets invested in KIA. The labor market has significant adjustments in busts. Income and employment levels will not to be affected in industries dominated by Kuwait labor, unlike foreign labor. Export price shocks also impact industries where energy is an intermediate. Large welfare commitments, which exceed half of the government’s spending, reduce the scope and flexibility of other public expenditures. Busts reverse some of the Dutch Disease effects and, consequently, moderate the net effect of resource revenue declines on the economy.

Downside risks in Kuwait have been successfully managed through the use of foreign financing, augmented by the fiscal commitment needed to maintain contributions to KIA funds, and by flexibility in the labor market. As such, importantly, Kuwait has two main valves of stabilization, being foreign labor exist and SWF inflow. Oligopoly behavior also contributed to the asymmetry and moderated the overall downside effects of busts. Inefficient changes in scale efficiency in network oligopolies carrying very large fixed costs could also contribute to observed differences in measured productivity between booms and busts. Full exploitation of oligopoly market power is hurtful in the long run, which is moderated in practice by pricing surveillance and price-cap regulations.
The analysis suggests that there is an asymmetric response in economic performance to shocks in petroleum prices in Kuwait, which is consistent with neoclassical fundamentals of trade. This asymmetry not only impacts Kuwait, but through impacts on foreign labor in Kuwait and on capital outflow, the volatility and asymmetric economic responses to the export price volatility will also impact non-petrostates in MENA through remittances, foreign aid, and foreign direct investments. Investments in SWF are critical to Kuwait’s ability to moderate negative shocks as are tradable non-oil industries which remain smaller contributors to the overall GDP. The asymmetry has implications on the formation of policies that aid adjustment to volatility.

Importantly, the ongoing analysis summarized in this paper emphasizes the economic merit of a flexible low-skill labor force, and how the distributional contrasts are affected by export price volatility and non-labor policy regimes. Innovation and growth literature advance that oligopolies distort markets and prices and that their sustained rents engender strategic behavior that detracts from growth-enhancing innovation. This paper draws attention to the further role of oligopolies in resource-economies, as they contribute directly to the aforementioned asymmetry. A critical implication of this contribution to asymmetry is that busts following booms do not necessarily place all boom gains at risk. This paper is the basis for subsequent research that examines various policy alternatives that aid adjustment to manage negative economic impacts associated with oil price declines and the effects of these policies on economic stability and performance in Kuwait. The policies include coordination between regulatory policies governing oligopoly pricing and the management of foreign labor contracts, as well as subsidies reform and the promotion of economic efficiency. Overall, the research has key implications to the understanding of economic development and growth in Kuwait and MENA at large.
REFERENCES


