UGSM-Monarch Business School Doctoral Dissertation Proposal

The Effect of Exchange Rate Policy, Oil Shocks and Income Tax on GCC Economies Using Computable General Equilibrium Model; The Case of Bahrain, Kuwait and Saudi Arabia

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The Effect of Exchange Rate Policy, Oil Shocks, and Income Tax on GCC Economies
Using the CGE Model: The Case of Bahrain, Kuwait, and Saudi Arabia

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1.0   INTRODUCTION

The Gulf Cooperation Council (GCC) consists of six countries: Bahrain, Kuwait, Qatar,

Oman, Saudi Arabia, and United Arab Emirates. This group represents an overall area

of 2,423,300 km^2 that has an estimated population of 45.9 million people. As of 2015,

the total Gross Domestic Product (GDP) of this region was $1.74 billion. Between them,

these six countries hold close to 40% of the world's oil reserves in its land—the largest

in the world with 486.8 billion barrels—and 22% of the world's proven gas reserves

(GCC, 2015). However, the current risk to the outlook of the economy in the region is a

decline in oil prices whereby external oil shocks could severely impact the macro

economy.

1.1   GCC Council and Integration Achievements

The GCC was established in 1981, with the aim of garnering further cooperation

between the countries in different fields including economics, finance, trade, customs,

tourism, industry, agriculture, and others; the goal was to achieve unity between the six

countries as per Article IV of the GCC charter.[1] In 2003, a customs union was formed

whereby all customs between GCC countries were abolished to foster inter-regional

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[1] Article IV states the basic objectives of the Cooperation Council: To effect coordination, integration and inter-connection between Member States in all fields in order to achieve unity between them, such as formulating similar regulations in various fields including: economic and financial affairs, commerce, customs, communications, education and culture. Also, stimulate scientific and technological progress in the fields of industry, mining, agriculture, water and animal resources. Moreover, the council aims to establish scientific research and joint ventures and encourage cooperation by the private sector for the good of their people (Abdullah, 2014).

trade. Later in 2008, a common market was established through which all firms and nationals were to be treated equally in the GCC countries regardless of their native GCC nationality.

Since 2000, the six countries have agreed to adopt a common United States Dollar (USD)-pegged exchange rate regime as a first step toward adopting a common currency. The new currency, which was planned to launch in 2010, failed due to several reasons, of which was the political disagreement regarding the location of the GCC central bank between Riyadh and Dubai. Additionally, the discrepancy in the exchange rate regime adoption across countries escalated as Kuwait abandoned its currency's peg to the US dollar in May 2007. Moreover, in December 2013, during the GCC's annual meeting held in Kuwait, Oman opposed joining the currency union and said "it will pull out of the bloc if the other members decided to go ahead with the proposal" (Kholaif, 2013).

1.2   Economic Overview and Challenges

Historically, and before the discovery of oil, the Gulf region was known for its possession of good fishing grounds and abundant pearl oysters, the trade of which it depended on for living. Relatively, these countries were considered poor until the discovery of oil in Bahrain in 1932, followed by Saudi Arabia, then Kuwait in 1938.

The GCC region has witnessed robust economic growth since the year 2000. Figure 1.2

illustrates a macro outlook showing the relative sizes and shares of the respective

countries within the GCC region as of 2011.

FIGURE 1.2
Relative Size of GCC Economies

Source: Haque (2011)
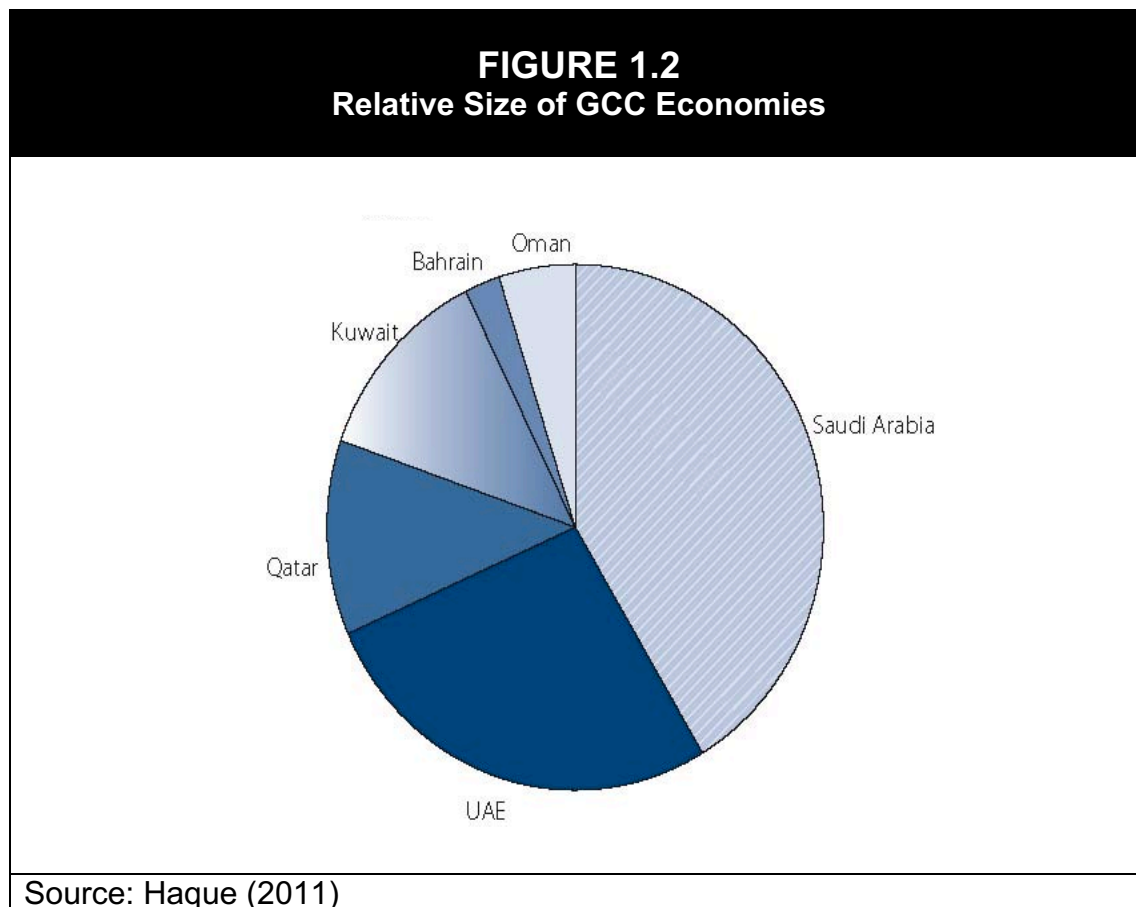
Based on a study of GCC 2020 conducted by *The Economist* (2010), the GCC countries

depend largely on the production and export of oil, which is roughly 40% of the region's

GDP. However, expectations indicate the depletion of most reserves of oil within 25

years, which pushes these countries to work on diversifying their economies (Hvidt,

2013). The government plays a prominent role in these economies; it contributes 25% to the GDP and represents the main source of employment for nationals. Among other major challenges facing them is their high dependence on foreign workers, which creates instability in their labor market. Instability is exacerbated by increasing inflation rates, which they are unable to properly control due to their currencies peg to the USD––except for Kuwait.

Throughout the last decade, the GCC countries have been sharing promising economic drivers like growing sovereign and private wealth due to the increase in oil prices, and growing sophistication in investments such as economic cities, university cities equipped with highly advanced technologies, mega-island construction projects, and heavy industry. In addition, they have experienced liberalization of regulatory environments that attract more and more foreign investments. Further, their stock markets are not highly correlated with the global equity market, which made them less vulnerable to the effects of the global financial crisis of 2008.

In general, the macroeconomic fundamentals for GCC have been quite solid due to the relatively small domestic public debt and highly-valued external assets. Foreign assets owned by GCC countries far exceed their public debts as they stand at an approximate 138% of GDP in Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) as of the end of 2014 (Gokkent, 2014). However, the current risk to the outlook of the

economy is a decline in oil prices whereby external oil shocks could impact the macro

economies of the GCC countries severely.

1.3   The GCC Region

Over the last 15 years, the GCC region has experienced a large increase in its real

GDP that has expanded by an annual average of 5.2%, representing a cumulative total

of 65% over the 12-year period of 1998 to 2010 (The Economist, 2010). The region has

recently attracted the interest of economic researchers since research in this area is

underdeveloped. Figure 1.3 represents a comparison of key economic indicators

between the region under study and the world.

FIGURE 1.3
Key Economic Indicators Comparison (2012-2013)
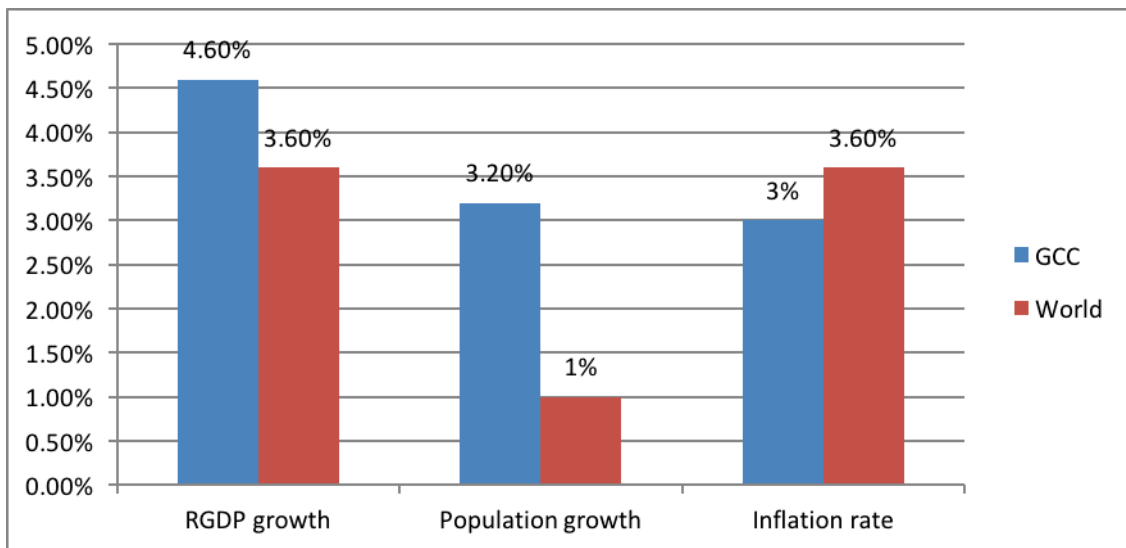
Source: IMF World Economic Outlook (WEO)

1.4   Bahrain, Kuwait, and Saudi Arabia

The contemplated research will examine three countries from the GCC that are believed

to provide a realistic representation of the region. The first country is Bahrain

representing the more modernized smaller GCC countries like Bahrain, Qatar, and the

UAE. It is the first country expected to deplete its oil reserves, therefore presenting the

economy with highest risk in the region in the event other sources of income for the

government are not identified. The country is characterized as having a free business

environment, which attracts a larger portion of foreign investments in the Gulf region,

yet possesses higher political risk rendering its economy relatively unstable.

The second country is Kuwait, a highly oil-dependent country with 9% of total world oil reserves in its borders, with Burgan field being the world's second largest oil field. Kuwait is the third largest oil producer in the region after Saudi Arabia and Iraq. Petroleum accounts for nearly half of its GDP, 95% of export revenues, and 80% of government income. Given its size, Kuwait is considered one of the richest countries in the world with a GDP per capita of $50,000. The country has done little to diversify its economy when compared to the UAE and Qatar (Townsend, 2015). Kuwait is the only GCC country that un-pegged its currency from the USD, thus representing an interesting case for the contemplated research that will examine whether abandoning the USD-peg serves these countries or not.

The third country, Saudi Arabia, has the largest GCC economy in terms of size, population, and oil reserves—almost 20% of world's oil reserves—and ranks the first exporter of oil in the world. Playing a leading role in the Organization of the Oil Exporting Countries (OPEC), Saudi Arabia has a highly oil-dependent economy and represents the more conservative GCC countries like Kuwait and Oman, in terms of diversification and opening to foreign investments. Exogenous oil shock is the most threatening economic risk that may affect this economy. This risk is the reason for this contemplated research. Table 1.4 represents the rationale behind choosing the three countries under consideration.

TABLE 1.4 Sample Country Rationale		
Sample	Representative of	Group Characteristics
Bahrain	Bahrain Qatar UAE	• Smaller • Modernized • More diversified economies • Open to foreign investments
Kuwait	Kuwait	• The only country in the region that unpegged its currency from the USD • Can be used as a benchmark for the others, such as if abandoning the peg policy leads to better performance or not
Saudi Arabia	Kuwait Oman Saudi Arabia	• Conservative • Less diversified economies • Not open to foreign investments

2.0   RESEARCH QUESTION

Exchange rate management in the GCC has been a significant concern for both

economic and political research. After the breakdown of the Bretton Woods system in

1973, whereby all currencies in the world were pegged to the USD, which was pegged

to gold, many countries moved towards floating exchange rate regimes. However, the

literature in general has not determined with any certainty which regime may be most

suitable for all countries at all times. Thus, the consideration of exchange rate regimes

became a controversial issue for policy makers especially those in the GCC who had

close political ties with the US, but lacked economic trade ties. The US represents only

7% of the region's total trade, which makes the benefit of pegging to the USD

economically questionable. Based on the need of adjusting monetary policies according to the needs of the domestic economies of the GCC, especially during high inflation periods and external oil shocks periods, the contemplated research will seek to recommend a more suitable exchange rate policy that best benefits these economies. Moreover, using empirical findings, the contemplated research will identify a specific taxation policy that can help GCC governments diversify their income so that it is not so highly dependent on oil revenues.

Main Research Question:

What are the effects of oil price shocks, exchange rate regime policy, and income tax on the macroeconomic aggregates of Bahrain, Kuwait, and Saudi Arabia?

This shall be examined by studying the following key aspects based on social accounting matrices, knows as SAMs and using a computable general equilibrium (CGE) model. The key aspects of this contemplated research are:

1. To examine the consequences of a change, both positive and negative, in the world oil prices, as this change represents the strongest economic shock on the macro-economies of the chosen countries;

2. To examine the effect of exchange rate regime choice and whether it plays a role in stabilizing the effects of economic shock;

3. To simulate the effect of introducing the income tax as an alternative source of income to the government.

3.0   RESEARCH RELEVANCE

The countries under study are vulnerable to external shocks due to their heavy dependence on oil. Exchange rate studies examining this region revealed contradicting results regarding which exchange rate regime is most suitable in comparison to keeping the peg or abandoning it and whether to keep it fixed to the USD or to a basket of currencies. Most of these studies like Cader (2009) and Sester (2007) have used time series data that are either insufficient or not reliable. The statistical databases in these countries are neither well developed nor maintained regularly, i.e. the existence of time-series gaps. Also, the possible introduction of income tax in this region has been highly controversial as it may represent a kind of instability that's not welcomed by the authorities or the population in this already highly politically unstable region, though it may be needed as an alternative source of governmental income. In the future, an alternative policy might be to start imposing *zakat*, a wealth-based type of Islamic tax, at a low rate of 2.5% that won't raise rebellion by the predominantly Muslim population.

4.0 CONTRIBUTION TO EXISTING KNOWLEDGE

The contemplated research shall contribute empirically to exchange rate theory applicability on the economies under study. This will be achieved by using CGE models that are known to be sophisticated economic models, but not as widely used as other econometric models. However, such complication has not prevented the increasing popularity of these models for policy makers. For instance, CGE models provide a comprehensive picture of the effect of economic policy on the different economic players inside an economy as well as the interactions between the economic agents, such as consumption, investments, government spending, imports, and exports.

Research regarding the use of CGE models in GCC countries is not extensive and this specific approach is not applied thoroughly with respect to the GCC. These models are highly recommended by the governments of these states who are looking forward to economic studies based on these models. Literature revealed only one built social accounting matrix for Saudi Arabia for the year 2000, two for Kuwait in 1991 and 1995, and none for Bahrain (Al-Mo'men, 2003; Khorshid, 2006; Lofrgen & Chemingui, 2004). Therefore, building SAMs for Saudi Arabia, Kuwait, and Bahrain shall be an important contribution of the contemplated research.

Second, CGEs have not been often used for these countries except in few studies on Saudi Arabia (Al-Thumairi, 2012; Hawwas, 2010; Lofrgen & Chemingui, 2004). It is
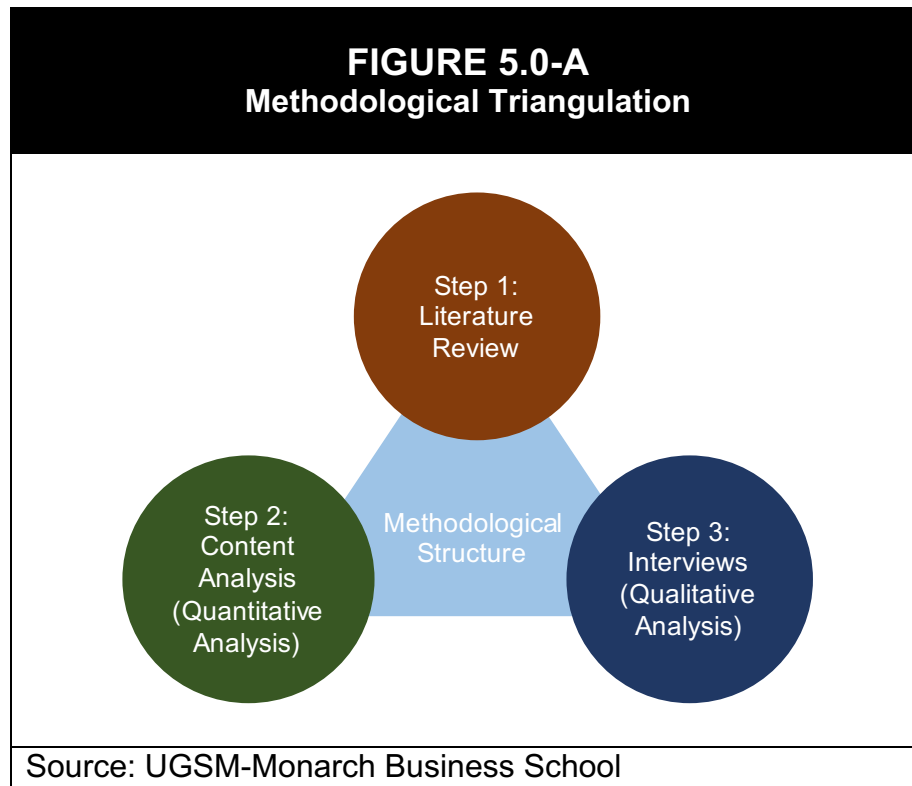
expected that the model will be used as a sound base by researchers to implement any desired policy in the future and test its effects on the entire economy for the three countries.

Testing the effects of oil shocks is most critical as this phenomenon would be a major exogenous shock to hit these economies. Understanding the potential effects is essential for macroeconomic studies and practices in these countries. Also, although the exchange rate regime for these countries has been examined from different perspectives, the approach used for the contemplated research will be new and will identify the consequences on all economic players and interactions. Finally, imposing taxes has been discussed in the literature along with its economic benefits and political constraints, but no research has examined the implementation of obligatory *zakat* that may have value-added to the overall economy.

5.0   RESEARCH METHODOLOGY

The contemplated research shall be built as an empirical study of the effect of exchange rate policy and taxation on the different players and interactions in the economy. As Figure 5.0-A shows, the contemplated research aims to respond to the main research question using a methodological triangulation that integrates the literature review with both quantitative and qualitative research methods.

FIGURE 5.0-A
Methodological Triangulation

Step 1:
Literature
Review

Step 2:
Content
Analysis
(Quantitative
Analysis)

Methodological
Structure

Step 3:
Interviews
(Qualitative
Analysis)

Source: UGSM-Monarch Business School

Step 1: In-Depth Literature Review. In-depth review of the main seminal and

influential authors within the study domains of exchange rate management, oil shocks,

taxation, GCC economic research, social accounting matrix, and computable general

equilibrium model will present a solid base on which the analysis will be built.

Step 2: Content Analysis. Based on the foundational literature review, an analysis

based on data obtained from national account statistics, the World Bank, the IMF, and

national statistical bureaus, papers, and other commercial data sources will be

examined. This analysis will develop a statistical base in the form of a social accounting

matrix from which equilibrium models will be developed as tools for examining the effect of exchange rate policy and taxation on the economies under study.

Step 3: Field Research. First semi-structured interviews will be conducted with key economic policy makers and researchers. Face-to-face interviewing will take place in Kuwait via telephone or video interviewing with policy makers from the other two countries. The World Bank and government research entities will be contacted for industrial insight on the practicality of the used model and its importance and preference for policy makers. Also, interviews with firms and households regarding exchange rate policy and taxation will be conducted.

More in-depth interviewing will follow based on the outcome of the first round of interviews. The sample size is expected to include maximum 10 participants at the macro level due to limitations in contacting government officials and policy makers in these countries and the lack of existence of developed economic planning institutes. A greater number of interviewees from the business sector (meso level) will be approached (20-30 companies) with more households (micro level) (50 persons). The second round of interviews is expected to provide deeper understanding of the approach used and the effect of exchange rate policy and taxation applicability and expected reaction on these economies. The model used is within the applied economic modeling field, which is expected to have practical contribution.
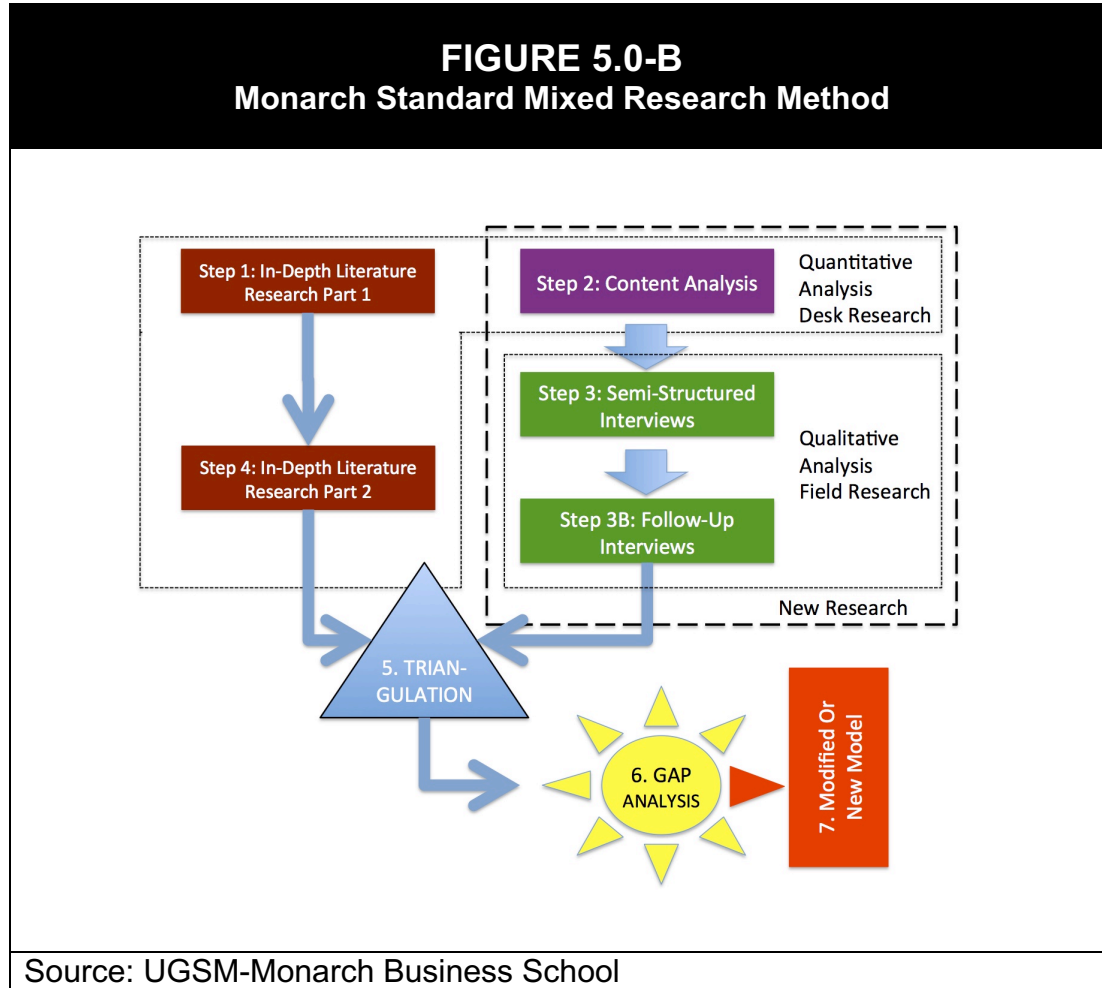
Step 4:-In-Depth Literature Review, Part 2. A second more in-depth literature research review will be completed based on the outcomes of both quantitative and qualitative analysis to further refine the scope and consideration of the existing knowledge and sheds light on the most recent literature specifically related to the research.

Steps 5 and 6: Triangulation of the Data and Gap Analysis. A triangulation of the data, literature, content analysis, and interviewing will be analyzed to determine whether the existing academic knowledge is congruent with the practical application of the CGE model for economic policy analysis. Eventually, the existence of a knowledge gap will be identified between the academic, theoretical, and the practical applied domains.

Step 7: Development of New Model. Building on the gap analysis, a thorough examination of the existing frameworks within the academic domain will be made. This analysis will confirm whether the research framework sufficiently coincides with the practical application in the economic real-life context for the chosen countries. If the findings show insignificant agreement between the theory and practice, further amendments to the existing model will be made to address the gap. This final step of the research process will be the milestone for original knowledge contribution by developing new economic model for these countries that may be used by other researchers to further develop or use to test other economic policies affecting these

economies. Figure 5.0-B illustrates the steps within the Monarch Standard Mixed

Research Method that will be followed.

FIGURE 5.0-B
Monarch Standard Mixed Research Method

Step 1: In-Depth Literature Research Part 1

Step 2: Content Analysis

Quantitative Analysis Desk Research

Step 3: Semi-Structured Interviews

Qualitative Analysis Field Research

Step 4: In-Depth Literature Research Part 2

Step 3B: Follow-Up Interviews

New Research

5. TRIAN-GULATION

6. GAP ANALYSIS

7. Modified Or New Model

Source: UGSM-Monarch Business School

5.1   Sources and Data Collection

Due to insufficient availability of long continuous time series data for these countries, a

CGE model will be constructed based on social accounting matrices for the countries

under study. Sources of data for the SAM that represent a snapshot of the economy will be derived from national account statistics, World Bank, IMF, and national statistical bureaus, papers, and other commercially available data sources.

5.2   A Note on Content Analysis

The CGE model will be constructed to analyze the macro economic impact of exogenous shock, exchange rate policy and taxation on output, aggregate exports, imports, government's expenditures, investments, private consumption, and savings. To do so, social accounting matrices for the respective countries need to exist. A SAM is a square matrix with specific number of columns representing the outcomes or the payments by economic agents and same number of rows representing the incomings or revenue for the economic agents. Thus, the SAM is a snapshot of the economy at a point of time showing all the interactions among all the driving forces inside an economy—production, income, consumption, and capital accumulation. It is a comprehensive, flexible, and disaggregated framework that elaborates and articulates the generation of income by activities of production and the distribution and redistribution of income between social and institutional groups (Round, 2003). It answers the question of "Who gets what, and how much, as a result of the economic process of income generation?" (Round & Pyatt, 1985).

For consistency reasons and comparison feasibility across the countries, a common base year of 2005 will be used to construct the SAMs. This will represent a significant contribution of the research. The constructed SAMs shall include the following accounts: (a) activity, (b) commodity, (c) two primary factors namely labor and capital, (d) households, (e) firms, (f) government, (g) rest of the world and five tax accounts, (h) sales, (i) activity, (j) import, (k) profit, (l) income taxes, and (m) a saving-investment account. The SAMs will be used as the backbone for CGE model consisting of mathematical equations (expected to be approximately 44 equations) representing the economic interactions that ensure the economy is at equilibrium. The model will then be used to run simulations of oil shocks, exchange rate policy, and taxation.

A CGE model is an economic model that uses actual economic data to show how an economy might react to any change in policy or effect of external shock on that economy. This gives CGE an advantage over the classical econometric models that use partial equilibrium analysis where focus is based on a specific market or product ignoring interactions with other markets where other factors are assumed constant (Raihan, 2014). The CGE models are preferable to see the effect simultaneously on several factors, markets, or even countries.

However, some limitations are attributed to CGE; for instance, the results are challenged based on the assumptions used, and they are based on the economic system represented in a base year that represents an equilibrium situation of the

economy. Yet, CGE models have been increasingly used for policy analysis and shocks testing in developing as well as developed countries, as they are empirical analysis tools used to analyze the aggregate welfare and distributional impacts of policies whose effects may be transmitted through multiple markets and across several economic agents.

The circular flow diagram is the starting point for CGE modeling, whereby all incomes must equal total expenditures. The main actors in the economy can be classified in the following categories:

1. Households who own the factors of production, land, labor, and capital where the last two are considered the primary factors in the model; they sell them for income which is then used to consume the final products;

2. Firms that hire the factors of production in return for rent, salaries or wages, and profits paid to the owners of these resources and produce final commodities to generate revenue;

3. Government that is included to collect taxes, very minimal in this case because the countries have no income tax and low profit and indirect taxes, but the government plays a major role in providing subsidies to the gulf people;

4. The rest of the world that represents international trade, imports, and exports, in
addition to transfers in and out, foreign savings, and ownership of foreign capital.

The CGE models will solve for general equilibrium in the economy based on the
following three prevailing conditions:

1. **Market clearance**: The outputs of firms' goods and services must be absorbed
by other agents in the economy;

2. **Zero profit**: Total revenue from the production of goods and services must be
spent on consumption of intermediate goods, paid for the primary factors owned
by households, or paid as taxes to the government;

3. **Income balance, balanced-budget accounting principle**: The income for
households from renting their primary factors must be spent on purchasing goods
and services.

In brief, CGE models consist of equations that describe the model variables assuming
optimizing behaviors for all the economic players. These models are useful when aiming
to estimate the effect of changes in one component of the economy on the rest. They
are useful to model the economies whose time series data are limited or irrelevant thus
CGE models consist of strong assumptions embedded in the model to replace historical

evidence. The methodology used in the contemplated research will help support the

analysis of the economy on three levels as illustrated in Table 5.2.

TABLE 5.2 **Level of Analysis**		
Macro	Societal	Government/Rest of the world
Meso	Institutional	Firms
Micro	Individual	Households
Source: Rola Mourdaa		

6.0   LITERATURE REVIEW

The literature review will be built on three main pillars as shown in Figure 6.0: (a)

literature background on exchange rate policy studies; (b) literature regarding social

accounting matrix theory and application studies; and (c) computable general

equilibrium model literature.

FIGURE 6.0
Literature Triangulation
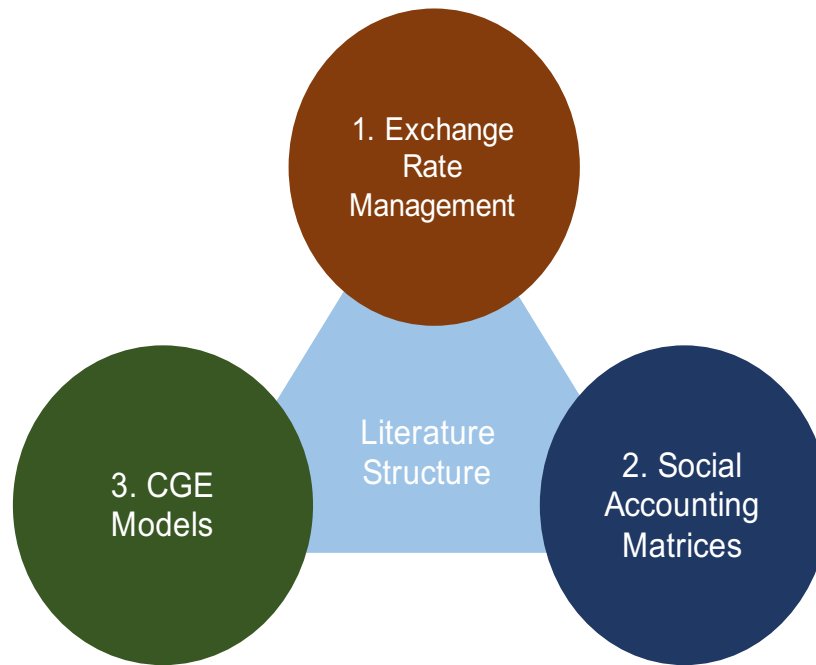
Source: UGSM-Monarch Business School

6.1   Exchange Rate Management

The last decade of the 20th century was characterized by several currency and financial

crises. The first was the crisis of the European Monetary System in 1992, then the

1994-1995 Latin American crisis in Argentina and Mexico, the East Asian-Russian

crisis, and finally the Brazilian crisis over the period 1997-1999 (Chiodo & Owyang,

2002; Evangelist & Sathe, 2006; Krugman, 1996; Ngo & Ramirez, 2016). These crises

called attention toward the choice of the appropriate exchange rate regime in small

open economies as well as emerging economies.

While the theoretical literature on this topic has concentrated on understanding the

trade-off between monetary independence and credibility implied by different exchange

rate regimes as well as testing real exchange rate misalignments, exchange rate effect

on international trade, common currencies, exchange rate risk, the effect of devaluation

and other concerns; little research tackling the appropriate exchange rate policies in the

context of social-accounting matrix has been conducted, especially for the countries

chosen (Al-Thumairi, 2012; Hawwas, 2010; Nabli & Varoudakis, 2005). Sester (2007)

tackled the pros and cons of the exchange rate peg to the USD in oil-exporting

countries, which makes it hard to adjust to large swings in the prices of oil. He

suggested pegging to a basket of currencies including the price of oil.

Frankel (2004), regarding the experiences learned for the exchange rate regimes in

emerging economies, suggested pegging the currencies of these countries to the price

of oil. This is considered a very risky policy especially in the case of a negative oil

shock. The contemplated research will empirically test the consequences of a negative

oil shock on the macro economies of the chosen countries. Setzeri (2004) showed that

exchange rate regime choice is not purely a theoretical issue, but strongly depends on

the political. For the contemplated research, this indicates the political effects due to the

alliance between the US and the Gulf countries that hinders the un-pegging of the USD

despite its disadvantages, mainly accelerating inflation rates, and real depreciation of national currencies, and most importantly, that the US does not represent the biggest trade partner for those economies. This position is supported by Feldman's (2008) argument that if the gulf countries decide to un-peg their currencies, it will not only lead to economic changes but will drag these countries into political dilemmas, mainly with the US. This calls attention to the reason why GCC countries are hesitant to change their adopted exchange rate policy. The contemplated research is expected to outline empirically the economic benefits of abandoning the peg policy on the macro aggregates of the chosen economies, but without digging into the political economic consequences of such policy alteration.

Abed, Erbas, and Guerami (2003), in their study on GCC Monetary Union, suggested pegging the GCC common currency to a basket of currencies, mainly dollar-euro, as an alternative to the mere peg to the USD. Such a policy can represent a first step towards a more flexible exchange rate policy to insure competitiveness in the world market given the promotion of more economic diversification. However, their study tackled GCC countries as one entity, while the contemplated research shall tackle each individual country separately and have cross-country comparisons. In characterizing the GCC region as an optimum currency area with 60% cross-correlation value in the regional GDP growth rates, Neaime (2005) considered that the homogeneous pegging of local currencies of the GCC countries to the USD is justified since oil exports, which are

denominated in USD, constitute more than 80% of total exports thus ensuring more stability for these economies. The contemplated research shall empirically test the pros and cons of keeping the peg or abandoning it and thus agreement or disagreement with Neaime's results shall be discussed. In his study on the feasibility of the proposed currency area in GCC, Arayssi (2008) suggested that a more appropriate peg for the common currency could be a basket of currencies rather than a weak currency (USD) as is the current situation.

The aim of the contemplated research will be to study which exchange rate policy is best for these countries individually. In this context, it is suggested that the optimal choice of exchange rate regime for the GCC common currency may be to be pegged to a basket of currencies rather than the USD as a preliminary step towards moving to a more flexible exchange rate regime (Al-Eisa & Hammoudeh, 2007).

6.2   Social Accounting Matrix

A SAM is an organized dataset that shows all transactions and transfers occurring within an economy at a certain point of time. They are usually constructed when time series data is deemed inefficient. This concept was mainly introduced by Sir Richard Stone, a 1984 Nobel Prize Economist. Several SAMs were constructed for different countries, for example Australia, UK, India, Indonesia, and Mozambique (Alarcón, Ernst,

Khondker, & Sharma, 2011; Pang, Meacher, & Lim, 2006; Pradhan, Saluja, & Singh, 2014; Stuttard & Frogner, 2003).

As for Middle East and North Africa (MENA) region countries, research revealed constructed SAMs for Egypt, Tunisia, and Libya (Ayadi & Salem, 2014; Eckaus, McCarthy, & Mohie-Eldin, 1981; Kerwat, Dewhurst, & Molana, 2009). However, for the GCC region, there was a lack of research except for attempts to build two SAMs for Kuwait in 1991 and 1995, and one for Saudi Arabia in 2000 (Al-Mo'men, 2003; Chemingui & Lofrgen, 2004; Korshid, 2006).

6.3   General Equilibrium Models

General equilibrium models were based on the idea of Walrasian general equilibrium theory that dates back to the 1870s where Walras (2008) assumed that there existed a set of prices that lead to general equilibrium in an economy between demand and supply of different commodities and factors. Later, Leontief in 1941 constructed a model where inter-industry linkages were developed for the American economy (Labiri, 2008). Based on that, CGE literature can be classified into two categories: (a) the numerical solution of the Walrasian system like the early work of Scarf (1967), and (b) the macro multi-sector analysis models aiming to analyze policy effects (Thissen, 1998). The first category started with the work of Harberger in 1962 that dealt with the effect of taxation in a two-sectors based economy, followed by the work of Scarf in 1973 (Ballard,

Fullerton, Shoven, & Whalley, 1985; Hansen & Scarf, 1973). More research on this category was conducted by Scarf and Shoven (1985), Shoven and Whalley (1984), and Hertel and Tisgas (1997), specifically on the Global Trade Analysis Project (GTAP).

As for the second CGE category, perhaps the first attempt to construct a multi-sectoral CGE model was probably that of Norway by Johansen (1961). Later Shoven and Whalley (1984) evaluated the effects of income tax in the US using a disaggregated CGE Model. In the 1980s, there was an explosion of the use of CGE models of national economies especially with the invention of computer software, General Algebraic Modeling System (GAMS) by Brooke et al. (1988) that made CGE modeling more accessible. Later in the 1990s, distinguished research on the effect of reduction in trade deficit on the US economy with 30 sectors CGE model represented a landmark in the development of more complicated CGE (Hansen, Robinsen, & Tokarick, 1993). More related work to the contemplated research especially in regards to Saudi Arabia is the work done by Lofrgen and Chemingui (2004) that both Al-Hawwas (2010) and Al-Thumairi (2012) used their 2000 SAM to develop CGE that test the effect of different economic policies on the Saudi economy. As for Kuwait, the only published available CGE was the one developed by Mo'men (2003). None have been published for Bahrain as of yet.

In summery, regarding the characteristics of CGE models, Dixon (2006), who worked on distinguishing the characteristics of CGE models, stated the following:

(i) They include explicit specifications of the behavior of several economic actors. They represent households as utility maximisers and companies as profit maximisers or cost minimisers;

(ii) They describe how supply and demand decisions are made by different economic actors to determine the prices of at least some commodities and factors;

(iii) They produce numerical results, i.e. they are computable. The coefficients and parameters in their equations are evaluated by reference to a numerical database.

For all the above-mentioned characteristics, it is believed that using CGE modelling in the contemplated research will add value to the economic empirical analysis for the chosen countries. The research is expected to explain the effect of external oil shocks on all the players and transactions within an economy.

7.0 RESEARCH PLAN

The research will be completed over 36 months. Interviews for groups of participants will take place over a three-month period from February 2017 through December 2017 after which time the data will be analyzed and the manuscript perfected. Each face-to-face interview will last up to 30 minutes and be conducted at an appropriate convenient location and time for the participants. Interviews will be conducted throughout the GCC

region. Due to the broad geographic coverage, Skype will be used when possible to conduct interviews.

8.0   RESEARCH TIMELINE

The contemplated research is expected to conclude over a 36-month period with a breakdown of the time allocation outlined in Table 8.0.

TABLE 8.0
Research Timeline

		Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PART A	Pre-Literature Review	█	█										
	Literature Review Part 1			█	█	█	█						
	Research Plan		█										
	Chapter 1			█									
	Chapter 2 & 3				█	█	█						
	Content Analysis				█	█							
	Official Submission of Chapters 1, 2, 3 and Slide Presentation to Obtain Authorization to Continue on to Field Research												
PART B	Interviews Part 1							█					
	Literature Review Part 2							█	█	█	█		
	Interviews Part 2									█	█		
	Data Analysis									█	█		
	Chapter 4, 5, 6										█	█	
	Manuscript Perfecting										█	█	
	Submission												█
Source: UGSM-Monarch Business School Switzerland													

9.0   RESEARCH BUDGET

The total cost of the contemplated research is estimated to be $10,800 USD. This amount will be privately funded. UGSM-Monarch Business School Switzerland has not been requested for any financial assistance towards supervisory costs or any other cost. The budget is presently fully funded and research may begin immediately. The breakdown of the budget is shown in Table 9.0.

TABLE 9.0 Research Budget	
ITEM	**Cost in USD**
Conferences	$3,000
Books and Article Purchases	$ 2,000
International calls and shipment costs	$500
Travel expenses and accommodation	$4,000
Software Purchase (GAMS, Minitab, and MAXQDA)	$1,000
Print outs	$300
TOTAL	$10,800

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