AMERICAN UNIVERSITY OF BEIRUT

MEASURING FISCAL SUSTAINABILITY IN THE MENA REGION USING A TIME-VARYING FISCAL REACTION FUNCTION

by
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A thesis
submitted in partial fulfillment of the requirements
for the degree of Master of Arts
to the Department of Economics
of the Faculty of Arts and Sciences
at the American University of Beirut

Beirut, Lebanon
April, 2024

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Date of thesis defense: April 23, 2024

Acknowledgements

Thank you, God, for everything.
To my mother, the one to whom I owe every bit of me, thank you.
My father, my angel, I hope I am making you proud up there.
My uncle, without you, I would not be in the place I am now.
To my siblings, I would like to thank you for believing in every step I take.
My friends, just by reading this, you know you are one of the few for whom I am grateful.
My advisor, Dr.Nadine Yamout, words cannot describe the unbelievable amount of help you have provided in this thesis and throughout this master's program. To say a simple "thank you" is really an understatement.
AUB, thank you for being the place I have dreamt about and finally reached.

Abstract
of the Thesis of

Majd Mohamad Shams Eddine for Master of Arts
Major: Economics

Title: Measuring Fiscal Sustainability in the MENA Region Using a Time-Varying Fiscal Reaction Function

Over the past few decades, countries of the Middle East and North Africa (MENA) region have faced several economic and political challenges such as plummeting oil prices, currency devaluations, political instability, and several refugee crises in several countries. Even prior to the onset of the COVID-19 pandemic, several studies revealed that the MENA region suffers from poor governance which leads to higher levels of debt as a share of the output. Consequently, addressing the sustainability of this mounting debt is a pressing issue for the region. As such, the escalating debt situation in the MENA region demands a comprehensive analysis. Against this background, this thesis evaluates the sustainability of public debt in some countries of the MENA regions, particularly Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates by employing a state-space model with time-varying parameters. The thesis endeavors to tackle how the trajectory of debt sustainability evolved in MENA region economies throughout different time periods and what economic criteria determine the threshold of public debt sustainability.

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Chapter 1

Introduction

During times of political hardships and wars between global powers and with the continuing effects of the COVID-19 pandemic, countries find it challenging to keep up with the economies of "developed" countries. It is true that a country can have debt and still manage to have a well-established economy, however, the abnormality appears when this debt becomes unsustainable. The issue of rising debt levels for nations worldwide has become a serious concern that needs to be addressed. Considering the unpredictable world today, it is mandatory to check whether a country's debt trajectory is foreseeable. Even advanced economies suffer from considerable debt levels that are allocated to investment expenditures and substantial costs to stabilize the financial system. This dilemma was further intensified because of the 2008 financial crisis and the onset of the European sovereign debt crisis in 2008 and recently by the COVID-19 outbreak. These crises have caused never-seen-before soaring public debt levels that led many policymakers to fear the aftermath on the economy. Not only does the fiscal sustainability of advanced economies affect their countries, but also it has the potential to extend and affect developing countries. One of the primary duties of any government is to keep sustainability to the public debt trajectory. Theoretical perspectives claim that economic growth can be negatively affected by elevated debt levels. Recent research has highlighted the threshold

level regarding the debt to gross domestic product (GDP) bringing the attention of the non-linear effects of public debt on economic growth Law et al. (2021).

Over the past few decades, the MENA region has been bombarded with shocks due to both economic and political instability. These challenges encompass plummeting oil prices, continuous exchange rate crises and deterioration of currencies, terrorist attacks, and Arab Spring uprisings followed by refugee crises in several countries in the Middle East. Studies exploring the relationship between public debt accumulation and the quality of institutions have revealed the high levels of debt in the share of output were due to poor governance even before the COVID-19 crisis (e.g. Tarek and Ahmed (2017)) making public debt sustainability a pressing topic in this region.

One approach to tackle this issue is to monitor the fiscal policies implemented by countries in the region. After the dip in oil prices in 2014, GCC started facing fiscal deficits from 2015 onwards. Low-Income Countries (LIC) and Middle-Income Countries (MIC) have encountered fiscal deficits between 2008 and 2018 along with declining average fiscal and primary balances. LICs have persistently maintained negative fiscal and primary balances during this whole period. In addition, Arab MICs and LICs have been challenged with high current account deficits due to their heavy reliance on imports and limited exports raising concerns since the current account encompasses the net balance of trade in goods and services, plus net income and current transfers (Sarangi, 2020).

Gross public debt in the MENA region have reached $1.4 trillion in 2020 attributing 60% of GDP escalating from a value of 20% of GDP in 2008 where this unprecedented rise was further aggravated by the COVID-19 pandemic. Even high-income Gulf Cooperation Council (GCC) countries witnessed a staggering surge of gross public debt surge from $ 117 billion in 2008 to $576 billion in 2020, accompanied by a substantial increase of debt-to-GDP ratios from 10% in 2008 to 41% in

2020. Likewise, middle-income countries have seen their public debt jump from $250 billion to $658 billion between 2008 and 2020 with a noteworthy mounting value in external public debt reaching approximately $111 billion. In addition, these countries have experienced lowered concessional borrowing from official creditors leading to a rise in private creditors introducing the risk attributed with external debt servicing which is heightened due to instabilities and currency exchange rates. Even after implementing "Debt Service Suspension", risk of debt distress is still widely available in LICs such as Comoros, Djibouti, and Mauritania suffering with outstanding debt surging from $3 billion in 2009 to $6.6 billion in 2020 ESCWA (2021).

As such, the escalating debt situation in the MENA region demands a comprehensive analysis. Against this background, this thesis evaluates the sustainability of public debt in some countries of the MENA region, particularly Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates. employing a state-space model with time-varying parameters. The thesis endeavors to answer the following research questions:

1. How has the trajectory of debt sustainability evolved in MENA region economies throughout different periods?

2. What economic criteria determine the threshold of public debt sustainability?

Chapter 2

Literature Review

The whole world has always witnessed economic crises that reshape the lives of billions within the enclosed economy of our planet. These crises whether caused by pure economic malfunctions, wars or pandemics are attributed with alleviated levels of public debt attracting economists to acknowledge the detrimental levels' effect on economic prospects. The significance of debt sustainability, being a major factor in shaping countries and people's confidence in the government's policies and work system, urged policymakers to delve deep into the different aspects of determining a sustainable path of public debt and estimating the effects of various economic indicators.

2.1 Debt Sustainability and Solvency

The literature generally aligns with the association between public debt sustainability and government solvency. According to the (IMF, 2002, p.5, as cited in Abbas et al. (2019)), public debt is considered sustainable if it meets the solvency condition without requiring significant corrections, taking into account the associated financing costs Similarly, Becker et al. (2010) define public debt sustainability as the government's capacity and willingness to meet its obligations without affecting

public revenues or expenditures, and without further increasing the debt-to-GDP ratio. Some studies focus on determining a "debt limit" as a threshold beyond which solvency becomes uncertain. Subsequently, the term "fiscal space" emerges, denoting the gap between the current debt level and the debt limit (Ghosh et al., 2013). Another important variable is the current account, encompassing the net balance of trade in goods and services, plus net income and current transfers. Attention will also be given to both the fiscal balance (the difference between government revenue and expenditure) and the primary balance (the fiscal balance without interest payments).

2.2 The Relationship between Debt Levels and Primary Balance

Various studies conducted in the field of debt sustainability aimed to explore the relationship between debt-related indices and economic factors and accounts. Bohn (1998), one of the pioneers in this field, figured out that the primary balance is positively correlated with the debt-to-GDP ratio. Bohn (1998) then implied that U.S. fiscal policy can be assessed through the response of primary balance to changes in the debt-to-GDP ratio. Waheed (2016) claims that Bohn offers a user-friendly method based on fiscal solvency. He then estimated a fiscal reaction function to study how the primary balance reacts to changes in outstanding debt and accounting for some external effects. When the primary balance rises as debt increases, the response is positive and debt is thus sustainable. This straightforward method provides a clear picture using available data, creating a vital tool for debt assessment. The research found that fiscal authority reacts responsibly by raising its primary surplus when public debt increases due to shocks or crises Olaoye and Olomola (2022). Likewise, but for 34 emerging markets and 22 industrial countries, Mendoza and Ostry (2008) established robust empirical evidence for the positive relationship

between primary fiscal surpluses and public debt using Dynamic Stochastic General Equilibrium. The study reveals the stronger responsiveness of primary balances to changes in public debt in emerging economies compared to advanced ones. This justifies how these emerging economies tend to converge toward lower average debt ratios over time. However, this responsiveness weakens as debt ratios go beyond 50 percent except for industrial economies indicating unsustainability. Following in Bohn's footsteps, Khalladi (2019) estimated the parameters of the relationship between the primary balance, lagged debt ratio, and other control variables to capture the dynamics of fiscal policy adjustments in response to debt changes. Results reveal a non-linear relationship by the fiscal reaction function between primary balance and government debt where low debt levels show a positive response using a panel data approach considering annual data from 27 countries over the period 2000-2017. Nevertheless, as the debt levels continue to increase, this response becomes negative. For this change in responses, Khalladi estimated the debt limit, the level where public debt becomes unsustainable, to be between 160% to 220% for Tunisia, Morocco, Egypt, and Jordan in the MENA region.

However, Ostry et al. (2010) criticize Bohn's work as being so simplistic and unrealistic for primary balances to always rise in proportion to increasing debt. In addition, Bohn fails to account for uncertainty and shocks on fiscal sustainability. In response to these limitations, the note considers the nonlinear relationship between fiscal policy and debt, especially at high levels factoring for uncertainty, default probabilities, and interest rates when evaluating fiscal sustainability. The study suggests that countries with a low probability of positive fiscal space have to implement substantial fiscal adjustments that deviate from historical patterns- "history is not destiny"- and the countries with positive fiscal space need to apply some medium-term changes in their fiscal policies for future commitments. While Bohn (1998) shows that an adequate condition for a government to meet its intertemporal

budget constraint is a positive reaction of the primary balance to lagged debt, Ghosh et al. (2013) extended Bohn's framework to have a "strict sustainability criterion" since the increase in primary balance as a result of the spike of debt does not stop the debt-to-GDP from continually increasing. Ghosh et al. (2013) claim that public debt should be expected to converge to some finite proportion of GDP implying that the debt-to-GDP ratio should not grow indefinitely. Ghosh et al. (2013) found that the additional reaction of primary balance to lagged debt is non-linear where it stays positive at moderate debt levels, consistent with Bohn (1998, 2008), but starts declining when debt reaches 90-100% of GDP. Ghosh et al. (2013) investigated the debt limit and fiscal space for 23 advanced economies to find out that debt limits for these countries range fall between 150% and 250% of GDP and some countries have very limited fiscal space meaning that they do not have much freedom to take fiscal decisions without giving up their fiscal sustainability like Greece, Iceland, Italy, Japan and Portugal unlike Australia, Korea and the Nordic countries have more flexibility in their fiscal policies. Similar to Ghosh et al. (2013), Sarangi (2020) indicates that in the Arab region, there exists a notable negative correlation between the lagged debt ratio and the primary balance. This suggests that the primary balance ratio worsens as the lagged debt ratio increases over one period. It's important to interpret the positive (and significant) fiscal reaction only observed with a third period lag cautiously, as there could be additional factors influencing or compelling a positive response in the primary balance, aside from fiscal policy mechanisms.

2.3 The Dynamics of Fiscal Limits

Motivated by Bohn (1998, 2008) and Ghosh et al. (2013), Bi et al. (2016) explored the factors that shape fiscal limit distributions in developing countries by imposing the debt sustainability condition through a Dynamic Stochastic General Equilibrium (DSGE) model. This condition implies that government debt should converge

to finite share of GDP under previous fiscal functions. They found out that developing countries have much more smaller fiscal limits compared to that of developed countries. The analysis included how real exchange rates lessen the country's fiscal limit reducing its capacity to borrow. This reality is worsened in countries which rely on external borrowing since the volatility of exchange rate enlarging the spread of distribution of fiscal limits, increasing the probability of sovereign default. In addition, in case of a shock, mounting debt levels lead to a rise in the sovereign risk, a difference of interest rates on government's bonds between the studied country, and that of a safer benchmark country. This sovereign risk can make investors question the resilience of the government using counter-cyclical fiscal policies to stabilize the economy. The results using simulations from three DSGE models (EAGLE-ESCB, GEAR-Bundesbank, and BE-Banco de España) show that high levels of high public debt make the economy vulnerable to shocks or crises. More importantly, such levels of debt are attributed to limited fiscal policy availability. Moreover, countries therefore encounter the crowding-out effect of private borrowing in both the long and short term and negatively affect the economy's long-term potential GDP. These consequences are often intensified when reactions arise due to sovereign risk premium leading to a rise in taxes to finance future debt burdens. Bi et al. (2016) emphasize the role of tax rates in shaping fiscal limits. Developing countries, unlike developed countries, suffer from non-compliance in the informal sector. This non-compliance poses challenges in dealing with "Hard-to-Tax" sectors like small businesses and state-owned companies, in addition to fragile governance and the spread of corruption related to low revenue collection in developing countries Cottarelli (2011). To make matters worse, tax rates in developing countries are on average much lower than in developed countries. Analysis by Bi et al. (2016) prove that an increase in the maximum effective tax rate can positively impact the distribution of fiscal limits for developing countries emphasizing the role revenue collection plays in fiscal

limits.

2.4 The Link between Fiscal and Primary Balances

For the GCC countries, there is a typical convergence between fiscal and primary balances. This is essential because these countries mainly receive interest payments, resulting in slight differences between fiscal and primary balances. Since 2005, the GCC countries maintained an overall surplus in their fiscal, primary, and current accounts except during the decline of oil prices. Measured as a percentage of the GDP, the average fiscal and primary balances declined due to the decrease in oil prices in 2009. Although the aforementioned indicators have been increasing since 2010 due to the recovery in oil prices, these indicators faced a sharp decrease starting in 2015 due to the decline in oil prices in 2014. As compensation for the deficits, the GCC countries are diversifying their borrowing options including but not limited to issuing sovereign bonds in the international capital market to meet their expenditure requirements. In addition, new policies are being initiated such as the value-added tax (VAT) and subsidies are being reduced. With respect to the middle-income countries (MICs) and least-developed countries (LDCs), the average fiscal and primary balances are in deficit, especially between 2008 and 2018 before the COVID-19 pandemic in 2020. Measured as a percentage of the GDP, MICs' fiscal and primary balances have been facing a continuous and steep decline since 2008 reaching -10% and -6% respectively in 2015, and reached -7% and -2% respectively in 2018. The case is different and pertinent to the LDCs where variations in the average fiscal and primary balances over the same period are evident. However, these variations are within a range of values less than zero where the average fiscal and primary balances for the LDCs were approximately -6.4% and -6.1% respectively Sarangi (2020). Figures 1 and 2 illustrate that the fiscal balance and primary balance, measured as a share of GDP, were positive for several countries during the period 2008-2010,

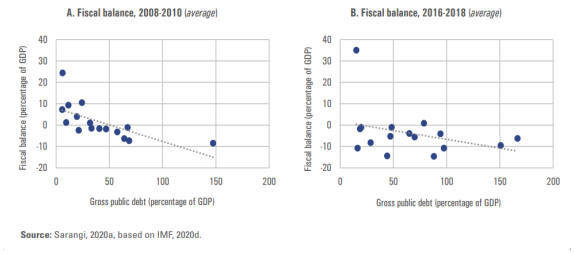

Figure 2.1: Gross Public and fiscal balances in Arab countries (percentage of GDP)

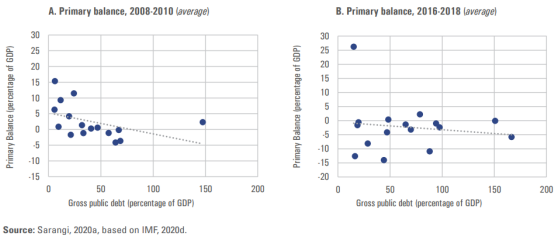

Figure 2.2: Gross Public and primary balances in Arab countries (percentage of GDP)

contrasting with negative balances during the period 2016-2018. The deterioration in fiscal and primary balances is associated with an increasing share of gross debt to GDP.

It is true that oil-importing low and middle-income countries have seen an improvement in their fiscal balances after the 2014 oil price crash. Nevertheless, the existing low economic growth and obstacles of revenue mobilization have led to the continuation of a negative fiscal account. In addition, the majority of MICs and LDCs in the MENA region face a surging deficit in current account balances due to their extensive dependence on imports for everyday consumption and their very specific exports. This can be clearly exhibited by the huge gaps between the percentages of imports and exports as a fraction of GDP. For instance, Jordan and Lebanon had peak imports at 74% and 75% of GDP, respectively, compared to their peak exports to GDP at 48% and 55%, respectively. It is believed that current deficits are closely attributed with budget deficits and piling up debt. Neaime (2015) claims that the consistent budget deficit in Lebanon exacerbates trade deficit by pressuring

up local interest rates leading to exchange rate appreciation since the 1990s which eventually caused a surge in debt levels. The COVID-19 pandemic further worsened the deficits and increased debt substantially in Arab MICs and LDCs, which were already highly indebted and at a high risk of debt stress.

2.5 The Role of Fiscal Policies in Shaping Public Debt

One way to tackle the concerning rise in public debt in oil-importing low and middle-income countries is to dig deeper into the fiscal policies adopted by countries. The study by Neaime (2010) employs various econometric tests, including unit root tests and co-integration analysis, to assess the sustainability of fiscal policies in Turkey, Egypt, Morocco, Jordan, and Tunisia. The findings convey varying levels of fiscal sustainability, with some countries exhibiting more sustainable policies than others. To illustrate, the expenditures and revenues series shows non-stationary trends in Egypt, and there exists a co-integrating vector between them suggesting that Egypt's debt and fiscal policies are weakly sustainable. However, Turkey witnesses an absence of a co-integrating vector between government expenditures and revenues inclusive of seigniorage indicating that Turkey's fiscal policy is on a non-sustainable path similar to the case of Morocco and Jordan. However, there exists a strong co-integrating vector between government expenditures and revenues showing that Tunisia's debt and fiscal policies are strongly sustainable. To visualize the fiscal sustainability gaps in a country, a study by Sarangi and El-Ahmadieh (2017) compares the actual primary balance and the debt-stabilizing primary balance. The results show that, on average, the debt-stabilizing primary balance is higher than the actual primary balance in the sample countries, indicating rising debt-to-GDP ratios. Some countries, like Egypt and Jordan, have negative debt-stabilizing primary balances, signifying that interest rates are below the growth rate. However, this condition may not be sustainable in the long run. To make debt sustainable,

Alberola et al. (2023) realized using a debt sustainability analysis that unconventional monetary tools such as Qualitative Monetary Easing (QQE) and the Yield Curve Control (YCC) were used by Japan. For instance, since Egypt has adopted a floating exchange rate regime, it can buy large purchases of assets to reach a target inflation rate. GCC countries' fiscal and primary balances tend to converge due to being net receivers of interest payments. According to ESCWA (2019), IRGD, the difference between a country's nominal interest rate on its debt and the rate of growth of its nominal GDP, is a key indicator for assessing debt sustainability and debt-stabilizing primary balance. However, monetary policy is passive in most of the Arab world due to their pegged exchange rates. This results in positive IRGD in countries like Lebanon and Jordan indicating higher interest rates relative to economic growth contribute to higher debt levels along with exchange rates and primary deficit.

As examined so far, studies employed in the literature of public debt sustainability have revealed their findings and analyses through estimating fiscal reaction function, intertemporal budget constraints, and stochastic and DSGE models. However, a relatively newly used model in economics to explore factors affecting debt sustainability is the state space model. This latter model was utilized for countries outside the MENA region like Brazil and South Africa. Campos and Cysne (2019) used monthly data from Brazil spanning from 2003 to 2016 using fiscal reaction functions with time-varying coefficients using the state space model. This study reported how the primary deficit became less responsive to variations in the debt-to-GDP ratio over the period. In the same vein, and using the same model, a study by Burger et al. (2011) for the South African economy found out the government has managed a sustainable fiscal policy by reducing the budget deficit or increasing the surplus when debt levels rise. Unlike the models used in the literature on debt sustainability in the MENA region, this thesis will estimate a fiscal reaction

function to evaluate debt sustainability using a state space model in a set of MENA countries.

Chapter 3

Data

3.1 Data

The thesis uses annual data from the International Monetary Fund (IMF) for certain countries in the Middle East and North Africa region based on availability Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates. The dataset is comprised of key economic indicators, including the current account balance expressed as a percentage of GDP, general government gross debt as a percentage of GDP, fiscal surplus as a percentage of GDP, and real GDP growth rate.

3.2 Descriptive Statistics

3.2.1 *Bahrain*

Figure 3.1: Bahrain

Current Account-to-GDP of Bahrain: The current account-to-GDP has been swinging between positive and negative values throughout the years indicating instability. This instability reveals that either Bahrain's imports exceed its exports, or its foreign trade spending exceeds its earnings. Despite its volatility, rebound can be seen after drops in this indicator especially the sharp rebound that occurred after 2020 indicating an improvement in trade balance or an increase in receipt from abroad. This sharp rebound can be justified by the benefits of Bahrain's oil exports due to the increase in oil prices or foreign investments.

Debt-to-GDP of Bahrain: An increasing trend in the debt-to-GDP ratio can be revealed from the graph especially from 2010 onwards exceeding the ratio of 100% of GDP in 2020. When this indicator exceeds 100 percent, a ratio is considered a

critical threshold to indicate potential risks of debt sustainability. Since Bahrain's debt profile is continuously increasing, necessary debt monitoring and precautionary management approaches are required to avoid a debt crisis.

Fiscal Surplus-to-GDP of Bahrain: As revealed in the graph, the fiscal surplus-to-GDP of Bahrain follows a cycle of surpluses and deficits. In recent years, Bahrain has faced fiscal deficits indicating that the government spending is higher than the revenue. One major drawback that led to debt accumulation is borrowing to finance persistent deficits; thus, debt sustainability is negatively affected. However, Bahrain can utilize the fiscal surplus in some of the years to repay the debt.

Real GDP Growth Rate of Bahrain: Major fluctuations along with a decreasing trend in this indicator can be revealed from the graph due to the occurrence of global crises including but not limited to the 2008 financial crisis and the 2020 COVID-19 pandemic. The increase in this indicator conveys economic expansion leading to a positive impact on Bahrain's ability to service its debt. Conversely, the decrease in this indicator reveals that debt sustainability might not be resilient.

Thus, Bahrain's fiscal consolidation is concerning. One solution to decrease the debt-to-GDP ratio of Bahrain is to strengthen its non-oil revenue and improve its institutional quality. Through these essential pillars, Bahrain would be able to resist external shocks, reduce its debt burden, and ensure economic stability with long-term fiscal health and debt sustainability.

3.2.2 *Egypt*

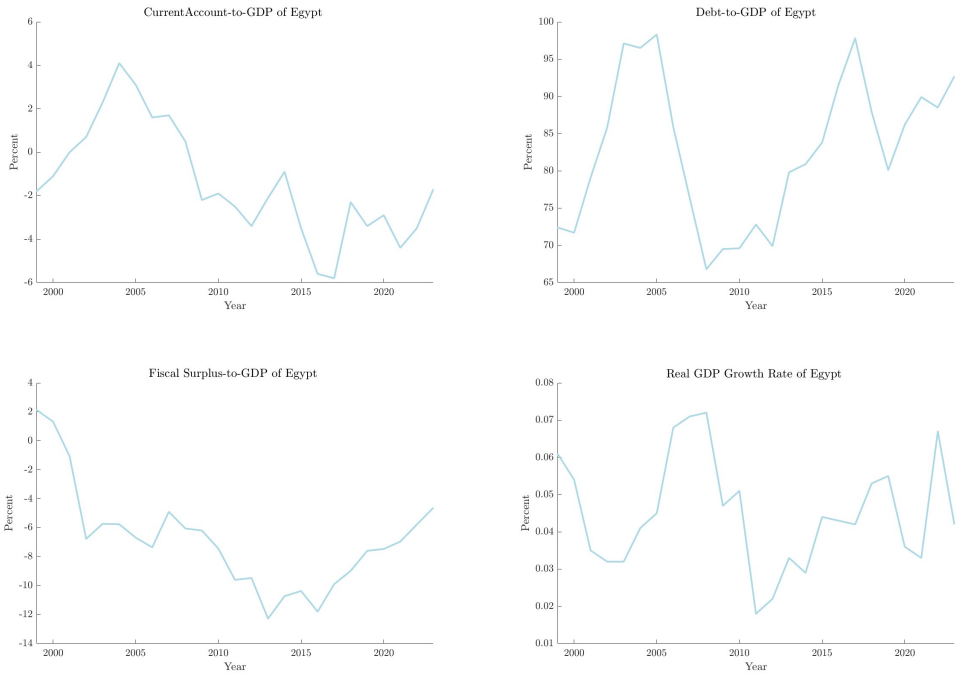

Figure 3.2: Egypt

Current Account-to-GDP of Egypt: As shown in the graph, Egypt's current account-to-GDP ratio has been in ongoing deficits since 2009. These deficits can be due to the fact that Egypt's spending on imports is higher than the revenue generated from exports. In addition, these deficits might be caused by the continuous variability of foreign transactions and trade balances. Thus, the consistency in deficits reveals potential problems in Egypt's ability to finance these deficits without building an undue level of external debt.

Debt-to-GDP of Egypt: As evident in the graph, Egypt's debt-to-GDP ratio reached its maximum in the mid-2000s, and minimum around 2010, and has been fluctuating in recent years. This upward trend indicates that Egypt's debt rate is increasing significantly against its economic output. As a result, Egypt might face a challenge in debt servicing by crowding out its productive investments, where a large part of the government spending would be on debt servicing.

Fiscal Surplus-to-GDP of Egypt: According to the graph, this ratio has been facing deficits with frequent fluctuations since the early 2000s. These deficits might be because the government spending exceeds its ability to spend. However, sustainable short-term deficits may not be alarming if used for investment. Thus, improvements in recent years can be seen which increase the pressure on Egypt to increase the sustainability of the fiscal discipline in the long run.

Real GDP Growth Rate of Egypt: Although the real GDP growth rate of Egypt faces numerous fluctuations as shown in the graph, it stays greater than zero through most of the period indicating a growth in Egypt's economy. The peaks in this indicator signify an outstanding economic performance; thus, debt management and servicing are improved. Conversely, the steady falls, especially around 2011 and 2020 occurred due to the Arab Spring uprising and COVID-19 pandemic respectively. These falls indicate the presence of economic vulnerability where the economy would be at risk of entering a recession.

Therefore, Egypt's economic indicators reflect a mixed picture pertinent to debt sustainability. The long-term debt sustainability is threatened by the volatility in the ratio of the current account to GDP and the continuous fiscal deficits. However, the economy is inferred to have periods of resilience where the GDP growth rate was positive during most of the years. To strengthen its economy and increase its ability to handle its debt burden, Egypt should plan to reduce the fiscal deficit along with the debt-to-GDP ratio.

3.2.3 *Jordan*

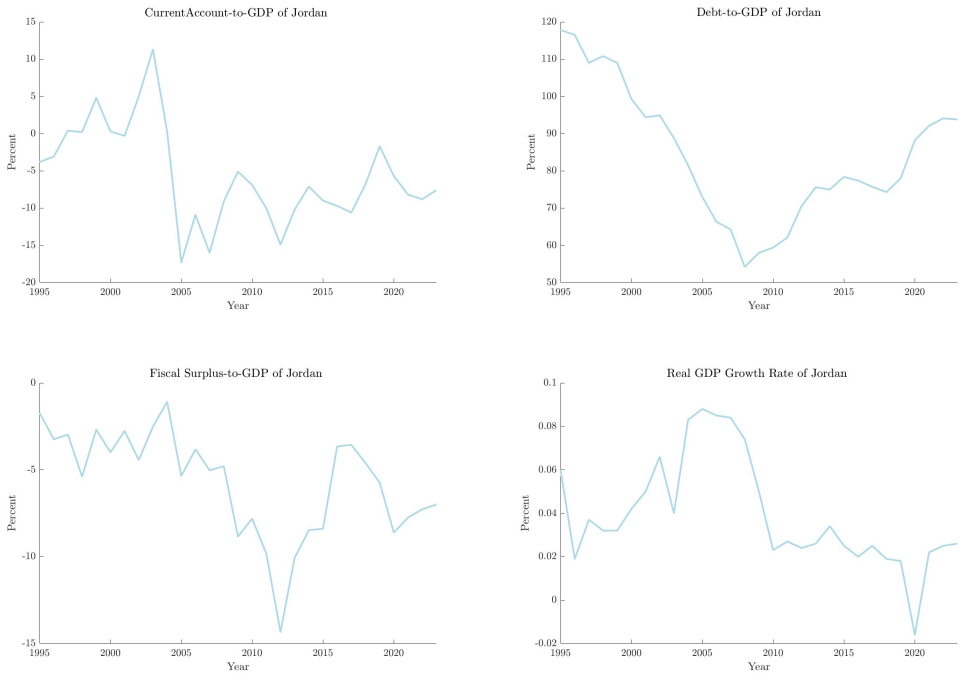

Figure 3.3: Jordan

Current Account-to-GDP of Jordan: As shown in the graph, the current account-to-GDP ratio of Jordan has been in deficit for most of the years of the analysis, especially around 2010 and 2020. Similar to Egypt, these deficits for this indicator imply that Jordan's spending on imports exceed the earnings generated from the exports. Financing from foreign investment or aid could have a negligible effect on the deficits where they could accumulate as debt since these financing methods are done by borrowing; thus, a challenge is imposed on debt sustainability.

Debt-to-GDP of Jordan: As revealed in the graph, the steep decline in debt relative to GDP from 120% in 1995 to less than 60% around 2007 signifies economic growth and effective debt management. However, this trend has been facing an incline after 2008 indicating that the rate of growth of the national debt exceeds that of the economic output.

Fiscal Surplus-to-GDP of Jordan: As shown in the graph, Jordan has been in a

fiscal deficit for the whole period of the analysis. The continuous fiscal deficits would lead to the accumulation of the debt. This might be due to Jordan's dependence on borrowing to finance its budget where a fiscal consolidation is needed to stabilize the public finances.

Real GDP Growth Rate of Jordan: As evident in the graph, Jordan has been facing variations in its real GDP growth rate throughout the years. After each increase, this indicator faces a significant decrease as in the early 2000s before 2005. As such, there is a significant decrease in this rate in 2020 which is followed by a continuous increase afterward. The significance of the positive growth rates lies within the improvement of the country's ability to service its debt, especially after a crisis where downturns could impact the debt servicing negatively which often occur during economic stress and crises.

Consequently, Jordan's economic indicators imply that the country suffers from persistent fiscal deficits and an increasing debt burden signifying debt sustainability challenges and structural problems in the payments balance. To increase the sustainability of its debt, Jordan should decrease its dependence on imports, increase revenues from exports, and improve government expenditure management.

3.2.4 *Kuwait*

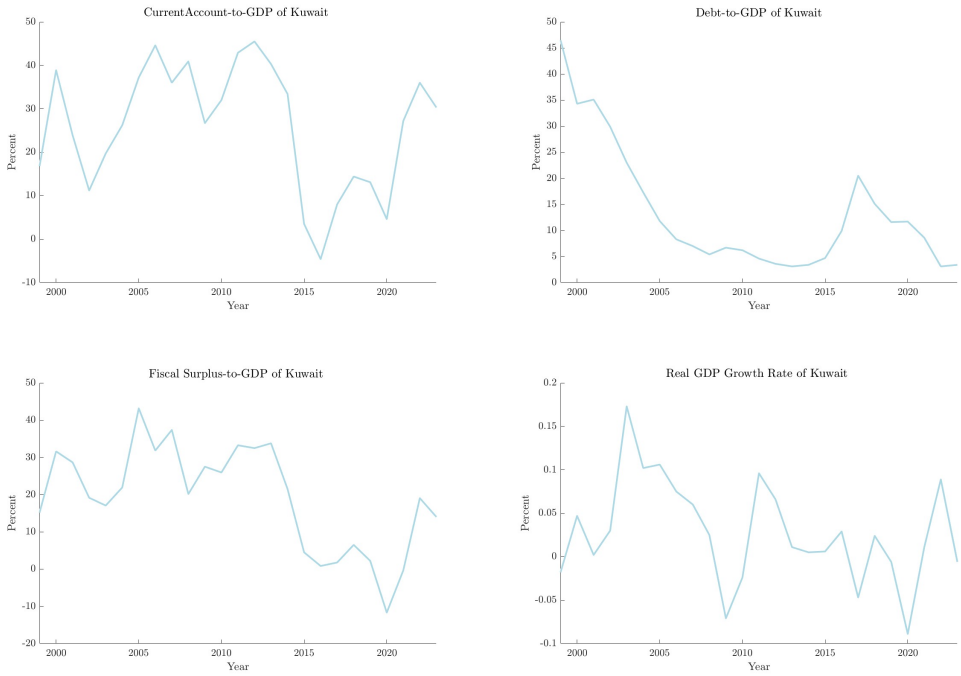

Figure 3.4: Kuwait

Current Account-to-GDP of Kuwait: Although Kuwait's current account-to-GDP ratio faces noticeable fluctuations, it is subjected to a positive trend. One of the major contributors to the increase in Kuwait's ratio is the high net foreign earnings generated from the oil revenue. As the oil prices decrease especially around 2015, the current account-to-GDP ratio will also decrease. By being persistently positive, this indicator signifies a strong debt sustainability in Kuwait where the country is meeting its foreign obligations by receiving enough income from abroad.

Debt-to-GDP of Kuwait: As shown in the graph, Kuwait has always been able to maintain a relatively low level of debt compared to its gross domestic product despite what occurred in 2015 and 2020 when this ratio was increasing. Thus, Kuwait demonstrated a considerable fiscal space due to the fact that its debt is relatively low compared to the size of its economy.

Fiscal Surplus-to-GDP of Kuwait: As revealed from the graph, Kuwait's fiscal

surplus-to-GDP is subject to both surpluses and deficits. In the early 2000s, Kuwait demonstrated a large surplus due to high oil revenues; thus, robust fiscal health is implied in this period. Yet, the deficit that has been observed in recent years might be due to either an increase in government spending or a decrease in oil revenues. The shift from deficit to surplus indicates that Kuwait is characterized by fiscal sustainability.

Real GDP Growth Rate of Kuwait: The real GDP growth rate for Kuwait faces a decline in the years 2008 and 2020 due to the 2008 financial crisis and the COVID-19 pandemic respectively. However, Kuwait demonstrated resilience in each economy due to the noticeable recovery and growth achieved in the subsequent years.

In conclusion, Kuwait's performance has been exemplary when it comes to the debt sustainability of the government. The presence of a buffer against debt risks can be inferred due to the positive current account balances and low debt relative to GDP; thus, these risks are minimized. However, the volatility in the fiscal balance and GDP growth rate could indicate that Kuwait's economy heavily depends on oil revenues which is volatile. This issue can be minimized by fiscal management improvements and revenue source diversification.

3.2.5 *Morocco*

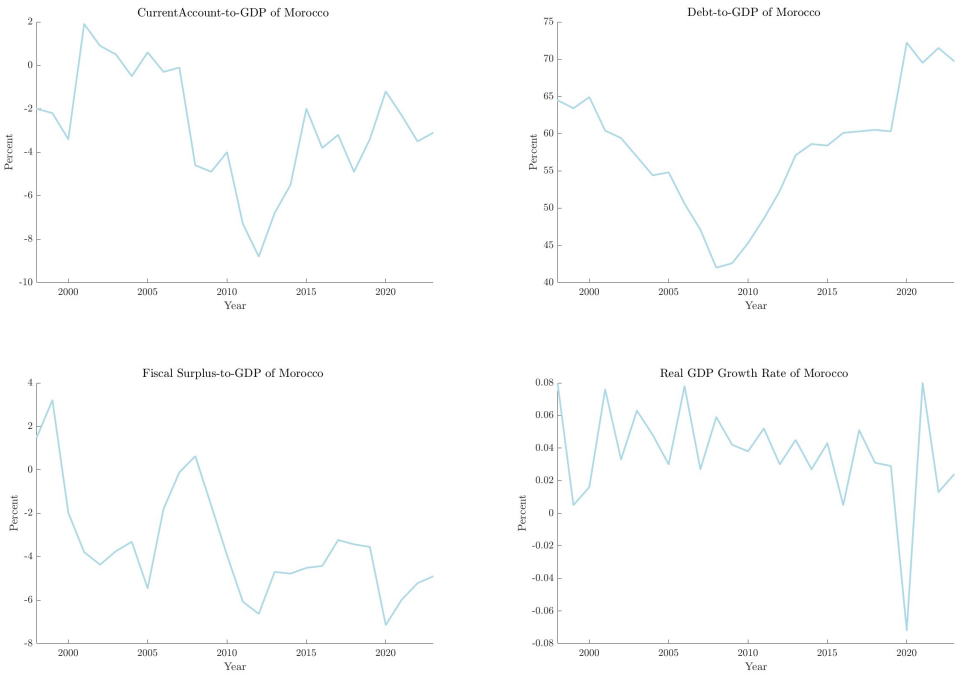

Figure 3.5: Morocco

Current Account-to-GDP of Morocco: As revealed in the graph, this indicator has been fluctuating since 2000 when the current account was mostly in deficit. Despite the presence of periods of recovery between 2012 and 2015, the current account of Morocco remains unstable. One logical explanation for this pattern is that Morocco is a developing country that finances its investment and development by borrowing. Thus, debt financing difficulties start to arise when deficits increase continuously.

Debt-to-GDP of Morocco: As shown in the graph, Morocco's debt-to-GDP ratio has been facing a noticeable decline since the 2000s. This indicates that either the economic growth in Morocco leads the debt accumulation, or the country pays its debts. Nevertheless, the debt-to-GDP ratio started increasing to unprecedented levels in 2010. This development of debt over economic output would signify that Morocco needs to manage its growing debt to avoid possible fiscal stress.

Fiscal Surplus-to-GDP of Morocco: As revealed from the graph, Morocco's fiscal surplus-to-GDP is subject to chronic deficits indicating that the government spending is greater than the generated revenues. Morocco must keep an eye on the financial soundness to become critical to debt sustainability.

Real GDP Growth Rate of Morocco: Although the real GDP growth rate for Morocco has been positive, it faces several fluctuations. A visible fall was caused in 2020 due to the COVID-19 pandemic demonstrating economic challenges faced at this time. Overall, Morocco shows positive growth rates that impact debt sustainability positively by increasing the government's revenues due to an increase in tax collections; thus, additional resources to service the debt are provided.

In sum, Morocco's indicators reveal that the country faces persistent deficits in both the current account and fiscal budget. However, these indicators are well-compensated by a positively growing economy. Nevertheless, the increasing trend in the debt-to-GDP ratio requires monitoring and policy adjustments to ensure the sustainability of the debt level and economic stability.

3.2.6 *Oman*

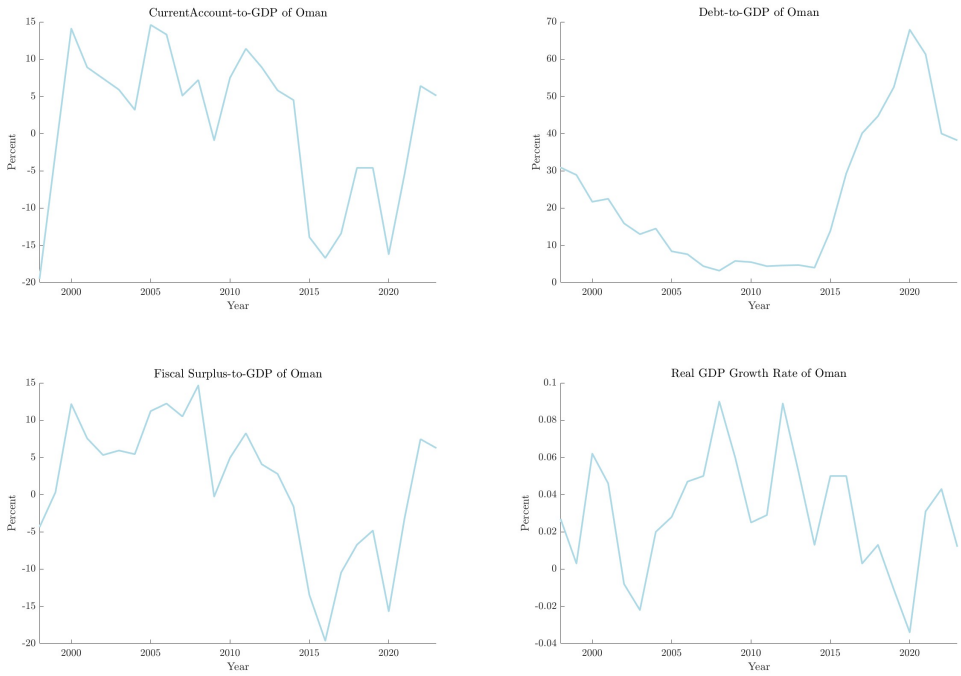

Figure 3.6: Oman

Current Account-to-GDP of Oman: The current account of Oman is examined to be fluctuating over the years as evident in the graph. It can be observed that the current account sharply dropped between the early 2000s and 2015. This could be attributed to the drop in oil prices or the dependence of Oman on exports. However, the current account showed some increase after the sharp decline in 2020.

Debt-to-GDP of Oman: The debt-to-GDP indicator dropped over the years indicating a decrease in debt burden. Around the oil price shock in 2014, the debt-to-GDP ratio witnessed a steep increase highlighting the surge in debt to cover deficits.

Fiscal Surplus-to-GDP of Oman: The fiscal balance against GDP is subject to alternating periods of surplus and deficit as shown in the graph. Despite the surplus that was shown in the early 2000s, Oman entered a deficit in around 2015. Similar to the current account indicator, Oman showed signs of recovery afterward.

Real GDP Growth Rate of Oman: As revealed in the graph, the real GDP growth rate of Oman is subject to continuous fluctuations where it reaches its peak around the mid-2000s and during the early 2010s, then faces a decline.

Analyzing the status of the indicators in Oman reveals instability and vulnerability. What mostly affects the current account, fiscal position, and how fast the economy is growing are external shocks like the shocks in oil prices due to the heavy reliance on oil revenues. Thus, it is recommended that the Omani government focus on diversifying its economy to minimize dependency on oil and to implement fiscal discipline to be able to sustain its public debt in the long run.

3.2.7 *Qatar*

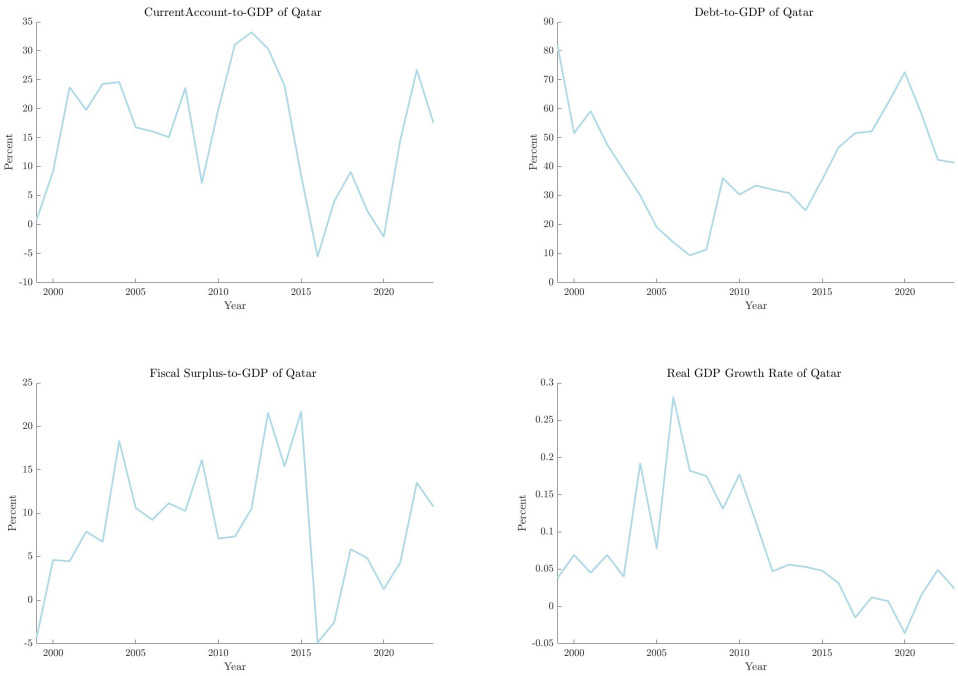

Figure 3.7: Qatar

Current Account-to-GDP of Qatar: Like previous oil-depending countries, Qatar's current account experiences fluctuations aligning with the direction of oil prices. As the exports increase, the current account surplus indicates an upward trend and increase in the country's wealth and vice versa.

Debt-to-GDP of Qatar: Up until the year 2008, the observed movement of the debt-to-GDP is aligned with the ideal result for debt sustainability. From 2010 onwards, the results show that the debt kept growing probably due to increased public spending and borrowing to grow the Qatari economy through investments. The Qatari government later shows to have shifted its focus towards declining this indicator after 2020 by implementing some fiscal policies or this improvement could be due to the regrowth of the economy following the shocks in energy prices pushing the Qatari revenues from exports upwards.

Fiscal Surplus-to-GDP of Qatar: Qatar's fiscal surpluses appear to have been

fluctuating reflecting inconsistent government fiscal policies, variations in revenues from its oil exports, and different economic states. This alteration reflects that as the government saves, the country is in a state of surplus and vice versa.

Real GDP Growth Rate of Qatar: Qatar is one of the economies that tremendously depends on oil revenues. As such, and given how volatile the oil market is, any shock in the oil prices leads to GDP contraction and the opposite holds as observed fluctuations of GDP growth rates in the graph.

To summarize, Qatar is a country that highly depends on revenues from its natural resources, mainly oil, which pushes the country to be in an inconsistent fiscal state as the natural resource market is highly volatile to any external shock.

3.2.8 *Saudi Arabia*

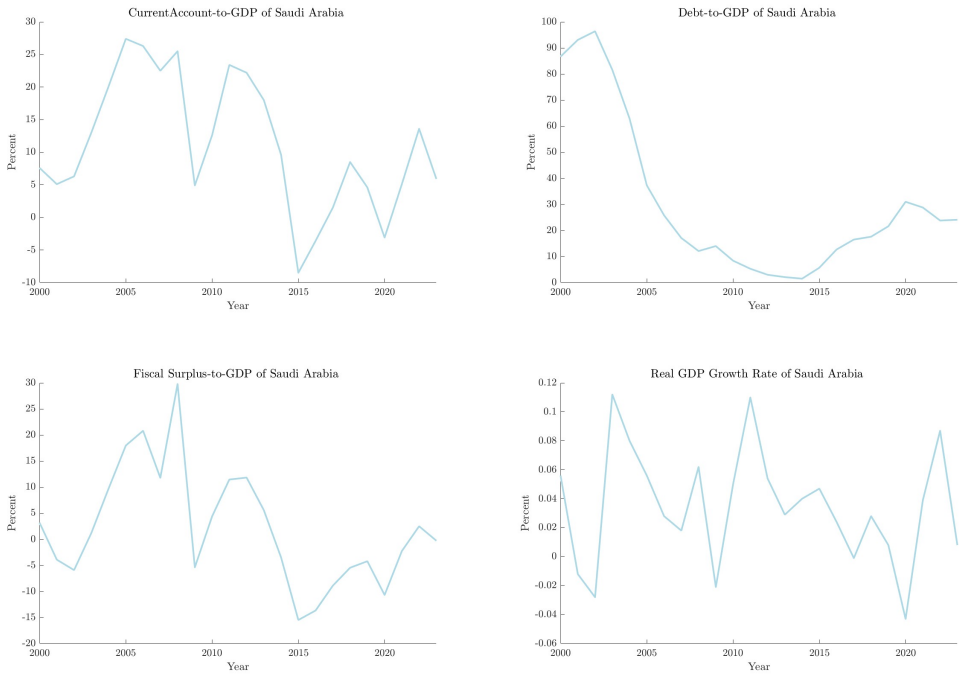

Figure 3.8: Saudi Arabia

Current Account-to-GDP of Saudi Arabia: The current account maintained high peaks of surpluses during periods attributed to high oil prices given the Saudi economy's dependence on oil export revenues. Conversely, troughs mark periods of relatively low world oil prices like in 2015, resulting in a deficit. The recent upward trend after the pandemic in the current balance could signal an increase in oil prices and might suggest that efforts toward economic diversification are yielding positive results.

Debt-to-GDP of Saudi Arabia: After an initial significant decrease, the debt-to-GDP ratio stayed stable with some fluctuations until around 2015. The increase around this time might be attributed to the country's fiscal response to falling oil prices, where financing of budget deficits was through borrowing. The subsequent leveling off and minor decline suggest that the country might started to address its debt levels, possibly through fiscal consolidation.

Fiscal Surplus-to-GDP of Saudi Arabia: The fiscal balance relative to the GDP of Saudi Arabia has shown a series of surpluses and deficits. Peaks in the graph indicate years when government revenues exceeded expenditures, likely strengthened by strong oil revenues. Sharp declines into deficit could represent periods of low oil prices, excessive government spending, or investments in diversifying the economy. The recent trend towards a surplus suggests a recovery in oil prices in addition to potential successful fiscal management including increased non-oil revenues.

Real GDP Growth Rate of Saudi Arabia: The real GDP growth rate graph for Saudi Arabia represents a highly volatile economy, with significant peaks and troughs occasionally reflecting periods of contraction. The high points likely coincide with periods of strong global demand and high oil prices, while the low points may align with oil price crashes or global economic downturns. This pattern suggests that the Saudi economy is significantly influenced by external market conditions, especially the energy sector.

Combining these indicators paints a picture of an economy tied to the global oil market. Debt sustainability in Saudi Arabia is substantially dependent on oil price stability. As the recent trends suggest movement towards greater sustainability, the risk of oil price shocks on Saudi's economy is diminishing. These trends may be resulting due to effective economic diversification, and fiscal management.

3.2.9 *Tunisia*

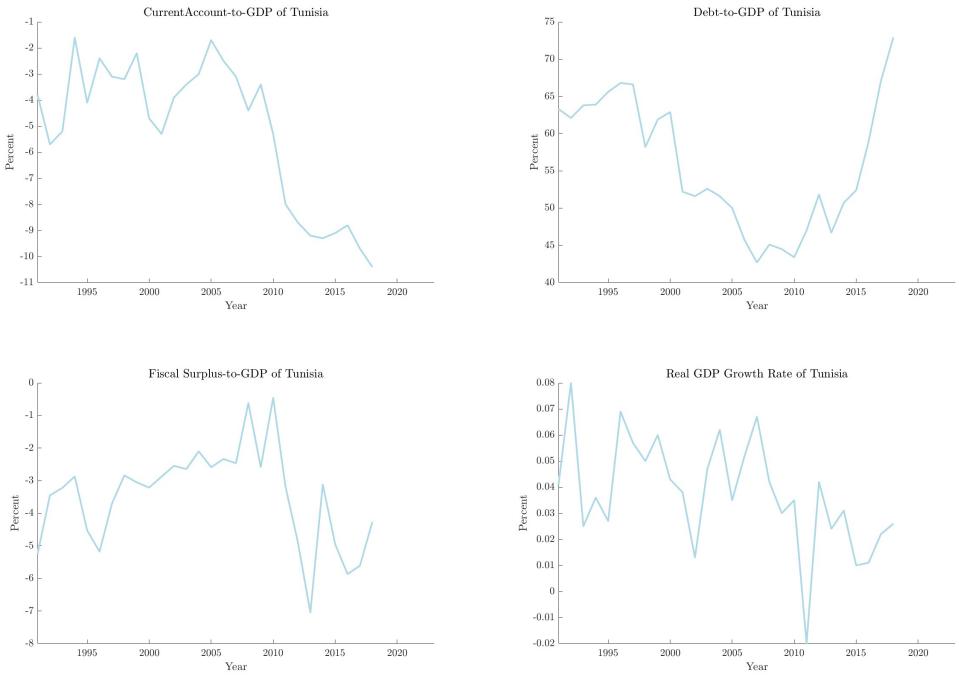

Figure 3.9: Tunisia

Current Account-to-GDP of Tunisia: The current account-to-GDP graph points toward a deficit, which remained persistent and was worsening further during the latter period of the observation. This means Tunisia is importing more compared to what they are exporting, and this makes the outflow of capital. A sustained current account deficit may be suggestive of the fact that the country is over-relying on external financing, and unless sustainable management for the same is exercised prudently, it may raise concerns for external debt.

Debt-to-GDP of Tunisia: The trend reflects an increasing debt-to-GDP ratio after 2010, raising alarms that the country's debt is snowballing at a much faster rate than its economic growth. This ratio, when growing, points at another red flag for the sustainability of debt, as this might imply that the government is likely to face problems serving the debt without really undertaking austerity or searching for the so-needed debt relief.

Fiscal Surplus-to-GDP of Tunisia: The fiscal balance is in a constant deficit, the deficit has further widened in recent years. In other words, such a persistent fiscal deficit may indicate a persistently exceeding government expenditure over revenue and may require the government to borrow more to finance the budget, which may then presage a less sustainable debt situation.

Real GDP Growth Rate of Tunisia: The rate of real GDP growth graph is characterized by a lot of ups and downs with the growth and contraction phase. In turn, the graph does show growth but reflects instability in the turnarounds. For instance, it is clear the dramatic decrease in growth rate around the Tunisian uprising in 2011.

The overall picture for Tunisia that emerges from these indicators is one of the challenges to the sustainability of the debt. Added to the rising ratio of debt to GDP and fiscal deficits, these are indications that this country could have worsening financial pressures. Add to these, the strong signals of potential tax bases that the country lacks outside oil, and sluggish growth in GDP would together suggest the possibility of grave difficulty in keeping the debt at sustainable levels without either major policy changes or large external assistance.

3.2.10 *United Arab Emirates*

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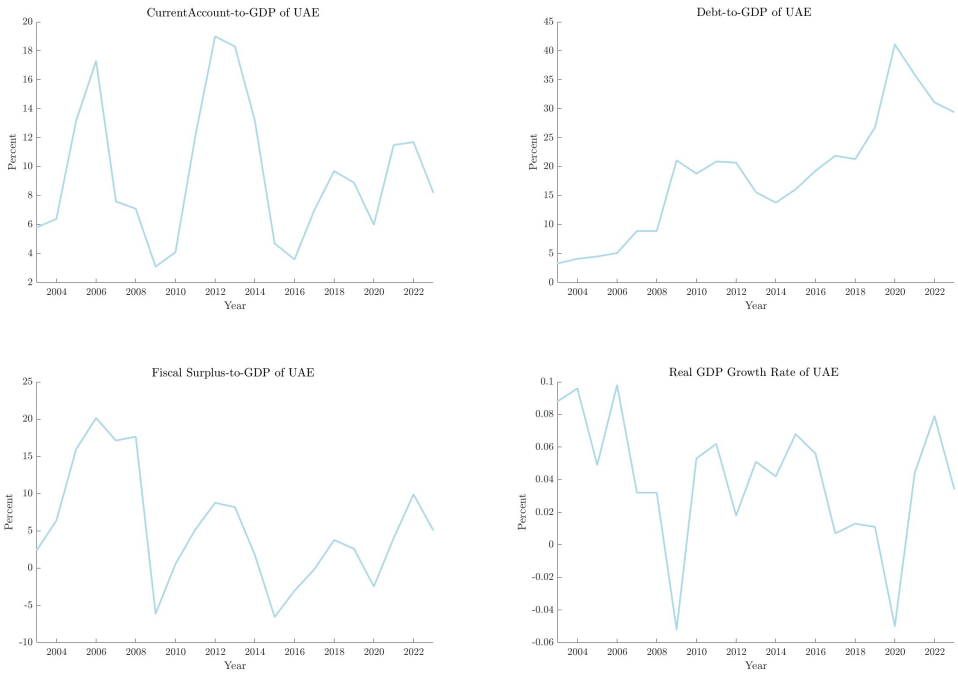


Figure 3.10: United Arab Emirates

Current Account-to-GDP of UAE: The ratio of current account-to-GDP has followed a considerable fluctuation in different dimensions over the years. Notably, there was an evident high pick around 2006, then a huge drop in 2008; it seems the reaction to the global financial crisis. The ratio recovered, but with further fluctuations, and this could only signal sensitivity to the external economic conditions, more particularly to commodity price shocks, given that the UAE is heavily dependent on oil revenues.

Debt-to-GDP of UAE: The trend on the debt-to-GDP graph is increasing, much more sharply in the period after 2014. This may bring alarming signals, which show that debt is accumulating at a pace quicker than the economic growth of the country. However, the current levels here have not breached the 40% mark, relatively moderate when compared to global standards. This recent downturn in the graph

may suggest efforts towards consolidation of the debt or an increase where GDP growth has outpaced growth in the debt.

Fiscal Surplus-to-GDP of UAE: Fiscal surplus-to-GDP varies on this graph from a surplus to a deficit over the period that is observed. In years of peaks like just before 2008, this means that government revenues were more than its expenditures, thereby giving good signals towards debt sustainability, as that would indicate that the government has extra resources for servicing debt. The dives into deficit, especially the one around 2009 due to the 2008 financial crisis and more recently, insinuate times when expenditures were exceeding revenue, something that should become a worrying trend.

Real GDP Growth Rate of UAE: The real GDP growth rate has also experienced volatility. The peaks observed during the early 2000s and about 2013 could be associated with peaking periods of global economic booms or rising tendencies of oil prices. In contrast, significant downturns were those close to 2009 and 2020, literally matching the global financial crisis and the COVID-19 pandemic, respectively. Positive growth rates are very key to the sustainability of the debt since they imply an expanding economy—capable of generating revenues enough to service the debt. In short, the economic indicators of the UAE tell the story of the country's resilience against a series of challenges. The country's fluctuations in the Current account-to-GDP and real GDP growth rate emphasize the country's exposure to global economic cycles and volatility in oil prices. The rising ratio of Debt to GDP flags carefulness for the management of debt. In the meantime, the rising ratio of Debt to GDP flags carefulness on the management of debt. However, it can be said that the overall moderate level of debt in comparison to the GDP and a period of fiscal surplus present a prudence situation in the fiscal policy.

Chapter 4

Methodology

4.1 Methodology

I hypothesize a fiscal reaction function where the government's fiscal policy responds to the debt-GDP ratio and in which oscillations in economic activity, the riskiness of debt and current account balance affect the debt trajectory:

$$s_t = \delta_0 + \rho_t d_{t-1} + \delta_1 y_t^c + \delta_2 r_{t-1} + \delta_3 ca_{t-1} + \epsilon_t^s \tag{4.1}$$

where s_t is the fiscal surplus-to-GDP ratio, d_{t-1} is the lagged debt-to-GDP ratio, y_t^c is the cyclical component of real GDP, r_{t-1} is a lagged measure of risk perception associated with debt insolvency, ca_{t-1} is a lagged measure of the current account balance-to-GDP and ϵ_t^s is a white noise innovation term.

The responsiveness of the government's fiscal policy to an increasing debt-GDP ratio is hypothesized to depend on the the long-term changes in growth of potential output:

$$\rho_t = \rho_{t-1} + \alpha g_{t-1}^y + \epsilon_t^\rho \tag{4.2}$$

where ρ_t measures the responsiveness of fiscal policy to debt, g_{t-1}^y is the lagged growth rate of potential output and ε_t^ρ is a white noise innovation term.

In order to estimate the growth rate of potential output, g_t^y, I adopt a standard unobserved components trend-cycle decomposition given by:

$$y_t = y_t^\tau + y_t^c \tag{4.3}$$

$$y_t^\tau = y_{t-1}^\tau + g_{t-1}^y + \epsilon_t^\tau \tag{4.4}$$

$$y_t^c = \gamma y_{t-1}^c + \epsilon_t^c \tag{4.5}$$

where y_t is the logarithm of real GDP which is decomposed into a trend component y_t^τ and a cyclical component y_t^c. The trend component y_t^τ is specified as a random walk with a drift where the drift in the growth rate of potential output g_t^y. The cyclical component y_t^c is modelled as a zero-mean stationary AR(1) process. I assume that the innovations ϵ_t^τ and ϵ_t^c are white noise innovation terms. Finally, I define the process for the growth rate of potential output as:

$$g_t^y = g_{t-1}^y + \epsilon_t^g \tag{4.6}$$

The model can be written in state space form. Let $\boldsymbol{y}_t = [s_t, y_t]'$ be the vector of observables, $\boldsymbol{z}_t = [r_t, ca_t]'$ be a vector of control variables and $\boldsymbol{x}_t = [\rho_t, y_t^\tau, y_t^c, g_t^y]'$ be the vector of state variables. The measurement equation relates the observed data to the unobservable state variable and controls:

$$\boldsymbol{y}_t = \begin{bmatrix} \delta_0 \\ 0 \end{bmatrix} + \begin{bmatrix} \delta_2 & \delta_3 \\ 0 & 0 \end{bmatrix} \boldsymbol{z}_{t-1} + \begin{bmatrix} d_{t-1} & 0 & \delta_1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix} \boldsymbol{x}_t + \begin{bmatrix} \epsilon_t^s \\ 0 \end{bmatrix} \tag{4.7}$$

The transition equation describing the evolution of unobservable state variables is written as:

$$\boldsymbol{x}_t = \begin{bmatrix} 1 & 0 & 0 & \alpha \\ 0 & 1 & 0 & 1 \\ 0 & 0 & \gamma & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \boldsymbol{x}_{t-1} + \begin{bmatrix} \epsilon_t^{\rho} \\ \epsilon_t^{\tau} \\ \epsilon_t^{c} \\ \epsilon_t^{g} \end{bmatrix} \tag{4.8}$$

Finally, as standard in the literature, I assume that the innovations are independently normal:

$$\begin{pmatrix} \epsilon_t^s \\ \epsilon_t^{\rho} \\ \epsilon_t^{\tau} \\ \epsilon_t^{c} \\ \epsilon_t^{g} \end{pmatrix} = \mathcal{N}\left(\mathbf{0}, \begin{bmatrix} \sigma_s^2 & 0 & 0 & 0 & 0 \\ 0 & \sigma_{\rho}^2 & 0 & 0 & 0 \\ 0 & 0 & \sigma_{\tau}^2 & 0 & 0 \\ 0 & 0 & 0 & \sigma_c^2 & 0 \\ 0 & 0 & 0 & 0 & \sigma_g^2 \end{bmatrix}\right)$$

To estimate the state-space model, Bayesian estimation techniques are employed which place informative priors on the estimated parameters (ϑ). In this framework, a prior distribution on the parameters, $p(\vartheta, \mathbf{T})$, is updated by sample information contained in the likelihood function $\mathcal{L}(Y|\vartheta, \mathbf{T})$ to form a posterior distribution

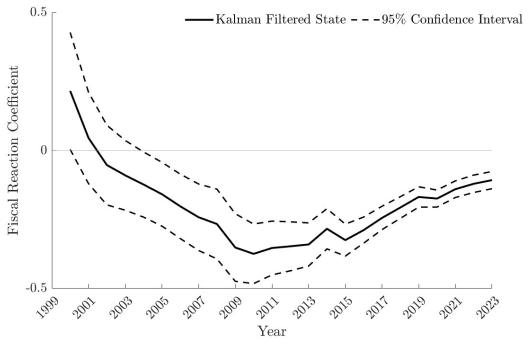
$$p(\vartheta, \mathbf{T}|Y) = \mathcal{L}(Y|\vartheta, \mathbf{T})p(\vartheta, \mathbf{T}) \tag{4.9}$$

Since the mapping from the state-space model to its likelihood function $\mathcal{L}(Y|\vartheta, \mathbf{T})$ is nonlinear in the parameters, the construction of the posterior distribution is too complicated to evaluate analytically. Therefore, the Metropolis Hastings algorithm is used to simulate from the joint posterior distribution of the structural parameters.

Chapter 5

Results and Discussion

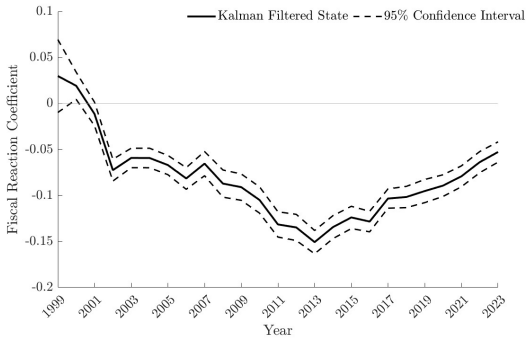
5.1 Bahrain



Fiscal Reaction Coefficient for Bahrain: Kalman filtered state is an accurate estimation of how the government responds to changes in its debt levels. When applied to Bahrain, and through examining the fiscal reaction coefficients graph throughout the studied period, it is revealed that the government was focusing on increasing its surplus to decline the debt levels in a couple of initial years up to 2001 when the debt started becoming unsustainable. Ten years after the decline of surpluses in the face of higher debt rates, the government shifted to fiscal consolidation measures to increase its surpluses as the coefficient turned positive. Overall, over the years it can be observed that the government has paid more attention to its fiscal policies

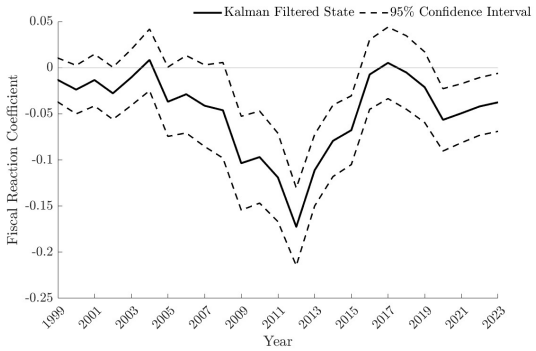
to manage its high debt levels, and this is evident by the narrowed 95% confidence interval.

5.2 Egypt



In Egypt's case, the debt trajectory seems to be unsustainable throughout the whole period. This can be seen through the negative coefficient over all the years indicating that the Egyptian government has not focused on adjusting its fiscal policies to create enough surpluses that offset the increase in the debt levels. The 95% confidence interval has narrowed down through the years which reveals the necessity of more rigid fiscal policies in Egypt to address the issue of debt sustainability.

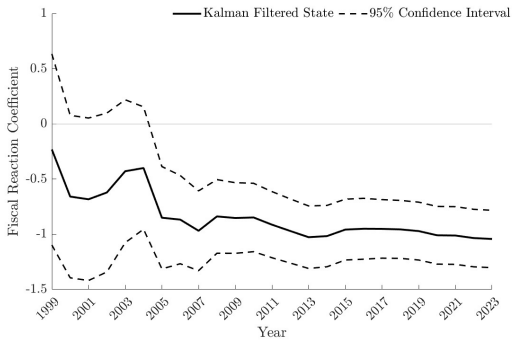
5.3 Jordan



Overall, the results of Jordan are similar to that of Egypt given that throughout all periods the value of the coefficient remained negative. A slight difference could

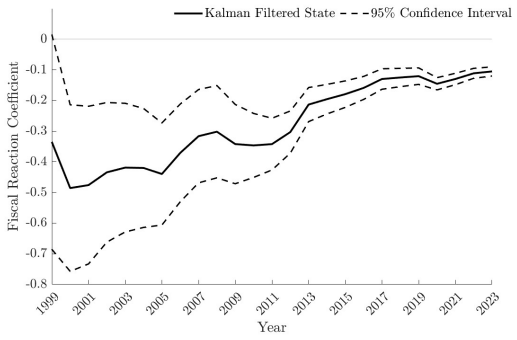
be in 2011 when the Jordanian government seemed to have shifted its fiscal policies towards actively curbing its surging debt levels as the coefficient had returned to near zero levels in 2017. The 95% confidence interval seems to have widened over the years indicating inconsistency and uncertainty in the Jordanian government's efforts to manage the debt levels. This could be attributed to economic or political instability leading to inefficient results of the fiscal policies.

5.4 Kuwait



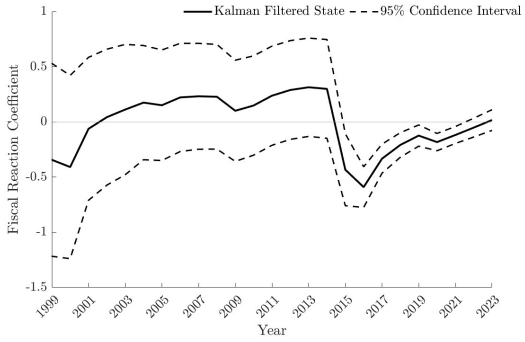
By examining the coefficient of Kuwait, it is clear that although there might have been some positive proactive efforts from the government to manage debt, yet, most of the efforts were unsuccessful as the coefficient remained negative throughout the largest segment of the years studied. However, the coefficient estimate results might not be as accurate given that the 95% confidence interval is shown to be wide.

5.5 Morocco



Observing the fiscal reaction of Morocco, the government was never able to efficiently use the fiscal policies to completely control the issue of debt levels. Although in some years the coefficient reached close to zero levels reflecting the strength of fiscal policies and surpluses, it never turned positive. The inconsistency and weak policies implemented by Morocco's government are evident by observing the varying width of the 95% confidence interval.

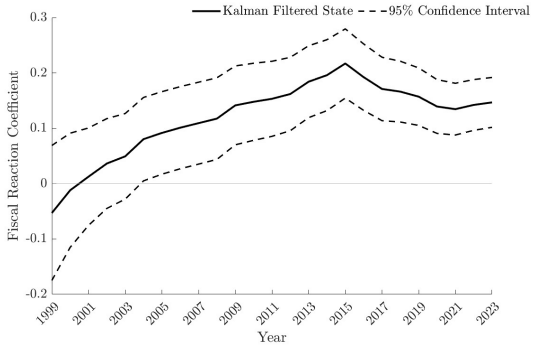
5.6 Oman



The government of Oman appears to have been successful in managing the public debt to GDP through its proactive measures up until 2005. The peak of efficiency of the government's policies, potentially through stimulating economic activities, was witnessed in the years 2008-2009 when the coefficient reached its highest value.

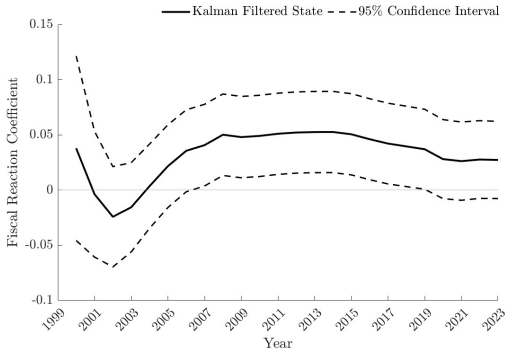
However, following the peak was the decline reaching a negative value up to 2015 signifying poor measure of debt management. The government's robust efforts were successful, although not as much as before 2011, and the coefficient showed positive values again.

5.7 Qatar



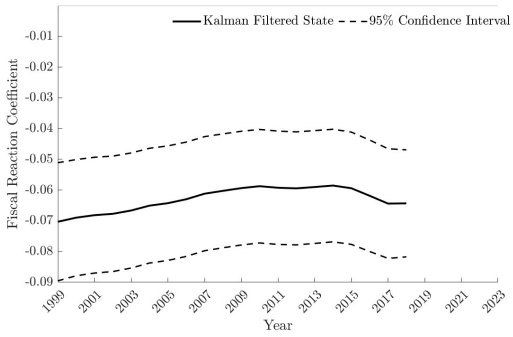
The government of Qatar appears to be making a consistent and successful effort in its sustainability of public debt. The results show that Qatar's fiscal policies have always been counter-cyclical to debt. In other words, as the debt increases, the government makes sure to increase its fiscal surplus through expanding government spending, reducing taxes, or both.

5.8 Saudi Arabia

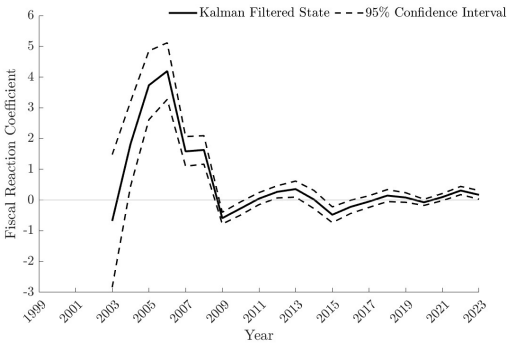


The results of the fiscal reaction coefficient reveal that Saudi Arabia did not implement any proactive and effective fiscal policies jeopardizing long-term fiscal sustainability. This reality shifted in 2003, the year that marked a transformation of Saudi Arabia's policies toward sustainable debt management. This is revealed by having a negative coefficient value from 1990 up to 2003 onwards. Also, the narrowing of the 95% confidence interval over the years suggests that Saudi Arabia is more invested nowadays in applying aggressive policies to enhance its fiscal discipline and institutional reforms to ensure consistent management of its public debt.

5.9 Tunisia



Similar to Morocco, Tunisia's government seems to have failed to adjust its fiscal surpluses and robustly address the issue of its public debt. This can be inferred by observing the coefficient remaining below zero values throughout the period being studied. This inability of the Tunisian government to successfully manage its public debt poses severe challenges to the country's sustainable path. The confidence interval seems to be fluctuating and is rather inconsistent suggesting variability and uncertainty in the efforts of the governments on this issue.



5.10 United Arab Emirates

The United Arab Emirates consistently worked on having an active fiscal policy and increasing its fiscal surplus to respond to the increase in its debt. Yet, this effort showed itself to be counterproductive starting in the early 2000s when the coefficient dropped to below zero values indicating a decrease in the government's surpluses in the face of its increasing debt. The movement of the confidence interval throughout the years reflects the effectiveness of the adjustments being made by the government. This means that, in the initial couple of years, when the coefficient was positive and the government was successful in debt management the confidence interval was narrowed down; however, as the government efforts began to be uncertain, the interval got wider.

Chapter 6

Conclusion and Policy Recommendations

This thesis investigated the path of debt sustainability within the economies of the MENA region across various periods. It also explored the economic factors that define the threshold for public debt sustainability. A hypothesis was proposed regarding a fiscal reaction function, wherein the fiscal policy of the government reacts to changes in the debt-GDP ratio. This function considers how fluctuations in economic activity, the risk associated with debt, and the current account balance influence the trajectory of debt annual data sourced from the International Monetary Fund (IMF) for Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and UAE in the MENA region.

The fiscal reaction coefficient and Kalman filter estimation have revealed various results for the ten countries studied in the Middle East and North Africa region and have conveyed some of the obstacles imposed on these countries for this field. Nevertheless, one typical direction for most of the studied countries is to reassess their fiscal policies and take more seriously the strategies needed on how to sustain debt. Negative fiscal coefficients were presented for some countries like Egypt and Morocco indicating weakness in the fiscal framework the governments follow. It

is important to mention that such negative coefficients arose in times of political instability where fiscal policies were not certain or predictable. For instance, it is clear that around 2011, the time of the Arab Spring, several countries particularly Egypt and Jordan witnessed a further dip in their negative fiscal reaction coefficients. In addition, even though positive fiscal reaction coefficients were seen for countries like Bahrain, and UAE, they still exhibit negative coefficients signifying poor fiscal decisions in times of uncertainty or crises. On the other hand, Qatar and Oman, do convey a persistent path in holding on to positive fiscal coefficients mirroring debt sustainability.

6.1 Policy Recommendations

1. Fiscal Discipline: Countries suffering from negative fiscal reaction coefficients should stop funding unfruitful investments and shift to promising projects that yield profits. Governments should also figure out ways to increase revenues by imposing a more vigorous tax system, for example.

2. Economic Diversification: Countries like Bahrain and Saudi Arabia must diversify their economy especially if heavily dependent on one major sector or resource. This is crucial in case of crises and shocks like in 2014 when the oil sector faced a dramatic decline in prices when countries showed a clear drop in revenues as well.

3. Strengthen Fiscal Frameworks: To make debt sustainable from an unsustainable path, structural reforms are a must. This can only occur when corruption is overcome, and transparency prevails. Investors trust the government when a clear path is declared, and rights are protected.

4. Tailored Fiscal Responses: Given the differences in the economic condition and fiscal capacity across the MENA region, policy recommendations have to be

tailored to the context of each country. This can be supported by sharing good practices and assistance in implementing effective debt management strategies under possible regional initiatives and cooperative efforts.

The diversified trajectory of fiscal response coefficients across the MENA region indeed underscores how complex the task is of trying to achieve debt sustainability amidst economic and political challenges. Progress in fiscal policy for some countries is shown, but some continue to struggle with how to align their fiscal response to meet sustainability goals. The policy measures recommended for implementation, combined with firm monitoring and adoption of the fiscal strategies, should help steer towards a more sustainable future in the fiscal aspects of the region.

Bibliography

Abbas, S. A., Pienkowski, A., & Rogoff, K. (2019). *Sovereign debt: A guide for economists and practitioners*. Oxford University Press.

Alberola, E., Cheng, G., Consiglio, A., & Zenios, S. A. (2023). Unconventional monetary policy and debt sustainability in japan. *Journal of the Japanese and International Economies*, *69*, 101274.

Becker, S., Deuber, G., & Stankiewicz, S. (2010). Public debt in 2020: A sustainability analysis for dm and em economies. *Deutsche Bank Research. Current Issues*.

Bi, H., Shen, W., & Yang, S.-C. S. (2016). Fiscal limits in developing countries: A dsge approach. *Journal of Macroeconomics*, *49*, 119–130.

Bohn, H. (1998). The behavior of us public debt and deficits. *the Quarterly Journal of economics*, *113*(3), 949–963.

Bohn, H. (2008). The sustainability of fiscal policy in the united states. *Sustainability of public debt*, 15–49.

Burger, P., Stuart, I., Jooste, C., & Cuevas, A. (2011). *Fiscal sustainability and the fiscal reaction function for south africa* (tech. rep.). International Monetary Fund.

Campos, E. L., & Cysne, R. P. (2019). A time-varying fiscal reaction function for brazil. *Estudos Econômicos (São Paulo)*, *49*, 5–38.

Cottarelli, C. (2011). Revenue mobilization in developing countries. *International Monetary Fund*, *8*(2011), 8–10.

ESCWA. (2021). Liquidity shortage and debt obstacles to recovery in the arab region.

Ghosh, A. R., Kim, J. I., Mendoza, E. G., Ostry, J. D., & Qureshi, M. S. (2013). Fiscal fatigue, fiscal space and debt sustainability in advanced economies. *The Economic Journal*, *123*(566), F4–F30.

Khalladi, H. (2019). Fiscal fatigue, public debt limits and fiscal space in some mena countries. *Economics Bulletin*, *39*(2), 1005–1017.

Law, S. H., Ng, C. H., Kutan, A. M., & Law, Z. K. (2021). Public debt and economic growth in developing countries: Nonlinearity and threshold analysis. *Economic Modelling*, *98*, 26–40.

Mendoza, E. G., & Ostry, J. D. (2008). International evidence on fiscal solvency: Is fiscal policy "responsible"? *Journal of Monetary Economics*, *55*(6), 1081–1093.

Neaime, S. (2010). Sustainability of mena public debt and the macroeconomic implications of the recent global financial crisis. *Middle East Development Journal*, *2*(02), 177–201.

Neaime, S. (2015). Twin deficits and the sustainability of public debt and exchange rate policies in lebanon. *Research in International Business and Finance*, *33*, 127–143.

Olaoye, O. O., & Olomola, P. A. (2022). Empirical analysis of asymmetry phenomenon in the public debt structure of sub-saharan africa's five biggest economies: A markov-switching model. *The Journal of Economic Asymmetries*, *25*, e00242.

Ostry, J. D., Ghosh, A. R., Kim, J. I., & Qureshi, M. S. (2010). Fiscal space1. *IMF Staff Position Notes*, *2010*(011).

Sarangi, N. (2020). Fiscal policy response to public debt and debt sustainability in arab states.

Sarangi, N., & El-Ahmadieh, L. (2017). Fiscal policy response to public debt in the arab region. *Economic and Social Commission for Western Asia (ESCWA)*.

Tarek, B. A., & Ahmed, Z. (2017). Governance and public debt accumulation: Quantitative analysis in mena countries. *Economic analysis and policy*, *56*, 1–13.

Waheed, A. (2016). Sustainability of public debt: Empirical analysis for bahrain. *Journal of Internet Banking and Commerce*, *21*(2), 1.