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FISCAL SUSTAINABILITY IN SELECTED ARAB COUNTRIES

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ABSTRACT

This paper examines the critical issue of fiscal sustainability, a topic that has gained considerable attention in recent years, with particular relevance for Arab countries. The study evaluates the fiscal sustainability of selected Arab nations by applying an extended version of Bohn's fiscal reaction function (1998–2011), incorporating additional economic variables. Using panel data covering the period 1999–2019 from UNCTAD, the IMF, the World Bank, and the Arab Monetary Fund, the analysis encompasses Jordan, Lebanon, Oman, Syria, Somalia, Comoros, Yemen, Egypt, Djibouti, Morocco, Mauritania, Tunisia, Algeria, and Sudan—all identified as indebted economies. The findings reveal that Arab countries rely on both internal and external borrowing, with a growing dependence on external sources in recent years. Total debt has risen sharply, with Egypt, Morocco, Lebanon, Tunisia, Jordan, and Sudan emerging as the most heavily indebted, and Egypt alone accounting for nearly half of the region's total debt. The empirical results show that openness and terms of trade exert insignificant effects on debt levels, whereas per capita income and government expenditure contribute positively to debt accumulation. In contrast, GDP growth and government revenues help reduce debt burdens. Overall, the study highlights shifting debt dynamics in Arab countries and underscores the increasing reliance on external financing. These insights offer valuable guidance for policymakers seeking to strengthen fiscal sustainability, particularly in economies facing persistent debt pressures.

KEYWORDS: Arab Countries, Budget Deficit, Financial Policy, Gross Domestic Product, Maximum Debt, Negative Debt Policy, Positive Debt Policy, Sustainable Finance.

1. INTRODUCTION

Recent economic and social developments have significantly impacted the financial situations of oil-exporting and oil-importing Arab countries, leading to increased public budget deficits and rising public debt levels in many nations. Consequently, some Arab countries have adopted fiscal reform programs aimed at restoring public finances to sustainable levels. These programs focus on diversifying revenue sources and controlling spending. Considering these developments, decision-makers in Arab countries are increasingly focusing on financial sustainability. They aim to evaluate budget deficits and public debt to achieve economic growth suitable for both economic and social development.

Fiscal sustainability refers to the government's ability to manage its finances in order to avoid excessive debt accumulation and ensure the long-term stability of public finances (Baharumshah et al., 2017). It is a vital concern for governments worldwide, and it has become particularly pertinent in Arab countries where economic challenges and geopolitical factors have intensified the need for sustainable financial policies.

A sustainable fiscal policy can be defined as a state where the government budget can be smoothly financed without generating an explosive increase in public debt in the long run (Adams et al., 2010, Khasawneh, 2017 and Akram and Rath, 2019). A sustainable fiscal policy refers to avoiding excessive growth in government liabilities while maintaining the capacity to provide essential public services and respond to economic challenges. policy is sustainable if the present value of future primary surpluses equals the current level of debt. This definition allows for the construction of various sustainability indicators, providing sufficient warning against excessive debt accumulation (Baharumshah et al., 2017). Although the concept appears straightforward, its practical interpretation is often ambiguous. As a result, countries assess fiscal sustainability using different indicators and methodological approaches. Despite the increasing relevance of fiscal sustainability in Arab countries, the existing research remains limited, leaving a notable gap in the understanding of the region's fiscal dynamics. Few studies have examined the specific determinants of fiscal sustainability within Arab economies, highlighting the need for a more comprehensive and context-sensitive analysis (Navarro Galera et al., 2016). This paper addresses this gap by evaluating the fiscal sustainability of selected Arab countries and examining the macroeconomic factors influencing their debt levels.

The conceptual foundation for fiscal sustainability is derived from the government's intertemporal budget constraint (IBC), which establishes the conditions under which government borrowing remains consistent with long-term solvency (Bohn, 2007). Under the IBC, a government's borrowing capacity is constrained such that the present value of future primary surpluses must equal or exceed the current stock of debt, ensuring that debt does not grow without bound (IMF, 2002). A fiscally sustainable trajectory therefore requires that the expected present discounted value of future debt converges to zero, preventing explosive debt accumulation and maintaining fiscal stability (Baharumshah et al., 2017).

The International Monetary Fund (IMF) defines fiscal sustainability as a condition in which a government's liability position satisfies the present-value budget constraint without necessitating substantial adjustments in income or expenditure balances, given prevailing market financing costs. According to the IMF's methodology, financial sustainability requires stabilizing the public debt-to-GDP ratio at an economically viable level or establishing a target threshold for the ratio that can be maintained over time (Bohn, 2007).

Similarly, the European Commission (EC) conceptualizes fiscal sustainability as the government's ability to bear the future burden of its debt without incurring excessive fiscal strain [9]. Fiscal policy is therefore considered unsustainable when it results in a persistent accumulation of government debt and rising debt-service obligations that increasingly constrain fiscal space and limit long-term economic stability.

This paper deals with an essential concern of fiscal policy, specifically fiscal sustainability, focusing on selected Arab countries. The main objective of this study is to assess and evaluate the fiscal sustainability of the select Arab countries. The main research question of this study is "Is the debt of the selected Arab countries sustainable, and what factors influence their debt?" The primary objective of this study is to evaluate fiscal sustainability in selected Arab countries using the fiscal reaction function framework developed by Bohn (2007). This approach provides a widely used empirical method for assessing whether governments adjust their fiscal balances in response to changes in public debt. This approach provides a powerful and straightforward method to manage empirical tests to satisfy fiscal richness.

The remainder of this paper is organized as

follows. The next section presents a comprehensive literature review, summarizing previous studies and key contributions on fiscal sustainability in Arab countries and situating the current research within the broader scholarly discourse. This is followed by the research methodology section, which outlines the analytical framework used to assess fiscal sustainability in the selected Arab countries. It details the data sources, variables, and statistical techniques applied to estimate the fiscal reaction function and examine its relationship with relevant economic indicators.

Subsequently, the results and discussion section provides an interpretation of the empirical findings, offering insights into the fiscal stability of the selected countries and identifying the primary factors influencing their debt dynamics. The paper concludes with a summary of key findings and implications for fiscal policy in indebted Arab economies.

2. RELATED LITERATURE

Existing literature emphasizes that achieving strong fiscal sustainability requires governments—both central and regional—to enhance revenue generation, reduce debt burdens, and maintain disciplined expenditure frameworks. Fiscal sustainability has become increasingly important as many countries face substantial internal and external debt pressures. While numerous studies have examined financial sustainability across different regions of the world, relatively limited research has focused specifically on Arab countries, highlighting the need for further investigation into the unique fiscal dynamics of the region.

2.1. Fiscal Sustainability – Concept and Measure

An empirical study by (Bui, 2020) on Spanish municipalities aimed to measure the relationship between financial sustainability and three dimensions (revenue, debt, and services). These three dimensions are proposed by the International Federation of Accountants (IFAC). These authors found that the income statement provides relevant information to measure financial sustainability and helps highlight sustainability problems. The data of the Unified Arab Economic Report for the year 2018 shows that the ratio of public debt to GDP in 2018 varied between 50% and 181% of GDP in some Arab countries. This necessitates developing a framework for assessing financial sustainability in these countries. The (El Mahmah and Kandil, 2019) study results indicate that the lagged debt stock coefficient was significant and positive, suggesting that GCC countries are increasing the pace of reforms and the fiscal primary balance to ensure a sustainable fiscal policy.

Camarero et al., (2015) studied fiscal sustainability in Pakistan, while (Bui, 2020) measured fiscal sustainability in Japan by incorporating the variables of output gap and government expenditure. Krejdl, (2006) evaluated the fiscal reaction function of South Africa and Brazil in their study with the extended model of lag of primary balance and output gap. Mahmah and Kandil, (2019) incorporated two variables in their study: domestic interest rate and foreign interest rate (Navarro-Galera et al., 2016) used the fiscal policy equation to measure the impact of government spending on oil price shocks, especially in oil-producing countries.

2.2. Factors Affecting Fiscal Sustainability

Existing literature shows that multiple economic performance measures, -including openness, oil prices, and economic growth-are significant determinants of fiscal performance (Mahmah and Kandil, 2019). A high degree of openness and low oil prices permit additional efforts for the reformation of the budget, safeguarding priority spending for the mobilization of non-energy growth, increasing the primary balance, and ensuring debt sustainability in Gulf Corporation Council (GCC) countries.

Krejdl (2006) introduces several sustainability indicators to assess the sustainability of Czech fiscal policy. The results show that the sustainable revenue ratio, enabling the future flow in age-related spending to be financed, is estimated at 48% of GDP, which is higher than the current revenue-to-GDP ratio by (7%) (Baharumshah et al., 2017) assessed the sustainability of fiscal policy in Malaysia during 1980–2014 using the Markov-switching model. The results show that policymakers followed a sustainable fiscal policy, except during short-term periods of economic difficulty. Empirically, to ensure sustainability in the long run, the government should decrease the deficits only if they exceed (55%) of the GDP and the deficit is negatively correlated with economic activity.

In addition, some studies identify a unidirectional causal relation between debt and growth. For example (Bui, 2020) investigates fiscal sustainability for a panel of developing Asian economies, showing that the fiscal sustainability in the region is not threatened as in earlier studies (Akram and Rath, 2019) examine the fiscal sustainability by the division of the fiscal deficit into low and high regimes by utilizing the quarterly data for the period 1997-2013.

It was concluded that there is sufficient evidence in favor of fiscal sustainability during the low fiscal deficit periods.

Akram and Rath (2019) measured and assessed the actual level of Jordanian public debt and its sustainability. They found that the discount rate of the public debt decreased from 102% to 99% from 2000 to 2011. However, internal debt increased from 10% in 2000 to 28% in 2011. This leads to the conclusion that external and internal debt has sustainability and has an insignificant liability on the economy (Bui, 2020) evaluated the fiscal sustainability of Saudi Arabia from 1969 to 2015 using the intertemporal budget constraint. The results indicate that government revenue is growing faster than government expenditure. In addition, there is a bidirectional relationship between government expenditures and revenues. This means that the kingdom could make simultaneous decisions on government expenditures and revenues to achieve fiscal sustainability in the future. Saudi Arabia should make decisions based on marginal costs and marginal revenues in order to achieve the appropriate level of expenditures and revenues.

2.3. Indicators Of Public Debt

As highlighted in the literature, numerous indicators are used to assess public debt, several of which are summarized in Table (1). Among these, the public debt-to-GDP ratio is considered one of the most important metrics for evaluating a country's debt burden relative to its economic activity and its capacity to meet repayment obligations. However, acceptable levels of this ratio vary across countries, depending on their economic structures and policy frameworks.

For example, the Maastricht Treaty stipulates that the public debt of European Union member states should not exceed 60% of GDP. In contrast, fiscal regulations in several Arab countries impose even stricter limits, often setting the maximum allowable debt threshold at approximately 40% of GDP (Adedeji and Williams, 2007).

Table 1: The Most Important Indicators of Public Debt.

Public Debt Indicator	Definition of the Indicator
Debt balance / GDP	It measures the level of debt concerning the state's economic activity and is considered one of the most important indicators used to measure the level of indebtedness.
Debt balance / Domestic Revenue	Measures the level of indebtedness relative to the government's ability to repay, showing several years needed to pay off the total debt balance.
Debt Service / Domestic Revenue	Measures the government's ability to pay debt service (interest paid and installments) by local sources, indicating the burden of benefits on the country's expenditures.
Interest / GDP	Measures the cost of benefits in terms of revenue collection in the country.
Interest / Domestic Revenue	Measures the ability to save foreign currency and repay debt, often used concurrently with the debt service index as a percentage of exports, comparing expenditures with foreign exchange resource collection.
External debt / Volume of exports	Indicates the number of times the external liabilities increase concerning the currency balance.
Net International Reserve / External Debt	Measures the ability to save foreign currency and repay debt, often used concurrently with the debt service index as a percentage of exports, comparing expenditures with foreign exchange resource collection.

Source: Calculated From the IMF Database.

The existing body of literature demonstrates that fiscal sustainability is a multidimensional concept shaped by a range of macroeconomic, institutional, and structural factors. Across various contexts, researchers consistently highlight the critical role of revenue mobilization, prudent expenditure management, and balanced debt strategies in maintaining long-term fiscal stability. Studies from different regions—including Asia, Europe, and emerging markets—emphasize the importance of aligning fiscal policies with sustainable debt trajectories, responding appropriately to economic cycles, and ensuring that public debt remains within manageable limits relative to GDP. At the same time, the evidence shows that countries differ considerably in their fiscal capacities and thresholds for sustainable debt levels, reflecting variations in institutional strength, revenue structures, and macroeconomic vulnerabilities.

However, despite the extensive global literature, research focusing specifically on fiscal sustainability in Arab countries remains comparatively limited. Existing studies tend to address isolated dimensions of fiscal policy or concentrate on oil-exporting economies, leaving significant gaps in understanding the broader regional dynamics. The few studies that do focus on Arab countries point to persistent structural constraints, including high dependence on external borrowing, limited revenue diversification, vulnerability to commodity price fluctuations, and procyclical fiscal behavior. Furthermore, the literature highlights that indicators such as the public

debt-to-GDP ratio, debt service obligations, openness, and terms of trade exert varying degrees of influence on fiscal performance, but their effects are neither uniformly measured nor conclusively understood in the Arab context.

Several gaps thus emerge from the reviewed literature. First, there is a lack of comprehensive, comparative studies examining fiscal sustainability across a wide set of indebted Arab countries. Second, previous research rarely incorporates extended fiscal reaction function models that capture both traditional determinants and broader macroeconomic variables. Third, existing findings on the roles of openness, terms of trade, government revenues, and economic growth are mixed, suggesting the need for updated empirical evidence grounded in recent economic developments.

Considering these gaps, the current study contributes to the literature by offering a systematic assessment of fiscal sustainability across selected Arab countries using a panel-based fiscal reaction function augmented with additional economic variables. By drawing on data from 1999 to 2019 and considering both internal and external debt dynamics, the study provides updated insights into the evolving fiscal landscape of the region. Ultimately, the literature underscores the urgency of improving fiscal governance, strengthening revenue systems, and enhancing economic resilience—objectives that are central to the empirical analysis undertaken in this research.

3. METHODOLOGY

3.1. Model Development

This section delves into the model used for assessing fiscal sustainability in the selected Arab countries and explain the variables incorporated into the model.

The primary objective of this study is to evaluate the fiscal sustainability of the chosen Arab countries. We employ a fiscal reaction function as the core analytical tool to achieve this. This model, originally developed and expanded by Bohn (2007), offers a suitable framework for assessing fiscal solvency. It allows us to explore the relationship between fiscal variables and debt dynamics, shedding light on whether these countries maintain sustainable fiscal policies.

The fiscal reaction function used in this study is represented by Equation (1):

$$\boldsymbol{PBt} = a_0 + a_1\boldsymbol{Dt{-}1} + a_2\boldsymbol{GSt} + a_3\boldsymbol{Xt} + st \quad \text{----------(1)}$$

Where:

$\boldsymbol{PBt}$ represents the main balance, which is the budget balance of the government, that excludes the interest payments on debt. It is a crucial indicator of a country's fiscal health, reflecting whether the government runs a surplus or deficit.

a_0, a_1, a_2, a_3 are coefficients that represent the intercept and the coefficients for lagged debt, government spending, and business indicators, respectively. These coefficients help us understand the magnitude and direction of the impact of these variables on fiscal sustainability.

$\boldsymbol{Dt{-}1}$ is the primary balance for the previous period (t-1), providing insight into the past fiscal performance. It helps assess whether a country has been running deficits or surpluses in the recent past.

$\boldsymbol{GSt}$ represents government spending, an essential factor influencing fiscal sustainability. Government spending changes can significantly affect a country's fiscal position.

Debt balance/GDP (t-1) reflects the debt percentage of GDP in the previous year (t-1). This variable is crucial for understanding the level of indebtedness in a country and its impact on fiscal sustainability.

$\boldsymbol{Xt}$ represents of business indicators' measure, such as the output gap, GDP per capita, or the GDP growth. These variables can affect fiscal performance in various ways. For example, higher GDP growth can lead to increased government revenue, while changes in GDP per capita can influence the country's overall economic health.

Another variable of this study is 'Terms of Trade (TOT). Although much literature examined the relationship between the terms of trade (TOT) and economic growth (El Mahmah and Kandil, 2019, Baharumshah et al., 2017) only a few studies have analyzed the impact of terms of trade on fiscal performance—the improvement of terms of trade lean towards a positive effect of capital-intensive sectors and fiscal revenues. On the contrary, terms of trade might affect labor-intensive industries and lead to higher social spending (unemployment benefits) (Akram and Rath, 2019).

The choice of the fiscal reaction function is motivated by its suitability for evaluating fiscal sustainability in our research objectives' context. This model allows us to explore the dynamics of fiscal variables and their relationship to debt levels, enabling us to determine whether the selected Arab countries are maintaining sustainable fiscal policies. It provides a structured framework to analyze and interpret the data, helping us draw meaningful conclusions about the fiscal sustainability of these nations. Table 2 summarizes the fiscal reaction function model and the variables included in the empirical analysis.

Table 2: Fiscal Reaction Function Model Framework.

Component	Description
Dependent Variable	**Primary Balance (PB□) –** The government's fiscal balance excluding interest payments; indicator of fiscal effort.
Core Model	PB□ = α□ + α□ **Debt**□□□ + α□ **Government Spending**□ + α□ **X**□ + ε□
Key Independent Variable	**Debt**□□□ – Lagged debt-to-GDP ratio, indicating whether governments adjust their fiscal balance in response to rising debt.
Fiscal Variables	**Government Expenditure (GSt) –** Expected to increase debt; **Government Revenues –** Expected to reduce debt.
Macroeconomic Controls (Xt)	**GDP Growth –** Typically reduces debt; **Per Capita GDP –** May increase expenditure pressures; **Terms of Trade (TOT) –** Mixed impact; **Openness –** May affect revenue and vulnerability to external shocks.
Theoretical Foundation	**Intertemporal Budget Constraint (IBC):** Long-term sustainability requires future primary surpluses to match current debt stock.
Empirical Purpose	To determine whether Arab countries follow solvency-consistent fiscal behavior by adjusting primary balances when debt rises.

3.2. Data Collection

To achieve the objective of the study, we collected panel data for the period 1999-2019 from various sources, including the United Nations Conference on Trade and Development (UNCTAD) (UNCTAD, 2021), World Bank (WB) (World Bank, 2021), International Monetary Fund (IMF), and Arab Monetary Fund (AMF) (Arab Monetary and Fund, 2021). This specific time frame was chosen, from 1999 to 2019, for several reasons. This period allowed us to analyze two decades of data, capturing a substantial economic and fiscal history for the selected Arab countries. It also aligned with some countries' significant fiscal events and policy changes.

During this timeframe, several Arab countries implemented structural adjustment programs in the early 1990s, which profoundly impacted their fiscal policies and external borrowing patterns (Navarro-Galera et al., 2016). Additionally, the period included the global financial crisis 2008 and its aftermath, which had repercussions on fiscal sustainability worldwide (Camarero et al., 2015). These events provided a rich backdrop for assessing the fiscal dynamics and debt trends in the selected Arab countries.

However, it is essential to acknowledge potential limitations during data collection. One challenge was the availability and quality of data, as some countries may need more reporting or data consistency. Missing data points or discrepancies in reporting can affect the accuracy and comprehensiveness of the analysis. Despite these challenges, we tried to ensure data reliability and consistency to the best of our ability.

3.3. Econometric Estimation and Interpretation

The fiscal reaction function is estimated using panel data techniques for selected Arab countries over the period 1999–2019. Panel estimation allows the analysis to exploit both cross-country and time-series variation while controlling for unobserved country-specific characteristics that may influence fiscal behavior. Country effects are included to capture structural and institutional differences across economies, while time effects account for common external shocks.

The empirical specification follows the extended fiscal reaction function framework proposed by Bohn (2007), in which the primary balance responds to the lagged debt-to-GDP ratio and a set of fiscal and macroeconomic control variables. The coefficient on lagged debt is central to the assessment of fiscal sustainability: a positive and statistically significant response indicates that governments adjust fiscal policy when debt increases, consistent with solvency-oriented behavior.

Government expenditure and revenues capture the fiscal policy stance, while GDP growth, per capita income, openness, and terms of trade control for macroeconomic conditions. Lagged variables are used where appropriate to mitigate simultaneity concerns and reflect the dynamic nature of fiscal adjustment.

The estimated coefficients are interpreted as follows. A positive response of the primary balance to lagged debt provides evidence of fiscal sustainability. Higher government revenues and stronger economic growth are expected to reduce debt pressures, whereas higher government expenditure and rising per capita income may contribute to debt accumulation. Insignificant coefficients on openness and terms of trade suggest that domestic fiscal and macroeconomic factors play a more dominant role in shaping debt dynamics in the selected Arab countries.

Overall, the econometric results indicate that fiscal sustainability in the selected Arab countries

depends primarily on domestic fiscal responses, particularly the ability of governments to adjust primary balances in response to rising debt. The positive response of fiscal balances to debt accumulation provides partial evidence of sustainability, although the magnitude of the response suggests that adjustment efforts may be insufficient in countries with persistently high debt levels.

4. RESULTS AND DISCUSSION

4.1. The Situation of the Arab Countries' Debt

Analyzing the fiscal situation in the selected Arab countries reveals a complex picture of debt dynamics. This section will delve deeper into the findings and provide a more comprehensive interpretation of the implications of the debt growth rates on the fiscal sustainability of each country.

Table 3: The External and Internal Debt of Arab Countries.

Country	Internal	External	Total	Inter/	Exter.	Total	Exter%.	Inter.	Change %		
	2010	2010	2010	2019	2019	2019	2010	2010	Inter.	Exter.	Total
Egypt	166.1	35.0	201.1	277.7	110.3	388.0	17.4	28.4	167.2	315.3	192.9
Morocco	37.9	23.6	61.5	60.9	35.9	96.8	38.3	37.1	160.5	152.2	157.3
Lebanon	32.0	20.3	52.3	54.8	37.6	92.4	38.8	40.7	171.0	185.5	176.6
Sudan	0.0	0.0	0.0	14.8	51.4	66.2		77.7			
Tunisia	7.0	21.6	28.6	8.2	35.1	43.3	75.5	81.0	117.2	162.5	151.4
Jordan	11.3	6.5	17.8	24.8	17.6	42.4	36.6	41.6	220.0	271.1	238.7
Mauritania	0.8	3.3	4.2	0.8	4.5	5.3	79.8	84.4	98.6	134.8	127.5
Algeria	14.8	5.5	20.2		3.8		27.0	-	-	-	-
Syria	10.5	4.5	15.0	-	-	-	29.8	-	-	-	-
Yemen	5.9	6.1	12.1	-	-	-	50.9	-	-	-	-
Total	286.4	126.3	412.7	441.9	292.4	734.4	30.6	39.8	154.3	231.5	177.9

Source: Calculated From the IMF Database.

As shown in Table 3, Egypt stands out as the most heavily indebted Arab country, with total debt rising from approximately USD 35.0 billion (21.2% of GDP) in 2010 to about USD 110.3 billion (35.7% of GDP) in 2019. This more than threefold increase within less than a decade raises significant concerns regarding Egypt's fiscal sustainability. Elevated debt levels can place considerable pressure on the government's capacity to service its obligations, heightening vulnerability to fiscal and macroeconomic instability. Addressing these challenges will require prudent debt management strategies, strengthened domestic revenue mobilization, and reduced reliance on external borrowing.

Sudan also experienced significant debt growth, increasing from $37.8 billion in 2010 to $51.9 billion in 2019, albeit at a more modest annual growth rate of 3.5% during the same period. Despite the lower growth rate, Sudan's debt remains high, amounting to 136% of its GDP. This level of debt raises concerns about the country's ability to manage its fiscal obligations effectively. Sudan's fiscal sustainability may be compromised if measures to reduce debt dependence are not implemented, especially given the country's high debt-to-GDP ratio.

Lebanon, Tunisia, Morocco, and Jordan collectively account for a substantial portion of the total Arab debt, with debt-to-GDP ratios ranging from 60% to 90%. While their debt growth rates vary, they all experienced steady increases during the decade as shown in Figure 1.

- Lebanon's debt increased from $35.1 billion in 2010 to $37.6 billion in 2019, with an annual growth rate of about 6.0%.
- Tunisia's debt grew from $25.5 billion to $35.9 billion during the same period, with an annual growth rate of about 7.0%.
- Morocco's debt increased from $37.9 billion to $61.5 billion, with an annual growth rate of about 8.9%.
- Jordan's debt grew from $6.5 billion to $17.6 billion, representing a threefold increase, with an annual growth rate of about 11.0%.

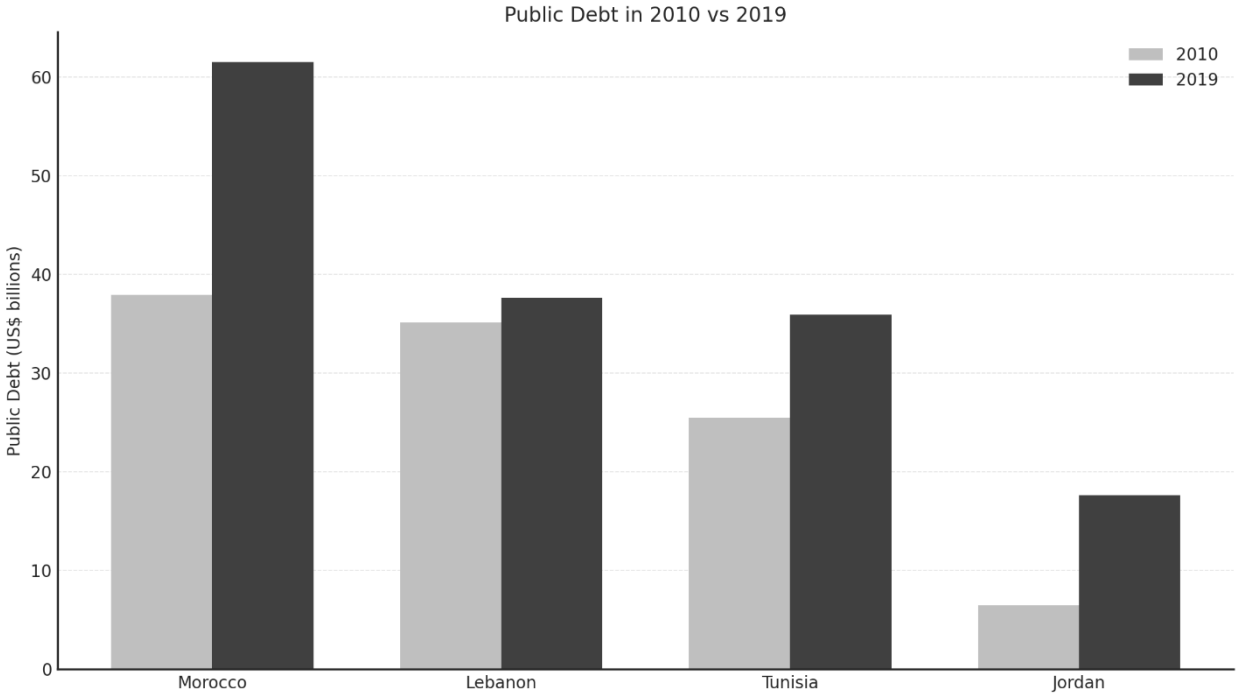

Figure 1: Grouped Bar Chart (Direct 2010 Vs. 2019 Comparison)

It is crucial for these nations to closely monitor their debt levels and implement measures to ensure fiscal sustainability. Sustainable economic growth and prudent fiscal policies will be essential to effectively manage these high debt burdens.
Djibouti, Algeria, and Comoros stand out with a decline in their debt levels during the period.

- Djibouti's debt decreased from $1.0 billion in 2010 to $0.8 billion in 2019, with an annual growth rate of about -2.4%.
- Algeria's debt decreased from $4.2 billion to $3.3 billion during the same period, with an annual growth rate of about -2.0%.
- Comoros' debt decreased from $0.4 billion to $0.3 billion, with an annual growth rate of about -2.2%.

While this is a positive development, it is essential to consider the specific factors contributing to this decrease. It may result from reduced borrowing, improved fiscal management, or other economic factors. Evaluating the sustainability of this trend will be important in the coming years.

4.2. Implications For Fiscal Sustainability

The findings underscore the need for strategic debt management in the selected Arab countries. High debt levels can pose risks to fiscal sustainability, leading to increased debt servicing costs, reduced fiscal space, and potential economic instability.

To address these challenges, these nations must prioritize policies to diversify revenue sources, control spending, and boost economic growth. Moreover, the high dependence on external sources of credit observed in some countries should be carefully managed. While external borrowing can facilitate economic development, it also exposes countries to risks associated with foreign exchange fluctuations and international financial conditions. Therefore, a balanced approach to debt management that includes domestic resource mobilization is essential to reduce vulnerability.

In conclusion, the analysis highlights the urgency of addressing the fiscal sustainability of selected Arab countries, particularly those with high debt-to-GDP ratios and rapid debt growth rates. Effective debt management and policies to enhance revenue and promote economic growth will be pivotal in ensuring a stable fiscal outlook for these nations in the coming years.

4.3. The Trend of the External Arab Debt

The external Arab debt has seen significant changes and trends in recent years, with 14 countries considered debtors according to IMF and AMF standards. These countries include Jordan, Tunisia, Algeria, Djibouti, Sudan, Oman, Comoros, Lebanon, Egypt, Morocco, Mauritania, Yemen, Syria, and Somalia, although data for the last two countries is unavailable.

Table 4: The Indicators of the External Arab Countries Debt.

Country	Debt Value (Bn of US$)		Change %	Growth Rate	Share of Total %	Debit % of GDP
	2010	2019			2019	2019
Egypt	35.0	110.3	315.1	13.6	35.7	36.4
Sudan	37.8	51.4	136.0	3.5	16.6	136.2
Lebanon	20.3	37.6	185.2	7.1	12.2	68.8
Morocco	20.8	35.9	172.6	6.2	11.6	30
Tunisia	21.5	35.1	163.3	5.6	11.4	90.3
Jordan	6.5	17.6	270.8	11.7	5.7	40.2
Yemen	6.1	6.6	108.2	1.0	2.1	27.1
Mauritania	3.3	4.5	136.4	3.4	1.4	60.8
Algeria	5.5	3.8	69.1	-4.0	1.2	2.3
Oman	3.0	3.5	116.7	2.0	1.1	4.6
Djibouti	0.6	2.2	366.7	15.0	0.7	70.5
Comoros	0.3	0.2	66.7	-3.8	0.1	16.6
Syria	4.5	-	-	-	-	-
Total	165.2	308.9	187.0	7.2	100.0	35.1

Sources: Calculated From AMF And IMF Database

As can be observed in Table 4, from 2010 to 2019, the total external Arab debt increased by $143.4 billion, rising from $165 billion in 2010 to approximately $308.9 billion in 2019. This represents a substantial increase of 186.7% over the decade, with an annual growth rate of 7.2%.

The primary driver of this surge in debt is Egypt, which experienced a debt increase of more than threefold during this period, reaching approximately $75.3 billion. This accounted for over half of the total increase in Arab debt. Other contributing countries to the overall increase in debt include Jordan, Tunisia, Lebanon, Sudan, and Morocco.

It is worth noting that Comoros and Algeria were the only Arab countries where the total debt decreased during the same period, with an annual rate of about -4%. As of 2019, Egypt stands as the most indebted Arab country, with a debt of about $110.3 billion, constituting 35.7% of the total Arab debt for that year. Egypt's debt increased from $35 billion (21.2% of the total) in 2010 to $110.3 billion in 2019, with an annual growth rate of 13.6%.

Sudan is the second most indebted Arab country, accounting for 16.6% of the total Arab debt, with a debt of $51.9 billion in 2019. Sudan's debt increased slowly, averaging 3.5% annually, amounting to a total increase of 36% from 2010 to 2019. Lebanon, Tunisia, and Morocco each contributed approximately 11-13% to the total Arab debt in 2019, with debts of $37.6 billion, $35.9 billion, and $35.1 billion, respectively. Together, these countries represent about one-third of the total Arab debt.

Jordan is also among the highly indebted Arab countries, with approximately $17.6 billion in debt in 2010. This amount increased nearly threefold from its 2010 level, with an annual growth rate of about 11%.

The growth rates of debt vary among the Arab countries, with Djibouti, Egypt, and Jordan experiencing increases of more than 10% annually, reaching approximately 15% for Djibouti. In contrast, other countries witnessed lower annual debt growth rates, except for Comoros and Algeria, which showed negative debt growth rates.

Table 5: Indicators Of the Debt on the Indebted Arab Countries.

Country	Debt Value (Billions)		Change %	Growth Rate	Share of Total % in 2019	Debit % of GDP 2019
	2010	2019				
Jordan	6.5	17.6	270.8	11.7	5.7	40.2
Tunisia	21.5	35.1	163.3	5.6	11.4	90.3
Algeria	5.5	3.8	69.1	-4.0	1.2	2.3
Djibouti	0.6	2.2	366.7	15.0	0.7	70.5
Sudan	37.8	51.4	136.0	3.5	16.6	136.2
Oman	3.0	3.5	116.7	2.0	1.1	4.6
Comoros	0.3	0.2	66.7	-3.8	0.1	16.6
Lebanon	20.3	37.6	185.2	7.1	12.2	68.8
Egypt	35.0	110.3	315.1	13.6	35.7	36.4
Morocco	20.8	35.9	172.6	6.2	11.6	30
Mauritania	3.3	4.5	136.4	3.4	1.4	60.8
Yemen	6.1	6.6	108.2	1.0	2.1	27.1
Syria	4.5	-	-	-	-	-
Total	165.2	308.9	187.0	7.2	100.0	35.1

Source: Calculated From the Annual United Arab Economic Report, Arab Monetary Fund, 2010-2019

Overall, Table 5 indicates that the distribution of debt among Arab countries has shifted since 2010, mainly due to the substantial increases in debt in Egypt and Sudan during this period.

Furthermore, when assessing the indebtedness of these states, it is essential to consider the debt-to-GDP ratio, a widely used indicator. This ratio provides insight into the state's financial stability, with higher values indicating a more significant threat posed by the state's indebtedness.

The remaining countries' debt represents a relatively low percentage of their GDP. These figures shed light on the debt burden faced by these Arab nations and highlight the varying degrees of indebtedness and economic challenges they contend with.

4.4. Debt Services

Debt service is a crucial aspect of the financial health of countries, and its evolution within the selected Arab countries warrants attention. The total debt services of Arab countries witnessed a substantial increase, surging from 14.3 billion US$ in 2010 to approximately 21.6 billion US$ in 2019. This represents a noteworthy growth rate of approximately 51% over this period, with an average annual increase of around 5.2%.

The countries experiencing the most pronounced growth in debt service costs during this period include Djibouti, Morocco, Jordan, and Egypt. Djibouti saw a remarkable annual growth rate of about 14.5%, followed by Morocco at 12.9%, Jordan at 12.5%, and Egypt at 12.3%. These increases can be linked to multiple factors, that includes the fluctuation in interest rates, debt structures' shifts, and the overall escalation of debt levels.

Conversely, Algeria, Sudan, and Oman experienced decreased debt service costs during the same period. Algeria's debt service costs decreased by 9.4% annually, Sudan's by 8.7%, and Oman's by 4%. These reductions impacted the overall growth rate of debt services for Arab countries. The changing pattern of debt services reveals that Egypt and Lebanon played significant roles, accounting for 36.2% and 22% of the total Arab countries' debt services. Together, they represented approximately 58.2% of the overall debt services in the region. Meanwhile, Morocco, Tunisia, and Jordan collectively contributed about 14.1%, 11.8%, and 8.5%, respectively, making up around 31.7% of the total Arab debt services.

Recognizing that the escalation of debt service costs can have far-reaching consequences for a country's fiscal health is essential.

Considering Table 6, the increasing debt service costs, prudent debt management practices, diversification of financing sources, and strategies to reduce reliance on costly external borrowing become paramount. Effectively managing debt service costs is vital to ensure fiscal sustainability and safeguard essential public services and investments in the face of mounting debt burdens.

Table 6: Arabic Country Debt Services.

Country	Value (Billions)		Growth Rate	Share of Country %		Debt Services % of Export
	2010	2019		2010	2019	
Jordan	0.6	1.8	12.2	4.4	7.2	8.1
Tunisia	2.3	3.2	3.7	16.0	12.8	9.6
Algeria	0.7	0.3	-10.0	4.7	1.1	0.7
Djibouti	0.0	0.1	16.3	0.2	0.6	0.6
Sudan	0.4	0.1	-10.5	2.8	0.6	1.4
Oman	0.5	0.3	-5.0	3.7	1.4	0.8
Comoros	0.0	0.0	8.4	0.0	0.0	6.6
Lebanon	4.2	4.6	1.2	29.2	18.8	32.7
Egypt	2.7	10.3	15.8	19.2	41.8	18.5
Morocco	1.8	3.3	6.9	12.7	3.4	7.2
Mauritania	0.1	0.2	9.5	0.8	1.0	9.3
Yemen	0.3	0.3	3.3	1.8	1.4	2
Syria	1.7			4.5		
Total	14.3	24.7	6.2	100.0	100.0	9.9

Source: Calculated From the IMF Database

In summary, the observed growth in debt service costs across some Arab countries underscores the importance of proactive fiscal strategies and responsible debt management to secure fiscal sustainability and protect vital public services and investments.

4.5. Model Estimation

The regression model results, as summarized in Table 7, offer insights into the relationship between various variables and the debt levels of the selected Arab countries. These results are crucial in understanding the factors influencing fiscal

sustainability in this context.

Table 7: The Results of the Regression Model Estimation.

Variable	Coefficient (β)	t-test	Sig. of (t)
(Constant)	35.310	4.1	0.000
OP (openness)	0.094	1.3	0.198
TOT	-0.014	-0.3	0.798
Per capita GDP	3.542	3.0	0.003
Real Gr	-3.746	-2.8	0.006
Revenues	0.004	4.6	0.000
Government expenditure	0.001	-3.8	0.000
□□−□	0.012	4.3	0.000
Debt in % of GDP(t-1)	0.315	3.7	0.000
Real GDP growth	3.15	4.12	0.000
Terms of trade growth	-0.001	-1.1	0.212
F	10.459		0.000
Adjusted R Square	0.288		

Source: Secondary Data Analysis by Authors

The Adjusted R-Square value of 0.288 suggests that approximately 28.8% of the variation in debt among the selected Arab countries can be explained by the included variables in the model. However, it is essential to acknowledge that other unaccounted-for variables or external factors could also influence debt levels. However, they are not considered in this analysis. These could include geopolitical events, changes in global economic conditions, or country-specific policy decisions that are not part of this model.

The following section discusses the estimated coefficients of the regression model presented in Figure 2.

- Real Growth Rate in GDP (RGDPG): The coefficient for the actual growth rate in GDP is negative (-3.746), which indicates that the increase in the real GDP growth rate is associated with the debt levels' decrease of the Arab countries. This finding suggests that fostering economic growth can reduce debt by increasing government revenues and reducing the need for external borrowing.
- Per Capita (Per Cap): The coefficient for per capita GDP is positive (3.542), indicating that increased per capita GDP leads to higher debt levels. This result is consistent with the idea that as a country's income per person rises, there may be increased government spending on various services and infrastructure projects, potentially leading to higher debt levels.
- Terms of Trade (TOT): The coefficient for terms of trade (TOT) shows an insignificant impact on debt levels in the selected Arab countries. This implies that changes in the terms of trade, which reflect the relative prices of a country's exports and imports, do not significantly affect debt accumulation in this context. Other factors may have a more dominant influence on debt dynamics.
- Opening Index (Openness): The opening index (Openness) coefficient is significant, indicating that these variable impacts debt levels. However, the direction and magnitude of this impact should be specified in the current model. Further analysis or interpretation is needed to understand the nature of the relationship between openness and debt in these Arab countries.
- Government Revenues: The coefficient for government revenues is negative and significant, suggesting that higher government revenues are associated with decreased debt levels. This finding underscores the importance of robust revenue generation for fiscal sustainability, as countries with more muscular revenue streams may rely less on external borrowing.
- Government Expenditures: The coefficient for government expenditures is positive and significant, implying that higher government expenditures increase debt levels. This result highlights the challenge of managing fiscal deficits and the need for prudent fiscal policies to control government spending.

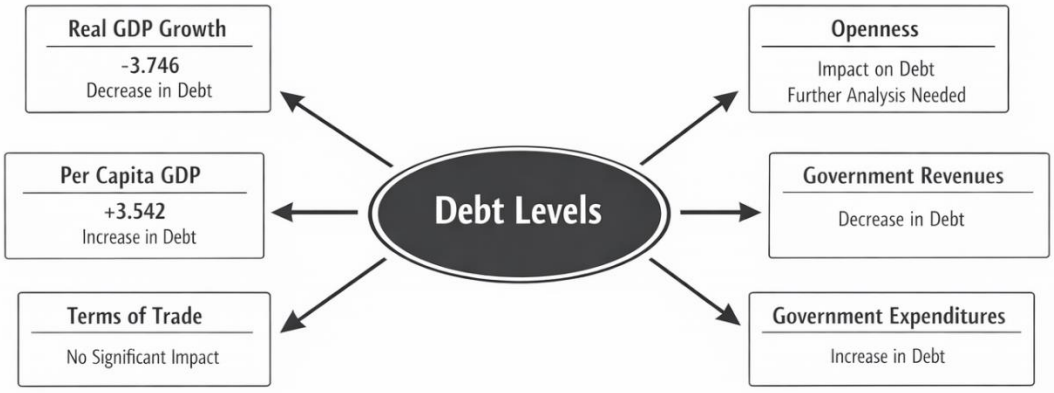

Figure 2: Determinants Of Debt Levels in Arab Countries.

In addition to these coefficient interpretations, it is essential to note that providing p-values for each coefficient would help assess their statistical significance. P-values indicate whether the observed relationships are statistically meaningful or potentially due to chance (Baharumshah, 2017).

In summary, the regression model results suggest that economic growth and government revenue generation play crucial roles in influencing debt levels in the selected Arab countries. While some variables, like real GDP growth, have significant impacts, others, like terms of trade, have relatively insignificant effects on debt dynamics. However, it is essential to recognize that this model captures only a portion of the complex factors that influence fiscal sustainability, and further research may be needed to explore additional variables and external factors.

5. CONCLUSION

This study set out to evaluate the fiscal sustainability of selected Arab countries and to identify the key macroeconomic factors influencing their debt dynamics. The analysis provides a comprehensive understanding of the fiscal conditions in these nations and highlights several important findings regarding the evolution and determinants of public debt across the region. The debt-to-GDP ratio remains a key indicator of fiscal sustainability, and the analysis in this study shows that several Arab countries continue to experience significant debt pressures. The results show that numerous Arab countries—including Jordan, Lebanon, Oman, Syria, Somalia, Comoros, Yemen, Egypt, Djibouti, Morocco, Mauritania, Tunisia, Algeria, and Sudan—continue to experience significant indebtedness, as documented by the Arab Monetary Fund and International Monetary Fund.

In 2019, total indebtedness among these countries reached approximately USD 734.4 billion, with internal debt constituting 60.2% of this total, despite recent increases in external borrowing. Egypt, Morocco, Lebanon, Tunisia, and Jordan were identified as the most heavily indebted economies, with Egypt alone accounting for 35.7% of the region's total debt—an amount that grew at an annual rate of 13.6% between 2010 and 2019. These findings underscore the uneven distribution of debt burdens within the region and the fiscal pressures faced by several economies.

The econometric analysis further reveals meaningful insights into the determinants of debt accumulation. Real GDP growth was found to significantly reduce debt levels, with each unit increase associated with a 3.746-unit decrease in debt. Conversely, higher per capita GDP was associated with increased debt, suggesting that rising income levels may be linked to heightened government spending or investment demands. Government revenues played a critical role in lowering debt levels, while government expenditures were shown to contribute to debt accumulation. These findings highlight the importance of revenue mobilization and prudent expenditure management in achieving fiscal sustainability. Moreover, demographic pressures—including high population growth—may suppress per capita income levels, thereby exacerbating debt vulnerabilities.

The study also finds that terms of trade and economic openness exert statistically insignificant effects on debt levels, likely due to structural adjustment reforms widely implemented in many Arab economies during the 1990s. This suggests that traditional external-sector indicators may play a limited role in explaining fiscal outcomes in these countries, relative to domestic macroeconomic and fiscal policy variables.

Several policy implications emerge from these findings. Promoting sustainable economic growth remains essential, as higher growth rates alleviate debt burdens. Strengthening revenue systems—particularly through diversification away from volatile sources—can provide more stable fiscal capacity, while disciplined expenditure management is necessary to prevent further debt escalation. Policymakers must also closely monitor the debt-to-GDP ratio and adopt measures to ensure that debt remains within manageable limits, particularly in countries already exhibiting high debt levels.

Finally, it is important to acknowledge the limitations of this study. Data constraints, gaps in reporting, and structural challenges across countries may introduce biases or measurement issues that affect empirical estimates. Continued research, supported by improved data availability and deeper examination of institutional factors, is essential for refining assessments of fiscal sustainability in the Arab region. Ongoing monitoring will play a crucial role in supporting evidence-based policymaking and ensuring long-term fiscal stability and economic resilience across these economies.

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