Fiscal Sustainability: The Case of Egypt

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Abstract

The existence of a chronic budget deficit, along with an unprecedented increase in Egypt's foreign debt over the past ten years, has raised growing concerns about the fiscal sustainability of Egypt. This paper examines Egypt's fiscal sustainability under various hypothetical scenarios, including; (i) the scenario where a predetermined debt-to-GDP ratio of 60% is maintained, (ii) the scenario in which the country's budget deficit transforms into a surplus, and (iii) the scenario of an Islamic rule in which the negative real interest rate is adjusted to zero. The study examines the fiscal sustainability of Egypt using the framework proposed by Enzo and V. Hugo (2003). The framework assumes a targeted debt-to-GDP ratio and suggests that the government should respond when the actual debt-to-GDP ratio exceeds the targeted ratio. The main findings of the study are as follows; (i) Egypt's current fiscal position of debt is unsustainable. (ii) Setting a target for the debt-to-GDP ratio of 60% does not improve fiscal sustainability. (iii) Fiscal sustainability can be realized by transforming the existing budget deficit into a surplus. (iv) Fiscal sustainability is attainable with a predetermined debt-to-GDP ratio of 60% and a corresponding targeted primary deficit-to-GDP ratio of 4% to 5%. (v) Fiscal sustainability can be attained with a targeted debt-to-GDP ratio of 60% and a corresponding targeted primary deficit-to-GDP ratio of 2.5%, provided that an Islamic rule of a zero limit on the real interest rate is implemented.

Keywords: Fiscal Sustainability, Sovereign Debts, Fiscal Policy

JEL Classifications: H6, E620, E630

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1. Introduction

Public debt levels surged in many countries following the 2008 financial crisis, and they reached even higher levels after the 2020 pandemic. Reis (2022) argues that the primary risk now lies in a fiscal crisis rather than a financial crisis. One implication of the macroprudential policies implemented by central banks after the financial crisis is the increased demand for government bonds by financial institutions to meet the requirements of holding safer and more liquid assets set by the central banks. However, there is a potential risk of a collapse in the bond market as the treasury takes advantage of this situation by running larger and larger deficits.

In Egypt, the ratio of gross debt to GDP rose steadily from 72.8% in 2011 to 83.75% in 2015 and further to 97.8% in 2017 and then decreased to 93% by 2023[1]. During the first half of 2020, particularly with the onset of the coronavirus pandemic, the Egyptian government borrowed $20 billion from international institutions and the international bond market, adding to the rapidly growing stock of external debt in recent years[2]. The annual growth rate of external debt increased from 13.6% for the period 2019-2020 to 14.5% for the period 2021-2022. Additionally, domestic debt rose from LE 4282.112 billion to LE 4742.107 billion between 2019 and 2020, with an annual growth rate of approximately 11%[3].

The debt situation has worsened following the Egyptian government's return to the IMF to request a new loan. As part of the conditions set by the IMF, the Egyptian government was obliged to liberalize the foreign exchange rate. In late October 2022, for the second time that year, the Egyptian authorities devalued the Egyptian pound against the US dollar. Consequently, the value of the Egyptian pound experienced a significant decline of approximately 58% in 2022. This depreciation of the domestic currency led to a substantial increase in the value of Egyptian debt when measured in terms of the domestic currency.

On October 27th, 2022, the IMF and the Egyptian authorities reached a staff-level agreement on a broad set of economic reforms. This agreement is backed by a 46-month extended fund facility agreement amounting to US$3 billion. Additionally, international and regional partners are expected to provide approximately US$5 billion in funds to Egypt for the fiscal year 2022/23. The involvement of these international and regional partners will be crucial in supporting and implementing Egyptian policies and reforms, ensuring their successful execution[4].

[1] IMF, Fiscal Monitor. Available at; https://data.imf.org/?sk=4be0c9cb-272a-4667-8892-34b582b21ba6&sid=1390030341854

[2] For more details See; http://country.eiu.com/article.aspx?articleid=669932250

[3] For more details See; CBE, External Position of the Egyptian Economy, July/March of FY 2021/2022, VOL.77. External and domestic debt for the years 2019-2020 are fetched from the CBE, available at; https://www.cbe.org.eg/en/EconomicResearch/Statistics/Pages/TimeSeries.aspx

[4]https://www.imf.org/en/News/Articles/2022/10/26/pr22363-egypt-imf-reaches-staff-level-agreement-on-an-extended-fund-facility-arrangement#:~:text=The%20IMF%20arrangement%20is%20expected,and%20regional%20support%20for%20Egypt.

The involvement of international and regional partners in supporting and implementing Egyptian policies and reforms highlights the increasing concerns surrounding the scale of Egyptian debt and the sustainability of Egypt's fiscal position.

This paper examines various approaches for evaluating fiscal sustainability and applies the operational criterion proposed by Enzo and V. Hugo (2003) to assess the fiscal sustainability of Egypt. The criterion assumes a predetermined target for the debt-to-GDP ratio and suggests that the government should take action when the actual ratio exceeds the target.

The remainder of the paper is as follows: Section 2 provides an overview of the different approaches that are used to quantify and evaluate fiscal sustainability. Section 3 assesses the fiscal sustainability of Egypt using the aforementioned criterion under different scenarios. Section 4 discusses hypothetical scenarios for fiscal sustainability in Egypt. Finally, Section 5 presents the concluding remarks.

2. Approaches to assessing fiscal sustainability

In the literature, the terms "fiscal sustainability" and "debt sustainability" (or government solvency) are often used interchangeably. Debt sustainability refers to the government's capacity to fulfill all its current and future payment obligations without relying heavily on significant financial assistance or facing the risk of default (Hakora, D. 2020). On the other hand, fiscal sustainability pertains to the government's ability to continue its current fiscal policies without jeopardizing its solvency in the future (Enzo and V. Hugo, 2003).

However, these two concepts have technical distinctions. Enzo and V. Hugo (2003) consider government solvency as a necessary condition for fiscal sustainability because it focuses on the government's ability to repay its debt at some point in the future, regardless of whether the government's intertemporal budget constraint is satisfied. In contrast, a sufficient condition for fiscal sustainability requires maintaining solvency by satisfying the government's intertemporal budget constraint. This means that fiscal sustainability not only considers the government's ability to repay debt but also emphasizes the importance of ensuring that the government's intertemporal budget constraint is met to sustain solvency in the long run.

In the literature, three different approaches for assessing fiscal sustainability are discussed. The first approach is the "Debt Sustainability Framework (DSF)," which was developed by the IMF and the World Bank. It came into effect in July 2018 and aims to align the financing needs of low-income countries with the repayment capacity required by creditors[5].

The DSF incorporates two main components: (i) The projection of a country's debt burden over the next 10 years, along with an analysis of its vulnerability to economic and policy shocks based on

[5]https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/16/39/Debt-Sustainability-Framework-for-Low-Income-Countries

both baseline and stress test scenarios. (ii) An assessment of the risk of debt distress, which is based on indicative thresholds and benchmarks for debt burden. These thresholds and benchmarks depend on the country's macroeconomic framework and other country-specific information.

Firstly, a composite indicator, based on various economic and non-economic variables, is used to classify countries into one of three debt-carrying capacity categories: strong, medium, and weak. Secondly, different indicative thresholds are applied to each category, with the highest threshold corresponding to strong performance and the highest capacity for debt carrying. Thirdly, debt risk signals are generated by comparing actual debt burden indicators with the indicative thresholds over the projection period. Based on this assessment, in addition to personal judgments, a country is considered to be at low risk if none of the actual debt burden indicators breaches their respective thresholds under both the baseline and stress test scenarios. Conversely, a country is deemed to be at high risk if any of the actual external debt burden indicators breach their respective thresholds under the baseline scenario, but the country does not face any repayment difficulties. However, a country is classified as being in debt distress if it experiences arrears, debt restructuring, or sustained breaches of these thresholds.

While the DSF is a comprehensive approach that incorporates a variety of variables to assess debt sustainability, it may be susceptible to bias due to inherent personal judgments. Additionally, the criteria for classifying countries into one of three debt-carrying capacity categories lack clarity and can be ambiguous. Furthermore, the thresholds for these debt-carrying capacity categories are subject to change over time, necessitating regular and resource-intensive debt sustainability analyses.

The second approach is Sustainability Tests (STs), which involve applying statistical tests to the time series of public debt and primary budget surplus to assess whether solvency conditions have been met in the past, and hence draw lessons for the future (Hamilton and Flavin, 1986; Trehan and Walsh, 1991; Bohn, H., 1995). Nevertheless, this approach has its limitations, including its sensitivity to the time span of the data, the frequency of data, and the specific statistical methods and procedures used by the researcher. Additionally, achieving debt sustainability within a given sample period does not guarantee debt sustainability in the future.

The third approach involves Sustainability Indicators (SIs), which utilize composite indicators to evaluate fiscal sustainability. Building upon Blanchard (1990), numerous studies focus on the debt-to-GDP or debt-to-GNP ratio as a key for assessing fiscal sustainability. Fiscal sustainability is deemed to exist when this ratio remains constant over time. Blanchard (1990) introduced the dynamic government budget constraint formula as follows:

$$\frac{db}{dt} = g + h - t + (r - \theta)b = d + (r - \theta)b \tag{1}$$

Here, g, h, and t represent the ratios of government expenditure, government transfers, and government taxes to GDP, respectively. b denotes the ratio of debt-to-GDP, while d stands for the

primary deficit-to-GDP ratio, calculated as $d = g + h - t$. The ratio of $(r - \theta)$ is assumed to be positive, with r representing the real interest rate and θ denoting the rate of growth of GDP.

Based on equation (1), fiscal sustainability is achieved when the debt-to-GDP ratio, *b*, remains constant (i.e., $\frac{db}{dt}$ = 0). Alternatively, fiscal sustainability can be expressed as the equality between the present value of the primary surplus-to-GDP, $-d$ ' discounted at the rate of $(r - \theta)$, and the current level of debt, b (i.e., $b = \frac{-d}{(r-\theta)}$). This condition is commonly referred to as the intertemporal budget constraint.

In light of this, Blanchard (1990) proposed two indicators for assessing fiscal sustainability. These indicators are calculated by projecting government revenue and expenditure based on current policies. (i) The primary gap indicator, -$[d + (r - \theta)b]$, represents the difference between the primary surplus-to-GDP ratio, -d, and the debt-to-GDP ratio multiplied by the difference between the real interest rate and the growth rate of real GDP, $(r - \theta)b$. This indicator measures changes in the debt-to-GDP ratio, particularly when using the average actual values of r and θ over the past years. (ii) the tax gap indicator, expressed as $(t_n^* - t)$, involves the actual tax rate, t, and the sustainable tax rate required to meet the intertemporal budget constraint, t_n^*, as follows:

$$t_n^* \approx (average\ over\ the\ next\ n\ years\ on\ g + h) + (r - \theta)b_0 \quad (2)$$

Where b_0 stands for the initial level of the debt-to-GDP ratio. A positive value of $(t_n^* - t)$, especially when t is relatively high, indicates a risk of financial crises or the need to resort to debt monetization.

Similar to Blanchard (1990), Enzo and V. Hugo (2003) proposed a simplified operational criterion for assessing fiscal sustainability. This criterion relies on a predetermined target for the debt-to-GDP ratio and corrective government actions when the actual debt-to-GDP ratio exceeds this target. These government actions typically involve generating a primary surplus, which, in turn, leads to the convergence of the debt ratio toward the target.

One advantage of this approach is its ability to anchor fiscal policy, ensuring that the targeted ratio is maintained over time. Furthermore, it provides a fiscal sustainability indicator without necessitating projections for future GDP and interest rates. However, it's essential to recognize that the framework has limitations. Fiscal sustainability in past and current periods does not automatically guarantee sustainability in the future. Additionally, many countries do not commit to a specific debt-to-GDP ratio target, which means that governments may not intervene to take corrective action when the actual ratio deviates from the target.

The operational criterion proposed by Enzo and V. Hugo (2003) for assessing fiscal sustainability is based on the following set of equations:

$$d_t = \beta_t d_{t-1} - ps_t \tag{3}$$

Where, $\beta_t = \frac{1+r_t}{1+g_t}$, (r_t and g_t symbolize real interest rate and real GDP growth rate, respectively). d_t and ps_t stand for debt-to-GDP ratio and primary surplus-to-GDP ratio, respectively. Equation (3) illustrates that changes in the debt-to-GDP ratio, d_t, result from variations in the primary deficit-to-GDP ratio, $-\ ps_t$, and the growth of real interest rate, r_t, higher than the growth of real GDP, g_t, given other factors including corrective policies and economic shocks.

By setting d_t=d_{t-1}=d^*, where d^* represents the targeted debt-to-GDP ratio established by fiscal authorities, we can derive the values of β^* and ps^*at the targeted debt-to-GDP ratio as follows:

$$ps^* = (\beta^* - 1)d^* \tag{4}$$

Equation (5) decomposes the current primary surplus-to-GDP ratio, ps_t, into two components;

$$ps_t = ps^* + \lambda_t(d_{t-1} - d^*) \tag{5}$$

The first component, ps^*, is the targeted primary surplus-to-GDP ratio associated with the targeted debt-to-GDP ratio, d^*. The second component represents the policy response to the deviation of the lagged debt-to-GDP ratio from the target. Equation 5 can be viewed as a fiscal rule or a policy reaction function, where λ_t (= $\frac{ps_t - ps^*}{d_{t-1} - d^*}$) represents the policy response at time (t), given the gap of debt-to-GDP ratio in the previous period.

By combining equations (3), (4), and (5), the law of motion of the debt-to-GDP ratio is derived as follows:

$$d_t = (\beta_t - \lambda_t)d_{t-1} - (\beta^* - \lambda_t - 1)d^* \tag{6}$$

Equation (6) illustrates that if d_{t-1} is higher than d^* then ps_t increases by λ_t, causing d_t in equation (3) to decrease if, and only if, λ_t exceeds β_t. In other words, to make the current debt-to-GDP ratio, d_t, decrease and converge to the targeted ratio, d^*, over time, the absolute value of (β_t- λ_t) in equation (6) should be less than one.

In light of these, Enzo and V. Hugo (2003) propose the Indicator of Fiscal Sustainability (IFS):

$$IFS = (\ \beta_t - \ \lambda_t) = \frac{1+r_t}{1+g_t} - \frac{ps_t - ps^*}{d_{t-1} - d^*} \tag{7}$$

A country is considered to have a sustainable fiscal position if the absolute value of IFS is less than one. Conversely, a country does not have a sustainable fiscal position if the value of IFS is equal to or greater than one.

3. Assessing the fiscal sustainability of Egypt: The baseline scenario

In the following analysis, we apply the fiscal sustainability criterion proposed by Enzo and V. Hugo (2003) to assess Egypt's fiscal situation. The baseline scenario provides an overview of Egypt's current debt position. It's important to note three key aspects of Egypt's fiscal landscape: Firstly, the government of Egypt does not adhere to a predetermined limit for its debt-to-GDP ratio. In other words, there is no specified threshold that Egypt aims to maintain in terms of its debt relative to GDP.

Secondly, Egypt has been running a chronic budget deficit for several years, which has led to a significant increase in both domestic and external debt, particularly over the past eight years starting from 2015[6]. According to equation 1, the government's intertemporal budget constraint can be expressed as follows: $b = \frac{-d}{(r-\theta)}$. That is to maintain fiscal sustainability, the primary surplus-to-GDP ratio, $-d$, discounted at $(r-\theta)$ must equal the current level of debt, b. Where r and θ stand for the real interest rate and the real GDP growth rate, respectively.

In the case of Egypt, inconsistency arises from the coexistence of high current debt levels and a persistent budget deficit. This situation implies a violation of the government's intertemporal budget constraint. Olijslagers et al. (2021) and Jiang et al. (2021) refer to such an inconsistency as the "valuation puzzle." One explanation to the "valuation puzzle, or the coexistence of high current debt levels and a persistent budget deficit, is that the financial markets anticipate a higher future primary surplus. Failure to align fiscal policies with market expectations may lead to challenges in securing new foreign loans, as the risk of default becomes a looming concern (Farhi and Maggiori, 2018, and Martinez, L. et al., 2022).

The substantial increase in Egypt's government public debt can be attributed, in part, to two factors: a lower real interest rate compared to the real GDP growth rate and extended periods of negative real interest rates. Blanchard O. (1990) argues that when interest rates on sovereign debt fall below the GDP growth rate, public debt may incur no fiscal cost (i.e., it is a 'free lunch). That is the government can issue new debt without the need to raise taxes or reduce public spending to repay it. However, in the case of Egypt, the presence of negative real interest rates goes beyond the notion of a free lunch, or a zero fiscal cost of issuing public debt, as it provides an incentive to the government for issuing new debt. This phenomenon may explain the substantial expansion of Egypt's public debt. In essence, the government is not only avoiding additional costs but also receiving a reward for issuing a new debt, which can incentivize further borrowing and contribute to the debt's rapid growth.

[6] According to the World Economic Outlook report (IMF, 2023) the general government gross debt in 2022 is E.P. 6943.24 billion ($ 225 billions) and expected to reach E.P. 15762.65 billion ($ 508 billions) in 2028. Available at; https://www.imf.org/en/Publications/WEO/weo-database/2023/April

Thirdly, the financing of the government budget deficit is determined by three primary sources, as outlined in equation (8)[7]:

$$(G-T)_t = [\Delta A_t + \ \Delta TB_t + R_t] - b(TB)_t - a(A)_t \quad (8)$$

Where, $(G-T)_t$ represents the primary budget deficit/surplus, which signifies the difference between government expenditure, G, and government taxes, T. ΔA_t, refers to new government loans, ΔTB_t, symbolizes new government bonds purchased by the CBE in the secondary market, and, R_t represents the profits transferred by the CBE to the government budget. $b(TB)_t$, denotes interest expenditure on government bonds, and $a(A)_t$, represents interest expenditure on government loans, with b and a representing the interest rates on government bonds and government loans, respectively.

Because the price stability anchors inflation expectations, eliminates risk premium, and hence protects the public debt from inflation risk, Reis, R. (2022), argues that the CBs can contribute to debt sustainability through its commitment to price stability. However, this argument is reversed in the case of Egypt. According to Awad (2021, 2008, and 2009), the CBE is not functionally independent from government intervention. This is largely because the CBE is mandated to finance the government budget deficit. On one hand, the CBE's contribution to financing the budget deficit results in the direct monetization of government debt, which can lead to inflationary pressures over time. On the other hand, the CBE's ability to independently manage nominal interest rates to combat inflation is limited, as it could have adverse effects on government loans within the financial sector, resulting in negative real interest rates persisting for an extended period.

In summary, the baseline scenario for assessing the fiscal sustainability of Egypt involves: (i) Setting a target of a zero debt-to-GDP ratio, indicating no intention to accumulate debt relative to the size of the economy. (ii) Maintaining a chronic budget deficit or, a primary deficit. (iii) Sustaining negative real interest rates for an extended period.

From equation 4, if the targeted debt-to-GDP ratio, d^*, is set to zero, it implies that the corresponding primary surplus-to-GDP ratio, ps^*, is also zero. In equation 5, given that $d^* = 0$, and $ps^* = 0$, the parameter, λ_t, can be calculated as the ratio of ps_t to d_{t-1}(i.e. $\lambda_t = \frac{ps_t}{d_{t-1}}$).

[7] For more details on the derivation of this equation see; Awad (2023).

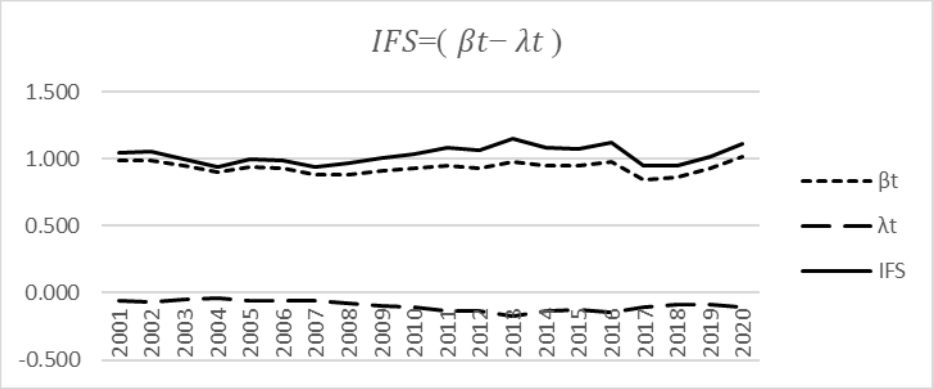

Figure 1. Fiscal Sustainability Under the Baseline Scenario During 2001-2020

Source: Data on IFS, equation 7, is fetched from the Economist Intelligence Unit (EIU)

Figure 1 illustrates the evolution of the IFS in Egypt for the period from 2001 to 2020. The conclusion drawn from Figure 1 is straightforward: Egypt's fiscal sustainability under the baseline scenario is non-existent, as the IFS consistently exceeds one for many years. In other words, throughout the entire period, the average IFS stands at 1.028. One contributing factor to the IFS exceeding one is the persistently high negative values recorded for λ_t over many years, primarily due to the chronic budget deficit. Specifically, the average λ_t for the entire period is -0.095. Additionally, given the presence of a negative real interest rate that is lower than the real GDP growth rates over an extended period, β_t registers values below one for most years, and the average of β_t for the entire period is 0.933.

To bolster the robustness of the conclusion regarding Egypt's unsustainable fiscal position under the baseline scenario, we conducted tests for fiscal sustainability, as outlined by Greiner and Fincke (2015). These tests differ from interest rate tests as they focus on the statistical characteristics of the time series data for both the debt-to-GDP ratio and the primary surplus/deficit-to-GDP ratio.

The first test, proposed by Bohn (1995), assesses the sustainability of public debt by examining whether the primary surplus-to-GDP ratio (dependent variable) shows a positive relationship with the debt-to-GDP ratio (independent variable). That is an increase in the debt-to-GDP ratio is matched by a corrective action by fiscal authorities to increase the primary surplus-to-GDP ratio. In the context of Egypt's chronic budget deficit, we alternatively investigate whether the primary deficit-to-GDP ratio displays a negative relationship with the debt-to-GDP ratio[8].

The results, as presented in Table 1, show an insignificant negative relationship between the primary deficit-to-GDP ratio (PD) and the debt-to-GDP ratio (DT). This result indicates that the Egyptian government does not take significant corrective action by cutting the primary deficit-to-GDP ratio against the increase in the debt-to-GDP ratio.

[8] With a chronic budget deficit, as the case of Egypt, fiscal sustainability occurs if the increase in the debt-to-GDP ratio is matched by a corrective action by fiscal authorities to decrease the primary deficit-to-GDP ratio.

Table 1. The Association Between Primary Deficit-To-GDP Ratio and Debt-To-GDP Ratio Over the Period 2001-2020

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DT	-0.0259	0.0276	-0.938	0.360
C	10.7154	2.6050	4.113	0.000
R-squared: 0.046		F-statistic: 0.880	Method: LS	

Table 2. Group Unit Root Test for Variables (In First Differences) Primary Deficit-To-GDP Ratio and Debt-To-GDP Ratio Over the Period 2001-2020

Method	Statistic	Prob.*	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.691	0.000	2	36
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	31.96	0.000	2	36
PP - Fisher Chi-square	32.04	0.000	2	36

* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

The second test, proposed by Trehan and Walsh (1991), examines whether public debt is sustainable by checking if it is quasi-difference stationary and if public debt and primary surpluses are cointegrated. Tables 2 and 3 present the results, indicating that both variables are stationary after differencing, but they are not cointegrated.

This result is consistent with the above-mentioned results in Table 1 as the primary deficit-to-GDP ratio (PD) and the debt-to-GDP ratio (DT) do not have a long-run relationship. Thus, tests for robustness in Tables 1, 2, and 3 underscore the conclusion that Egypt's fiscal position under the baseline scenario is unsustainable.

Table 3. Unrestricted Cointegration Test (Trace) for Variables (In First Differences) Primary Deficit-To-GDP Ratio and Debt-To-GDP Ratio Over the Period 2001-2020

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.396	12.281	15.494	0.143
At most 1	0.162	3.202	3.841	0.073

Sample (adjusted): 2003 2020

Trend assumption: Linear deterministic trend

Trace test indicates no cointegration at the 0.05 level

4. Hypothetical scenarios for fiscal sustainability in Egypt

In this section, we delve into the criteria outlined by Enzo and V. Hugo (2003) to examine various algorithms within different hypothetical scenarios related to fiscal sustainability in Egypt.

Scenario 1 encompasses multiple instances of fiscal sustainability, assuming a fixed debt-to-GDP ratio of 60% (d^*=60%), given the existing framework of monetary policy implemented by the CBE. Case 1 in Table 4 illustrates that setting a target for the debt-to-GDP ratio at 60%, all else being equal, does not lead to an improvement in Egypt's fiscal sustainability, given the persistent chronic budget deficit.

Table 4. Scenario 1 For Fiscal Sustainability in Egypt, Given the Existing Framework of Monetary Policy

Scenario	**Baseline**	**Presumed predetermined debt ratio (d^*) = 60%**			
		Case1: under the current budget deficit	Case2: under a hypothetical switch to a budget surplus	Case 3: ps^*= ps_t= -4%	Case 4: ps^*= -4% and ps_t=-5%
$IFS = (\beta_t - \lambda_t)$	1.028*	1.167*	0.698	0.933	0.980
$\beta_t = \frac{1+r_t}{1+g_t}$	0.933*	0.933*	0.933*	0.933*	0.933*
$\lambda_t = \frac{ps_t - ps^*}{d_{t-1} - d^*}$	-0.095*	-0.235*	0.235*	0	-0.048*
$ps^* = (\beta^* - 1)d^*$	0	-0.04	-0.04	-0.04	-0.04
d^*	0	0.6	0.6	0.6	0.6
β^*	0.933*	0.933*	0.933*	0.933*	0.933*
Fiscal ustainability	n.a.	n.a.	a.	a.	a.

(*) = average value of the period of 2001-2020.

However, under the assumption of a predetermined debt-to-GDP ratio of 60%, fiscal sustainability becomes attainable, in a hypothetical Case 2 presented in Table 4, if the chronic budget deficit is transformed into a surplus, assuming other factors remain unchanged.

Furthermore, under a predetermined debt-to-GDP ratio of 60% (d^*=60%), the corresponding targeted primary surplus-to-GDP ratio (ps^*) is -4% (i.e., correspondent targeted primary deficit-to-GDP ratio, $-ps^*$, is 4%). If the government manages to maintain the primary surplus-to-GDP ratio (ps_t) at -4% or even within a maximum limit of -5%, resulting in λ_t being zero or negative, fiscal sustainability becomes applicable, as demonstrated by cases 3 and 4 in Table 4. In simpler terms, given the correspondent targeted primary deficit-to-GDP ratio of 4% under a

predetermined debt-to-GDP ratio of 60%, the maximum allowable actual budget deficit that aligns with fiscal sustainability in Egypt is 5% of GDP.

Scenario 2 investigates fiscal sustainability with the assumption of a fixed debt-to-GDP ratio of 60% (d^*=60%) within a hypothetical Islamic variant of monetary policy by the CBE. In this Islamic monetary policy framework, the CBE is mandated to maintain the real interest rate at a zero limit (i.e., setting $1 + r_t$=1 so that $\beta_t = \frac{1}{1+g_t}$)[9].

A zero limit on the real interest rate means that the CBE is required to set the nominal interest rate equal to the expected rate of inflation. This policy acts as a deterrent to the government from pressuring the CBE to finance the budget deficit or monetize the debt. Under this assumed target debt-to-GDP ratio of 60% and the real interest rate's zero limit, the corresponding targeted primary surplus-to-GDP ratio (ps^*) is -2.5% (i.e., the corresponding targeted primary deficit-to-GDP ratio, $-ps^*$, is 2.5%) and fiscal sustainability is applicable, as indicated in Table 5.

Table 5. Scenario 2 For Fiscal Sustainability in Egypt Under a Hypothetical Islamic Monetary Policy Framework

Scenario	**Baseline**	**Presumed predetermined debt ratio (d^*) = 60%, and Real interest rate = 0 (or $1 + r_t$=1)**
$IFS = (\beta_t - \lambda_t)$	1.028*	0.982
$\beta_t = \frac{1+r_t}{1+g_t}$	0.933*	0.958*
$\lambda_t = \frac{ps_t - ps^*}{d_{t-1} - d^*}$	-0.095*	-0.023*
$ps^* = (\beta^* - 1)d^*$	0	-0.025
d^*	0	0.6
β^*	0.933*	0.958*
Fiscal Sustainability	n.a.	a.

However, within an Islamic Banking system, the avenue for monetizing government debt by the CBE is obstructed. One key reason for this is the risk of surpassing the zero limit on real interest rates, which could jeopardize price stability.

Nevertheless, the government can turn to interest-free bonds, known as Islamic bonds or Sukuk, to finance the budget deficit. These bonds are asset-backed securities issued in domestic and/or foreign currency and can function even within conventional banking systems. Under the Islamic banking system, Islamic bonds are issued by the Islamic central bank as a tool for monetary policy management, as well as by the government to finance budget deficits[10].

[9] Using a dynamic small-scale macro-econometric model, Awad (2021) concludes that the zero real interest rate has positive consequences on the economic performance in Egypt comparing to other model scenarios.

[10] For more details on the use of Islamic bonds by Islamic CBs as a monetary policy instrument; see, Awad (2015)

It is worth mentioning that, at the time of preparing this paper, the Egyptian government had issued its first USD-denominated Islamic Sukuk with a nominal interest rate of 11% and a total value of USD 1.5 billion[11]. However, with a formal headline CPI inflation rate of 40.26% and an overnight lending rate of 17.25%, the real interest rate is negative, contradicting the previously mentioned zero limit on the Islamic real interest rate[12].

5. Conclusions

This paper evaluates Egypt's fiscal sustainability using the operational criterion proposed by Enzo and V. Hugo (2003), which involves a predetermined target for the debt-to-GDP ratio and government reactions when the actual ratio exceeds this target. The study explores various scenarios to assess the applicability of fiscal sustainability in Egypt.

The key findings of the study can be summarized as follows: (i) Under the baseline scenario, Egypt's fiscal debt position is unsustainable. (ii) Setting a debt-to-GDP ratio target of 60% under current conditions will not improve fiscal sustainability due to the prevailing chronic budget deficit. (iii) Fiscal sustainability can be achieved with or without a predetermined debt-to-GDP ratio if the budget deficit is transformed into a surplus. (iv) Egypt's fiscal sustainability is attainable with a predetermined debt-to-GDP ratio of 60% and a corresponding targeted primary deficit-to-GDP ratio of 4% to 5%. (v) Alternatively, fiscal sustainability can be achieved with a debt-to-GDP ratio target of 60% and a corresponding targeted primary deficit-to-GDP ratio of 2.5%, conditional on the Islamic rule of a zero limit on real interest rates.

These findings have important policy implications: (i) The high level of public debt and budget deficit in Egypt poses a "valuation puzzle" that mirrors market expectations of higher future primary surpluses. Failure to meet these expectations, as indicated in conclusion iii, could make it challenging for the government to secure new loans and increase the risk of default.

(ii) According to the World Economic Outlook on Egypt (IMF, 2023)[13], the expected debt-to-GDP ratio and the expected primary deficit-to-GDP ratio over the year 2023 are 92.93 % and 7.56 %, respectively. In light of this, to achieve fiscal sustainability as outlined in conclusion iv, the Egyptian government would need to significantly reduce domestic debt by 35.4%% (or equivalently, cutting the debt-to-GDP ratio by 35.4%, i.e. from 92.93% to 60%) and the primary deficit by 33.86% (or equivalently, cutting the primary deficit-to-GDP ratio by 33.86%, i.e. from 7.56% to 5%). Cutting domestic debt by 35.4% will force the government to sell public assets to foreign investors. In addition, cutting the primary deficit by 33.86% will worsen the economic position of many people and push many of them under the poverty line. Therefore, such procedures may cause social and political unrest and hence it should be implemented gradually.

[11]https://enterprise.press/stories/2023/02/23/egypts-debut-usd-1-5-bn-sovereign-sukuk-issuance-wraps-4x-oversubscribed-97675/

[12] Available at; https://www.cbe.org.eg/en/Pages/default.aspx

[13] Available at; https://www.imf.org/en/Publications/WEO/weo-database/2023/April

(iii) An alternative approach, as per conclusion v, involves even more substantial cuts to domestic debt by 35.4% and the primary deficit by 66.93% (from 7.56% to 2.5%), with the added benefit of maintaining price stability under the Islamic banking system.

(iv) The government may also consider hybrid financing instruments that combine Islamic and conventional methods. In such cases, the CBE should refrain from financing the budget deficit and maintain instrument independence to manage monetary policy. A managed floating regime for the nominal exchange rate could be part of this approach.

References

Awad, Ibrahim L., (2008), "Towards Measurement of Political Pressure on Central Banks: The case of the Central Bank of Egypt," *Prague Economic Papers*, XVII (3), 254-275.

Awad, Ibrahim L., (2009), "Did Egypt Satisfy Prerequisites for an IT Regime?" *ACTA Oeconomica Pragensia*, 6, 63-80.

Awad, Ibrahim L., (2021), "The Islamic Rate of Return versus the Nominal Rate of Interest: A Macroeconometric Model," *Eastern Economic Journal*, 47, 253-272.

Blanchard, O. J., (1990), "Suggestions for a New Set of Fiscal Indicators," OECD Economics Department Working Paper, No. 79, OECD Department of Economics and Statistics, April 1990.

Bohn, H., (1995), "The sustainability of budget deficits in a stochastic economy," *Journal of Money, Credit and Banking*, 27, 257-271.

Buiter, W. H., (1985), "A Guide to Public Sector Debt and Deficits," *Economic Policy*, 21, 14-79.

Enzo, C. and V. J. R. Hugo, (2003), "Assessing Fiscal Sustainability: A Cross-Country Comparison," Working Paper No.145, IMF Working Paper, 2003.

Farhi, E. and Maggiori, M, (2018), "A model of the international monetary system," *The Quarterly Journal of Economics*, 133(1), 295-355.

Greiner, A. and B. Fincke, (2015), *Public Debt, Sustainability and Economic Growth: Theory and Empirics*, Springer International Publishing, Switzerland.

Hakora, D., (2020), "Back to Basics: What is Debt Sustainability?" *Finance & Development*, 57 (3), 60-61.

Hamilton, J. D. and M. Flavin, (1986), "On the limitations of government borrowing: A framework for empirical testing," *The American Economic Review*, 76, 808-819.

Jiang, Z., Lustig, *et al*., (2021), "What drives variation in the u. S. Debt/output ratio? The dogs that didn't bark," Working Paper 29351, National Bureau of Economic Research.

Martinez, L. *et al*., (2022). "Sovereign Debt," Working Paper /22/122, IMF Working Paper.

Olijslagers, S., et al., (2021), "Debt sustainability when $r - g < 0$: no free lunch after all" Tinbergen Institute Discussion Paper, Tinbergen Institute 2020-079/VI.

Reis, R., (2022), "Steady prices, Sustainable Debt" *Finance & Development*, 59(1), 16-19.

Trehan, B. and C. E. Walsh, (1991), "Testing intertemporal budget constraints: theory and applications to U.S. Federal budget and current account deficits," *Journal of Money, Credit and Banking*, 23(2), 206-223.