



Enhancing Social Expenditure and Fiscal Sustainability: A Structural Macro Modelling Approach



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Abstract

High debt service burdens, the adverse impact of COVID-19 on economic growth and revenues mobilization and declining ODA – all constrain ESCWA member states' ability to maintain and enhance social expenditures towards supporting people and economies to achieve the SDGs. The current study assesses the revenues mobilization channels of Governments in the Arab region and proposes solutions to enhance fiscal space including through taxation, well strategized debt finance and debt relief measures.

It proposes Arab Governments to develop credible fiscal frameworks over the medium term for revenues and expenditures, with focus on improving tax progressivity, tax efficiency and tax compliance to mobilize domestic revenues while at the same time channeling the newly available resources towards growth enhancing targeted social expenditures. Arab Governments also need to explore innovative financing options including the Climate/SDGs Debt Swap – an innovative financial instrument aimed at improving fiscal space while at the same time bolstering SDG/climate financing.

Fiscal space may also grow by stabilizing debt-to-GDP at a higher rate in the medium term than the baseline forecasts, in line with a requirement for social investments that enhance human capital and GDP. The paper demonstrates the impact of debt-stabilizing and increased social spending scenarios through application of the World Economic and Forecasting Model to the economies of Tunisia and Jordan. It concludes that stabilizing the debt-to-GDP ratio over the medium term and allocating additional fiscal space to social expenditures such as health, education and housing services, among others, can have a growth-enhancing effect, with conducive monetary policy. Such a strategy would ensure both debt sustainability and higher output, while building human capital.

I. Introduction

A central question for policy makers and research over the past thirty years has been to examine the growth-enhancing impact of public social expenditures. The results remained mixed and context specific, especially considering social expenditure in conjunction with quality of governance, savings and investment at macro level.¹

In recent years, studies have argued that targeted public social expenditures do have positive impact on human development achievements, which has significant direct impact on the accumulation of human capital, and therefore social expenditure is growth-enhancing at macro level, especially for the low and middle-income countries.² Furthermore, the timing and need of public social expenditure is more than ever. The COVID-19 Stimulus Tracker estimates that the region requires an additional \$462 billion toward achieving a resilient and fast recovery path at par with global regions. These challenges are on top of the challenges that the region is facing in progressing towards the SDGs.

Following an eventful decade of post Global Financial Crisis recovery for economies in the Arab region, the pandemic has exacerbated existing challenges – from low growth to mounting deficit and debt, further constraining fiscal space as a result. The realities of the COVID 19 crisis therefore require strategies for the enhancement of fiscal space in order to provide both much needed social expenditure as well as to bridge the fiscal response gap to the global average in order for an inclusive recovery.

To this end, the paper examines different options for enhancing fiscal space including a domestic revenue mobilization and debt finance options combined with innovative solutions and debt relief efforts. The paper provides an in-depth analysis of challenges and potential of enhancing fiscal space, such as through taxation reforms, debt relief through debt restructuring and debt swap, and working out a well strategized debt finance scenarios considering debt to GDP stabilization in the medium term, by applying a structural macro-econometric modelling approach, considering fiscal sustainability and macroeconomic stability. The analysis and findings of the paper further contributes to advance the knowledge that channeling public expenditure to social investments to targeted social services has a positive impact on growth and output levels, which is demonstrated through a case study of two selected countries in the region.

II. The Arab region faces compounding effect of COVID-19 on fiscal space for financing social expenditures

A. Adverse impact of COVID-19 made the economies more vulnerable

Starting with the global economic slowdown in 2008, the Arab region has witnessed several economic and political shocks in many parts of the region that have generated a continuous downside effect on

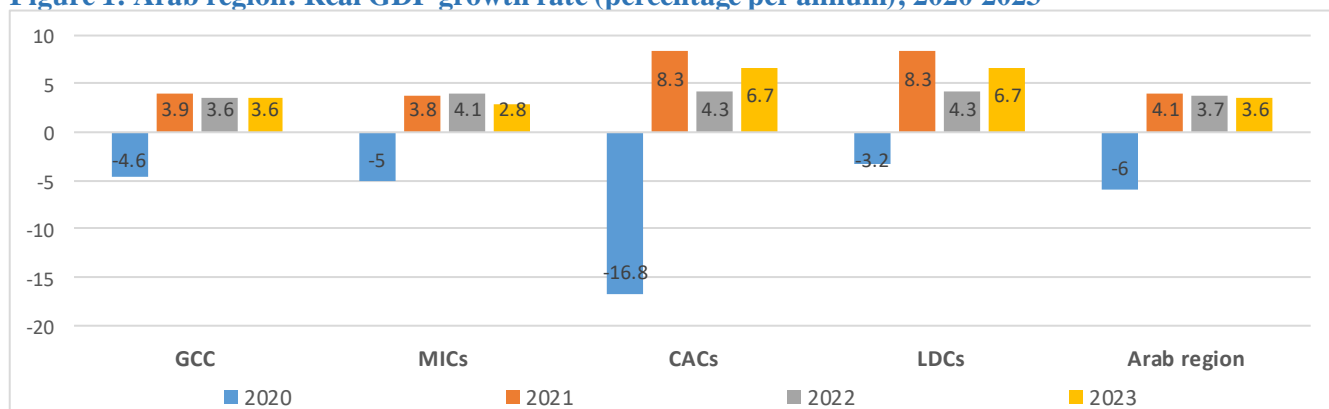
¹ Sala-i-Martin, 1992; Atkinson 1995; Filmer and Pritchett, 1999; Gupta et al 2003; Rajkuman and Swaroop 2008; Khan and Bashar 2015; among others.

² Bellettini and Ceroni, 2000; Baldacci et al 2004; Sarangi and von Bonin 2017; Haile and Nino-Zarazua 2018; Cammerat 2020.

economic growth. The oil price plunge in 2014 and the slow recovery since then further weakened regional economic growth during the last five years. When growth forecasts were slowly moving up during 2018 and 2019, the adverse impact of the global pandemic and the collapse of oil prices severed economic growth prospects for 2020. Forecasts for 2020 indicate to a severe contraction of economies in the Arab region due to COVID-19, resulting in a negative growth rate of around -6 percent as against the pre-COVID-19 projected rate of 2.5 percent³. This is equivalent to a contraction of about \$159 billion of real gross domestic product (GDP), owing to the negative impacts on oil markets, remittances, tourism receipts, trade and investment flows.

The impact varies, however, by different sub-regions and country groups in the Arab region (figure 1).⁴ Countries whose economies are already vulnerable, were made even more so by the COVID crisis. In 2021, ESCWA expects a moderate rebound in growth, however, this is heavily dependent on global rebound and demand for oil and on the success of the vaccination campaigns⁵.

Figure 1: Arab region: Real GDP growth rate (percentage per annum), 2020-2023



Source: ESCWA, 2021a.

B. Increasing debt burdens in the MICs and LDCs limit fiscal space available for social expenditure

The Arab region has been facing a considerable increase in public debt starting from the beginning of the 2010s, and COVID-19 has further amplified debt burdens, posing challenges to a resilient recovery and financing social expenditure for several low- and middle-income Arab countries. Public debt in the region was estimated to reach 60 percent of GDP in 2020 (equivalent to \$1.4 trillion), up from 25 percent of GDP in 2008 (figure 2). A combination of factors including a general lack of adequate fiscal and monetary policy response to public debt sustainability combined with recurrent trade and fiscal deficits, as well as low economic growth have contributed to high growth of public debt across the region.

³ UN, 2020a.

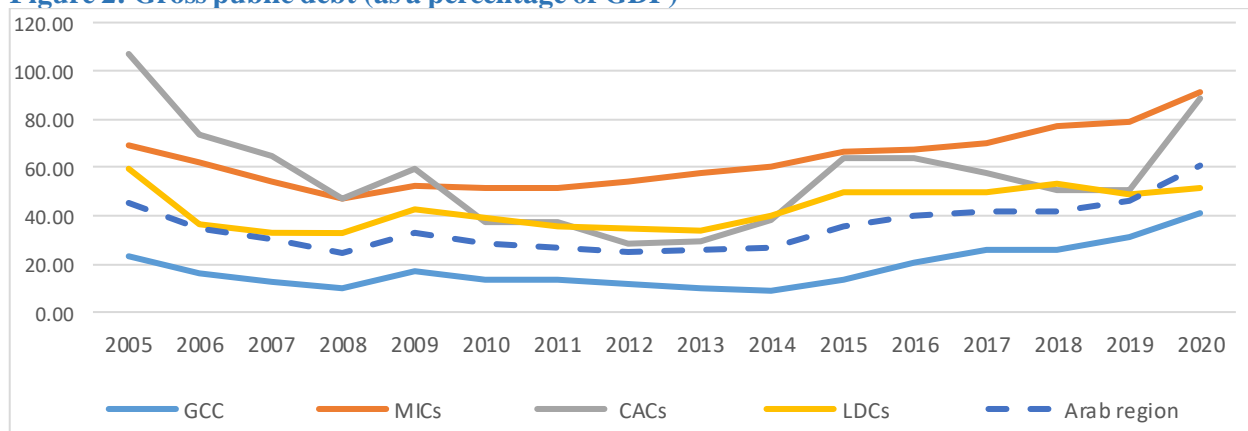
⁴ Classification of country groups: (1) Gulf Cooperation Council (GCC) countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates; (2) Middle Income Countries (MICs): Algeria, Egypt, Jordan, Lebanon, Morocco and Tunisia (3) Conflict-affected Countries (CACs): Iraq, Libya, Palestine, the Syrian Arab Republic and Yemen; (4) Least developed countries (LDCs): the Comoros, Djibouti, Mauritania, Somalia and the Sudan. See ESCWA, 2020.

⁵ ESCWA, 2021. Survey of Economic and Social Developments in the Arab Region 2020-2021.

The GCC countries are relatively better off, although they are increasingly using debt-financing as a strategy to finance their expenditure needs due to low oil revenues since 2015. Fiscal pressure is high for most MICs and LDCs that are facing high debt burdens. The LDCs experienced a considerable increase in their debt burdens since the last decade. Their public debt increased by three-folds between 2008 and 2020; from \$2.4 billion (33 percent of GDP) to nearly \$7 billion (52 percent of GDP). For the LDCs, grant finance and debt relief measures, including those under the G20 Debt Service Suspension Initiative (DSSI) and the HIPC debt relief initiative, are essential to fight the adverse impact of the COVID-19 and ensure financing social expenditure. However, the current initiatives are not enough to the scale required, as several LDCs, including Comoros, Djibouti and Mauritania remain at risk of debt distress due to the adverse impact of COVID-19.⁶ These countries are experiencing steep output contractions at the same time that COVID-19 relief and recovery efforts are demanding a massive increase in expenditures.

The MICs’ debt burden represents nearly half of the Arab region’s debt burden and it has been increasing significantly since the last decade. In 2020, large fiscal shortfalls due to the adverse impact of COVID-19 pushed the MICs’ public debt to reach \$658 billion (91 percent of GDP), up from \$250 billion (47 percent of GDP) in 2008. For instance, Egypt, Jordan and Tunisia, taken together, have borrowed over \$10 billion during April-May 2020 under IMF’s short- and medium-term lending mechanisms.⁷ The COVID-19 and its adverse consequences on the economy have increased debt risks for the MICs, however, they remain not eligible for debt relief by the DSSI initiative of G20 neither for the HIPC. Overall, the high level of debt and increasing trend puts the region at risk of debt unsustainability, especially since regional GDP growth has remained sluggish and fell below zero in 2020 (figure 3). This impedes progressing towards a fast and resilient recovery and financing social expenditure.

Figure 2: Gross public debt (as a percentage of GDP)



Source: Authors’ calculations based on data from IMF WEO.

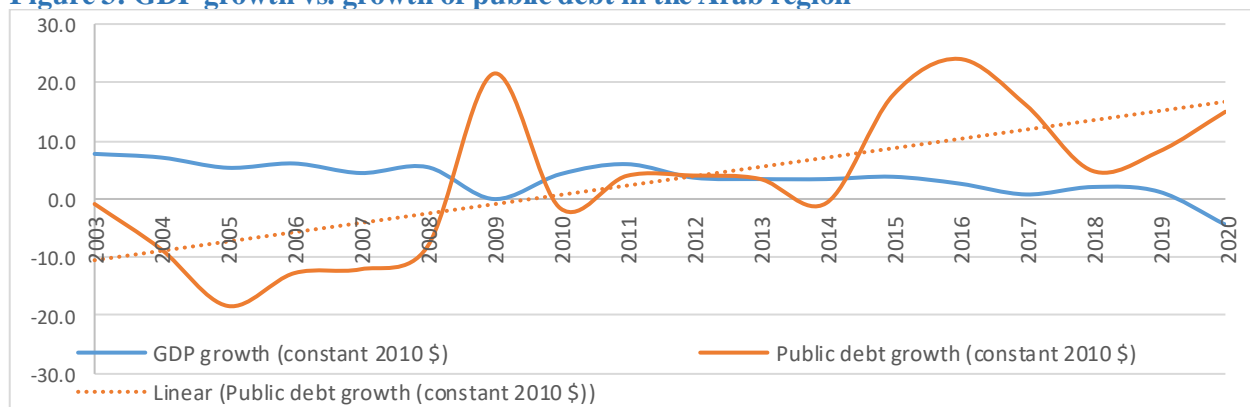
Note: Aggregate for CACs exclude Palestine and Syrian Arab Republic; Aggregate for LDCs exclude Somalia and Sudan.

⁶ World Bank, 2021.

⁷ IMF financial assistance for emerging and advanced market economies are: *Stand-By Arrangements (SBAs)* to address short-term or potential balance of payments problems; *Extended Fund Facility (EFF)* as a medium-term support to countries facing protracted balance of payments problems because of structural weaknesses that require time to address; *Rapid Financing Instrument (RFI)* to provide rapid assistance to countries with urgent balance of payments need to cope with shocks. (See <https://www.imf.org/en/About/Factsheets/IMF-Lending>)

In addition to increasing debt, the composition of debt has been changing as well, especially with increasing external debt from private creditors and reduced concessional borrowings from official creditors for several MICs and LDCs in the region. With increasing share of non-concessional loans and low access to grant finance, most MICs are facing increasing debt servicing burdens. Lebanon, for instance, spends nearly 43 percent of public revenues in debt servicing (on average during 2016 to 2019). Tunisia spent nearly 20 percent of its revenues in debt servicing during the same period. Egypt, Jordan and Morocco had spent more than 10 percent of their revenues in debt servicing. For some LDCs, including Mauritania and Djibouti, debt service consumes more than 20 percent of public revenues, on average, between 2016 and 2019. While expanding the fiscal space to mitigate the medium to long term impact of COVID-19 is an imperative for most countries in the region, increasing debt servicing burdens put a major impediment to release resources that could have been spent in essential social areas.

Figure 3: GDP growth vs. growth of public debt in the Arab region



Source: Authors' calculations based on data from IMF WEO and World Bank WDI.

C. Persistent fiscal and current account deficits pose liquidity challenge that constrain the provision of essential public services

High and persistent fiscal deficits for MICs and LDCs in the Arab region are among the key drivers of debt accumulation and they pose increasing liquidity challenges that constrain social and economic investments for the SDGs. MICs have witnessed a continuous decline in fiscal balances (as a percentage of GDP) since 2008, and COVID-19 has further widened the fiscal and primary balances to -9 percent of GDP and -3 percent of GDP in 2020, respectively (figures 4A and 4B). Average fiscal and primary balances in LDCs remained mostly negative after 2008. In 2020, the average fiscal and primary balance of LDCs reached -11.6 percent and -11.4 percent, respectively, as a result of the adverse impact of the pandemic.

For the GCC, the average fiscal and primary balances (as a percentage of GDP) turned negative from 2015 onwards owing to the 2014 oil price plunge which led them to increasingly considering by issuing sovereign bonds in international capital markets to meet expenditure needs, in addition to introducing new policy measures such as VAT and subsidy reductions. In 2020, COVID-19 that caused significant oil revenue losses for these countries pushed their fiscal and primary deficits to -9.2 percent of GDP and -10.6 percent of GDP, respectively. Recurring negative primary balance across several countries in the region leads to increased debt finance and rollover of debt outstanding.

Figure 4: Fiscal balances in the Arab region

Figure 4A: Fiscal balance (as a percentage of GDP)

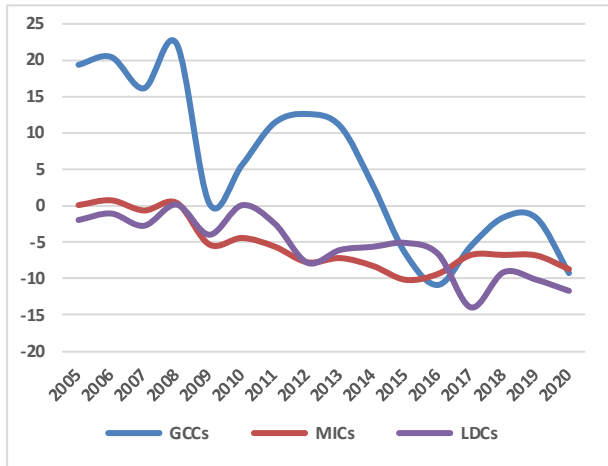
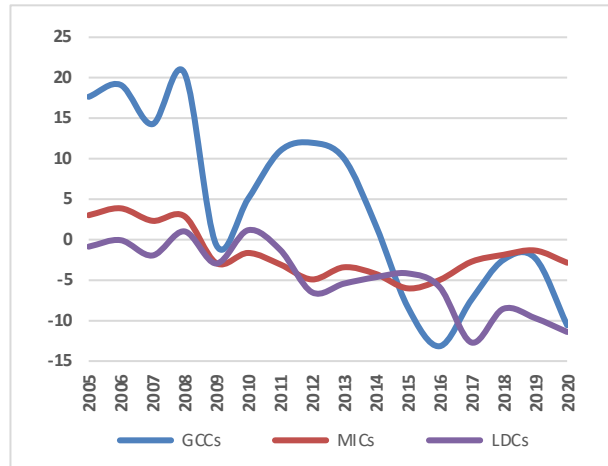


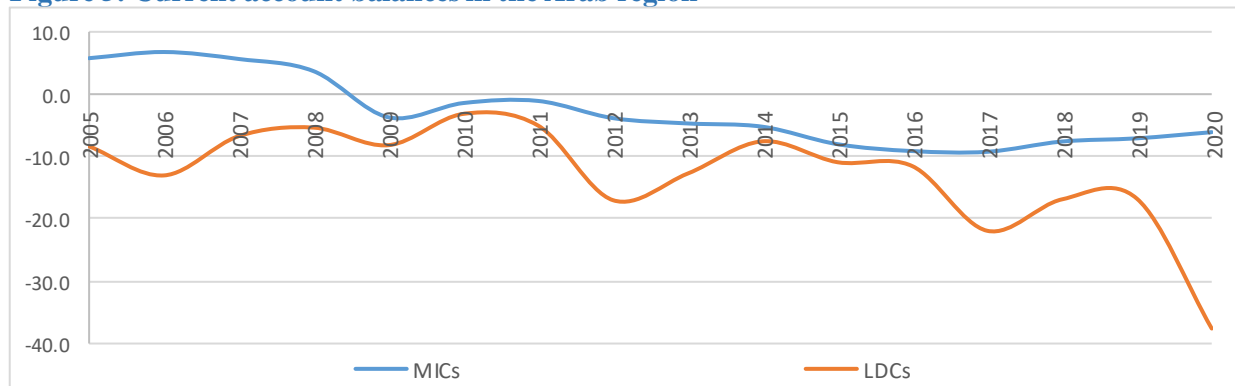
Figure 4B: Primary balance (as a percentage of GDP)



Source: Authors' calculations based on data from IMF WEO and World Bank WDI.

Persistent current account deficits in the MICs and LDCs add to the liquidity challenge in foreign currency and drive their external borrowing. Current account deficits are a major constraint for most Arab MICs and LDCs because they are heavily reliant on imports for local consumption while their exports are largely limited to primary products. In 2020, the current account deficit reached 6 percent of GDP for the MICs and around 37 percent of GDP for the LDCs (figure 5). The associated liquidity constraints will make the path to recovery from COVID-19 more challenging and will pose challenges for financing the SDGs and social investments.

Figure 5: Current account balances in the Arab region



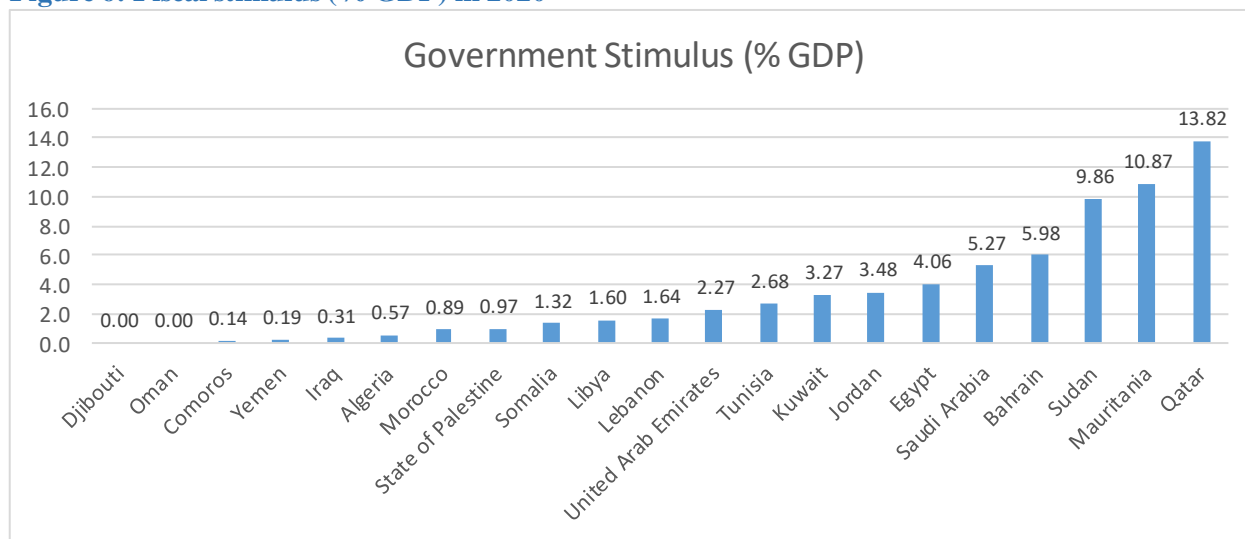
Source: Authors' calculations based on data from IMF WEO.

D. Limited fiscal space constrained COVID-19 policy responses posing challenges to a resilient and inclusive recovery

Consequent constrained fiscal space and liquidity challenges are reflected by the Arab region's insufficient and inadequate fiscal support to mitigate the adverse effects of the pandemic, and progress

towards a resilient recovery. Of the total global fiscal support of \$18.7 trillion, Arab countries have allocated only \$ 94.8 billion, which is around 4 percent of their GDP in 2020, compared with a global average of 22 percent.⁸ Governments have provided fiscal support quite differently across countries, largely due to available fiscal space (Figure 6). Government support in Sudan and Mauritania stand out amongst the LDCs. Mauritania announced the creation of a special fund for social solidarity amounting to 800 million dollars representing a large proportion of the stimulus total which stands at 11 percent of GDP. Sudan has allocated significant fiscal and monetary resources to the COVID 19 response by way of social safety net measures; however the bulk of the measures constitute the shoring up of the healthcare system. With the exception of the two countries mentioned, fiscal response to the crisis measured in percent of GDP remained significantly low in the LDCs.

Figure 6: Fiscal stimulus (% GDP) in 2020

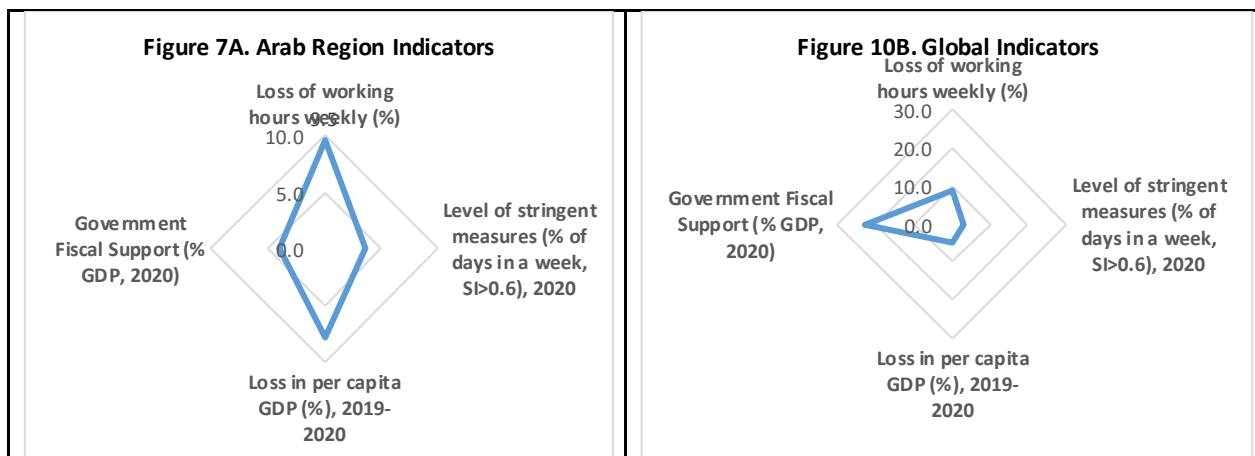


Source: ESCWA 2020a. COVID-19 Stimulus Tracker

Given the loss of income and jobs, and the strict containment measures, the fiscal stimulus in the Arab region is low compared with the global average, especially in view of the region’s high pandemic losses and its additional financing needs for recovery (Figure 7).

⁸United Nations, [COVID-19 social protection and economic policy responses of governments: lessons for social protection readiness and building forward better](#), 2021.

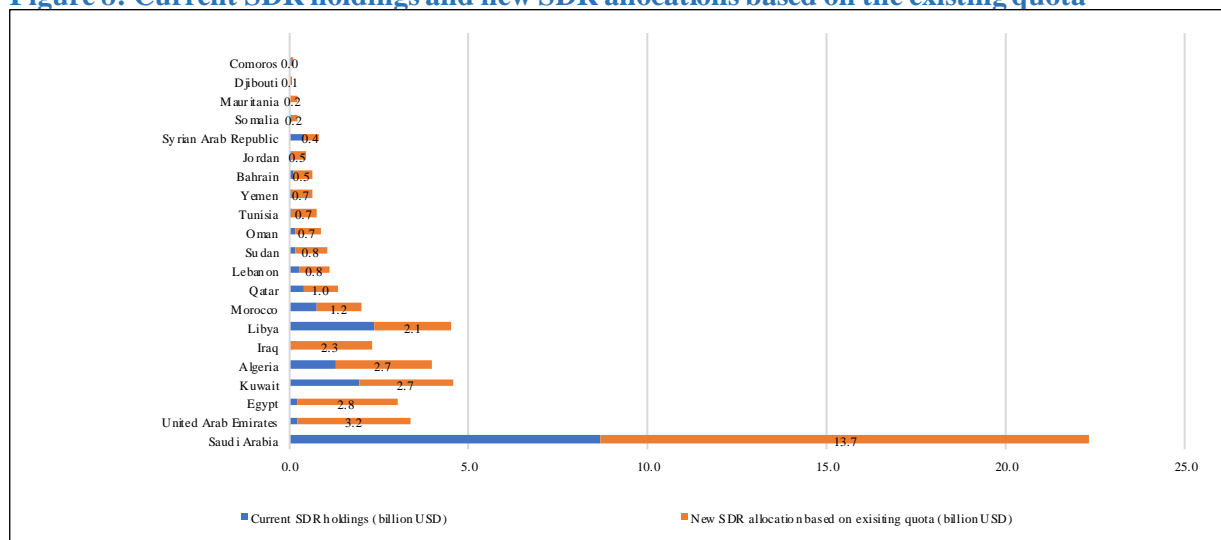
Figure 7: Indicators gaging the impact of COVID



Source: ESCWA 2021.

The new issue of Special Drawing Rights (SDRs) is a useful liquidity support measure, however it remains skewed toward benefitting the high income countries more than the developing countries, based on existing quota of distribution of SDRs. Out of \$650 billion, the Arab region will receive \$37.3 billion, with the low- and middle-income countries of the region (15 out of total 22 Arab States) receiving only about USD 15 billion (figure 8). Overall, the amount of new SDRs allocation to the region is far below than that is required for recovery and building forward better. The Global Stimulus Tracker estimates that the region requires an additional \$462 billion toward achieving a resilient and fast recovery path at par with global regions.

Figure 8: Current SDR holdings and new SDR allocations based on the existing quota



Source: ESCWA (2021). Calculations based on IMF data.

These challenges are on top of the challenges that the region is facing in progressing towards the SDGs. The latest Arab Sustainable Development Report (ASDR) 2020⁹ by ESCWA, provides analysis of the official SDG indicators, where data is available, and shows a regional snapshot of uneven and worrying rates of SDG achievement. In many key indicators, the region will not reach the SDG targets by 2030 and it lags behind other regions on the global stage – most notably in those related to income poverty, gender equality, health-care coverage, social protection, peace and security, the sustainable management of natural resources, consumption and production, and climate change.

Estimates suggest that additional expenditure requirements for delivering on the SDGs are between roughly US\$2 and \$3 trillion per year (UNCTAD 2019). The UNCTAD World Investment Report 2014 estimated the annual investment gap between current investment and what is required to achieve the SDGs at between \$1.9 to \$3.1 trillion for the developing countries¹⁰. In 2019, the IMF calculated that low income developing countries would need US\$0.5 trillion and emerging market economies would need \$2.1 trillion in additional spending in 2030 to achieve meaningful progress on SDGs in the areas of education, health, roads, electricity, water, and sanitation.¹¹ These areas were studied because of their direct links to investment in human, social, and physical capital. \$2.1 trillion represents an additional 4% of GDP for the emerging market countries, a challenging but attainable target for the countries to achieve themselves. However, financing needs for low-income developing countries accounted for 15% of their GDP, far beyond what these countries can achieve through their own means.

The COVID-19 pandemic has created a two-sided problem, increasing the funding requirements that countries need for the SDGs, while at the same time reducing governments' abilities to finance expenditures. Progress toward the SDGs has slowed or reversed as the global pandemic has increased poverty rates, increased mortality, and erased gains in education (UN DESA 2021)¹². Additionally, addressing emergency health and social protection needs associated with COVID-19 has consumed government resources which could otherwise have been allocated toward the SDGs. In a study of four countries, the IMF estimated that SDG spending requirements increased by 21% due to the COVID-19 pandemic.¹³ In a similar vein, a 2020 OECD report concludes that there was US\$2.5 billion in unmet SDG financing prior to 2020, and over the course of the pandemic, needs have increased by a further US\$1 billion.¹⁴ Meanwhile, a slowdown in economic activity has made financing more difficult. The OECD paper claimed that external private financing fell by US\$700 billion in 2020, creating a “scissor effect” by which spending needs increase while spending capabilities decrease. The challenge is particularly severe for least-developed countries which depend on ODA, as the pandemic has curtailed partner countries' abilities to provide support.

⁹ ESCWA (2020b)

¹⁰ UNCTAD (2014)

¹¹ IMF (2019)

¹² UN (2021b)

¹³ IMF (2021)

¹⁴ OECD (2021)

III. Fiscal strategy for enhancing social expenditure and fiscal sustainability

The envelop of resources for enhancing social expenditure can come from many areas, but there are three key areas where public policy can matter: a) improving domestic resources, mainly focusing on taxation; b) increasing debt financing in a well strategized framework that is coherent with stabilizing debt to GDP in medium term and improving debt sustainability in the medium to long term. We assess these options in case of Arab region and their potential, taking into consideration the key issue of promoting growth and fiscal sustainability.

A. Improving domestic resources

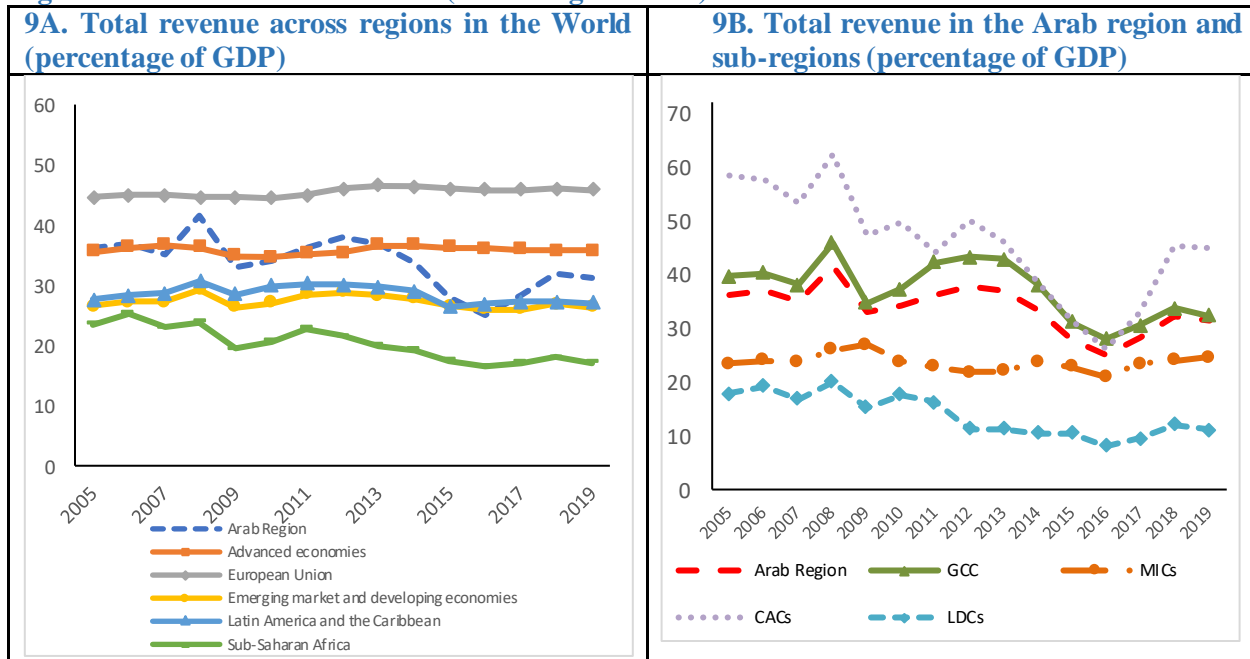
Total revenues: Vary widely across the region

Total revenues of the Arab region, as a share of GDP, was 31 percent in 2019 (figure 9). Within the region, there are wide variations in revenues to GDP share, largely due to differences in natural resources and income level. The revenues to share of GDP in middle-income countries (MIC) was about 25 percent; in the GCC it was 32 percent and in the LDCs it was 11 percent in 2019.

Since the global economic slowdown in 2008, the region has been hit by several economic and political shocks that have adversely affected economic growth and revenues mobilization. Public revenues, as a share of GDP, dropped from a peak of 42 percent in 2008 to 31 percent in 2019 (figure 9A & 9B). The trends in revenues of GCC, which is strongly associated with changes in international oil prices¹⁵, are a key driver to the decline in aggregate public revenues of the region. The share of revenues to GDP of GCC was 46 percent in 2008, against 32 percent in 2019. For the least developed countries (LDCs), the share has declined from 20 percent in 2008 to 11 percent in 2019. The Conflict-Affected Countries (CACs) in the region that include oil exporting countries such as Libya and Iraq to LDCs such as Yemen have experienced significant loss of revenues during the past decade and half as well. Public revenue of the MICs, who rely mainly on taxation, has remained largely unchanged, hovering around 26 percent to their GDP during 2008 and 2019. However, their performance in revenue mobilization is lower than that of the emerging market and developing economies whose revenues to GDP ratio hovered around 30 percent over the last decade.

¹⁵ ESCWA 2019.

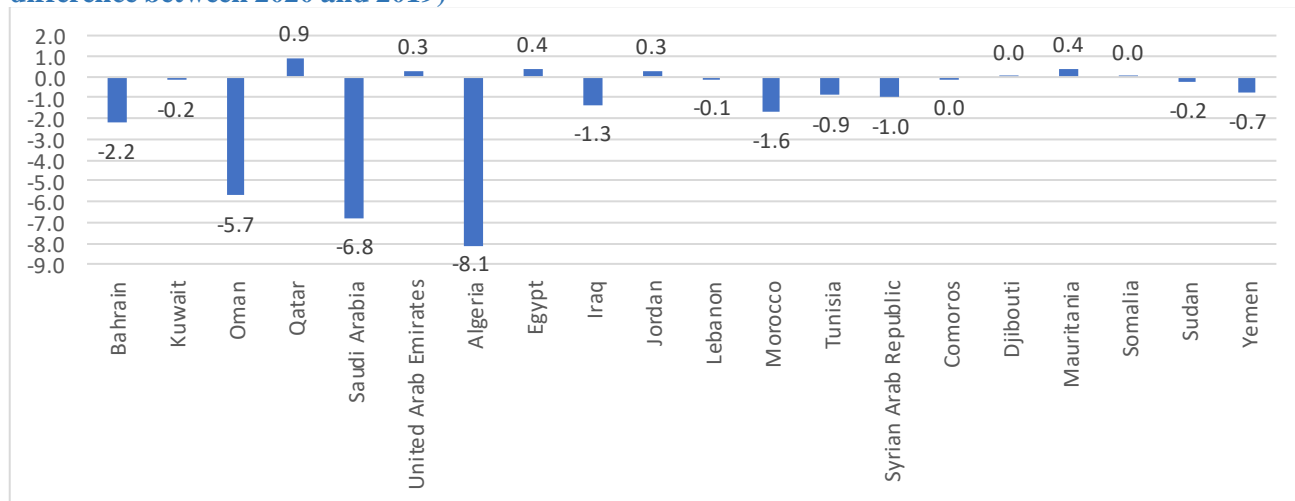
Figure 9: Trends in total revenues (Percentage of GDP)



Source: ESCWA 2021b, based on national data and IMF data.

Note: Regional and sub-regional aggregates are weighted averages. The averages exclude Somalia, State of Palestine, and Syrian Arab Republic due to unavailability of data. The classification of emerging market and developing economies follows that of IMF World Economic Outlook.

Figure 10: Loss of revenues due to adverse impact of COVID-19 (percentage of GDP – percentage point difference between 2020 and 2019)



Source: ESCWA 2021b, based on GEFM forecasts.

The adverse economic impact of COVID-19 has resulted in further loss of revenues (figure 10). The region lost nearly USD 150 billion of revenues – the share of revenues to GDP went down from 31 percent in 2019 to 27 percent in 2020. Most governments across the region have announced tax relief measures to support individual taxpayers and business that find themselves in a difficult financial

situation. These measures include tax exemptions, deferment of tax collection, waiver or reduction of customs duties that have resulted in reduction of government revenues. For instance, as part of the COVID-19 crisis response, Egypt increased personal deductions and reduced the tax burden on transactions executed on the Egyptian Stock Exchange with the aim of promoting investment and stimulating economic activity; Morocco introduced tax exemptions for individuals who lost their jobs because of the crisis (Annex Table A4).

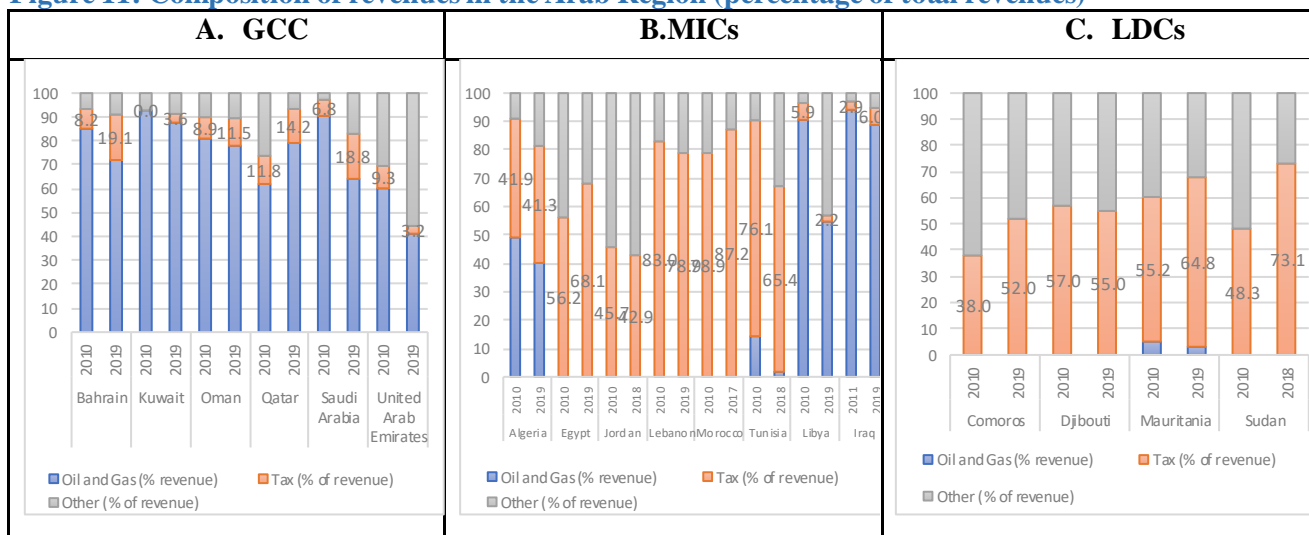
The sources of revenues differ widely across countries in the Arab region. Oil and gas revenues constitute the main source of revenues in GCC. In recent years, the contribution of tax revenues increased in several countries, including in Saudi Arabia, Bahrain, Oman, Qatar, and Kuwait (figure 11A). The increase in share of tax revenues could be attributed to two reasons—several GCC countries introduced VAT or customs and excise taxes; and secondly, they witnessed a significant decline in oil revenues due to low oil prices since 2014 which increased the share of tax revenues.

The MICs rely mainly on taxes and excise for public revenues, except for Algeria that has a high reliance on oil sector (figure 11b). Morocco, Tunisia, and Lebanon are relatively good performers within the MICs in the region – they mobilize more than three-quarters of their revenues from taxes. In recent years, several MICs such as Egypt and Morocco have increased customs duties or used mechanisms such as privatization of public investments to increase revenues.

Taxes, as well as foreign grants, constitute a large source of revenues for the LDCs. However, the share of taxes in total revenues has increased in several LDCs during the period 2010 and 2019, such as in Comoros, Mauritania and Sudan (figure 11c).

Among other countries in the region, Iraq, Libya and Yemen have high reliance on oil sector revenues.

Figure 11: Composition of revenues in the Arab Region (percentage of total revenues)



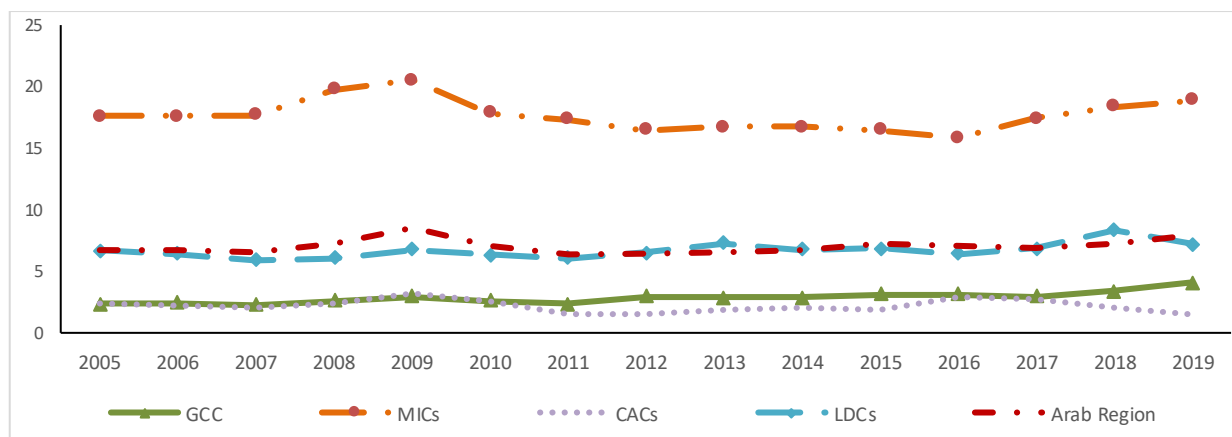
Source: ESCWA 2021b, based on national data, and IMF.

Note: The components of other revenues are country specific.

Tax revenues: Equity and progressivity remain a challenge for most countries in the region

Improving tax revenues remain a challenge for most countries in the region with total tax revenues of the region, as share of GDP, being steady at around 8 percent since 2010 (figure 12). Within the region, this share ranges from a low of 1 percent of GDP in one oil-rich country to 25 percent in one low- and middle-income country. Income tax out of total tax revenue remains low, while wealth taxes are almost negligible.¹⁶ Despite the MICs relying mainly on taxes for public revenues, they have witnessed a steady decline in their taxes to GDP share between 2009 and 2016, especially due to the global economic slowdown combined with conflicts in several parts of the region. They have introduced several tax reforms aimed at increasing tax revenues during the last five years, which explains the slight increasing trend of taxes to GDP between 2016 and 2020. However, their median taxes to GDP ratio remained low, at around 16 percent in 2019, as compared to 25 percent in the world's developed countries and around 18 percent in the world's middle-income countries.¹⁷ The GCC countries have not historically imposed taxes on individuals and goods and services, which explains a low tax to GDP ratio. Their taxation system mainly relies on corporate income taxes (CIT). Since the 2014 plunge in oil prices, the GCC countries have increased their focus on fiscal policy reforms mainly concentrating on the introduction of taxes on goods and services, such as VAT and excise tax, as part of efforts to diversify the revenue base and improve revenue collection. The low tax to GDP of LDCs and CACs is reflective of the development challenges of these countries.

Figure 12: Trends in tax revenue within the Arab Region (Percentage of GDP)



Source: ESCWA 2021b, based on national data and IMF.

Several tax reforms have been enacted across countries in the Arab region since the last decade as part of efforts to improve revenue mobilization. However, these reforms have not spurred the desired increase in public revenues, not least, due to the significant tax revenue leakages that continue to undermine the integrity of tax systems in the region.

¹⁶ See ESCWA, 2019 and ESCWA, 2021.

¹⁷ UN (2021c). FSDR.

Furthermore, for the most part, the reforms fell short of improving tax equity and progressivity. The contribution of income tax (personal income tax and corporate income tax) is low for most MICs and LDCs. There have been efforts recently to mobilize higher revenues from income tax reforms in several countries, however, the share of income tax in total taxes is at most 20 percent in most cases, except Tunisia where income tax share is around 30 percent in 2019 (figure 13). Wealth tax constitutes a negligible share of total tax revenue, despite that the region has a high concentration of wealth among the top 1 per cent of people¹⁸. The high share of taxes being mobilized from goods and services indicates the regressive nature of taxes, since the burden of indirect taxes is more on the poor and the middle class than the rich¹⁹. Additionally, implementation of VAT across the countries suggests that multiple tax exemptions and rates often reduce equity in the administration of VAT and burdens the poor and the middle class more than the richest sections of population²⁰. The rationale of exemptions is often not clear and not targeted toward lessening the tax burden on low-income taxpayers. In some cases, VAT tax exemptions are granted for luxury items which are not consumed by taxpayers at the bottom end of the income distribution.

Figure 13: Composition of tax revenues in MICs (percent share)



Source: ESCWA 2021b, based on national data and IMF.

Note: For Algeria, the red dotted pattern includes goods and services tax revenue, property tax revenue, and other tax revenues. For Lebanon, the purple pattern represents revenues from direct taxes, and the green pattern includes property tax and other tax revenues. For Tunisia, revenues from goods and services tax include revenues from VAT, consumption duties, and other indirect taxes. The dark green-dotted pattern includes goods and services, property, and other taxes.

Most Arab countries still suffer from low tax buoyancy -except for Algeria and Morocco- as GDP growth does not trigger a proportional rise in tax revenues. Weak tax administration and tax leakages are reasons for such performance. This is also typical for settings where large parts of the economy are informal.

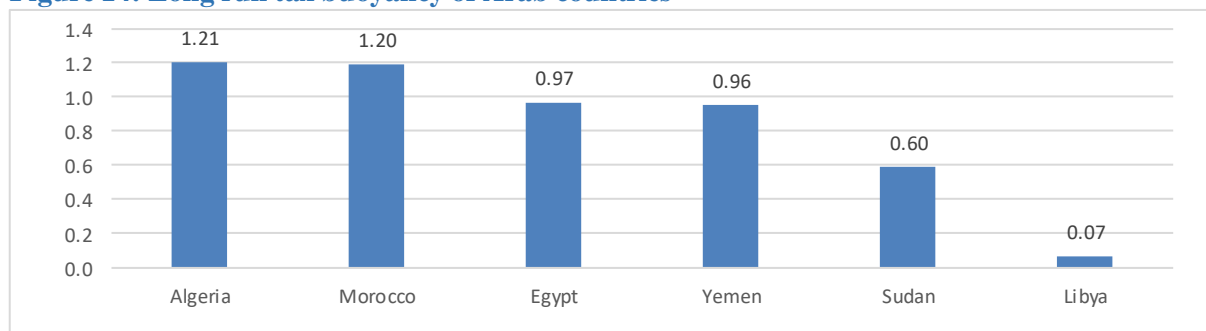
¹⁸ Alvaredo, Assouad and Piketty (2018)

¹⁹ Sarangi, Bhanumurthy and Abu-Ismaïl, 2015.

²⁰ ESCWA, 2017

While informal economic activity compromises low skilled labor, much of the tax lost comes from high-net-worth individuals, and hard to tax professional services (figure 14).

Figure 14: Long run tax buoyancy of Arab countries



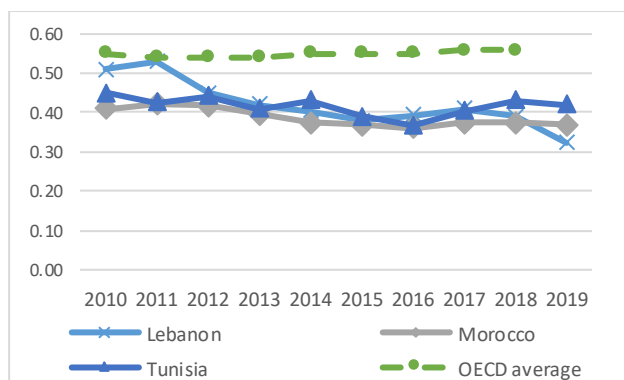
Source: Dudine and Jalles 2017, IMF Working Paper.

Note: Percent increase in tax revenue for 1 percent increase in GDP

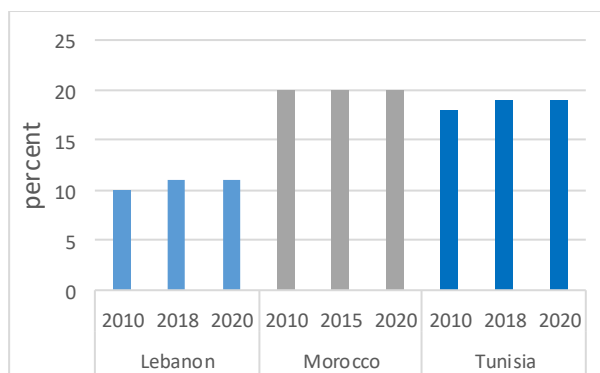
Despite the several tax reforms undertaken, VAT efficiency remains low in the region, varying between 0.32 and 0.42, as compared to global benchmark, such as OECD average of 0.55. Furthermore, VAT efficiency shows a declining trend for most Arab countries, even for those that have increased VAT rates (Lebanon and Tunisia). Countries with higher VAT rates do not necessarily have higher efficiency and those that increased their VAT did not necessarily witness improved VAT efficiency (Figure 15). In this context, revenue reforms should be aimed at targeting tax leakages and efficiency of tax systems in order to improve revenue mobilization and fiscal space available to financing social investments and the SDGs.

Figure 15: Higher VAT rates are not enough to improve tax efficiency

15A: VAT efficiency in the Arab region compared to OECD average



15B: VAT rates in the respective countries and their increase over time



Source: ESCWA 2021b, based on data from Ministry of Finance of the selected countries, IMF and OECD.

Note: VAT efficiency represents the ratio between VAT collection measured in percent of GDP and the VAT rate

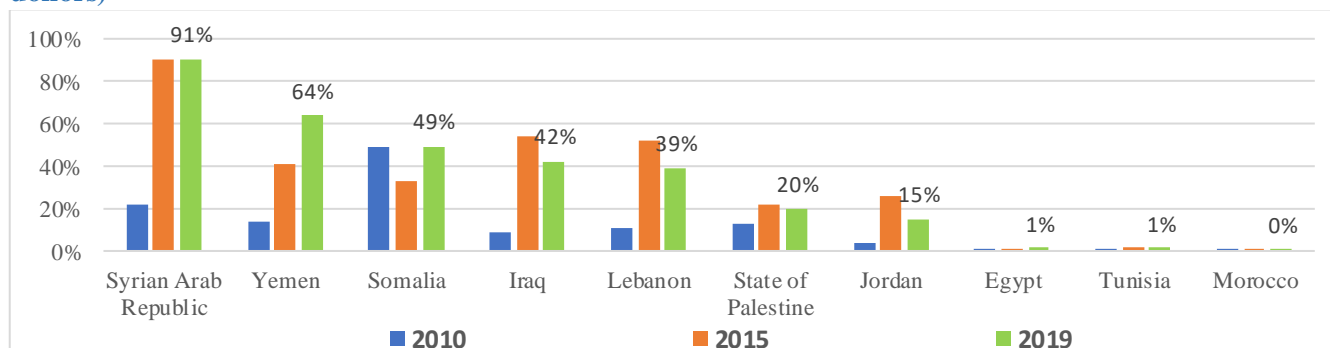
ODA: falls short of commitments by DAC countries and

Official Development Assistance (ODA) is a critical means of implementation for several SDGs targets. Total ODA provided to Arab countries (excluding Arab donors), has steadily increased since 2011,

following years of sharp decline during 2008-2010. In 2019, total ODA in the Arab region was \$33.9 billion, which is approximately 10% lower than the peak within the past decade registered in 2018. The total ODA received by Arab countries from all sources is 17.6 per cent of total ODA extended to developing countries in 2019.

However, the increasing trend of ODA to the region is largely influenced by in-country “refugee” costs and humanitarian aid channelled to the countries affected by conflicts (figure 16). This reflects the global situation where in fragile and conflict-affected situation, it is often the case that the majority of social services are provided by humanitarian organisations, constituting the only way that conflict-affected populations can access services.²¹ For instance, about 90 per cent of ODA to the Syrian Arab Republic was humanitarian aid. Among the least developed countries (LDCs), Somalia and Yemen received a higher inflow of ODA in the past five years, a large part of which was humanitarian aid. In contrast, ODA to the Sudan has declined significantly during the past decade. ODA to the middle-income countries of the region, including Egypt, Jordan, Morocco and Tunisia, appears to have increased during the past decade, but aid flow has remained volatile, fluctuating from one year to another. The inconsistency in the flow of ODA remains a major concern, in addition to the fact that developed countries need to keep their commitment of 0.7 per cent of gross national income (GNI) to disburse as ODA to developing countries.

Figure 16: Humanitarian aid as percentage of total ODA disbursed (10 largest Arab recipients from all donors)



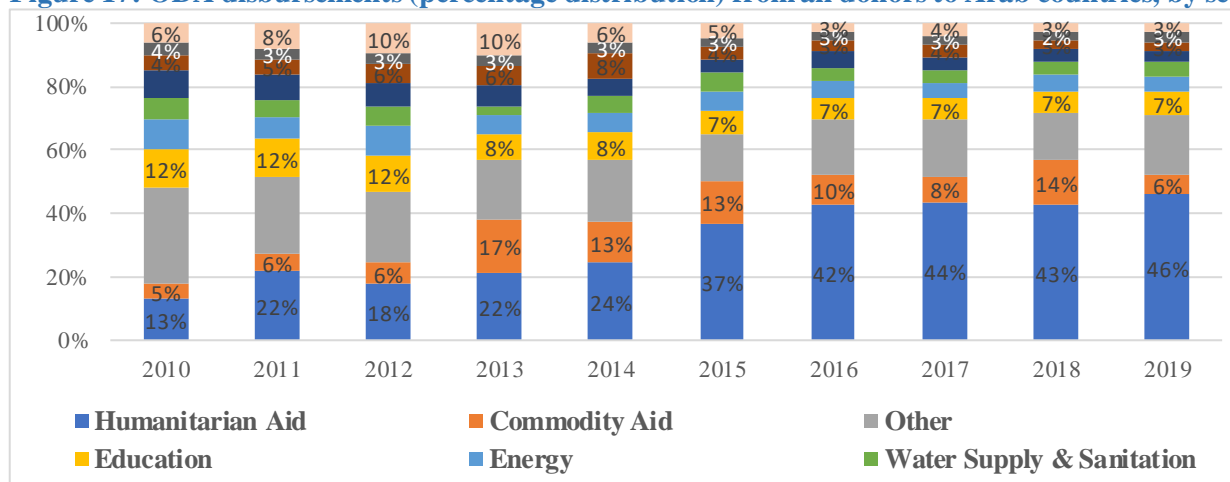
Source: OECD, 2021.

In the region, the share of ODA to education sector has declined over the years, and was only about 7 per cent in 2019. The share of ODA to health sector, water supply and sanitation remain negligible, declining to 3 per cent and 4 per cent, respectively, in 2019. Together water supply and sanitation, education, health and commodity aid accounted for only 21 per cent of total ODA in 2019 (figure 17). ODA share to the production sector declined over the years as well. These trends are worrisome and can hamper the progress of several SDGs of the region, considering that significant resources are needed in

²¹ Shuftan, C., van der Veen, A., & Lothe, P. (2003). Evaluation of ECHO’s 1999 to 2002 funded actions in Sudan. An evaluation prepared for the European Commission Humanitarian Office (ECHO).

these sectors to improve the quality of public services and improve access to the poor in order to make the societies more inclusive and sustainable.²²

Figure 17: ODA disbursements (percentage distribution) from all donors to Arab countries, by sector



Source: OECD, 2021.

B. Climate/SDGs debt swap as an innovative financial instrument to improve fiscal space

Given high debt burdens and insufficient access to finance, many countries in the region are struggling to finance inclusive recovery from the COVID-19 crisis, which could lead to deep and long-term social and economic scarring. Weak fiscal positions are also severely constraining the ability of many economies in the region to address growing climate challenges and manage a green transition. Against this backdrop, the provision of debt relief through innovative financial instruments can help create the fiscal space needed for countries to invest in a sustainable, inclusive, and green recovery.

The G20’s Debt Service Suspension Initiative (DSSI) and the subsequent establishment of the Common Framework on Debt Treatments Beyond the DSSI are important initial steps in facilitating debt relief efforts and increasing fiscal space for essential public services for many vulnerable countries. However, middle-income countries facing high debt burdens remain ineligible to benefit from the initiative, and there is no clear incentive or mechanisms that can provide an enabling environment or compel private creditors to participate in debt relief efforts. There is need for more comprehensive debt relief initiative, that encompasses a wider group of countries and enables participation of all creditors, particularly given the urgent need to fill substantial gaps in financing SDGs and climate action.

The innovative climate/SDGs debt swap can be an effective instrument for supporting debt relief and increasing fiscal space for implementation of Agenda 2030 and Paris Agreement, especially for countries that do not have unsustainable debt burdens. In 2020, the United Nations High-level Meeting on Financing for Development set out a menu of options for consideration by Heads of State and Government, that includes the use of debt swaps as a way to assist countries that are facing high debt

²² Sarangiet al., 2018.

burdens.²³ Such debt swaps have historically been used for social or environmental objectives, and for both official and commercial debt. In the former case, official creditors cancel debt while in the latter, grant funding is used to repurchase commercial debt in the market (which is generally traded at a discount). In both cases, this is done in return for a commitment to allocate freed resources for investments in agreed priorities.

Furthermore, developed countries have reiterated their commitments to improve climate finance for developing countries in the CoP-26 in 2021. While there is an acknowledgement of urgency of reaching the \$100 billion target annually, the financing instruments utilized need to be innovative especially because new debt has become a less viable option for many developing countries as external private sector held debt has skyrocketed over the past decade, even before the onset of the pandemic. Further, the Arab region, for instance, receives climate finance mostly through external debt instruments, which exceed grant finance by a factor of 8.5. While the pandemic has triggered a sharp increase in debt vulnerabilities in the Arab region, climate finance in any kind of new borrowing will add to the debt service burden and thus it would risk inclusive recovery and effective climate action.

In 2020, the United Nations Economic and Social Commission for Western Asia (UN-ESCWA) launched, the Climate / SDGs Debt Swap - Donor Nexus Initiative to assist countries toward improving fiscal space for financing SDGs and climate action, while also contributing to reducing their debt burdens.²⁴ The initiative creates a new generation debt swap instrument which is an innovative long-term swap mechanism by taking into consideration issues of scalability of swap amount, donor support and a key-performance-indicators (KPI) framework to maximize the impact of the swap. The new initiative addresses the limitations of traditional type of debt swaps that were mainly implemented on ad hoc basis and had limited impact on development objectives.²⁵ The initiative encourages participation of middle-income countries in the region that are facing high debt burden, but they are not unsustainable, and bilateral creditors that are serious about supplementing their commitments to ODA and climate finance pledges, especially those with objective of accelerating implementation of SDGs and climate action.

The opportunity is significant for the middle-income Arab States as external debt service consumes about \$20 billion of their expenditures, which constitute about 11 percent of their export earnings (or nearly double the middle-income countries' global average). Furthermore, Arab States' climate financing lags behind other regions in terms of volume, particularly in the water and agricultural sectors where adaptation needs are greatest. The success of the initiative will depend upon support of the developed countries and their effective actions toward improving climate action pledges for developing countries. In conclusion, the climate debt swap is a perfect example of the type of innovative solutions that countries may employ in order to work towards fulfilling the SDGs while at the same time freeing up fiscal space.

²³ United Nations, 2020. Financing for Development in the Era of COVID-19 and Beyond: Menu of Options for the Consideration of Heads of State and Government.

²⁴ ESCWA 2020.

²⁵ Sarangi and Griswold 2020. Debt Swap for Climate and SDGs Finance in the Arab Region. Technical Paper. ESCWA.

C. Well strategized debt financing through stabilizing debt/GDP ratios

Reducing debt to GDP is an important challenge for several of the MICs in the region while there is an urgent need for increasing finance for public services and SDGs. Therefore, additional debt finance cannot be ignored despite some of the countries are facing high debt burdens. While adopting a strategy to increase debt finance, there is no acceptable threshold for setting debt limits. However, governments need to be mindful of interest burden on revenue flows in any debt financing strategy.

In this context, a debt finance strategy should consider stabilizing debt to GDP in the near to medium term, instead of reducing debt to GDP, to mobilize additional fiscal space for much needed increase in public expenditures to finance the recovery efforts and the SDGs.²⁶ An accounting exercise would serve to guide the adoption of a debt to GDP stabilizing threshold for the near to medium term, either maintaining the current ratio or any change in that ratio, and thus estimate how much fiscal space can be released (or generated through debt finance), without affecting solvency risks.²⁷

A debt-stabilizing threshold that is above the target of the baseline forecast (overall in medium term) would imply increased fiscal space through more debt finance. The critical issue in maintaining debt stabilization ratio is that the share of interest payments to revenue flows should remain at an acceptable level. Furthermore, the additional finance should be channeled to investments that generate productivity and growth and thereby it improves revenues. Ideally, it should be part of a medium-term framework of expenditures and revenues.

Against this background, an analysis of debt-stabilization ratios is conducted for selected middle-income countries, such as Tunisia and Jordan, in a structural macroeconomic modelling and forecasting framework and assessed its impact on macroeconomic performance of the economy.

The structure of the country models, utilized for the exercises, are based on the Global Economic Forecasting Model (WEFM), with critical extensions in government sector that allow for additional channels of policy influence. The baseline forecasts till 2030 uses actual data through 2020, including the estimated COVID-19 impact (See Annex for the equation structure of the model).

Case Study: Jordan

Jordan is facing a significantly high debt burden, low economic growth and high interest rates in recent years. The adverse economic impact of the COVID-19 has produced a contraction in economic growth to -5.4 percent in 2020²⁸. Public debt is estimated to be at 93 percent of GDP in 2020. Revenues being low, primary deficit as a share of GDP has widened as well in 2020. The baseline forecasts, based on the

²⁶ Sarangi, 2020; ESCWA 2020.

²⁷ The stabilizing debt to GDP solution would not work in a case where the debt is unsustainable and default risk is high or already defaulted. In such cases, the approach is to restructure debt (Stiglitz and Rashid 2020).

²⁸ ESCWA, 2021. Survey of Economic and Social Developments in the Arab Region 2020-2021: Summary. <https://www.unescwa.org/sites/default/files/pubs/pdf/survey-economic-social-developments-2020-2021-summary-english.pdf>

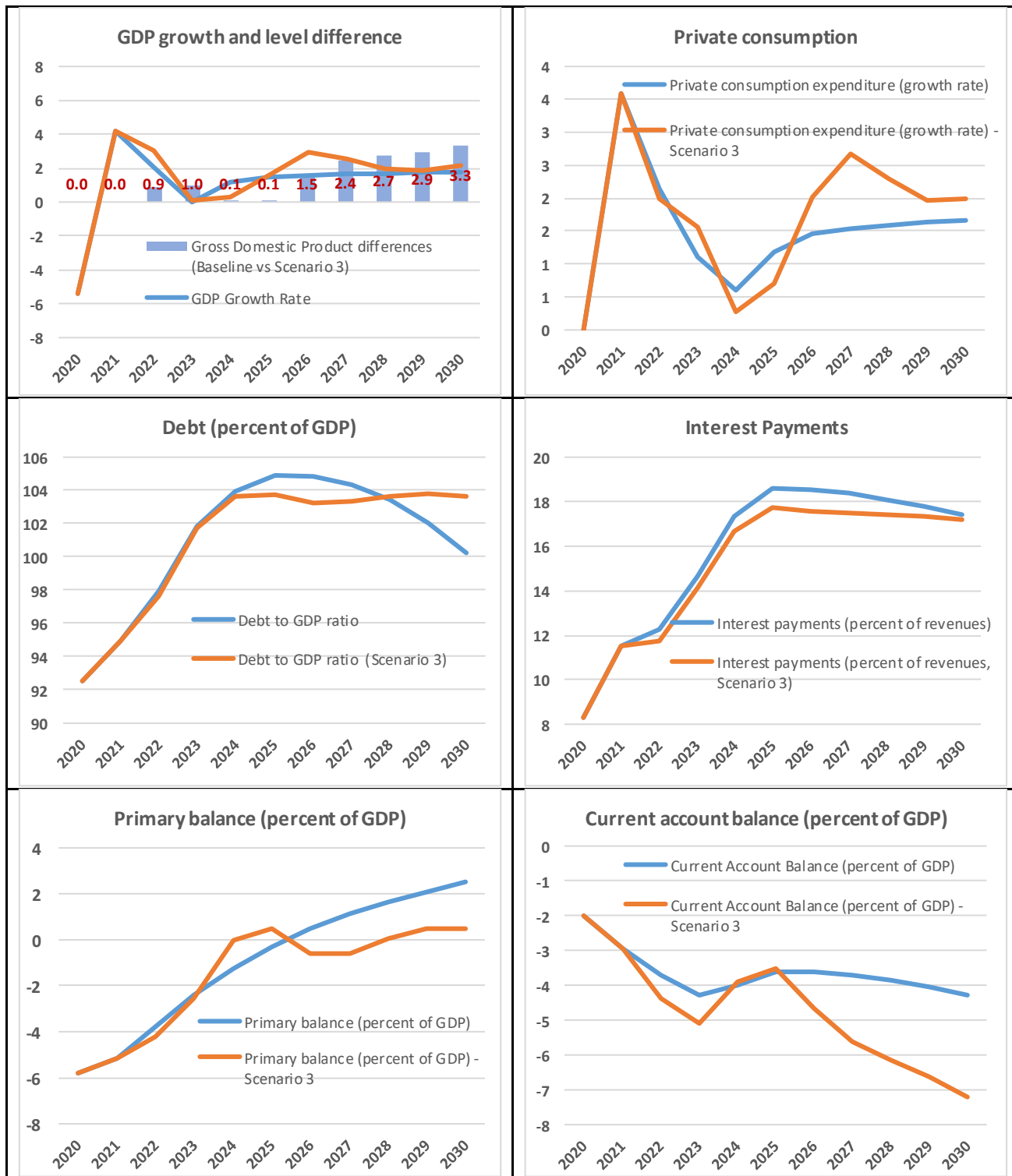
World Economic and Forecasting Model, indicate that debt-to-GDP ratio will increase to 105 percent by 2025, and thereafter it will go down to 100 percent in 2030.²⁹

Given the financing needs for social expenditures and public investments, including financing the COVID-19 recovery packages, an alternative option is to allow debt to GDP ratio to stabilize in the medium term, i.e., by 2030, at 104 percent of GDP (Scenario 1). This would imply some austerity measures between 2024 and 2026, with a relative easing thereafter, thus generating additional fiscal space for public expenditure. The estimated additional fiscal space created by stabilizing debt to GDP at 104 percent of GDP is 3 billion JD, which can increase the envelop of public expenditures (over the period 2021-2030), as compared to the baseline – representing 2.7 percent of baseline total public expenditure (cumulative). These additional resources can be spent on increasing public expenditure in general or they can be targeted to social sectors, such as education, health and housing that have a more pronounced impact on SDGs and on boosting productivity.

The initial trajectory of debt and that of public expenditure are both below the baseline have an adverse impact on economic performance during 2024 through 2025. Thereafter, scenario growth rises above the baseline by 0.4 to 0.9 percent from 2026 onwards. This is mirrored by a rise in the output level that is outweighs its baseline counterpart starting from 2026. Thus, the additional nominal GDP generated by this scenario between 2021 and 2030 amounts to 2.1 billion JOD, with the indicator reaching 44.4 billion JOD – namely 1 billion JOD above baseline. The advantage of having increasing public expenditure is that potential output rises, private expenditure goes above that of the baseline, which implies a higher level of demand and consumption capacity for people. The primary balance remains turns positive and in 2030 remains so. The current account balance deteriorates to a level 1 percentage of GDP point below its baseline value by 2030. The share of interest payments to total revenues stands between 17 and 18 percent from 2024 onwards, which is slightly higher than the average for developing countries (at 15 percent).

²⁹ IMF published its latest version of the World Economic Outlook together with an updated database and figures for Jordan. The current exercise does not take into account the revised data, however the intuition behind the results remains applicable.

Figure 18: Scenario with increased social expenditure and stabilizing debt to GDP (Scenario 3) (difference from baseline forecast) by 2030 - Jordan



Source: Authors' simulations based on World Economic Forecasting Model.

An alternative scenario (Scenario 2) is to generate additional fiscal space by raising domestic resources through taxation (for instance, raising taxes by 1% GDP), along with additional debt finance through stabilizing debt to GDP at 104 percent by 2030. The increase in taxation revenue here is not necessarily achieved through revision of tax rates, but through improving tax collection and improving efficiency either through expanding tax base or tax compliance. The extra revenue derived from the tax increase is fully utilized as increased spending. This opens up more fiscal space in the earlier part of the projections interval.

This Scenario 2 output yields GDP growth above the baseline for most of the projection interval thus the level of output rises above the baseline for nearly the entirety of the interval with a cumulative gain over the baseline of 5.2 billion JOD. The effect of the increased fiscal space thus created (7.6 billion JD between 2021 and 2030) is not fully optimized as the sum is spent on increasing public expenditure in general, without focusing on specific productivity enhancing sectors. Such allocation of public expenditure doesn't tend to show a higher multiplier for growth, since most of the expenditure goes into current expenditure.

Two cumulative scenarios on Scenario 2 are applied to examine the impact of additional fiscal space being allocated to social sectors such as education, health and housing; and adding to it a phased-in increase in the level of total factor productivity by 4 percent by 2030 (Scenario 3). The increase in TFP is based on historical average of productivity increase in Jordan for the past 10 years as a bare minimum achievement. The additional fiscal space for government expenditure generated by Scenario 3 amounts to 7.7 billion JD (for the period between 2021 and 2030), which is a 7% increase in total public expenditure. The increase in public expenditure is allocated entirely to social investments such as education, health and housing (according to their relative shares within total social spending). Between 2021 and 2030, expenditure on education increases from 1.3 billion JD to 2.1 billion JD; expenditure on health from 1 billion JD to 1.8 billion JD; expenditure on housing from 0.34 billion JD to 0.54. The rest of areas are adjusted as per the general increase in public expenditure over time, which increased from 6.6 billion JD to 7.5 billion JD.

In Scenario 3, the level of output increased to 44.8 billion JD by 2030, which is the highest as compared to the previous scenarios. The real GDP in Scenario 3 is 3.3 percent above baseline in 2030 as compared to 2.7 percent for Scenario 2. Private consumption increases by 4.1 billion JD between 2021 and 2030 as compared to only 4.0 billion JD in Scenario 2 and 3.9 billion JD in scenario 1. The share of interest payments in total revenues stabilizes at around 17 percent from 2027 onwards which is mostly lower than that of the baseline and scenario 1. Overall, this scenario is more efficient in terms of increasing the level of output above the baseline, increasing private consumption above the baseline and maintaining macroeconomic stability³⁰ with a share of interest payments to total revenues that is lower than the baseline in 2030.

³⁰ The scenarios do not take into consideration import elasticities of switching expenditures more to social sectors and consequent changes in current account balances are as in business-as-usual case.

Case Study: Tunisia

The impact of COVID-19 had a deep contractionary effect on the economy in Tunisia as growth declined to -7.2 percent in 2020. Forecasts for post-2020 show economic bouncing back by 5.3 percent in 2021 and improves by 3.2 percent in 2022³¹ with subdued growth thereafter ranging between 1.5 and 2 percent. Shortfalls from COVID-19 led to increasing the fiscal deficit to -7.4 percent of GDP in 2020, up from a deficit of -3.9 percent in 2019. For the subsequent years, the fiscal deficit is forecasted to slightly narrow to -6.8 percent in 2021, gradually declining to -2.4 percent at the forecast horizon in 2030. The share of debt to GDP increased from 72 to 83 percent in 2020, and as per the baseline forecast produced by the World Economic and Forecasting Model (WEFM), this share will decline to 78 percent by 2030.

The adverse economic and social impact of COVID-19 calls for a need to strategize fiscal policy to generate fiscal space for much needed increase in public expenditures to finance the recovery efforts, social expenditure, and the SDGs. Tunisia is one of the leaders among the Arab middle-income countries to mobilize higher taxes as a share of GDP, however, it suffers from underlying inefficiencies and leakages in taxation systems (ESCWA 2017). While there is still potential to improve tax collections, debt financing through stabilizing debt to GDP ratio can be a viable option. In this context, stabilizing it gradually at about 85 percent until 2030, instead of reducing it to 78 percent, can generate additional fiscal space for government expenditure in the later period.

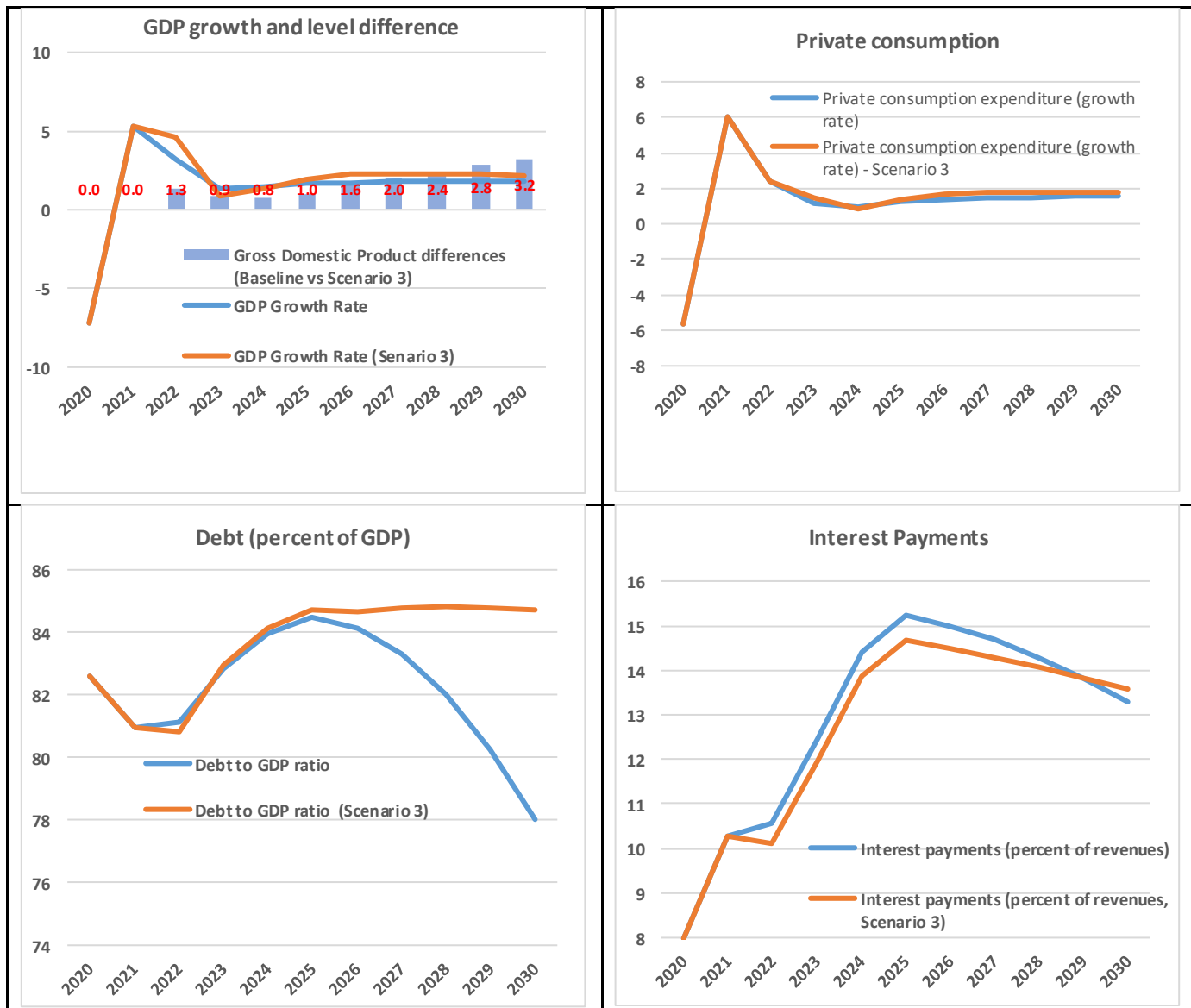
Stabilizing the debt to GDP ratio at 85 percent in 2030 would generate an additional fiscal space of 21.2 billion TD for government expenditure through the period between 2021 and 2030 and this scenario would raise government expenditure above the baseline level from 2025 onwards (Scenario 1). GDP growth generated by this scenario is above baseline growth by 0.2 to 0.4 percent from 2025 onwards (figure 19). Furthermore, this scenario generates an output level that is higher than that of the baseline starting from 2025. The additional nominal GDP generated by this scenario between 2021 and 2030 amounts to 14.1 billion TD. Private consumption³², being a proxy for improving socio-economic outcomes at household level, increases as well from 62.1 billion TD in 2021 to 75.8 billion TD in 2030 and remains above the baseline level in the later period (2025-2030). The share of interest payments in total revenues goes up initially to over 15 percent (as one would expect with higher debt levels), declining to slightly above 14 percent by 2030. This share of interest payment is slightly high; however it is within reasonable limits as it remains at less than 15 percent of revenues³³.

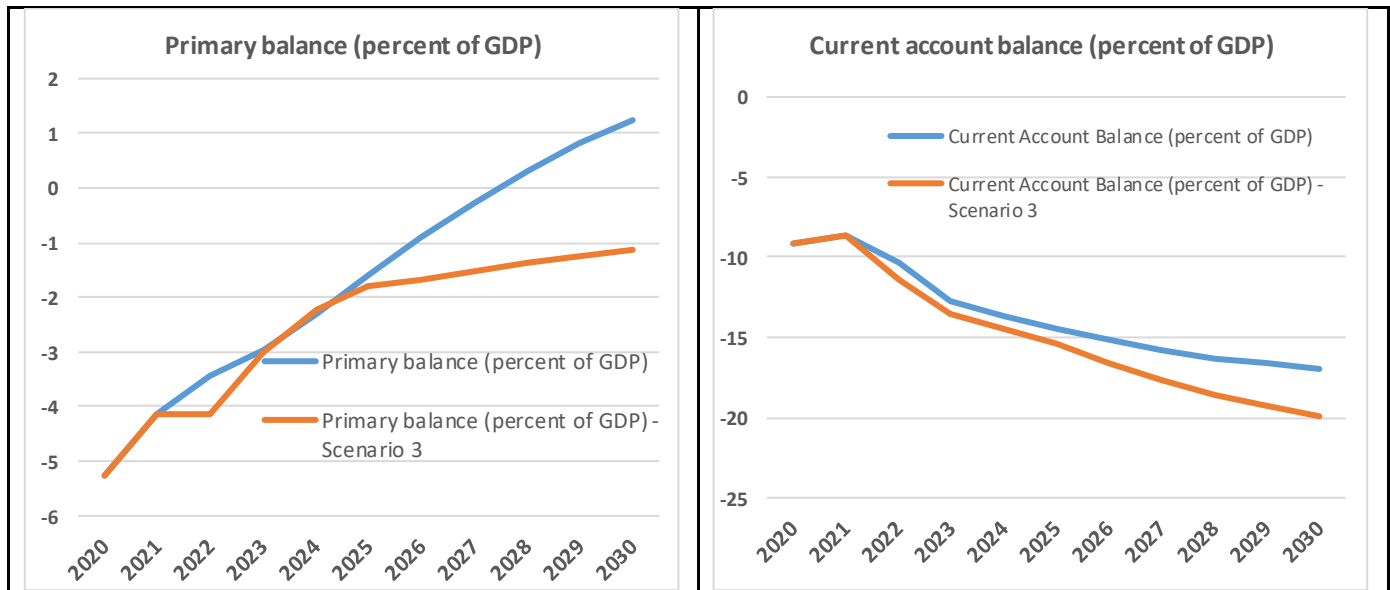
³¹ In October 2021, the IMF published its latest version of the World Economic Outlook together with an updated database and figures for Tunisia. The current exercise does not take into account the revised data, however the intuition behind the results remains applicable.

³² The scenarios do not take into consideration import elasticities of switching expenditures more to social sectors. It is assumed to be same as before.

³³ Interest payment to revenues ratios for developing countries of Latin America, on average, is around 15 percent; this ratio is between 15 to 20 percent for South Asia region. However, global average of interest payments to revenues is around 8 percent in 2018. Therefore, the ratio of interest payment to revenues around 15 percent is high but it is reasonable for the developing countries.

Figure 19: Scenario with increased social expenditure and stabilizing debt to GDP (Scenario 3 – difference from baseline forecast) by 2030 – Tunisia





Source: Authors' simulations based on World Economic Forecasting Model.

An alternative scenario is improving fiscal space through debt financing as well as domestic resource mobilization by increasing tax collection, for instance, raising taxes by 1% GDP (Scenario 2). This scenario generates an additional 40.7 billion TD in fiscal space between 2021 and 2030 which is higher than the previous scenario. However, with GDP growth higher for the first half of the projections interval than in the debt finance scenario, the level of output (nominal GDP) and of private consumption yield slightly better results while the current account presents a slight deterioration vis-à-vis the previous scenario and the primary balance generated by this scenario is close to the debt financing solution. The increase in fiscal space generated by this scenario is directed toward government expenditure in general, being mostly current expenditure, and not toward productive and social investments. This might explain why the increased fiscal space in this case is not translated into much improved growth nor much improved socio-economic outcomes at household level (as reflected by private consumption trends).

Two cumulative scenarios on Scenario 2 are applied to examine the impact of additional fiscal space being allocated to social sectors such as education, health and housing; and adding to it a phased-in increase in the level of total factor productivity (TFP) by 4 percent by 2030 (Scenario 3). Monetary policy intervention is delayed minimizing the adverse impact on demand side. The increase in TFP is based on historical average of productivity increase over the past 10 years, on average globally, as a bare minimum achievement. The scenario 3 is the most efficient in terms of increasing the level of output, increasing private consumption and maintaining macroeconomic stability with a share of interest payments to total revenues remaining at acceptable levels.

The additional fiscal space for government expenditure generated by scenario 3 amounts to 42.2 billion TD (for the period between 2021 and 2030), which corresponds to a 8.3 percent increase above the baseline as compared to 8 percent in Scenario 2 and 4.1 percent in Scenario 1. The increase in public expenditure is allocated entirely to social investments such as education, health and housing (according to their relative shares within total social spending). The rest of areas are adjusted as per the general

increase in public expenditure over time. Between 2021 and 2030, expenditure on education increases from 9.5 billion TD to 21.1 billion TD; expenditure on health from 2.8 billion TD to 6.1 billion TD; and expenditure on housing from 1.5 billion TD to 3.4 billion TD. GDP growth under this scenario remains very similar to, yet slightly above the previous scenarios and more so above the baseline stabilizing above 2 percent. The level of output remains above the baseline throughout the projection interval under this scenario and the scenario results in a cumulative increase in nominal GDP amounting to 29.2 billion TD, which is the highest as compared to previous scenarios. As compared to the baseline, private consumption increases by 4.7 billion TD under this scenario between 2021 and 2030 versus approximately 2.3 billion TD under Scenarios 1 and 2, which indicates this scenario being the most effective in terms of improving people's welfare.

Increasing public expenditure is critical to build capital stock that improves supply side constraints, which plays a critical role in driving growth, especially when private sector is weak. Debt finance is important, but it should be accompanied with a strategic fiscal policy for allocating fiscal space efficiently and effectively to improve growth and SDGs.

D. Improving debt management and more sustainable debt treatment to enhance fiscal space

While working out debt stabilizing scenarios for creating medium term debt sustainability frameworks are important, they are not permanent solutions to debt sustainability for countries that are facing staggering high debt burdens. Adopting austerity measures and fiscal consolidation is also not a solution at a time when increasing public expenditure is essential to finance recovery from COVID-19. "Debt restructuring" provides an alternate option to address these challenges more effectively³⁴ than adopting strong austerity measures that can be forced upon the countries as per IMF DSA frameworks. Sovereign debt restructuring, following the standard principles³⁵, however, requires agreement of the debtor and its creditors, and carries potential sovereign credit rating risks; it also takes time to work out debt restructuring arrangements, which often doesn't make it an easy option for the debtor countries. It has also become more complicated with the increasing share of private creditors in the sovereign debt.

The Secretary-General has called on the international community to consider debt relief initiatives that build on and complement the Common Framework.³⁶ The focus would be twofold: debt management and sustainable freeing up of resources for investment in the pandemic response toward rebuilding more inclusive and sustainable societies. In this context, the developed countries are called upon to build upon existing principles, mechanisms and initiatives such as the United Nations Basic Principles on Sovereign Debt Restructurings and the G20 Common Framework for Debt Treatments and establish a multilateral

³⁴ Stiglitz and Rashid, 2020.

³⁵ UN, 2015.

³⁶ United Nations (2020). Liquidity and Debt Solutions to Invest in the SDGs: The Time to Act is Now. Secretary-General's Policy Brief, March.

sovereign debt forum to foster greater coordination among creditors and debtors toward sustainable sovereign debt resolutions and debt relief to promote SDG financing.³⁷

IV. Conclusions and key messages

- Following a decade of turbulent social and economic times for the region, COVID 19 has compounded the challenges and hindered progress towards SDGs. With an equivalent of \$159BN USD in GDP erased by the pandemic, and Arab region debt increasing to 1.4Tn USD, the region faces a more than doubling of the debt burden in 2020 as compared to 2008. Large fiscal shortfalls due to the adverse impact of COVID-19 further strain on public finances in the region.
- Constrained fiscal space does not allow for a best response to the challenges brought about the pandemic as the region is falling behind the global average in terms of stimulus – the region averaging 4% of GDP versus the global 22% of GDP average. Further, financing for much needed social expenditure is scarce, leading to a need to access resources in order to finance social expenditure and accelerate progress towards SDG achievement.
- Fiscal strategies for enhancing fiscal space must include efficiency and progressivity gains for the tax system. Tax collection improvements would increase efficiency whereas broadening the tax base and improving progressivity can bolster tax buoyancy – both measures leading to an improvement in tax revenues.
- Tax revenues in the region, as share of GDP, hovered around 8 per cent since 2010. This ratio masks wide variations among countries as taxes in MICs constitute 19 percent of GDP in 2019, compared to 7 percent for LDCs, and 1.5 percent in conflict-affected countries (CACs). MICs, who rely mostly on taxation as a main source of public revenue, have undertaken tax reforms over the last decade, including in personal income tax (PIT), corporate income tax (CIT), and goods and services tax. However, their median taxes to GDP ratio remained low, at around 16 percent in 2019, as compared to 25 percent in Europe and the world’s developed countries and around 18 percent in the world’s middle-income countries.
- Overall, the tax system in the region heavily relies on indirect taxes, which impose the tax burden more on the poor and the middle class than that on the rich. Income tax out of total tax revenue remains low in the region, and wealth tax almost negligible. These patterns show prevalence of a more regressive taxation system across the region, despite several reforms introduced in recent years. Improving progressivity remained a challenge across countries in the region.
- The recent tax reforms that targeted increasing tax rates as well as expanding tax bases have not yielded enough in terms of improving tax revenues. Available data does not provide enough evidence to assess the efficiency and the fairness of the taxation system.
- Improving tax efficiency, to the average OECD level, would lead to increase in revenues as high as 45 percent over that they collect in some countries. The VAT efficiency remained low, varying between 0.32 and 0.42 as compared to global benchmark, such as OECD average of 0.55. Raising tax collection is not just depended on tax reforms alone but social investments for provision of quality public services that builds trust on governments and creates ‘buy in’ among the taxpayers to consider the tax reform proposals.

³⁷ ESCWA 2021.

- ODA has been declining to sectors that matter for the SDGs. Developed countries are called upon to bridge the inequality gap in fiscal stimulus between developing and developed countries by improving official development assistance (ODA) to finance recovery from the pandemic, fulfilling the commitments to financing the SDGs and contributing to inclusive global recovery.
- IMF member States should consider the adoption of mechanisms to rechannel unused SDRs from advanced to developing countries on the basis of their need, going beyond the existing quota system which favors high-income countries above others. The rechanneling of SDRs must consider equity and inclusive global recovery captured through indicators of vulnerabilities and needs, including trade and balance of payments imbalances, crisis situations and financial needs for recovery from the pandemic.
- Enhancing fiscal space through innovative financing instruments such as debt swaps, as proposed by ESCWA, is an innovative solution to the challenges posed by the current crisis. With MICs external interest payments at 20Bn USD annually, the proposed instrument can help toward alleviate mounting pressures on public finances while releasing fiscal space for financing SDGs.
- Improve debt management practices by improved debt data transparency and undertaking risk analysis of debt instruments, including modelling scenarios of debt sustainability such as working out debt stabilizing scenarios³⁸ over the medium term, taking into account any need for augmenting existing borrowing or new borrowing to help expand the fiscal space to finance the SDGs and boost economic growth. Develop a conducive monetary policy that ensures the necessary conditions to maximize the value of fiscal measures and ensure better fiscal-monetary policy coordination. Improve overall public finance management through effective medium-term expenditure frameworks and medium-term revenue frameworks.
- Evidence from employing this strategy for Tunisia yields positive results. Debt stabilization at 80% of GDP in the medium term of 10 year interval by itself yields 16.9Bn TD (5.6Bn USD) additional fiscal space. Applying the revenue mobilization and social investment strategies, the gain is 43.1Bn TD (a 6.6% increase over baseline) while nominal output levels stand 29.1Bn TD above baseline.
- Build upon existing principles, mechanisms and initiatives such as the United Nations Basic Principles on Sovereign Debt Restructurings and the G20 Common Framework for Debt Treatments and establish a multilateral sovereign debt forum, as called upon by the Secretary-General, to foster greater coordination among creditors and debtors toward sustainable sovereign debt resolutions and debt relief to promote SDG financing.

³⁸ Economic and Social Commission for Western Asia, 2020. [Fiscal Policy Response to Public Debt and Debt Sustainability in Arab Countries](#).

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Annex
A Single-Country Macroeconomic Model Structure
An extension of United Nations WEFM single-country models

1) Introduction

The purpose of this note is to give a brief description of the model structure used in the present analysis. The model is an extended version of the single country model used in DESA's World Economic Forecasting Model (WEFM).

The model has its origins in the Project LINK Global Model and is an example of a structural macro-econometric model. It consists of a set of behavioral equations designed to capture agent behaviour and identities that capture the accounting structure of the economy. The underlying theory is of a New-Keynesian flavour, where the long run is determined via a Neo-classical supply side and the short run is driven by a Keynesian demand side. Imbalances between supply and demand, as measured by the size and sign of the output gap, are resolved via the impact of changing prices and other adjusting mechanisms.

It is an econometrically estimated approach, using the Cointegration/Error Correction methodology. The Cointegration relation identifies long run equilibrium relationships and can be related to economic theory, while the error correction relation fits the data and provides a useful framework for forecasting.

The models have roughly 60 equations with 15-20 key behavioural relationships. Because the WEFM contains 160+ individual country models, the estimation scheme uses constrained estimation to ensure correct signs and sensible bounds on the size of coefficients. It also uses a weighting scheme to handle oil and non-oil producing countries. The goal is models that have sensible economic properties and that are stable.

The core economic actors are: households who consume goods and supply labour; firms who produce goods, demand labour and invest; governments that consume and via the balance sheet provides a measure of sustainability; and the external sector which provides a net impact on demand, and another measure of sustainability via the current account balance.

In the following sections the model structure is presented block by block, starting with the supply side, then the components of demand, the government sector, the foreign sector and finally prices.

The description of the single-country model structure also presents the extensions introduced to the standard WEFM through modified supply side (equation on trend output); modified government sector (equations on revenues and expenditures); introduction of fiscal policy rule; introduction of monetary policy rule; and endogenous exchange rates. These extensions support policy simulations

related to enhancing social expenditures, improving debt sustainability, improving fiscal-monetary coordination and their impact on growth forecasts.

2) Supply Side

2.1) Trend Output

Trend output is determined by the evolution of inputs to the production process, labour, capital and technical progress. The standard version of the WEFM model uses a long run, balanced growth, approximation to a production function to model trend output. This eliminates the explicit need for capital stock data but confounds technical progress with capital deepening. Here, capital stock is introduced and is embedded in a Cobb-Douglas production function with labour augmenting technical progress.

$$\text{LOG(YFT)} = \text{LOG}(\text{ALPHA}) + \text{BETA} * \text{LOG}(\text{KSR}) + (1 - \text{BETA}) * \text{LOG}(\text{LNT} * \text{YFIT1_TREND})$$

Where:

YFT = trend output

KSR = total capital stock

LNT = trend labour supply

YFIT1_TREND = technical progress,

ALPHA = scale parameter

BETA = output elasticity of capital.

Trend labour supply adjusts labour force for the NAIRU,

$$\text{LNT} = (1 - \text{NAIRU}/100) * \text{LFN}$$

There are several different specifications utilized for the evolution of technical progress, depending on particularly country characteristics. One possibility (Tunisia....) has TFP evolving exogenously via segmented trends.

$$\text{DLOG(YFIT1_TREND)} = \text{C}(1) + \text{C}(2) * \text{D200610} + \text{C}(3) * \text{D2011A} + \text{C}(4) * \text{DLOG(YFIT1_TREND}(-1))$$

Where:

D200610 = 1 for the years 2006 to 2010 and 0 otherwise

D2011A = 1 after 2011 and 0 otherwise.

Another possibility is to use a partial adjustment mechanism to bring TFP to a specified growth rate, TFP_TARGET, over a period of time.

$$\text{DLOG(YFIT1_TREND)} = \text{C}(1) * \text{DLOG(YFIT1_TREND}(-1)) + (1 - \text{C}(1)) * \text{TFP_TARGET}$$

Capital stock, investment and depreciation rates come from the IMF's FAD Investment and Capital Stock Database 2020.³⁹ These are disaggregated into private and government components. Capital stock is defined as beginning of period and evolves according to a

³⁹ Data source: <https://www.imf.org/external/np/fad/publicinvestment/>

perpetual inventory equation, with time varying depreciation rates and assumes that new investment is operational in the middle of the period.

$$KSR = KPR + KGR$$

$$ITR = IPR + GIR$$

$$KPR = (1-DELTA_P)*KPR(-1) + (1-0.5*DELTA_P)*IPR$$

$$KGR = (1-DELTA_G)*KGR(-1) + (1-0.5*DELTA_G)*GIR$$

Where:

KPR = private sector capital stock

KGR = government sector capital stock

IPR = real private investment

GIR = real government investment

DELTA_P = private capital stock depreciation rate

DELTA_G = government capital stock depreciation rate

2.2) Labour Market:

Labour supply is determined via the labour participation rate (LRX) and Population (POP). The participation rate is a function of the gap between the (4-year cumulative growth of) observed labour productivity and the growth rate of TFP

$$D(LRX_t) = 20*[CUMG(\text{LOG}(YER_t/LNN_t)) - DLOG(YFIT_TREND_{t-1})]$$

$$LFN_t = POP_t * LRX_t / 100$$

Labour demand increases as the output gap increases and “corrects” to long-run labour supply. Labour demand and supply then determine the unemployment rate (URX).

$$DLOG(LNN_t) = DLOG(LNN_{t-1} + LFN_t * (1 - NAIRU/100)) + 0.4*(DLOG(YER_t) - DLOG(YFT_t))$$

$$URX_t = (1 - LNN_t/LFN_t) * 100$$

3) Demand, private sector

3.1) Consumption function

The original WEFM specification of the consumption function uses a Hendry style specification where consumption is cointegrated with disposable income, and static homogeneity is imposed, so that the savings rate is stable in the long run. This is then embedded in an error correction equation. A further nuance is that without a full specification of personal disposable income, neither price changes nor taxes will affect consumption, so the model uses terms of trade adjusted GDP (GDI) adjusted by tax

rates. In addition the error correction equation is augmented by population (POP) to proxy unconstrained consumers, and a price surprise term so that unanticipated changes in inflation impact on consumption. In the present context, with trend output more variable than in the WEFM specification, a further adjustment term is added to the long-run term, $\log(\text{MM}/\text{MT})$, where MM is nominal GDP and MT is the target for nominal GDP, trend output times the inflation target. Other nominal targets could be used.

$$\begin{aligned} \text{DLOG}(\text{TUN_MT}) &= \text{DLOG}(\text{TUN_YFT}) + \text{TUN_INFT}/100 \\ \text{DLOG}(\text{TUN_MM}) &= \text{DLOG}(\text{TUN_YEN}) \end{aligned}$$

This “device” helps the model equilibrate supply and demand, by pushing the growth of consumption below(above) that of terms of trade adjusted GDP if demand is greater(less) than supply, the speed of adjustment depends on the size of the G coefficient.

$$\begin{aligned} \text{DLOG}(\text{TUN_PCR}) &= \text{C}(1) - \text{C}(2) * (\text{LOG}(\text{TUN_PCR}(-1)) - \text{LOG}(\text{TUN_RPDI}(-1)) - \text{G} * \text{LOG}(\text{TUN_MT}/\text{TUN_MM})) \\ &+ \text{C}(3) * \text{DLOG}(\text{TUN_RPDI}) + (1 - \text{C}(3)) * \text{DLOG}(\text{TUN_POP}) - \text{C}(4) * (\text{DLOG}(\text{TUN_HIC}) - \text{LOG}(\text{TUN_INFT}/100 + 1)) \end{aligned}$$

3.2) Investment Demand

In the WEFM prototype model the equation for total fixed investment is specified in error correction form, with long run investment assumed to be cointegrated with terms of trade adjusted GDP (GDI) and the error correction equation adds an accelerator mechanism and lagged investment. In the revised model, total fixed investment is disaggregated into private and public investment. Public investment is discussed in the section on the government sector.

Private investment adopts a similar specification as in the original model, but changes the long run term. Use is made of the condition resulting from a profit maximizing firm setting its marginal product of capital equal to the user cost of capital, as a cointegrating relation.

Using simplified notation, the Cobb/Douglas production function with labour augmenting technology can be written as;

$$Y = AK^\beta (Le^{\lambda t})^{(1-\beta)}$$

The profit maximizing condition for capital sets the marginal product of capital equal to the user cost, defined as the nominal interest rate minus expected inflation plus the rate of depreciation:

$$\beta Y/K = (R - \pi^e + \delta)$$

Note that this condition ties down the capital/output ratio, so that with a constant use cost, capital and output will grow at the same rate in the long-run. It also allows monetary policy to affect demand.

This can be re-written to determine the optimal capital stock (KSTAR). Using model notation:

$$\text{LOG}(\text{KSTAR}) = \text{LOG}(\text{BETA} * \text{YER} / (((\text{STI} - \text{INFT})/100) + \text{DELTA_T} + 0.1500))$$

Then the error correction equation for private investment is specified as:

$$DLOG(IPR) = C(1) - C(2) * (LOG(KSR(-1)/KSTAR(-1))) + C(3) * DLOG(PCR+GIR+GCR+XTN/YED) + C(4) * DLOG(IPR(-1))$$

Where:

STI = the interest rate

INFT = the inflation target (proxy for expected inflation)

DELTA_T = the depreciation rate for total capital

4) Government Sector

Given the need to more closely analyze the government sector, the government block of the model has been expanded significantly.

4.1) Government Revenue

Total General Government revenue (GGR) is derived from 3 different taxes plus “other” revenue:

GGRTIX = General government tax rate on income, profits, and capital gains

GGRTOX = General government tax rate on goods and services + other Taxes

GGRTTX = General government tax rate on international trade and transactions

GGRO = Other Revenue

Revenue is generated by the exogenous tax rate times its appropriate base, while “other” revenue follows nominal GDP.

$$GGRTI = GGRTIX * YEN$$

$$GGRTT = GGRTTX * XTN$$

$$GGRTO = GGRTOX * YEN$$

$$DLOG(GGRO) = DLOG(YEN)$$

$$GGR = (GGRTI + GGRTT + GGRTO) + GGRO$$

4.2) Government expenditure

Government expenditure comprises 3 categories of social expenditures – education (GGXED), health (GGXHE), and housing (GGXHO) – interest payments on debt (GGEI), and other expenditure (GGXO). Adjusting for inflation (YED), these are set to grow at an average of the rates of growth of trend output and terms of trade adjusted GDP. This is the specification from the WEFM for total expenditure, useful for forecasting, but for scenarios these variables can be exogenized for policy experiments or can follow a “rule: as seen below.

$$GGX = (GGXED + GGXHE + GGXHO) + GGEI + GGXO$$

$$DLOG(GGXED/YED) = 0.5 * DLOG(YFT) + 0.5 * DLOG(GDI(-1))$$

$$DLOG(GGXHE/YED) = 0.5 * DLOG(YFT) + 0.5 * DLOG(GDI(-1))$$

$$DLOG(GGXHO/YED) = 0.5 * DLOG(YFT) + 0.5 * DLOG(GDI(-1))$$

$$DLOG(GGXO/YED) = 0.5 * DLOG(YFT) + 0.5 * DLOG(GDI(-1))$$

$$GGEI = GINT/100 * GDN$$

4.3) Government Deficits and Debt

In the WEFM model, government net debt (GDN) is denominated in domestic currency and no allowance is made for its decomposition into domestic and foreign denominated components. In the present context, however, this decomposition is important. The WEFM accounting structure is as follows:

$$GGR = (GGRTI+GGRTT+GGRTO)+GGRO$$

$$GGX = (GGXED+GGXHE+GGXHO)+GGXO+GGEI$$

$$GLN = GGR - GGX$$

$$GDN = GDN(-1)-GLN + GLOTH$$

$$GGEI = GINT/100.000000 * GDN$$

Revenue (GGR) and expenditure (GGX) are determined, which then determines government net lending (GLN). Net lending plus the statistical discrepancy (GLOTH) then determines the change in net government debt. This then determines interest payments on debt GGEI which depends on the interest rate on government debt GINT.

In the revised model government debt is comprised of domestic debt denominated in domestic currency (GDND) and external debt denominated in \$US (GDNX\$). Total net debt in domestic currency then becomes:

$$GDN = GDND + GDNX$ * EXR$$

Each period the deficit is financed by a mix of domestic and foreign borrowing, where GDNS is the share of the deficit that goes to domestic debt (based on historical shares).

$$GDND = GDND(-1)-GDNS * GLN + GLOTHD$$

$$GDNX$ = GDNX$(-1)-(1-GDNS) * GLN/EXR + GLOTH$$$

Then interest payments on debt are determined as:

$$GGEID = GDND * GINT/100$$

$$GGEIX$ = GDNX$ * GINTX/100$$

$$GGEI = GGEID + GGEIX$ * EXR$$

4.2 Linking Expenditure from the Government accounts to GDP by expenditure components.

By using the expenditure by function identity in the model, it becomes necessary to link these expenditure variables to Government Consumption and Government Investment. Careful attention is paid to homogeneity, namely that (GCR+GIR)*YED is very close to GGX-GGEI. The two “bridge” equations are done in terms of the components of GGX, where the component specific coefficients (SH**) are the average share of each component going to government consumption and investment.

$$\text{TUN_GCR} = (\text{SHED} * \text{TUN_GGXED} + \text{SHHE} * \text{TUN_GGXHE} + \text{SHHO} * \text{TUN_GGXHO} + \text{SHXO} * \text{TUN_GGXO}) / \text{TUN_YED}$$

$$\text{TUN_GIR} = ((1 - \text{SHED}) * \text{TUN_GGXED} + (1 - \text{SHHE}) * \text{TUN_GGXHE} + (1 - \text{SHHO}) * \text{TUN_GGXHO} + (1 - \text{SHXO}) * \text{TUN_GGXO}) / \text{TUN_YED}$$

5 Fiscal Policy Rules:

5.2 Fiscal – Endogenous tax rates

In the WEFM model there are no “solvency” rules for the fiscal sector. For the present exercise where targeting debt-ratios is a key, various rules have been assessed. The first set of rules depends on endogenizing the three tax rates. A simple version makes tax rates depend on the difference between the debt to GDP ratio (GDNRATIO) from a pre-specified target (. The target can be time varying and can be changed in scenarios. The rate of convergence (here .001) can be varied, and the rule can be in other terms, such as government debt relative to a target term.

$$\begin{aligned} \text{GGRTIX} &= \text{GGRTIX}(-1) + (0.001 * (\text{DEBT_TARGET} - \text{GDNRATIO})) \\ \text{GGRTTX} &= \text{GGRTTX}(-1) + (0.001 * (\text{DEBT_TARGET} - \text{GDNRATIO})) \\ \text{GGRTOX} &= \text{GGRTOX}(-1) + (0.001 * (\text{DEBT_TARGET} - \text{GDNRATIO})) \end{aligned}$$

5.3 Fiscal – Endogenous expenditure

Another method of imposing solvency is by endogenously determining spending (GGX) to achieve a target debt to GDP ratio. This equation results from inverting the GDN identity to solve for GGX and then setting GDN(-1) equal to the debt target times nominal GDP. This formulation imposes that any increase in revenue resulting from changes in GDP will be fully spent. The resulting level of expenditure is then shared to the components of expenditure by their historical shares of each component in total (non-interest) expenditure. These shares can be adjusted.

$$\begin{aligned} \text{GGX} &= \text{GGR} + 0.5 * ((\text{DEBT_TARGET} * \text{YEN}) / 100 - \text{GDN}(-1)) - \text{GLOTH} \\ \text{GGXED} &= \text{SH2ED} * (\text{GGX} - \text{GGEI}) \\ \text{GGXHE} &= \text{SH2HE} * (\text{GGX} - \text{GGEI}) \\ \text{GGXHO} &= \text{SH2HO} * (\text{GGX} - \text{GGEI}) \\ \text{GGXO} &= (\text{GGX} - \text{GGEI}) - (\text{GGXED} + \text{GGXHE} + \text{GGXHO}) \end{aligned}$$

5) External Sector:

5.1) Export Volumes

The WEFM model is a global model so the trade equations (both for volumes and for prices) in the individual country models rely on trade linkages via a matrix of bilateral country trade shares. Each country’s exports is determined by a weighted average of the import demands of all of its trade partners and the import price a country must pay depends on a weighted average of the export prices charged by all of its trade partners. The weights are derived from the trade matrix, which represents the bilateral trade flows between countries for a particular “base” year.

In the “base” year export volumes should be exactly those determined from the trade matrix (WDR), the weighted value of trade partners import volumes, which is simply what was recorded by the original matrix.

$$WDR_j = \sum_i a_{ij} MTR_i$$

Moving away from the base year, however, allowance is made for these historical trade shares to be affected by competitiveness. The trade volume equation relates the growth of export volumes (goods and services) directly to the growth of world demand (WDR) and to a measure of competitiveness, the ratio between the country’s (non-oil) export price and its competitors export price.

$$DLOG(XTR_t) = DLOG(WDR_t) + (1-CXS)*(-\phi_1 * DLOG(PXNO\$/CXUD_t))$$

To handle the different characteristics of oil versus non-oil producing countries, the variable CXS, the share of oil exports in total exports, is introduced. In the case where oil constitutes all of exports, the relative price term would drop out, and export demand would be completely dependent on world demand.

5.2) Import Volumes

Import volumes are determined within the country model and are assumed to be cointegrated with domestic demand (WER=YER+MTR) and the relative price of the non-oil import deflator (MTDNO) compared to the domestic price (YED). A homogeneity restriction is imposed so that, in the long-run, imports are a stable share of domestic demand. In the error correction part, domestic demand is separated into its components to allow the speed of pass-through of total final expenditure to differ across components.

$$DLOG(MTR_t) = \phi_0 - \phi_1 [LOG(MTR_{t-1}) - (\phi_2 * LOG(WER_{t-1}) - \phi_3 (LOG(MTDNO_{t-1}/YED_{t-1})))] + \phi_4 * DLOG(XTR_t) + \phi_5 * DLOG(PCR_t) + \phi_6 * DLOG(I_t) + \phi_7 * DLOG(G_t)$$

5.3) Trade Prices

The non-oil import deflator (MTDNO) is the local currency equivalent of CMUD which is the weighted average of trade partner’s export prices via the Trade Matrix.

$$CMUD_{it} = \sum_j h_{ij} XTDNO\$_j$$

$$DLOG(MTDNO) = DLOG(CMUD) + DLOG(EXR)$$

The import deflator (MTD) is then a weighted average of CMUD and the world oil price. The weight OMS is the oil share of imports, POILU is the world oil price in \$, and EXR is the local currency to \$US exchange rate.

$$MTD = (EXR/EXR_{2012}) * [(1-OMS)*CMUD + OMS*(WLD_POILU/WLD_POILU_{2012}) * MTD_{2012}]$$

The non-oil export price (XTDNO\$) depends on a country’s competitors’ export prices (CXUD) and domestic costs (YED).

$$CXUD_{it} = \sum_i g_{ij} XTDNO\$_j$$

$$\begin{aligned} DLOG(XTDNO\$_t) = & -DLOG(EXR) + \phi_0 \\ & - \phi_1 * [LOG(XTDNO\$_{t-1} * EXR_{t-1}) - (\phi_2 * LOG(YED_{t-1}) + (1-\phi_2) * LOG(CXUD_{t-1} * EXR_{t-1}))] \\ & + \phi_3 * DLOG(YED) + (1-\phi_3) * DLOG(CXUD * EXR) \end{aligned}$$

The export deflator (XTD) is a weighted average of the non-oil export price XTDNO\$ and the world oil price (POILU). The weight OXS is the share of oil exports in total exports.

$$XTD = (EXR/EXR_{2012}) * ((1-OXS) * XTDNO\$_t + OXS * (WLD_POILU//EXR_{2012}) * XTD_{2012})$$

5.4) Current Account Balance

Given the trade volumes and prices, the Current Account Balance can be calculated, with BTN the goods and services balance in domestic currency, CAN, the current account balance in \$US, and, CANRATIO, The Current Account Balance as a share of nominal GDP.

$$\begin{aligned} XTN &= XTD * XTR \\ MTN &= MTD * MTR \\ BTN &= (XTN - MTN) / EXR \\ CAN &= BTN + CANOTH \\ CANRATIO &= CAN / YEN \end{aligned}$$

5) Monetary policy and interest rates

Interest rates enter the investment equation through the user cost of capital and can impact the model via the exchange rate if the exchange rate is floating, via changes in the interest rate differential vis-à-vis the USA. As a base case, the interest rate is exogenous, but in policy studies it can be switched-on via an interest rate “rule”. In this case the policy rate (STI) is set according to a (Taylor-type) rule depending on the deviation of the inflation rate from its target (INFT) and the output gap (YGA), with some persistence via the lagged STI. a,b,c,d are user adjustable parameters:

$$STI_t = a + b * DLOG(YED_t - INFT_t) + c * (YGA) + d * STI_{t-1}$$

6) Exchange rates

Exchange rates (EXR) are expressed as local currency per \$US and are modeled using the arrangement currently in place - fixed against a particular currency or basket of currencies or floating. In the floating case the exchange rate can be exogenized or set to follow a (pseudo) uncovered interest parity condition, specified in real terms. As exchange rates are measured relative to the \$US, the interest differential is relative to the US.

$$LOG(REXR) = LOG(REXR(-1)) - ((STI-INFA)/100 - (USA_STI-USA_INFA)/100)$$

$$EXR = (REXR/CXUD) * HIC$$

7) Prices: The GDP deflator

The GDP deflator (YED) is the driving price variable in the model and is determined as a Phillips curve specification with dynamics driven by lagged consumer prices (HIC), import prices and inflation expectations (modelled assuming equal to the inflation target (INFT)). Price homogeneity is imposed so that the model is not explosive.

$$\begin{aligned} \text{DLOG}(YED_t) = & \phi_1 \text{DLOG}(HIC_{t-1}) + \phi_2 \text{DLOG}(MTD_t) + \phi_3 \text{LOG}(D(YGA_t)) \\ & + (1 - \phi_1 - \phi_2) \text{DLOG}(INFT_t) \end{aligned}$$

Consumer prices then error correct towards inflation in the GDP deflator. The lagged dependent variable allows for some persistence in the deviation between the price indices.

$$\begin{aligned} \text{DLOG}(HIC_t) = & \phi_0 + \phi_1 [\log(HIC_{t-1}) - \log(YED_{t-1})] + \phi_2 \Delta \log(YED_t) \\ & + (1 - \phi_2) \Delta \log(HIC_t) \end{aligned}$$

8) Multiplier: Increase in Government Spending

Suppose temporary increase in G (by 1% of GDP)?

Short run: 1st classic multiplier effect

⇒ Y ↑ ⇒ C ↑ I ↑ but M leakage

Medium run: Output gap increases (Demand > Supply)

⇒ Inflation ↑

⇒ C slowed

⇒ competitiveness deteriorates ⇒ X ↑ M ↓

So far: Y ↑, P ↑, Current Acct ↓, Gov bal ↓

Long run: increase in demand dissipates and some increase in trend output till YGA 0.

So no change in Y, no change in P, Unemployment no change, Current Acct no change

But Gov Balance (%GDP) ↓ (pay for temporary boost)

Increase in Government Spending by 1% of GDP (2019-21)

Increase in Government Spending by 1% of GDP (2019-21)



