Future Fiscal Adjustments and Debt Sustainability

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Future Fiscal Adjustments and Debt Sustainability in Oman

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Abstract

We estimate a VAR, which summarizes the dynamics of five variables, the real price of oil, the long-run real interest rate, real GDP, the primary fiscal balance-GDP, and debt-GDP. We make dynamic stochastic projections and use the data to compute the annual primary fiscal balance required to achieve a particular debt-GDP target over the period from the end of the sample in 2018 to 2024. For Oman to achieve a debt-GDP target between 60 to 20 percent in 2024, it has to increase its *annual* primary fiscal balance by about OR 4 Billion (USD 10.4 Billion) either by increasing revenues, decrease expenditures, or both. This figure increases substantially if Oman wants to achieve the target earlier than 2024.

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1. Introduction

Figure (1) plots the debt-GDP ratio for Kuwait (KWT), Oman (OMN), Qatar (QTR), Saudi Arabia (KSA), and the United Arab Emirates (UAE).[i] The IMF-WEO forecasts show that Oman stands out with an expected average debt-GDP ratio of 76 percent over the period 2020 to 2024; hence, Oman is the focus of this analysis. Oman is highly dependent on oil. When the price of oil falls below the *break-even* price to the extent that the government cannot finance its high expenditures level from oil revenues; the government has only two options: draw on its savings or resorts to external borrowing, and often both. The government of Oman found that reducing public spending challenging.

Figure (2) plots the debt-GDP ratio and the average real price of oil measured as the average of Brent, WTI, and Dubai prices.[ii] Figure (3) plots the primary fiscal balance measured by total revenues minus total expenditures – interest payments on loans, and the debt-GDP ratio. In periods when the primary fiscal balance-GDP is negative, debt-GDP ratio increases. The correlations are negative in both cases.

The IMF Article IV consultation June 7, 2019 assessed Oman's economic development including debt sustainability. Here is the summary, which emphasizes oil prices repeatedly. It also indicates the improvement in the fiscal balance.

"Economic activity started to recover last year, and the overall fiscal and current account deficits improved somewhat, reflecting mainly higher oil prices. However, macroeconomic vulnerabilities continued to rise, with government and external debt increasing further, while some fiscal reforms were delayed. Higher vulnerabilities have led to new sovereign credit rating downgrades and increases in sovereign risk premia. Economic activity is gradually recovering. Staff estimates that, after reaching a low of ½ percent in 2017, real non-hydrocarbon GDP growth has increased to about 1½ percent last year, reflecting higher confidence driven by the rebound in oil prices. Furthermore, oil and gas production increases boosted hydrocarbon GDP growth in 2018 to an estimated 3.1 percent. These developments brought overall real GDP growth to 2.2 percent. Non-hydrocarbon growth is projected to increase gradually over the medium term, reaching about 4 percent, assuming efforts to diversify the economy continue. Preliminary budget execution data indicate an improvement in the overall fiscal balance last year. The fiscal deficit is estimated to have declined to about 9 percent of GDP from 13.9 percent of GDP in 2017, reflecting higher oil revenues.

However, gross government debt increased by 7 percent of GDP last year (to 53.5 percent of GDP). Preliminary data indicate that a substantial pickup in exports, primarily hydrocarbons, combined with an estimated decline in imports, helped reduce the current account deficit by about 10½ percentage points of GDP (to 4.7 percent of GDP). External buffers have remained broadly stable, with an increase in central bank reserves broadly offsetting a decrease in the value of external assets in the State General Reserve Fund, Oman's sovereign wealth fund. Private sector credit growth has somewhat moderated, and interest rates have increased due to U.S. monetary policy normalization. Banks benefit from high capitalization, low non-performing loans, and strong liquidity buffers."

Mirzoev *et al.* (2020) is an IMF paper that discusses the future and fiscal sustainability in the GCC region. It emphasizes the vulnerability of Oman (and Bahrain) in particular. The paper argues that, "The fiscal sustainability impact would be significant: at the current fiscal stance, the region could exhaust its financial wealth in the next 15 years. Holding the current levels of expenditure and non-hydrocarbon revenue constant in percent of non-hydrocarbon GDP provides a reference point for assessing fiscal sustainability implications of the benchmark oil revenue projection. When projected forward, it implies a steady widening of fiscal deficits and a corresponding erosion of the region's financial wealth at an accelerating pace. In this illustrative simulation, the region's aggregate net financial wealth, estimated at $2 trillion at present, would turn negative by 2034 as the region becomes a net borrower. Total non-oil wealth would be depleted within another decade. This timeline would be brought forward in the alternative scenarios of faster improvement in energy efficiency and introduction of a carbon tax. Specific timing would vary across countries, reflecting differences in their initial conditions. For example, Bahrain and Oman are most vulnerable to this downturn, while Kuwait's large SWF will help keep its net financial wealth positive until about 2052."

Analyzing debt sustainability for the GCC countries is different from textbook macroeconomics in two ways: first, almost all the debt is external. Second, the budget deficit is usually a result of lower oil prices, and not a result of lower tax revenues. There are two main narratives in economic literature about debt. The first one is the Keynesian theory. In the Keynesian theory, when expenditures exceed tax revenues, the government finances its budget deficit by issuing debt of an equal amount. The reduction in tax revenues is assumed to be temporary because the government cannot borrow forever, and because governments change over time. Debt affects savings and capital, which then affects output and factor

prices. It is assumed that the government budget constraint is constant, i.e., holds in the long run, therefore, future taxes will have to increase to satisfy the budget constraint in the long run.[iii] In other words, the Keynesian theory assumes that debt affects the economy in the short run only. There is a fundamental difference between the textbook assumption and the GCC in general. Firstly, for Oman, the existing fiscal deficit was a result of a sudden significant drop in oil prices in 2014, which reduced revenues, and not a result of a reduction in tax revenues because taxes play insignificant role in financing the budget deficit in GCC and in Oman, and secondly because most of the debt is external.

Unlike taxes, it is difficult to assume that the reduction in oil prices or the share of oil in output will be temporary. The Keynesian reasoning goes as follows: The reduction in taxes increases household's disposable income, and increase private wealth. Therefore, private consumption increases, which increases aggregate demand. The increase in aggregate demand increases real national income over the business cycle, which is based either, on the assumption of sticky wages or a misperception mechanism (e.g., see Elmendorf and Mankiw, 1998).[iv] The Keynesian narrative does not fit the GCC's current situation because the deficit and the subsequent increase in debt are results of an exogenous reduction in oil prices and oil revenues. Oman's aggregate demand falls rather when the price of oil falls. Therefore, Oman experiences a slowdown in economic activity, a reduction in consumption, and a fall in aggregate demand over the business cycle.

The second narrative is the Recardian equivalence theory. It says that the (domestically held) debt does not have a real effect on the economy, i.e., the debt is neutral. A reduction in taxes today, without a change in spending, or only reduces spending by a little amount results in a budget deficit. Expectations are rational in the sense that they use all available information to predict the government future's action. Lower taxes today imply that people anticipate higher taxes tomorrow in order for the government to maintain the intertemporal budget constraint. Under the Permanent Income Hypothesis, people do not increase current consumption unless they expect an increase in future income. Thus, the tax cut is a windfall (temporary increase in income). Presumably, they save it (or most of it) in order to pay for future taxes. Therefore, current consumption does not increase and aggregate income remains unchanged. If people, however, expect future after-tax real income to increase, they increase current consumption.

It is unclear how the Recardian story applies to the GCC. Razzak and Laabas (2016) show that the share of oil in output in the GCC countries creates as a wedge between real wages and the marginal productivity of labor in a manner similar to the tax rate on income. Workers seem to work longer hours in "market activity" in periods of low oil prices to compensate for the loss in income (and rent) and to smooth consumption. Essentially, a drop in the price of oil is like a reduction in the tax rate; it increases labor supply.

Furthermore, there is no exact definition of a "sustainable fiscal position." The idea of debt sustainability requires having a view, i.e., projections, on the evolution of debt-financed fiscal balance over time. External debt is also more of a concern than the debt held by the residents, which requires information about the real exchange rate depreciation rate and net foreign investments are important.

The objective of this paper is to estimate the fiscal adjustment required to keep a particular debt target, i.e., the percentage change in the primary fiscal balance-to-GDP ratio. We do so by estimating a standard VAR and then solve the model dynamically and stochastically over a number of years to make projections of the primary fiscal balance. Then we use these projections to compute a number of scenarios of primary fiscal balance-GDP to achieve particular debt-GDP targets.

We describe the method in the next section. In section 3, we present our results and in section 4, we discuss policy issues that are pertinent to achieving a particular debt-GDP target. Section 5 is a conclusion.

2. Methodology

The long-run government budget constraint under solvency is:

$$D_0 - \sum_{t=1}^{\infty}(R_t - G_t)\left(\frac{1}{1+r}\right)^t = 0, \qquad (1)$$

Where $D_0$is the initial debt; R_t is total government revenues. The sources of revenues in Oman are oil, indirect taxes, and corporate taxes. G_t is total government expenditures. The constant interest rate is $1 + r$. This long-term interest rate is the world interest rate $1 + r^*$+ a risk premium. All variables are in constant prices.

Equation (1) could be written in terms of ratios to GDP.

$$\frac{D_0}{Y_0} - \sum_{t=1}^{\infty}\left(\frac{R_t - G_t}{Y_t}\right)\left(\frac{1+g}{1+r}\right)^t = 0, \quad (2)$$

Where Y is GDP (we can either use nominal ratio or real ratios), and g is the growth rate of real GDP. This condition is the strong form budget constraint, and usually does not hold in real scenarios. It requires a significant increase in revenues or significant reduction in expenditures, or both. Call the budgetary improvements or adjustmentsPB_t^*, i.e., the primary balance (revenues less expenditure adjusted for interest payments), hence:

$$\frac{D_0}{Y_0} - \sum_{t=1}^{\infty}\left(\frac{R_t - G_t}{Y_t} - \frac{R_t^* - G_t^*}{Y_t}\right)\left(\frac{1+g}{1+r}\right)^t = 0 \quad (3)$$

Or

$$\widetilde{D}_0 - \sum_{t=1}^{\infty}\left(\frac{1}{1+\tilde{r}}\right)(PB_t - PB_t^*) = 0, \quad (4)$$

where $\widetilde{D}_0 = \frac{D_0}{Y_0}$; the discount rate $\tilde{r}$ is defined such that $1 + \tilde{r} = 1 + g/\,1 + r$. Essentially $\tilde{r}$ is *approximately* equal to the difference between the interest rate and real GDP growth rates.

$PB_t = \frac{R_t - G_t}{Y_t}$; and $PB_t^* = \frac{R_t^* - G_t^*}{Y_t}$. We solve (4) for PB_t^* ,

$$PB_t^* = \tilde{r}\left(\widetilde{D}_0 - \sum_{t=1}^{\infty}\left(\frac{1}{1+\tilde{r}}\right)^t PB_t\right) \quad (5)$$

The equation is similar to the EU Commission measure S2 and required *very long* projections of PS_t, as$PS_t \to 0$, European Commission (2006).

To manage this problem, the EU Commission (2006) assumes a terminal period, thus:

$$\widetilde{D}_0 - (PB_0 - PB_t^*)\sum_{t=1}^{\infty}\left(\frac{1}{1+\tilde{r}}\right) - \sum_{t=1}^{\infty}\left(\frac{1}{1+\tilde{r}}\right)\Delta PB_t = 0 \quad (6)$$

Solving yields:

$$PB_t^* = \tilde{r}\widetilde{D}_0 - PB_0 - \tilde{r}\sum_{t=1}^{\infty}\left(\frac{1}{1+\tilde{r}}\right)\Delta PB_t \quad (7)$$

To avoid the infinite projection requirement, assume a debt target (Creedy and Scobie, 2015) such that the budget is:

$$D^T = D_0(1+r)^T + \sum_{i=0}^{T-1}(R_{T-i} - G_{T-i})(1+r)^i \quad (8)$$

In terms of ratios

$$\widetilde{D}^T = \widetilde{D}_0(1+\tilde{r})^T - \sum_{i=0}^{T-1} PB_{T-i}(1+\tilde{r})^i \quad (9)$$

To achieve the debt target the fiscal authority chooses PB^{*T} such that:

$$\widetilde{D}^T = \widetilde{D}_0(1+\tilde{r})^T - \sum_{i=0}^{T-1}(PB_{T-i} - PB_T^* ca)(1+\tilde{r})^i \quad (10)$$

Now solve for PB_T^* - the changes in revenues, expenditures, or both required to achieve the debt target:

$$PB_T^* = \frac{\tilde{r}}{(1+\tilde{r})^T - 1}\left[\widetilde{D}_0(1+\tilde{r})^T - \widetilde{D}_T^* - \sum_{i=0}^{T-1} PB_{T-i}(1+\tilde{r})^i\right] \quad (11)$$

PB_T^* is the *annual adjustment* in the primary fiscal balance, i.e., revenues, expenditures, or both, that are required to achieve a debt-GDP target by the final projection year.

Next, we make dynamic stochastic projections of $\sum_{i=0}^{T-1} PB_{T-i}$and then solve (11) under different debt-to-GDP scenarios.

3. Estimation, projections of the primary fiscal balance, and scenarios of debt-GDP targets

To produce the projections we estimate a standard VAR, which is a summary the dynamics of the data. From the model above, the main variables involved in the calculation are real GDP, a measure of the long-term real interest rate, the primary fiscal balance-GDP, and the debt-GDP ratio. We add the real price of oil as an exogenous variable. The price of oil is the only shock that triggered the need to borrow in Oman historically. A sharp decline in the price of oil causes a sharp increase in the budget deficit.

The sample is 1990 to 2017. The data are real GDP, the primary fiscal balance to GDP (PB-GDP), and the debt-GDP ratio. The source of the data is the Ministry of Finance. We measure the price of oil as an average of three prices: Dubai, WTI, and Brent deflated by the U.S. CPI index. For the long-term interest rate, we use the U.S. 10 year bond rate because Oman has a fixed exchange rate regime to the U.S. dollar. The long-term real interest rate is the U.S. 10-year bond rate minus CPI inflation. This is a proxy for the world real interest rate. Note that Oman has a hard peg exchange rate regime to the U.S. dollar.

Figure (4) plots the VAR variables. We test the time series properties of the data.[v] There is a unit root in all the variables except for the long-run interest rate, and the remaining four variables are cointegrated. We estimate the VAR in levels. The VAR lag length is determined using a number of commonly used Information Criteria (AIC, SC, HQ, FPE, LR, and Log L). We found that the optimal number of lags is between one and three depending on what method we use.[vi] The fit is good.[vii] Figure (5) plots the Generalized Impulse Response functions (GIRF) of the first VAR, Pesaran and Shin (1998). We do not plot the impulse response functions of the exogenous real price of oil. The GIRF no.1 shows that the long-run real interest rate declines initially in response to the increase in the real oil price. The GIRF no.5 shows that the long-run real interest rate responds positively to rising debt-GDP ratio. In the second row, the real GDP responds positively to the increase in the real price of oil, which is expected for a country like Oman (GIRF no.6); and it responds negatively to the long-run real interest rate (GIRF no. 7). Real GDP response is positive to the PB-GDP (GIRF no.9), and negatively to the debt-GDP ratio (GIRF no. 10). The PB-GDP response to real oil price is positive (GIRF no.11); negatively to the long-run interest rate (GIRF no. 12), but it does not respond at all to real GDP (GIRF no. 13). PB-GDP response to the debt-GDP ratio is negative (GIRF no 15). The debt-GDP ratio declines with oil prices (GIRF no. 16); increases with long-term real interest rate (GIRF no. 17), and like the PB-GDP, it is not responsive to real GDP (GIRF no. 18). The ratio declines in response to PB-GDP as we expect (GIRF no. 19). Oman did not borrow externally in the past when the fiscal balance was positive.

The next step is to solve the model dynamically stochastically over the period 2018 to 2024 and obtain projections for the primary fiscal balance so that we could solve equation (11) for the fiscal adjustment. The model is solved repeatedly for different draws of the stochastic components. Errors are generated for each observation. Endogenous variables are updated at the end of each repetition. We also bootstrap the distribution of the projections. The number of iteration is set to 1000. The solution method is Broyden, which is a modified Newton method.

Figure (6) plots the dynamic stochastic mean projections of the primary fiscal balance. The projection is negative from 2017 to 2020, and then begins to improve steadily. It is positive from 2021 to 2024. We use these projections to calculate the PB-GDP required to achieve a number of debt-GDP targets next.

We compute the required fiscal balance adjustment required to achieve debt-GDP targets of 60, 50, 40, 30, and 20 percent of GDP over the period 2018 to 2024. The long-term real interest rate r is 0.03 and the growth rate of GDP, g is -0.03, therefore, $\tilde{r}$ is 0.06. Our projections of the primary fiscal balance for the period 2018 to 2024 are -11.74, -7.49, -2.84, 1.73, 5.72, 9.62, and 12.19 respectively. We found that the fiscal balance adjustments required are 14.7, 14.6, 14.5, 14.3, and 14.2 percent. The differences between achieving high and low debt-GDP targets are small. However, the fiscal adjustment increases substantially if the government wants to achieve the debt-target sooner, e.g., achieving a 20 percent target in 2021 instead of 2024. Given that nominal GDP in 2017 was OR 27.7 Billion, the primary fiscal adjustments are approximately OR 4 Billion *annually* over the period 2018 to 2024.

4. Policy issues pertinent to fiscal adjustments

One component of the government's fiscal adjustment plan to deal with the effects of the negative oil price shock is the increase revenues either by introducing new taxes on corporation, on consumption tax (VAT), and labor income tax. The government increased fees too. However, although taxes can increase revenues to a certain level, the standard results in the literature are that more taxes imply a higher deadweight loss and distortions, e.g., Feldstein (1999). For welfare reduction, Razzak and Laabas (2016) calculated the *lifetime consumption equivalence* for an introduction of VAT of 5 percent in the GCC; Oman's is -3.77 percent. The 5 percent VAT tax reduces consumer's welfare by 3.77 percent. Oman consumers suffer the least from a 5 percent VAT than all other GCC countries, perhaps because Omanis are not as big consumers as the rest of the GCC.

The fall in oil prices, reduce GDP in Oman as shown earlier. More taxes also reduce real after-tax GDP. They will have a negative impact on economic growth, which will make the sustainability of the debt harder, not easier, because the sustainability gaps are sensitive to the real interest rate. Furthermore, if the level of real GDP falls, tax revenues are likely to fall at some point in time (i.e., the Laffer curve). The question is whether the increase in corporate tax rate and the introduction of consumption tax worsen the sustainability of the debt, or not? This requires some evidence.

The other question is whether the debt affects monetary policy if the real interest rate, the real exchange rate depreciation, and the current account change significantly. Would the debt

burden increase if the currency depreciates in real terms? Oman has to service the debt in U.S. dollar. For Oman, government expenditures are highly correlated with the real exchange rate. More (less) spending appreciates (depreciates) the currency in real terms. Figure (7) illustrates.[viii]

Another factor that affects the interest rate and the real exchange rate is risk premium. Risk premium is a non-linear function of the debt level itself. Ostry *et al.* (2010) show more debt is correlated with higher cost of borrowing. Risk premium slowly increases for a small debt-to-GDP ratio, and increases rapidly if the ratio exceeds 1.5 (150 per cent of GDP). A question that policymakers should ask is whether the fixed exchange rate system they have currently is best suited for sustaining an increasing debt level.

Bernanke and Blinder (1988) show the effects of a positive term of trade shock (an increase in the price of exports relative to the price of imports) in commodity exporting country on the economy. The main assumption of their model is that the interest rate is endogenously determined so monetary policy is held constant. The term of trade shock affects aggregate demand through the increase of domestic bank lending, a reduction in the risk premium, and an increase in the money supply. Money increases in order to allow the real exchange rate to increase (real depreciation) and to balance the current account. The result of these changes is that income is higher and the interest rate is lower after the shock. The term of trade ensures a balanced current account at a higher level of real GDP. The real appreciation leads to an increase in investments associated with more credit.

There is a strong reason to believe that the above effect is symmetrical, i.e., the effect of a negative term of trade shock such as the recent decline in oil prices. We could expect a shrinking credit supply, a contraction in the money supply, and possibly a higher risk premium. The anticipated reduction in the real value of expected future oil exports reduces the potential collateral of the country, which might make it costly to borrow. This in effect can cause real depreciation of the currency, which could potentially be a very serious policy issue. As the real exchange rate increases (real depreciation), consumer confidence about future income may fall, and banks become unwilling to lend, or increase the price of lending. For Oman, monetary policy is unable to deal with these adverse effects, except perhaps through regulations and macro-prudential policies, e.g., Pereire da Silva and Harris (2012) or floating the currency. How much have policymakers in Oman thought about these issues?

There is also an issue of crowding out. How much debt crowds out private capital in the short and the long runs? The analysis of such subject requires detailed long-term population projections. The increase in debt leads to a higher cost of borrowing for everyone. If government fiscal consolidation leads to high taxes and fees (or oil rent declines instead) the increase in taxes (or the decline in oil rent) would be equally distributed across people of different ages such that each person's income will decrease by the amount of the interest payments per capita in each period in the future. People will reduce consumption in each period by the same amount (consumption smoothing). Thus, both consumption and income fall equally. Investment spending should also fall, thus the level of capital stock falls with debt one for one, i.e. complete crowding out.

Two studies stand out and remain as guiding methods to answering this question are (but there many more studies). In Blanchard (1985), debt will reduce capital but not one for one. In a more elaborate general equilibrium overlapping generation model, Auerbach and Kotlikoff (1987) the debt crowds out capital one for one.

In the Keynesian narrative, high debt reduces national savings because it reduces government savings, and may not increase private savings by the same amount. Therefore, the stock of capital falls or the share of capital in output declines, and the marginal product of capital increases. In the long run, the economy is governed by a number of identities that must hold. Consider the national income identity whereby real output (Y_t) is equal to the sum of consumption (C_t), domestic investment (I_t), government spending (G_t), and net exports (NX_t):

$$Y_t \equiv C_t + I_t + G_t + NX_t \tag{12}$$

Combining this with the identity that output (Y_t) is the sum of consumption (C_t), saving (S_t), and taxes less transfers (T_t) gives us a new identity.

$$Y_t \equiv C_t + S_t + T_t \tag{13}$$

So,

$$S_t + (T_t - G_t) \equiv I_t + NX_t \quad (14)$$

Private saving (S_t^p) plus government saving, $S_t^g = (T_t - G_t)$, equal to domestic investment (I_t^d) plus net exports (NX_t). Further, from the current account we can replace NX_t with Net Foreign Investment (NFI_t) to arrive at yet another identity.

$$S_t^p + S_t^g \equiv I_t + NFI_t \quad (15)$$

So national saving is the sum of private saving and government saving, which must be identical to the sum of domestic investment and net foreign investment in the long run.

For Oman, we replace taxes (T_t) with revenues (R_t), which is mainly oil revenues, in the last identity and suppose that government saving falls because revenues are less than spending. On average, this identity holds over the period 1990 to 2014. The average private saving to real GDP ratio is 0.30, government saving to real GDP is 0.0, domestic investments to real GDP is 0.30 and NFI to real GDP is 0.0, but expected to fail to hold when the government savings becomes negative as the price of oil keeps falling. This identity can continue to hold, however, if (1) private saving increases; (2) domestic investment falls; and / or (3) net foreign investment falls (i.e., foreigners invest more in Oman than Omanis investing abroad).

Private saving increases if people realize or even expect that future government savings are falling and they react by increasing their own savings. People could hold more government debt as a form of saving. If the latter happens then the debt affects national saving in the long run, depending on the change in private savings; or on the other hand, if the government pursues policies to increase private savings.

When savings decline, domestic investments must decline. Investments are key determinant of economic growth. The productivity statistics suggest falling labor and capital productivity and expected fall in capital productivity. Thus, we would expect a fall in *net* foreign investment because foreigners will invest less in Oman than would the Omanis invest abroad. This fall would be inconsistent with the above long – run identity of the economy. Figure (8) plots the Conference Board growth rate of total factor productivity for Oman. The data sample is 1990 to 2019. Given economic conditions from 2019 to-date, we do not expect the

growth rate to improve. It is likely to remain negative in the future, and it represents a serious economic impediment.

Declining productivity and increasing debt in the near future is an unpleasant combination. Rising debt could reduce the ability of the country to deal with adverse shocks and international crisis. Investors may also be less confident in investing in countries with high debt. The real value of the currency is affected by the investors' view of the Omani Rial – denominated assets, hence there is a concern for currency crisis.

Another important policy issue is pertinent to population projections. Adequate sustainability analysis requires long-run population projections in order to assess the government future fiscal position. Future liabilities of the government is a major issue, hence the "fiscal gap". The fiscal gap is a measure of all future commitment of the government. For Oman, this is crucial because the role of the state in the economy is significant. The government pays for education, health, infrastructure, and most importantly for the debt issue, it pays for retirement. The World Bank data for population projections suggest the following for Oman in 2050.[ix] First, the birth rate will fall from 19.32 (per 1000 people) to 17.4 per cent. Second, working age population (age 15-64) as a percent of total population falls from 76.9 percent to 66.07 percent. Third, the number of old people, age > 65 years, in the population increases from 3.86 per cent to 20.43 per cent. Fourth, life expectancy at birth rises from 77.32 to 84.30. Therefore, Omanis will live longer, but more people will be old and retired and less people are born than today. How would the government pay its future liabilities if the price of oil does not increase and productivity does not increase?

5. Conclusions

The effects of the increase in the debt-financed fiscal spending on the economy in the short and the long runs are ambiguous in general. The Keynesian theory, however, predicts a short run increase in aggregate demand. The IMF projections, which are model-based that assume certain prices for oil and government fiscal adjustments, indicate a slowly increasing real GDP over time. GDP growth over the five years after the sudden fall in oil prices in late 2014 is substantially lower than the GDP growth prior to that. The fiscal and current account deficits are projected to last for a long time.

If the term of trade shocks (e.g., an oil price shock) are symmetric, i.e., the effect of an increase in oil prices has the same magnitude but the opposite direction, we would expect the economy to contract or significantly slow down over the next 5 years. We would also predict that the effect to be persistent. Hence, debt is required to soften the contractionary effect of GDP.

Debt sustainability requires that current debt plus the sum of the discounted present value of government expenditures are covered by the sum of the discounted present values of government revenues. We estimated a VAR, which includes the real price of oil, the long-run real interest rate, real GDP, the primary fiscal balance-GDP, and debt-GDP from 1990 to 2017. Then, we made dynamic stochastic projections of the primary fiscal balance to 2024. These projections are used to compute the primary fiscal balance adjustments that are required to maintain a certain target of the debt-GDP ratio, over a number of years. We found that the annual adjustment needed to achieve debt-GDP targets of 60, 50, 40, 30, and 20 percent to be almost the same, OR 4 Billion (approximately, USD 10.4 Billion). The differences in the primary fiscal balance adjustments that correspond to different debt-GDP targets are small, but they increase significantly if Oman wants to achieve the targets in a shorter period. For example, if Oman wants to achieve a target of 60 percent in three years instead of six.

The IMF projection is that the debt will rise to nearly 70 percent of GDP over the period 2020-2024. The IMF article IV (2019) assessment of Oman's debt is optimistic. However, while the debt is probably sustainable for a long time, it is not payable in the short or the medium runs. For the debt to be payable the government must run a fiscal surplus for a number of years. The IMF projection is that the government will be running a deficit for the next six years.

However, there are policy issues that could affect the future sustainability of the debt. Two are essential ones for the long run. The increase in the debt-financed fiscal balance means that government saving falls, thus national saving falls. To rebalance the economy three things must happen, over the long run: private savings increase, domestic investments decrease, and net foreign investments decrease (i.e., Omanis invest less abroad than foreigners investing in Oman do). In other words, sustainability of the economy in the long run require less domestic spending and more foreign investment such that the net foreign investment is negative.

The government fiscal adjustment program assumes some reduction in spending and increases in non-oil revenues. Some of these non-oil revenues included taxes. Corporate taxes reduce real GDP and productivity growth. Such policies could also reduce foreign investments, which are inconsistent with long – run macroeconomic identities. Therefore, these policies and the intended effects must be well understood.

Debt-financed fiscal spending sustainability also requires more private-savings. There are no government policies regarding the private savings. These policies require research in the areas of the fiscal gap, population projections, and the sustainability of the (*pay-as-you-go*) retirement fund system, and the optimal amount of *domestic* debt.

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Figure (1)
Average Debt-GDP Ratios

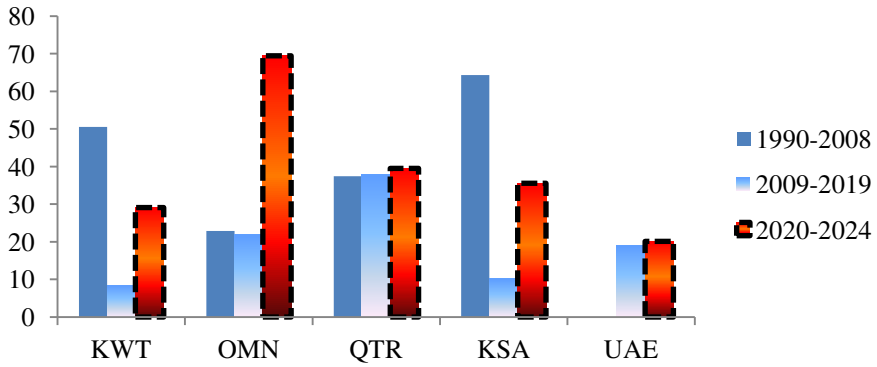


Figure (2)
Debt and Oil Price are Negatively Correlated
1990-2017

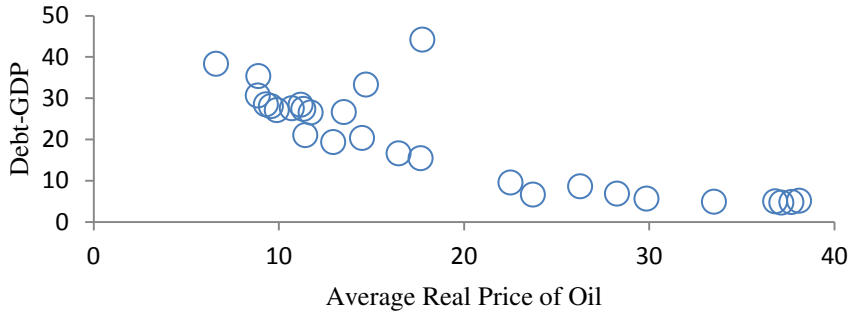


Figure (3)
Primary Fiscal Balance and Debt-GDP

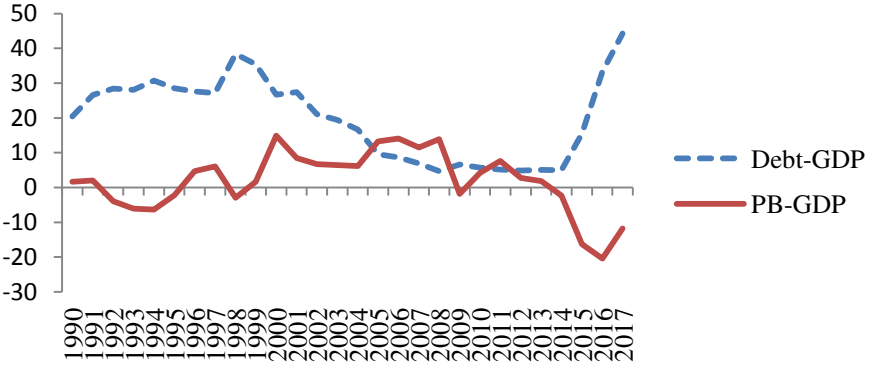
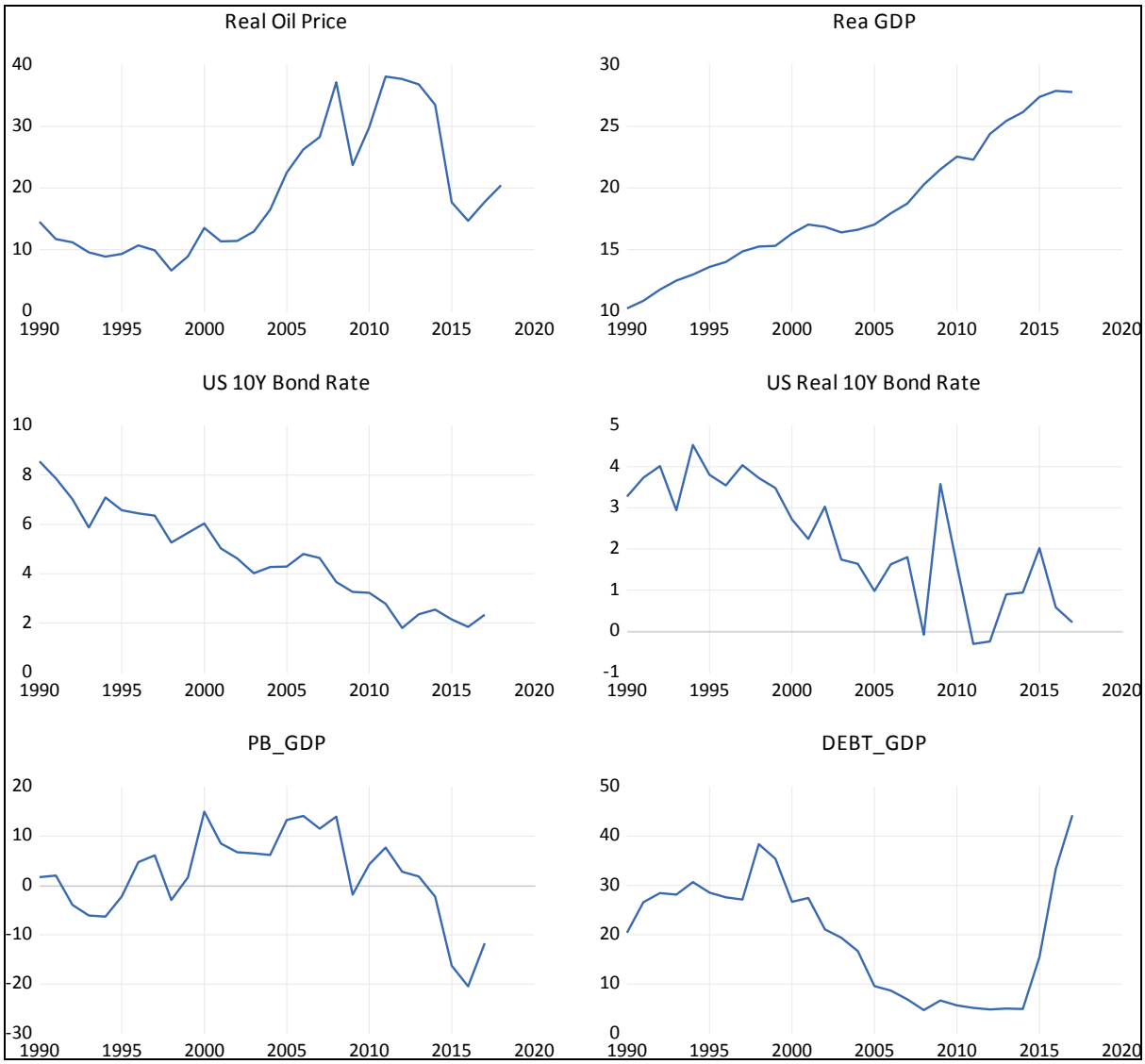
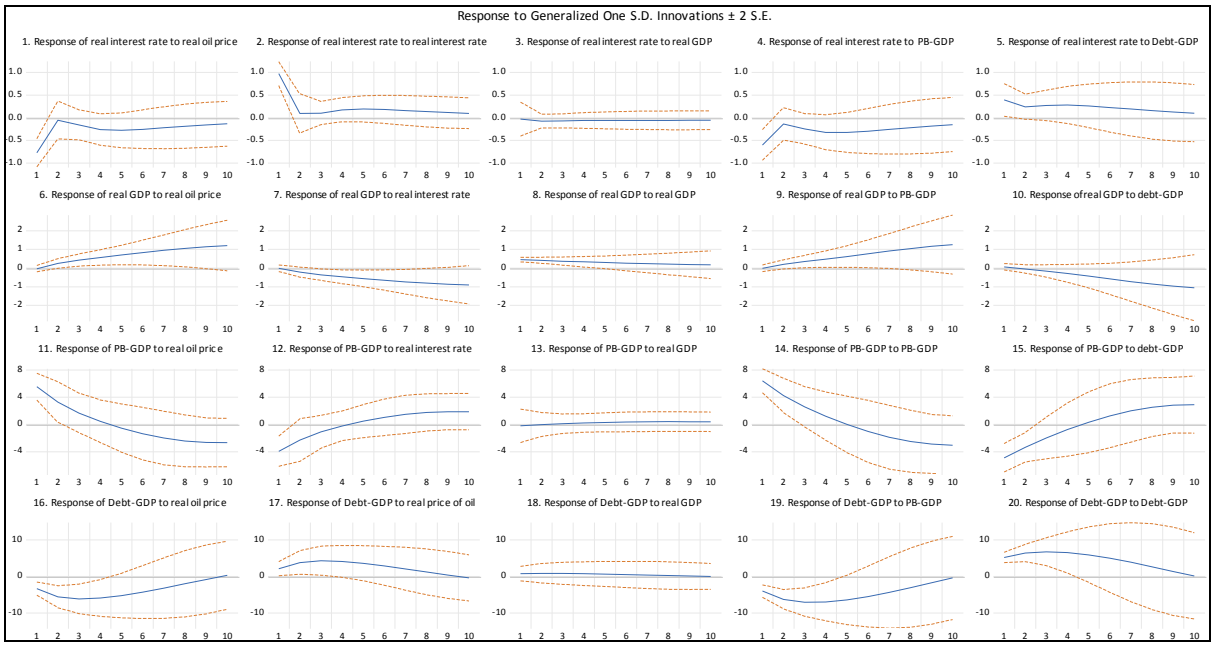


Figure (4)



Source: oil price is from the IMF-WEO October 2019 data set; the real interest rate is the U.S. nominal long-term 10-year bond deflated by the U.S. CPI. The data are from the Federal Reserve Bank of St. Louis data set FRED; real GDP, the primary balance-GDP and the debt-GDP data are from Oman Ministry of Finance.

Figure (5)


Response to Generalized One S.D. Innovations ± 2 S.E.
1. Response of real interest rate to real oil price
2. Response of real interest rate to real interest rate
3. Response of real interest rate to real GDP
4. Response of real interest rate to PB-GDP
5. Response of real interest rate to Debt-GDP
6. Response of real GDP to real oil price
7. Response of real GDP to real interest rate
8. Response of real GDP to real GDP
9. Response of real GDP to PB-GDP
10. Response of real GDP to debt-GDP
11. Response of PB-GDP to real oil price
12. Response of PB-GDP to real interest rate
13. Response of PB-GDP to real GDP
14. Response of PB-GDP to PB-GDP
15. Response of PB-GDP to debt-GDP
16. Response of Debt-GDP to real oil price
17. Response of Debt-GDP to real price of oil
18. Response of Debt-GDP to real GDP
19. Response of Debt-GDP to PB-GDP
20. Response of Debt-GDP to Debt-GDP

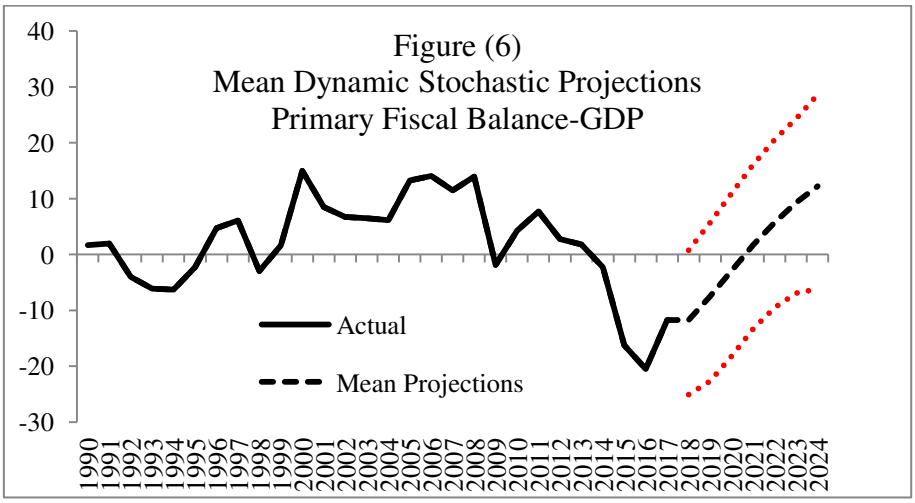


Figure (6)
Mean Dynamic Stochastic Projections
Primary Fiscal Balance-GDP
Actual
Mean Projections

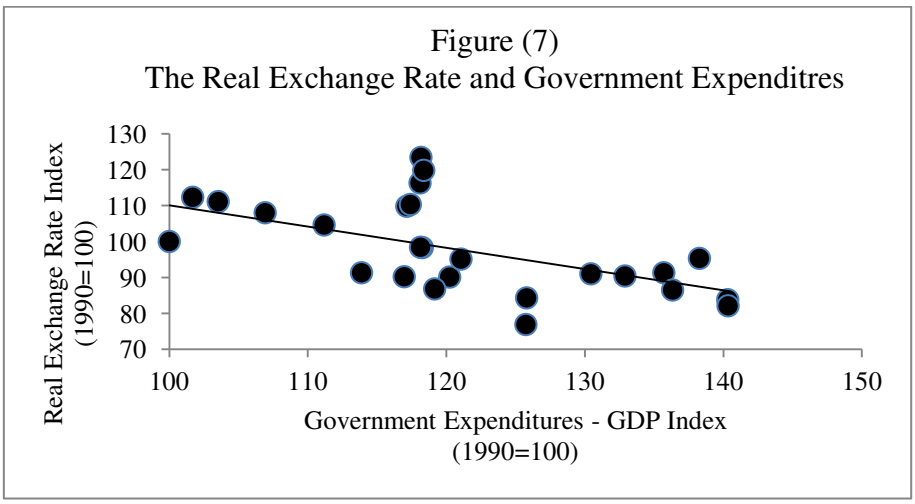
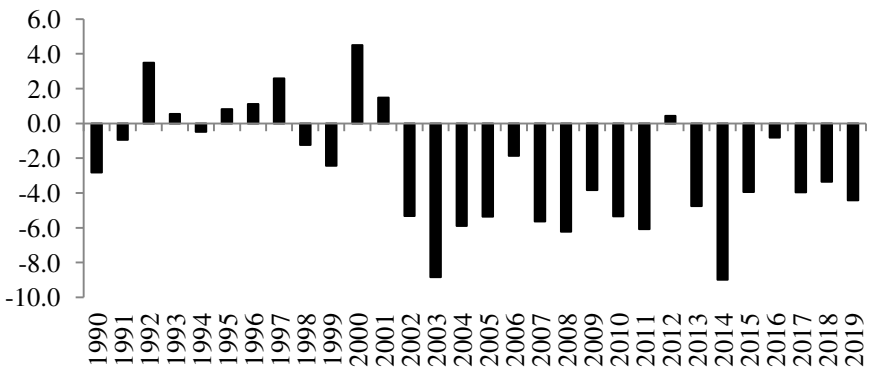


Figure (7)
The Real Exchange Rate and Government Expenditres
Real Exchange Rate Index
(1990=100)
Government Expenditures - GDP Index
(1990=100)

Figure (8)
Total Factor Productivity Growth Rate



[i] The data are from the IMF World Economic Outlook October 2019 version, which does not report data for

[ii] The average real price of oil is the US dollar price deflated by the US CPI.

[iii] The intertemporal budget constraint.

[iv] When prices are assumed to be sticky, an increase in income without an immediate jump in the price level, increases real income in the short run until prices adjust. In Lucas and in Barro's model, economic agents increase their output or labor supply in the short run because they misinterpret the shock, and once they realize their mistake that their real income has not increased, they reduce output and labor supply, and the aggregate demand returns to its equilibrium level before the shock.

[v] We tested a number of specifications using the Augmented Dickey-Fuller test (with trend, no trend, constant term, and no constant term, constant term, and a trend etc). The number of lags is chosen using a commonly used Information Criteria. The real price of oil and real GDP tests indicate that we cannot reject the unit root hypothesis. The P value is 0.7061. Although the ADF is a weak test, this finding remains reasonably consistent with what people assume. The U.S. real 10-year bond rate is I(0). The P value of the standard ADF test is 0.0027. For the primary fiscal balance-to-GDP ratio, we test for a unit root with a various break specifications using the ADF. The primary fiscal balance has a unit root. The same is true for the debt-to-GDP; the unit root cannot be rejected. The P value 0.8590. The four I(1) variables share a common trend, i.e. they are cointegrated. We used commonly used tests. Short span of data notwithstanding, they indicate that there is most two cointegrating vector.

[vi] The LR method is the sequential modified LR test statistic find the lag length to be 1. Schwarz Information Criterion also found one lag to be optimal. The rest of the methods, Akaike IC, Hannan-Quinn IC, and Final Prediction Error found the lag length to be three.

[vii] The F tests for the five equations are 14.1, 7.6, 685.2, 6.0, and 24.3 respectively.

[viii] The real exchange rate is calculated as the deviation from Purchasing Power Parity (PPP). We use the GDP price deflators for Oman and the U.S. because they are available at the IMF. The data for the period 2016 to 2012 are IMF forecasts of prices and government expenditures. The decrease in the real exchange rate means real appreciation of the currency.

[ix] https://knoema.com/WBPEP2014/population-estimates-and-projections-1960-2050?country=1002160-arab-world