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POLICY PAPER

FISCAL RULE OPTIONS FOR PETROLEUM REVENUE MANAGEMENT IN UGANDA

APPENDIX

Revenue Watch Institute

Thomas Lassourd
Andrew Bauer

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Table of Contents

Appendix 1: Policy options for fiscal rules

If Uganda decides to enshrine a fiscal rule to regulate its Petroleum Fund in the Finance Bill, as described in the Uganda Oil and Gas Revenue Management Policy, there are a number of options, with different advantages and drawbacks that should be carefully weighed given Uganda's specific development challenge. In this appendix, we first show the potential effect of not having any fiscal rules for oil revenue management, and then we analyze in more detail four options that represent the main categories of fiscal rules used by resource-rich countries. The five scenarios are:

1. **No rule:** All oil revenues are spent in any given year.
2. **Ghana-type "benchmark revenue" rule (revenue rule 1):** 70 percent of an 11-year average of oil revenues is spent; the rest is saved.
3. **Permanent Income Hypothesis (PIH) rule (revenue rule 2):** Oil revenue spending is limited to percent of petroleum wealth.
4. **Balanced budget rule:** The budget deficit may not exceed 3 percent of the non-oil GDP.
5. **Balanced budget combined with expenditure growth rule:** The budget deficit may not exceed percent of the non-oil GDP, and current primary expenditures may not grow by more than 7 percent per year.

We analyzed all five scenarios based on a fiscal sustainability model, as described in Appendix 2. In all five, we assumed stable non-oil GDP growth. We then forecast revenues and public expenditure using first stable long-term oil prices and non-resource revenue, and then volatile medium-term oil prices and non-resource revenue, to assess the impact of different fiscal rules on stabilization and saving. The case for anticipating volatility in oil revenues has been made above. Given Uganda's past volatility in tax revenue — illustrated in Appendix 3: Volatility in tax revenue — we should also expect volatility in non-oil revenue to continue in the short and medium term.

1. ABSENCE OF A FISCAL RULE

The current Public Finance Draft bill, Part VII, creates a petroleum fund without specifying clear fiscal rules to determine how much oil revenue Uganda should save and how much should go to the budget (for infrastructure and development expenditures) each year. This absence of rules creates significant risks, which we describe in this section.

Under the draft bill, the Uganda Revenue Authority is to collect all petroleum revenues and deposit them in a petroleum fund. Money can be withdrawn from the Petroleum Fund to supplement the annual budget through the annual appropriation act voted on by parliament or be invested in accordance with the petroleum revenue investment policy. The savings are meant to be invested in assets such as international treasury bonds from stable governments that bear little risk. There is no specific rule on how much can/should be spent in the national budget or how much should be saved each year. There is no rule that requires use of the Petroleum Fund to smooth public expenditure. Discretion over annual spending and saving is left to the Ministry of Finance, voted on by parliament.

Creating a petroleum fund is a first step in good management of oil revenues. However, by not tying the transfer of revenues in and out of the fund to a fiscal rule, the draft bill creates a perverse effect, as the executive will be less constrained in deciding when and how to spend the money.

As most international examples[1] show, the absence of a legally binding rule is likely to lead to a situation where all oil revenue is spent rapidly after collection and none is saved. Under these assumptions, the projected government revenues and public primary expenditures, in percentage of non-oil GDP, would look like **Figure 1.**

FIGURE 1
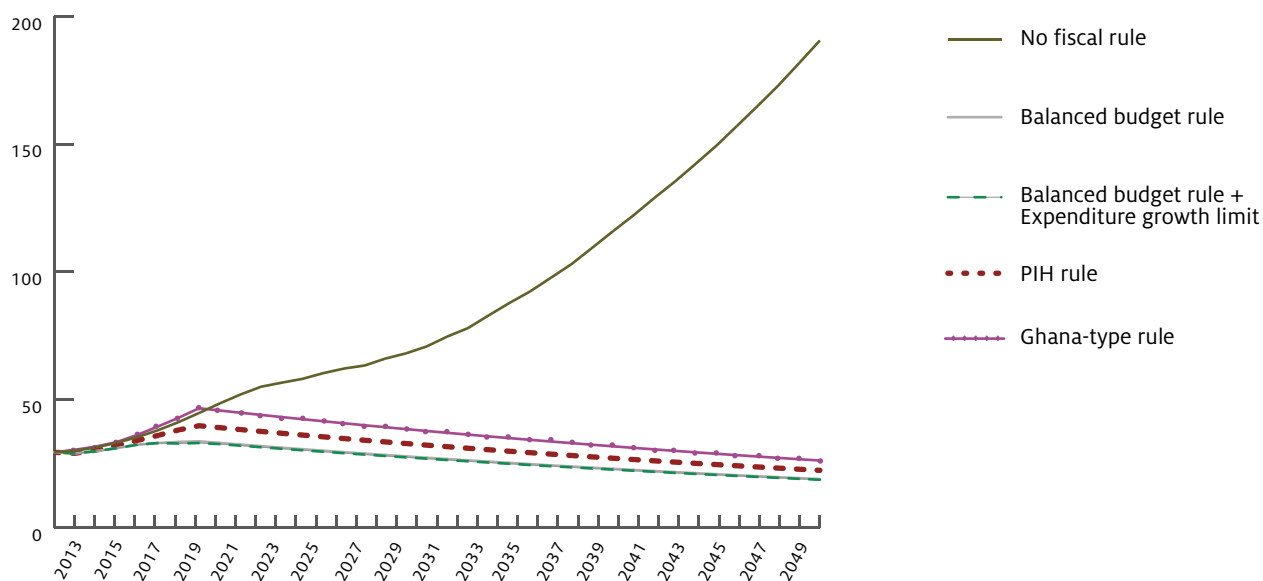REVENUES AND PUBLIC EXPENDITURES UNDER CURRENT PUBLIC FINANCE BILL (% GDP)
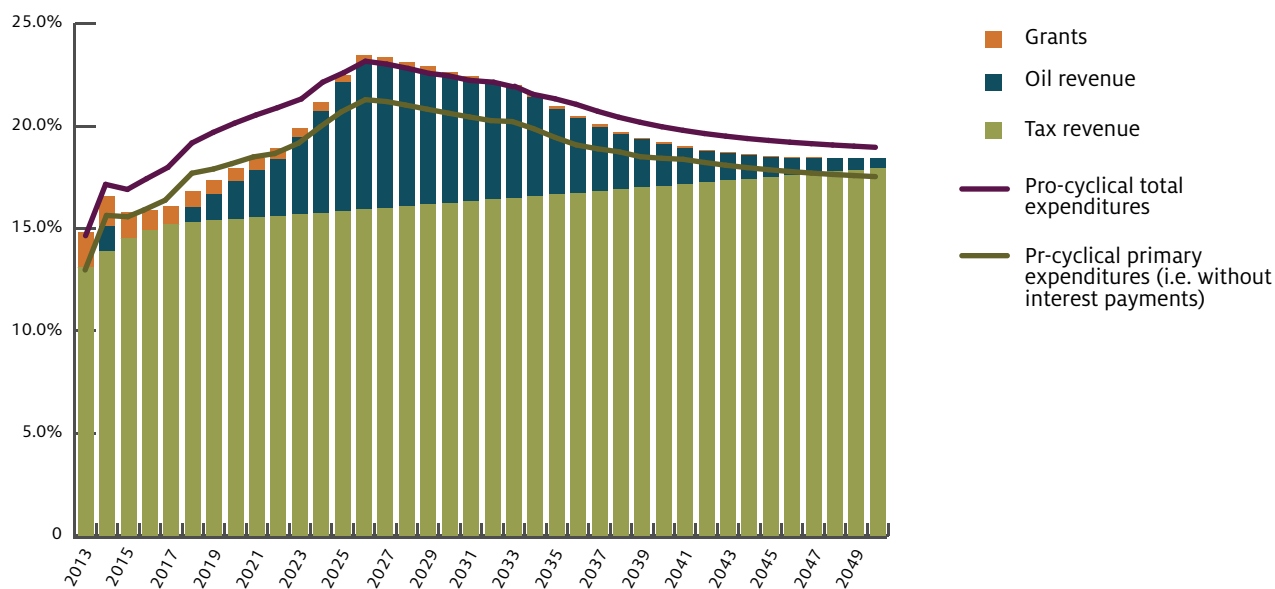
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

In such a context, all the revenue accruing to the Petroleum Fund ends up being spent in the following months. In this case, the Petroleum Fund's balance at end-year is zero, and there is no room for any meaningful savings. As a consequence, public spending would be pro-cyclical — they would increase very quickly as oil revenues are generated but would then have to adjust downwards with declining oil production or prices. **Figure 1** illustrates the unsustainable path of oil expenditures in this scenario: When oil revenues decline, so do public expenditures, so that no oil expenditure can be sustained beyond oil production. Temporary windfalls generate substantial incentives to spend when revenues are high, leading to poor public expenditure decisions — for example, con¬struction of concert halls, new unnecessary infrastructure and other legacy projects — and poor-quality infrastructure, since it takes time to adequately plan and execute projects. When revenues decline, governments often face debt crises or are unable to pay for government salaries or operations and maintenance of new infrastructure. Under volatile revenues, **Figure 2** illustrates how pro-cyclical spending in the absence of a fiscal rule can lead to a much higher debt burden. The impact on the private sector can be equally devastating, as businesses invest when they receive government contracts and scale back or even go bankrupt when contracts dry up. This could cause inflation and have negative effects on economic growth and fiscal sustainability, while also being politically difficult to implement, and it could leave Ugandan citizens with the impression that oil revenues have been wasted.

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[1] Such examples include the Excess Crude Account (Nigeria), which was depleted from a peak of $20 billion in 2008 to $5.1 billion in September 2013 (according to the Daily Trust: "Nigeria: Devouring Excess Crude Account, M.U NDAGI, 7 SEPTEMBER 2013); or Iran, whose fund is being depleted due to sanctions and budget challenges. The Alberta Heritage Fund, SOFAZ, and funds from Gabon and Equatorial Guinea never managed to accumulate funds due to lack of internal rules.
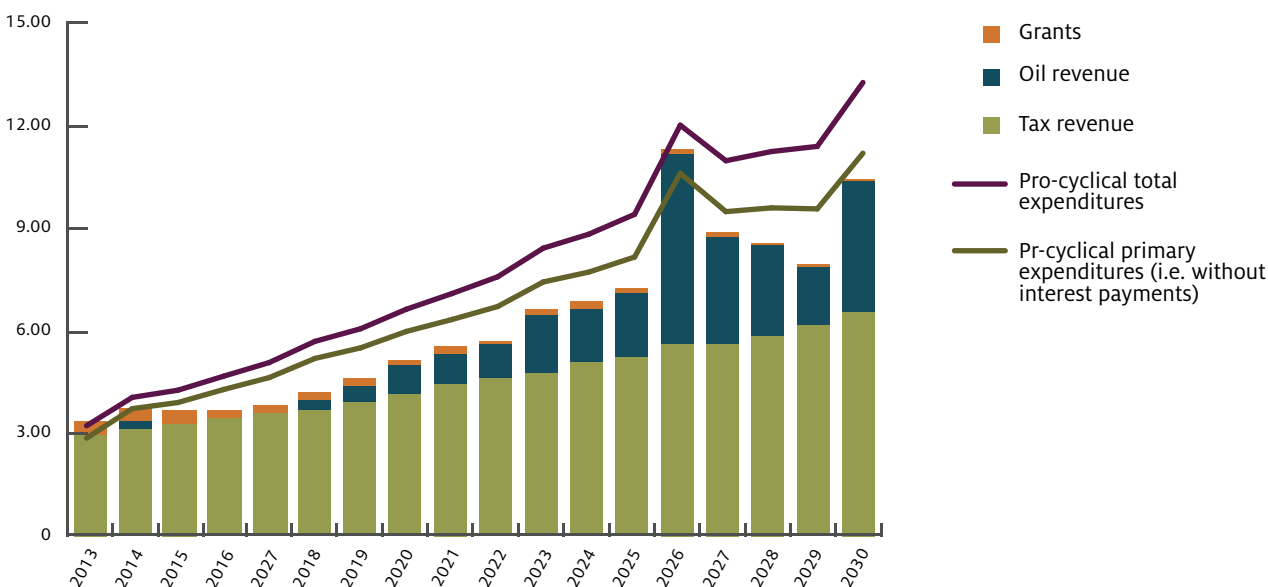
FIGURE 2
NET PUBLIC DEBT UNDER VOLATILE OIL AND NON-OIL REVENUES AND DIFFERENT SCENARIOS, IN % OF GDP

— No fiscal rule
— Balanced budget rule
—·—·— Balanced budget rule +
Expenditure growth limit
····· PIH rule
—+—+— Ghana-type rule

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

Figure 3 illustrates what could happen to public expenditures under assumptions of volatile revenues. Given the absence of a rule, there is no substantial buffer created during periods of high oil prices and revenues to run a countercyclical policy when oil prices and/or non-oil revenues are low. The only options would be to decrease spending or increase debt — both unappealing scenarios. These projections clearly show the risks of the absence of a fiscal rule in the current draft bill: the inflow of volatile oil revenue would lead to sharp increases and sharp decreases in public spending.[2] Given the volatility that characterizes the oil sector, the absence of a rule could therefore lead to year-on-year fluctuations in public spending as high as 30 percent. This could mean unsustainable spending followed by painful cuts during oil commodity cycles, leading to waste and unproductive investments with a negative impact on economic growth, development outcomes, macroeconomic stability and private-sector investment quality.

FIGURE 3
REVENUES AND PUBLIC EXPENDITURES UNDER CURRENT PUBLIC FINANCE BILL AND VOLATILE OIL PRICES AND NON-OIL REVENUE (REAL 2013 USD)

■ Grants
■ Oil revenue
■ Tax revenue
— Pro-cyclical total expenditures
— Pr-cyclical primary expenditures (i.e. without interest payments)

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

[2] In real USD terms.

Given the risks highlighted above, we strongly recommend the adoption of a fiscal rule in Uganda's Public Finance Bill. **Figure 2** shows how all fiscal rules are efficient at keeping public debt in the long run under control, at between 20 and 40 percent of GDP.

Table 1 in the core paper describes the pros and cons of the different fiscal rules envisioned by Uganda's government. The Ghana-type benchmark revenue rule — the option that best seems to match Uganda's policy objectives — would create a rule that sets a ceiling on how much oil revenue can enter the budget. Ghana, Mexico, Nigeria (2011) and Timor-Leste[3] have all adopted this type of rule. One variation, Ghana's, limits amounts spent each year from the petroleum fund to only benchmark revenues, calculated at a pre-determined price. Any excess or deficit that would result from the difference between the predetermined and the realized price would be accumulated or withdrawn from the fund. Ghana has opted for a two-fund model — one for saving and one for stabilization purposes — but this rule can also be applied under a single-fund scheme, as is now provided for in Uganda's draft bill.

To encourage higher savings and make sure the financial buffer is big enough, countries tend to set aside a given percentage of annual oil revenues each year. A smaller percentage is chosen when the revenue management policy encourages early spending of oil revenue domestically, for infrastructure needs for instance (e.g., Ghana). A higher percentage is preferable when long-term savings is a primary objective, or if a country needs to build a larger financial buffer to hedge against revenue volatility (e.g., Trinidad and Tobago).

2. A GHANA-TYPE "'BENCHMARK REVENUE'" RULE (REVENUE RULE 1)

In our model, we have estimated the impact of a rule similar to Ghana's: 70 percent of the benchmark annual oil revenue is added to the budget, 30 percent is saved,[4] and any amount over (below) benchmark revenue would be deposited (withdrawn) from the fund.

The impact of such a rule, illustrated in Figure 9 of the main paper, is a larger fiscal space in the early years of resource extraction (2025-2035), compared with other fiscal rules. This means fewer savings but additional funds for domestic investments and the possibility to respond to social demands for effective investment of oil revenue.

The impact on the Petroleum Fund is that the assets accumulate later than under other fiscal rules, but substantial amounts are still saved over the long run (as shown on Figure 10 of the main paper and can translate into permanent income once oil production ends. On top of these savings, we should take into account the gains in economic growth, improved infrastructure and social services that would be the outcome of smart investment of the additional revenue for the budget during oil production.

In terms of stabilization, this rule is an effective mechanism. As illustrated by **Figure 4**, primary expenditures remain on a stable trend even when we account for projected volatile oil and non-oil revenues.[5] Saving at least 30 percent of benchmark revenue each year allows for the creation of a financial buffer that can be drawn upon when realized revenues are lower than projected.

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[3] Revenue entering the budget from the petroleum fund cannot exceed 3 % of national petroleum wealth.

[4] A maximum of 21% is allocated to a stabilization fund. A minimum of 9% is allocated to a Heritage Fund for future generations.

[5] In theory, highly volatile non-oil revenues could still have a negative impact on public expenditures.

FIGURE 4
REVENUES AND PUBLIC EXPENDITURES UNDER A GHANA-TYPE REVENUE RULE WITH VOLATILE OIL PRICES AND NON-OIL REVENUE (2013 BILLION USD)
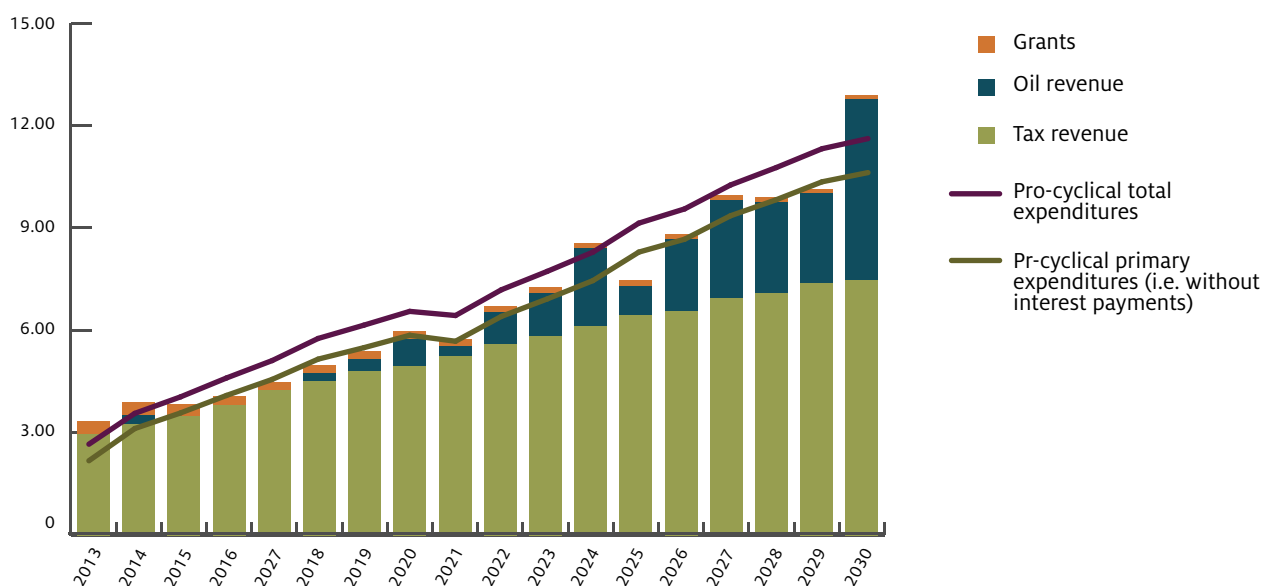
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

This option would equip Uganda with rules that allow flexibility in financing priority sectors to promote economic development while also offering a very effective mechanism to protect the budget against revenue volatility. Among the four options presented here, we believe this best responds to Uganda's strategic policy objectives.
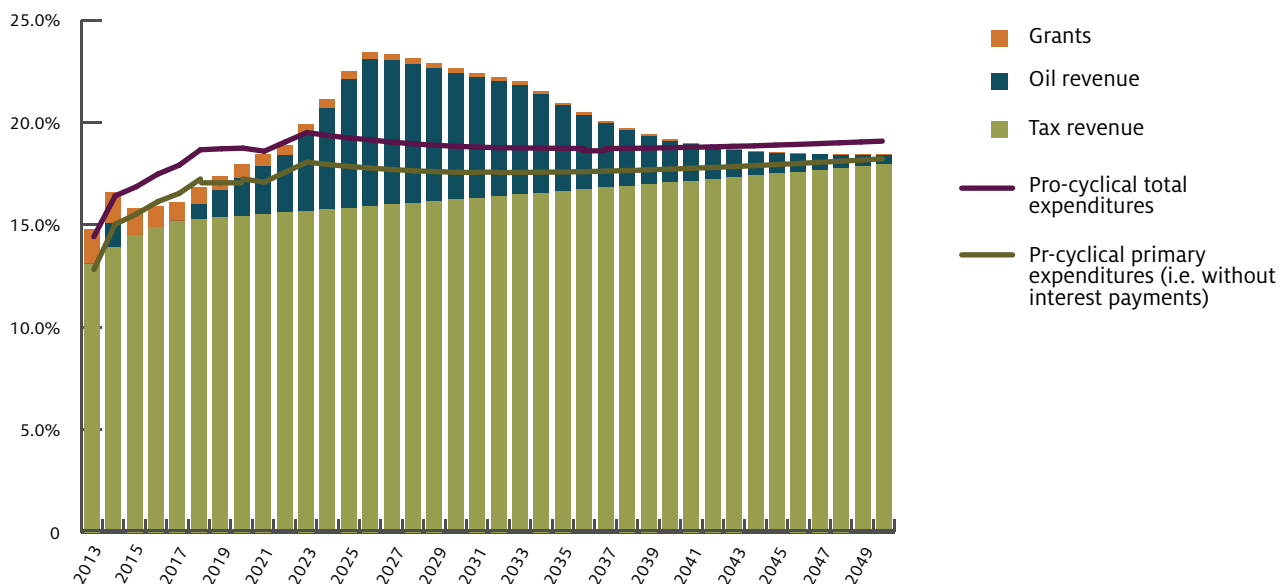
3. A PERMANENT INCOME HYPOTHESIS RULE

Another common fiscal rule for oil revenue management is based on the Permanent Income Hypothesis (PIH), which limits spending from oil and gas or revenues in any given year to the interest accrued on total oil and gas wealth (whether extracted or not), converting a temporary inflow of resource revenues into a permanent income stream that can be maintained indefinitely. The idea is that, since oil and gas are non-renewable, consuming them today is unfair to future generations. In short, the subsoil asset should benefit current and future generations equally.

This rule is relatively conservative in terms of public spending, as it restrains additional expenditure to the equivalent of interest earned over the net present value of oil revenues over the lifespans of all fields. We have assumed that Uganda still has a restricted access to financial markets and therefore cannot actually frontload any income in the first years of oil production,[6] but instead must wait for the fund to build up before withdrawing any money from it. This assumption could be relaxed to allow increased spending earlier.

As **Figure 5** and **Figure 6** illustrate, a PIH-type rule allows for an initial gradual increase of public expenditures but then restricts additional spending until much later in the lifecycle of oil production, which might be suboptimal given Uganda's development challenges and immediate investment needs. It might also be politically difficult to justify, given the Ugandan population's expectations of immediate visible benefits from production.

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[6] Which aligns with provisions that forbid collateralization of future oil revenues.

FIGURE 5
REVENUES AND PUBLIC EXPENDITURES UNDER A PIH RULE

Legend:
- Grants
- Oil revenue
- Tax revenue
- Pro-cyclical total expenditures
- Pr-cyclical primary expenditures (i.e. without interest payments)

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

Figure 6 illustrates that money is withdrawn from the fund at a constant level in real terms/increasing with inflation in nominal terms, which leads to the accumulation of assets throughout oil production.

A PIH-type rule is better suited for a country like Norway, where non-resource GDP growth is low and the population is aging, or Kuwait, where resource revenues represent a very high share of total revenues. It does not seem to fulfill the objectives of Uganda's Revenue Management Policy on investing in much-needed infrastructure and development projects.

FIGURE 6
PETROLEUM FUND UNDER THE PIH (CURRENT BILLION USD)

Legend:
- Balance
- Inflows
- Withdrawals
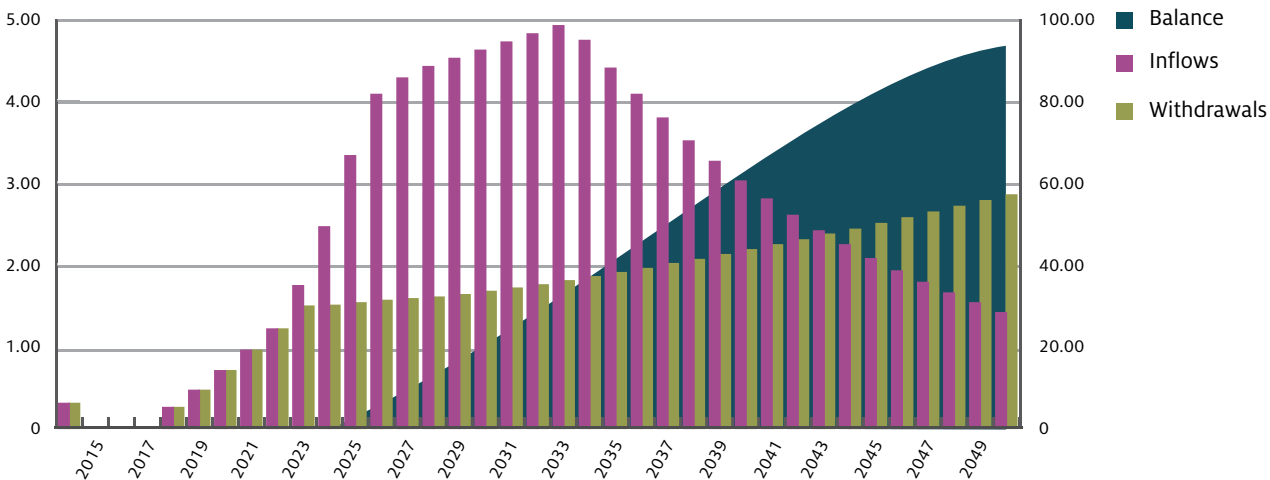
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

In terms of stabilization, the PIH rule, like the other revenue rule, stabilizes inflows from oil revenues into the budget but does not deal with non-oil revenue volatility. It stabilizes inflows from oil revenues under volatile oil revenues once oil revenues are high enough for the Petroleum Fund to act as a buffer to be tapped when revenues are low. When the buffer has been built, the permanent income generated is not subject to cycles. In the first few years of extraction, though, the predicted permanent income stream is higher than actual oil revenues, and unless the government can openly access international financial markets, it will not be able to spend more than realized oil revenue.[7] The spending pattern would therefore look like **Figure 7**.
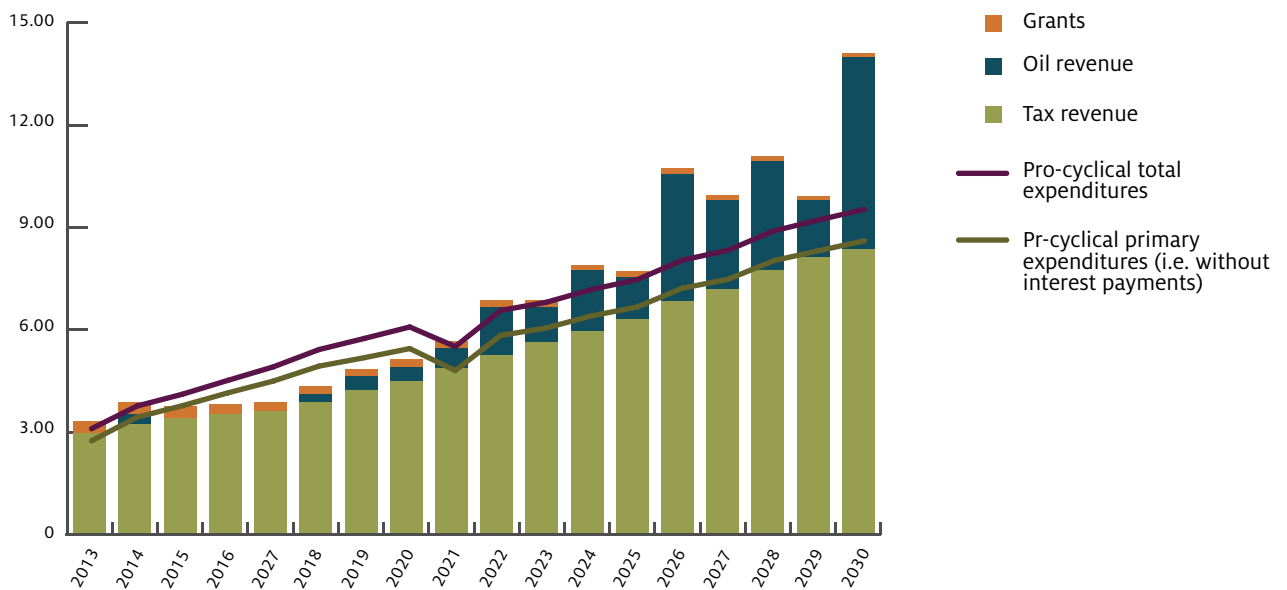
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

4. THE BALANCED BUDGET RULE

The Oil and Gas Revenue Management policy, drafted by the Ministry of Finance, Planning and Economic Development, suggests a limit on public expenditure through a maximum non-oil non-grant budget deficit. The policy document does not make explicit the target deficit. For example, if the target were a non-oil non-grant budget deficit of 5 percent of GDP, annual government expenditures would be limited to non-oil non-grant revenues plus 5 percent of GDP, even if total revenues were higher (or lower). Countries that have adopted similar rules include Norway,[8] Chile[9] and Mongolia.[10]

We tested this rule on a range of non-oil non-grant budget deficit targets often adopted by resource-rich countries, between 2 and 5 percent of non-resource GDP. Under our assumptions, a rule with a 3 percent target would allow the Petroleum Fund to build up during the oil extraction phase and maintain fiscal sustainability during and just after the oil extraction, as **Figure 9** illustrates. As we can see in Figure 8, this rule allows the government to increase spending before large oil revenues are available, as long as borrowing

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[7] For the purpose of this exercise we assume that the government is cash-constrained.

[8] Non-oil structural deficit of the central government cannot exceed 4%, which is the expected long-run real return on sovereign wealth fund investments.

[9] Structural surplus of 1% of GDP.

[10] Structural deficit cannot exceed 2% of GDP.

on the international market is possible. A more cautious approach to this rule would be to suspend its application until oil production begins.[11] In that case, the rule would be very conservative and would not allow Uganda to frontload oil revenues at the beginning of production.

In the long run, this rule links increases in spending to the increase of non-oil revenues, which allows the gradual build-up of the Petroleum Investment Reserve during the oil boom (as shown **by Figure 9**), but quickly depletes the fund if the target of the rule is not revised conservatively when oil production starts decreasing.

FIGURE 8
REVENUES AND PUBLIC EXPENDITURES UNDER A BALANCED BUDGET RULE (MAX NON-OIL NON-GRANT BUDGET DEFICIT OF 3% OF GDP)
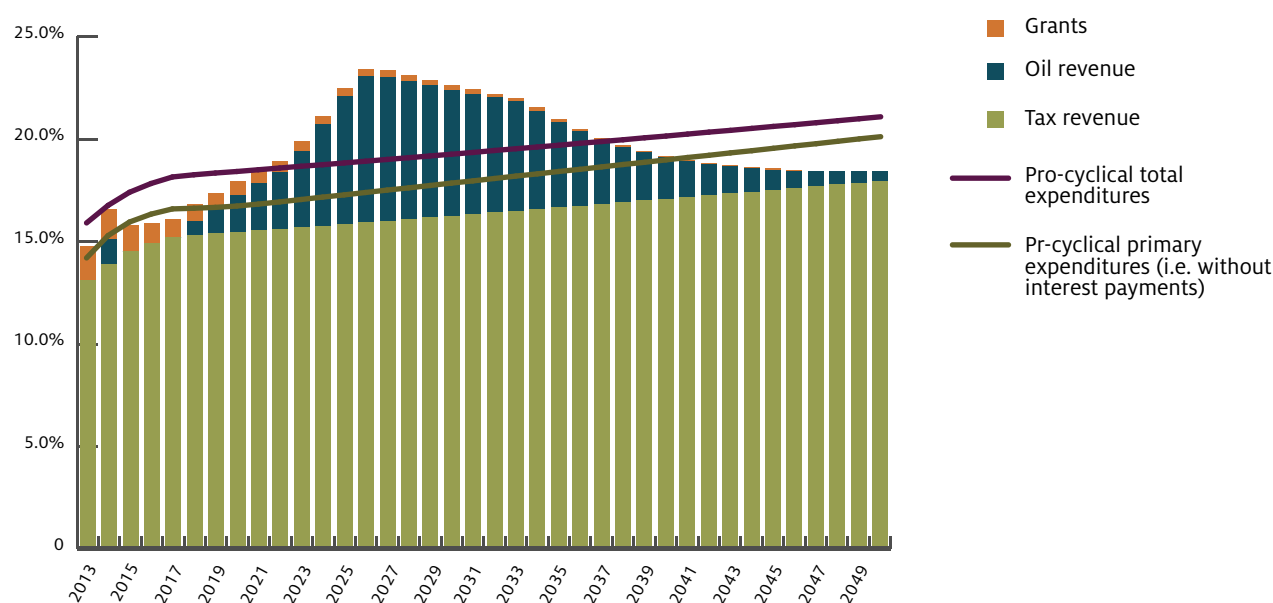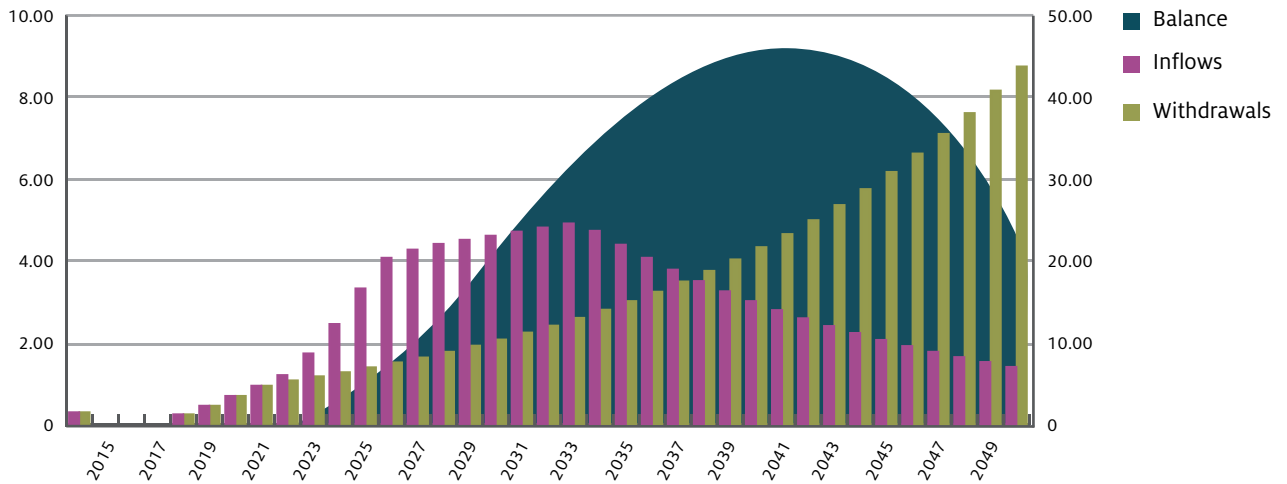

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

Once oil runs out, there may be room to maintain a deficit, though it would have to be reduced downward if Uganda wishes to maintain a positive balance in the Petroleum Fund over a longer period. The fund would be depleted more or less quickly depending on the target chosen for the deficit.

If Uganda decides to implement such a rule, the actual target enshrined in the law should be the object of additional analysis and discussion. A higher target would allow higher spending of oil revenue but a rapid depletion of the fund after production, thus limiting intergenerational transfer of resource wealth unless the target is revised after peak oil production. A lower target would allow the interest earned on the Petroleum Investment Reserve to supplement the budget long after oil production ends but would limit the early use of oil revenues.

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[11] Which would be more realistic, in light of Uganda's wise decision to forbid collateralization of future oil revenues.

FIGURE 9
PETROLEUM FUND UNDER A BALANCED BUDGET RULE (CURRENT USD) (MAX NON-OIL NON-GRANT
BUDGET DEFICIT OF 3%)

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

To solve this dilemma, we recommend combining this rule with an expenditure growth limit (see
scenario 4), as suggested in the Oil and Gas Revenue Management Policy.

As we can see in **Figure 10**, this rule only partly achieves fiscal stability despite volatile oil revenues
(stabilization effect). It does not protect against the volatility of non-oil revenue, as it is linked to the
non-oil budget deficit (i.e., non-oil revenues minus primary expenditures). It is therefore less efficient
as a stabilization mechanism than other fiscal rules could be if Uganda expects volatility in government
revenue to remain on its recent trend. However, the addition of an expenditure growth limit would go a
long way toward solving this problem.

As far as oil revenues are concerned, though, if the target is conservative enough, the Petroleum
Fund will be able to build up sufficiently, so that any shortfall in oil revenues in a given year
can be compensated for by drawing from the Petroleum Fund. Therefore, the annual increase in
public expenditures would be fiscally manageable, and it would prevent budget shortfalls in the
implementation of Medium Term Expenditure Plans.
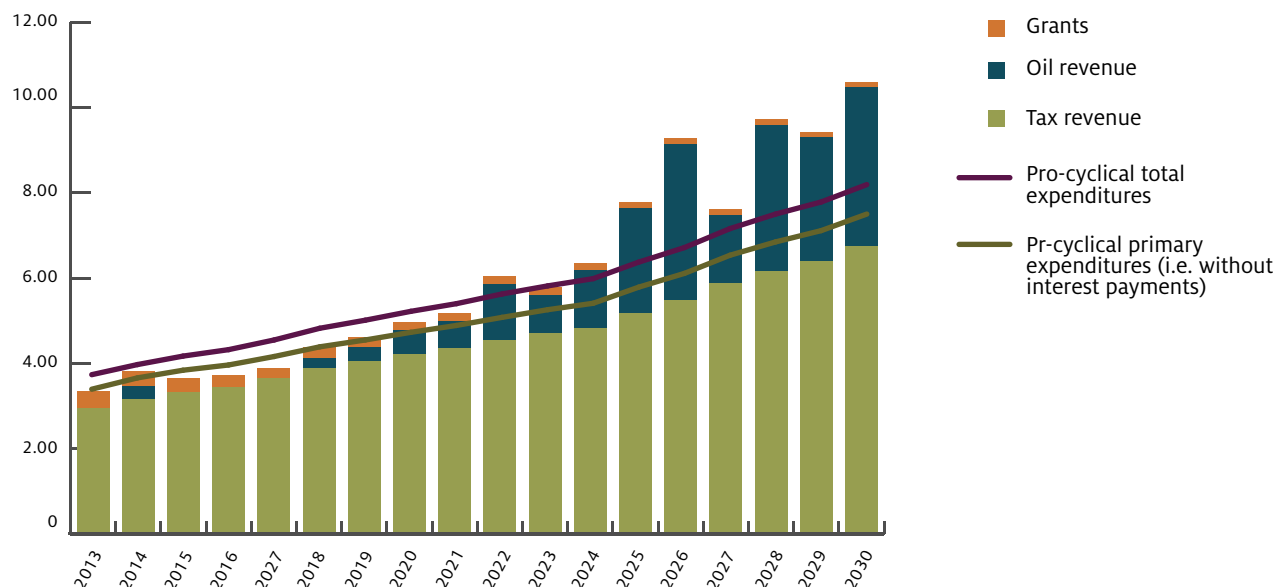
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

5. THE BALANCED BUDGET RULE COMBINED WITH AN EXPENDITURE GROWTH LIMIT

The Ministry of Finance in the Oil and Gas Revenue Management policy document also mentions imposing a limit on the annual growth of government expenditure as a future complement to the initial fiscal rule (target non-oil non grant budget deficit). Other governments, such as those of Botswana,[12] Peru,[13] Brazil and Mongolia,[14] have also chosen to impose such a constraint on their public spending. An expenditure growth limit is indeed a very good complement to a balanced budget rule.

For the sake of illustration, we have modeled an expenditure growth limit in addition to the non-oil non-grant budget deficit limit of 3 percent GDP in this scenario. Without further specification, our assumption is a 7.6 percent limit in primary expenditure growth. In nominal terms, this is equal to the average long-term growth in non-oil revenues. These assumptions take into account the large infrastructure and social services needs of Uganda while still making this incremental increase manageable by the Ugandan government and ensuring the parallel increase in absorptive capacity.[15] **Figure 11** shows the smoothed increase in public expenditure that is the outcome of this fiscal rule, during and after the oil boom. A higher limit in expenditure growth would make this rule less conservative, if such were Uganda's policy stance.

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[12] Ceiling on the expenditure-to-GDP ratio of 40%.

[13] Real growth current expenditure ceiling of 4%.

[14] Expenditure growth limited to non-mineral GDP growth.

[15] Under these or revised assumptions, we could analyze the same scenario with various levels of expenditure growth limits in order to test what the ideal level would be.

FIGURE 11
REVENUES AND PUBLIC EXPENDITURES UNDER A BALANCED BUDGET RULE COMBINED WITH AN EXPENDITURE GROWTH LIMIT (% GDP)
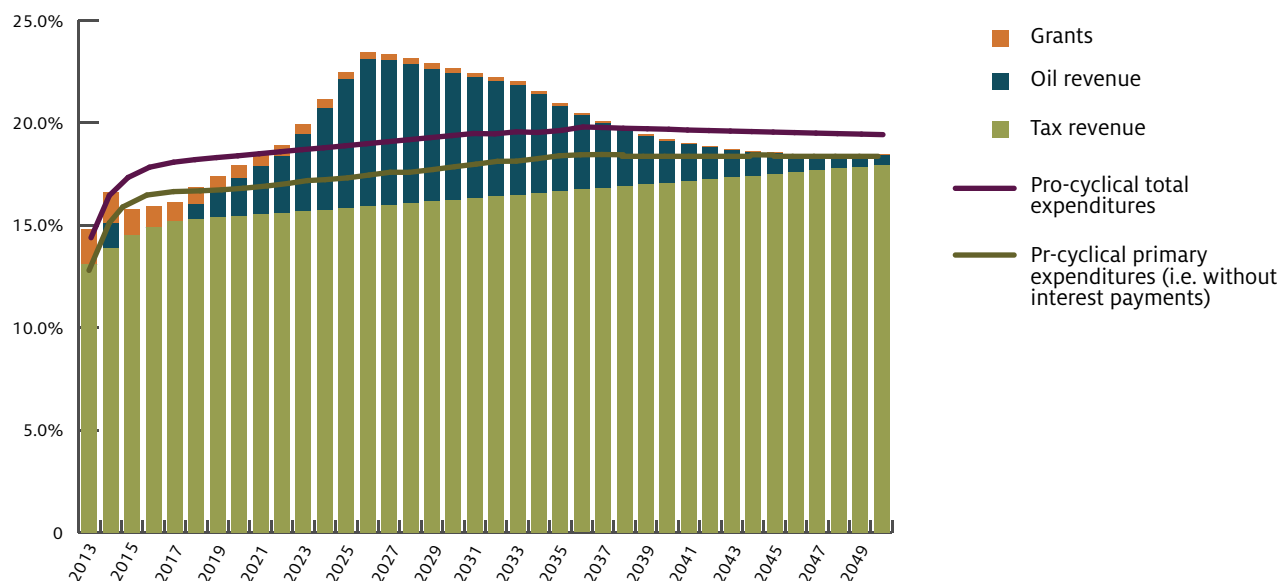
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

This rule does not frontload expenditure of oil revenues like the Ghana-type revenue rule. Instead, it backloads expenditure to a later stage (2035-2055), when actual oil revenues decrease and dry up. Accordingly, **Figure 12** shows that the Petroleum Fund would gradually build up from 2025 on, setting money aside for after the peak of oil production. As **Figures 11 and 12** also illustrate, this rule allows higher expenditures, even after oil production, allowing post-oil fiscal sustainability and preventing a quick depletion of the Petroleum Fund. Depending on when the revenue will be more efficiently invested, this could be the best option for Uganda.

FIGURE 12
PETROLEUM FUND UNDER A BALANCED BUDGET RULE COMBINED WITH AN EXPENDITURE GROWTH LIMIT (CURRENT BILLION USD)
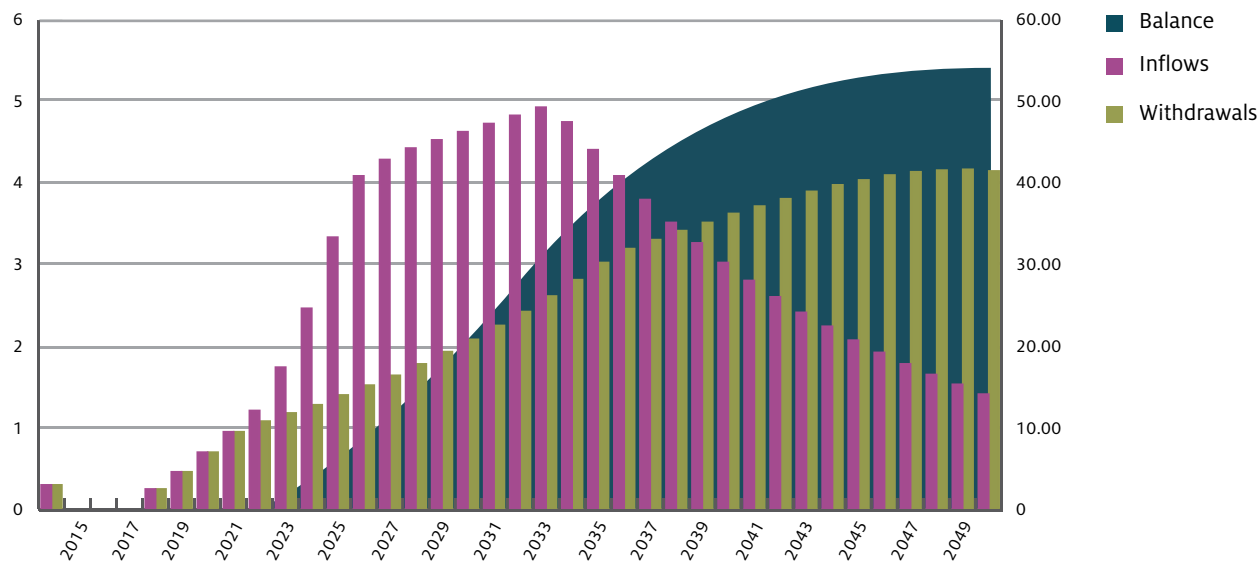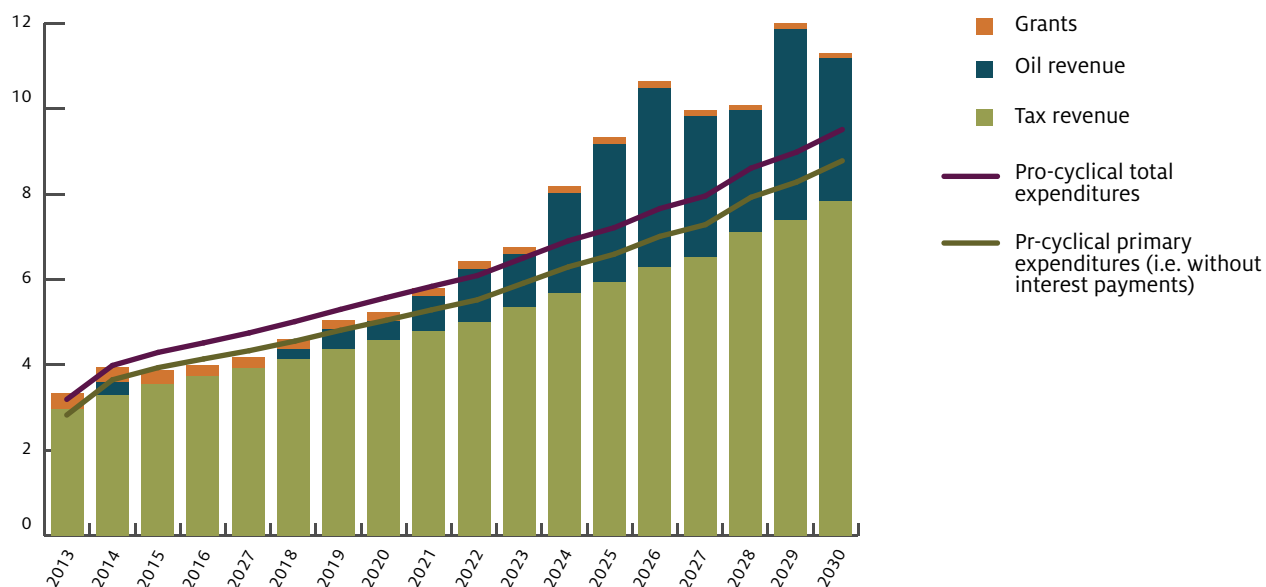

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

The advantage of this rule is that it smooths expenditure in the long run while allowing for the gradual increase in government capacity to manage additional revenue, therefore limiting wasteful spending of initial oil revenues.[16] This fulfills part of Uganda's oil revenue policy, though it does not allow for frontloading much of the oil revenue, which might prove difficult in the short run, given high expectations among the population for improvement in living standards.

This rule also allows for a smoothing effect on public expenditure under volatile oil prices and revenues, as **Figure 13** illustrates. While spending only increases at a determined rate, additional oil revenue is saved in the fund, or money can be withdrawn from the fund to supplement the budget when oil revenues in a given year are too low to sustain the planned rate of increase in expenditures. It has the added benefit of smoothing expenditure volatility in non-oil revenues.

FIGURE 13
REVENUES AND PUBLIC EXPENDITURES UNDER A BALANCED BUDGET RULE COMBINED WITH AN EXPENDITURE GROWTH LIMIT AND VOLATILE OIL PRICES AND NON-OIL REVENUE (2013 BILLION USD)

Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

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[16] For the rule to reach its full benefit, actual improvement in public finance management needs to be a top priority of the government.

Appendix 2: Modeling assumptions

We based the modeling part of our analysis on public information and reasonable forecasts. The assumptions described below are subject to revision and discussion with stakeholders in Uganda. We interpreted our results in light of the characteristics of these assumptions. This is why our analysis focuses on trends and interpretations of the impact of the different fiscal rules.

For the purpose of our analysis, we use a two-step approach: We first model expected government revenue from oil extraction, using assumptions found in academic papers[17] and other estimates, but rely on more recent information from the official declaration of Uganda's Ministry of Energy and Mineral Development, as well as Tullow's website.[18] In particular, recoverable oil reserves are estimated at 1.7 billion barrels, oil prices up to 2018 are based on the IMF World Economic Outlook forecasts,[19] and future oil price (2019 and after) at $75 USD in real terms, with Uganda's oil being valued with a discount of 5 percent to account for its lower quality. Total investment cost is estimated at $9 billion USD, including a $3 billion USD pipeline and a $2.5 billion USD refinery. Total cost per barrel is estimated at $20 USD, including potential pipeline transport/local refining.

We make the projections through a simple oil project model, from which we obtain project net cash flows. Key fiscal figures include a 4.2 percent royalty, a government share of profit oil estimated at 60 percent at all levels of production, a corporate income tax rate of 30 percent, no withholding taxes on dividends, and a six-year straight-line depreciation of capital expenditures. We also assume that all the revenue generated is actually paid to the treasury and collected by the Revenue Authority.

The outcome of our forecasting is similar to that found in the 2012 OxCarre paper footnoted above, accounting for revised recoverable reserves. This allows for a reasonable confidence in the results.

The second step is a simple fiscal sustainability model, using fiscal operations of the government of Uganda figures from the IMF World Outlook database and latest country report.[20] Projections are available until 2018. We take a slightly more conservative assumption than the IMF on GDP growth, because we are isolating non-resource GDP and accounting in USD terms. We follow IMF estimates on tax revenue and public debt in percentage of GDP terms:

	2013	2014	2015	2016	2017	2018
Real non-resource GDP growth rate	5.6%	6.0%	6.0%	5.5%	5.5%	5%
Stable non-resource tax take, as % of non-resource GDP	13.1%	13.9%	14.5%	14.9%	15.2%	15.3%
Primary expenditure	14.3%	16.4%	17.1%	17.7%	18.0%	18.8%
Recurrent expenditure (excluding interest)	9.0%	8.5%	8.8%	9.1%	9.1%	9.3%
Capital expenditure (excluding externally financed projects)	3.7%	6.4%	6.6%	6.9%	7.3%	7.8%
Interest payments	1.6%	1.5%	1.7%	1.7%	1.6%	1.7%
Government debt	29.4%	30.0%	31.3%	33.1%	35.3%	38.0%

[17] Mark Henstridge and John Page, *Managing a Modest Boom: Oil Revenues in Uganda*. OxCarre Research Paper 90, http://www.oxcarre.ox.ac.uk/images/stories/papers/ResearchPapers/oxcarrerp201290.pdf.
Hassler et al, http://hassler-j.iies.su.se/PAPERS/UgandaOil.pdf.
IFPRI discussion paper *Managing Future Oil Revenue in Uganda for Agricultural Development and Poverty Reduction*, http://www.ifpri.org/sites/default/files/publications/ifpridp01122.pdf, and World Bank Uganda Country Brief, http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/UGANDAEXTN/0,,menuPK:374947~pagePK:1411 32~piPK:141107~theSitePK:374864,00.html.

[18] http://allafrica.com/stories/201310011176.html?viewall=1;
http://www.tullowoil.com/index.asp?pageid=62.

[19] Crude oil (petroleum), simple average of three spot prices; Dated Brent, West Texas Intermediate, and the Dubai Fateh, US $ per barrel.

After 2018, we have followed the following assumptions:

- Non-resource GDP growth rate of 5 percent
- Real interest rate of 3 percent on international markets
- U.S. inflation rate of 2 percent
- A steady increase in non-resource tax take, from 15.3 percent of GDP in 2018 to 18.5 percent of GDP in 2050
- Volatility in non-oil revenue (we simulate the growth of the non-oil tax take in percentage of GDP terms following a normal law with a mean of 0.5 percent and a standard variation of 0.2; the actual volatility of non-oil revenue in the past 12 years was higher, but we expect current fiscal management reforms to have a positive effect on this variable)
- A sustainable level of public expenditures at 18 to 19 percent of GDP (excluding externally financed projects), though when estimating the impact of fiscal rules this variable is allowed to change to conform to the rules imposed on public finance
- Volatility in oil prices (based on the standard variation of 0.22 in the oil prices of the past 13 years, we forecast future oil prices following a normal law with a mean of 75 and a standard variation of 0.22)

Appendix 3: Volatility in tax revenue

Even before becoming an oil-producing country, Uganda is experiencing very volatile revenue, illustrated by **Figure 14**, which has made budget planning and execution harder. As current reforms by the Ministry of Finance, Planning and Economic Development and the Uganda Revenue Authority bear fruit, this volatility is expected to decrease, but it is likely to remain an ongoing challenge to Uganda's public finance management in the short run.

FIGURE 14
REVENUE VOLATILITY, 2001-2012
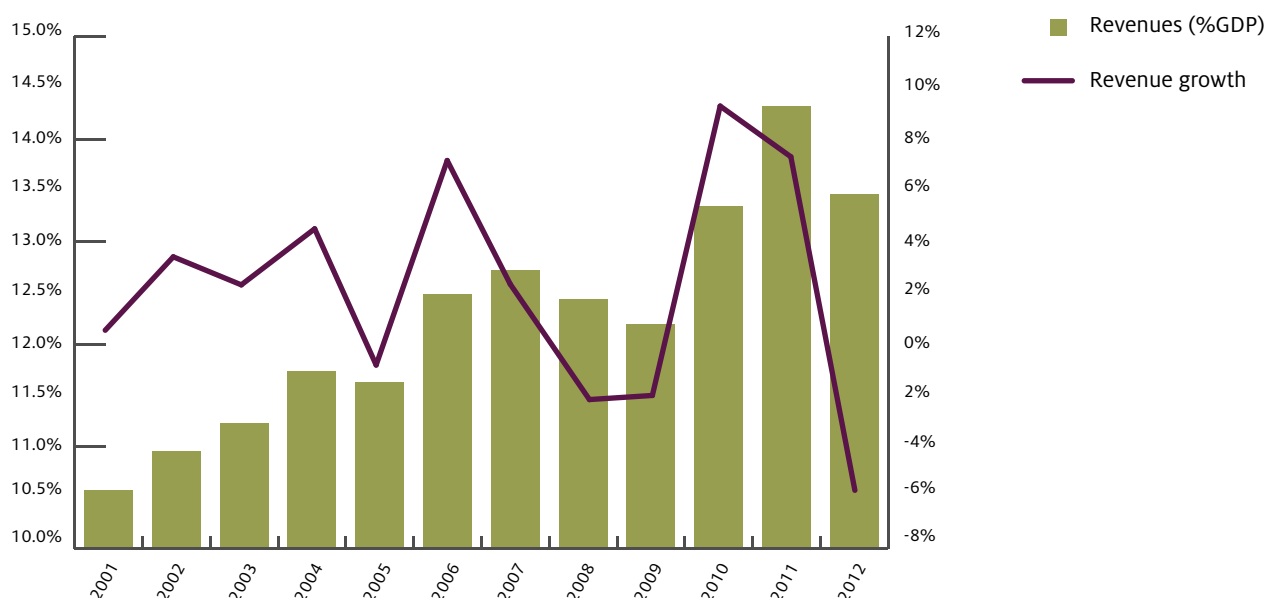
Sources: IMF WEO database and article IV Uganda report (2013) and RWI projections

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[20] *Uganda: 2013 Article IV Consultation and Sixth Review Under the Policy Support Instrument, Request for a Three-Year Policy Support Instrument and Cancellation of Current Policy Support Instrument—Staff Report*, IMF Country Report No. 13/215, July 2013, http://www.imf.org/external/pubs/ft/scr/2013/cr13215.pdf.