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Uganda's oil

How much, when, and how will it be governed?

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Abstract: We study Uganda's journey to become a petroleum producer and provide estimates regarding the size and timing of the oil revenues to be expected. At an average US\$38 per capita per year over a 33-year period, oil revenue by itself will not be transformational for the Ugandan economy, but it could provide a welcome boost. The question is whether the Ugandan government will manage to avoid squandering it, and will transform the country's natural resource assets into productive assets. To this end, the government has made significant additions and changes to the policy and institutional framework that will govern the use of revenues, adapted from the Norwegian model. We study the framework put in place and identify a number of potential shortcomings. Weaknesses in public investment management further raise doubts about the transformational impact of the planned investments.

Keywords: Uganda, extractive industries, structural change

JEL classification: O13, O55

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1 Introduction

In 2006, discoveries of commercially viable oil reserves in Uganda raised hopes of a timely boost to economic growth in the country. Twelve years later, despite pressing development needs, Uganda has not yet moved to the production stage and is yet to derive significant revenues from the resource. There are good reasons to tread slowly. Economists routinely warn of the pitfalls of windfall revenue from natural resources, and negative experiences of young petrostates provide cautionary examples. In this paper we attempt to provide a primer on the Ugandan journey to becoming a petroleum producer and study the path the country is taking to navigate the potential perils of the ‘resource curse’.

We complement previous work with a renewed modelling effort to gauge the size and timing of revenue flows. Our estimates are based on updated cost estimates, leaked details of production sharing agreements, and the state of development of the infrastructure required for production. We assume that the first oil will flow in 2022 at the earliest, and estimate that revenues will average about US\$2,115 million over 33 years in constant 2018 US\$ terms. The expected revenue will not allow Ugandans to stop working and live off the oil; we estimate that it will average US\$38 per capita per year over the same 33-year span, compared with a GDP per capita of US\$797 in 2018.

The Ugandan government’s stated intent is to use oil revenues to boost growth and structural transformation through investment in infrastructure at a controlled pace. To this end the Government of Uganda (GoU) has introduced a new policy and institutional framework that will govern the use of oil revenues. Adapted from the Norwegian model, the established framework mandates that revenues first enter a Petroleum Fund, and then be used either to invest in a sovereign wealth fund, or to finance a maximum fiscal deficit of 3 per cent of non-oil GDP. The sovereign wealth fund is meant to park revenues abroad in times when domestic investment absorption is at capacity and/or signs of Dutch disease emerge. We identify a number of potential shortcomings of the framework put in place. We point to gaps in the management of volatility, lack of isolation from the political cycle, unclarity regarding the distribution of revenues to local governments, and a persistent lack of transparency. Weaknesses in public investment planning and management raise further doubts as to whether the planned investments will realise the expected transformational impact.

Our analysis draws on a growing body of work on Uganda’s oil boom that discusses options to manage the revenue inflows, and that evaluates whether certain best-practice oil governance models should be adopted in Uganda (African Development Bank 2015; Bategeka and Mawejje 2013; Collier 2011; Henstridge and Page 2012; Polus and Tycholiz 2017; Shepherd 2013; World Bank 2015). Other work that we build on focuses on the politics behind oil governance in Uganda, and argues that power relations in the country, rather than technical considerations, are the most important predictor of the eventual developmental outcomes from the oil revenues. We also look at the relatively long process of commercializing oil. This has been a subject of debate in the literature we refer to, as to whether this delay represents deliberate government choice or is an early manifestation of inadequate capacity and elite capture (Patey 2015; Polus and Tycholiz 2016).

Our paper is part of a series of UNU-WIDER working papers on natural resources, structural change, and industry in Africa. Two complementary papers in the series study the role of the construction sector (Colonelli and Ntungire 2018) and local content policy (Sen 2018) to understand how the oil boom to come can play a role in the structural transformation of the Ugandan economy. The UNU-WIDER working papers further contrasts the Ugandan story with those of other natural resource exporters (Ghana, Mozambique, Tanzania, and Zambia) and draws overarching lessons in a number of framing papers.

In Section 2, we lay out the timeline of oil exploration in Uganda, and then move on to describe the expectations and assumptions regarding the size of the boom to come. We then provide our projections. In Section 3, we discuss the institutional framework that has been put in place to manage oil revenues, and comment on its advantages and disadvantages. Section 4 concludes.

2 Timing and sequencing of the oil boom

2.1 Uganda's oil timeline thus far

Exploration during colonial times

Oil in Uganda has a history that goes back to the late 19th century, when local communities discovered oil seepages in the Albertine region. Such finds were documented by Emin Pasha in 1877 and by British colonial administrator and explorer F. Lugard in 1890, the latter being quick to declare ownership of them.

In the 20th century, exploration was erratic and hindered by geopolitical events. In 1925, the British colonial administration conducted a geological survey to map possible oil deposits. This survey provided the first official confirmation of the presence of hydrocarbons in the Albertine Graben and generated international interest in commercializing oil reserves in Uganda (Kiiza et al. 2011). Next, in 1938, a Johannesburg-based investment company drilled exploration wells and made discoveries. More exploration wells were drilled, but these initial attempts were soon halted by the Second World War, disrupting the oil market. Some exploration activity resumed in 1952, but this was again halted after a change in colonial policy that clustered East Africa into an agriculture zone. Up to independence, no reserves of commercial viability were discovered.

Exploration after independence

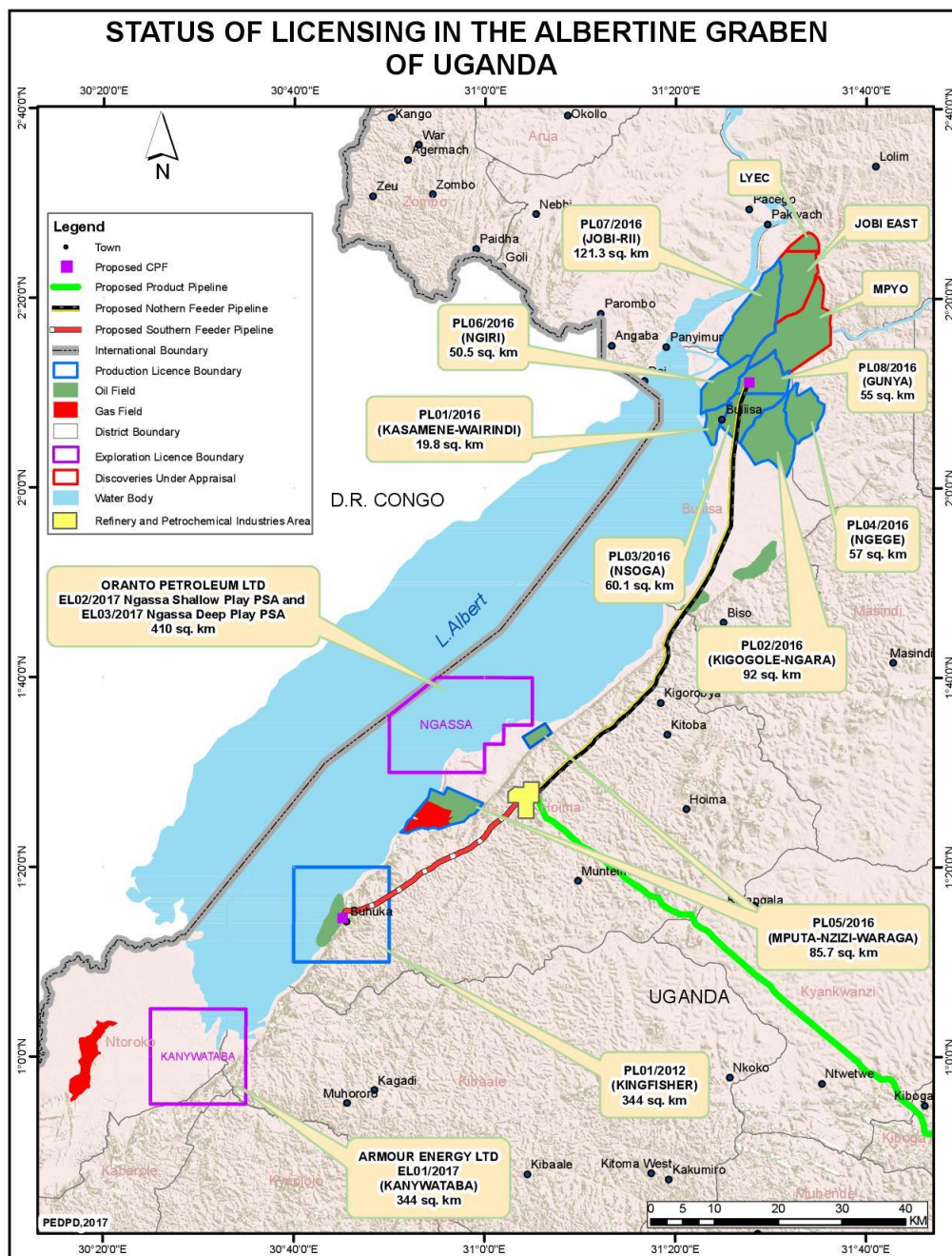
The political turmoil and insecurity that followed Ugandan independence put a brake on exploration activity until the early 1980s, when President Obote resumed power. The new government restarted exploration and was assisted by the World Bank to fund aeromagnetic surveys over the Albertine region. It also advanced the legislative and administrative framework by passing The Petroleum (Exploration and Production) Act in 1985 and establishing a dedicated Petroleum Unit in the Geological Survey and Mines Department. This Act, along with the Petroleum (Exploration and Production) (Conduct of Exploration Operations) Regulations of 1993, regulated upstream activities in the oil sector. Political instability in the mid 1980s, however, delayed progress. Soon after the National Resistance Movement (NRM) took power in 1986, President Museveni suspended negotiations with oil companies. With the aim of endowing Ugandan professionals with stronger bargaining power so that they might negotiate favourable contract terms, staff were sent for training to Norway, the USA, and India (Rwakakamba and Lukwago 2013).

A few years later, the government signed the first production sharing agreements (PSAs). The first three were signed with Petrofina, a Belgian oil company, in 1991, and with Uganda Works and General Engineering Company, in 1995. These were, however, cancelled after the alleged failure of the oil companies to deliver on the agreed terms. The next agreement was signed in 1997 with Heritage Oil and Gas for the exploration rights of Exploration Area (EA) 3A in the Semliki basin.¹

¹ EA3A covered the southernmost part of Lake Albert and its shores, an area stretching from Kanywataba to Buhuka (see Figure 1).

Under this contract, Heritage conducted the first seismic surveys, which considerably increased confidence that significant oil deposits were present in the area.

Figure 1: Status of Licensing in the Albertine Graben (as of 2018)²



Notes: Blue border = Fields licensed for production. Purple border = Fields licensed for exploration. PL = Production licences, followed by the month and year the licence was granted. EL = Exploration licences.

Source: Ministry of Energy and Minerals Development (2017a).

² 'Kingfisher' was licensed for production in 2012, all other fields in 2016. All production licences are currently held by the joint venture partners. New exploration licences were granted for the Ngassa field to Nigeria's Oranto Petroleum and for the Kanywataba field to Australia's Armour Energy.

The 2000s were marked by more substantial exploration activity and the emergence of Irish company Tullow Oil as a dominant player in the Ugandan oil sector. On the back of increases in the oil price and a decade of stability in the country, investments in the region increased significantly and more companies showed an interest in drilling exploration wells. The government signed a number of PSAs, and three companies—Tullow Oil, Hardman Resources, and Heritage Oil—fielded discoveries. As a result, the commercial threshold of reserves for oil extraction was reached in 2006 for EA2³, in 2007 for EA3A, and in 2009 for EA1⁴. Through several acquisitions, Tullow Oil managed to consolidate rights for all Exploration Areas with significant discoveries (EA1, EA2, and EA3A), and attracted oil giants Total and CNOOC into a joint venture at equal shares in 2011.

Slow-down of exploration activity and development of current legal framework

The five-year period after 2011 was characterized by a substantial slow-down of activity in the sector. Four factors contributed to the deceleration. First, the government saw a need to develop a more robust policy and legal framework before moving into the production stage. To this effect, the Ministry of Energy and Mineral Development (MEMD) approved a National Oil and Gas Policy in 2008, and in 2011 Parliament imposed a moratorium on the signature of new contracts until the requisite legal framework was put in place. Second, the government did not want to proceed to the production stage without agreement on a large refinery. The president pronounced that he did not want oil to be sold without adding value in-country. He wanted a refinery large enough to refine all of Uganda's oil, saturate the domestic fuel market, and export surplus fuel to the regional market. Oil companies, on the other hand, had concerns regarding the commercial viability of a large refinery and feared ending up in a monopsony. Third, several tax disputes arose, leading to litigation between the government and the oil companies. Last but not least, a downward trend in the oil price beginning in 2014 lowered the oil companies' incentive to push ahead with investments.

With regard to the first of these factors, Parliament passed the Petroleum (Exploration, Development and Production) Act and the Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act in 2013. These Acts established the Petroleum Authority of Uganda (PAU) as the regulatory body and designated the Uganda National Oil Company (UNOC) to manage the government's commercial interest in the sector. Formulated with Norwegian support, the two Acts formed the legal basis for the development of upstream and midstream capacity. In the same year, the Ministry of Finance approved an Oil and Gas Revenue Management Policy. This provided an important signal that the government intended to put in place a prudent governance framework to manage the expected revenue. Consequently, the government also passed the Public Finance Management Act in 2015. This was a landmark legislation that included provisions on the management of oil resources and gave birth to the Charter for Fiscal Responsibility, the Petroleum Revenue Fund, and the Petroleum Revenue Investment Reserve. The development of the legal policy and regulatory framework saw extensive support by development partners, most prominently the Norwegian government.⁵

The second and third factors slowing down exploration and operational progress towards the production stage were overcome through concessions from both the government and

³ EA2 covered most of Lake Albert and its shores, excluding the southern and northern ends.

⁴ EA1 covered the northern end of Lake Albert, and the confluence area of the Nile called the Pakwach Basin.

⁵ The Norwegian government pledged in its third phase of support US\$6.5 million for the period 2015–18. The first and second phases ran from 2006 to 2009 and from 2009 to 2014 at budgets of US\$2.58 million and US\$18.3 million, respectively.

international oil companies. In 2013, the government accepted the oil companies' compromise on the refinery and agreed to a smaller facility to serve only the domestic fuel market, and to a pipeline to export crude oil (see below). Regarding the tax disputes, the government stood its ground and Tullow Oil eventually agreed to pay the taxes demanded in order to avoid risking the non-renewal of its exploration licences. External factors also improved when in 2016 the international oil price began to recover.

Development of infrastructure required for production

Construction of the required infrastructure for production has been slow. The only major oil-related projects completed thus far are the Hoima–Kaiso–Tonya road (finished in 2014, this was an entirely GoU-funded project and forms an important network to connect oil wells) and an oil waste treatment plant in Nyamasoga (finished in 2015). Virtually no progress has been made in the three crucial large infrastructure projects, namely the crude oil refinery, the oil pipeline, and the Hoima airport.

Critical infrastructure project 1: Oil refinery

From the time of its proposal, the crude oil refinery has been a contentious project. President Museveni initially insisted on refining all Ugandan crude oil in Uganda to increase local value addition and end dependency on fuel imports. The President's views were bolstered by Foster Wheeler's feasibility study conducted in 2010–11, which claimed that a 150,000 bbl/day refinery would generate US\$1 billion in profits annually through import substitution and export earnings. These figures were disputed by the oil companies, which expected local demand to be insufficient to render the refinery profitable. The oil companies cited a similar situation in Kenya, where the refinery in Mombasa shut down due to lower efficiency than the large competitors in the Middle East and India, and other failed refinery projects across Africa (Patey 2015). After lengthy negotiations, the government changed its view and agreed to a smaller refinery of 30,000 bbl/day (scalable to 60,000 bbl/day) to serve the domestic market. The Russian company RT Global Resources was selected as lead investor for the refinery in early 2015. However, the deal fell through due to disagreement on the terms, and this led to another round of bidding. In early 2018 the GoU signed a new deal on the refinery with investors consisting of the Albertine Graben Refinery Consortium (led by USA-based General Electric). However, a final investment decision is yet to be taken, making the completion date an open question.

The refinery is estimated to have a cost of US\$3–4 billion and it is to be financed to 40 per cent by the GoU. The government's stake in the project is held by the Uganda Refinery Holding Company (which is a subsidiary of UNOC). The refinery, as well as the planned airport, will be hosted in the Hoima Oil and Gas Industrial Park (see Figure 1) (New Vision 2018a).⁶ A major bone of contention at the moment is the resettlement of more than 20,000 people in the area that has been earmarked for the refinery, complicated by the lack of formal land ownership titles among Ugandan residents.

Critical infrastructure project 2: Oil pipeline

For the oil companies, the construction of a crude oil export pipeline was non-negotiable; it was viewed as the only commercially viable and reliable path to bringing Ugandan oil to the international market. In late 2013, the government accepted the oil companies' demands for a pipeline, but the choice of route quickly became a geostrategic issue. A deal between Uganda and Tanzania for the East African Crude Oil Pipeline (EACOP) was reached in 2016, after an informal

⁶ The Industrial Park is also planned to include petrochemical industries and a free zone for export production.

agreement with the Kenyan government was voided. The 1445 km pipeline will be the longest heated pipeline in the world. In addition to the route being more cost effective thanks to numerous concessions by the Tanzanian government, issues of land acquisition, resettlement, and security played a role in swaying the GoU to decide against Kenya. President Museveni was also said to have been wary of the Kenyan route due to Uganda's experience with price surges of fuel transiting through Kenya during the 2008 election period (Patey 2015). The governments of Tanzania and Uganda are planning to finance 70 per cent of the project through international lenders, and 30 per cent through equity from the joint venture partners. At an expected cost of US\$3.5 billion, it will transport a maximum of 216,000 barrels a day, at an expected price of US\$12.2 per barrel. As of mid-2018, the Tanzanian and Ugandan governments are yet to complete the deal through the signature of a host government agreement that assures the investing parties' contractual rights for the Tanzanian section of the pipeline. This is a major outstanding issue before a final investment decision can be made. In the light of this, it is unlikely that the pipeline will start operation before 2022. Consequently oil companies will be unable to begin large-scale production until then.

Critical infrastructure project 3: Hoima airport

The international airport in Hoima, which will be Uganda's second international airport, has been deemed necessary to bring in equipment for production that is too large to enter the country by road. It is planned to be completed by May 2020, i.e. 36 months after the start of construction. In 2018, Parliament approved borrowing of US\$318 million for the project. The majority of this sum is to be borrowed from UK Export Finance. The construction project has been awarded to the Israeli firm SBC Uganda.

2.2 Forecast of size and timing of revenue stream

In planning for oil revenues, an accurate forecast of the potential size and timing of the revenue stream provides an important input for fiscal policy decisions, and helps determine the choice of institutional framework. Will the revenues be larger or smaller than current tax collections, and how will they stack up against aid inflows? Will there be more revenues than can initially be absorbed in efficient domestic investments? Ever since 2006, when it was proven that oil in Uganda was commercially viable, the government, civil society, and researchers have built estimates and expectations of the size of the prospective oil boom.

Some of these expectations have already been solidified in infrastructure investments, or built into investment plans. The government has run an average budget deficit of 4.3 per cent of GDP over the last 10 years, mainly to fund large infrastructure investments. In part, the investments made or planned provide the infrastructure necessary to enable oil production in the Albertine Graben, such as roads connecting the different fields, the export pipeline, the refinery, and an industrial park including the airport to allow importation of heavy equipment. But the scope of public investment extends far beyond the oil-producing regions, with three large hydropower dams on the Nile, airport extensions, new railway lines, and extensions of the road network to bolster trade (see Table 1 for an overview of large ongoing or planned public infrastructure projects in Uganda).

Investments funded through debt have seen the stock of public debt increase from 26.1 per cent in FY 2012/13 to 37 per cent or US\$9.4 bn in FY 2016/17 (see Figure 2). The government plans to further increase its debt stock to 47.8 per cent by FY 2021/22. While these debts have not been collateralized against future oil revenues, the GoU expects future oil revenues to play an important role in managing its accumulated debt in the medium term, and expects the debt stock to begin declining as oil revenues come on stream (Ministry of Finance 2017a).

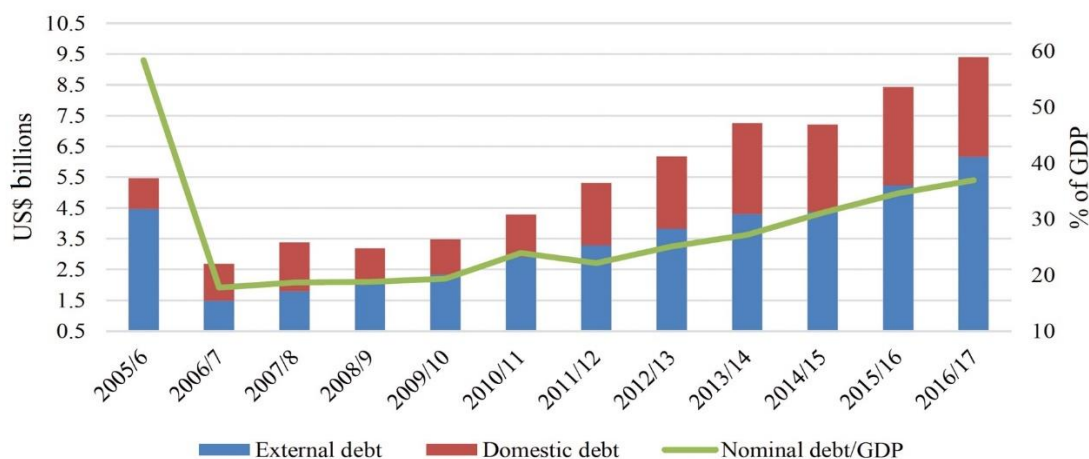
Table 1: Large (>US\$100m) ongoing or planned public infrastructure projects in Uganda

Name of project (ordered by start of construction)	Estimated cost (US\$m), rounded**	External funding*	Start of construction (actual or expected)	End of construction (actual or expected)
Kampala–Entebbe expressway	480	86% Chinese loan	2012	2018
Karuma dam	2,200	85% Chinese loan	2013	2018
Isimba dam	590	82% Chinese loan	2013	2018
Bridge over the Nile	180	83% Japanese loan	2014	2018
Entebbe airport expansion	500	100% Chinese loan	2016	2021
Re-establishment of Uganda Air	400	82.5% commercial loan	2018	2018
Hoima airport	320	100% British loan	2018	2020
Oil pipeline	3,550	30% equity, 70% debt	2019	2022
Refinery	3,500	60% equity, 40% debt	2019	2022
Ayago dam	1,900	unknown	2020	2025
Kampala– Jinja expressway	1,000	60% PPP investment	2020	2025
Standard gauge railway (Malaba–Kampala section)	2,300	unknown	unknown	unknown
Standard gauge railway (remaining network)	Up to 10,500	unknown	unknown	unknown

Notes: * Remainder is expected to be funded by GoU. ** Excluding operation and maintenance costs.

Source: Authors' compilation from project documentation, the National Development Plan II, the Public Investment Plan 2017/18–19/20, and newspaper articles.

Figure 2: Evolution of public debt in Uganda, 2005–17



Source: Ministry of Finance (2017a).

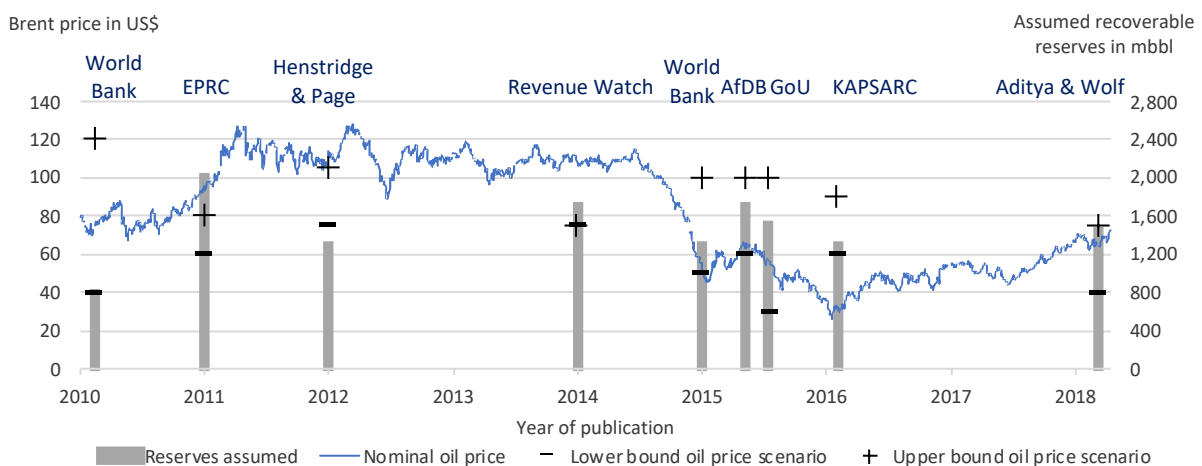
Yet, forecasts of oil revenue have varied significantly, depending on the information available at the time they were produced, and the assumptions made. To illustrate this, we compare assumptions made in forecasts by the World Bank (2010), Bategeka and Matovu (2011) of the Economic Policy and Research Centre, Henstridge and Page (2012), Lassourd and Bauer (2014) of the Revenue Watch Institute, a joint report by the National Planning Authority, AfDB, and World Bank (World Bank 2015), and KAPSARC (2016). All authors point to three major sensitivities:

- International crude **oil prices**;
- The estimated size of **recoverable reserves**; and
- **Delays** in the execution of projects.

Critical forecast sensitivity 1: Oil price

The oil price is notoriously volatile and hard to predict, so most authors provide several low- and high-price scenarios to illustrate the sensitivity of their revenue models to changes in the oil price. Among the projections we reviewed, assumptions regarding the oil price at the start of production range from US\$30 to US\$120. By coincidence or not, this is about the same range of fluctuation as the actual oil price over the period these projections were produced (see Figure 3). The earlier studies were conducted in a high-price environment and thus were more optimistic over oil price assumptions, often assuming a minimum price above US\$60. Once the price fell to about US\$50 in 2015 and then US\$30 in 2016, more pessimistic assumptions were used. The price of Brent has since risen to above US\$70 again. To provide conservative estimates in the light of the price fluctuations over the last decade, we model a lower bound price scenario with a constant price of US\$40 (the actual oil price dipped below this level for only 97 days over the period 2008–18), a reference case scenario starting with the current price of US\$77 and a 2 per cent growth rate, and a higher bound price scenario starting with the current price of US\$77 and a 5 per cent growth rate.

Figure 3: Oil price, assumed oil price, and estimated reserves by study and year of publication, 2010–18



Source: Authors' illustration based on US Federal Reserve data.

Critical forecast sensitivity 2: Recoverable reserves

Uncertainty regarding recoverable reserves also has a large impact on the accuracy of projections. Between 2011 and 2016 the signature of new contracts for exploration was halted by a parliamentary moratorium, and exploration thus continued at a relatively low pace under existing contracts. Despite this, the level of proven reserves was revised upwards from 3.5bn to 6.5bn barrels in 2014. This increased the estimated range of recoverable oil reserves, from 200m barrels to between 1.2bn and 1.7bn barrels.⁷ At this stage, 40 per cent of the total area with potential for petroleum reserves had been explored. In late 2017, Australia's Armour Energy and Nigeria's Oranto Petroleum signed new PSAs with the government for exploration in the Kanyawataba EA

⁷ Source: Petroleum Authority of Uganda (<http://petroleum.go.ug/uploads/resources/FrequentlyAskedQuestion.pdf> [sic]).

in Ntoroko district and the Ngassa EA in Hoima district (see Figure 1), respectively. They plan to drill over 400 new wells in the next 2–3 years (the last 15 years saw 121 wells drilled). The probability of additional discoveries is therefore reasonably high, especially given the high drilling success rate of 87 per cent up to 2017. However, the Ngassa EA and further currently unlicensed EAs that make up the majority of unexplored territory are located mostly off the shores of Lake Albert. These fields would need to contain significant reserves to be commercially viable because exploration and production in a body of water is more expensive than on land. It also bears higher environmental risk.

Adding to the uncertainty over reserves is the potential downward revision of already established estimates of recoverable reserves if recovery proves more difficult than expected—which is the reason ‘proven recoverable reserves’ are quoted in a relatively large range of 1.3–1.7bn by the MEMD. The recovery factor eventually realized will depend on the development of production cost prices and geological conditions on the cost side, and the oil price on the revenue side.

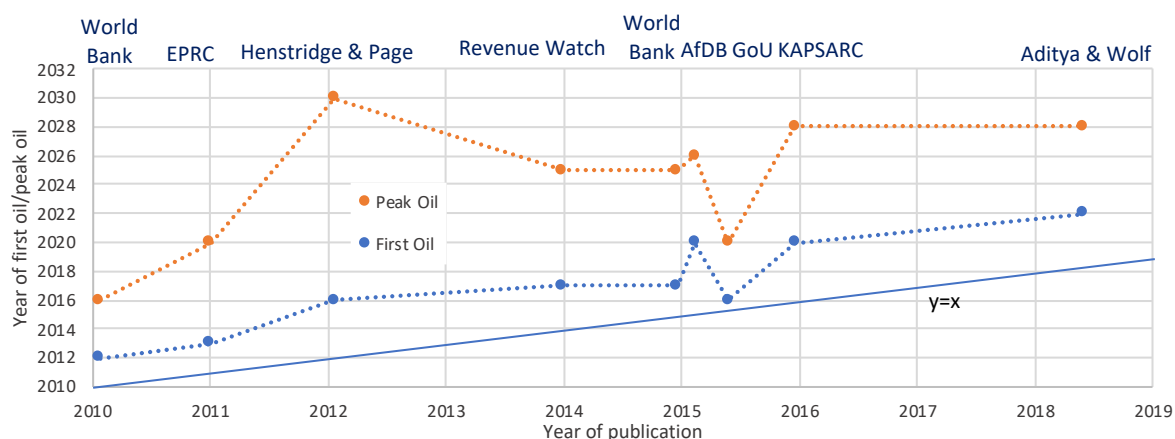
We base our projections on estimates of 1,054m barrels recoverable reserves quoted by KAPSARC (2016), who provide a detailed model of upstream development and operational costs for the production fields in EA1, EA2, and EA3A based on information from the MEMD. In addition, we assume recoverable reserves of 400m barrels for the production fields in EA1A⁸, an area for which no official estimates have been made public. As a result, our lower bound and reference scenarios assume recoverable reserves of 1,454m barrels, right in the middle of the 1.2–1.7bn barrel range quoted by the MEMD. Our higher bound scenario assumes additional discoveries in the remaining 60 per cent of terrain at 50 per cent of the success rate of exploration thus far, i.e. 2,181m barrels of total recoverable reserves by 2027.

Critical forecast sensitivity 3: Delays

The timing of the onset of production would seem to be the easiest factor to predict, given that it is largely under the control of the GoU and the contracted oil companies. Generally, the projections we have reviewed have assumed, in line with government plans, that production would start within 2–3 years of the publication of the relevant studies (see Figure 4). Ex-post, we know that none of the expectations embodied in previous projections regarding the onset of production have been met thus far, and that the government has continuously pushed back its schedule to reach first oil (Parliament of Uganda 2016). However, as of 2018 the key infrastructure projects are ready for final investment decisions, and it appears likely that production will start in 2022, if final investment decisions are made in 2018 and construction begins in 2019.

⁸ EA1A was created in 2012 after EA1 exploration rights expired. It was made up of the area of EA1 for which no production licence application had been submitted.

Figure 4: Expected first oil and peak oil by study and year of publication



Source: Authors' illustration based on cited studies.

How will oil companies split revenues with the government?

By mid-2018, no PSAs had officially been published by the GoU. Despite repeated assurances that it would do so, the government has never signed up for the Extractive Industry Transparency Initiative, raising concerns about its commitment to accountability towards its citizenry. Yet, copies of PSAs have been leaked by NGOs (Global Witness 2014; Lay and Minio-Paluello 2010). Comparing the terms in these copies with the limited details that have been made available by the government (Ministry of Energy 2015, 2017b, 2017c; World Bank 2015) suggests that the leaked PSAs could be accurate, and we thus base our estimates on these leaked PSAs, in the absence of better information.

Four separate PSAs govern the existing oil discoveries in Uganda. The earliest stems from 2001 and governs EA2; two further agreements were signed in 2004 and govern EA1 and EA3A, and the most recent agreement was signed in 2012 and governs EA1A (see Table A1 in the Appendix for an overview of the PSAs). All four contracts have four royalty tiers—5 per cent, 7.5 per cent, 10 per cent, and 12.5 per cent—that will apply if less than 2,500, more than 2,500, more than 5,000 or more than 7,500 barrels per day are extracted, respectively. They all have a cost recovery limit of 60 per cent, and include profit oil sharing of 40–65 per cent (EA2), 45–67.5 per cent (EA1 and EA1A) and 46–68.5 per cent (EA3A), triggered again by the rate of production in steps from 5,000 to 40,000 barrels per day. The contract for EA1A has, in addition to the royalty triggered by the daily production rate, a royalty that is triggered by the cumulative production in the contract area. This royalty ranges from 2.5 to 15 per cent, in 2.5 per cent increments, due if cumulative production surpasses 50–350m barrels in 50m increments, respectively.

In addition to royalties and profit oil, the government will receive revenue from the participation of UNOC of 15 per cent in each contract area. Costs for UNOC are carried by the joint venture partners and recovered from UNOC's share of profit and cost oil. Furthermore, the government will receive 30 per cent income tax on the oil companies' profits, as well as withholding tax on interest and dividends that depends on the tax residence of the oil companies and ranges from 10 to 15 per cent. For oil produced in EA1A the government has the option to charge an additional windfall tax in the event of oil prices rising much higher than expected at the time of contract signature. However, as yet no such intention has been stated and we thus do not include a windfall tax for EA1A in the model. Overall, the contracts have been judged to be favourable to Uganda by civil society organizations (Global Witness 2014), and have been improved consecutively, culminating in the design of a new model PSA that was used in negotiations with contractors in the 2016 bidding round.

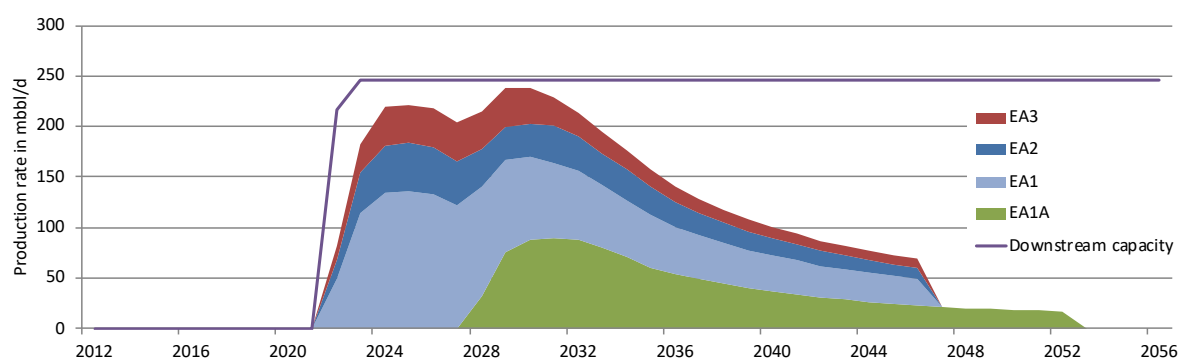
Production and cost projections

We base our revenue projections on the production and cost profiles in an upstream cost model by KAPSARC (2016) and exploration cost accounts from Tullow (2012). In order to arrive at one production and cost profile for each of the four contract areas, we transform KAPSARC's production and cost profiles to match the coverage of the different contract areas. This provides the basis for the computation of revenue flows using the correct fiscal terms per contract. KAPSARC modelled the production and cost profiles for EA1 and the northern half of EA2 together as the Buliisa field, which will share one central processing facility (CPF), called Kingfisher CPF. This required us to split the production and cost profiles in proportion to the field size to separate out production and cost for each contract. The transformation has the potential for error since only costs incurred within the licensed areas can be claimed as cost oil under the respective PSAs, but no better information is publicly available. EA3A and the southern half of EA2 will also share a CPF, but were modelled separately by KAPSARC, which makes it easy to combine the production and cost profiles from the southern half of EA2 with the estimated production and cost profiles from the northern half of EA2.

KAPSARC did not model EA1A, and no information regarding the exact recoverable reserves in this field have been published. We therefore assume that EA1A has the same production and cost profiles (minus the CPF) as the Buliisa field but scale them down in proportion to the expected field size. The oil from EA1A will be processed in the Ngiri CPF in the Buliisa field, and thus we subtract costs for a CPF.

As described above, we model first oil in 2022 for EA1, EA2, and EA3A. EA1A is expected to see first oil in 2028 when production in EA1 and the northern half of EA2 declines and frees up capacity in the Ngiri CPF, and downstream capacity in the pipeline and the oil refinery becomes available. The Kaiso-Tonya field in EA2 is expected to see first oil only in 2029, when the production in the Kingfisher field in EA3A declines and frees up capacity in the Kingfisher CPF. According to these production profiles, peak oil will be reached in 2028. Figure 5 shows the resulting production profiles by contract area.

Figure 5: Production by Exploration Area



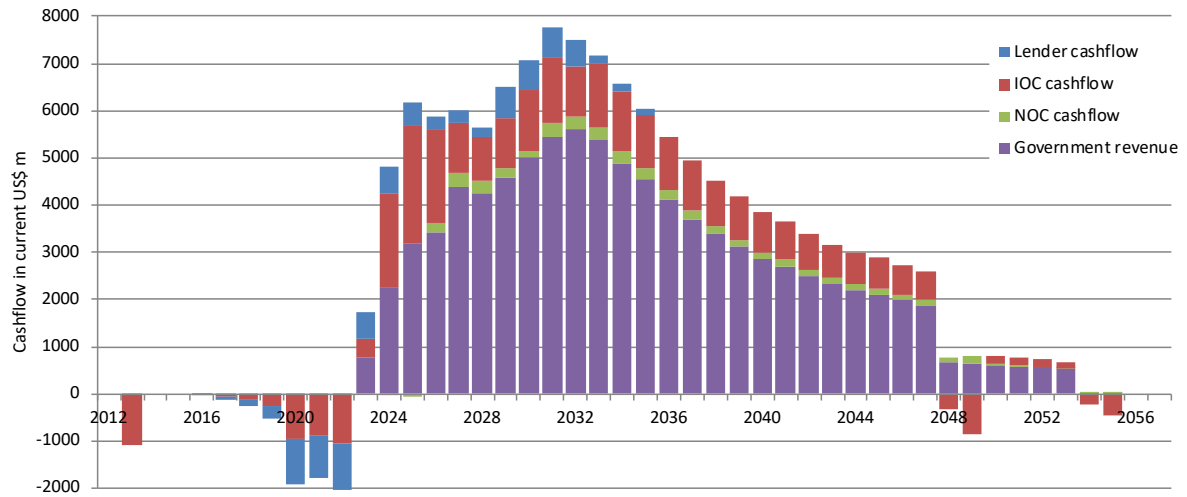
Source: Authors' illustration based on authors' model.

Revenue projections

Due to its high viscosity Ugandan oil will incur a discount factor estimated at US\$12 pb, and a transport cost and transit fee summing to US\$12.20 pb according to the Memorandum of Understanding signed for the construction of the oil pipeline. In our reference case scenario of a US\$77 pb oil price in 2018 with a 2 per cent growth rate and a balancing 2 per cent inflation rate

we project that oil revenues will peak at US\$4,536m and average US\$2,116m over 33 years in constant 2018 US\$ terms (see Figure 6).

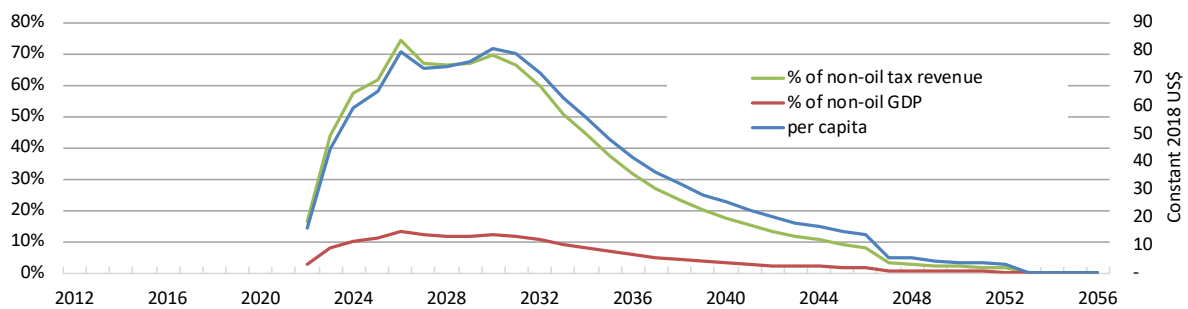
Figure 6: Projected cashflows for Lender, International Oil Companies, National Oil Company, and GoU revenues



Source: Authors' illustration based on authors' model.

In per capita terms, we project revenues of up to US\$83 at peak oil and US\$38 if averaged over 33 years. As a percentage of non-oil GDP the oil revenue would be 13 per cent at peak oil and 6 per cent on average, and as a percentage of non-oil tax revenue 73 per cent at peak oil and 32 per cent if averaged over 33 years (see Figure 7 for the evolution of these figures over the production horizon).

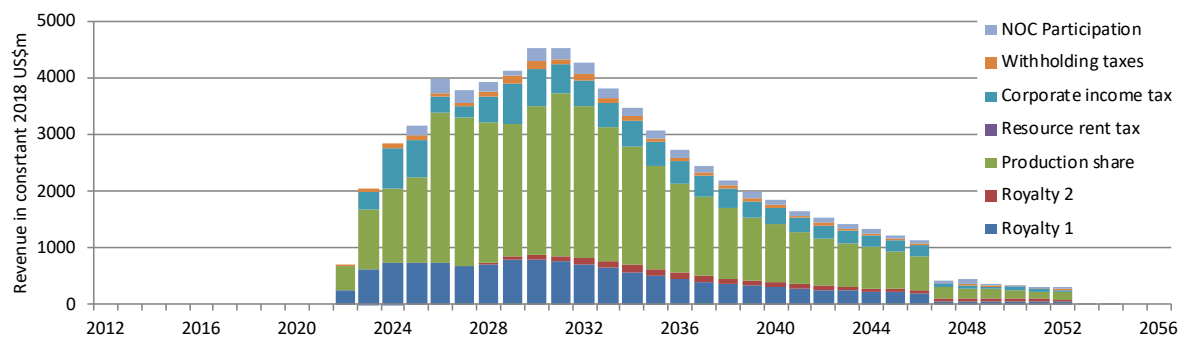
Figure 7: Government oil revenue as % of non-oil GDP and tax revenue, and per capita



Source: Authors' illustration based on authors' model.

The non-discounted revenues are composed of 57 per cent of profit oil, 19 per cent of daily production royalty, 15 per cent of income tax, 5 per cent of UNOC participation, 3 per cent of withholding tax, and 3 per cent of cumulative production royalty (see Figure 8).

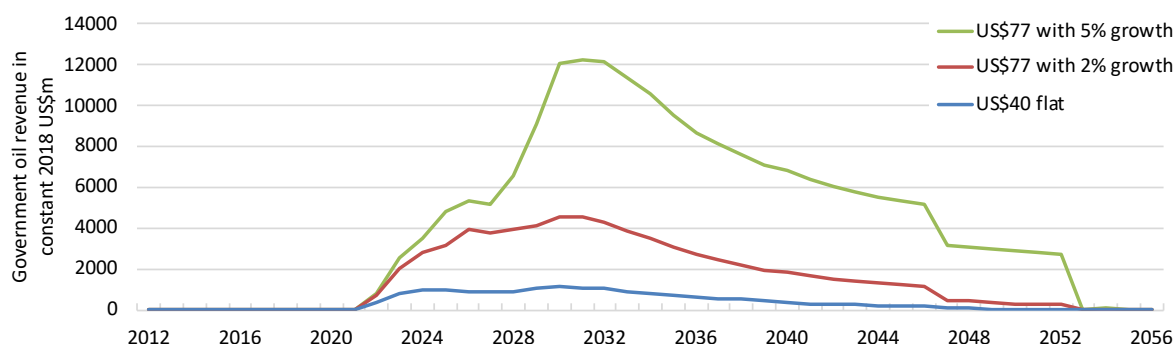
Figure 8: Government oil revenue by type



Source: Authors' illustration based on authors' model.

The above projections are very sensitive to the assumed oil price. In the event of a US\$40 flat oil price throughout the production period, but 2 per cent inflation of other prices, the government oil revenue peaks at US\$1,177m in constant 2018 US\$—only 26 per cent of the reference case scenario. In the event of a US\$77 oil price—with a 5 per cent rather than a 2 per cent growth rate, and additional discoveries of 50 per cent of the current total discoveries, assumed to follow EA1A contract terms, production, and cost profiles—government oil revenue would peak at nearly US\$12bn. Figure 9 compares the reference case to these different scenarios, which should be considered lower and upper bounds rather than likely scenarios.

Figure 9: Government oil revenue sensitivity to oil price assumptions



Source: Authors' illustration based on authors' model.

3 Is Uganda ready for oil to flow?

Experiences of failure to derive sustainable development outcomes from natural resource assets are so common that a vast literature exists on the ‘resource curse’. In its introduction, the Natural Resource Governance Charter, an authoritative collection of best-practice measures that provides a benchmarking tool for countries such as Uganda that are in the process of increasing their resource extraction, states: ‘Countries with non-renewable resource wealth face both an opportunity and a challenge. When used well, these resources can create greater prosperity for current and future generations; used poorly, or squandered, they can cause economic instability, social conflict, and lasting environmental damage.’ (NRGI 2014: 4). Grounded in this Charter, the Natural Resource Governance Institute (NRGI) also produces an index that aims to assess the quality of natural resource governance. The index published in 2017 classified Uganda’s resource governance as ‘poor’, but improving towards ‘weak’ (NRGI 2017), ranking the country 51st out of the 89 countries assessed. In this section we aim to provide an overview of the governance

framework put in place thus far and complement previous assessments in identifying areas of weakness and room for further improvement.

We first lay out the expectations the government has built for the sector, then provide an overview of the governance framework established to achieve the goals. We uncover ambiguities regarding the definition of the fiscal anchor and the use of the sovereign wealth fund and briefly discuss the vulnerability of the fiscal anchor to price and political shocks. Given the relatively small revenues there is only a low risk of Dutch disease effects, which should easily be contained if a fiscal rule is adhered to. We contrast the fiscal rule the government has chosen with other options, and end the discussion of the governance framework with the crucial issue of public investment management, which is arguably one of the biggest weaknesses in the current governance framework.

3.1 Expectations for the oil sector

‘Vision 2040’, which was adopted in 2007, is the primary policy document that establishes the government’s objectives for the coming decades. The headline policy goal of this document is to attain upper-middle income status for Uganda by 2032. The objectives are delineated into workable strategy plans via six 5-year National Development Plans (NDPs), which guide the medium-term public expenditure priorities (The Republic of Uganda 2007). The NDP-I (2010–15) was published in 2010 and aimed for Uganda to attain middle income status by 2017 (The Republic of Uganda 2010). The NDP-II (2015–20) was published in 2015 and revised the target year for attainment of middle income status to 2020 (The Republic of Uganda 2015a). Recent GDP growth has, however, been slower than anticipated, averaging 4.47 per cent over 2012–16 compared with 7.7 per cent for 2007–11.⁹ This makes it highly unlikely that Uganda will achieve middle income status by 2020. Regardless of whether their goals are realistic or not, the first two NDPs provide valuable insights into the direction of the strategic medium- and long-term policy.

The NDPs identified infrastructure development and employment generation as the key outcomes expected from development of the oil and gas sector. Within this, the oil pipeline and refinery were prioritized as the large-scale investment projects to drive growth. Additionally, Hoima city is to be developed as a strategic city for supporting further development of oil infrastructure. The delays are evident: Vision 2040 sequenced the oil refinery for completion under NDP-I and the oil pipeline under NDP-II (with initial investments as early as the third year of NDP-I), but as of 2018, neither project has reached the final investment decision stage.

During their construction and future operational stages, these projects are expected to create a multiplier effect generating further investments in secondary industries such as petrochemicals, plastics, and fertilizers, as well as tertiary industries such as manufacturing, transportation, construction, and communication (New Vision 2018b). As negotiations and contractual agreements for infrastructure projects are still being finalized, there is reason to believe that the local economy is not in a position to maximize gains from the anticipated investment inflow. Although government policy has placed significant importance on local content development, progress to develop labour skills and infrastructure has been slow.¹⁰

⁹ Source: World Development Indicators, World Bank Data (<https://data.worldbank.org/country/uganda>).

¹⁰ This has been reiterated over numerous reports (Report of the Auditor General (2015), and National Strategy for Private Sector Development (2017/18–2021/22) (Ministry of Finance 2017d)). With regard to the labour force, Uganda is part of the East African Community’s Common Market Protocol, which establishes free movement of labour amongst EAC member nations. While this can alleviate the shortage of skilled labour in the country, Ugandan workers need to develop skills at a fast rate to take advantage of the opportunities in the oil and gas sector.

3.2 The current governance framework and its shortcomings

The delays in Uganda's progress towards oil production have given time to put in place a governance framework for the management of oil revenue. The governance framework for oil revenue is currently defined through:

- the Public Financial Management Act (2015);
- the Charter of Fiscal Responsibility (2015), to be updated after every general election;
- the Petroleum Revenue Management Policy (2012).

The Petroleum Fund is set up and defined in the Public Financial Management (PFM) Act (The Republic of Uganda 2015b). Withdrawals from this fund are to be made either to support the annual budget (via transfers into the consolidated fund) or to invest into the Petroleum Revenue Investment Reserve (PRIR) (which is designed to be a sovereign wealth fund invested abroad). The expected annual withdrawals from the Fund are required to be outlined in the Medium-Term Budget Framework (MTBF).¹¹ The Petroleum Fund has so far received revenue only from taxation. The government withdrew money (Sh.125.3 billion) for the first time for the 2017/18 annual budget.

Ambiguity regarding the fiscal anchor and sovereign wealth fund

As per the Petroleum Revenue Management Policy, the government is adopting the non-oil, non-grant deficit as a fiscal anchor, eventually to be combined with an overall expenditure growth limit. This anchor is to be operationalized through the Charter of Fiscal Responsibility, which determines the deficit limit. Section 3.1 (iii) of the Charter states that the fiscal balance, when calculated without petroleum revenues, should be 'maintained at a sustainable level over the medium term'. However, clarification is required on whether the sustainable fiscal balance limit is the same as mandated by the East African Monetary Union protocols (at 3 per cent of GDP), which must be adhered to by FY 2020/21 according to the Charter (Ministry of Finance 2016a). The exact definition of the fiscal anchor for the use of oil revenues has been postponed and the Charter is supposed to be updated to 'establish specific operational objectives for petroleum revenue management once there is certainty of the flow of petroleum revenues'.

The working of the PRIR is also ambiguous at the moment. It will be held by the Bank of Uganda at the Federal Reserve Bank of New York. Appropriations to the PRIR are required to be based on the recommendations of an Investment Advisory Committee¹² to the Minister of Finance. However, these recommendations are not binding, and it is unclear to what extent they must be followed. Ambiguity also surrounds the use of the funds saved in the PRIR, as the PFM Act does not regulate withdrawals. It is unclear whether the government can only tap into the expected permanent income derived from the reserve, or whether withdrawals of the principal are also allowed. By end of December 2017, the Petroleum Fund held Sh.422 billion (equivalent to US\$114.21 million)¹³, with the PRIR having a zero balance.

¹¹ At this stage, the MTBF projects Sh.125.28 billion for oil infrastructure development for 2017/18. The MTBF 2018/19–2022/23 does not indicate any fiscal expenses from the oil fund (Ministry of Finance 2017c).

¹² The Investment Advisory Committee is to comprise four non-public officials (including the chairperson) and three government representatives (one each from the Ministry of Finance, Ministry of Energy and Mineral Development, and National Planning Authority). The committee has not yet been established.

¹³ At US\$1 = Sh.3695.

Vulnerability to price and political shocks

Another issue that is not addressed in the PFM Act is how the government plans to shield itself from the volatility of oil revenues in the event that it uses them to finance its deficit. While the fiscal anchor is a good tool to shield the economy from large year-on-year changes in government spending, it only works well if revenues are consistently above the levels required to finance the non-oil non-grant deficit targeted by the fiscal anchor. In our lower bound scenario, oil revenues would not be enough to fund a 3 per cent budget deficit except around the peak oil years. Therefore, especially in a situation of already high debt burdens, it would be advisable to maintain a medium-term credit line either through paying off debt to leave more room for short-term financing or by keeping a balance in the Petroleum Fund to help smooth revenue volatility, avoid disruptions to public spending and investments, and prevent premature withdrawals from the PRIR.

A further issue of contention with the definition of the fiscal rule (embedded in the Charter of Fiscal Responsibility) is that it must be approved by every new Parliament. This affords the government flexibility to react to unforeseen circumstances. However, the downside is that it ties the fiscal rule to the political business cycle and leaves fiscal sustainability at the mercy of the powers that be, which can lead to irresponsible spending.

Narrow focus on development spending

The use of petroleum revenue is restricted through the PFM Act. Section 58 of the Act states that money from the Petroleum Fund can be used either for the national budget or for investing in the PRIR; and Section 59 (3) of the PFM Act further states: ‘For avoidance of doubt, petroleum revenue shall be used for the financing of infrastructure and development projects of government and not the recurrent expenditure of government’. Although it appears to be a well worded maxim, it is debatable what does and does not constitute infrastructure and development projects—for example, does expenditure on security, which is a component of the NDP, count as infrastructure building? Furthermore, since the consolidated fund does not earmark its sources for specific allocations and money is fungible, this restriction appears void. Another concern is that the current definition in the PFM Act omits mention of the necessity to plan for operational and maintenance expenditure at the time development projects are financed, and in fact prohibits paying for these from petroleum revenue. Insufficient provision of operational and maintenance funds is already a cause for fast depreciation and low return from public investments (World Bank 2016). Another issue is that 6 per cent of revenues from royalties are to be appropriated as transfers to local governments for development purposes, but it is unclear whether this is to be done as they are collected, or whether the transfers can be shifted to other fiscal years.

Mitigating the risk of Dutch disease

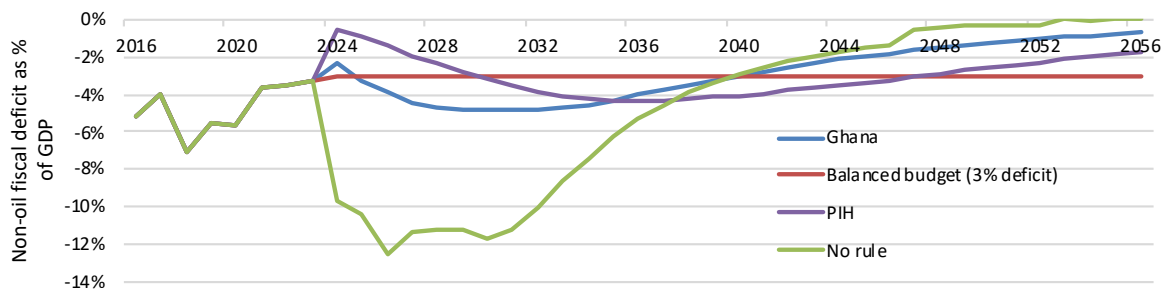
Dutch disease has hampered growth in numerous resource-rich African countries (its insidious effects on Nigeria’s economy and particularly on its agriculture sector during the 1970s form the archetype of natural resources precluding developmental gains). The disease plays out as follows. Divide the economy into the oil sector, the non-oil sector (which is tradable), and the non-oil, non-tradable sector. Increased foreign exchange earnings lead to an increase in overall spending, which in turn appreciates the real exchange rate. This adversely affects the price of tradables relative to non-tradables. The currency appreciation leads to an increase in imports of the tradables, and the higher demand for non-tradables leads to higher prices in this sector. With a reduction in non-oil exports, capital and labour move to the more attractive non-tradables sector. Eventually, the tradables sector shrinks due to reduced demand and the movement of factors of production to the non-tradables sector, making the economy more reliant on oil revenue and reducing international competitiveness.

Studies attempting to estimate Uganda’s exposure to Dutch disease suggest that its negative effects are likely to be modest given the expected size of the boom (Lassourd and Bauer 2014). One way to mitigate any potential impact of the above scenario is to spend at a sustainable level defined by the fiscal rules discussed above. Uganda’s fiscal planning in the past has demonstrated commitment to adopt sound and predictable planning methods. For instance, the Ministry of Finance was one of the early adopters of the MTEF. The government should take a similarly progressive stance on commitment mechanisms for the Petroleum Fund, and possibly enshrine a fiscal rule in the PFM Act. Another mechanism to shield the economy from Dutch disease is to sterilize the effect of changes in exchange rates through investment abroad, as planned with the PRIR. Withholding oil revenue from the domestic economy can preclude and tame the effects of exchange rate appreciation. As the government’s investment absorption capacity is in doubt, this method can halt large cash inflows and the subsequent currency appreciation.

How much to spend: the choice of fiscal rule

In Figure 10 we illustrate the effect different fiscal rule choices would have on the government spending path. We simulate (1) a Ghana-style option of saving 30 per cent of average oil revenues over the previous seven years, (2) a consistent 3 per cent government-financed budget deficit from oil revenues (the option chosen by government), (3) a permanent income style of withdrawing only at the rate of return of the PRIR, and (4) hand-to-mouth government spending of oil revenue. The figure shows that the option chosen by government (assuming the non-oil deficit is set at the EAC deficit norm of 3 per cent) is a relatively conservative spending scenario, particularly in the earlier years, and especially when compared with hand-to-mouth spending. Hand-to-mouth spending not only leaves the government at the mercy of oil price volatility, but also front-loads investment, with serious operations and maintenance implications as well as adverse macroeconomic effects (Adam et al. 2014). The rules yield results similar enough to conclude that any rule would be better than no rule.

Figure 10: Options for fiscal rules



Source: Authors’ illustration based on authors’ model.

This section has so far focused on the management of oil revenues, and certain restrictions on it. However, equally important is the governance of expenditures that will be financed from the oil revenues. As Uganda gets closer to oil extraction, the lack of a fiscal strategy to delineate a long-term development expenditure plan raises concerns. Governance measures defined in the PFM Act will only be put to the test after significant revenue from oil exports begins to flow into the Petroleum Fund. Up to now, only relatively small amounts of money have been collected in the Petroleum Fund through taxes, signature bonuses, or tax settlements with oil companies, so the government’s commitment to prudent management of these resources has not yet been tested.

Poor quality of public investment management

The government plans to convert oil reserves into assets through public investments. Its public investment programme has already expanded significantly (guided by the NDPs that have placed infrastructure, energy, and transport as priority sectors) over the last five years. As more development projects get funded through the national budget rather than by donors and development partners, the government's oversight and competency in managing these investments becomes more decisive.¹⁴ However, relatively poor Public Investment Management Assessment (PIMA) scores raise doubts regarding current government capacity to significantly expand its public investment portfolio without further reducing its already low rate of return. The Ministry of Finance (2017b) estimates that Uganda currently loses over 60 per cent of resources invested in public projects due to inefficient management.

Recent diagnostic studies by the Ministry of Finance, World Bank, and IMF have identified numerous issues in the existing project management system that require reassessment and reform. Ex-ante analysis carried out during project inception and appraisal stages has been weak and limited. Preparation for projects often starts after they are included in the budget, thereby precluding the possibility of any appraisal or feasibility study to guide investment decision making (IMF 2018; Ministry of Finance 2016b; World Bank 2016). An internal diagnostic study by the Ministry of Finance suggests that the Development Committee (which is the approval body for projects at the Ministry of Finance) is 'not comprehensive and faces challenges to standing up to political directives on including projects' (Ministry of Finance 2016b). Furthermore, project evaluations rarely consider the external costs of investments such as environmental degradation or pollution, which can have negative affects on sectors such as tourism and agriculture. This may thus inflate the profitability of some investments at the expense of growth in other sectors.

Under-execution of projects has also been a challenge. In 2017/18, 47 of 69 projects that were due for completion, as indicated in the Public Investment Plan (PIP), needed extensions. Although the energy sector, which features the largest investments, has seen an improvement in its absorption rate (from 19 per cent in 2015/16 to 25 per cent in 2016/17), it is still low enough to be a cause for concern (Ministry of Finance 2018). Some of these delays are due to institutional factors. The IMF suggests that the PIP is over-committed in the medium term, which is affecting budget releases. Although the MTEF includes projects mentioned in the PIP, the link between the Public Investment Management System and the MTEF still requires stronger feedback mechanisms to better capture progress and thereafter direct funding into areas with higher absorption. Additionally, for monitoring purposes, improvements in stocktake mechanisms within the Ministry of Finance can allow a more systematic identification of medium-term commitments (IMF 2017b). As government-funded and externally funded projects are not coordinated in the same data systems, an 'Integrated Bank of Projects' is being implemented at the Ministry of Finance, which is expected to ameliorate this problem.

At the concluding stages, project plans often do not include an asset management strategy. They also have weak monitoring and evaluation systems to assess the quality of service, which results in an under-provision of maintenance and support during operational stages. A generally poor maintenance culture in the management of assets exacerbates this problem. Though the government over the years has increased budget allocations for operations and maintenance (from 3.4 per cent (2004/05–2008/09) to 8.4 per cent (2012/13–2016/17)), they are still far below the global best practice mark of 20 per cent of total budget (World Bank 2016). To improve this, there

¹⁴ The Public Investment Plan for 2017/18 consisted of 440 projects, of which 317 are funded by the GoU.

is a need to develop better feasibility studies and a stronger monitoring and project evaluation mechanism.

4 Conclusion

For the first time since its formation in 1998, the Uganda Bureau of Statistics, in its 2016/17 household survey, measured an uptick of poverty. Growth in real per capita terms has stagnated, averaging about 1 per cent over the years 2012–16, and the government has improved its tax take only marginally to just above 13 per cent of GDP. Debt levels have risen quickly. Infrastructure has been prioritized over service delivery in the use of the little fiscal space available, and the quality of service delivery has stalled or worsened. Development partners currently fund large parts of the service delivery system, which the government has increasingly less appetite for. In the light of these developments, windfall revenues from the exploitation of natural resources could provide a welcome fiscal relief to Uganda.

This paper complements previous work with a renewed modelling effort to estimate the size and timing of revenue flows, taking into account recent information regarding the size of reserves, costs of extraction, and progress with the required infrastructure. We expect that first oil will flow in 2022 at the earliest, and estimate that revenues will average about US\$2,116m over 33 years in constant 2018 US\$ terms. The amount of revenue to expect will not allow Ugandans to stop working and live off the oil; as per our estimate, revenues would average US\$38 per capita per year over the same 33-year span, compared with GDP per capita of US\$797 in 2018.

In an attempt to transform the natural resource assets into productive assets, the government has established a new policy and institutional framework with the goal of boosting growth and structural transformation through investment in infrastructure at a controlled pace. Adapted from the Norwegian model, the established framework mandates that revenues shall first enter the Petroleum Fund, and then be used either to finance a maximum deficit of 3 per cent of non-oil GDP, or to invest in the sovereign wealth fund. The sovereign wealth fund is meant to park revenues abroad in times when domestic investment absorption is at capacity and/or signs of Dutch disease emerge.

Despite pressing needs, the development of the oil sector has proceeded slowly—much more slowly than people outside and within the government expected. Whether intentionally or not, it seems that so far the Ugandan government has done a good job in the sequencing of policy, legislation, and institutional and commercial development. Particularly when compared with other African oil producers, such as Ghana, which raced from discovery to production in only two years, Uganda is taking its time to prepare for the onset of revenues. That being said, we identified a number of shortcomings in the framework put in place that could become problematic if unaddressed. These include unclarities in the management of volatility, a lack of isolation of revenue management from the political cycle, uncertainty regarding the distribution of revenues to local governments and a persistent lack of transparency. Weaknesses in public investment management raise further doubts about the transformational impact of the planned investments.

It is important to note that these are not purely technical challenges, and that the political will to improve governance will be the overall deciding factor regarding the benefits that the resource boom will bring for the economy. In economies like Uganda's, the government plays the biggest part in capturing benefits from a natural resource boom owing to the small size of the private sector. Whereas this paper has focused mainly on the size, timing, and governance of oil revenues, the two other papers on the oil boom in Uganda that form part of the series that this paper contributes to (Colonelli and Ntungire forthcoming; Sen forthcoming) explore in more detail the

role the government can play to use the oil sector as an engine of structural transformation and diversification.

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Appendix

Table A1: Overview of production sharing agreements

Year of signature		2001	2004	2004	2012
Contract area		EA2	EA1	EA3A	EA1A
<i>Royalty 1: Based on daily production rate</i>					
Threshold 1	mbpd	2.5	2.5	2.5	2.5
Threshold 2	mbpd	5	5	5	5
Threshold 3	mbpd	7.5	7.5	7.5	7.5
Royalty rate - Tranche 1	%	5%	5%	5%	5%
Royalty rate - Tranche 2	%	7.5%	7.5%	7.5%	7.5%
Royalty rate - Tranche 3	%	10%	10%	10%	10%
Royalty rate - Tranche 4	%	12.5%	12.5%	12.5%	12.5%
<i>Royalty 2: Based on cumulative production</i>					
Threshold 1	mBbl				50
Threshold 2	mBbl				100
Threshold 3	mBbl				150
Threshold 4	mBbl				250
Threshold 5	mBbl				350
Royalty rate—Tranche 1	%				2.5%
Royalty rate—Tranche 2	%				5.0%
Royalty rate—Tranche 3	%				7.5%
Royalty rate—Tranche 4	%				10.0%
Royalty rate—Tranche 5	%				12.5%
Royalty rate—Tranche 6	%				15.0%
<i>Production sharing</i>					
Cost recovery limit	%	60%	60%	60%	60%
<i>Profit sharing thresholds: based on daily production rate</i>					
Threshold 1	mbpd	5	5	5	5
Threshold 2	mbpd	10	10	10	10
Threshold 3	mbpd	20	20	20	20
Threshold 4	mbpd	30	30	30	30
Threshold 5	mbpd	40	40	40	40
<i>Government share</i>					
Tranche 1	%	40.0%	45.0%	46.0%	45.0%
Tranche 2	%	45.0%	47.5%	48.5%	47.5%
Tranche 3	%	50.0%	52.5%	53.5%	52.5%
Tranche 4	%	55.0%	57.5%	58.5%	57.5%
Tranche 5	%	60.0%	62.5%	63.5%	62.5%
Tranche 6	%	65.0%	67.5%	68.5%	67.5%
<i>Income tax</i>					
Income tax rate	%	30.0%	30.0%	30.0%	30.0%
Depreciation (straight line)	years	6	6	6	6
<i>Resource rent tax</i>					
Threshold	%				0.0%
Tax rate	%				0.0%
<i>NOC participation</i>					
NOC interest	%	15.0%	15.0%	15.0%	15.0%
Interest rate on carry	%	6.0%	6.0%	6.0%	6.0%

Cont'd

Year of signature		2001	2004	2004	2012
Contract area		EA2	EA1	EA3A	EA1A
<i>Withholding taxes</i>					
on interest	%	10.0%	10.0%	15.0%	15.0%
on dividends	%			15.0%	15.0%
<i>Financing assumptions</i>					
Percentage of capital costs debt-funded	%	50%	50%	50%	50%
Repayment period	years	10	10	10	10
Interest rate on loan	%	6%	6%	6%	6%

Source: Authors' compilation based on Global Witness (2014) and Lay and Minio-Paluello (2010).