A FIRST LOOK AT TANZANIA’S LNG PROJECT AND ITS MACROECONOMIC IMPLICATIONS

Tanzania is estimated to have a large reserve of confirmed offshore natural gas deposits, which, if well developed, could have significant macroeconomic implications. As part of the National Five-Year Development Plan, the authorities foresee a multi-billion investment on building the LNG plant and the associated infrastructure to utilize this potential. Towards this goal, negotiations with investors are progressing although important steps remain. This Selected Issues Paper takes stock of progress in the project's expected timeline, investment and production prospects, and the project’s potential macroeconomic implications. Drawing from review of empirical literature, the paper also highlights key lessons for managing revenues from natural gas. This paper is the first step towards a more comprehensive assessment of the macroeconomic impact of the project, which will require information on the technical details of the projects as well as the fiscal regime (production sharing agreements, royalties, taxes, etc.).

A. Background and Context

1. Tanzania has proven substantial natural gas resources. A small amount of gas has already been developed from two fields (Songo Songo and Mnazi Bay) since 2004/05, which is utilized for power generation at the Ubungo power plant in Dar es Salaam and industrial use, including for cement production. Significant discoveries in the order of 47.1 trillion cubic feet of natural gas were made between 2010 and 2015 in various deep-water blocks off the coast of Lindi and Mtwara (Figure 1). Shell Exploration and Production Tanzania LTD (Shell) made the natural gas discoveries in Blocks 1 and 4 with its partners Ophir and Pavilion. Equinor Tanzania AS (Equinor), formerly Statoil with its partner ExxonMobil, made natural gas discoveries in Block 2 (Tanzania Petroleum Development Corporation (TPDC)).

2. Tanzania’s Liquefied Natural Gas (LNG) project aims to commercialize natural gas discoveries made in the deep offshore basin. It is one of the flagship projects in Tanzania’s Third National Five Years Development Plan. The project will involve drilling development wells in deep offshore fields, construction of subsea pipelines from deep offshore fields that will transport natural gas onshore for processing, construction of an LNG plant, and development of jetty loading facilities in the project area. Total investment on these activities is estimated to be about US$32.7 billion (over 40 percent of current GDP) and is expected to be executed during the second half of the current decade. The LNG plant, comprising multiple mid-scale LNG trains, is expected to have a total production capacity of 15 million metric tons per year (mtpa) and production life span will be about 30 years. The liquified gas will be exported to international markets (Asia and Europe),

1 Prepared by Melesse Tashu (IMF). The author would like to thank the authorities for their constructive comments and suggestions received during the presentation at the mission’s outreach event.

2 An additional “Mid-Life” upstream drilling investment of about US$18 billion will also be needed to maintain plateau gas production through 2052 and extend overall production to 2059 (Stanbic, 2022).
and a small portion of the gas is expected to be domestically used by power generations, industries, institutions, and households.

3. **Negotiations between the government and private developers picked up following the change in the Administration.** Soon after President Hassan became President of Tanzania negotiations resumed. The Ministry of Energy accelerated talks with private sector developers (Shell and Equinor), and the government formed various negotiation and technical teams. A framework agreement (detailed memorandum of understanding) was signed between the Tanzanian government and private developers on June 11, 2022. The framework agreement is expected to facilitate both continued discussions with government and technical feasibility studies related to the project itself. The next step is the signing of the Host Government Agreement (HGA), which is expected by mid-2023. The HGA establishes the fiscal, legal, and commercial terms for the onshore part of the LNG project.3

4. **Preparatory technical work for the LNG project has also advanced.** A site for the onshore LNG plant has been identified in the Lindi region following an extensive site selection process. The Tanzanian Petroleum Development Corporation (TPDC), a fully government owned company responsible for the acquisition of the LNG site, commenced the compensation process for the affected communities at the LNG site consistent with Tanzanian law in May 2020. According to Equinor Tanzania, about US$4 billion has so far been invested towards exploration and appraisal activities to find and assess the gas.

5. **Notwithstanding progress made so far, several steps remain to realize Tanzania’s LNG potential.** Several steps, including amending relevant laws, preparing the project blueprints, and environmental assessment are required before a final investment decision on the project is made, which is not expected before 2025. Private developers will make the investment decision based on the estimated internal rate of return taking into account government regulations, taxation, structural

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3 These terms for the offshore part of the project are defined in the Product Sharing Agreement (PSA), which is believed to have been determined at the time of licensing in 2004 (Stanbic, 2022).
factors, and global market prospects. Following the investment decision, the development and construction phase is expected to take about 4-5 years. A plausible but optimistic scenario would see increasing FDI during the project’s implementation period of 2026-30 and mid-life investment period of 2038-2043, and gas exports and consumption during 2030-2059 (Stanbic, 2022).

B. Potential Macroeconomic Impacts

6. **If well-developed and managed, the LNG project has the potential to have significant macroeconomic impacts.** The large investment during the construction and development phase will likely have consequences to economic activity and the current account. Production of gas will also have impact on GDP, exports, and fiscal revenue. More importantly, if well-managed and invested, the fiscal revenue from gas exports will enable the government to build the human and physical capital of Tanzania and raise its growth potential.

7. **Sound assessment of the direct and indirect macroeconomic impacts of the project using a general equilibrium analysis would require granular information.** The authorities requested Fund Technical Assistance (TA) on natural resource management. Such TA could help the authorities assess the macroeconomic implications of the project and design institutional and policy frameworks for effective management of the expected gas revenues.4 This includes compiling granular data on the investment, cost, and production structure of each block and the LNG plant as well as estimates on the efficiency and effectiveness of public investment in Tanzania which are needed for the assessment.5 Details of the fiscal regime agreed between the Tanzanian government and private developers is also key to estimate the expected fiscal revenues. As a first step towards future TA engagements with the Tanzanian authorities for a comprehensive quantitative analysis, the SIP provides a qualitative assessment and a review of quantitative estimates from previous studies.6 A future research project could undertake a macroeconomic analysis of the impact of LNG when relevant parameters, including the expected cost, the project production profile, and fiscal regime, are known, or developed with the help of TA.

8. **The current account balance will likely deteriorate during the investment phase, while significant improvements are expected during the production phase.** Investments on the LNG project will likely be highly import intensive and Tanzania’s current account balance is expected to significantly deteriorate during the construction and development phase. Considering the estimated US$32 billion investment during 2026-29, and assuming about 80 percent import content, a back-of-the-envelope calculation suggests that the current account balance could deteriorate by about

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4 A series of TAs on fiscal regime for natural resources were provided to Tanzania during 2012-14. The information from these TA reports is now outdated since the nature of the project has evolved significantly since then.

5 In this regard, the recently (December 2022) provided TA on Public Investment Management Assessment with Climate Module (C-PIMA) will be an important input for the assessment.

6 Previous assessments on the fiscal and macroeconomic impacts of Tanzania’s LNG project include IMF (2014), Scurfield and Manley (2019), and Stanbic (2022). Results from previous studies should be interpreted with caution if they are based on outdated information or data extrapolations from similar projects in other countries, which may not reflect the reality on the ground.
US$6½ billion (5-6 percentage points of GDP) a year, compared to the baseline scenario (without LNG). During the production phase (2030-2059), however, the current account will benefit from significant amounts of LNG exports, the magnitude of which will depend on the size of production and international gas prices.7

9. **The most important macroeconomic consequence of the project will be reflected through its impact on the fiscal accounts.** The impact of the project on fiscal accounts during the construction phase will depend on whether the government will have an equity stake in the project or not. Although this is likely to be part of the ongoing negotiations, previous studies assume the government, through TPDC, to have an equity stake of 10-15 percent in the project (Scurfield and Manley, 2019; IMF, 2014; and Stanbic, 2022). In this scenario, the government would have to borrow (either directly or through carried interest8) about US$3.2 bln-US$4.8 bln, depending on its equity share, increasing public sector debt by the same amount. During the production and exports phase, however, the government will benefit from substantial amounts of revenue from its share in production, royalties, and taxes. The size of government revenues will depend on the fiscal regime (production sharing agreements, taxes, fees, levies and charges, etc.), the amount of production and exports, and international gas prices.9

10. **The project is expected to have both direct and indirect impacts on economic activity.** The economic growth impact of the investment during the development phase is likely to be limited by the high import content of the investment. The project will, however, have material impact on economic activity through the value added of gas production, stimulating related service activities, enhancing energy supply, and reinvestment of the government revenues on human capital and infrastructure. If not well managed, natural gas revenue could also have a negative impact on growth through the Dutch disease effect. A proper accounting of the net impact of the LNG project on economic growth would require taking into account all of these effects using a general equilibrium analysis.10

C. Managing Revenues from Natural Gas: Key Considerations

11. **The economic impact of the Tanzania’s LNG project will depend heavily on the management of fiscal revenues.** The experience of resource dependent economies shows that

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7 Stanbic (2022) estimates LNG exports to range from US$3.4 bln in a US$5.50 Million British Thermal Units (MMBTU) gas price scenario to US$8.2 bln a year in a US$12 MMBTU gas price scenario.

8 Where private sector partners finance the government’s equity contribution during the construction phase with a contract that repayment (with interest) will be made from the government’s future share of gas revenues.

9 Estimates by Stanbic (2022) show annual government revenues to range from US$2.2 bln (about 3 percent of current GDP) in a US$5.5 MMBTU gas price scenario to US$6 bln (about 8 percent of current GDP) in a US$12 MMBTU gas price scenario. Similarly, a simulation exercise by IMF (2014) shows revenue estimates of several percentage points of GDP.

10 One attempt to estimate the impact of the LNG project in Tanzania is Stanbic (2022), which puts the growth impact in the range of 0.5-1.5 ppts per year depending on gas price assumptions of US$5.5-12 MMBTU. Due to lack of project-specific information, however, the analysis in this study is relies on financial information of LNG development projects in Mozambique, which may not be comparable to Tanzania’s project.
natural resources can be either a blessing or a curse depending on how they are managed. The positive potential of natural resources are obvious—investment and production stimulate economic activities (creates jobs and value added to the economy) and the revenue generated from exports could enable governments to invest in the future potential of the economy. If not managed well, natural resources could also have negative consequence, such as through the Dutch disease effect, macro-fiscal instability (e.g., due to volatility of commodity prices), corruption, and internal conflicts. For these reasons, it is important for the government of Tanzania to design a sound macro-fiscal framework that will ensure that the LNG revenues will be managed in a way that benefits the country and its citizens.

12. **The macro-fiscal framework should aim to preserve short-term macroeconomic stability and long-term fiscal sustainability.** The exhaustibility of gas reserves means that the gas revenues and capital built during the windfall through public investment will not be sustained. On the other hand, revenue volatility arising from international price fluctuations can cause macroeconomic instability (Berg et al, 2012). To address these concerns, the macro-fiscal framework should aim to balance saving and investment during the windfall and design a fiscal anchor that is based on either the non-resource balance or price-based rules.

13. **A key policy decision facing the Tanzanian authorities, when gas revenue come onstream, will be the choice between saving and investment.** A Permanent Income Hypothesis (PIH) based management of revenues would imply saving most of the revenues with the objective to smoothen spending or investment over time. While this approach provides a useful theoretical benchmark, it may not be practical for Tanzania since it does not take into account the need for scaling up investment to address the country’s developmental gaps. On the other end of the saving-investment spectrum, Tanzanian authorities could immediately utilize gas revenues for scaling up public investment. While this may yield short-term benefits in terms higher capital accumulation and growth, the outcome may not be sustainable as the economy will face instability, inefficiency, and Dutch disease effects (Berg et al, 2012 and IMF, 2013).11

14. **International experience shows that a balanced saving-investment approach that scales up public investment gradually helps achieve stability, efficiency, and sustainability.** There is empirical evidence showing that a gradual investment scale up, taking into account absorptive capacity, efficiency of public investment, and exhaustibility of the gas resources, leads to more desirable outcomes (Berg et al, 2012; IMF, 2013; and Gurara et al, 2019). The balanced approach de-links investment decisions from revenue fluctuations, thereby shielding the economy from the vagaries of commodity price volatility. It also gives space for external savings of some of

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11 For instance, a study of six oil-exporting countries (Algeria, Ecuador, Indonesia, Nigeria, Trinidad and Tobago, and Venezuela) that scaled up public investment during 1975-78 by Gelb (1998) (cited in Berg et al, 2012), shows that the growth rate of non-oil GDP increased during the investment period, but quickly slowed after 1978 suggesting that the growth effect did not last past the windfall period.
the revenues, which helps mitigate the Dutch disease effect\textsuperscript{12} and serves as a buffer against shocks and exhaustibility of the gas reserves.

15. **The fiscal framework should also set out a fiscal anchor taking into account revenue volatility and exhaustibility.** Tanzania’s gas reserve is limited, and its revenue windfall is estimated to last for no more than 30 years. When the resource horizon is short, the issue of exhaustibility, in addition to volatility, should be given prominence in fiscal policy design. In this context, using the overall fiscal balance as a fiscal anchor, can lead to abrupt adjustments when revenues fluctuate as a result of prices, or come to a halt when resources are exhausted, which could have disruptive effects to the provision of public services or economic activity.

16. **The non-resource primary balance (NRPB) is an appropriate fiscal anchor for countries with shorter reserve horizons (IMF, 2012).** The NRPB is defined as non-resource revenues less primary expenditures (i.e., excluding net interest payments and income) expressed in percent of non-resource GDP. Setting fiscal policy based on the NRPB can help delink fiscal policy from the volatility of resource revenues and ensure sustainability when the reserve horizon is short. To the extent that Tanzania derives an increasingly large part of its fiscal revenues from natural gas, the structural primary balance, which is the sum of the NRPB and the structural component of resource revenues, could also be an important complement to the NRPB. A price-based smoothing rule, using a reference price, can be used to compute the structural resource revenues. A key decision point in this case is the determination of the reference price. Two common approaches are: the use of an automatic formula or a determination by an independent committee. While research on this issue is ongoing, the former is more advisable for developing countries with limited institutional capacity (IMF, 2012).

D. Concluding Remarks

17. **This paper takes stock of progress towards implementing Tanzania’s LNG project and presents a preliminary assessment of the project’s potential macroeconomic implications.** Negotiations between the government and private sector developers have gained momentum recently and an HGA is expected to be signed early this year. Meanwhile, preparatory technical work in terms of site selection and acquisition has advanced. Notwithstanding these achievements, several important steps remain, including amendment of relevant laws, preparing project blueprints, environmental assessments, and a final investment decision.

18. **If it goes through, the project has the potential to transform the Tanzanian economy.** In addition to the direct impacts of the LNG investment and gas production on economic activity, the revenue generated from LNG exports could enable the Tanzanian government to invest on highly needed human capital and infrastructure, thereby raising the potential of the economy and lifting millions of Tanzanians out of poverty.

\textsuperscript{12} IMF (2013) shows that the tradable sector suffers from loss of competitiveness under an aggressive investment path scenario because of the appreciation of the real exchange rate.
19. **Realizing the potential of the LNG project requires putting in place proper institutional and policy frameworks for the effective management of gas revenues.** International experience shows that a balanced saving and investment approach that scales up public investment gradually, taking into account absorptive capacity, efficiency of public investment, volatility of revenues, and exhaustibility of gas reserves would serve Tanzania better than either savings based on the PIH model or aggressively scaling up public investments. Considering the relatively short horizon of Tanzania’s gas reserves, fiscal policy formulation should be based on the non-resource primary balance than the overall balance.

20. **While preparations towards project implementation progress, the Tanzanian authorities should start developing a policy framework for effective management of gas revenues.** The first step would be having a comprehensive understanding of the macroeconomic implications of the project. Fund technical assistance could help the authorities build a framework for analyzing the macro-fiscal impacts of the project, taking into account the investment, cost, and production profiles of the project as well as the global LNG market outlook. As progress is made on project implementation, the authorities should consider putting in place a fiscal framework for the management of gas revenues with technical support from the Fund and other development partners. Meanwhile, improving the efficiency and effectiveness of public investments can help Tanzania prepare for a productive utilization of upcoming gas revenues.
References


