



UNITED REPUBLIC OF TANZANIA

SELECTED ISSUES

April 2023

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April 5, 2023

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**The African
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CONTENTS

A FIRST LOOK AT TANZANIA'S LNG PROJECT AND ITS MACROECONOMIC IMPLICATIONS	4
A. Background and Context	4
B. Potential Macroeconomic Impacts	6
C. Managing Revenues from Natural Gas: Key Considerations	7
D. Concluding Remarks	9
FIGURE	
1. Geographical Location of the LNG Project	5
References	11
BUILDING RESILIENCE TO CLIMATE CHANGE	12
A. Stylized Facts of Climate Change Trends	12
B. The Impact of Climate Change	15
C. Policy Responses: Adaptation, Mitigation, and Resilience to Climate Change	18
D. Conclusion	21
FIGURES	
1. ND-Gain Country Index: Vulnerability and Readiness Score	12
2. Types and Frequency of Natural Disasters	14
3. Sub-Saharan Africa and the World: Number of Natural Disasters, 1990s-2022	14
4. Sub-Saharan Africa: Annual Impacts of Natural Disasters by Country, 2000–22	14

TABLE

1. Climate Change Strategies and Institutions _____	19
---	----

References _____	23
------------------	----

ASSESSING FISCAL RISKS FROM STATE-OWNED ENTERPRISES _____ 25

A. Background and Context _____	25
---------------------------------	----

B. Conceptual Framework _____	26
-------------------------------	----

C. Financial Performance Analysis of Selected Tanzanian SOEs _____	29
--	----

D. Legal and Institutional Frameworks for Tanzanian SOEs _____	31
--	----

E. Concluding Remarks _____	33
-----------------------------	----

FIGURE

1. Yields on GoT's Investment in Selected SOEs _____	29
--	----

TABLES

1. Key Economic Indicators of Selected SOEs, 2020/21 _____	26
--	----

2. Channels of Fiscal Risks from SOEs _____	27
---	----

3. Assessment of Financial Soundness of SOEs _____	28
--	----

4. Financial Health Indicators of the 12 Selected SOEs _____	30
--	----

5. Transaction of Selected SOEs with the Government _____	30
---	----

6. Financial Health Indicators of Selected SOEs _____	31
---	----

References _____	34
------------------	----

REEXAMINING THE MONETARY POLICY TRANSMISSION MECHANISM IN TANZANIA __ 35

A. Introduction _____	35
-----------------------	----

B. Literature Review _____	36
----------------------------	----

C. Empirical Analysis _____	39
-----------------------------	----

D. Results _____	39
------------------	----

E. Policy Implications _____	43
------------------------------	----

FIGURES

1. Recent Developments _____	37
------------------------------	----

2. Stylized View of the Monetary Policy Transmission Mechanism _____	38
--	----

3. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Shocks in a Recursive VAR (Overnight Interbank Rate) _____	40
--	----

4. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Shocks in a Recursive VAR (T-Bill Rate) _____	41
---	----

5. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Reserve Money and Overnight Interbank Rate Shocks in a Factor-Augmented VAR _____	41
6. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Reserve Money and T-Bill Rate Shocks in a Factor-Augmented VAR _____	42
7. Variance Decomposition – Relevance of Reserve Money and Interest Rates Shocks to Output and Price Volatility _____	43
8a. Selected Interest Rates _____	45
8b. Drivers and Macro-Financial Outcomes of Bank Lending Rates and Intermediation Spreads _____	45
References _____	46

A FIRST LOOK AT TANZANIA'S LNG PROJECT AND ITS MACROECONOMIC IMPLICATIONS¹

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.² 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),

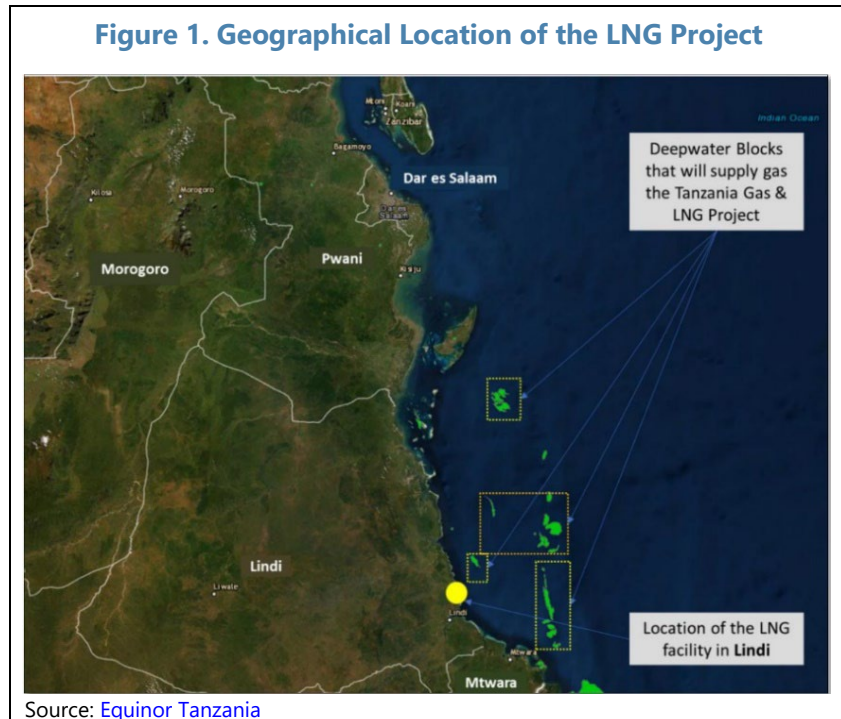
¹ Prepared by Melesse Tashu (IMF). The author would like to thank the authorities for their constructive comments and suggestions received during the presentation at the mission's outreach event.

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

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

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

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-US\$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

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 post the windfall period.

the revenues, which helps mitigate the Dutch disease effect¹² 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.

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.

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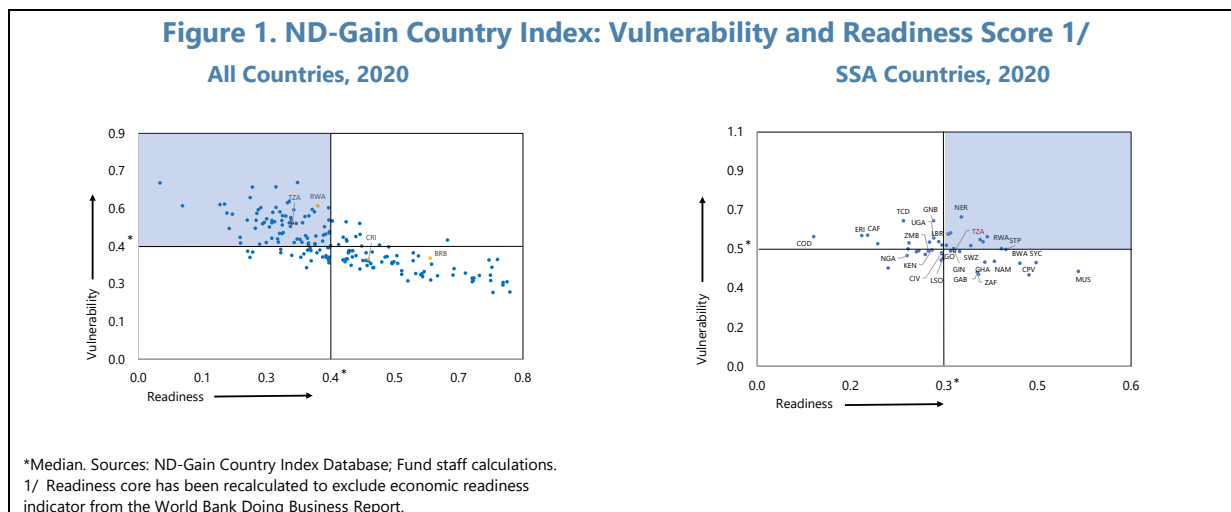
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BUILDING RESILIENCE TO CLIMATE CHANGE¹

Tanzania is highly vulnerable to climate change and at the bottom quartile of readiness score to address its impacts in the global sample. Tanzania is a major food producer, and heavily depends on rain-fed agriculture, but recurrent floods and droughts are increasing in frequency and severity. The Tanzanian authorities acknowledge climate change as a major challenge and are seeking to boost resilience, but the implementation of such plans is at its infancy. Tanzania authorities have expressed interest in the Resilience and Sustainability Trust (RST) to support its efforts to tackle climate change challenges. Against this backdrop, this SIP: (i) presents stylized facts of climate change trends in Tanzania; (ii) examines the macroeconomic impact of climate change, including on economic sectors and food security; (iii) reviews the policy response and explores additional steps for building resilience and improving coping mechanisms; and (iv) analyzes financing implications and sources for climate change adaptation and mitigation.

A. Stylized Facts of Climate Change Trends

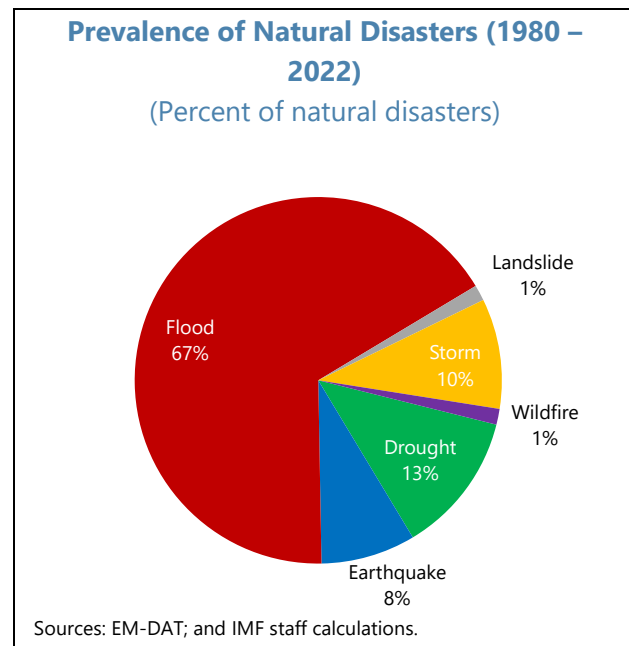
1. Tanzania is highly vulnerable to climate change but less prepared to address its impacts compared to most countries in the world. Tanzania is the 45th most vulnerable country to climate change among 182 assessed in the ND-GAIN Country index and the 58th least prepared to leverage investments to adaptation actions among 192 assessed.² The high vulnerability score and low readiness score of Tanzania places it in the upper-left quadrant of the matrix for global sample, suggesting the greater adaptation needs and less preparation. But in the matrix for sub-Saharan (SSA) countries, Tanzania is at the intersection of the median of vulnerability and readiness.



¹ Prepared by Xiangming Fang, Roberta Guarnieri, and Jens Reinke. The authors would like to thank the authorities for their constructive comments and suggestions received during the presentation at the mission’s outreach event.

² According to the readiness core in ND-GAIN country index, Tanzania is ranked as the 40th least prepared to leverage investments to adaptation actions among 192 assessed. Staff recalculates the readiness score to exclude economic readiness indicator from the World Bank’s Doing Business Report. Based on the new score, Tanzania is ranked as the 58th least prepared.

2. Tanzania suffers from recurrent floods and droughts, and the frequency (and severity) of events has been increasing in recent decades, although there is no discernible trend in the share of the population affected by disasters (Figure 1&3). Floods accounted for about two thirds of all natural disasters over the past four decades, increasing from an average of 0.8 floods per year between 1980 and 2010, to 1.8 per year during 2011-22. Droughts were the second most prevalent disaster and the main source of disruption for the population (e.g., 10 percent of the population was affected by droughts in 2006). According to data from EM-DAT, it is also estimated that floods and earthquakes accounted for losses of about US\$463.8 million between 1980 and 2022.



3. The floods, droughts and storms have become more frequent in Tanzania, broadly in line with the trend in sub-Saharan Africa (SSA) and the rest of world (Figure 2). Indicating its vulnerability, the occurrence of floods increased more in Tanzanian than other countries over the last decade. The frequency of floods in Tanzania increased by 45% during 2010-2020, while the frequency in SSA and the rest of world decreased by 14 and 15 percent, respectively. Droughts and storms have become more frequent in Tanzania as well but rose in line with other countries in the region and the world. Overall, Tanzania is among the top 10 countries in SSA with the highest frequency of natural disasters, given its total number of floods, droughts, and epidemics. In terms of impact, droughts are the type of natural hazards that affect the largest number of people in SSA due to its impact on rainfed agriculture, and therefore food security. Tanzania's population is most vulnerable to droughts and floods. In 2021, drought affected almost 8,000 people per million population. The number of displaced populations from floods is estimated to have increased from 182 in 2016 to 22,680 in 2020 (National Environmental Master Plan for Strategic Interventions (NEMPSI) (2022-2032)). In addition, droughts and floods have caused substantial property damage including to livestock and crops, houses, and infrastructure.

Figure 2. Types and Frequency of Natural Disasters

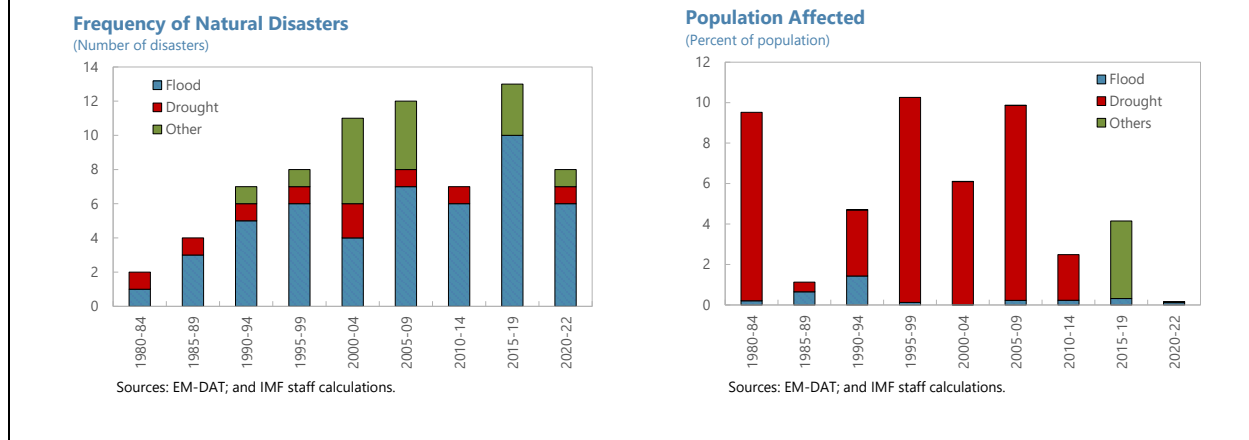


Figure 3. Sub-Saharan Africa and the World: Number of Natural Disasters, 1990s-2022*

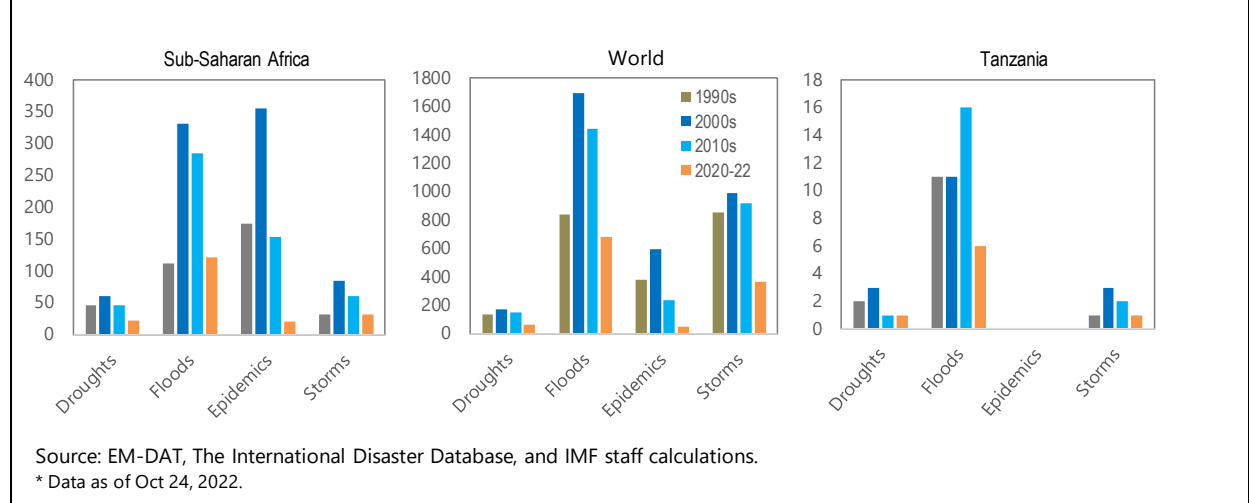
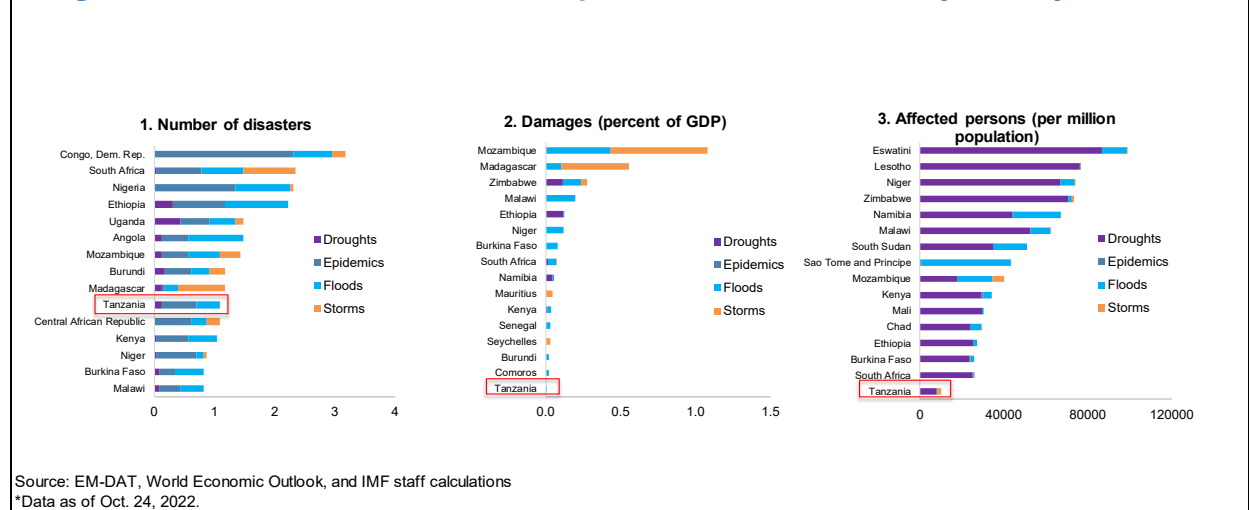


Figure 4. Sub-Saharan Africa: Annual Impacts of Natural Disasters by Country, 2000–22*



B. The Impact of Climate Change

Projected Climate Change

4. Climate change is projected to increase the frequency and intensity of droughts and floods in Tanzania. The projected climate changes in Tanzania include higher temperature, increased duration of heat waves and dry spells, increased frequency and intensity of heavy rains, and rising sea levels.³ Average temperature levels in Tanzania have risen steadily over the last few decades and are projected to increase further in the future. According to the forecast in the NEMPSI (2022-2032), the western regions, southern highlands, and central part will be warmer by more than 2°C by 2041, while most regions in the eastern zone will experience a temperature increase of 1°C.⁴ In line with rising average temperature, the duration of heat waves and dry spells are projected to rise significantly. In addition, rainfall projections in the NEMPSI indicate that some parts of the country may experience an increase in mean annual rainfall of 18 to 28% by 2100, particularly over the Lake Victoria Basin and North-Eastern Highland. The expected precipitation change in Tanzania is expected to be uneven across regions, suggesting that areas with decreased precipitation will be prone to drought while areas with increased precipitation will be prone to floods. The USAID Climate Risk Profile for Tanzania (2018) suggests that heavy rainfalls are expected to become more frequent (7-40 percent more) due to the increased water vapor holding capacity of a warmer atmosphere, while the intensity of heavy rainfall event is expected to increase by 2-11 percent. Moreover, the sea level of the coast of Tanzania is expected to rise as a result of global warming.

5. Deforestation and other unsustainable practices negatively affect Tanzania's resilience to climate change. Tanzania has one of the fastest rates of deforestation in the world, driven largely by demographic change and the resulting demand for agricultural land and for domestic cooking fuel. It is estimated that 80-90 percent of households use biomass—mainly wood and charcoal—as their main source of domestic fuel (The Potential and Optimal Strategies for Charcoal Sub-sector Development in Tanzania, 2019). Deforested land is at higher risk of damage from floods and droughts, less able to absorb water, and more prone to erosion. The establishment of large plantations of water-intensive crops, such as sugar cane, in semi-arid and climate-sensitive areas further contribute to vulnerability.

Macroeconomic Impact

6. Cross-country analysis on SSA suggests large macroeconomic effects of rising temperature in Tanzania. The IMF's SSA REO (April 2020) finds that the potential impact of climate

³ The causalities are sometimes complex as are the results. Many observers have noted a relationship between the melting glaciers on Kilimanjaro and climate change. Yet temperatures on Kilimanjaro remain far below freezing; the glaciers are not melting. Scientists now believe that changing currents (caused, inter alia, by climate change) in the Indian Ocean cause a fall of precipitation on Kilimanjaro; as a result, the glaciers are no longer being replenished sufficiently.

⁴ According to the World Bank Climate Change Knowledge Portal (2022), as a result of increasing greenhouse gas (GHG) concentrations, Tanzania is projected to face a range of 0.4-4.3°C increase of mean temperature by the end of the century relative to the 1995–2014 baseline.

change on growth is larger and longer lasting in SSA than in the rest of the world, reflecting the region's lower resilience and coping mechanisms, and its dependence on rain-fed agriculture. The REO estimates that economic activity in a given month can shrink by 1 percent when the average temperature is 0.5°C above that month's 30-year average. Given Tanzania's heavy reliance on rain-fed agriculture and insufficient adaptation mechanism, the economic impact of higher temperature would be similar in Tanzania as in other SSA countries. Average temperature has been rising and is projected to rise further in Tanzania. Based on multi-model ensembles used by the World Bank for Tanzania's climate projections, Tanzania is expected to face a range of 0.4–4.3°C increase of mean temperature by the end of the century relative to the 1995–2014 baseline (see World Bank Climate Change Knowledge Portal 2022).⁵ The study on the Greater Horn of Africa region shows that rising temperature in Tanzania would likely lead to increased frequency of prolonged drought and extreme heat, while flooding would be exacerbated by intensified heavy rainfalls (Osima et al. (2018)). The combined effect of longer dry spells and heavy rainfall events are likely to slow down growth through its substantial damage to the country's key economic sectors, such as agriculture, tourism, and infrastructure, and energy sectors.

- Agriculture.** Tanzania has a large and diverse agricultural sector, encompassing traditional export crops (coffee, tea, cashew, sisal, etc.), a booming horticulture export sector, a cattle and meat sector, commercial production of staples (maize, other grains) for domestic and regional markets, and of course subsistence farming. Agriculture is almost entirely rainfed and dependent on seasonal rain patterns; it further depends on often vulnerable physical infrastructure. The agricultural sector accounts for about 25 percent of GDP and employs 75–80 percent of the workforce in the country (USAID, 2018). About 80 percent of agricultural production comes from low-input smallholder farms which are predominantly rainfed and prone to droughts. But the length and intensity of the rainy season have become increasingly unpredictable. Only about 1.5% of national crop land suitable for irrigation is irrigated, while the national crop land area exposed to at least one drought per year will increase in response to global warming (BMZ and GIZ, 2021). Moreover, the impact of climate change on food production varies by crops. Millet, sorghum, rice, groundnuts and cassava are projected to gain from climate change, but production of maize, the main staple crop nationally and a major export commodity, is projected decrease 8–13 percent by 2050 (USAID, 2018). Livestock production is also at risk from increasing dry spells, flood losses and degraded pasture. Overall, agricultural sector is highly vulnerable to weather variability due to its limited adaptive capacity.
- Tourism.** Tanzania has globally significant ecosystems and biodiversity with many internationally recognized wetlands and the southern portion of the Coastal Forests of Eastern Africa biodiversity hotspot. The World Economic Forum's Travel and Tourism Competitiveness Index ranks Tanzania 1st in Africa and 12th worldwide for the quality of its nature-based tourism resources. Tourism is a major component of Tanzania's economy. In 2019, tourism sector was the largest foreign exchange earner, the second largest contributor to the gross domestic

⁵ These estimates are consistent with the authorities' own projections. According to the authorities' NEMPSI (2022–2032), Tanzania is expected to face a range of 1–2°C increase of mean temperature by 2041.

product (GDP), and the third largest contributor to employment (World Bank, 2021). However, the tourism sector is now at risk from climate change. With rising temperatures and increased frequency and intensity of droughts, wetlands and riverine systems are increasingly at risk of being converted to other ecosystems (BMZ and GIZ, 2021). Increasing temperatures and heavy rainfall also shift the suitable ranges of plant and wildlife species with detrimental impacts for some native species, which would threaten important ecosystem services and tourism revenue.

- Infrastructure.** Droughts and floods have already caused damages to infrastructure, resulting in major economic costs (IMF, 2022). A post-disaster assessment shows that the 2019 Tanga flood severely impacted critical infrastructure including water supply system, electricity networks, roads and bridges, schools, hospitals and residential buildings, and various equipment. According to Tanzanian government's estimate (Tanzania, 2019), the total direct damages and losses are US\$19 million. In Dar es Salaam, infrastructure assets with the value of US\$5.3 billion are increasingly at risk from flooding and sea level rise (USAID, 2018; Tanzania, 2014). While Tanzania has been most frequently affected by floods (46 times during 1980-2020) based on EM-DAT data, prolonged droughts have led to adverse economic impacts, including the reduction in hydropower capacity. Currently, about 37 percent of Tanzania's electricity generation capacity is based on hydropower, which is susceptible to changing precipitation patterns. Heavy rainfalls in 2017 and 2020 had threatened the structure of dams, whereas dry spells in 2015 led to a near cessation of the Mtera dam (Tanzania, 2021a). To meet future electricity demand, approximately 5,100 MW of hydro capacity is planned over the next twenty years (Tanzania, 2020). Given the climate trends, it is crucial to take full account of climate-related risks in energy infrastructure planning.
- Other sectors.** Fisheries and construction, which make important contributions to employment and GDP, are also affected by climate change. Fisheries, covering both coastal and regions, provide more than 4 million jobs and are an important food source. Fishing is also threatened by rising sea level and sedimentation exacerbated by heavy rains (USAID, 2018).

Food Security

7. Food production in Tanzania is highly vulnerable to climate change. Given Tanzania's heavy reliance on increasingly unreliable rainfall, current agricultural production will be unlikely to ensure food security in the country nor support the current level of food exports. Both floods and droughts could negatively affect the food security situation via lower crop production and higher post-harvest losses. With every event of flood or drought, there is an increase in food insecurity of 5–20 percentage points (IMF, 2020).

8. Successive shocks from the COVID-19 pandemic and the war in Ukraine and have further increased food insecurity by inflating food import bills. The war in Ukraine drove up prices of food, fuel and fertilizers, exacerbating existing food supply vulnerabilities, which is already weakened under COVID 19 pandemic. Tanzania accounts for 41.2 percent of SSA countries' imported maize and cassava, the two most consumed staples, and also saw food price inflation

compounded by export demand. These challenges are compounding pressures from rapid population growth and a lack of resilience to climate change.

9. Climate change is set to further intensify food insecurity by hampering food production and distribution. Climate change is identified as a primary driver of malnutrition in Tanzania, in addition to demographic change and poverty (Inter-Agency Research and Analysis Network, 2017). Increased food insecurity could weigh on child nutrition, educational attainment, and earnings potential. This could potentially unravel decades of hard-earned improvements in health and education outcomes.

Public Health

10. Climate change is likely to have pronounced impact on public health. Climate change threatens the health and sanitation sector through more frequent incidences of heatwaves, floods, and droughts. Due to increasing temperatures and heavy rainfall events, diarrheal diseases, and malaria, both leading causes of death in Tanzania, are likely to escalate (areas in Tanzania previously free of malaria are now affected, mainly due to rising temperature and moisture levels). Tanzania has the third largest population at risk of this disease in Africa, with 90 % of the population living in malaria areas (MalariaSpot, 2016). Aggressive health programs have reduced malaria morbidity and mortality in recent years, but new cases are emerging in the previously malaria-free highlands due to climate changes. In addition, rising temperatures will result in more frequent heat-related mortality and increased flooding threatens further outbreaks of waterborne diseases.

Inequality

11. Climate change disproportionately affects the vulnerable groups. Climate change is exacerbating already large inequalities, as poorer households are the most adversely impacted. And the post-disaster consumption inequality always widens across households. About half of the population lives below the poverty line and depends on weather-sensitive activities such as rain-fed agriculture, herding, and fishing for their livelihoods. Limited financial buffers and low levels of education and health care impede their ability to adapt to adverse consequences of climate change, raising vulnerabilities to food insecurity and income losses (IMF, 2020).

C. Policy Responses: Adaptation, Mitigation, and Resilience to Climate Change

12. The Tanzania National Climate Change Response Strategy (NCCRS) 2021-26, the Third National Development Plan (FYDPIII), and the NEMPSI (2022-2032) specify policy actions for addressing climate change. The NCCRS 2021-26 updates Tanzania's 2012 climate change strategy. It entails a set of adaptation and mitigation interventions in major economic sectors, which are designed to strengthen Tanzania's climate change resilience and contribute to global efforts to reduce greenhouse gas emissions. The FYDPIII, which informs national planning across all economic sectors, also contains specific policy actions to promote renewable energy technologies and

strengthen climate change adaptation and mitigation measures. These measures are to be financed through establishing a US\$304mn Climate Change Fund and a National Climate Change Financing mechanism, to build institutional capacity for coordinating and enhancing resource mobilization. The NEMPSI (2022-2032) was drafted to guide strategic and coordinated environmental interventions, based on spatial variation of environmental challenges and intervention options. Specifically, it provides an assessment of existing environmental challenges, identifies priority areas for interventions, and establishes intervention options for addressing the environmental challenges. The authorities are also developing an interactive tool, the NEMPSI Dashboard, to allow stakeholders access to environmental data and information.

Table 1. Tanzania: Climate Change Strategies and Institutions¹

Key Strategies and Plans	Coverage
Updated Nationally Determined Contribution (2021)	Pursuant to Article 4 of the Paris Agreement, Tanzania submitted its updated NDC in 2021 and communicated the commitments towards 2030 in the context of the objectives of the Paris Agreement to hold the increase of the global average temperature to well below 2C above pre-industrial levels while pursuing efforts to limit the increase to 1.5C. The updated NDC covers all key sectors that contribute to the country's mitigation efforts, as well as on the adaptation agenda.
National Climate Change Response Strategy (2021–26)	The National Climate Change Response Strategy (NCCRS) was published in 2021 tandem with the updated NDC. The NCCRS covers the period of 2021-2026 and presents climate actions across sectors to deliver the NDC objectives. The NCCRS includes detailed measures and investments, implementation arrangement, resource mobilization, and the monitoring and evaluation of the NCCRS.
Five Year Development Plan III (2021/22–2025/26)	The Five-Year Development Plan III (FYDP III) is the medium-term national development plan. The FYDP III covers the period of 2021/22-2025-26 and integrates climate change considerations among the guiding principle of Tanzania's development strategy.
National Environmental Master Plan for Strategic Interventions (2022–2032)	National Environmental Master Plan for Strategic Interventions (2022-2032) was published in 2022 and covers the period of 2022-32. The overall objective of the master plan is to guide strategic and coordinated environmental interventions at all levels, based on spatial variation of environmental challenges and intervention options.
Tanzania Vision 2050 (proposed)	The Government of Tanzania is proposing development of Vision 2050 document to formulate a long-term development strategy of the country. This will build the Tanzania Development Vision 2025 and the Long-Term Perspective Plan 2011/12-2025/26. The Vision 2050 is expected to include an emphasis on long-term climate policy and strategic priorities.
National Disaster Management Plan (forthcoming)	As required by the National Disaster Management Act 2015 and the latest amendments in 2022, the government of Tanzania is in the process of developing a National Disaster Management Plan (NDMP). The NDMP is expected to provide an institutional framework for disaster risk management and reduction across levels of government and to be integrated into the country's FYDP.

¹ IMF Technical Report, "Tanzania: Public Investment Management Assessment with Climate Module, 2022.

Institutions	Climate Related Responsibilities
National Climate Change Steering Committee	The National Climate Change Steering Committee (NCCSC) has been established, chaired by the Permanent Secretary of the Vice President's Office, to ensure coordinated actions across various sectors and institutions. The National Climate Change Technical Committee (NCCTC) has also been established, chaired by the Director of Environment, with the role of providing technical advice to the NCCSC.
Sector Ministries	In the NDC context, line ministries contribute sectoral targets and programs to the national climate strategy, as well as incorporate climate policy targets and goals into their strategies and action plans. Line ministries play a critical role in the development and implementation of climate-relevant infrastructure projects and climate-related rules and regulations.
Ministry of Finance and Planning	The Ministry of Finance and Planning (MOFP) plays a critical role in climate-related public investment planning and budgeting processes, and disaster risk financing. The MOFP coordinates and engages with sector ministries in the implementation of the PIM process and provides relevant guidelines. It is also the counterpart institution for external financing of public investment projects.
Tanzania Meteorological Authority (TMA)	Tanzania meteorological authority provides weather and climate and other related services.
Vice President's Office, Union and Environment	The Vice President's Office, Union and Environment, is responsible for overseeing the implementation of climate related activities and the NDC at the national level. The VPO leads the development of the NDC and the NCCRS, and coordinate with other ministries on their implementation. The VPO is also responsible for the coordination and communication with the UNFCCC.

13. Current and planned interventions have covered several areas. The NEMPSI, NCCRS and FYDPIII are big-picture strategies that need to be supplemented by actionable, fundable, and well-prioritized implementation plans. The authorities have started to identify, plan and implement actions in the following areas:

- **Increasing food security:** The government is promoting investment in irrigation for food production to enhance food security and improving agricultural productivity in more arid areas.
- **Floods prevention and resilience:** The government is advancing in strengthening key infrastructure (e.g., rebuilding highway bridges, flood barriers) to protect transport from disruptions caused by floods. The government also plans to build institutional capacity for sustainable management of water bodies and catchments to reduce flood risks.
- **Reducing charcoal dependence and containing deforestation:** The government promotes the adaption of clean technologies and renewable energy to reduce households' dependence on charcoal and to slow the deforestation rate. Tanzania has been promoting tree planting campaign.

- **Preserving ecosystems:** The government has put in place several measures to safeguard biodiversity and preserve ecosystems, including coastal and marine ecosystem conservation and restoration, wetland conservation and water sources conservation.
- **Other adaptation projects:** The government has implemented some adaptation projects, including Reversing Land Degradation and Food Security in Semi-Arid Areas - LDFS), (2017 – 2022); Ecosystem-Based Adaptation for Rural Resilience in Tanzania, 2018 – 2022; and Construction of sea wall in Mikindani (Mtwara) and Sipwese (Pemba).

14. Macroeconomic resilience to climate change is also enhanced when adapting to changed global economic dynamics and the international climate change agenda. Tanzania's gas reserves could provide valuable revenue while meeting global demand for transition fuels (especially as coal-fired power stations are being phased out) and provide reliable, affordable and comparatively clean energy for domestic users. Tanzania potential for renewable energy (solar, wind, and hydro) together with its strategic location offers a natural advantage for the production of carbon neutral fuels (e-fuel and hydrogen-based fuels) for the global transportation sector. Finally, Tanzania's biodiversity, still high level of forestation and relatively abundant land make it a naturally attractive destination for carbon-offset investments. Realizing these opportunities will require an improved business environment and regulatory reform in the energy sector.

15. Despite its small contribution to the global emissions, Tanzania has committed to a robust climate mitigation goal. In its updated Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2021, Tanzania has set a GHG emission reduction target of 30-35 percent below its business-as-usual (BAU) emission level by 2030 (including mainland Tanzania and Zanzibar). The low ambition scenario, 30 percent reduction, would result in approximately 138 million tons of carbon dioxide equivalent (MtCO₂e) lower the BAU scenario by 2030, whereas the high ambition scenario, 35 percent reduction, would result in approximately 153 MtCO₂e lower than the BAU scenario by 2030. Tanzania has prioritized four mitigation sectors in the NDC, including energy, transport, forestry and waste sectors. The government also phased out the temporary fuel subsidy in January 2023, which could help reduce greenhouse emissions. Overall, the updated NDC estimates that the total funding required to support the implementation of climate adaptation and mitigation activities would amount to US\$ 19.2 billion between now and 2030. The NDC notes that Tanzania needs international support beyond domestic resources for NDC implementation.

D. Conclusion

16. In recognition of its vulnerability to climate change, Tanzania has featured climate goals in its national planning. Strengthening the systems of environmental protection and sustainable use of natural resources are among the key priorities of the Third National Development Plan (FYDPIII). The Tanzania National Climate Change Response Strategy (NCCRS) 2021-26 entails a set of adaptation and mitigation interventions in major economic sectors. Other interventions include

the promotion of renewable green energy technologies and strengthening climate change adaptation and mitigation measures.

17. Responding to climate change requires mounting spending and financing. Studies find that responding to climate change by financing adaptation measures will be expensive, but substantially less costly than frequent disaster relief (IMF, 2020). However, ramping up adaptative investment requires mounting financing needs. Tanzania commits to reduce greenhouse gas emissions economy-wide between 30-35% relative to the Business-As-Usual (BAU) scenario by 2030, which is estimated to cost around US\$19 billion (Tanzania, 2021b).

18. Effective NDC implementation calls for efficiently mobilizing domestic resources as well as additional financing from the international community. Mobilizing domestic revenues could provide some fiscal space to raise adaptative investment for greater resilience, however Tanzania's effective capacity to undertake strong adaptation and mitigation actions requires financing beyond domestic resources. Accessing grants and concessional financing from development partners is pivotal for NDC implementation, given that the total estimated budget of US\$19 billion cannot be met only with domestic resources. Tanzania authorities have expressed interest in the Resilience and Sustainability Trust (RST) to support its efforts to tackle climate change challenges.

19. Private flows could also play a role in advancing climate adaptation. The private sector has an evident interest in investing in adaptation to climate change. The need for private sector contribution is even more pronounced in Tanzania given its sizable needs for adaptation and limited fiscal space. While the estimate of the potential for private investment in climate adaptation is only a small fraction of overall financing needs, private investment remains very important and should be mobilized to the extent possible (Bari and Dessus, 2022).

20. Tanzania has made some progress in addressing climate financing needs, but more financial and technical support are needed. Tanzania is one of few countries with an accredited institution to directly access global climate funds. The OECD climate finance database reports that between 2015 and 2020 Tanzania had commitments for climate-related projects of US\$3.8 billion in the form of grants (45 percent), and debt instruments (55 percent), of which 93 percent is concessional. The climate focus of the funds committed were adaptation (48 percent), mitigation (40 percent), and multiple focus (12 percent), mainly in the transport, water and sanitation, energy, and agriculture sectors. However, financing needs remain large to implement aforementioned planned interventions and projects. The government also seeks technical support to enhance capacity in project assessment and execution as well as climate finance access from multilateral funds.

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ASSESSING FISCAL RISKS FROM STATE-OWNED ENTERPRISES¹

This study assesses the financial performance of Tanzania's largest SOEs and the legal and institutional framework in which they operate to identify key sources of risks to the overall public finance management. Assessment of recent financial performance of 12 systemically important non-financial SOEs points to looming fiscal risks and the need for closely monitoring their books. In particular, immediate interventions would be needed for Air Tanzania Company Limited and the Tanzania Railway Corporation, which are technically insolvent. Similarly, assessment of Tanzania's institutional and legal framework for SOEs shows the need for strengthening the transparency and accountability frameworks as well as the oversight framework and capacity of the Office of Treasury Registrar.

A. Background and Context

1. State-owned enterprises (SOEs) played key roles in the economic history of Tanzania.

Following independence in 1961, the new independent government adopted a socialist system where the state assumed a leading role in economic activity. Major investment and productive activities were carried out through public statutory corporations (PSCs), including SOEs. The growth of the SOEs sector came to a halt following the 1970s and 1980s economic crises, which resulted in reduced capacity of the government to finance large investment projects and deterioration of the SOEs performances. The estimated annual fiscal loss incurred by the government of Tanzania (GoT) from SOEs reached about 7 percent of GNP in late-1980s (OTR, 2022).

2. Reforms implemented since the 1990s aimed to reduce the size and roles of the SOEs sector in Tanzania.

Supported by the IMF and the World Bank, Tanzania launched structural reforms in the second half of the 1980s with the objective to reduce the burden of loss-making SOEs on the budget, improve the operational efficiency of SOEs, and enhance the role of the private sector in the economy. The reform received a new momentum in the 1990s following the establishment of the Presidential Parastatal Sector Reform Commission (PSRC) in 1992 with a mandate to coordinate implementation of the government's PSCs reform. By the time the PSRC assumed its role, the government owned a total of 455 PSCs, of which 399 were SOEs (i.e. commercial entities)². By the time the PSRC was wound up in 2007, a total of 251 SOEs were divested, of which 136 SOEs were privatized and 115 SOEs were either liquidated, closed or placed under a debt recovery program.

¹ Prepared by Melesse Tashu (IMF), Abeid Mzee (MoFP), and Chelaus Rutachururwa (IMF, Res Rep Office). The authors would like to thank the authorities for their constructive comments and suggestions received during the presentation at the mission's outreach event.

² The Office of Treasury Registrar defines SOEs as PSCs that operate on purely commercial basis and with government shares or public interest of at least be 51 percent of all holdings in it (OTR, 2022).

3. As of December 2022, Tanzania had 248 PSCs with majority (at least 51 percent) government ownership. In addition, the government held minority stakes (less than 51 percent ownership) in 50 other companies. The government's total portfolio investment (equity holding) in both majority and minority owned companies amounted to about Tsh 68 trillion (about 44 percent of GDP) in FY 2020/21 (OTR, 2022).

4. This study assesses the performance and fiscal risks of 12 SOEs systemically important SOEs. These SOEs held about 88 percent of total non-financial SOEs debt as of June 2022. They are key players in a wide range of systemically important sectors, including communication, energy, housing, industry, logistics, mining, and transportation (Table 1). As of June-2021, they held public sector assets of about 24 percent of GDP and equity of about 6 percent of GDP; and provided employment opportunities for about 16.4 thousand citizens.

Table 1. Tanzania: Key Economic Indicators of Selected SOEs, 2020/21
(In Billions of Tsh; unless stated otherwise)

SOE	Sector	No. of employees	Asset	Equity	Debt
Tanzania Electric Services Company (TANESCO)	Energy	7,151	17,288	3,791	1,521
Tanzania Railway Corporation (TRC)	Transportation	2,881	6,642	(218)	42
Tanzania Ports Authority (TPA)	Logistics	2,495	3,260	1,618	508
Tanzania Telecommunications Company Ltd (TTCL)	Communication	1,243	568	248	0
Tanzania Posts Corporation (TPC)	Communication	740	232	170	0
Air Tanzania Company Limited (ATCL)	Transportation	523	295	(240)	0
National Housing Corporation (NHC)	Housing	410	5,048	3,321	222
Tanzania Petroleum Development Corporation (TPDC)	Energy	357	3,775	257	3,311
Kilimanjaro Airports Development Company Ltd (KADCO)	Logistics	291	20	11	0
Marine Services Company Limited (MSCL)	Transportation	132	159	148	0
State Mining Corporation (STAMICO)	Mining	121	119	25	0
National Development Corporation (NDC)	Industry	82	209	71	93
Total		16,426	37,616	9,201	5,697
<i>In percent of GDP</i>		...	24.2	5.9	3.7

Sources: Annual financial statements and authors' calculations.

B. Conceptual Framework

5. State-owned enterprises play important roles in the economies of many countries, in particular, in developing economies. They provide key public services such as electricity, water, transportation, and communication, and in some countries, they are important sources of investment and employment. For governments, SOEs could ease burden by supplying key public goods and services and generate income through tax payments and dividends.

6. Inefficient and poorly managed SOEs can be a major source of risk to public finance and to the economy, in general. As owners, governments have the responsibility to bail out SOEs when they fail, and this would have significant consequences to the budget. Weaknesses in SOEs that supply key public services such as water, electricity, and transportation could also mean disruptions in such services which could have economy-wide consequences.

7. State-owned enterprises are prone to financial weaknesses for many reasons (Ter-Minassian, 2017; Renteria et al, 2018; Baum et al 2020 and 2021). Some of these include:

- Even though SOEs are meant to be profit-making entities established to partake in commercial activities on behalf of their governments, they often engage in quasi-fiscal activities, such as provision of good and services at prices not sufficient to cover costs, investment in infrastructure, and job opportunities to citizens irrespective of commercial rational. As a result of these activities, SOEs end up running recurring losses and borrow excessively.
- SOEs could be operationally inefficient because of capacity constraints. In many developing countries, the remuneration scheme and working environment of SOEs is not competitive enough to attract highly skilled professionals from the private sector. Furthermore, appointments of executives and Board members are often made based on political rational than competence. Politically appointed senior executives lack not only the professional competence, but also the managerial independence needed to run commercial businesses.
- Weak governance and oversight mask weaknesses and vulnerabilities in the SOEs' operations. Absence of independent and competent supervisory board means that SOEs would not have effective internal control and audit arrangements. State-owned enterprises may also become inefficient and more risk taking, including indebtedness, if their governments do not exercise adequate oversight over their operations.

8. The failure or weaknesses of SOEs ultimately becomes a fiscal or budget problem (Sayegh, 2019; Baum et al 2020 and 2021). The performance of SOEs affects the budget through a number of channels. Well-performing SOEs can pay taxes and dividends to the budget. On the other hand, SOEs that run losses will need transfers and subsidies from the budget. Some governments provide on-lending to SOEs, which may not be paid back if these SOEs do not perform well. State-owned enterprises can also be a source of contingent liability, both explicitly when governments provide loan guarantees and implicitly because governments are expected to step in and bailout their SOEs in case of financial troubles. (Table 2)

Revenue	Expenditure	Net financial position
<ul style="list-style-type: none"> • Taxes and royalties • Dividends • Credit risks from on-lending 	<ul style="list-style-type: none"> • Subsidies or transfers triggered by quasi-fiscal operations • Recapitalizations and bailouts • Debt service payments triggered by guarantees 	<ul style="list-style-type: none"> • Realization of explicit and implicit contingent liabilities of SOEs • Positive valuation effects on SOEs liabilities or negative effects on SOEs assets

Source: Baum et al (2020 & 2021).

9. Assessing and monitoring the performance SOEs in an ongoing basis could help identify and mitigate realization of costly fiscal risks. Drawing from Renteria et al (2018) and Sayegh (2019), the framework for the quantitative risk assessment rates the financial performances of SOEs (profitability, solvency, and liquidity) against industry standards (Table 3). In principle, these analyses should be complemented with forward-looking assessment of risks and vulnerabilities using sensitivity, scenario, and stress-testing analyses. However, such assessments are beyond the scope of the current study due to limited data availability to make projections of the SOEs financial performance.

Table 3. Tanzania: Assessment of Financial Soundness of SOEs				
Financial independence. <i>Does the company depend on fiscal support from the government through subsidies, equity, loans, guarantees to continue operating?</i>			No	Yes
Profitability				
• <i>Return on asset.</i> The efficiency of a company in using its assets to generate profits.	>10%	0%-10%	-10%-0%	<-10%
• <i>Cost recovery.</i> ^{1/} Ability of the SOE to generate adequate revenue to cover operating expenses.	>2	1.5-2	1-1.5	<1
Solvency				
• <i>Liability-to-asset ratio.</i> Ability of SOE to pay off liabilities in the future.	<30%	30%-50%	50%-80%	>80%
• <i>Interest coverage ratio.</i> ^{2/} Ability of SOE to service its debt from its current profits.	>3	1.5-3	1-1.5	<1
Liquidity				
• <i>Current ratio.</i> ^{3/} Ability of SOE to meet short-term liabilities from selling short-term assets.	>2	1.5-2	1-1.5	<1

Sources: Renteria (2018) and Sayegh (2019).
^{1/}Measured by the ratio of operating revenue to operating expense.
^{2/}Measured by the ratio of operating profit to interest expense.
^{3/}Measured by the ratio of current assets to current liabilities

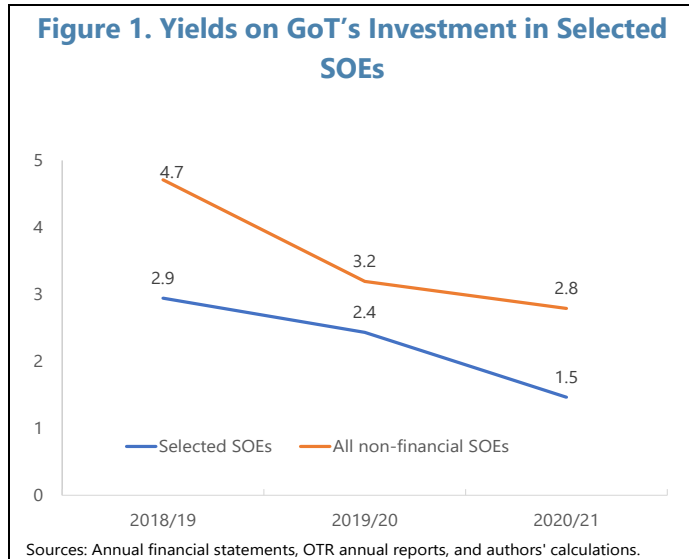
10. The quantitative assessment of the SOEs financial performance is supplemented by qualitative assessments of the legal and institutional frameworks under which the SOEs operate. In section 4, the study reviews Tanzania's legal and institutional arrangements of SOEs to assess the extent to which the policy and legal frameworks clearly articulate ownership policy, accountability, operational autonomy, and oversight functions.

C. Financial Performance Analysis of Selected Tanzanian SOEs

11. On the basis of yield and profitability, the majority of Tanzanian SOEs appeared to have demonstrated resilience against the COVID-19 shock. While declining from the level in 2018/19, the average yield of non-financial SOEs was 2.8 percent in 2020/21. Seven of the 12 selected SOEs were profitable in 2020/21 and 10 of them paid dividends with an average yield of 1.5 percent (Figure 1 and Table 4).³ That said, the profitability (return on assets) of most of the SOEs was marginal and had cost recovery ratios below the recommended benchmark (Table 4). In particular, SOEs engaged in tourism-dependent activities were heavily affected by the pandemic. The government had to bail out 3 PSCs, namely Tanzania National Parks (TANAPA), Ngorongoro Conservation Area Authority (NCAA), and Tanzania Wildlife Authority (TAWA) which were directly hit by COVID-19 in 2020/21.

12. Most SOEs are highly leveraged with liability-to-asset ratios well above the recommended benchmark (Table 4). On average, the selected SOEs had liability-to-asset ratio of 76 percent, which is more than twice the recommended benchmark of 30 percent, during 2018/19-2020/21. Three of the 12 SOEs (ATCL, TPDC, and TRC) were highly leveraged. In addition, ATCL and TRC had negative equity (Table 1), indicating that they were technically insolvent. Five SOEs (ATCL, KADCO, NDC, TRC, and TTCL) had interest coverage ratios well below 1, indicating that their net operating income (profit before interest and taxes) would not be sufficient to cover their interest expenses.

13. More than half of the SOEs also faced serious liquidity problems. (Table 4) Seven of the 12 SOEs had current ratios below 1 in June 2021, implying that they were not able to meet their liquid assets were not sufficient to cover their current liabilities.



³ Dividends are paid out of previous fiscal year profits.

Table 4. Tanzania: Financial Health Indicators of the 12 Selected SOEs

SOE	Profitability 1	Cost recovery 2/	Leverage 3/	ICR 4/	Liquidity 5/	Financial independence 6/	Tax arrears
Air Tanzania Company Limited	-16.1	0.6	181	-144.9	0.2	No	Yes
Kilimanjaro Airports Development Company Ltd	-8.1	1.0	44	-35.9	8.9	No	Yes
Marine Services Company Limited	-1.9	0.4	7	...	0.6	No	Yes
National Development Corporation	-6.9	0.9	66	-0.3	0.3	No	No
National Housing Corporation	3.4	2.3	34	2.3	1.6	Yes	Yes
State Mining Corporation	1.3	1.3	79	...	0.6	No	Yes
Tanzania Electric Services Company	0.1	1.4	78	3.1	0.6	No	Yes
Tanzania Petroleum Development Corporation	0.6	3.1	93	1.4	1.7	Yes	Yes
Tanzania Ports Authority	11.6	2.7	50	...	1.0	Yes	Yes
Tanzania Posts Corporation	0.6	1.0	27	...	0.5	Yes	Yes
Tanzania Railway Corporation	-1.9	0.6	103	-39.0	3.1	No	No
Tanzania Telecommunications Company Ltd	0.1	1.0	56	-0.3	0.5	Yes	No
Aggregate	2.0	1.7	76	4.0	1.0	No	Yes

Sources: SOEs financial reports and authors' calculations.

1/Return on assets; average for FY2018/19-2020/21.

2/The ratio of operating revenue to operating expenses; average for FY2018/19-2020/21.

3/Liabilities-to-assets ratio in percent; June-2021.

4/Interest coverage ratio calculated as the ratio of net operating income (profit before net financing cost and taxes) to interest expenses; average for FY2018/19-2020/21.

5/The ratio of current assets to current liabilities; June-2021.

6/'Yes' if contribution to government (taxes and dividend) was greater or equal to support from government (subvention and equity injection) during FY2018/19-2020/21; 'No' otherwise.

14. Most SOEs are not financially independent. Seven of the 12 SOEs received more support from the government than what they paid back; and ten of them owed the government tax arrears (Table 4). The GoT transferred Tsh 2.7 trillion (1.7 percent of GDP) in the form of capital grants or equity injection and Tsh 77.7 billion in the form of recurrent grants (subvention) to the 12 SOEs in FY 2020/21. These SOEs also owed the government significant amount of on-lending debt and Tsh 3.6 trillion (2.3 percent of GDP) in outstanding tax liabilities. In return, the government collected only Tsh 134.7 billion in the form of dividends (equivalent to 1.5 percent of equity)⁴ and Tsh 143 billion in the form of taxes (Table 5).

15. In summary, some of Tanzania's largest SOEs are heavily indebted with weak liquidity position. In addition, many SOEs depend on government support for their operations. These are indications of limited capacity to service debt and looming risks to the budget.⁵

16. Preliminary FY2021/22 data for some SOEs show improvements in their financial positions (Table 6). In particular, profitability of all the five SOEs for which data is available improved notably. Some SOEs also saw improvements in their

Table 5. Tanzania: Transaction of Selected SOEs with the Government
(In Billions of Tsh; unless stated otherwise)

Transaction	2018/19	2019/20	2020/21
Government subvention	117.1	98.7	77.7
Equity injection/capital grants	472.7	1,704.8	2,666.7
Dividend payment to government	178.0	152.8	134.7
Taxes paid to government	91.0	249.6	143.1
<i>Memo:</i>			
Yield (in percent) 1/	2.9	2.4	1.5
Outstanding balance of tax liabilities	2,299.9	2,622.3	3,573.3
<i>In percent of GDP</i>	1.7	1.8	2.3
Total outstanding debt	5,450.1	5,320.8	5,697.0
<i>In percent of GDP</i>	4.1	3.7	3.7

Sources: SOEs financial reports and authors' calculations.

1/Dividend paid by the 12 SOEs in percent of their total equity.

⁴ The yield of the government's investment on the 12 SOEs declined from 2.9 percent in FY 2018/19 and 2.4 percent in 2019/20 to 1.5 percent in 2020/21, in part reflecting the impact of COVID-19.

⁵ The government also has contingent liability of about Tsh 4.8 trillion (about 2.8 percent of GDP) for its guarantee of the state-owned insurance company's insurance coverage of a large hydro dam being built by international contractors.

liquidity positions. In late 2022, the government converted Tsh 5 trillion (about 2.6 percent of GDP) on-lent debt of TANESCO and TPDC, the largest SOEs, to equity to improve their solvency.

D. Legal and Institutional Frameworks for Tanzanian SOEs

Tanzania's SOE Ownership Policy, Operational Autonomy, and Accountability

17. In line with international best practices, Tanzania has a centralized ownership structure for public corporations. The Treasury Registrar Act 2002 mandates the OTR to hold all investments comprised of the paid-up capital of PSCs as well as in private investments where the government owns shares or interests. This is consistent with the OECD's guidelines for corporate governance of SOEs which encourages ownership of SOEs to be centralized in a single ownership entity (OECD, 2015).

18. Public corporations are required to operate on commercial principles, but their Boards of Directors may face interference from parent Ministries. The Public Corporations Act states that a public corporation shall operate its business according to sound commercial principles; and it grants Board of Directors control and management of the affairs of their respective public corporations. Article 6 of the Act, however, states that the parent Ministry may give the Board of Directors of the public corporation general or specific directions as to the performance of its functions. This is not consistent with international best practices whereby Boards of Directors of

Table 6. Tanzania: Financial Health Indicators of Selected SOEs

	2019	2020	2021	2022
TANESCO				
Return on assets	-0.3	0.4	0.3	1.0
Cost recovery	1.4	1.6	1.3	2.1
Liability-to-Assets	83	86	78	79
Interest coverage ratio	1.9	3.9	3.5	7.4
Current ratio	0.2	0.5	0.6	0.4
TPDC				
Return on assets	0.6	0.4	0.9	2.7
Cost recovery	3.6	2.9	2.8	2.8
Liability-to-Assets	111	110	93	92
Interest coverage ratio	1.4	1.3	1.5	2.3
Current ratio	1.0	0.8	1.7	1.3
NHC				
Return on assets	-0.6	9.0	1.9	1.9
Cost recovery	2.1	2.6	2.3	2.6
Liability-to-Assets	36	35	34	33
Interest coverage ratio	1.8	2.7	2.5	4.4
Current ratio	1.4	1.5	1.6	2.2
KADCO				
Return on assets	...	14.2	-30.4	8.7
Cost recovery	1.4	1.2	0.5	1.1
Liability-to-Assets	...	35.1	44.2	41.8
Interest coverage ratio	...	67.7	-139.6	56.1
Current ratio	...	10.9	8.9	10.7
STAMICO				
Return on assets	-13.0	8.2	8.7	15.3
Cost recovery	0.7	1.4	1.7	2.1
Liability-to-Assets	132.5	97.0	79.4	63.5
Interest coverage ratio
Current ratio	0.3	0.3	0.6	0.8

Source: SOEs financial reports and authors' calculations.

SOEs are independent and have the autonomy to exercise their responsibilities without interference or pressure from government authorities (IMF, 2016; OECD, 2015).

19. While the accounts of PSCs are subject to audit, there is no clear requirement for publication of audited statements. Section 9 of the Public Corporations Act requires the accounts of PSCs to be audited, although audits for PSCs with full government ownership are required to be conducted by a government owned audit firm⁶. The same Act requires the audited accounts to be submitted to the Minister of the parent Ministry, who is responsible to present the audited accounts and auditors' report to the National Assembly. However, audited financial statements of most SOEs are not publicly available and there is no legal requirement for them to be published. In this context, it is important to ensure that SOEs observe high standards of transparency, including by requiring them to publish audited statements on a timely and regular basis.

The Oversight Framework of Tanzania's SOE

20. The Treasury Registrar Act grants the OTR an oversight role over operations of PSCs. As part of its oversight role, the OTR enters annual performance contracts with the PSCs Boards of Directors with the objective to ensure that the envisaged goals are achieved and conducts financial performance reviews as well as management audits to assess the extent to which the PSCs comply with legal requirements, procedures, regulations and guidelines issued by the government.

21. The OTR prepares and submits to the government annual reports on the performance of the SOEs. The report covers the GoT's financial investment performance in terms of dividend returns, including contributions to the consolidation fund, as well as qualitative assessment of operational performance and corporate governance of PSCs. However, the report could be strengthened by including a risk-based financial performance assessment of major PSCs with the objective to identify and mitigate risks to public investments.

22. While the OTR is granted autonomy by law⁷, it operates under a fragmented legislative framework that could undermine its effectiveness. The OTR's custodian, oversight, and advisory role over PSCs is subject to multiple Acts including the Treasury Registrar Act, Public Corporations Act, Government Loans, Guarantees and Grants Act, NBC Bank Act, Budget Act 2015, Finance Act of 2001 as amended, Mining Act of 2017, and other laws, some of which have conflicting effects to the oversight role of the OTR. For instance, the powers granted to parent Ministries in the Public Corporations Act (powers to appoint Directors in Section 9 and give directions to Directors in Section 6) could undermine the oversight role of the OTR. Against this backdrop, the various laws pertaining to PSCs governance need to be consolidated either by issuing a single Act or by amending the Treasury Registrar Act to be the main law with overriding effect in matters relating to PSCs governance.

⁶ The Tanzanian Audit Corporation, which is established by Act.

⁷ The Treasury Registrar Act (as amended in 2010).

23. The OTR is strengthening its oversight capacity by launching ITC platforms, but it faces capacity constraints. If effectively deployed, the OTR's new ICT systems (OTRMIS)⁸ could help strengthen its oversight role and the transparency of PSCs. However, the OTR lacks adequate competencies and expertise in its core functions, including review of shareholders' agreements, management contracts, and technical assistance agreements as well as investigations of certain specialized businesses in which the government has stake (OTR, 2022). In this regard, recruiting new personnel with the right skills and expertise and building the capacity of existing personnel would be critical for strengthening the OTR's oversight capacity.

E. Concluding Remarks

24. The Tanzanian authorities need to closely monitor the performance of SOEs with weak financial track record. Two large SOEs (Air Tanzania Company Limited and Tanzania Railway Corporation) are technically insolvent and require immediate equity injection. In particular, the authorities need to review the strategic direction of ATCL which engages in purely commercial business, but falls under high-risk rating (red zone) by all indicators of financial performance. One possibility could be finding a strategic private sector partner with the objective to improve the returns of the government's investment. For TRC, it would be important to review the underlying causes of its underperformance, which may include the tariff structure, quasi-fiscal activities, or internal operational efficiencies. Other SOEs such as TANESCO, NDC, and STAMICO also lack financial independence and face liquidity risks, and review of the underlying causes of their weak financial positions would be needed to mitigate fiscal risks.

25. Improvements in the accountability of SOEs and the oversight capacity of the OTR would be important for strengthening Tanzania's public finance management. More specifically, it would be important to tighten legislative loopholes, build capacity of the OTR, and effectively implement the recently developed ICT systems. Timely and regularly publishing SOEs' audited financial statements could also help strengthen transparency and accountability.

26. Given data availability limitations, the study conducts the risk assessment based only on historical data. A more complete identification of risks and vulnerabilities would include a forward-looking assessment using sensitivity, scenario, and stress-testing analyses. Going forward, enforcing OTR's newly developed ICT systems would be helpful for compiling timely information and monitoring risks and vulnerabilities.

⁸ The OTRMIS has three modules including the *Board Management Information System* which is designed to enhance management of board appointments, *Financial Analysis and Reporting System* which is designed to enhance financial data reporting from PSCs, and *Geographical & Business Information Systems* which are designed to facilitate assets management of privatized entities.

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REEXAMINING THE MONETARY POLICY TRANSMISSION MECHANISM IN TANZANIA¹

A key question facing the Tanzanian authorities as they transition toward an interest-rate based monetary policy framework concerns whether and how changes in different monetary policy instruments affect inflation and output. This chapter presents evidence that money, interest rate, and credit channels of the monetary policy transmission mechanism (MTM) are active in Tanzania. Moreover, with sticky lending rates remaining a phenomenon in Tanzania, financial sector, and other reforms to increase bank lending flexibility and strengthen the MTM should continue in parallel with the monetary policy operations framework transition, particularly in view of the potential future development of Liquefied Natural Gas (LNG) resources.

A. Introduction

1. The Bank of Tanzania (BoT) currently employs a reserve money targeting monetary policy framework and uses a variety of instruments to achieve its monetary policy objectives.

To control inflation and achieve monetary policy's price stability objective, the BoT's current operating target is reserve money growth, by which the BoT (through the money multiplier) influences the money supply, M3 (the intermediate target). Monetary policy instruments used in this context include repurchase and reverse repurchase agreements (the main monetary policy instrument); open market operations; purchases and sales of foreign currency in the interbank foreign exchange market; statutory minimum reserve requirement ratio; the discount rate; and standby (intraday and Lombard) facilities.

2. In recent years Tanzania has made progress towards implementing an interest-rate based monetary policy framework (see [Country Report No. 2022/269, Annex on Monetary Policy Framework Transition](#)). In line with the harmonization of East African Community (EAC) monetary policies, Tanzania is transitioning towards an inflation-targeting framework that uses a short-term interest rate as monetary policy's operating target. Significant progress towards this goal has been made, and further critical steps towards completing this process are envisioned as part of the current Extended Credit Facility (ECF) program.

3. In this light, the goal of this chapter is to deepen our understanding of the impact of monetary policy decisions on output and prices in Tanzania, with particular focus on the impact of reserve money and short-term interest rates on these variables. The pending adoption of a short-term interest rate as the operating target of monetary policy increases the importance of understanding how changes to reserve money, vs changes in interest rates, affect output and prices in Tanzania.

¹ Prepared by Ayman Alfi and Cameron McLoughlin. The authors would like to thank the authorities for their invaluable assistance in providing data and for constructive comments received during the presentation and discussions of this work at the mission's outreach event.

4. This empirical study differs from the previous literature along three dimensions. First, it uses an updated and more recent dataset, running from July 2006 to December 2021. Second, it uses an improved model specification and econometric approach, including using a dynamic (rather than static) principal component analysis, which accounts for potential variable autocorrelation. Finally, the findings provide new evidence for the MTM in Tanzania.

B. Literature Review

5. Previous empirical work has found mixed evidence regarding the monetary policy transmission mechanism in Tanzania.² Montiel et. al. (2012) found a statistically significant (but economically insignificant) effect of reserve money on the price level in a recursive Vector Autoregression (VAR) model. This result was not robust to using a structural vector autoregression (SVAR) model. Davoodi et. al (2013), found, using a recursive VAR specification, a positive but statistically insignificant effect of reserve money shocks on the price level for the period 2000 -2010. This effect became highly significant when estimated over a longer sample period, starting in 1993. Furthermore, Davoodi et. al (2013) found, using a Factor Augmented Vector Autoregression (FAVAR) approach, a statistically significant positive effect of a reserve money shock on output. These studies also found an insignificant effect of interest rate shocks on output, as well as evidence of the “price puzzle”.³

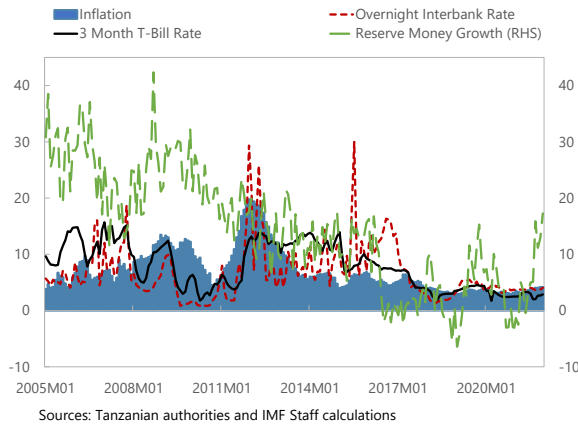
6. On the other hand, Berg et al. (2013) found evidence (albeit less clear than for other EAC countries) in support of the interest, credit, and exchange rate channels in Tanzania. They use an event study approach to the monetary policy tightening undertaken by four East African Community (EAC) members, including Tanzania, in 2011. In this study, effects of the monetary policy tightening on some interest rates, activity, the exchange rate, and inflation in Tanzania were broadly evident, but lending rates failed to respond. However, there is little evidence supporting the monetary transmission mechanism for the period since this time, for example Bashagi, Kimolo and Sanga (2019) find for 2002: Q4 to 2018: Q4 that the sensitivity of output and prices to changes in monetary policy is generally weak.

² See Appendix 1 of Davoodi et. al. (2013) for a comprehensive overview of the literature on the MTM in Tanzania.

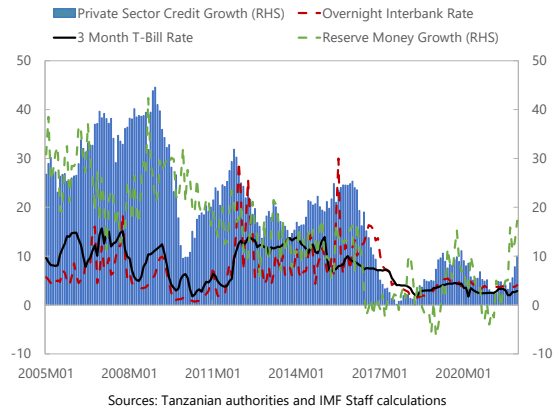
³ The “price puzzle” refers to an increase in inflation in response to a positive interest rate shock. We find more evidence of the “price puzzle” when using static principal components to construct the endogenous and exogenous factors used in the FAVAR analysis, compared to the dynamic principal components case.

Figure 1. Recent Developments

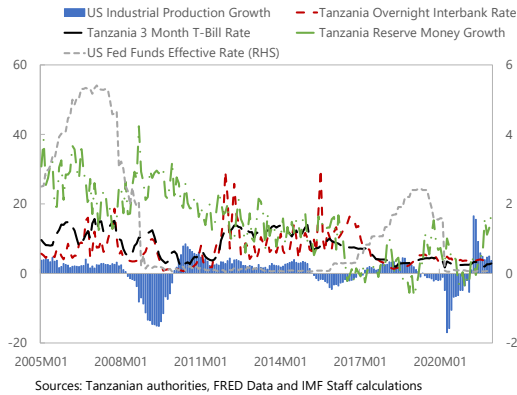
Monetary Policy and Inflation



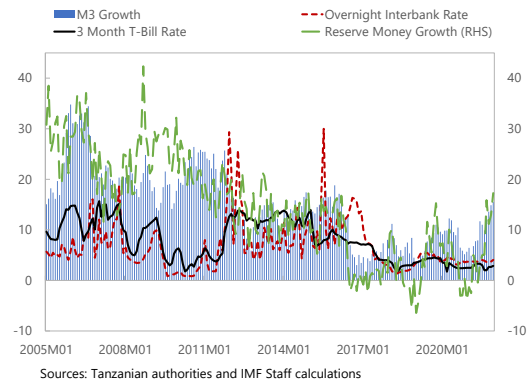
Monetary Policy and Private Sector Credit



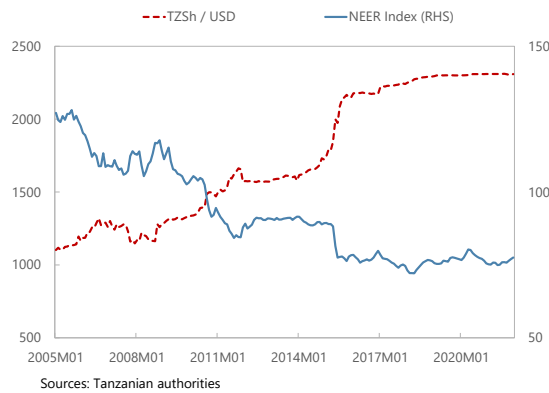
Monetary Policy and Global Environment



Monetary Policy and Monetary Aggregates

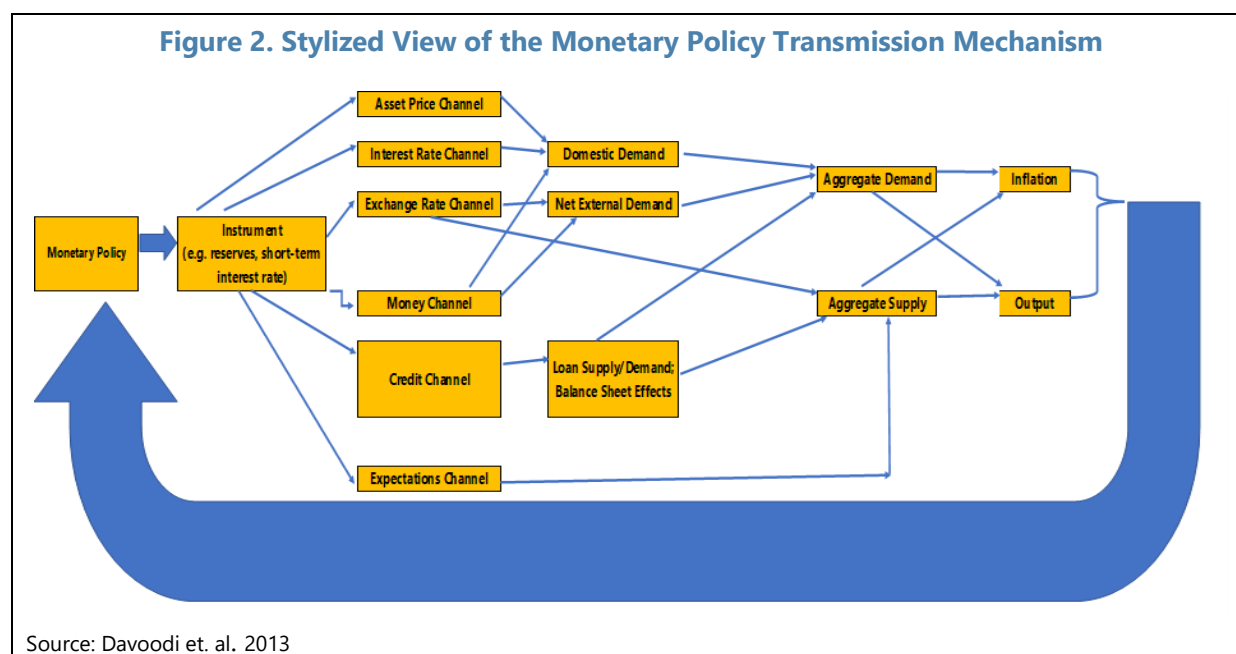


Exchange Rate Developments



7. Broadly speaking, monetary policy decisions may affect output and prices through several channels, the strength of which varies by country. As is well known in the monetary policy literature, these channels are as follows:

- **Money Channel:** changes in reserve money transmit to broad money via the money multiplier.
- **Interest Rate Channel:** an expansionary monetary policy may cause the real interest rate to fall, decreasing the cost of capital and stimulating investment, inducing an increase in aggregate demand and output.
- **Exchange rate channel:** for small open economies with a flexible exchange rate, changes in monetary policy affect the exchange rate and hence relative export and import prices, net exports and output.
- **Credit (bank-lending and balance sheet) channel:** imperfections in credit markets may cause a monetary contraction to lead to an increase in the external finance premium faced by borrowers and to a decrease in the loan supply.
- **Expectation channel:** expectations of future inflation rates or/and monetary policy changes affect interest rates. Generally, operationalizing monetary policy through this channel is common in developed economies with well-functioning and deep financial markets.
- **Asset price channel:** monetary policy may affect financial asset discount rates, which affects asset prices and hence the real economy.⁴



⁴ Asset price data for Tanzania is limited, hence the empirical analysis abstracts from this channel.

C. Empirical Analysis

8. This study further investigates the channels of monetary policy transmission in Tanzania using regression analysis. We adopt the empirical approach of Davoodi et. al. (2013), estimating both recursive structural VAR and FAVAR models on monthly data from 2006 to 2021 (the exact sample period varies according to the VAR lag structure).

9. We first use a recursive structural VAR to investigate the MTM channels mentioned above. The endogenous variables in the model are real GDP (seasonally adjusted and interpolated from quarterly data using the quadratic sum method); inflation; reserve money⁵; a short-term policy-related interest rate (we use both overnight interbank and T-bill rates); credit to the private sector; and the nominal effective exchange rate.⁶ The exogenous variables in the model are an oil price index, a food price index, the US Fed Funds Rate, and US industrial production. The former two account for the externally affected component of inflation rates while the latter two are proxies for global demand conditions. A Time trend and dummy variables for the Global Financial Crisis (GFC) and the Covid-19 pandemic are also included. All variables (apart from the short-term interest rate, and the GFC and Covid dummies) enter the model in log levels. The use of levels does not affect statistical inference (Sims, Stock, and Watson, 1990).

10. Estimating the FAVAR model serves as a useful robustness check of the recursive SVAR results. Here, we use the first principal component of the nominal effective exchange rate index, credit to the private sector, M2 and M3 as an endogenous regressor. Similarly, we use the first principal component of the oil price index, food price index, the US Fed Funds rate, and US industrial production as an exogenous regressor. In this vein, FAVAR models permit a wider range of variables to be used in the regression analysis, whilst avoiding over-parameterizing the empirical model. Such a broader information set may be more representative of the range of information used by central bank policymakers in their monetary policy decisions.

D. Results

11. The recursive SVAR analysis yields evidence that reserve money shocks affect output and prices in Tanzania (Figures 3 and 4). Consistent with previous literature on the relationship between money and prices in Tanzania (e.g., Adam et. al. 2012), and the operation of the Reserve Money Program (RMP) by the authorities, a positive shock to reserve money increases prices permanently, with an estimated time lag of about 2 years, and significantly affects output. In the overnight interbank rate case (Figure 3), the significant output response to a reserve money shock is relatively prompt (about 2 quarters) and lasts longer than the case of the T-Bill rate shock (Figure 4). In both cases, prices remain permanently higher due to a reserve money shock.

⁵ We experiment with both end of month and monthly averages of reserve money. Results are not materially different.

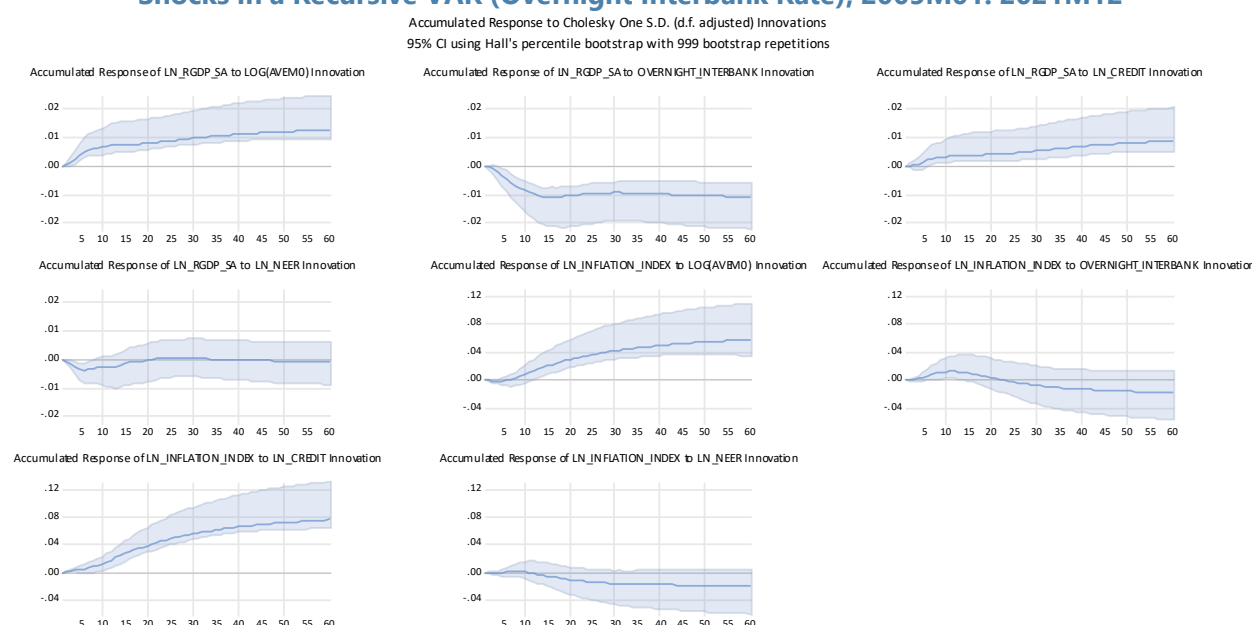
⁶ Shocks in the model are identified using a Cholesky factorization according to this variable ordering.

12. While all other channels also appear broadly operational, evidence of the effectiveness of the interest rate channel is strong (Figures 5 and 6). A positive shock to the T-bill rate affects output and prices almost immediately. The negative impact on output is economically intuitive as shocks to sovereign bond yields are usually associated with economic downturns. The positive impact on prices, however, is not as intuitive but is consistent with the “price puzzle” phenomenon found in the literature for Tanzania and other EAC countries (e.g., Davoodi et al). Understandably, output and prices are also affected by FX shocks. Moreover, in contrast to previous literature, we find that - independent of the reserve money shock – a one standard deviation interest rate shock significantly affects near-term output and prices. The credit channel also appears to be active, with significant effect of a credit shock on prices and output. Similarly, there appears to be some evidence of a significant role for the exchange rate channel.

13. Results from the FAVAR model generally support the findings from the initial regression analysis for prices with differences for output (Figures 5 and 6). Within the FAVAR framework, both reserve money and interest rate shocks have positive impact on prices. The impact on output remains statistically significant from interest rate, but not from reserve money shocks.

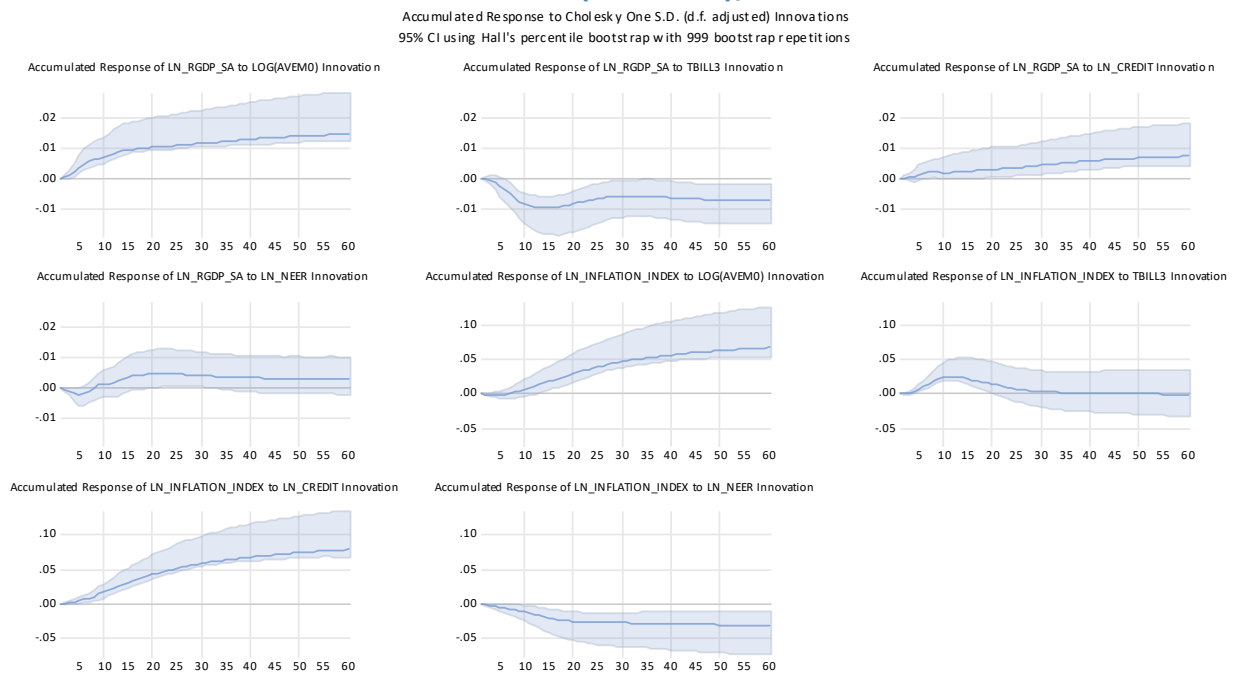
14. Variance decomposition analysis reveals significant contribution of interest rate shocks to changes in GDP and inflation, compared to reserve money. Variability in both output and prices over a 2-year horizon is most sensitive to the T-bill rate shock (Figures 7). Using the overnight interbank rate as a proxy for interest rate in the regression, the variability in inflation is impacted most by reserve money changes only up to three quarters and is largely surpassed by the changes in interbank rates afterwards.

Figure 3. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Shocks in a Recursive VAR (Overnight Interbank Rate), 2005M01: 2021M12



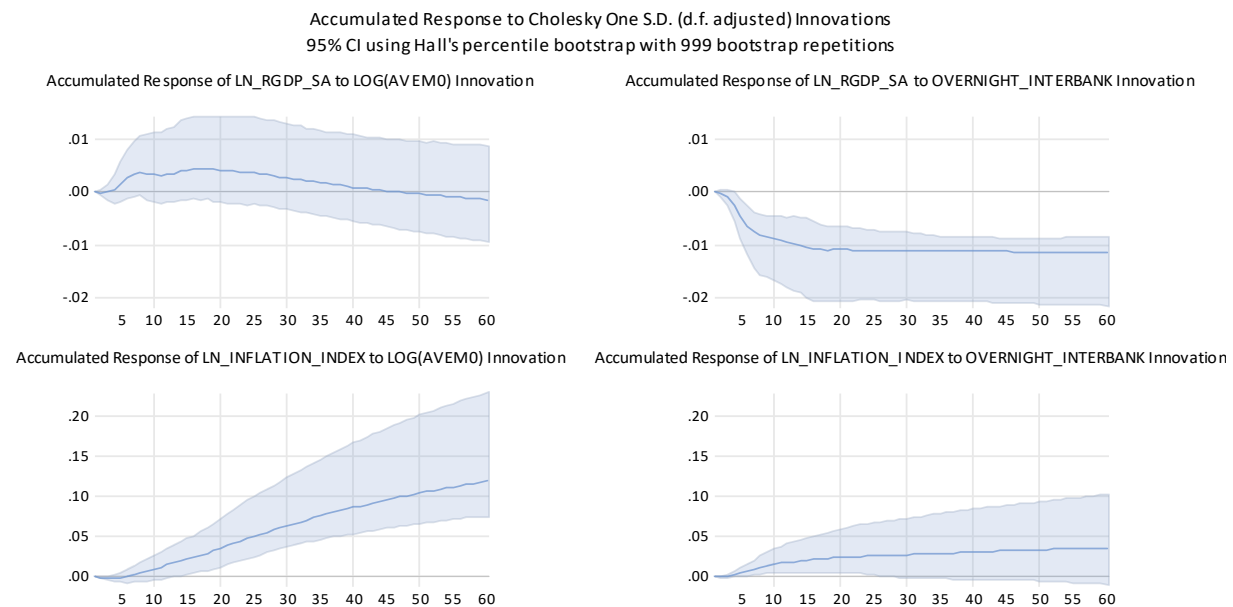
Note: Accumulated impulse responses and 95% confidence bands from a recursive model with 4 lags (based on residual diagnostic tests and lag selection criteria) and Hall (1992) percentile bootstrapped standard errors with 999 bootstrap replications. Benkwitz, Lütkepohl and Wolters (2001) note the advantages of the Hall (1992) bootstrap method.

Figure 4. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Shocks in a Recursive VAR (T-Bill Rate), 2005M01: 2021M12



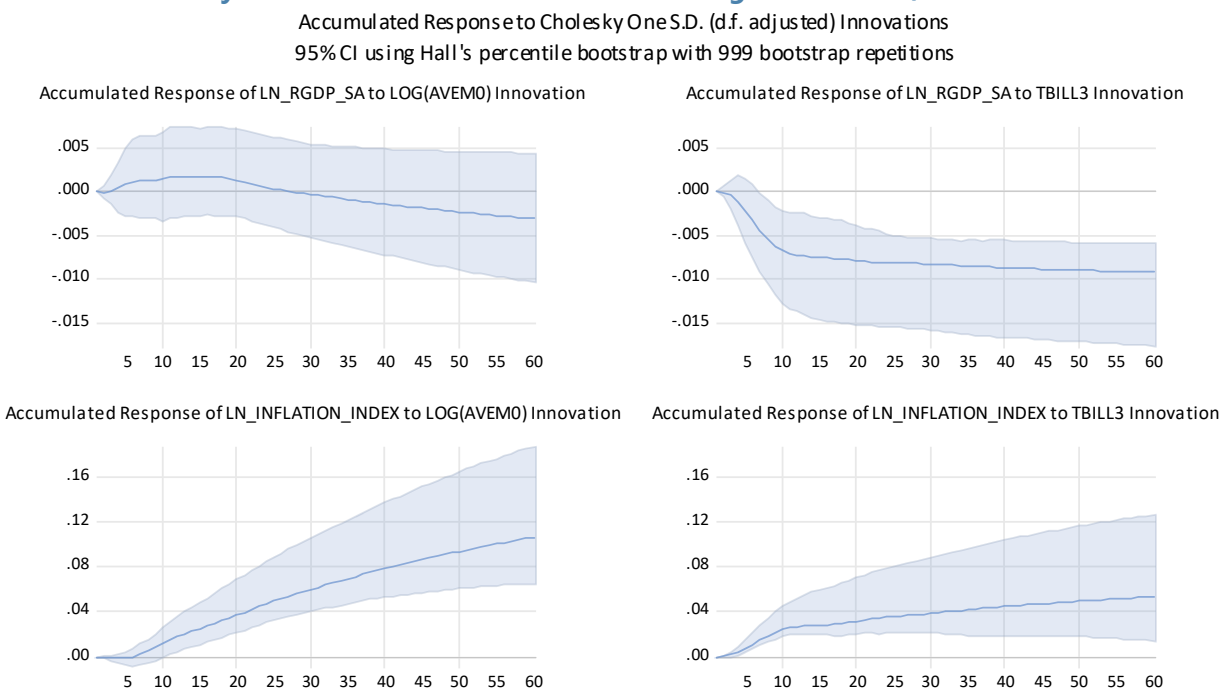
Note: Accumulated impulse responses and 95% confidence bands from a recursive model with 4 lags (based on residual diagnostic tests and lag selection) and Hall (1992) percentile bootstrapped standard errors with 999 bootstrap replications. Benkwitz, Lütkepohl and Wolters (2001) note the advantages of the Hall (1992) bootstrap method.

Figure 5. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Reserve Money and Overnight Interbank Rate Shocks in a Factor-Augmented VAR, 2005M01: 2021M12

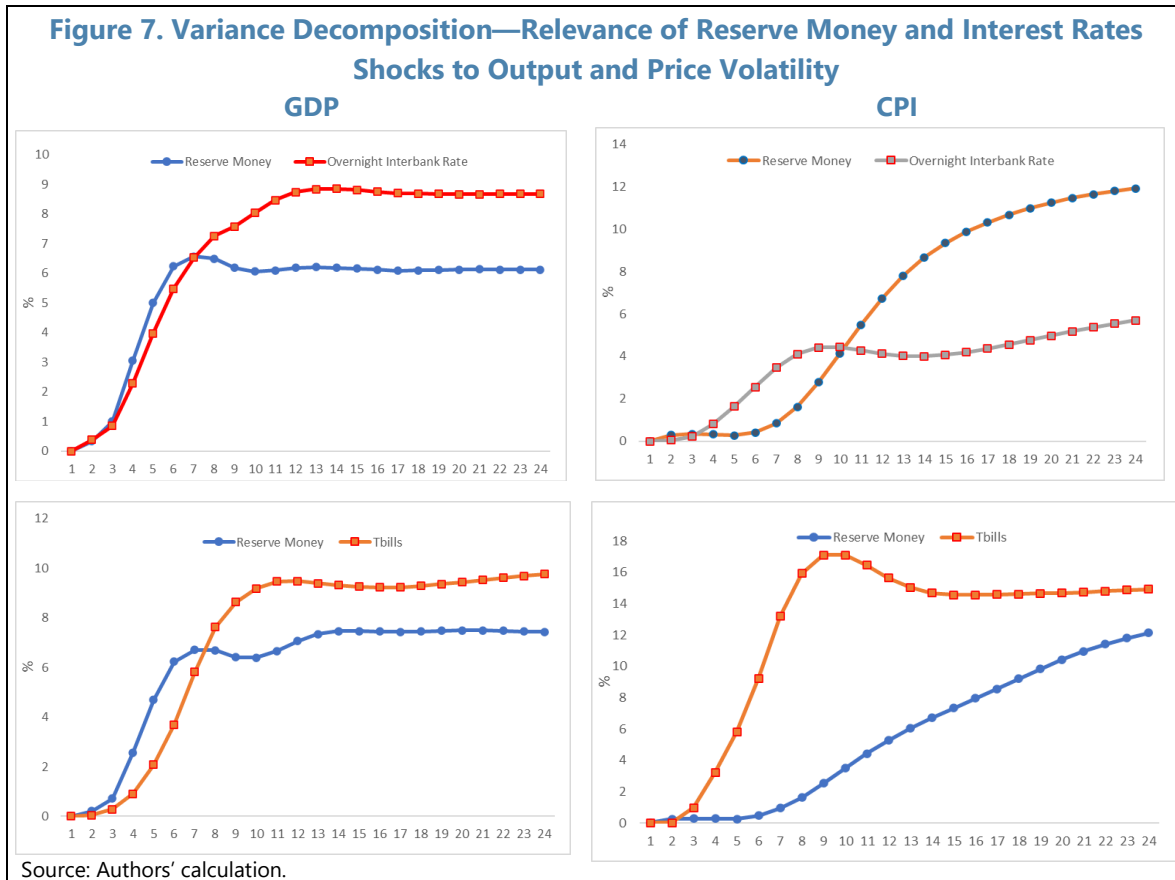


Note: Accumulated impulse responses and 95% confidence bands from a FAVAR model with 7 lags (based on residual diagnostic tests and lag selection) and Hall (1992) percentile bootstrapped standard errors with 999 bootstrap replications. Benkwitz, Lütkepohl and Wolters (2001) note the advantages of the Hall (1992) bootstrap method.

Figure 6. Accumulated Impulse Responses of Output and Prices to One Standard Deviation Reserve Money and T-Bill Rate Shocks in a Factor-Augmented VAR, 2005M01: 2021M12



Note: Accumulated impulse responses and 95% confidence bands from a FAVAR model with 5 lags (based on residual diagnostic tests and lag selection) and Hall (1992) percentile bootstrapped standard errors with 999 bootstrap replications. Benkwitz, Lütkepohl and Wolters (2001) note the advantages of the Hall (1992) bootstrap method.



E. Policy Implications

15. This study has shed new light on the effect of monetary policy decisions on the Tanzanian macroeconomy. This chapter has presented evidence that most MTM channels are active in Tanzania including, the money, interest rate, FX, and credit channels using a data set covering from 2006-2022. While the findings regarding the role of reserve money conforms with the literature, it provides new evidence regarding the effectiveness of the interest rate and other channels. It also sheds light on the differences between the different existing market interest rates and their effectiveness as policy instruments. Findings on the role of exchange rates and credit also provide important policy considerations.

16. From a monetary perspective, the study provides strong support to the transition from reserve money to an interest-rate based monetary policy, as envisaged by the BoT. This contrasts with earlier studies which found that the interest rate, and credit channels, in Tanzania are weak. Short-term interest rate innovations (both overnight interbank and T-bill rates) have significant and faster impact on prices. Among the two, it may appear that Tbill rates are more correlated with prices than the interbank rates, but this is likely due to the high volatility in the interbank market attributed to liquidity related factors. Overall, findings in this study provide important policy considerations. First, the use of an interest rate rule based monetary policy can be more effective than reserve money targeting. Second, OMOs are an effective monetary policy

instrument which explains why they have been increasingly deployed by BoT recently through the sale/purchase of liquidity papers.

17. The positive impact of interest rate shock on prices, the so-called price puzzle, highlights the role of expectations and importance of anchoring them. The price puzzle phenomenon is not uncommon and is, indeed, seen in other countries in the region (e.g., Montiel et al 2012). Money market rates adjust to inflation expectations as participants account for the inflation outlook in their pricing. This impact is also evident by the permanent nature of the impact where prices do not revert to their pre-shock levels, as opposed to the case of anchored expectations. The move to inflation targeting is a critical step to anchor these expectations; but it also requires clear communication and a deep, well-functioning financial market to instate the credibility of the anchor.

18. The finding of credit shock impact on output and prices reemphasizes the need for financial development. A well-functioning credit market can unlock resources for further output growth. As is, the financial market remains shallow. The size of the Tanzanian credit markets, both wholesale and retail, is small compared to most neighboring countries.

19. While FX stability is key for price stability, FX flexibility is also key for output growth and overall macro stability. As evident from our models, while a positive exchange rate shock absorbs inflationary pressures, it deteriorates competitiveness and weighs on output growth, especially in an open economy like Tanzania where sectors like tourism are major drivers for growth.

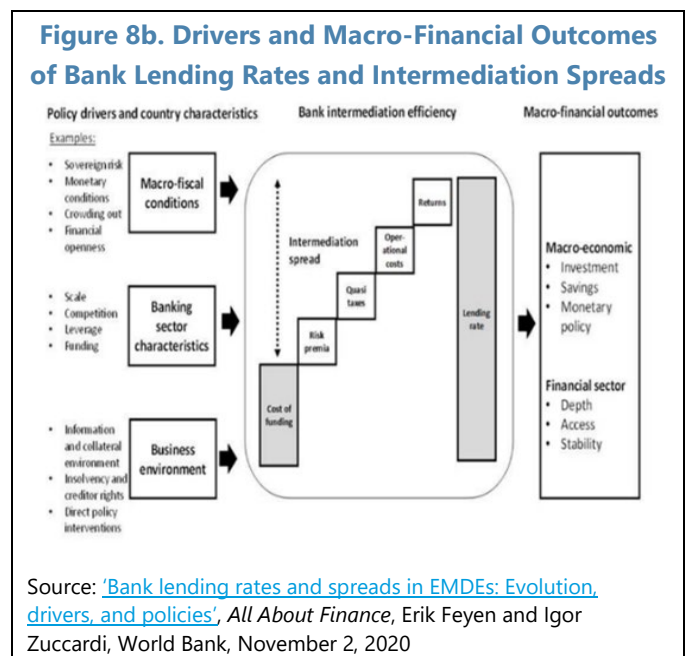
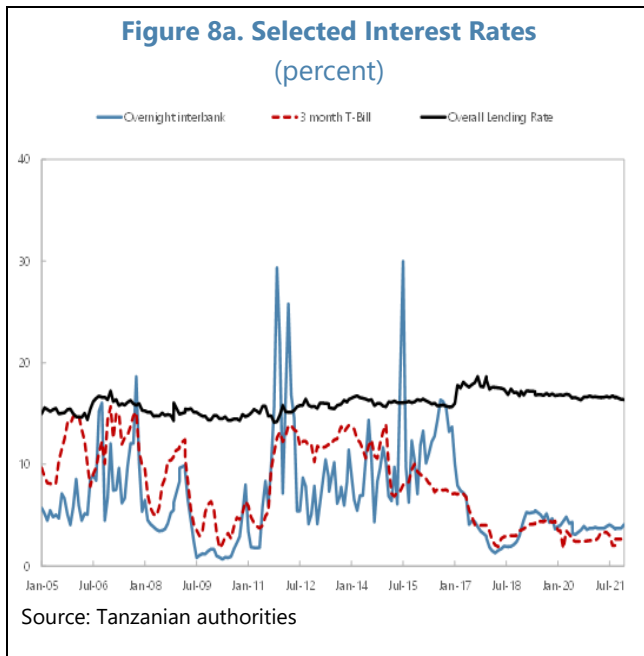
F. Conclusion

20. The authorities can take heart from the evidence presented by this study regarding the operation of the interest rate channel and the MTM in general as they make further progress in the transition towards using short-term interest rates as the operational target of monetary policy. As the Tanzanian authorities continue to progress the transition to an interest rate based monetary policy, the results of this study—highlight the potential role of interest rates as an operational target of monetary policy. Nevertheless, there remains much reform work to be done to strengthen the link between policy and market interest rates, revamp the monetary policy toolkit, and deepen the financial sector.

21. Going forward, the pending development of LNG resources in Tanzania (see Special Issues Paper on this subject) heightens the importance of an effective MTM, greater exchange rate flexibility, and a robust monetary policy operations framework. The forthcoming LNG project will likely complicate monetary policy in both the development (due for example to significant FDI flows) and exploitation (e.g. managing wealth and aggregate demand effects, as well as the implications of global energy price volatility).⁷ These considerations highlight the importance of ongoing financial sector reforms aimed at financial deepening and stability, transparent monetary policy and interventions, greater exchange rate flexibility (which will enhance the exchange rate

⁷ See IMF (2012), Kessy et. al, (2017) and Herdeschi et. al. (2021) for further information regarding monetary policy management and natural resources.

channel of monetary policy), and furthering the transition towards an interest-rate targeting monetary policy operations framework.



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