Technical Proposal for the Provision of Consultancy Services for the Construction of Business Cycle Indicators

Submitted to

Tanzania Revenue Authority (TRA)

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Table of Contents

1. Understanding of the terms of reference

1.1 Introduction

Business cycles are output fluctuations that involve movements in GDP overtime in alternating periods of expansion in economic activity (boom) and contraction in economic activity (recession). GDP/output being a base of tax revenue, business cycles are usually associated with fluctuations in tax revenue.

1.2 Comments on the Terms of Reference

In view of the fact that business cycles have a significant impact on tax revenue, the Tanzania Revenue Authority (TRA) intends to carry out a study that will involve constructing business cycles and linking them to revenue collection performance in Tanzania. The goal of carrying out this study is to enable TRA to monitor and track the developments in macroeconomic variables so that TRA can adopt measures that will cushion tax revenue from the adverse effects of swings in the economic activity (business cycles).

1.2.1 Specific Objectives

(i)   *Examine the nature, main features and causes of business cycles in Tanzania and the associated reasons for their occurrence:*

Two (2) main tasks will have to be undertaken to address this specific objective. These are:
(1) The first task will be to estimate and examine the trends and cyclic components of output (GDP), and other macroeconomic variables such as private consumption, investment, money stock, government expenditure, tax revenue, and the general price level/consumer price index (CPI) and the main characteristics of business cycles in Tanzania. Specifically, the following two issues will have to be addressed; namely:

a) Using the relevant time series filters such as the Hodrick-Prescott (HP) filter, and Baxter-King (BK) filter to estimate the trend/permanent and cyclic components of macroeconomic variables (including GDP, sectoral GDP, private consumption, government expenditure, imports, inflation, exchange rate and tax revenue); and examining their patterns, such as the volatility of fluctuations/cyclic components;

b) Identifying macroeconomic variables that are pro-cyclic (move together with output/GDP), and macroeconomic variables that are counter-cyclic (move in different directions with output/GDP) over the business cycle.

(2) The second task will be to identify factors that influence/cause business cycles in Tanzania. Normally, these factors (in the literature of business cycles) fall under two categories: (i) monetary factors, and (ii) real factors. In addition to identifying the factors that influence business cycles, the assignment will also have to carry out the assessment of relative importance of these factors in influencing business cycles in Tanzania.

(ii) ***Analyze economic sectors' behavior and sectoral revenue data and determine the more responsive sectors in terms of upward and downward movements as well as their impact on revenue***.

This objective requires examining the behavior of economic sectors (such as agriculture, manufacturing, services, mining etc); and examine how the sectoral performance influence tax revenue. More specifically, this objective will require the study to carry out the following:

a) Examine the sectoral performance (in terms of output) trends, and relative contribution of sectors to GDP;

b) Examine the sectoral performance over the business cycle. This will involve decomposing sectoral output into trend and cyclic components and examine the patterns of the components over time. In addition the study will have to measure the volatility of sectoral output fluctuations over over the business cycle.

c) Examine the extent to which tax revenue responds to movements in sectoral output in (ii) a) and ii) b) above.

(iii)   *Undertake   analysis of business cycles linking with tax revenue collections*.

This will involve examining how the tax revenue has been behaving over the business cycle over time. This will involve the following

a) Examining how tax revenue responds to long-term movements in GDP and sectoral output/GDP
b) Examining how tax revenue responds to short-term movements in GDP and sectoral output/GDP

(iv)   Prepare a model report on Tanzania business cycles linking with tax collection

This will involve coming up with a report, which among other things, will include a model linking tax revenue with business cycles.

2. Competence to Carry Out the Assignment

As a consultant, I clearly understand the terms of reference, and what is supposed to be done; and I have the necessary competence to carry out the assignment. I have the experience, expertise and skills in conducting similar studies.   My previous experience includes the following.

2.1 Experience
Business Cycles

(1) Business Cycles in Tanzania: A Monetary or Real Phenomenon? (2000)
   This research was carried out to fulfil the thesis requirement for my PhD in economics. The research involved among other things, examining the patterns of the business cycles in Tanzania in relation to stylized facts (regular patterns) of business cycles in the empirical literature of business cycles worldwide. The research also involved examining the factors that influence business cycles in Tanzania, and their relative importance in influencing the cycles.
   I have supervised one PhD student who has carried out and completed more or less a similar study for the East African Community countries.

Tax Revenue Studies

(2) Revenue Performance in Tanzania (with N. E. Osoro) Chapter 7 in G. D Mjema and B. A. T Kundy (Eds) *Managing Tax Regime in Tanzania: Experiences, Challenges and Lessons*

(3) Tanzania Revenue Authority (2009) "Capacity Determination of the Tanzania Revenue Authority and Zanzibar Revenue Board in Collecting Domestic Union Taxes in Zanzibar"

Similar Macroeconomic Studies

(4) Macroeconomic Convergence in the East African Community: Progress and Implications for the proposed Monetary Union

(5) Macroeconomic Convergence Policy in the Southern African Development Community (SADC): Prospects and Challenges (Carried out jointly with 4 other colleagues).

(6) Inflation and Economic Growth in Tanzania: A revisit (2012)

(7) The Effect of Inflation and Economic Growth in Tanzania (2000) (Carried out jointly with one colleague)

(8) Mathematical Analysis of the Impact of Real Exchange Rate on Output Growth and Inflation: The Case of Tanzania (Carried out with 2 other colleagues)

(9) Tanzania Trade Flows: Does Real Exchange rate Volatility Matter (Carried out jointly with 2 colleagues)

2.2 Expertise and Skills

2.2.1 Data Analysis Expertise

I have the expertise in data analysis, and particularly econometrics. I am conversant with econometric analysis, both from the point of view of theory and application. I have more than 10 years experience doing research involving application of econometric analysis. I have more than 10 years of teaching econometric theory and applied econometrics to MA and PhD students.

2.2.2 Data Analysis and Programming Skills

1) I am conversant with several statistical/econometric software packages such as RATS, EViews, Stata, and GRETL.

2) I am familiar with Gauss, R, and Matlab programming environments for

econometrics.

3) I am familiar with C and C++ programming languages.

3. Methodology

3.1 Literature Review
Both theoretical and empirical literature related to business cycles and the behaviour of tax revenue over the business cycle will be reviewed. The main aim of this review is to guide the choice of analytical techniques for carrying out the assignment.

3.2 Data collection
Secondary data will be used. Time series data for macroeconomic variables (including tax revenue) will be obtained from official publications (database kept) by the Bank of Tanzania (BOT), the National Bureau of Statistics (NBS), and Tanzania Revenue Authority (TRA). The International Financial Statistics (IFS) will be another source of time series data for the variables. Qualitative information will be obtained from the publications; and if necessary, from interviews with officials from the institutions.

IMF: World Economic Outlook

3.3 Data Analysis

3.3.1 Estimation of trend and cyclic components of variables
Standard filters such as the Hodrick – Prescott (HP) and Baxter King (BK) filters will be used to estimate the trend and cyclic components of the variables.

3.3.2 Econometric Analysis
Econometric analysis will be used to examine the factors that influence business cycles in Tanzania. This will also involve using Vector Autoregression (VAR) and particularly variance decomposition to determine the relative importance of factors that influence business cycles in Tanzania. Econometric analysis will also be used to examine the link between business cycles and tax revenue.

3.4 Software package:
R will be used for both estimation of business cycles and econometric analysis

3.5 Report Write Up
A draft report on Business Cycles and Tax Revenue in Tanzania will be written.

Upon receiving comment from the client, the final report will be written and submitted.

4. Estimated Number of Man-days for the Assignment

The assignment is estimated to take about 30 man-days. The breakdown of the number of days for each of the main task of the assignment is presented in Table 4.1 below.

Table 4.1 Estimated number of man-days for the assignment

Sn	Task	Number of Days
1	Preparation of inception report	6
2	Preparation of draft report	18
3	Preparation of final report	6
	Total man-days	**30**