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Terms of Trade Inquiry for the Resource Rich Sub-Saharan African Countries
Surajit Deb (University of Delhi (Aryabhatta College), India)

Introduction: The indicators of terms of trade (henceforth TOT), at the level of both sectors and international trade, are often perceived to bear significant macro-economic implications. It may be recalled that the TOT at the level of domestic sectors are defined by their relative price ratios, whereas the same at the level of international trade are expressed by the price ratios of exportable to importable. At the one hand, the TOT between agriculture and industry sectors has at times been visualized as a means of extracting surplus from agriculture during the early industrialization phase. On the other, the Prebisch–Singer hypothesis predicted that the price of primary commodities relative to that of manufactured commodities would decline in international trade causing the TOT for primary product based economies to deteriorate. The examination of both the hypotheses remains very relevant and bears the implications for improving upon the income and well-being levels of certain African economies that remained in poverty with stagnant growth for long.

Motivation and Objective: It has been the standard practice to accomplish the analysis of TOT between two sectors within a dual economy framework, where the economy is notionally bifurcated into agriculture and industry sectors. However, contemporary sectoral profiles of countries indicate that developing economies can no longer be represented in the terms of a dual economy. The growth experience in many countries has led to a structural transformation, whereby an increasing share of the GDP originates from service. In fact, the present-day slow-growing economies are better characterized by the features of unsustainable agriculture, stagnant industry but a growing service sector.

In this context, the objective of the paper is to put into application the TOT measurement within the system of national accounts (SNA) framework and examine the implications of formulating a multi-sector analysis of domestic TOT through case studies of ten resource-rich Sub-Saharan African economies, viz., Angola, Botswana, Congo (Republic of), Equatorial Guinea, Gabon, Nigeria, South Africa, Sudan, Tanzania, and Zambia. It may be noted that the proposed SNA methodology uses an accounting framework, which takes into account the entire economy and not just two notional sectors. The same methodology can be used to generate consistent and

comparable set of TOT estimates across the ten resource-rich economies of SSA on which there exists very little research work. The SNA framework of TOT measurement would use a uniform methodology and database to generate consistent and comparable set of TOT estimates, both from inter-sectoral and international trade.

Methodology: The multi-sectoral formulation of terms of trade (hereafter referred to as TOT) evolved in the works of Rasmussen [1957] and Olgaard [1966]. Subsequently, Bjerke [1968, 1972], Olgaard [1981] and Derksen [1980] have made use of this framework in the context of the Danish and Dutch economies. These studies, by employing the inter-industry transactions data within the SNA framework, have attempted to provide measures of income gains (or losses) accruing to different domestic sectors as a result of changes in the economy's relative price structure. These effects can be considered as the *"sectoral TOT effects"* on various domestic sectors in the economy. There are two different concepts of TOT effect, one that defines the TOT gain from a *production point of view* focusing on aspects of intermediate purchase, while the other focuses on TOT gain from an *income point of view* emphasizing final demand expenditures, as given below:

$$\text{Gain (Production)}_j \quad = \quad \frac{1}{P_{va}}\left[X'_{va.j}\left(P_{va.j} - P_{va}\right)\right]$$

$$\text{Gain (Income)}_j \quad = \quad \frac{1}{P_D}\left[X'_{va.j}\left(P_{va.j} - P_D\right)\right]$$

where:

$X_{va.j}$ = sectoral gdp of the j-th sector at current prices
$X'_{va.j}$ = sectoral gdp of the j-th sector at constant prices
$P_{va.j}$ = implicit price deflator for the j-th sector, i.e. $P_{va.j} = X_{va.j} / X'_{va.j}$
P_{va} = implicit price deflator for the economy, i.e. $P_{va} = \Sigma_j X_{va.j} / \Sigma_j X'_{va.j}$
P_D = price index of final demand (consumption plus investment)

It should be noted that the sum of TOT gains (income), i.e, Measure II, accruing to various domestic sectors will be equal to the nation's gain from international TOT change in foreign trade as follows:

Gains from International TOT = $(1/P_D) X_{va} - X'_{va}$
= $1/P_D (X_E - X_M) - (X'_E - X'_M)$

where, X_E and X_M indicate exports and imports in the economy, respectively, and X'_E and X'_M indicate deflated values using corresponding prices, viz., P_E and P_M.

Data Base: The basic data on total GDP and constituent sectors (both at current and constant prices) would be gathered from issues of *National Accounts Statistics*, brought out by United Nations (UN).

Policy Implications: Our results would provide some insights on the domestic terms of trade effect for the growing services sector or the impacts of international TOT change on their economies for these resource-rich SSA countries. The multi-sectoral orientation in this paper could suggest new insights on the role of TOT as a policy device. In the past, sectoral TOT have been discussed in the context of providing incentives during the early phase of growth and with respect to policies that affect the growth of agricultural sector. The TOT analysis disaggregated over the sectoral classification of SNA, allows us to examine whether the TOT incentives play a role in determining the growth prospects of the industry, infrastructure and service sectors of the respective economies.