

A Methodological Review of Measures of Productivity and Competitiveness

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Key Messages

No single measure of competitiveness. international competitiveness “as the level of the real exchange rate which in combination with the requisite domestic economic policies achieve internal and external balance”.

Competitiveness refers to a collection of factors, policies and institutions which determine the level of productivity of a country and that therefore determine the level of prosperity that can be attained by an economy.

Technology and Innovation positively influence productivity and competitiveness.

Introduction

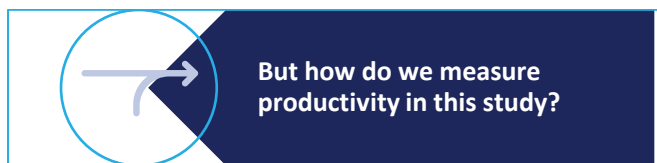


Productivity is commonly defined as a ratio of a volume measure of output to a volume measure of input use. While there is no disagreement on this general notion, a look at the productivity literature reveals very quickly that there are many different productivity measures. The choice between them depends on the purpose of productivity measurement and, in many instances, on the availability of data. Broadly, productivity measures can be classified as single factor productivity measures i.e., relating a measure of output to a single measure of input - or multifactor productivity measures i.e., relating a measure of output to a bundle of inputs. Another distinction of relevance at the industry or firm level is between productivity measures that relate some measure of gross output to one or

several inputs and those which use a value-added concept to capture movements of output.

In line with such classification, empirical studies have used Single factor productivity measures such as output or value added per worker or capital (see OECD, 2001) and multiple factor productivity measures such as total factor productivity (see OECD, 2001). Indeed, each approach has its own strengths and weaknesses. For instance, while single factor productivity measures such as value added or capital per worker are easy to measure and read, they are only partial productivity measures. Conversely, Multiple factor indices provide a relatively more accurate estimates of productivity although their measurement are relatively more complex and may require a significant amount of data. This is why our analysis of productivity

of the enterprise sector in Tanzania relies on more than one indicator.



Given data availability, our study uses Value Added Per Worker (VAPW) and Total Factor Productivity (TFP) to measure productivity of the enterprise sector in Tanzania. TFP was estimated based on the following Cobb Douglas production function.

$$Q = AL^{\alpha}K^{\beta} \dots\dots\dots (1)$$

Where Q is the total output, L is the number of workers (labour force) and A is the index of TFP. Applying logarithm on both sides of Equation 1, the following Equation 2 is also true.

$$\ln Q = \ln A + \alpha \ln L + \beta \ln K \dots\dots\dots (2)$$

Then we rearrange Equation 2 to make TFP the subject in the equation as follows (see Equation 3).

$$\ln A = \ln Q - \alpha \ln L - \beta \ln K \dots\dots\dots (3)$$

VAPW was calculated as the difference between total sales and costs of intermediate inputs divided by total number of employees of a firm.



Like productivity, there is no single agreed definition of **competitiveness** which implies there are multiple measures applied to the term and this creates confusion (Siudek and Zawajska, 2014). Nonetheless, the literature provides different approaches to measuring

competitiveness including Macroeconomic Approach, Business Strategist Approach and Technology and Innovation Approach. **Macroeconomic perspective** is based on the fact that exchange rate is a necessary instrument for achieving international competitiveness. It defines international competitiveness "as the level of the real exchange rate which in combination with the requisite domestic economic policies achieve internal and external balance". An appreciation of the real exchange rate is associated with a loss in a country's international competitiveness, while a depreciation of the real exchange rate implies an improvement.

Unlike the first approach which is based on economic grounds, the **Business Strategy approach** hinges on a business studies perspective, mainly advocated by Porter (1990) in addressing the issues of rivalries between firms and the strategies adopted by firms as they compete locally and internationally. Porter developed a "Diamond Model" in which he identified four interrelated factors necessary for sustaining competitiveness, these are: firm strategy, structure and rivalry, demand conditions, related supporting industries and factor conditions (key factors that are created e.g., skilled labour, capital and infrastructure). The government acts as facilitator in this model encouraging firms to become competitive and creating the environment that enables firms to increase productivity and become more competitive by improving the infrastructure and investing in education and engineering etc.

They defined competitiveness as "that collection of factors, policies and institutions which determine the level of productivity of a country and that therefore determine the level of prosperity that can be attained by an economy. However, productivity is also the key

driver of the rates of return on investment, which in turn determine the aggregate growth rates of the economy. Thus, a more competitive economy is one that is likely to grow faster over the medium to long term". Given its broad nature, many countries use this definition to compile composite indices on competitiveness that shows microeconomic aspects of benchmarking competitiveness against each other. Such indicators include the business competitiveness index (BCI) and the growth competitiveness index (GCI).



The Technology and Innovation approach

is rooted in industrial competitiveness in that it emphasizes role of FDI, learning, R&D in fostering competitiveness. It accentuates the role that enterprises must play in importing technology and the ability to learn it. The innovation and learning process necessitate interactions among different institutions within the National innovative system (NIS). This theory defines competitiveness as "the capacity of firms to compete, to increase their profits and to grow. It is based on costs and prices, but more vitally on the capacity of firms

to use technology and the quality and performance of products. At the macroeconomic level it is the ability to make products that meet the test of international competitiveness while expanding domestic real income." (Durand et al, 1992). Examples of measures under this perspective include the market share indicators (e.g. country's exports to the World export, or region) and the Manufacturing Export Competitiveness Index (see Vignes and Smith, 2005).

In this case, we used Unit Labour Cost (ULC) to measure firm competitiveness. ULC is an index which measures the ratio of labour compensation to labour productivity. It measures the labour costs incurred for each unit of output. We calculate ULC as follows

$$ULC = \frac{W_n}{Q_i/H_i} \dots\dots\dots (4)$$

Where W_n is the Nominal Wage per worker
 Q_i is the Gross Value Added in industry i and
 H_i is the number of hours worked or number of workers in industry i

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