COMPARATIVE ANALYSIS OF NIGERIA AND INDIA ESSENTIAL MACRO-ECONOMIC INDICES

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ABSTRACT

Bearing in mind the long standing relations between Nigeria and India, a comparative analysis of their 2008 SAM was undertaken in order to assess the relative strength of each country. To do this, the forward and backward linkages of the economies obtained from the technical coefficients were compared. In spite of the fact that per capita GDP of Nigeria is higher than India, it was found that Nigeria's GDP is dominated by import while that of India was dominated by private consumption expenditure. Nigeria's economy is still import dependent while the export sector is dominated by primary products like yams and oil and gas, making Nigeria vulnerable to external shocks. There are also wide disparities between the domestic demand of goods between Nigeria and India. Nigeria must reduce the importation of capital goods and increase investment spending on the public sector services for up to 45% of that of India in order to be at the present welfare level of India..

KEYWORDS: GDP, Forward integration, Backward Integration, GAMS, RStudio

INTRODUCTION

Social Accounting Matrix (SAM) originated with the work of Meade and Stone (1940), when a national account of the UK was first composed. Subsequently, a SAM of the UK was first composed by Stone (1962). It is thought that the SAM of developing countries was first composed around 1970 (Stone, 1977; Cicowiez & Sánchez, 2012).

A SAM is a comprehensive, consistent and complete datasystem that captures the various interdependence and linkages that exists within and between economic systems, typically of a country. According to Burfisher (2011), a SAM is a database that gives a logical framework of the visual display of all the transactions and circular flow (Fig. 1) of income and spending of an economy. The aggregation of the data in a SAM describes the macroeconomic behaviour of a country or region (Cicowiez & Sánchez, 2012). In addition, the linkages among agents/industries tend to show their demand for primary factor and intermediate inputs as well as the level of competition for the factors of production, notably land, labour and capital.

SAM has some unique features including being a square matrix and each agent (commodity, industry, land, labour capital, taxes, savings, investment, households, enterprises, government, rest of world) having a column and a row. The grand total of all the columns or rows is the country's GDP. The column is a record of the spending while the row gives the income of GDP. In addition, each cell of SAM simultaneously depicts expenditure and income by an agent. The column total is the total expenditure by each agent while the row total is the total income accruing to each agent implying that supply equals demand of the economy. However, SAM is neither a time series data nor does it explain the behavioural and technical relationships that generated its values (Burfisher, 2011; Cicowiez & Sánchez, 2012; Breisinger, Thomas & Thurlow, 2009).

The activity/industry column of SAM can be used to divide the economy into intermediate inputs and value-added to the economy. The value-added is further divided into factor payments, factor use tax, sales taxes and production tax. In addition, the activity column can be used to determine the input-output coefficients (I/O) of the economy, by dividing each cell by its column total. The I/O describes the intermediate input intensity or factor intensity. The economy is intermediate or factor intensive in the activity with the highest I/O. The I/O is then used to determine the backward linkage index (i.e. the sum of the coefficients of all intermediate goods used in the sector). In addition, from SAM, forward linkage index (the share of an industry's output that is used as intermediate inputs by other industries) of the economy is calculated (Burfisher, 2011).

The current independently prepared SAM for Nigeria is the 2006 SAM by Nwafor, Diao & Alpuerto (2010) which is a 61 sector/activities with the column and row beginning with activities account, followed by commodities account and thereafter accounts for the economic agent in the Nigerian economy. The SAM has 12 manufacturing sectors (such as beef, textiles, and wood products); 2 mining sectors (including crude petroleum and natural gas); and 13 service

sectors (such as building and construction, electricity and water, and hotels and restaurants). The SAM was built from various data sources, including but not limited to publications of the National Bureau of Statistics (NBS), the Central Bank of Nigeria (CBN), and the Federal Ministry of Agriculture and Water Resources (FMAWR). In addition, the earlier Nigerian SAM developed by UNDP in 1995 was also used and was balanced using the cross entropy estimation method (Keyzer, Merbis, van Veen, & van Wesenbeeck, 1996). On the other hand, the current Indian SAM is the 2012 SAM prepared by Pal, Pohit& Roy (2012). The compositions and details of the SAM which are aptly described by Pal, et .al. (2015) have 85 sectors i.e. agriculture (19), livestock products (1), forestry, mining (9), manufacturing (32), construction, electricity (3), biomass, water supply, transport (5), other services (12). Unlike Nigeria, India has a more consistent history of SAM development. In all, India has developed nine SAMs starting in 1981.

Nigeria-India relations have existed over time, both being members of the Commonwealth and have established diplomatic and bilateral relations. India established a diplomatic mission in Nigeria since 1958, even before Nigeria gained independence from Britain in 1960. Nigeria is the largest trading and largest market in Africa for Indian exports. Whereas India exports to Nigeria as at 2013 was valued about USD2.738B and on the increase, Nigeria's export to India was USD1.3826B and on the decrease (Anonymous, 2017). Currently, Nigeria is just coming out from some contraction of the economy which was triggered by the change of administration in 2015. As at 2016, the GDP of Nigeria was USD405,952M while that of India was USD2,256,397M showing that India's GDP is far higher than Nigeria, even historically (Fig. 2), but per capita GDP of Nigeria (USD2,183) was higher than that of India (USD1,704) (Anonymous, 2017a).

From the foregoing, it can be observed that, although the two economies are buoyant and in spite of the long standing relations, the balance of trade is clearly in favour of India. In view of this, there is need to understand, sector by sector, how Nigeria and India compares economically and to investigate possible reasons for the divergence, if any. It is also important to seek for lessons that Nigeria can learn from India in order to increase the export of Nigerian goods to India and possibly reduce imports. The natural questions to ask therefore are to what extent does Nigeria's GDP as well as forward and backward linkages in the economy compare to that of India. The objectives of this study, therefore, are to estimate the GDP, forward linkage and backward linkage of both countries and compare them with a view to

identifying the weak points of Nigeria which can be used to formulate policies that will engender increasing and sustained GDP using a common yardstick. It is hoped that the result of this study will be utilised by policy makers, researchers and the media to foster economic welfare of Nigerians.

METHODOLOGY

The data for this research is the 2008 SAM of Nigeria and India obtained from McDonald & Thierfelder (2004) and Badri & Walmsley (2008). The SAM is aggregated into 10 commodities/industries and five factors of production. The aggregated commodities/industries are Agriculture (AGR), Mining & Extraction (MXT), Processed Food (PFO), Labour-Intensive Manufactures (LIM), Capital-Intensive Manufactures (CIM), Utilities and Construction (UCO), Transportation & Communication (TCM), Private Financial & Other Services (PFT), Public Services (PSE) and Dwelling (DWE). The aggregated factors namely Land, unskilled labour, skilled labour, capital and natural resources are not a major focus of this paper.

In addition to the SAM, a structured table for analysing the SAM and obtaining various GDP metrics (domestic and export demand, import and export shares, commodity/industry shares in the import and export trade) was obtained from GTAP (2017). After the GDP was estimated with the structured table, then the individual cells in the 10x5 SAM were converted to input-output (technical) coefficients. From the input-output coefficients, the forward and backward linkage indices for the various sectors were determined (Burfisher, 2011). The intermediate demand of each sector of the economy was estimated using modified GAMS (GAMS, 2017) codes developed by Bayer (2000). The results were presented using bar charts. All the charts and graphs were rendered using RStudio and some r-packages (Allaire, et. al., 2017; R Core Team, 2017; Wickham, 2009; Neuwirth, 2014).

RESULTS AND DISCUSSION

The results of the various comparisons are presented in Fig. [3] - [13]. As can be observed in Fig [3] - [6], in the case of Nigeria and India, capital-intensive manufactures had the highest pull on the economies while public services exerted the least pull on Nigerian economy and dwelling exerted the least pull on the Indian economy (Fig.4). On the other hand, capital intensive manufacture (Fig. 3) still gave the greatest push to the Indian economy while in Nigeria; it is the utilities and construction that gave the greatest push to the economy. Expectedly, the largest difference between the linkage patterns of Nigeria

and India are dwelling for forward linkage and processed foods for backward linkage (Fig 5). In addition, Indian economy is far ahead of Nigerian public services and mining & extraction (Fig. 6). So if Nigeria were to focus on sectors that will bring immediate push to the economy, it should be public services, like roads, schools, power, health facilities which will definitely increase private consumption and hence stabilise Nigerian economy against external shocks.

The result in Fig.7 show that mining & extraction rules Nigeria's economy while agriculture and transport & communication rules India's economy. A similar trend is observed in Fig.8 where the major contributor to India's GDP is private consumption and the main contributor to Nigeria's GDP is exports. The implication of this will be discussed shortly.

Nigeria's domestic demand is agriculture and capital-intensive manufactures whereas India's domestic demand is agriculture, utilities, transportation & communication, all of which India has the internal capacity and technology (Fig. 9). In the agriculture sector of Nigeria, substantial amount of agricultural produce are imported (rice, wheat, sugar). Furthermore, Fig.10 shows that Nigeria is importing expensive finished goods whereas India is importing cheap raw materials which are then processed and exported again. Here investment in technology improvement through research and development activities is what is needed to catch up with India.

Nigeria's economy is almost entirely dependent on mining & extraction sector i.e. oil and gas (Fig. 11). And as can be observed further, the oil and gas are exported raw, making Nigeria's foreign exchange sector dependent on it. This phenomenon has not changed much even with the current drive towards diversification of the economy. What many Nigerians understand as diversification is primary agricultural production and exporting raw agricultural produce which will leave Nigeria in the hands of unstable foreign exchange earnings. What Nigeria can learn from India here is to export only finished goods and grow the technological base of the country through research and development. In Fig.12 it is observed that Nigeria is far more import-dependent than India and most goods imported to Nigeria are in the finished category (consumption expenditure), not raw materials (investment expenditure) that could be used to enhanced the economy.

The predominant sectors in Nigeria and India's export sector are common i.e. mining & extraction, labour-intensive manufactures and private financial and other services, although the mining (notably oil and gas) sector still rules Nigeria's export economy (Fig 13). This is a confirmation that most of Nigeria's exports are raw materials and not finished goods,

which do not help the internal strength of the economy against adverse shocks, especially from outside the economy.

The intermediate demand for goods and services by Nigeria and India follow similar patterns with the other measures (Fig. 14). However, Nigeria's demand is only higher than that of India in the labour-intensive manufacturing (LIM) and processed foods (PFO) sectors of the economy. This has further confirmed the low level of industrialisation in the Nigerian economy and the dependence on imports, particularly in the processed foods sector. Therefore, Nigeria needs to target its capital intensive manufactures through unprecedented increased funding of research and development activities.

The technical coefficients in Fig. 15 indicated that Nigeria's economy is heavily dependent on labour-intensive manufactures, processed foods as well as transportation and communication while India is Agriculture, capital intensive manufactures as well as utilities and construction. This is a further indicator that Nigeria needs to massively fund technology so that the benefit of scale economies can be derived with lower cost of production.

CONCLUSION AND RECOMMENDATIONS

The unique features of SAM makes it a strong candidate for comparing the economic performance of various countries, sector by sector, as was done in this paper for Nigeria and India. The goal of the comparison was to identify areas where Nigeria can learn from India how to improve performance and which sectors will present a greater pull or push towards sustainable developments and achievement of the 2030 agenda. The comparison was achieved by computing the forward and backward linkage indices through the technical coefficients of the various sectors of the economies.

The major findings indicate that in the case of Nigeria and India, capital-intensive manufactures had the highest pull on the economies while public services exerted the least pull on Nigerian economy and dwelling exerted the least pull on the Indian economy. The largest difference between the linkage patterns of Nigeria and India are dwelling for forward linkage and processed foods for backward linkage. In addition, Nigeria's domestic demand is agriculture and capital-intensive manufactures whereas India's domestic demand is agriculture, utilities, transportation & communication, all of which India has the internal capacity and technology. It is recommended that Nigeria should focus on increased funding of research and development as well as public services, like roads, schools, power, health facilities which will definitely increase private

consumption and hence stabilise Nigerian economy against external shocks.