



FORECASTING SUB-NATIONAL ECONOMIC PERFORMANCE: A PRODUCT SHOWCASE

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Introduction

→ Gross Domestic Product (GDP) is one of the most important economic variables. It is available for Nigeria as a country over a long period of time and has been useful in planning and decision making at the aggregate country level.

→ To further aid the process and success of decision making, it is crucial that GDP also exists at the sub-national level; but Nigeria does not have consistent GDP figures at the State level.

→ Although there are past attempts by few institutions to do so, such attempts are often directed towards meeting specific goals of these institutions.



Introduction Cont'd



➔ Meanwhile, in 2018 and 2019, the NBS published state level GDP for 22 states for the period 2013 to 2017, but estimates thereafter have been largely through individual state efforts, sometimes by collaborating with the NBS.

➔ For instance the NBS helped to validate the GDP computed by Lagos State for the period 2013 to 2021 and the same has been done with few other states.

➔ Since the most recent publicly available state level GDP ended in 2017 and it is only for 21 states and FCT, with Lagos added later, attempts are made in this Presentation to provide some recent estimates of GDP for Nigerian states.

Introduction Cont'd



- We have developed a methodology, using a model that has the capability to project the NBS estimates of 2013-2017 to the current period and beyond for each of the states.
- Specifically, State GDP are computed, i.e., Gross State Products (GSP). The growth rates of real GSP are also computed and compared among the various states.
- Note these are estimates to guide our understanding of the economies of these states and are useful to the extent that official data are not readily available for a particular period

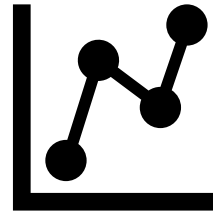
Objectives

- ✓ To fill the blanks for Gross States Product (GSP) estimates of the remaining 14 states.
- ✓ To forecast the Gross State Products (GSP) for 2021 to 2025
- ✓ To compute and forecast the States' growth rate
- ✓ To compute and forecast the per capita GSP
- ✓ To compute and forecast the GSP per capita growth rate for this period

Procedure Summary

- ✓ Identified variables that can help obtain the relative shares of respective States from the national GDP
- ✓ Such variables are selected based on their abilities to predict GSP values that are very close to the NBS estimates.
- ✓ Established the relationship between these variables and movement in GSP. Such relationships vary by states and their values serve as factors with which GSPs are derived from the variables.
- ✓ Disaggregated national GDP into GSP according to the trend in the selected variables and its relationship with the factors
- ✓ Obtained GDP forecast from reputable institutions (e.g. IMF, NDP -2021-2025, etc)
- ✓ Project GSP and its other derivatives

Assumptions



- Sum of GSP at time t must equal national GDP at time t .
- It is possible to obtain a set of indicators that can be used as factors to determine the relative shares of states in the national GDP.
- The relationship between the indicators and the National GDP remains constant.
- States that are contiguous or are nearest neighbours share the same ratio of share in GDP to share in indicator, γ_j .
- NBS estimates is a good underlying structure to build on.

The disaggregation equation is denoted as follows.

$$g_{j,t} = \gamma_j \cdot I_{j,t}^S \cdot G_t$$

$g_{j,t}$ is the GSP of state j at time t

γ_j is the ratio of a state's share in GDP to its share in indicator

$I_{j,t}^S$ is the share in indicator for state j at time t

G_t is National GDP at time t

A set of variable, i , is obtained to proxy the relative size of state economies

Many of such variables were experimented with, including; population, number of bank branches, banks credit and deposits, capital importation, value and number of Agricultural Credit Guarantee Scheme Fund (ACGSF) and number and size of Micro, Small and Medium Enterprises (MSME).

Few ones with the highest information content and explanatory power in a regression model were selected, such as VAT, IGR and 13% derivatives for the oil producing states

These indicators are then aggregated to derive a composite indicator of size, I .

$$I_{j,t} = \sum_{j,t} i_{j,t} \quad (1)$$

where $I_{j,t}$ is the aggregated indicator for state j at time t .

$I_{j,t}$ was smoothened using a 3-year moving average to remove any short-term fluctuations that may obscure the underlying trend.

$$I_{j,t} = I_{j,\bar{t}} \quad (2)$$

The share of indicator across the 37 states is therefore defined as,

$$I_{j,\bar{t}}^S = \frac{I_{j,\bar{t}}}{\sum_{j=i}^{37} I_{j,\bar{t}}} \quad (3)$$

Also, share of each of the 22 states + FCT's GDP from the NBS in the National GDP is,

$$G_{j,t}^S = \frac{g_{j,t}}{G_t} \quad (4)$$

Where $g_{j,t}$ represent the estimates from the NBS and G_t is the national GDP at time t .

The factor $\gamma_{j,t}$ is obtained as the ratio of a state's share in GDP to its share in indicator,

$$\gamma_{j,t} = \frac{G_{j,t}^S}{I_{j,\bar{t}}^S} \quad (5)$$

Since $\gamma_{j,t}$ varies with time, its average is computed as a constant,

$$\gamma_j = \frac{1}{t} \sum_t \gamma_{j,t} \quad (6)$$

Since it is impractical to compute $G_{j,t}^S$ for states that NBS has no GSP estimates for, our assumption that “States that are contiguous or are nearest neighbours share the same determinant factor” is then applied to γ_j for such states.

Therefore, the GSP for state j at time t is therefore defined as;

$$g_{j,t} = \gamma_j \cdot I_{j,t}^S \cdot G_t \quad (7)$$

Where the assumption that “the Sum of GSP at time t must equal national GDP at time t ” is violated, that is: $\sum_j g_{j,t} \neq G_t$

The balance (B) is distributed across the states in the proportion of their respective GSP estimates

$$\tilde{g}_{j,t} = g_{j,t} + \frac{g_{j,t}}{\sum_j g_{j,t}} \cdot B \quad (8)$$

Computing GSP at Constant Market Prices

The computation of GSP at constant prices requires data on GSP deflator at the state level.

Because this is not officially available, information on state-level Consumer Price Index (CPI) is therefore used to estimate state-level deflator at time t , ($d_{j,t}$) as shown below:

$$d_{j,t} = \frac{p_{j,t}}{p_t} \cdot d_t \quad (9)$$

where $p_{j,t}$ is the official all items CPI for state j at time t , p_t is the national all items CPI at time t and d_t is the national GDP deflator at time t .

Since the national (headline) CPI already has forecast value, say from the IMF, those of the States, $\hat{p}_{j,t}$, are projected for 2023 to 2025 by computing a ratio θ obtained as the average of each states CPI to the Average of National CPI for the period 2017 to 2021.

The States Deflator $\hat{p}_{j,t}$ is then obtained as follows.

$$\theta = \frac{\bar{p}_{j,t}}{\bar{p}_t} \quad \text{for } t = 2017, \dots, 2021 \quad (10)$$

$$\hat{p}_{j,t} = \theta \cdot p_t \quad \text{for } t = 2023, \dots, 2025 \quad (11)$$

where p_t is the national all items CPI at time t .

Therefore, GSP at constant basic price for state j ($\tilde{g}_{j,t}^c$) is computed as:

$$\tilde{g}_{j,t}^c = \frac{\tilde{g}_{j,t}}{d_{j,t}} \cdot 100 \quad (12)$$

Computing Other Derivatives of GSP

Real GSP Growth Rate (%), $\tilde{g}_{j,t}^c$

$$\tilde{g}_{j,t}^{cr} = 100 \cdot \frac{\tilde{g}_{j,t}^c - \tilde{g}_{j,t-1}^c}{\tilde{g}_{j,t-1}^c} \quad (13)$$

Real GSP Per Capita Growth rate

$$\tilde{g}_{j,t}^{pcr} = 100 \cdot \frac{\tilde{g}_{j,t}^{pc} - \tilde{g}_{j,t-1}^{pc}}{\tilde{g}_{j,t-1}^{pc}} \quad (14)$$

where $\tilde{g}_{j,t}^{pc}$ is the Real GSP per Capita computed by

$$\tilde{g}_{j,t}^{pc} = \frac{\tilde{g}_{j,t}^c}{P} \quad (15)$$

P is the National Population.

Per Capita GSP (\$'000)

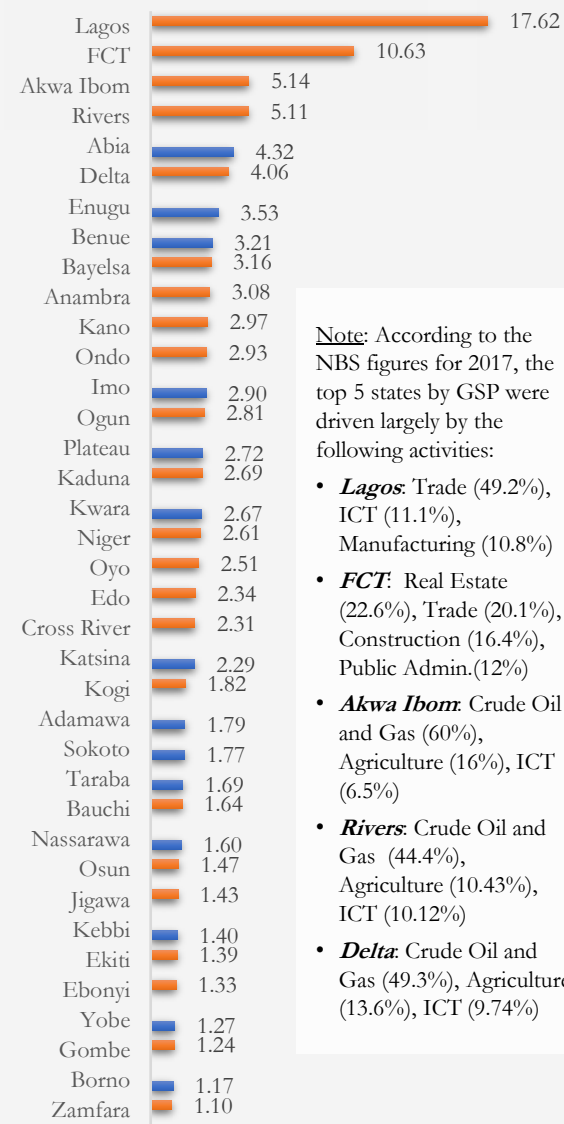
$$\tilde{g}_{j,t}^p = \frac{\tilde{g}_{j,t}^{pp}}{EXR} \quad (16)$$

where $\tilde{g}_{j,t}^p$ is the GSP per Capita computed by

$$\tilde{g}_{j,t}^{pp} = \frac{\tilde{g}_{j,t}}{P} \quad (17)$$

Output - Estimates of States' Economic Performance

Gross State Product (GSP) Estimates (N'trn), 2017

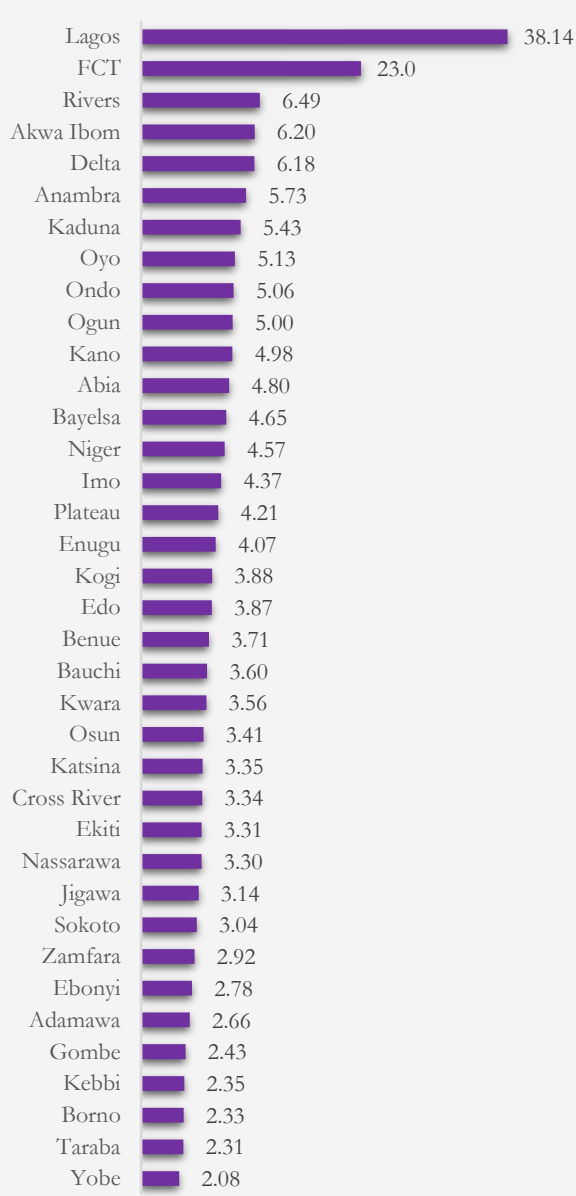


Note: According to the NBS figures for 2017, the top 5 states by GSP were driven largely by the following activities:

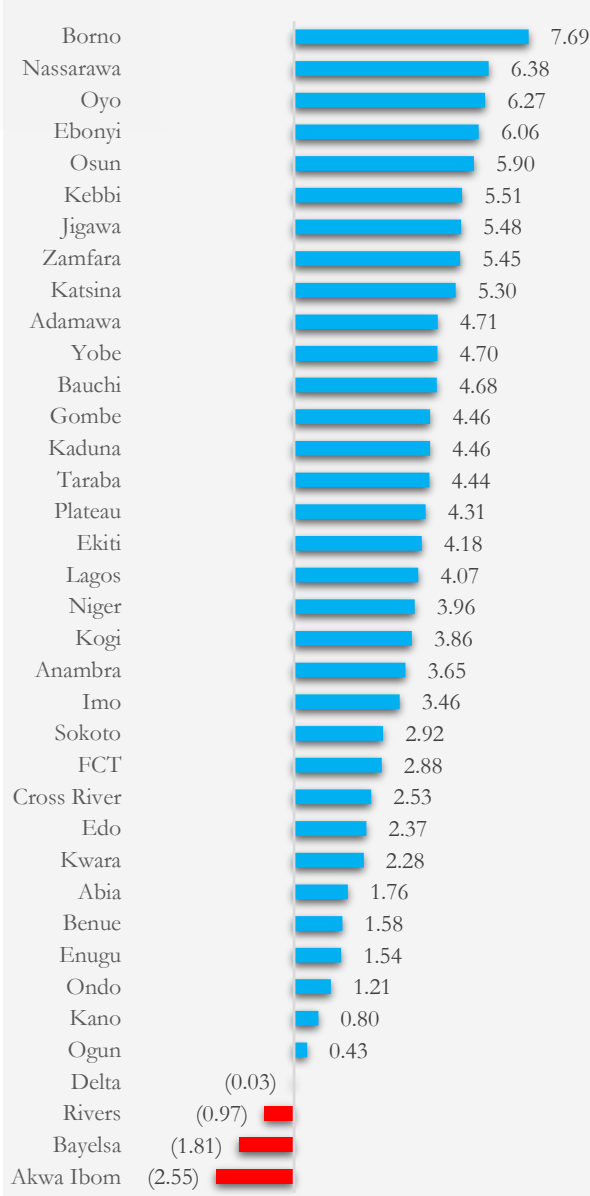
- **Lagos:** Trade (49.2%), ICT (11.1%), Manufacturing (10.8%)
- **FCT:** Real Estate (22.6%), Trade (20.1%), Construction (16.4%), Public Admin.(12%)
- **Akwa Ibom:** Crude Oil and Gas (60%), Agriculture (16%), ICT (6.5%)
- **Rivers:** Crude Oil and Gas (44.4%), Agriculture (10.43%), ICT (10.12%)
- **Delta:** Crude Oil and Gas (49.3%), Agriculture (13.6%), ICT (9.74%)

■ NBS Estimates of 21 States + FCT (2019) & for Lagos (2022)
■ ADSR Estimates of Omitted States

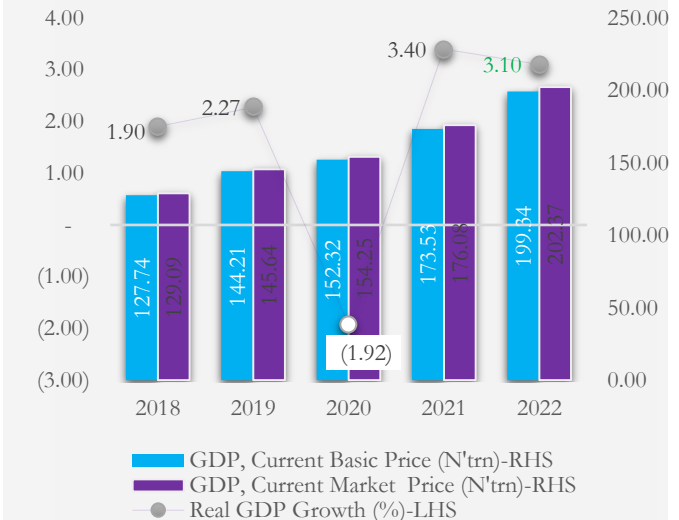
Gross State Product Estimate (N'trn), 2022



Real GDP Growth Rate Estimates (%), 2022



1a. Trend of Nigerian GDP (N'trn) and Growth Rate (%)



Insights

- In the NBS estimates for 2017, Lagos (N17.62trn), FCT (N10.63trn), Akwa Ibom (N5.14trn) and Delta (N4.06trn) were the top 5 states in GSP. ADSR estimates to fill in the blanks for states not included by NBS show Abia (N4.32trn), Enugu (N3.53trn) and Benue (N3.21) among the top 10 states in Nigeria by GSP.
- Estimates for 2022 shows Lagos (N38.14 trillion), FCT (N23 trillion) and Rivers (N6.49 trillion) leading other states, while Yobe (N2.08 trillion), Taraba (N2.31 trillion) and Borno (N2.33 trillion) as the least.
- In terms of the economic growth rate, measured by % change in real GDP, the economies of Borno (7.69%), Nasarawa (6.38%) and Oyo (6.27%) are estimated to grow fastest in 2022 while oil producing states of Akwa Ibom (-2.55%), Bayelsa (-1.81%), Rivers (-0.97%) and Delta (-0.03) grew least and actually contracted.
- Nigerian GDP at current basic prices increased from N127.74 trillion in 2018 to N199.34 trillion in 2022. GDP at current market prices increased from N129.09 trillion to N202.37 trillion over this period. The economy (real GDP) grew by 1.9% in 2018, contracted by -1.92% in 2020 and grew by 3.1% in 2022.

NIGERIA GROSS STATES PRODUCT FORECAST DASHBOARD

(2021 - 2025)

This Dashboard presents projections for each of the States of Nigeria on 3 main economic indicators of growth and citizens' welfare;

- a) Real GSP Growth Rate,
- b) Real GSP Per Capita Growth Rate, and
- c) Per Capita Nominal GSP in dollars.

The aim is to aid analysis, research and planning at the sub-national level. The estimates can be used where official statistics are not readily available or as benchmarks for estimates from other sources at the States' level. This version of the Dashboard (V2.1) presents the baseline estimates while the results of other possible scenarios as well as more information on the methodology and inputs into the forecasts are available on request.

[View Dashboard](#)

Thank You