The Nightmare of Estimating the National Accounts of a War Torn Country

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THE CASE OF LIBERIA

By

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Introduction

The first Liberian civil war was fought from 1989 until 1996. This civil war, which was one of Africa's bloodiest, claimed the lives of more than 200,000 Liberians and further displaced a million others into refugee camps in neighbouring countries. Entire villages were emptied as people fled. The war destroyed a once-viable economic infrastructure including the hydroelectric power system.

The second Liberian civil war began in 1999 and ended in October 2003, when UN and US military intervened to stop the rebel siege on Monrovia. By the end of the final war, more than 250,000 people had been killed and nearly one million displaced.

At the election of Liberia's first democratic President since the initial 1980 coup d'état of Samuel Doe, the new president, Ellen Johnson Sirleaf, was inaugurated in January 2006. After fourteen years of war, Liberians are ready for development of basic services on peaceful terms, particularly electricity and primary infrastructure. The economy is normal, with economic activities going on. An additional hurdle to economic recovery was achieved in December 2007 with the clearance of the country's very high level of debt arrears by multilateral organizations (World Bank, 2007a). Liberia remains today one of the poorest countries, with a level of per capita GDP of only US$130 in 2005 according to data from the latest African Development Indicators database (World Bank, 2007b). There is the need for an up-dated database on all economic activities in the post conflict economy.

The Department of Statistics, now Liberia Institute of Statistics & Geo-Information Services (LISGIS) conducted the first National Account Survey (NAS) in 1986. The results were published in December 1987. These results included all National Accounts indicators, tables and graphs. The data was used to rebase the national accounts to 1987.

The second attempt was made in the year 2001, but the results were not finalized due to poor response rate. Therefore, GDP figures were derived from administrative and other related records. Additionally, where there are no data, guesstimates were made.

Evidence of underestimation of published GDP estimates

There is evidence of a high level of underestimation of the published GDP estimates of Liberia. The following facts are proofs to this claim:

a) Published GDP estimate for 2008 is USD 919.9 million. This translates to a per capita GDP of USD 262.83. This figure is well below the poverty lines set by the two approaches for both rural and urban in 2007 using the results of the CWIQ survey. The first approach set the poverty line at USD 344.60 and USD 376.55 for rural and urban respectively. This puts the population below the poverty line as 63.8 percent. The second approach set the poverty line at USD 402.30 and USD 567.16 for rural and urban respectively. It is obvious that the per capita GDP for 2008 calculated from the published GDP is underestimated

b) Imports of goods and services for 2008 were 83.3 percent of GDP. This ratio is the highest in the ECOWAS sub-region. With the level of poverty and pace of development, the Import/GDP ratio looks overstated due to a lower GDP estimate. The question therefore is that, "are majority of Liberians living on food aid?" The import data disaggregated by SITC do not suggest so.
c) Tax revenue to GDP ratio was as high as 28 percent in 2008. A country with large informal sector, and having the lowest tax rate in the ECOWAS sub-region, who were taxed to achieve that revenue? The average for low income sub-Saharan African countries is 17 percent.

General observations of the current statistical system

1. There is no institutionalized mechanism for routine data collection for national accounts. As such there is no data base to compare the quality of data from different sources.
2. There is no documented methodological procedure for compiling national accounts. Therefore, it is difficult to review the compilation procedures for published estimates and compare with newly generated estimates to ascertain reasons for disparities.
3. There is no coordination between different divisions within LISGIS as well as different government departments in data collection. Therefore, data gaps in available statistics make it difficult to compile good national accounts
4. LISGIS does not have the human capacity to build a strong national accounts unit as well as the production of other economic indicators.

Data needed to rebase the national accounts

1) Data from routine surveys designed to collect economic data for the compilation of the national accounts.
2) Demographic data, showing the population in each socio-economic group, preferably more detailed information on sector (e.g. public, private formal, private informal etc.) and industry (e.g. agriculture, manufacturing, transport etc.) of activity.
3) A household budget survey, showing in particular consumption (purchased and own-produced).
4) Government fiscal data, which covers sources of public incomes (e.g. income tax, sales tax etc.) and incidence of public expenditures (e.g. wages and salaries, expenditure on education and health etc.)
5) Itemised balance of payments data from central bank statistics, covering i) import and export statistics; ii) factor payments like direct investment income (profit remittances); iii) current transfers including unrequited transfers; and iv) capital transfers

6) Other administrative data from the government ministries, departments, agencies and financial statements of public and private institutions.

Data available for the rebasing

Two important data collection activities occurred in 2007, namely, the Core Welfare Indicator Questionnaire Survey (CWIQ) and Economic Survey which listed all identifiable economic units in major towns in Liberia. The latter served as a sampling frame for the national accounts annual survey (NAAS) which was conducted in 2009. The national population and housing census was conducted in 2008 as well as an agriculture survey which concentrated on the input-output structure of crop production in the different counties. In 2009, a full scale agriculture census took off.

Other data available were on balance of payments, education, public finance, exports, output of selected commodities and financial statements of some large companies.

Problems identified with the census and survey data

Complete enumeration of some variables is always needed to obtain raising factors when totals of variables in a sample survey are required. In order to raise the survey value added to arrive at the national totals, value added per worker was to be raised using number of workers in that sector as recorded in the population census. Since value added per worker differs between employees in the formal and informal sectors for the same activity, workers classified by formal and informal should be used as the raising factors for the value added per worker. The 2008 population and housing census did not categorise employees as such, making it difficult to correctly raise the values to arrive at national aggregates.

The 2009 NAAS questionnaire followed the standard approach for surveys of this type. As informal enterprises do not typically keep business records, the survey depended totally on the ability of the operators to recall revenue and expenditure as well as field officers' ingenuity. The recall periods vary from one week to 12 months, depending on the expected frequency of the item in question. The questions also include the "number of months operational".

The use of short recall periods—although necessary—can create a problem. When two-week recall periods are used, it is quite possible that an accurate response could show that there were sales but little or no expenditure in the period—maybe purchases are typically made monthly—or even expenditure and no sales. Such extremes are possible, and if the sample size is adequate, such responses would cancel each other out. However, in this survey it is unlikely that the sample size for some activities is sufficient to cover these situations, so it is important that each response is closely checked for common sense at the time of enumeration. This, both enumerators and supervisors failed to do, leading to wide disparities between information provided by look-alike establishments.

Because of non-response by some large companies during the 2009 NAAS, a serious data gap existed. Though, for some of them, export data were available but information on their intermediate consumption was absent. Input-output ratios of Ghana were applied in such cases, but this may not necessarily reflect the true structure of industry in Liberia.

Rebasing the national accounts using available data

In national accounts compilation, the quality of the estimates depends very much on the source data available. This section covers how indirect methods can be used to estimate value added in the absence of survey and census data as well as financial statements. The following gives the summary of indirect methods used in arriving at value added based on the data available:

Crop production: Data on consumption from the 2007 CWIQ survey was used to estimate production of local staples rather than income from production for three main reasons. First, consumption is better measured in household surveys than income. Second, consumption is a better proxy of the well-being of the household as it provides a better picture of a household's standard of living. Third, in countries where majority of the population work in the informal sector, net income is very difficult to measure.

Though a lot of data were generated from the CWIQ survey, there were still serious data gaps that inhibited the use of "best practice" compilation approaches in national accounts. There was no information on intermediate consumption and trade margins, among others. Table 1 shows a draft computation of how the CWIQ survey consumption data was adjusted to arrive at production estimates.

Table 1: Estimation of total domestic production of food crops

Type of crop	Market value (Liberian $)	15% trade margin	Farm gate value	VA ratio*	Value Added (Liberian $)	Value Added (USD)
Plantain/banana	1,438,560,675	215,784,101	1,222,776,573	0.87	1,063,815,619	16,885,962
Cassava	3,303,234,439	495,485,166	2,807,749,273	0.83	2,330,431,896	36,990,982
Fruits	855,232,592	128,284,889	726,947,703	0.88	637,808,909	10,123,951
Local rice	20,279,260,951	3,041,889,143	17,237,371,808	0.79	13,617,523,728	216,151,170
Maize	270,467,161	40,570,074	229,897,087	0.82	188,515,611	2,992,311
Peas and nuts	1,037,273,398	155,591,010	881,682,388	0.91	802,330,973	12,735,412
Palm nut	4,046,435,582	606,965,337	3,439,470,245	0.84	2,904,814,197	46,108,162
Yam/potato	467,794,712	70,169,207	397,625,505	0.83	330,029,169	5,238,558
Vegetable	3,111,398,820	466,709,823	2,644,688,997	0.86	2,274,432,537	36,102,104
Total cash expenditure	**34,809,658,329**		**29,588,209,579**			**383,328,613**
Value of own consumption of crops produced			**24,248,556,425**		**19,398,845,140**	**307,918,177**
Total staples produced and consumed locally						**691,246,790**

* value added ratios are those used in Ghana for the 2004 SUT

Source: Author's estimation from the 2007 CWIQ

Output data on rubber, cocoa and coffee can be found only as export figures. It should be noted that total output within a period may not necessarily be equal to exports, if even local consumption is zero. These data were also adjusted using the intermediate consumption for Ghana as well as other costs in the supply chain.

Forestry: There is no consistent data on logging, as the central bank reports on round logs for some years and sawn timber for other periods. Sawn timber is a product of manufacturing, and a lot of adjustments have to be made before arriving at the volume and value of logs used in its production. This indirect estimate poses a problem since there is no information on the consumption of sawn timber locally.

The indirect method entailed estimating the average volume of wood wasted during sawmilling. This figure was used to adjust upwards the volume of sawn timber reported. Average price per meter of log was used to value the estimated volume of logs. The estimate was further adjusted to account for intermediate consumption.

The output of forestry is not just the logs harvested, but should also include a measure of stock change and hunting and gathering.

Livestock: In this industry, stock change is a very important component of output. There was limited data as the agriculture survey conducted in 2008 lack the details needed to build a livestock model, which is the best way of monitoring stock changes as well as estimating animal off-takes and by products.

Indirect estimates using consumption data from the CWIQ survey (purchased and own-consumption) were used for computing the value of the off-take. This was further used to estimate the stock change based on the ratios from the livestock model for Ghana.

Fishing: Like the other subsectors of agriculture, no reliable data on fishing was available. Only five establishments were covered under the 2009 NAAS, which was inadequate to make a good estimation. Moreover, the absence of data on sector of activity made it difficult to raise the survey values to national values. Therefore, consumption estimates had to be adjusted to arrive at total production. That is, the value of total consumption (purchased and own-consumed) on fish minus imports of fish equals total domestic production.

Manufacturing: Sources of data for estimating manufacturing output and value added was from the NAAS and financial statements of large manufacturing companies. Non-response was a major problem leading to under coverage of some activities. For example, only one establishment each was covered under distilling of spirits; sawmilling and planning of wood; and creative arts. Another problem was the raising factor.

For activities which had inadequate data, the following sources were used:

- Value of consumption of the commodity from the CWIQ
- Export values for export goods
- Flow of imported inputs

Construction: This sector is one of the most difficult areas in national accounts. Many construction materials are imported as are most capital goods. The commodity flow technique was used in estimating production. Building materials data was taken from import statistics as well as major local manufacturers. The cost composition of each input in construction was taken from the 2005 ICP construction survey.

Wholesale and retail: Data collected under the 2009 NAAS had a lot of reporting errors. The errors were confirmed when the NAAS data was compared with the cash purchases in the 2007 CWIQ. Therefore, cash expenditure for both frequently purchased and non-frequently purchased goods recorded in the CWIQ survey was used as the total output. Average marketing margins estimated in the NAAS survey, which was comparably close to that of Ghana's, was used to estimate value added.

Lessons learnt and recommendations

1) One of the important indirect uses of population census data in economic statistics is in raising survey figures to national estimates. So economic statisticians should make inputs in population censuses that can collect information that can be used as raising factors.
2) For countries where regular economic surveys are not possible because of lack of human capacity and financial constraints, some few questions to collect indicators on national accounts should be allowed to be incorporated on non-economic surveys, if possible.
3) Proper recruitment practices and adequate training and supervision are key to getting best results from fieldwork. Therefore, in estimating output of informal activities, field officers should be well trained in simple but detailed estimation procedures. Supervisors have to be comparing responses of look-alike businesses during field work for possible errors.
4) Data may be available from different sources but contain gaps and therefore unusable for computing national income. There should be a coordinated effort in data collection by all stakeholders.