**Lebanese Republic**

**Presidency of the Council of Ministers**

Central Administration of Statistics

# Quarterly GDP: sources and methods

*Beirut, February 2020*

## Section A. Introduction

This document provides a detailed description of the data sources and compilation methods used by the Central Administration of Statistics (CAS) to estimate gross domestic product (GDP) on a quarterly basis. It is intended to supplement and update the publication *National Accounts of Lebanon: Data sources and compilation methods (2011)* in which the 2011 benchmark and subsequent annual sources and methods were described.

The sources and methods used to compile quarterly estimates of GDP are very similar to those used in the former annual system. The benchmark estimates, based on a Supply Use Table (SUT) which provided a comprehensive picture of the structure of the economy in 2011, are extrapolated in a systematic way using quarterly indicators of value and volume. The annual estimates are obtained by summing the four quarterly estimates in each year. The difference is that annual data sources may not be available for some months after the end of the year. Until then, some temporary quarterly indicators or projections are used. When the annual data becomes available, the quarterly estimates are revised to align with the annual ones so that, when the four quarters are added up, they result in the same annual numbers.

GDP is calculated according to the production approach. Gross value added (GVA) is estimated for each activity both at current prices and at previous year's prices. To the sum of these numbers, estimates of taxes less subsidies are added to give GDP at market prices. (Previous years' prices are used for aggregation purposes, to ensure that growth rates reflect up-to-date relative prices.) As will be seen from the description below, many assumptions are made in the absence of more comprehensive accounting data. The estimates are made at minimum cost. They do not rely on any regular surveys of private enterprises. Nonetheless, the Lebanese estimates are more reliable than in many countries, where estimates may be based mainly on survey data that tends to be unreliable in small economies.

Activity in small economies such as that of Lebanon tends to be more variable than that in large ones. Growth can be more rapid and contraction more acute. The quarterly statistics can be volatile and should be used with caution. Seasonal effects are less stable which makes adjustment less reliable and subject to revision. For this reason, the numbers presented in the release focus more on the latest 12-month period than on the latest quarter. Comparisons are made, not with the previous quarter but with the same period in the previous year.

This document is arranged as follows. First the sources and methods used for a majority of activities is described in Section B. This is the standard methodology. The sources and methods used for the other activities are set out in Section C. Finally, the sources and methods for calculating the taxes and subsidies are given in Section D.

## Section B. Standard sources and methods used for a majority of activities

GVA is defined (at both current and previous year's prices) as the difference between total output (TO) and intermediate consumption (IC). The latter is the value of goods and services at the time they are consumed to produce the output.

The economic activities for which the sources and methods are described in this section are shown in box 1. There are four stages of calculation for each activity.

***Box 1: Activities estimated according to the sources and methods described in Section B***

- Manufacturing, except tobacco (8 categories)
- Water supply & waste management
- Commercial trade
- Transport (except air)
- Hotels & restaurants
- Information services
- Professional services
- Administrative services
- Private health services
- Other services

### *1 Total output at current prices*

Sales data are used as indicators of total output at current prices for the specified activities. (In theory output differs from sales by the extent of changes in work-in-process and stocks of finished goods, ignored as a small timing difference.) The source is the system of VAT returns made by over 40,000 enterprises every quarter. Aggregate data classified by ISIC are received from the Ministry of Finance every quarter, showing both taxable and non-taxable sales among other variables. The sales data are aggregated to the level of main activities (see box 1).

Separate details are also received for traders making a VAT return for the first time, and when they were first registered for (other) tax purposes. This information is used to adjust the overall sales data to take account of the increased coverage of the VAT system. The adjusted data, in the form of indices of value relative to 2011, are used to extrapolate the total output of each activity as measured in the benchmark year. It may be noted that the benchmark included an estimated value of production by the informal (non-observed) sector of the economy, businesses not registered for VAT. Implicitly, this sector is assumed to follow the same trend as the adjusted VAT data.

Wholesale and retail trade is a special case, in that the output is defined as the margin added by traders not the full value of the sales. In other words, it is the difference between their sales and the cost of the goods sold. For each of 18 types type of trader, the mark-up or percentage margin is assumed to be the same as in the benchmark SUT.

### *2 Total output at previous year's prices*

Within each year, quarterly output is measured according to the prices of the previous year as follows. For each of the specified activities, the total output at current prices is deflated by price indices (deflators). The source of information for the deflators is the monthly consumer price index (CPI) compiled by CAS. The detailed item-level CPIs (classified according to purpose) are regrouped according to the national accounts classification of products and activities and combined at this level using CPI weights. When a new base year is introduced in the CPI, the indices are linked to form continuous series. Average quarterly indices are calculated and then re-referenced to the benchmark year 2011 (=100). They are further combined into activity groups using weights based on the 2011 SUT.

The next step is to deflate the total output at current prices, dividing by the derived price indices. The resulting indicators of the output volume are re-referenced as constant price series at the price level of an arbitrary year. To obtain the average relative price levels in each previous year, the annual aggregates of both current and constant prices are obtained, and the ratios found. These annual ratios for each previous year are used to convert the constant price series into quarterly estimates at previous years' prices.

### *3 Intermediate consumption at previous years' prices*

To determine the level of intermediate consumption in volume terms it is assumed that it changes in the same proportion as the volume of output. If a lorry travels twice as far, it needs twice as much fuel, irrespective of the price. In reality it is not so simple, but this assumption is widely used in many countries, especially in the short term, as more accurate estimates depend on large amounts of data and highly sophisticated methods.

So IC at the prices of the previous year is estimated in two steps. First, using current prices, the input-output ratio (the ratio of intermediate consumption to total output) for the whole previous year is calculated. This ratio is then applied (in the current quarter) to the output at previous year's prices. The calculation of the ratio is an iterative process, starting from the benchmark estimates. This method is the standard way and is used for all activities.

### *4 Intermediate consumption at current prices*

Intermediate consumption at current prices is not a readily available statistic for most activities. It differs from purchases by changes in inventories and also possible changes in valuation. Where no data are available, the approach used in Lebanon is to reflate the IC at previous years' prices to the prices of the current quarter.

The reflation factors are calculated as follows. First the total supply of goods and services is calculated at current and at previous years' prices by adding together the corresponding estimates of total output to those of imports. (Imports in value and volume are derived from Customs data. The data are transformed into national accounts categories). The deflators obtained by dividing current prices by previous years' prices reflect price changes in the various products used as intermediate consumption by the various activities. The 2011 SUT includes an IC matrix in which the cost structure of every activity has been estimated. For each activity, this cost structure is used as weights to combine the product deflators into reflation factors appropriate to the IC of each activity. Except where estimates of IC are available from a source (see Section C), this method is used for most activities.

## Section C. Sources and methods for other activities

In this section the data sources and compilation methods are described for those activities for which those described in Section B may not apply (total output especially). These activities are listed in Box 2.

***Box 2: Activities estimated according to other sources & methods, described in Section C***

- Agriculture
- Mining & quarrying
- Tobacco manufacturing
- Electricity
- Construction
- Triangular trade
- Air transport
- Financial services
- Real estate
- General government
- Private education
- Domestic services

### *Agriculture*

In the absence of estimates of production from the Ministry of Agriculture, for the last several years CAS has obtaining data from a commercial source. The data is provided annually and covers the volume and value of crop and livestock production in more than 60 categories. The data enables estimates to be for production in each quarter of past years, but for the latest year projections are made on the basis of past performance. These are therefore subject to revision when new annual data are received.

Estimates of total output at both current and previous years' prices are derived from these data. The estimates of IC are based on input-output ratios from the benchmark and calculated as in Section B.

### *Mining and quarrying*

In the absence of direct information, benchmark estimates for quarrying are extrapolated using the value and volume of construction output. The volume indicator is rescaled into TO at previous years' prices in the standard way. Estimates of IC are made in the standard way.

### *Manufacturing of tobacco products*

Annual (and from 2019 quarterly) profit and loss accounts of the Régie du Tabac provide the data for total output and intermediate consumption at current prices. These were interpolated to obtain quarterly estimates until the end of 2018. Estimates of TO at previous years' prices are obtained using the CPI for tobacco products as the deflator as in Section B. IC at previous years' prices is also derived in the standard way. But IC at current prices comes directly from the data.

### *Electricity*

Annual profit and loss accounts of Electricité du Liban (EdL) are used to obtain the total output and intermediate consumption at current prices for each year. Total output is measured at basic prices, that is excluding taxes on products but including subsidies. EdL is considered to receive a subsidy which in the national accounts is calculated by the difference between the total costs of production and the sales.

Monthly data are available on the output of EdL in millions of KWHs. A quarterly volume indicator of total output is derived from this data. A current price indicator is derived by multiplying the volume indicator by the CPI for petroleum products. This indicator is "benchmarked" to the annual total output at current prices to give the quarterly estimates. Quarterly intermediate consumption at current prices is obtained by applying the annual input-output ratio (projected in the absence of the annual accounts) to the quarterly total output at current prices. IC at previous years' prices is derived in the standard way.

No regular information is available about privately produced electricity. The demand for it is modelled by applying "exponential smoothing" to the quantity of electrical appliances imported. For current prices the volume is multiplied by the price index of private electricity from the CPI. Given the extrapolated total output at current prices, the estimates are derived in the standard way described in Section B.

### *Construction*

An indicator of the volume of construction output is estimated from data on cement deliveries and the quantities of imports of construction materials. For current prices the value indicator is derived by multiplying the volume index by an index of construction prices. Estimates of intermediate consumption at both previous years' prices and current prices are derived in the standard way set out in Section B.

### *Triangular trade*

The quantities of transhipments are provided by the Ports Authority are used as a proxy for the volume of triangular trade (part of the wholesaling). Values are derived by multiplying the volume indicator by the overprice index for imports (excluding petroleum products). The estimates of IC are derived in the standard way described in Section B.

### *Air Transport*

Standard methods are used except that the quarterly VAT data are "benchmarked" to the annual sales data from MEA.

### *Financial services*

In the case of commercial banks, total output is made up of financial intermediation services indirectly measured (FISIM) and other services for which a charge is made or from which a margin is derived. According to international standards, FISIM is to be measured by comparing the interest rates payable on deposits and those receivable on loans with a "reference" rate. However, in Lebanon, the result is unusually sensitive to the choice of reference rate, and in 2011 it was decided to continue using net interest as a proxy for FISIM. Net interest is the simple difference between interest received and interest paid, formerly known as the imputed bank service charge. Further consideration is being given to this issue.

Aggregate data from the annual profit and loss accounts of the commercial banks are provided by the Banque du Liban (BdL). These data provide annual estimates of total output and intermediate consumption. Annual accounts are also available for other types of bank. However, these data are only available several months after the end of the year concerned.

From 2015 onwards, quarterly data has been assembled from quarterly reports published by a few large banks and supplemented by annual data from others where available. Quarterly indicators of the value of FISIM (net interest) and other output thus obtained are "benchmarked" to (aligned with) the existing annual data. Annual input-output ratios are used on a quarterly basis (and projected in the absence of annual data) to obtain estimates of IC at current prices.

Data on insurance activity are available in the quarterly and annual reports published by the Insurance Control Commission. These sources provide the output (essentially the administration costs) at current prices. IC is available annually and the input-output ratios are interpolated and projected to provide quarterly estimates in current prices.

The estimates for both banking and insurance are deflated using the all items index of the CPI as a measure of general inflation. The standard procedure is used to convert volume indices into output at previous years' prices. IC at previous years' prices is also derived in the standard way.

### *Real estate*

Estimates for real estate combine information at current prices from the VAT system (deflated by an index from the CPI for a volume indicator) with the assumed number of households (a volume measure) reflated using the CPIs for rent and imputed rent (for values). Otherwise the estimates are derived in the standard way described in Section B.

### *General government*

This heading covers three "non-market" activities: public administration, including defence and social security; public education services; and public health services. Output of non-market activities is calculated as the sum of the costs of production. These costs include intermediate consumption (IC), compensation of employees (CoE: wages, salaries and benefits) and the consumption of fixed capital (CFC: effectively the depreciation of fixed assets). Other expenditures such as interest, subsidies, and on fixed assets are not included.

The source of data annually is the *Public Finance Annual Review* published by the Ministry of Finance from which the estimates of IC and CoE are obtained. Summary data for every month become available in the *Fiscal Performance Report* and the *Monthly Bulletin of Personnel Cost* and are used to produce quarterly indicators which are the "benchmarked" to the annual data. The CoE for public administration and for education at current prices are

deflated according to the estimated increase in wage rates when they occur. Public health output is limited to IC as there are no employees involved in this activity.

CFC at current and constant prices is calculated annually using a simple perpetual inventory method based on historical data on fixed capital formation by government. It is interpolated and projected quarterly and allocated as a whole to public administration.

Intermediate consumption plays no part in the calculation of non-market GVA, as it is used to calculate total output and then subtracted again to obtain estimates of GVA. For completeness it is included in the estimation system and deflated using the total supply price indices weighted by the SUT cost structures of the type used for reflating the IC of other activities.

### *Private education*

In volume terms, total output is based on the number of students at each level weighted by the 2011 level of fees per student. For current prices, price indices of education fees from the CPI are used to convert the volume indicators into a value indicator. For intermediate consumption estimates, the standard methods of Section B are used.

### *Domestic services*

Except for domestic services, other services are estimated using the standard methods of Section B. However, for domestic services the number of work-permits issued for domestic workers from abroad is used as an indicator of volume. Price indicators from the CPI are used to convert the volume series into values. Otherwise standard methods are used.

## Section D. Sources and methods for taxes and subsidies on products

### *Taxes on products*

The details of taxes falling on products are available in the Ministry of Finance *Annual Report* while the monthly totals are shown in the *Fiscal Performance Report*. The taxes concerned include Customs duties, excise duties, passenger departure tax and VAT. Revenue from telecommunications is also treated as a tax on products in the national accounts. Adjustments may be made to reallocate telecoms revenue to the periods in which they accrued.

Using annual ratios, the taxes are divided between those that fall on imports and those relating to local production. (Taxes that fall on imports are part of GDP although the values of the imports themselves are not.) To derive estimates at constant prices, taxes on imports of each product group in 2011 are extrapolated by quarterly volume indices derived from Customs data. VAT falling on local production is deflated by the implicit GVA deflator (GVA at current prices divided by GVA at the prices of the previous year.) The total output of telecoms at constant prices provides a volume indicator for telecoms revenue and the number of departing passengers provides a volume indicator for the corresponding tax. These indicators are rescaled to the prices of the previous year in the standard way.

### *Subsidies*

The losses incurred by Electricité du Liban are treated as subsidies on the product. The corresponding volume indicator is the output in millions of KWHs.