

National Accounts Manual

Sources and Methods

Ghana
Statistical
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CHAPTER ONE

INTRODUCTION

1.0 Overview

National Accounts provide a comprehensive, conceptual, and accounting framework for analyzing and evaluating the performance of an economy. National Accounts are designed to account for all economic transactions and its compilation draws data from several sources. These sources consist of administrative data and data collected directly through censuses and sample surveys conducted by National Statistical Offices (NSOs). The underlying concepts and methodology of compilation is the System of National Accounts 2008 (2008 SNA).

Currently, Ghana produces and publishes annual Gross Domestic Product (GDP) by production and expenditure approaches and quarterly GDP by the production approach.

Both the Annual GDP and the Quarterly Gross Domestic Product (QGDP) adopts the same principles, definitions, and structure. QGDP constitutes a system of integrated quarterly time series coordinated through an accounting framework.

The purpose of this document is to provide a detailed description of the procedures, data sources, coverage and methods used in the compilation of the national accounts estimates of Ghana. This document first outlines the general procedures used in the GDP compilation and then goes on to explain the data sources and compilation methods used for the individual industries and activities. The annual GDP estimates of Ghana have been rebased from base year 2006 to new base of 2013 using the 2013 Supply and Use Table (SUT).

1.1 The National Accounting Framework

Gross Domestic Product (GDP), and its components, is one of the major economic indicators that the Ghana Statistical Service (GSS) produces. The GSS has further adopted the 2008 SNA recommendations for compiling GDP estimates, and International Standard of Industrial Classification Revision 4 (ISIC Rev.4) was used to classify the country's economic activities.

1.2 Measuring GDP

Three approaches can be used to calculate GDP:

The production approach: This method calculates what each separate producer adds to the value of final output (value added), by deducting intermediate consumption from gross output. Value added is summed for all producers.

The income approach: This method directly measures the incomes received by the owners of the factors of production. These represent the returns to the labour and capital employed such as wages, salaries, and profits.

The expenditure approach: This method sums the values of all final demands, including final consumption expenditures (of households, government and non-profit institutions serving households), gross fixed capital formation, changes in inventories, and net exports.

Theoretically all these approaches must produce the same result. Like all statistical estimates, these will contain errors and omissions that are usually reconciled.

The two GDP approaches currently being used in Ghana are:

The production-based GDP (GDP-P)

The expenditure-based GDP (GDP-E)

The GDP is estimated both in current and constant prices.

Current Prices measure GDP/ inflation/asset prices using the actual prices noticed in the economy. Current prices make no adjustment for inflation.

Constant prices adjust for the effects of inflation and enable to measure the volume change in output (and not just an increase due to the effects of inflation).

Table 1: GDP Series by Approach

	Current Price Series	Constant Price Series
Annual	Production Expenditure	Production Expenditure
Quarterly	Production	Production

Data Sources

Several data sources are incorporated in compilation of the benchmark estimates. The main datasets that were used in developing the 2013 benchmark estimates included: the 2012/2013 Ghana Living Standards Survey (GLSS6), Integrated Business Establishment Survey (IBES) 2013, Income Tax Data, the survey of informal transportation among others.

Routine data available for annual GDP compilation include data from administrative sources, Value Added Tax (VAT) returns from the GRA. Other administrative sources are the Ministry of Agriculture, Forestry and Fishery Statistical Declaration, Forestry Commission, Minerals

Commission, National Insurance Commission, Bank of Ghana and Ghana Ports and Harbours Authority among others.

Various statistical and administrative data sources are used in annual national accounts compilation. Table 1.1 shows the lists of the data sources used in compiling GDP by both the production and expenditure approach:

Table 1.1: Main data sources used in compiling GDP

No.	Name of the data source	Prod.1	Exp.2
1	IBES	X	X
2	Value Added Tax declaration (VAT)	X	X
3	External Trade	X	X
4	Consumer Price Index	X	X
5	Production Price Index	X	X
6	Construction cost index (CCI)	X	X
7	Export prices Index	X	X
8	Minerals Commission	X	X
9	Agriculture, Forestry and Fishery Statistical Declaration	X	X
10	Expenditure and income of General Government	X	X
11	Revenues and expenditures statements, quantities, prices of Electricity and Water supply	X	X
12	Profit and loss account of Bank of Ghana	X	X
13	Quarterly profit and loss account of commercial banks	X	X
14	Quarterly profit and loss account from non-banking monetary institutions	X	X
15	Balance of Payments		X

Classifications

Classifications are essential for the production, compilation and dissemination of statistics. The statistical classifications are updated continuously to better reflect the economic, technological and structural changes in the economy and to enable comparison across countries in the world.

Classifications used in national accounts are:

1. International Standard Industrial Classification of All Economic Activities Revision 4 (ISIC Rev 4);

¹ The data source is used for the production approach to GDP.

² The data source is used for the expenditure approach to GDP.

2. Central Products Classification (CPC 2);
3. Classification of Individual Consumption by Purpose (COICOP);
4. The Classification of Government Expenditure by Function (COFOG); and
5. The Classification of Fixed Assets.
6. Balance of Payment Manual 6
7. Harmonized System (HS 2012)
8. International Standard Classification of Education (ISCED 1997)

Rebasing and Revision of National Accounts Statistics

Rebasing of national accounts is the update of the old base year to a new and more recent base year. Over time, various changes take place in the economic structure of a country, including changes in relative prices of various commodities. This requires a revision of national accounts compilations to incorporate such changes.

Internationally recommended best practice that is undertaken in many countries ideally every five years. The reasons for rebasing are varied and include among others:

- Capture structural changes in the economy
- Adopt new compilation methods and new classifications
- Availability of new or improved data
- Revision Policy

The estimation of GDP in Ghana is done in stages depending on available data and progressively termed as provisional, revised, and final. The first publications are the provisional estimates.

The main causes of revisions are as follows:

Incorporation of additional and improved data: Most revisions reflect the incorporation of a wider range of data. In particular, some data that were not available at the release date are incorporated through revisions into subsequent releases.

Reconciliation of quarterly and annual measures: The process of reconciling the quarterly measures with the annual measures can lead to further revisions. The quarterly measures of these series are based on a smaller range of data than the annual measures.

Benchmarking

Quarterly benchmark

Benchmarking is the reconciliation of high-frequency quarterly data that track short-term dynamics in the economy with more accurate and detailed annual GDP estimates. This is done

using a Microsoft Excel add-in (XLBPM) developed by IMF's Statistics Department to assist compilers of quarterly national accounts statistics.

Annual benchmark

Supply and Use Table (SUT)

The System of National Accounts (SNA) contains a wide range of macroeconomic indicators. One of the most important indicators is Gross Domestic Product (GDP) which is estimated by different approaches. Each method is based on a different view of the economic system, using different indicators and offering in this way an overview of logical relationships within the national system.

Supply and use tables are an effective statistical tool serving primarily as a balancing framework that reconciles the GDP estimation by the three approaches (Production, Expenditure and Income) and find the most accurate result, checking consistency and completeness of statistical data. In theory, the different approaches should produce the same result however in reality they may generate different results. A definitive GDP estimation can be accomplished after the process of balancing and adjustments.

The SUT framework provides a detailed description of production process but also the commodity flows in economy. While the commodity flow approaches and product balances are applied at individual product (or group of products) level, the SUTs integrate the product balances of all individual products (or group of products) in matrix framework to present a coherent picture of supply and uses of both the individual products and the whole economy.

The system of SUT is set up by two main tables, supply and use table.

The supply table shows the supply of goods and services by type of product in economy for a given period of time. It consists of the production matrix which in itself is divided into two main parts: by the domestic production and imports of goods and services, the matrix of transport and trade margins and the matrix of net taxes (taxes less subsidies on products).

The values of the domestically produced products and import in the supply table are shown initially at basic prices then they are transformed to purchasers' prices in the final columns, where for each product, the net taxes on products (taxes less subsidies on products), trade and transport margins are added. This transformation of supply from basic prices to purchasers' prices is done to have balanced supply and use at the same valuation system, at purchasers' prices.

The use table shows the use of products by domestic industry and by the final demand, i.e. consumption by households, general government and non-profit organizations serving households (NPISH), capital formation (GFCF) by enterprises, general government and households, changes in inventories and exports. The use table shown by column the input structure of each industry and

describes in the rows the use of different products and services. The use table also shows the components of gross value added by industry.

Ghana Statistical Service (GSS) compiled the consolidated Supply and Use tables (SUTs) for the base year 2013. The annual benchmark GDP 2013 estimates have been derived from a fully balanced SUT.

The compilation of supply and use tables (SUT) in Ghana includes the components of the production and expenditure approaches to estimate GDP.

Data sources

The compilation of supply and use tables aggregates requires the most detailed data sources information and various types of adjustment are made in order to meet the SUT framework format and classification.

1. The main data sources used for the SUT 2013 are the following:
2. Industrial Business Economic Survey 2013, GSS
3. Annual financial statements of enterprises, Ghana Revenue Authority (GRA)
4. Value Added Tax data, GRA
5. Financial sector data, Central Bank of Ghana (CBG)
6. Balance of Payment, GBG
7. Import and Export of goods, GRA
8. Ghana living standard survey, GLSS 2013, GSS
9. Ministry of Food and Agriculture
10. Ministry of Fishery and Aquaculture
11. Electricity production, transmission and distribution companies
12. Statement of Government Operations, Ministry of Finance
13. Ghana National Petroleum Corporation

Classifications

The main classifications used to describe goods and services by products and industries by activities in the SUT are:

1. International Standard Industrial Classification, ISIC Rev.4
2. Central Product Classification (CPC) 2.1
3. Other classifications used in national accounts:
4. Classification of Functions of Government, COFOG
5. Classification of Individual Consumption by Purpose, COICOP
6. Classification of the purposes of non-profit institutions, COPNI
7. Harmonized Commodity Description and Coding System, HS

Balancing Procedure

The balancing procedure for each commodity is such that the supply data on production and imports are matched with the corresponding data on intermediate and final use. The initial large statistical discrepancies are removed in a manual balancing process. For the balancing of supply and uses, it is very important to evaluate the quality of data sources. The estimates with almost strong information are excluded from the stage of manual balancing and they are not adjusted. The second stage is an automatic balancing process when the credible (plausible) economic pictures have been defined for all economic components. In the end a balanced, consistent SUT is obtained for all industries (columns) and commodities (rows).

Key Findings

The Supply Table derived Gross Output measured at basic prices of 213,403 million GHC while the Use Table showed a total intermediate consumption of 95,090 million GHC which is measured at purchasers' prices. The difference between output and intermediate consumption gives gross value added at basic prices of 118.314 million GHC. By adding net taxes on products valued at 6,164 million GHC, the resultant Gross Domestic Product measured at Market Prices was 124,478 million GHC.

In regards with the supply table structure at purchases prices, domestic production represents 81.0 % of the total, while the imports represent 16,7 %. The goods represent 52.1 % and services 47.9% of domestic production. Imported goods constitutes 81.6 % of total imports, while services 18.3 %.

The structure of the use of disposable goods and services is presented as follows: 36.1 % was used for intermediate consumption in production processes, 63.9 % was used for final consumption of households, governments, gross fixed capital, and exports. Goods represent 73.9 % of total uses while services 26.1%.

CHAPTER TWO

METHODOLOGY OF GDP COMPILATION - PRODUCTION APPROACH

2.1 Introduction

The compilation process of GDP by production approach can be summarized in two steps. In the first step gross value added at basic prices is estimated as the difference between output at basic prices and intermediate consumption at purchases prices. In the second step taxes on products are added and subsidies on products are deducted to arrive at the gross value added at market prices.

Financial Intermediation Services Indirectly Measured (FISIM) are allocated by user industries and sectors. As a consequence, the intermediate consumption of each economic activity includes FISIM as well.

2.2 Broad industry groups

Industry groups for GDP are combined to form the following broad groupings, based on the UN's International Standard Industrial Classification (ISIC) Revision 4:

Agriculture (Crops, Livestock, and Forestry & logging and Fishing)

Industry (Mining and Quarrying, Manufacturing, Electricity, Water supply, sewerage, waste management and remediation activities, and Construction)

Services (Wholesale and retail trade; repair of motor vehicles and motorcycles Transportation and storage, Accommodation and food services, Information & communication, Finance and insurance activities, Real estate, Professional, administration and support service activities, Public administration, defense and compulsory social security, Education, Health and social work activities, Other personal services activities).

In addition to the above industrial groupings there exists an 'unallocated' category, which includes taxes on products and import duties.

When measuring the GDP, national accounts statisticians focus on considering all productive activities, more specifically, on measuring value added generated in the production process exhaustively. This means that the value added generated in the non-observed economy is also measured and included on GDP estimates. To ensure exhaustiveness of GDP estimates, GSS compile and include the estimates of informal economy in the GDP figures. IBES and GLSS data are used for the estimation of informal economy which comprise 29.2% of total GDP.

2.3 Data sources and methods used for each industry group

The activity classification used for presentation of the GDP estimates is the ISIC Rev.4. The main groups of this classification are given below and are discussed in detail in subsequent sections.

1. Agriculture, forestry and fishing
2. Mining and quarrying
3. Manufacturing
4. Electricity, gas, steam and air conditioning supply
5. Water supply, sewerage, waste management and remediation activities
6. Construction
7. Wholesale and retail trade; repair of motor vehicles and motorcycles
8. Transportation and storage
9. Accommodation and food service activities
10. Information and communication
11. Financial and insurance activities
12. Real estate activities
13. Professional, scientific and technical activities
14. Administrative and support service activities
15. Public administration and defence; compulsory social security
16. Education
17. Human health and social work activities
18. Arts, entertainment and recreation
19. Other service activities
20. Activities of households as employers; undifferentiated goods-and-services-producing activities of households for own use

2.3.1 Crops

2.3.2 Introduction

This section covers the cultivation of crops and animal natural resources, comprising the activities of growing crops, raising and breeding of animals, harvesting of timber, and other plants, animals or animals' products from a farm or their natural habitats

2.3.3 Coverage

Growing of food Crops and Cocoa. Food crop estimate covers twenty-seven different crops categorized into cereals, root tubers and starchy, leguminous, vegetables and fruits. These crops are the cereals: maize, rice, millet and guinea corn/sorghum; the starchy crops: cassava, cocoyam, yam and plantain, the legumes: groundnuts and beans; oil seeds: soya beans, oil palm, and shea nut, vegetables and bulbs: okra, tomatoes, garden egg, onion, shallot, pepper; and fruit

Statistics Research and Information Directory (SRID) provides information on crop production and crop budget obtained from an extensive annual sample survey of farming in all sixteen regions using crop cutting and field measurement approaches to obtain crop yield, area under cultivation for each crop in the year, cost of production and wholesale price of the various crops grown in Ghana. Ghana Cocoa Boars (COCOBOD) provides data on major season and minor season output of cocoa production based on cocoa purchased during the seasons and the annual purchasing price of cocoa as announced in the crop year.

2.3.4 Estimation GVA at Current Price

The gross value output at current price of the various crops in the annual estimates is obtained by multiplying the produced quantities of the crop concerned by its respective wholesale price obtained from SRID.

To obtain quarterly output of crops, the crop budget supplied by SRID is used to derive quarterly ratios which in turn is used to determine the output of crops in each quarter of the year based on the crop output in the calendar year. The ratios are determined based on the total input cost of producing a particular crop in each quarter after adjusting for rent of land which is a non-produced asset. This is done for all the crops including cocoa.

The intermediate consumption of the respective crops is obtained using the input/output ratio for each individual crop in the 2013 Supply and Use Table. The GVA of crops is the sum of the differences between the GVO of each crop and their respective individual intermediate consumption.

$$GVA = \sum_{i=1}^n (a_i - b_i); \text{ where}$$

a_i = GVO of crop i ; for example maize, rice, soya beans, or cocoa and

b_i = intermediate consumption of crop i .

2.3.5 Estimation of GVA at Constant Price

The GVA at constant prices is derived as the difference between GVO at constant price and IC at constant price

To arrive at GVO at constant prices, output of each crop is valued at wholesale prices of the base year and the input/output ratio is applied to the GVO at constant price to get the IC. The GVA is derived by deducting the intermediate consumption from GVO.

2.3.6 Cocoa production

The data on cocoa production is provided regularly by COCOBOD, which bases its estimates on the current levels of purchases and past patterns during the two crop seasons. The major crop season is from October to March, while the minor season is from July to September. The annual

production per calendar year is estimated as the sum of the year's minor crop plus half of the two major crops at the beginning and the end of the calendar year. Thus, for the year 2013
$$\text{Output} = M_{2012/2013} + M_{2013/2014} + m_{2013},$$

where M=Major season

m=Minor season

The producer price is used to value the output of this activity. No provision has been made to account for changes in the size of the plantations and changes in stocks of cocoa beans under gross fixed capital formation.

2.3.7 Estimation of GVA at Current Price

The current price estimates are obtained by multiplying the production figures and producer prices. The intermediate consumption value derived like other crops by using input/output ratios from the Supply and Used 2013 table. The GVA of Cocoa is then derived by deducting the intermediate consumption from its GVO at current price.

2.3.8 Estimation of Cocoa GVA) at Constant Price

The GVO at constant price is compiled based on the production quantities of the cocoa of each year valued at the producer prices of the base year. The input output ratio of the cocoa production is then applied to the GVO to obtain the intermediate consumption for the cocoa production for the year. The difference between the GVO and the intermediate consumption for the cocoa production for the year gives the Cocoa GVA for the year under consideration.

2.4 Livestock Production

2.4.1 Sources of data

The main source of information for livestock is the Animal Health and Production Department of the Ministry of Food and Agriculture. The information is largely limited to the population of the livestock by main species, that is, cattle, sheep, goat and pigs, plus poultry. For the purpose of calculating livestock output, the activity has been divided into animal husbandry and poultry farming.

2.4.2 Animal Husbandry

Although slaughtering data is also provided by the Ministry of Food and Agriculture and Ghana Abattoir Company, that of the ministry is limited to the animals inspected by veterinary and environmental health inspectors only, while that of the Abattoir is likewise limited to those who use their services. This forms a very small proportion of the total number of animals slaughtered in the country. In order to improve upon the slaughtering estimates, a simple demographic model

was constructed that uses the annual livestock herd size provided by the Ministry of Food and Agriculture as control totals, while reasonable assumptions³ on animal death and birth rates are used to obtain the number of domestic animals slaughtered during the year. Imported animals are added and the total number of animals slaughtered is obtained.

2.4.3 Estimation of GVA at Current Price

The output of livestock activity consists of two segments, namely the change in the size of the herds of livestock and the value of animals sold for slaughtering (or exports, if any). It must be noted that slaughtering is an industrial or manufacturing activity and that the value added generated from this activity is not to be included in agriculture. The output of both components of the livestock activity is derived from a livestock model. The difference in the size of the herd at the end and beginning of the period is also the basis for the increase in the value of herds, which is output, capital formation and change in inventory⁴.

The valuation of the herd as well as the slaughtered animals is taken as half the retail value of the meat produced from these animals. This value is used for both the slaughtered animals and the increase in herd.

To derive the gross value added from the livestock sub-sector, deductions have to be made for the costs of feed and medicines provided for the raising of livestock. The normal practice for feeding cattle, sheep and goats is to allow them to graze in pasture land, farmland or forest-land. Little concentrates or food grains are fed to these animals. Cost of production as a percentage of gross output for cattle, sheep/goats, and pigs is determined separately to be 0.12, 0.22, and 0.05 respectively.

The gross value added from animal husbandry is calculated by subtracting the cost of production or inputs from the gross value of output.

³ *The parameters have been adapted from the livestock model used in Sudan, where substantial research has been conducted in this area given that livestock is a major export item. While regional variations will exist, the general framework and the order of magnitude of the parameters are applicable in a wide range of circumstances.*

⁴ *Breeding stock and draught animals are to be allocated to capital formation, while the increase in the stock of other animals is allocated to changes in inventories. In practice, this distinction is difficult to make and all changes are treated as capital formation.*

2.4.4 Estimation of GVA at Constant Price

Constant-price estimates are obtained by measuring the change in the number of animals slaughtered and the increase in herd sizes for each of the four main species from year to year. Due to the non-availability of livestock prices, the retail prices of meat of the base year in the Consumer Price Index are used as an approximation for the livestock production. GVA is extrapolated with the volume index of the GVO for each type of livestock.

2.4.5 Poultry

The data on poultry production is also obtained from the Animal Health and Production Department of the Ministry of Food and Agriculture. This includes birds' population and price. The estimated number of poultry in the country is also provided by the Animal Health and Production Department of the Ministry of Food and Agriculture. As the life cycle of poultry is short, the demographic model for the main types of livestock, which is annual, cannot be used for the estimation of poultry slaughtering. Moreover, data relating to the number of eggs produced and their utilization and the estimated number of birds killed for meat purposes is not available. However, the book entitled, "Poultry Health" by Dr. S. N. Appiah of the Veterinary Laboratory Kumasi (1993), has estimates of:

1. The proportion of layer-birds as a percentage of the total poultry population;
 2. The average number of eggs laid per layer-bird per annum;
 3. The percentage utilization of eggs; and
 4. The mortality rate of birds.
5. Using this information, it was possible to estimate:
6. The total number and value of eggs produced;
 7. The number and value of eggs retained for table purposes;
 8. The number of eggs hatched and their wastage; and
 9. The number of birds killed for meat purposes.

2.4.6 Estimation of GVA at Current Price

The Animal Health and Production Department of the Ministry of Food and Agriculture provides data on birds' population and price for each year. Out of this and with the help of ratios derived from Dr. Appiah's work (1993) mentioned above, the number and value of mature layers, eggs laid, eggs used for consumption, chicks hatched, chicks imported, birds killed and increase in stocks were estimated along with the mortality rate.

The total gross output from poultry farming is calculated by adding the estimated value of eggs consumed, the value of birds killed, and the value of change in stock of birds together.

These are the costs of feed and medicines provided for the raising of poultry. The normal practice for feeding poultry is to provide concentrates or food grains. Thus, in the case of poultry farming,

adequate feeding arrangements are made. Following Dr. Appiah's (1993) work it was possible to estimate the cost of feed per bird per annum to be 35 percent of total value of output. These rates were adopted to estimate the total feed requirement for poultry in Ghana.

The gross value added from poultry is calculated by subtracting the cost of production from the gross value of output.

2.4.7 Estimation of GVA at Constant Price

The gross value added at constant 2013 prices from poultry is calculated by extrapolation of the GVA with the volume index of poultry gross value of output.

The value added of all livestock is the sum of value added from poultry and animal husbandry.

2.5 Forestry, Logging, Hunting and Gathering

Forestry and logging cover the conservation and development of forests, for example forest plantations; logging and gathering of forest products such as berries and mushrooms and hunting.

2.5.1 Coverage

The economic activities considered include forestry and logging.

Forestry

The activities covered under forestry include timber tracts; planting, replanting and conservation of forests; gathering of uncultivated materials, such as gum and resins, wild rubber, saps, barks, herbs, wild fruits, and flowers, leaves, reeds, needles, firewood cutting and charcoal burning carried out in the forests.

Logging

Logging comprises: the felling and rough cutting of trees; hewing or rough shaping of poles, blocks, bolts and other wood materials; and transportation of logs up to permanent lines of transportation from where these can be transported by rail or road.

2.5.2 Source of data

The Forestry Commission of the Ministry of Lands and Natural Resources is the principal source of forest statistics in Ghana.

2.5.3 Estimation of GVA at Current Price

For the purposes of evaluating output from forestry and logging, data on the following areas are collected:

1. Logs processed into wood products for export;
2. Domestic market consumption of wood products;
3. Fuel wood consumption;
4. Forest plantation investment;
5. Wildlife products;
6. Forestry services.

The gross output is calculated by multiplying production (in quantity) and the corresponding average price for the year for all the output listed above and summed up to obtain the total value of gross output.

The inputs under this economic activity refer to operational costs and expenditure on repairs and maintenance carried out in forestry and logging activities. Using details from earlier estimations, the total value of cost of production is taken to be 41.3 percent of the value of output.

The cost of production is deducted from the gross value of output to arrive at the gross value added.

2.5.4 Gross Value Added (GVA) at constant prices

The constant price estimate of the value of output is obtained by multiplying the quantity of output by the base year (2013) price. Volume index of output is used to extrapolate the GVA of forestry.

2.6 Fishing

Natural stocks of fish with an economic value are assets and the same considerations apply to them as to other natural resources.

Fishing is commonly used to describe the various activities involved in the harvest of aquatic resources

2.6.1 Coverage

The scope of the fishing sub sector includes:

1. Marine fishing: commercial fishing in ocean, coastal and offshore waters;
2. Freshwater or inland fishing: catching, taking and gathering of freshwater fish from rivers, lakes, dams, ponds etc.; and
3. Aquaculture.

2.6.2 Sources of data

The principal source of information is the Fisheries Commission. In the base year, data is also obtained from the Economic survey (IBES) and a fishing survey on landing sites along the coast of Ghana. The data collected include:

1. The total catch of marine fish by large fishing vessels and canoes (artisanal, offshore),
2. The catch of inland water fish; and
3. The average prices of fish (marine, inland and aquaculture).

2.6.3 Estimation of GVA at Current Price

The value of output at current prices of marine fish is estimated as the total volume of fish catch multiplied by the average current prices.

Input costs, operational costs and repairs and maintenance forms 51 per cent of the value of gross output from the supply and use tables, 55% for inland fishing and 60% for aquaculture.

The gross value added is estimated as the difference between intermediate consumption (IC) and the gross value of output.

2.6.4 Estimation of GVA at Constant Price

For estimates of the value of output at constant prices, the quantity of the fish catch for each year is valued at the base year price.

The volume index of output is used to extrapolate the GVA at constant prices. IC is estimated as the difference between output and GVA.

2.7 Mining and Quarrying

The mining and quarrying sub sector includes the extraction of minerals that occur in nature as solids, liquids or gases. It covers underground and surface mines and quarries with all supplemental operations for dressing and the beneficiation of ores and other crude minerals such as breaking, milling, washing, cleaning, grading, etc and other preparations needed to render the material marketable by the establishment. All these activities are covered to the extent that they are carried out at the mine site or up to the first point of sale. Salt production by solar evaporation of sea water is considered under the mining sector. Large expenditures on preparing mining sites, prospecting and drilling activities are not included here as they are included under the 'construction' sector.

2.7.1 Coverage

The sub sector is divided into the following components:

1. Minerals: gold, diamonds, bauxite and manganese;
2. Quarrying and salt mining;
3. Crude oil and gas production.
4. Mining support services (core ore, crude and gas)
5. Crude Oil Production and Oil Related Activity

Extraction and production of hydrocarbons; crude petroleum and natural gas includes the extraction and production of bituminous or oil shale and tar sand to obtain crude oils; and extraction of condensate by draining and separation of liquid hydrocarbon fractions, gas desulphurization and mining of hydrocarbon liquids.

Quarrying and Salt Mining

Quarrying and salt mining consist of crushing and breaking of limestone, gypsum and anhydrite, extraction and dredging of industrial sand, sand for construction, breaking and crushing of stone and gravel, quarrying of sand, phosphates, and magnesium etc.

Minerals: Gold, Diamonds, Bauxite and Manganese

The minerals sector comprises mining of Gold, Bauxite, Diamond and Manganese.

Mining Support Services

Mining support services consist of support services to core ore mining and support services to crude petroleum and gas extraction. the activities in this section include support services through traditional prospecting methods such as taking core samples and making geological observations as well as drilling , directional drilling ,test drilling or redrilling, spudding in , derrick erection in situ, repairing and dismantling for oil wells, metallic minerals in addition to building oil and gas well foundations, cementing oil and gas well castings, cleaning, bailing and swabbing oil and gas well, draining and pumping mines, overburden removal services at mines but exclude service activities performed by operators of oil or gas field, specialized repairs of mining machinery, liquefaction and regasification of natural gas for purpose of transport done off the mine site and geophysical , geologic and seismic surveying.

Sources of Data

Ghana National Petroleum Corporation (GNPC) provides data on the monthly production of crude oil and gas, oil well development and exploration cost. The Bank of Ghana provides exchange rate and unit value prices of crude oil export.

Business turnover (VAT) data obtained from the Ghana Revenue Authority (GRA) are used for the compilation of estimates on the quarrying and salt mining sub-sector and extrapolation of the mining support services activities.

The Minerals Commission provides consolidated quarterly and annual production data on all the major minerals and Bank of Ghana provides the export price per unit of each type of mineral.

The industrial section of Ghana Statistical Service provides the Producer Price Index used as a deflator for all the various sub-sectors within the mining and quarry sector.

2.7.2 Estimation of GVA at Current Price

The estimates of gross value output (GVO) for the minerals is calculated by multiplying production (in quantity) by the corresponding average export price in US dollars for all the products including crude oil and gas. The exchange rate of Ghanaian cedis to the dollar for the year or quarter is then used to convert the gross value of output into local currency (cedis)

Gross value of output for the quarrying subsector is obtained from the integrated business survey for the base year and extrapolated for the subsequent years using the VAT data. This is then added to the gross value of output of the year for the other minerals to obtain the total value of gross output for the mining and quarry sector. Intermediate consumption is derived using the input/output ratio and the GVO of the respective minerals estimates. This is then deducted from the GVO of the respective mineral to derive the GVA at current prices.

The GVO and IC of crude petroleum and Gas is estimated using the same approaches since the gas is a byproduct of the extraction of oil petroleum in Ghana. The GVO crude petroleum extracted annually or quarterly is obtained by multiplying the volume in barrel extracted by the export price in US Dollars and converted into cedis using the exchange rate of the period under consideration but that of gas is obtained using the agreed price per million standard cubic feet (mmscf) of 2.90 US dollars. The IC of crude petroleum and gas is then taken to be the respective proportion of production cost of obtaining the volume of crude petroleum and gas produced for the year or quarter adjusted for the personnel income. The GVO and IC in cedis is obtained using the US dollar to Cedis exchange rate and the GVA obtained by deducting the IC in cedis terms from GVO in cedis.

The value of output and the IC at current price of the Mining Support Services sub sector is obtained from the IBES for the base year and the subsequent years GVO and IC obtained by using the VAT annual growth rate of the Mining Support Services establishment component to extrapolate from one year to the other. The GVA of this sub-sector is then obtained by deducting the IC from the GVO.

2.7.3 Estimation of GVA at Constant Price

The GVO at constant prices is obtained by valuing the quantity of output of each major mineral and crude oil at their corresponding annual average base price and exchange rate. For quarterly estimates, the respective average quarterly base year price in US dollars with its corresponding exchange rate to the cedi is used. The IC at constant price is obtained by multiplying the GVO at constant price by the respective mineral's input / output ratio from the 2013 SUT.

The GVO at current prices for quarrying, crude petroleum and gas, and mining support services are deflated by their respective component producer price index (PPI) to obtain their GVO at constant price. Their IC at constant price is obtained for each type of activity by multiplying the

GVO at constant price for quarrying, crude petroleum and gas, and mining support services by their respective input/output ratio from the 2013 SUT. The GVA for the mining and quarry subsector is computed by summing the GVO less the intermediate consumption of the various mineral's gold, diamond, bauxite manganese, oil and gas, quarry and mining support services.

2.8 Manufacturing

Manufacturing is defined according to ISIC Rev.4 as the mechanical or chemical transformation of inorganic or organic substance into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the workers' home and whether the products are sold through wholesale or retail outlets. The economic activity relating to assembly of components and repair work as well as the installation of machinery is included under manufacturing. Manufacturing is captured under the Major Division C of ISIC Rev 4.

2.8.1 Coverage

Twenty-three categories of manufacturing activities take place in Ghana. These are:

1. Manufacture of food products
2. Manufacture of beverages
3. Manufacture of textiles
4. Manufacture of wearing apparel
5. Manufacture of leather and related products
6. Manufacture of wood and of products of wood and cork, except furniture;
7. Manufacture of paper and paper products
8. Printing and reproduction of recorded media
9. Manufacture of coke and refined petroleum products
10. Manufacture of chemicals and chemical products
11. Manufacture of pharmaceuticals, medicinal chemical and botanical products
12. Manufacture of rubber and plastics products
13. Manufacture of other non-metallic mineral products
14. Manufacture of basic metals
15. Manufacture of fabricated metal products, except machinery and equipment
16. Manufacture of computer, electronic and optical products
17. Manufacture of electrical equipment

18. Manufacture of machinery and equipment n.e.c.
19. Manufacture of motor vehicles, trailers and semi-trailers
20. Manufacture of other transport equipment
21. Manufacture of furniture
22. Other manufacturing
23. Repair and installation of machinery and equipment

2.8.2 Sources of Data

The source of data for estimating GVA of the Manufacturing sub sector is mainly from the Integrated Business Establishment Survey (IBES II). The IBES II data is complemented with data from the non-farm enterprise module from the Ghana Living Standard Survey (GLSS) round Six (6). The GLSS 6 data covered informal manufacturing activities not captured under the IBES II survey design.

GVO and IC data are derived from annual financial statements of manufacturing firms obtained from the Ghana Revenue Authority (GRA) to extrapolate the subsequent years value other than the base year.

The PPI is used as a deflator for the sub sector.

2.8.3 Estimation of GVA at Current Price

The final value of manufacturing output is estimated according to accounting statements (profit and loss accounts), IBES, and own account production. These output components are standard and are estimated for all market producers.

The estimate of GVO of the sub sector is the sum of all the outputs of the 23 divisions. To obtain the GVA of the sub sector, the value of IC is subtracted from the GVO estimate.

2.8.4 Estimates of GVO/ GVA at Constant Price

The PPI for each division is used to deflate the GVO of the corresponding division.

IC to output ratio is derived from the 2013 Supply and Use Table (SUT) for each division of manufacturing. This is applied to the GVO of the manufacturing division to get the IC. The GVA is the difference between the GVO and the IC.

For quarterly estimates, the VAT data is used as an indicator for the manufacturing sub sector. The process for arriving at the GVO, GVA and IC is the same as for the annual estimate.

2.9 Electricity, Gas, Steam and Air Conditioning Supply

This sub sector includes the activity of providing electric power, natural gas, steam, hot water and the like through a permanent infrastructure (network) of lines, mains and pipes. The dimension of the network is not decisive; also included are the distribution of electricity, gas, steam, hot water and the like in industrial parks or residential buildings.

2.9.1 Coverage

The activities covered in this sub sector are those that take place in the Ghanaian economy, i.e. electric power generation, transmission and distribution.

2.9.2 Sources of data

There are four (4) main sources of data for this sub sector.

1. Volta River Authority (VRA): Akosombo Hydro, Kpong Hydro, Takoradi Thermal, Takoradi International Company, Tema Thermal Plant, Siemens Power Plant, and Takoradi Extension (T3).
2. Independent power generators. These are Sunon Asogli, Bui Power Plant, and Cenit Power Plant.
3. The Grid Company of Ghana, GRiDCo: Data on transmission of electric power
4. The Electricity Company of Ghana and Northern Electricity Distribution Company-NEDCO Data on distribution of electricity to households, industrial and commercial users.

2.9.3 Estimation of GVA at Current Price

The production data is multiplied by average price per Kwh to obtain the estimate of GVO for the sector. The input output ratio derived from the 2013 IBES for each type of electricity production is applied to the GVO to get the IC.

The GVA for electricity is the GVO less IC of electricity generated.

2.9.4 Estimation of GVA at Constant Price

At the base, both constant and current price figures are the same, hence the process of estimation of current price is the same as that of the constant price. For subsequent years the output data is multiplied by average base year price per Kwh in 2013 to obtain GVO estimates at 2013 constant prices. For the estimation of GVA at constant prices, the change in volume of production (change between the current year and the previous year) is used to extrapolate from the GVA of the previous year. The method of estimation is the same for annual and quarterly GDP.

2.10 Water Supply, Waste and Sewerage Management and Remediation Activities

The divisions of the sub sector are water collection treatment and supply, sewerage, waste collection treatment and disposal activity; material recovery, remediation activities and other waste management services

2.10.1 Coverage

i. Water collection, treatment and supply.

These include the following:

1. Collection of water from rivers, lakes, wells etc.
2. Collection of rain water
3. Purification of water for water supply purposes
4. Treatment of water for industrial and other purposes
5. Desalting of sea or ground water to produce water as the principal product of interest
6. Distribution of water through mains, by trucks or other means
7. Operation of irrigation canals

ii. Sewerage

This includes the following:

1. Operation of sewer systems or sewer treatment facilities
2. Collecting and transporting of human or industrial wastewater from one or several users, as well as rain water by means of sewerage networks, collectors, tanks and other means of transport (sewage vehicles etc.)
3. Emptying and cleaning of cesspools and septic tanks, sinks and pits from sewage; servicing of chemical toilets
4. Treatment of wastewater (including human and industrial wastewater, water from swimming pools etc.) by means of physical, chemical and biological processes like dilution, screening, filtering, sedimentation etc.
5. Maintenance and cleaning of sewers and drains, including sewer rodding

iii. Waste Management

The coverage of activities under the Waste Management are as follows:

1. Collection, treatment, and disposal of waste materials
2. local hauling of waste materials and the operation of materials recovery facilities (i.e., those that sort recoverable materials from a waste stream).

2.10.2 Sources of data

The principal data source for water activity is Ghana Water Company Limited (GWCL). The company provides data on the quantity of water produced and supplied in million cubic metres, and average price per cubic metre. Data from IBES was used to supplement the base year compilation. Producer Price Index (PPI) is used to deflate the annual data.

Data sources for sewerage and waste management are VAT, IBES and CPI for refuse collection.

2.10.3 Estimation of GVA at Current Price

The GVO of water at current prices is derived by multiplying the price per cubic meter by the quantity of water produced. The output includes the total sale of water, other income, output held as inventory and so on. The intermediate consumption for water production is composed of all costs of production of the company excluding compensation of employees.

The GVA for water production is the GVO less the intermediate consumptions for water production.

In the case of Waste and Sewerage Management the estimation of GVO and intermediate consumption are estimated based on the financial statements data of the enterprises operating under this activity, provided by GRA. The GVA for the sector is obtained by subtracting the IC of the sector from the GVO.

2.10.4 Estimation of GVA at Constant Price

The GVO of water at constant prices is derived by multiplying the 2013 price per cubic meter by the quantity of water produced from GWC to convert the production level to 2013 prices.

The estimation of annual GVA at constant prices is obtained by extrapolating the base years GVA estimates with the volume index of the GVO at constant prices. The same procedure is followed in arriving at the quarterly GVA estimates at constant prices.

The GVO at constant prices for Sewerage, Waste Management and Remediation Activities is obtained by deflating output with the 2013 consumer price index (CPI) component for refuse collection. Intermediate consumption at constant prices is a multiplication of base year intermediate consumption/output ratio with the output at constant prices. While GVA at constant prices is estimates as difference of GVO at constant prices and IC at constant prices

2.11 Construction

The construction sector includes general construction and specialized construction activities for buildings and civil engineering works. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures on the site and also construction of a temporary

nature. This work can be carried out on an own account or on a fee or contract basis. Portions of the work and sometimes even the whole practical work can be subcontracted out.

2.11.1 Coverage

The divisions of the construction sub sector are:

1. Construction of buildings
2. Civil engineering (roads, railways, water and electricity mains, harbours, airports, dams, drainage, hydro-electric plants)
3. Specialized construction activities (demolition, site preparation, electrical, plumbing and other construction installation activities)

It also covers all own-account construction activities by households and firms.

2.11.2 Sources of Data

The sources of data for the construction sub sector are:

1. The Ministry of Roads and Highways, which provides data on Government expenditure on civil engineering.
2. Controller and Accountant General's Department (CAGD) financial statements.
3. Financial statements of construction firms from GRA
4. Cement production data from cement manufacturing companies
5. VAT data on locally produced materials, including cement.
6. Imports and exports of building materials.
7. Deflator: Import unit value index of construction materials
8. IBES data mainly used for the base year 2013

2.11.3 Estimation of GVA at Current Price

The GVO at current price for construction is from IBES for the base year, then the financial statements of construction firms in IBES from Ghana Revenue Authority (GRA) is used as the indicator for the subsequent years. An input-output ratio of 51% was obtained from the 2013 SUT and used to derive the IC. The GVA is the difference between the GVO and IC.

2.11.4 Estimation of GVA at Constant Price

The current GVO at current prices for all the components of construction are deflated with a unit value index (UVI) of import of construction materials to arrive at GVO at constant prices. An input-output ratio of 51% from the 2013 SUT is used to arrive at the IC and the GVA computed as the difference between GVO and IC.

For the quarterly estimates, the domestic production of cement and average price plus import of cement is used as the indicator.

The current GVO for the reference quarter is derived from the production by their average price in addition to the import for the quarter. The input output ratio from the base year is used to derive the IC. GVA is the difference between the GVO and the IC.

For the quarterly constant estimates the production and import of cement is valued at the base year price and same method is used to derive the IC and GVA

2.12 Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles

The sub sector, "Wholesale and Retail Trade" is also referred to as "Distributive Trade". It covers resale (sale without transformation) of new and used goods to retailers; industrial, commercial, institutional or professional users, or to other wholesalers; or selling merchandise to institutions and the general public for consumption.

2.12.1 Coverage

This sub sector covers the following divisions:

1. Wholesale and retail trade and repair of motor vehicles and motorcycles (WRTRM);
2. Wholesale trade, except of motor vehicles and motorcycles (WT);
3. Retail trade, except of motor vehicles and motorcycles (RT);
4. Retail sale of automotive fuel in specialized stores (RSF).

2.12.2 Sources of Data

Data from IBES and Financial Statements of trading companies from the GRA are the sources of data for the sub sector. VAT data is the primary source of information used in estimating the Quarterly GVA for this sector.

2.12.3 Estimates of GVA at Current Price

The estimate of annual GVO for the sub sector is the sum of all the output of the four divisions. IC is derived by applying the intermediate consumption shares of each sub-sector to the GVO of each sub-sector. The IC is deducted to obtain annual GVA of the sub sector.

For quarterly estimates, the VAT data is used as an indicator for the sub sector. The process for arriving at the GVO, GVA and IC is the same as for the annual estimate.

2.12.4 Estimates of GVA at Constant Price

The GVO of WT and RT are deflated by CPI combined index.

The base year IC shares of each division is used to derive the estimates of IC at constant prices. GVA at constant prices is estimated as the difference between GVO and IC at constant prices.

2.13 Transportation and Storage

This sub-sector is categorized under ISIC section H – Transportation and Storage. The sub sector includes the provision of passenger or freight transport, whether scheduled or not, by road, water or air and associated activities such as terminal and parking facilities, cargo handling, storage etc.

2.13.1 Coverage

For the estimation of GVA, the sub sector is further divided into the following divisions:

1. Land transport
2. Water transport
3. Air transport
4. Warehousing and support activities for transportation
5. Postal and courier activities

2.13.2 Sources of Data

The sources of data for this sub sector include:

1. VAT data from Ghana Revenue Authority;
2. Driver and Vehicle Licensing Authority (DVLA)
3. Integrated Business Establishment Survey (IBES)
4. Informal Sector Transport Survey

2.13.3 Estimates of GVA at Current Price

The GVO of the sub sector is estimated from companies profit and loss accounts, IBES and VAT data. The estimate of GVO of the sub sector is the sum of all the outputs of the five divisions. The ratio of input/output from the 2013 SUT is applied to the GVO to obtain the ICs. The GVA is obtained as the difference between the GVO and IC.

Transport component of the VAT data is used as an indicator to derive the quarterly estimates by obtaining the difference between the GVO and the ICs. The ICs are derived by applying the input/output ratios from the 2013 SUT to the GVO at current prices.

2.13.4 Estimates of GVA at Constant Price

The GVO at current prices of transportation and storage are deflated by the CPI component of transport. The base year input/output shares of each division are used to derive the estimates of IC at constant prices. GVA at constant prices is estimated as the difference between GVO and IC at constant prices.

2.14 Accommodation and Food Service Activities

This sub-sector includes the provision of short-stay accommodation for visitors and other travelers and the provision of complete meals and drinks fit for immediate consumption. The amount and type of supplementary services provided within this section can vary widely. The sector excludes the provision of long-term accommodation as primary residences, which is classified as real estate activities.

2.14.1 Coverage

This sub sector comprises accommodation and food services.

1. Accommodation services include;
2. Short term accommodation activities
3. Camping grounds, recreational vehicle parks and trailer parks
4. Other accommodation
5. Food and beverage service activities
6. Restaurants and mobile food activities
7. Events catering and other food service activities
8. Beverage serving activities

2.14.2 Source of data

The primary source of data is VAT Division of the Ghana Revenue Authority and IBES data. The catering services and accommodation services CPI are used as the deflators.

2.14.3 Estimation of GVA at Current Price

The GVO of accommodation and food services is estimated using the output from the financial statement with IBES as the source of the base year estimates. The estimate of GVO of the sector is the sum of the output of both accommodation and food service activities. The GVA of the sector is obtained by subtracting the IC from the GVO. The IC is derived as the input/output share of the base year and multiplied by the GVO.

For quarterly estimates, the VAT data is used as an indicator for the sub sector. The process for arriving at the GVO, GVA and IC is the same as for the annual estimate.

2.14.4 Estimation of GVA at Constant Price

The GVO at constant price of accommodation and food services is estimated using CPI of accommodation services and catering services components respectively to deflate the GVO at current price. The base year IC shares of each division are used to apply on the GVO at constant price to derive the estimates of IC at constant prices. The GVA at constant prices is estimated as the difference between GVO and IC at constant prices.

. 2.15 Information and Communication

This sub-sector includes the production and distribution of information and cultural products; and the provision of the means to transmit or distribute these products; as well as data or communications, information technology activities and the processing of data and other information service activities.

2.15.1 Coverage

The sub sector is divided into information activities and telecommunications activities.

1. Information activities include:
2. Publishing activities including software publishing;
3. Motion picture and sound recording activities;
4. Information technology activities; and
5. Other information service activities
6. Telecommunication activities include:
7. The services provided by telecommunication enterprises;
8. Radio and TV broadcasting and programming activities.

2.15.2 Sources of Data

The sources of data for this sub sector are;

1. VAT data from Ghana Revenue Authority
2. IBES
3. National Communication Authority
4. Financial statements of Telecommunication firms from GRA

2.15.3 Estimation of GVA at Current Price

The GVO of the telecommunication component is the sum of the output of all the telecommunication firms from their financial statements and IBES. The IC of the sub sector is obtained by summing the cost of production from the financial statements and IBES. The GVA is derived by netting the IC from GVO. Subsequently, the growth of the main telcos is used to extrapolate the growth rate in the telecommunication activities. Same method is applied to Radio and TV broadcasting and programming activities.

For the quarterly estimates, the production data (outbound calls per minute, data usage in megabytes, international inbound/outbound calls, roaming) and their average prices are used as an indicator and benchmarked to the annuals.

Quarterly GVA estimation for the information component of the subsector is done using the VAT data as an indicator. That is, the GVA is derived as the difference in sum of GVO of the main firms

in this activity and base year IC ratio. The growth rate is then used to extrapolate for the information component.

2.15.4 Estimation of GVA at Constant Price

To estimate the GVA at 2013 constant prices for Information, Radio and TV broadcasting and programming activities (excluding publishing activities), the GVO at current prices is deflated by the recreation and culture component of CPI. The publishing activities' GVO at current prices however, is deflated by the PPI component of publishing. The input/output shares are used to derive the estimates of IC at constant prices. GVA at constant prices is estimated as the difference between GVO and IC at constant prices.

To estimate the GVA at 2013 constant prices for the telecommunication activities, the GVO at current prices is deflated using telecommunication CPI to obtain GVO at 2013 prices and then the base year input/output ratio is used to derive the IC.

For the quarterly estimation of the subsector, production data (outbound calls per minute, data usage in megabytes, international inbound/outbound calls, roaming) is valued at 2013 average prices as an indicator for the constant quarterly estimates and benchmarked to the annuals.

Quarterly GVA estimation for the information component of the subsector is done using the VAT data as an indicator deflated by the CPI. The GVA is derived as the difference between the sum of GVO of the main firms in this activity and the IC.

2.16 Financial and Insurance Activities

This sub sector includes financial service activities, insurance, reinsurance and pension funding activities and activities to support financial services.

The sub sector is categorized under ISIC rev.4, section K - Monetary Intermediation, division 64 financial service activities, except insurance and pension funding. The sub sector includes financial service activities of obtaining and redistributing funds other than for the purpose of insurance or pension funding.

1. These institutional units are all corporations and quasi corporations which are principally engaged in: Monetary intermediation (ISIC rev.4, Division 64) and;
2. Insurance companies and pension funds (ISIC rev.4, Division 65)

The current situation related to the classification of the financial sector from the available sources is shown in Table 2.0.

Table 2.0: Classification of financial sector in Ghana

Activity code	Activity	Type of producer	Main sources
ISIC rev.4, Division 64	Financial service activities, except insurance and pension funds	1. Market 2. Non-market	3. Quarterly profit and loss account 4. Monetary statistics 5. Detailed structure of loans and deposits and accrued interest on loans and deposits 6. Interbank loans and deposits <i>Source: Bank of Ghana</i>
ISIC rev.4, Division 65	Insurance	Market	1. Quarterly profit and loss account 2. Detailed structure of insurance premiums and claims <i>Source: National Insurance Commission</i>

Financial Service Activities, except Insurance and Pension Funding

The division comprises of the following sub-sectors:

1. Central Bank;
2. Other deposit-taking corporations, except central bank; and
3. Other financial intermediaries, except insurance corporations and pension funds

2.16.1 Coverage

The sub-sector includes the following financial intermediaries.

1. Central Bank of Ghana
2. Universal Banks
3. Savings and Loans Companies
4. Rural and Community Banks
5. Finance House

2.16.2 Sources of Data

Annual financial statements, quarterly profit and loss accounts and balance sheet of financial corporations, notably:

The Central Bank of Ghana (BoG) covers Universal Banks, Savings and Loans, Rural and Community Banks, Finance Houses. The profit and loss accounts of these industries are then used for the compilation.

2.16.3 The Central Bank

In Ghana, the Central Bank is in charge of issuing national currency fully backed by foreign exchange reserves. According to the System of National Accounts (SNA) 2008 methodology, the output of the division is computed as non-market output by summing all the costs.

2.16.4 Other Deposit-taking Corporations, except Central Bank

The division comprises financial institutions that have financial intermediation as their principal activity. They incur liabilities in the form of deposits or financial instruments that are close substitutes for deposits. In general, the division comprises commercial banks, universal banks, all-purpose banks, savings banks (including trustee savings banks and savings and loan associations), savings and loans, rural and community banks. There are two types of financial services namely:

Financial services provided in return for explicit charges; and

Financial services provided in association with interest charges on loans and deposits which is recorded as Financial Intermediation Services Indirectly Measured (FISIM).

2.16.5 Estimation of GVA at Current Price

The output of the division is estimated explicitly and implicitly.

1. Market output (Explicit) is the sum of Income from fees and commissions plus other margins on trading securities
2. FISIM (Implicitly) is the sum of FISIM on loans plus FISIM on deposits.
3. FISIM on deposits and loans: The estimates of FISIM in current prices are derived using the reported data on interest payable and receivable; stock on loans and deposits, reference rate interest and weighted average interest rate of loans and deposit applied to the stocks.

Computation of FISIM

FISIM is computed using the following formula.

$$\text{FISIM} = \text{FISIML} + \text{FISIMD} = (rL - rr) * YL + (rr - rD) * YD.$$

Where,

FISIML = FISIM on loans

FISIMD = FISIM on deposits

rL = Lending rate

rD = Deposit rate

rr = Reference rate

Intermediate consumption is the sum of operating expenses plus other administrative charges related to operation.

The GVO of the financial institutions is taken to be the sum of direct charges and FISIM. The quarterly GVA is obtained by deducting the IC from the GVO. The annual estimates are thus, the sum of the quarters.

2.16.6 Estimation of GVA at Constant Price

To estimate the quarterly GVA at 2013 constant prices for the financial activities, the GVO is deflated by the financial component of the CPI. The rebased 2013 input/output ratios are applied to the constant price GVO estimates to compile the constant price IC estimates, with the constant price GVA estimates derived as residuals.

The annual estimates are then obtained by the summation of the quarterly GVAs of the individual divisions.

Computation of FISIM at constant prices

FISIM is compiled using the base year margin to the deflated stocks of loans and deposits. A general CPI index is used to deflated stocks.

The FISIM is computed using the following formula.

$$\text{FISIM} = \text{FISIML} + \text{FISIMD} = (\text{rL}-\text{rr}) * \text{YL}/\text{CPI} + (\text{rr}-\text{rD}) * \text{YD}/\text{CPI}. \text{ Where,}$$

$$\text{FISIML} = \text{FISIM on loans}$$

$$\text{FISIMD} = \text{FISIM on deposits}$$

$$\text{rL}-\text{rr} = \text{Base year margin for FISIM on loans}$$

$$\text{rr}-\text{rD} = \text{Base year margin for FISIM on deposits}$$

$$\text{YL}/\text{CPI} = \text{deflated average stock of loans}$$

$$\text{YD}/\text{CPI} = \text{deflated average stock of deposits}$$

2.17 Insurance

This industry is categorized under ISIC rev.4; Insurance, reinsurance and pension funding, except compulsory social security and Activities auxiliary to financial service and insurance activities.

This division includes the underwriting of annuities and insurance policies and investing premiums to build up a portfolio of financial assets to be used against future claims.

2.17.1 Coverage

In Ghana, insurance activities comprise the following:

Life insurance; and

Non-life insurance.

2.17.2 Sources of Data

Annual financial statements, quarterly profit and loss accounts and balance sheet of insurance corporations, notably from:

National Insurance Commission.

Life Insurance

The output of life insurance is estimated as;

Output = Premiums earned + Premium supplements - claims - Increases in technical reserves

Non-Life Insurance

The activities of non-life insurance are estimated as;

Output = Premiums earned + Premium supplements – claims incurred

The claims incurred are usually adjusted for volatility.

Estimation of GVA at Current Price

The benchmark 2013 input/output ratios are applied to the current price output estimates to compile the current price IC estimates, with the current price GVA estimates derived as residuals for both the annual and quarterly.

Estimation of GVA at Constant Price

To estimate the quarterly and annual GVA at 2013 constant prices for the insurance activities, the GVO at current prices is deflated by the insurance component of CPI. The benchmark 2013 input/output ratios are applied to the GVO estimates at current price to compile the constant price IC estimates, with the constant price GVA estimates derived as residuals.

2.18 Real Estate Activities

This sub-sector includes activities such as acting as lessors, agents and/or brokers in one or more of the following: selling or buying real estate, renting real estate, providing other real estate services such as appraising real estate or acting as real estate escrow agents. Activities in this section may be carried out as follows:

On own or leased property and

On a fee or contract basis.

It also includes the building of structures, combined with maintaining ownership or leasing of such structures and also covers real estate property managers.

Before the introduction of the ISIC Rev 4 and 2008 SNA, Real Estate was part of Business Activities but now it stands alone. The coverage of the various aggregates for real estates had been reviewed to take account of the emergence of new economic activities in the economy, incorporated changes on account of possible omissions or duplications and adopted New International Standards (e.g., 2008 SNA, ISIC Revision 4).

2.18.1 Coverage

The sub-sector covers real estate activities and imputed rent. The real estate activities include the following:

Buying, selling, renting and operating of self-owned or leased real estate, such as apartment buildings and dwellings, non-residential buildings, including exhibition halls, self-storage facilities, malls and shopping centers and land.

Provision of homes and furnished or unfurnished flats or apartments for more permanent use, typically on a monthly or annual basis. This includes development of building projects for own operation, i.e. for renting of space in these buildings, subdividing real estate into lots, without land improvement operation of residential mobile home sites

The provision of real estate activities on a fee or contract basis including activities of real estate agents and brokers, intermediation in buying, selling and renting of real estate on a fee or contract basis, management of real estate on a fee or contract basis, appraisal services for real estate and activities of real estate escrow agents.

It excludes the development of building projects for sale, subdividing and improving land.

2.18.2 Source of Data

The sources of data are:

1. IBES from Ghana Statistical Service;
2. VAT data from Ghana Revenue Authority;
3. GLSS from Ghana Statistical Service; and
4. Annual Financial Statements from Ghana Revenue Authority.

2.18.3 Estimation of GVA at Current Price

The estimation of GVO of the sector is the sum of all the output of activities of the sub-sector (i.e. real estate and imputed rent). The IC is obtained by multiplying the input/output ratio by the GVO. The GVA is obtained by subtracting the IC from the GVO.

The method for the estimation of the GVA of the real estate activities for the quarterly is the same as the annual estimation.

2.18.4 Estimation of GVA at Constant Price

To estimate the GVA at constant prices for the sub-sector, the GVO of real estate activities are deflated by the non-food component (Rent) of CPI. The base year input/output shares are used to derive the IC at constant prices. The GVA at constant prices is obtained as the difference of the real estate GVO at constant prices and the IC at constant prices.

2.19 Professional, Administration and Support Service Activities

This sub-sector is a combination of professional, scientific, technical; administration and support services activities. The sub-sector includes specialized professional, scientific and technical activities which require a high degree of training, and make specialized knowledge and skills available to users. On the other hand, the administration and support services part include a variety of activities that support general business operations. These activities differ from those in professional, scientific and technical activities since their primary purpose is not the transfer of specialized knowledge.

Professional, administration and support service activities sub-sector has gone through revisions. Before rebasing in 2013, the sub-sector was called business activities comprising real estate and professional, scientific and technical activities. With the adoption of SNA 2008 and ISIC Revision 4 the sub-sector was reclassified to include professional, scientific, technical, administration and support service activities excluding real estate activities.

2.19.1 Coverage

This sub-sector comprises:

1. Legal and accounting activities;
2. Activities of head offices; management consultancy activities;
3. Architectural and engineering activities; technical testing and analysis;
4. Scientific research and development;
5. Advertising and market research;
6. Other professional, scientific and technical activities;
7. Rental and leasing activities;
8. Employment activities;

9. Travel agency, tour operator, reservation service and related activities;
10. Security and investigation activities;
11. Services to buildings and landscape activities;
12. Office administrative, office support and other business support activities.

2.19.2 Sources of Data

1. IBES from Ghana Statistical Service;
2. VAT data from Ghana Revenue Authority;
3. Annual Financial Statements from Ghana Revenue Authority.

2.19.3 Estimation of GVA at Current Price

The estimation of GVO of the sub-sector is the sum of all the outputs of activities. The base year input/output shares are used to derive the IC. The GVA is obtained by subtracting the IC from the GVO.

2.19.4 Estimation of GVA at Constant Price

To estimate the GVA at constant prices for the sector, the GVO is deflated by the non-food component of CPI. The base year input/output shares are used to derive the IC at constant prices. The GVA at constant prices is obtained as the difference between the GVO at constant prices and the IC at constant prices.

2.20 Public Administration and Defence, and Compulsory Social Security

This sub-sector includes activities of the government carried out by the public administration. These include the administration of programmes, legislative activities, taxation, national defense, public order and safety, immigration services, foreign affairs and the administration of government programmes. This sub-sector also includes compulsory social security activities.

Government units normally engage in non-market production because of market failure or as a matter of deliberate economic or social policy. Such output is recorded at the time it is produced, which is also the time of delivery in the case of non-market services⁵. In general, however, it cannot be valued in the same way as goods or services produced for own final consumption or own capital formation that are also produced in large quantities for sale on the market.

There are no markets for collective services such as public administration and defense, but even in the case of non-market education, health or other services provided to individual households, suitable prices may not be available. It is not uncommon for similar kinds of services to be produced on a market basis and sold alongside the non-market services but there are usually

⁵ Reference SNA 2008 para 6.94 and 6.95

important differences between the types and quality of services provided. In most cases it is not possible to find enough market services that are sufficiently similar to the corresponding non-market services to enable their prices to be used to value the latter, especially when the non-market services are produced in very large quantities.

For these reasons, and also to ensure that the various non-market services produced by government units are valued consistently with each other, they are all valued by the sum of the costs incurred in their production. The output of the sub sector is a non-market output, which is provided without charge to households and it is financed out of general tax and other incomes. That is, as the sum of:

Intermediate consumption;

Compensation of employees;

2.20.1 Coverage

1. General public administration activities
2. Regulation of the activities of providing health care, education, cultural service and other social services, excluding social security.
3. Regulation of and contribution of more efficient operation of businesses.
4. Provision of services to the community as a whole.
5. Compulsory social security activities.

2.20.2 Sources of Data

The source of data for this sub-sector is the;

Controller and Accountant-General's Department's Report (CAGD), and the Financial Statement of the Public Accounts on the Consolidated Fund.

Ministry of Finance Fiscal data

2.20.3 Estimation GVA at Current Price

The estimate of GVO of the sub-sector is the sum of cost comprising: intermediate consumption and compensation of employees from the CAGD Report. The GVA is obtained by subtracting the IC from the GVO of the sub-sector.

The GVO is estimated as the sum of costs of production, as follows:

Intermediate consumption (IC);

Compensation of employees (CE);

Output at current price;

$$GVO=CE+IC$$

Gross Value Added at current price;

$$GVA= GVO-IC= \text{Compensation of Employees}$$

2.20.4 Estimation of GVA at Constant Price

To estimate the GVO at constant prices for the sub-sector, the Wage Index is used to deflate the GVO. The base year IC share is used to derive the estimates of the IC at constant prices. The GVA at constant prices is obtained as the difference of the GVO and IC at constant prices.

The quarterly estimates are computed using quarterly data as applied in the annual estimates.

2.21 Education

This sub-sector includes education at any level or for any profession. It includes education by the different institutions in the regular school system at its different levels as well as adult education, literacy programmes, etc. The sub-sector includes public as well as private education. For each level of initial education, the classes include special education for pupils with physical disabilities or learning difficulties.

The breakdown of the categories in this sub-sector is based on the level of education offered as defined by the levels of the International Standard Classification of Education (ISCED 1997).

2.21.1 Coverage

1. Pre-primary and primary education
2. Secondary education
3. Higher education
4. Other education
5. Educational support activities

2.21.2 Sources of Data

The sources of data for this sub-sector are:

1. The Controller and Accountant-General's Department Report and Financial Statement of the Public Accounts on the Consolidated Fund;
2. Integrated Business Establishments Survey
3. The Education Management Information System (EMIS).

2.21.3 Estimation of GVA at Current Price

The GVO for public sector education is derived as the sum of costs comprising intermediate consumption and compensation of employees computed from the fiscal data.

The IBES data was used to estimate the base year of the GVO for the private sector education. The IC includes the purchase of teaching aids and other expenses (e.g. chalk, flip chart etc.) from the IBES data, etc. The GVO for onward estimates is computed using the growth of private education enrolment. The input/output ratio of the base year IC is applied on the GVO to estimate the IC. The GVA is the difference between the GVO and IC. The total Education GVA is the sum of public and private GVAs.

2.21.4 Estimation of GVA at Constant Price

The wage index of public sector employees is used to deflate the public education GVO at current prices to obtain the GVO at constant prices. The base year IC share is used to obtain the estimates of the IC at constant prices. However, the base year average school fees is applied on the current enrollment to obtain the constant estimates for private education.

The quarterly estimates of the public education sub sector are computed as the annual. The private education GVO is computed by multiplying the average school fees charged by the enrollment figures. The base year IC is computed using the input-output ratio. The GVO at constant is obtained by using base year average school fees. The total Education GVA is the sum of public and private GVAs.

2.22 Human Health and Social Work Activities

This sub-sector includes the provision of health and social work activities. This consists of a wide range of activities; healthcare provided by trained medical professionals in hospitals and other facilities, residential care activities, social work activities without any involvement of healthcare professionals.

2.22.1 Coverage

1. Residential nursing care facilities
2. Residential care activities for mental retardation, mental health and substance abuse
3. Residential care activities for the elderly and disabled
4. Other residential care activities
5. Social work activities without accommodation for the elderly and disabled
6. Other social activities without accommodation

2.22.2 Sources of Data

Sources of data for this sector include:

The Controller and Accountant-General's Department Report and Financial Statement of the Public Accounts on the Consolidated Fund

Ministry of Finance Fiscal data

2.22.3 Estimation of GVA at Current Price

The GVO for public health is derived as the sum of costs comprising: intermediate consumption and compensation of employees is computed from the fiscal data.

The IBES data was used to estimate the base year GVO for private health. The IC of private health is obtained using the input/output ratio of the IBES data and applied on the GVO. Total health GVA is the sum of public and private GVAs.

2.22.4 Estimation of GVA at Constant Price

The wage index is used to deflate the GVO at current prices to obtain the GVO at constant prices. The base year input/output share is used to derive the estimates of the IC at constant prices. For the private health sector, the CPI of health is used to deflate the GVO at current prices to obtain the GVO at constant prices. The input/output ratio of the base year IC is applied on the constant GVO to estimate the IC at constant prices.

For the quarterly estimates, the public Health sub sector follows the annual compilation procedures. The growth in the GVO for public health is used to extrapolate the GVO for private health. The IC of private health is estimated using the established input/output ratio obtained during rebasing.

2.23 Arts, Entertainment and Recreation

This sub-sector includes a wide range of activities such as cultural, entertainment, and recreational interests of the general public, including live performances, operation of museum sites, gambling, sports and recreation activities.

2.23.1 Coverage

This sector covers a wide range of activities including:

1. Creative arts and entertainment activities;
2. Libraries, archives, museums and other cultural activities;
3. Gambling and betting activities;
4. Sports activities amusement and recreation activities;
5. Activities of amusement parks and theme parks.

2.23.2 Source of Data

The sole source of data for this industry is VAT data.

2.23.3 Estimation of GVA at Current Price

The estimate of GVO of the sector is the sum of all the output using the VAT data, data from IBES and financial statements of respective companies. The base year input/output shares are used to derive the IC. The GVA is obtained by subtracting the IC from the GVO.

2.23.4 Estimation of GVA at Constant Price

To estimate the GVA at 2013 constant prices for the sub-sector, the GVO at current prices is deflated by the recreation, and culture, and non-food components of the CPI. The base year IC shares are used to derive the IC at constant prices. The GVA at constant prices is obtained as the difference between GVO and IC at constant prices.

Other Service Activities

It also includes the activities of membership organizations, the repair of computers and personal and household goods and a variety of personal service activities not covered elsewhere in the classification.

2.23.5 Coverage

1. Activities of membership organizations:
2. Activities of business, employers and professional membership organizations
3. Activities of trade unions
4. Activities of other membership organizations
5. Repair of computers and personal and household goods:
6. Repair of computers and communication equipment
7. Repair of personal and household goods
8. Other personal service activities:
9. Washing and (dry-) cleaning of textile and fur products
10. Hairdressing and other beauty treatment
11. Funeral and related activities.
12. Other personal service activities n.e.c.

Source of Data

The sole source of data for this industry is VAT data, financial statements of respective companies.

Estimation of GVA at Current Price

The estimate of GVO of the sector is the sum of all the output using the VAT data. The base year input/output shares are used to derive the IC. The GVA is obtained by subtracting the IC from the GVO.

Estimation of GVA at Constant Price

To estimate the GVA at 2013 constant prices for the sub-sector, the GVO at current prices is deflated by the non-food component of the CPI. The base year IC shares are used to derive the IC at constant prices. The GVA at constant prices is obtained as the difference between GVO and IC at constant prices.

2.21 Net Indirect taxes

Net Indirect Tax is the difference between the Indirect tax and subsidy

Coverage

1. Taxes on domestic goods, taxes on international trade and subsidies
2. Sources of data
3. Fiscal data from Ministry of Finance (MoF)
4. Estimation of GVA at Current Price
5. Subsidies are deducted from the sum of Taxes on domestic goods and taxes on international trade to arrive at Net Indirect Taxes at Current Price.

Estimation of GVA at constant Price

The growth rate in Gross Domestic Product at basic prices is used to extrapolate for the Net Indirect Taxes at Constant Prices

CHAPTER THREE

GDP EXPENDITURE APPROACH

3.1 Computation of GDP Expenditure Approach

This chapter describes the methodology used to estimate GDP using the expenditure approach. All output from production is destined for either intermediate or final consumption, gross fixed capital formation (investment), inventory and export. The GDP Expenditure is obtained by summing the components of final expenditure on goods and services produced.

GDP by Expenditure is calculated as:

$$\begin{aligned} & \text{Household final consumption expenditure (C)} \\ & + \text{Government final consumption expenditure (G)} \\ & + \text{Gross Fixed capital formation (including changes in inventory) (I)} \\ & = \text{Gross national expenditure Domestic demand} \\ & \quad + \text{Exports of goods and services (X)} \\ & \quad - \text{Imports of goods and services (M)} \\ & = \text{Expenditure on Gross Domestic Product (GDP}_E\text{)} \\ & \text{GDP}_E = C+I+G+X-M \end{aligned}$$

3.2 Definition of terms

Brief definitions of the final components of GDP_E are provided in this section.

3.2.1 Final Consumption Expenditure

It is incurred by three institutional units namely; households, general government, and non-profit institutions serving households. Government final consumption expenditure is categorized into; individual consumption expenditure and collective consumption expenditure. Individual consumption expenditure benefits individual households. A typical example of this is education and health. In other words, individual consumption expenditure is the expenditure incurred by the government for the benefit of individual households. On the other hand, collective consumption expenditure comprises payables for goods and services that are provided to benefit the community as a whole. Examples are the maintenance of law and order, defence and general public administration. All final consumption expenditure by households and non-profit institutions serving households is individual, while final consumption expenditure by the government is partly individual and partly collective.

Private final consumption expenditure refers to the sum of final consumption expenditure of households and non-profit institutions serving households.

The SNA also defines final consumption, which includes all goods and services acquired by an institutional unit for final consumption. All individual consumption expenditures are attributed to households as actual consumption while collective consumption expenditure remains as actual consumption by the government. Non-profit institutions serving households do not have any actual consumption since all their consumption expenditure is for services to households. In the system of accounts, individual consumption expenditure incurred by government and NPISH are recorded as transfers in kind to households. There are two categories:

Expenditure for services supplied free or at prices that are not economically significant, e.g. education (transfers of individual non-market goods and services)

Expenditure for goods purchased by government or NPISH and distributed to households, e.g. services of private doctors.

3.2.2 Gross Fixed Capital formation (GFCF)

Gross fixed capital formation (GFCF), also called "investment", is the acquisition of produced assets (including purchases of second-hand assets), including the production of such assets by producers for their own use, minus disposals

Gross fixed capital formation includes all expenditure by producers on acquisitions less disposals of produced fixed assets to be used in the production process. Such assets can be produced by the producers for their own use.

Changes in inventories are by definition equal to the total value of all goods that enter the inventories of producers minus all goods that are withdrawn from them. Producers keep inventories of the goods they produce either as finished products or work-in-progress, raw materials and supplies for use as intermediate consumption, and of goods purchased for resale but not disposed of before the end of the period under consideration.

Acquisitions less disposals of valuables where valuables are assets not primarily used for production or consumption. Instead, valuables are assets acquired as stores of value. Examples are paintings or sculptures, precious stones and metals, jewelry and antiques. It is unlikely that such items will be recorded in the national accounts of Ghana, and therefore not discussed further in this chapter.

3.3.3 Exports and Imports of Goods and Services

This consists of sales, barter, grants or gifts of goods and services from/to residents and to/from non-residents.

3.4 Estimation Methods and Data Sources

3.4.1 Final Consumption by Households

Final consumption expenditure by households includes all expenditure by resident households on goods and services for the purpose of consumption minus sales of any of such goods. The expenditure must be recorded as the goods are delivered or a service is rendered. The valuation is at the purchaser's price payable by households. Further clarifications are as follows:

Durable goods, e.g. cars or household capital goods, are included in consumption although they have a life span of more than one year. However, there are two exceptions: dwellings and valuables.

The acquisition of dwellings and major repairs of them are classified as gross fixed capital formation by an unincorporated household enterprise producing housing services for its owners (self-owned housing or owner-occupied dwellings).

The acquisition of valuables is included in gross capital formation if it is acquired for a purpose business, but this will most probably not have any practical consequences in Ghana.

Consumption in kind comprises two categories: i) goods and services received as income in kind, and ii) goods and services produced for own consumption, the only service being self-owned housing (owner occupied).

Fees paid by households to government and non-profit institutions serving households (NPISH) for goods and services at prices that are not economically significant are included. Also included in this category are fees for all kinds of licences and permits except licences for motor vehicles, boats, aircraft, and firearms, and for hunting or fishing. The exceptions are classified as current taxes on income and wealth.

Regarding households owning unincorporated enterprises, care must be taken to include only expenditure for final consumption and exclude any expenditure for intermediate consumption or capital formation by the household enterprise.

All expenditure by resident households in foreign countries is included, while all expenditure by non-residents on the domestic market is excluded. This type of expenditure is recorded as "Direct purchases abroad by residents" and exports are recorded as "Direct purchases in the domestic market by non-residents" respectively.

3.4.2 Sources of Data

The main data source for the household final consumption expenditure comprises the GLSS. However, additional administrative source data were used to cross-check, validate and complete the base year estimates of HFCE.

Estimation of HFCE

Survey which provides the basis for the estimation of household final consumption expenditure (HFCE). All expenditure items recorded in the survey are coded based on the Classification of Individual Consumption According to Purpose Central Product Classification (COICOP), and aggregated to convert into the SUT product classification.

3.4.4 Final Consumption by NPISH has been included in the Household Data.

The main source of data for the NPISH is IBES. The non-market output approach excluding any incomes from sales is used to estimate the value of NPISH. The overall CPI is used to deflate the NPISH from current to constant prices.

3.4.5 Final Consumption by Government

Government Final Consumption Expenditure comprises two main categories;

Expenditure on individual services (e.g., education and health) and collective services (e.g. general administration and defence) produced by the government itself that are supplied free or at prices that are not economically significant (less than market output price). By convention, such output is recorded as final consumption expenditure by the government.

Expenditure on consumption goods and services purchased by the government from market producers and supplied directly to households without further processing, i.e. as social benefits in kind.

This category (a) above consists of the expenditure incurred by the government for consumption of its own output. Conceptually, this is different from the expenditure on goods and services for intermediate consumption and other costs of production, i.e., on the inputs in the process of non-market production. The value of the consumption of output is equal to the value of output minus any sales receipts. These sales receipts include receipts from fees and charges that are not economically significant and, to a minor extent, receipts from sales of market output.

In summary, final consumption expenditure by government is defined as:

$$\begin{aligned} & \text{Intermediate consumption} \\ & + \text{Compensation of employees} \\ & + \text{Consumption of fixed capital} \\ + & \text{Taxes on products, net of subsidies, paid by government itself} \\ & = \text{Output} \\ & - \text{Sales and fees} \\ + & \text{Expenditure on social benefits in kind} \end{aligned}$$

= Final Consumption Expenditure

Actual final consumption by the government includes final consumption expenditure on collective services, i.e. services that are provided to the community as a whole or to large sections of it. Examples are the maintenance of law and order, defence and general public administration.

The SNA recommends that government consumption be classified according to the Classification of the Functions of Government (COFOG).

The classification of Government final consumption of goods and services as individual or collective expenditure is achieved by categorizing the COFOG categories as either individual or collective expenditure.

3.4.6 Sources of Data

The main source of data is the fiscal data from the Ministry of Finance and CAGD.

Estimation of Government Final Consumption Expenditure

The final consumption of the government is estimated directly from the output of producers of government services. The value of government sales of non-capital goods and services, plus social benefits in kind, as given in the fiscal data, are deducted from this output to obtain the government final consumption expenditures.

Constant estimates are arrived at by deflating the different components as follows:

Intermediate consumption by non-food CPI;

Compensation of employees by minimum wage index;

Expenditure on social benefits in kind by combined CPI

3.4.7 Gross Fixed Capital Formation (GFCF)

Gross fixed capital formation (GFCF) is broadly defined as the value of acquisitions, less disposals, of new and used (second-hand) fixed assets by producers. Fixed assets constitute output of producers, i.e. they are produced assets used in the process of production for more than one year. Also included in GFCF are certain additions or improvements on existing produce assets that extend the asset's economic useful life beyond the earlier assessment by way of maintenance of the produced assets and enhancement of the production capacity of the assets in the same maintenance and renovations or improvement in the value of non-produced assets made by purchaser.

Categories of GFCF may be classified by type of assets:

Acquisition, less disposals, fixed assets (including marked improvements to existing assets) covering:

Buildings and structures: dwellings (residential buildings), other buildings (non-residential buildings), and other structures (civil engineering works, e.g. roads, bridges etc.);

Machinery and equipment: Transport equipment, other machinery and equipment;

Cultivated assets: Animals for breeding, dairy, draught, etc.; plantation of vineyards, orchards and trees giving repeated output. Acquisition, less disposals, of intangible fixed assets:

1. Mineral exploration;
2. Computer software;
3. Entertainment, literary and artistic originals.
4. Additions to the value of tangible non-produced assets:
5. Major improvements;
6. Costs of ownership transfer.

The acquisition of new fixed assets includes purchases of assets, assets received as barter, assets received as capital transfers, and assets produced for own use. The assets are valued at purchasers' prices including installation costs and also costs of ownership transfer, e.g. fees paid to real estate agents and lawyers. Production of fixed assets is normally valued as its cost of production. The acquisition of existing fixed assets is valued at the actual purchasers' price plus any costs of ownership transfer.

The disposal of existing fixed assets at actual purchaser's prices is recorded as negative GFCF if disposed of by resident producers.

GFCF in mineral exploration includes the expenditure incurred in such activities, not only test drillings but also other costs, like transportation, geological and aerial surveys, etc. Mineral exploration is defined as GFCF whether it is successful or not. Computer software is valued at the purchaser's price or, if developed in-house, by the costs of development.

3.4.8 Sources of Data

The sources of data are as follows:

1. IBES
2. VAT
3. Imports
4. Ministry of Roads and Highways.
5. Ministry of Works and Housing
6. Controller and Accountant General's Department
7. Ministry of Finance
8. Ghana National Petroleum Commission
9. Petroleum Commission

Estimation of GFCF

In estimating the capital formation for the construction of buildings, the output of construction of buildings excluding the value of small repairs from the production approach is used as the investment in buildings both residential and non-residential.

The acquisition of machinery and transport equipment is estimated using import and the output of domestic production of machinery and transport equipment for both the current and constant estimates. The total value of imports of machinery and transport equipment is deflated to derive 2013 prices using the Unit Value Index (UVI) of imported commodities and the Producer Price Index (PPI) for domestic production.

Estimation of the construction of roads and railways is the value of total expenditure incurred on the construction activity within the year.

3.4.9 Changes in Inventories

There are four categories of inventories:

1. Finished goods.
2. Work-in-progress.
3. Materials and supplies.
4. Goods for resale.

Sources of Data

The main source of data used for the estimates of changes in inventory are:

1. Ministry of Agriculture
2. Forestry Commission
3. GNPC

Estimation of Changes in Inventory

The compilations are done for changes in inventories for livestock, forestry and crude oil using data from the sources listed above. Estimates are obtained as the sum of inventories for livestock, forestry and crude oil.

3.4.10 Exports and Imports of Goods and Services

Exports and imports of goods and services comprise sales, barter, gifts or grants of goods and services between residents and the rest of the world. International transactions in services different from those in goods. The scope of exports and imports of goods and services are with the exception

of FISIM. The boundary between trade in goods and services is not always clear since one transaction may contain elements of both. However, the valuation of both imports and exports at Free-on-Board F.O.B prices determines implicitly the boundary between goods and services. Direct purchases in the domestic market by non-residents (exports) and direct purchases abroad by residents (imports) are recorded as services although they actually contain purchases of both goods and services.

Both exports and imports of goods should be recorded at market prices F.O.B. This is the value at the border of the exporting country and includes the value of goods at basic prices and all distributive services up to the border. By valuation at F.O.B prices, exports and imports are valued in a uniform way. Nevertheless, imports of individual goods may be recorded at Cost Insurance and Freight (C.I.F.) prices including all costs for transportation and insurance up to the border of the importing country. Adjustments to compute imports F.O.B must then be done by Bank of Ghana on the level of total imports according to the Balance of Payments standards.

3.4.11 Sources of Data

The main source of data is from the Balance of payments (BoG).

Estimation of Exports and Imports

National accounts data on export and imports of goods and services are harmonized with Balance of Payment data of BoG. The export and imports of goods and services values are the same as in BoP data.

CHAPTER FOUR

QUARTERLY GROSS DOMESTIC PRODUCT

The aim of this chapter is to provide a description of data sources and compilation methods, which are used for quarterly national accounts (QNA) in Ghana. Methodology of QNA follows the IMF manual on Quarterly National Accounts.

Quarterly National Accounts are a harmonized system of quarterly time series data adopting the same principles as the Annual National Accounts. Quarterly National Accounts data have a time-series character, which means that they are identical over time and will be amenable to the same estimation principles as the annual series estimates. This is necessary, because by applying the same concepts over time different periods become comparable.

Data sources are an important part of the process, because the results of the quarterly estimation will be based on the quality of data. Quarterly National Accounts are less complete than annual ones, because the latter use more accurate and timely data sources, such as financial statements and other consolidated annual data. In general, data consists of either volume or value data. The main data sources that are used to estimate QNA are in general administrative data provided from GRA, Bank of Ghana, GNPC, MoFA, Electricity and Water supply companies, etc. Main sources of data for QGDP and their time of availability of the data is provided in the Table 4.0.

Table 4.0 Data sources and timeliness

No.	Agriculture	Sources of Data
1	Crops	Ministry of Food and Agriculture
2	o/w Cocoa	COCOBOD
3	Livestock	Ministry of Food and Agriculture
4	Forestry & Logging	Forestry Commission
5	Fishing	Fishery Commission
No.	Industry	Sources of Data
1	Mining and Quarrying	Minerals Commission
2	o/w Oil and Gas	Ghana National Petroleum Commission
3	Manufacturing	VAT-Ghana Revenue Authority
4	Electricity	Volta River Authority, ECG, GRIDCO
5	Water & Sewerage	Ghana Water Company
6	Construction	Cement Producing Factories and Import of Cement

No.	Services	Sources of Data
1	Trade, Repair of Vehicles, Household Goods	VAT-Ghana Revenue Authority
2	Hotels and Restaurants	VAT-Ghana Revenue Authority
3	Transport & Storage	VAT-Ghana Revenue Authority
4	Real Estate	VAT-Ghana Revenue Authority
5	Professional, Admin.& Support Services	VAT-Ghana Revenue Authority
6	Other Personal Service Activities	VAT-Ghana Revenue Authority
7	Public Administration, Defense & Social Security	Ministry of Finance
8	Education	Ministry of Finance & Controller and Accountant General Department
9	Health & Social Work	Ministry of Finance & Controller and Accountant General Department
10	Information & Communication	National Communication Authority & Vat
11	Financial & Insurance Activities	Bank of Ghana

The most important classifications used in QNA include the industrial classification of economic activities ISIC Rev 4. The same level of industrial classification is used both at annual and quarterly estimates.

Currently the quarterly GDP is produced only by production approach and regular estimates of quarterly GVA are published approximately 100 days after the end of the reference quarter. Time series of GVA component by main economic activities, according to the production approach, are available in current prices, at base year prices and in seasonally adjusted form.

Quarterly National Accounts, to ensure better consistency with the Annual estimates, as well as complying with 2008 SNA, the volume measure of quarterly time series is expressed in average prices of the base year (2013=100).

Regular electronic publication and the complete time series of QNA can be downloaded at the:

https://statsghana.gov.gh/nationalaccount_macros.php?Stats=MjkwMzA1NjI0LjE0MTU=/webstats/oq43q9p651

Revision Policy

One of the most important aspects of the quarterly series relates to revisions policies. Using new information available, revisions take place with every quarter publication of the quarterly figures. These revisions are related to quarterly and annual data changes.

While the majority of revisions are made to the four most recent quarters of the series, there is no restriction on when an estimate of the quarterly series for a given period can be revised. The main causes of revisions are as follows:

- a) Incorporation of additional and improved data: Most revisions reflect the incorporation of a wider range of data. In particular, some data that were not available at the release date are incorporated through revisions into subsequent releases.
- b) Reconciliation of quarterly and annual measures: The process of reconciling the quarterly measures with the annual measures can lead to further revisions. The quarterly measures of these series are based on a smaller range of data than the annual measures.

4.1 The Links between Annual and Quarterly Series

Compared with data used to produce the annual series, the quarterly series for production measure of GDP are derived from a smaller range of data. As a result, they are regarded as being less accurate. Although the same sources and methods are used whenever possible, alternative sources and methods for the quarterly series are necessary when corresponding quarterly data are not available.

There are three possible types of relationship between quarterly and annual data:

Quarterly and annual series are derived from the same information sources. In this case, the annual figures are calculated by summing the estimates for the four appropriate quarters.

Quarterly and annual series are derived from different sources. In this situation, the quarterly indicator provides the basis for the quarterly movements. The independently derived annual series provides the annual benchmark levels. The quarterly indicator is reconciled to the annual series in a way that preserves the quarterly distribution within the time series with the condition that the annual sum of the resultant reconciled series equals the annual estimate.

No quarterly indicator series is available and quarterly estimates are prepared by interpolating between annual benchmarks. The estimates are generated using the same mathematical techniques used to reconcile quarterly indicators to annual benchmarks. For the latest quarters, estimates are prepared by extrapolating the interpolated quarterly series. This method is used sparingly.

4.2 Techniques used in Quarterly National Accounts

4.2.1 Benchmarking Quarterly GDP Estimates to Annual GDP Estimates

Benchmarking deals with the problem of combining a series of high-frequency data (e.g., quarterly data) with a series of less frequent data (e.g., annual data) for a certain variable to create a consistent time series.

Quarterly data sources often differ from those used in the corresponding annual estimates, and the typical result is that annual and quarterly data sources show inconsistent annual movements. In a few cases, the quarterly data may be superior and so may be used to replace the annual data. More typically, the annual data provide the most reliable information on the overall level and long-term movements in the series, while the quarterly source data provide the only available explicit information about the short-term movements in the series, so that there is a need to combine the information content of both the annual and quarterly sources.

Annual estimates of nominal GDP are not computed as the sum of the four quarterly estimates for the year but on the basis of detailed industry data compiled from more comprehensive data sources. Accordingly, the yearly sums of the quarterly estimates would not be expected to be equal to the independently compiled annual estimates. Thus, it is necessary to re-align or benchmark the quarterly estimates with the annual estimates.

Benchmarking of quarterly estimates to annual estimates will ensure consistency in these estimates. The proportional Denton benchmarking technique is adopted and results in a revised series of quarterly estimates with growth rates similar to the original series, but whose annual totals are equal to the annual estimates.

With this procedure, the adjustments applied to each observation are proportional to its magnitude; the larger values will be adjusted to a larger extent than the smaller values. By avoiding the introduction of artificial discontinuities between the fourth quarter and the first quarter of the following year, this procedure has the further advantage of preserving the seasonality of the original series.

When the annual estimate is given as the 'sum of the quarters', the annual value is derived as the sum of the deflated quarterly series. Reconciliation to the annual value, therefore, becomes unnecessary. If the method is described as 'extrapolation by a quarterly indicator', then the quarterly series is reconciled to the annual value. As each new annual value becomes available this involves interpolation between the latest annual values using the quarterly indicator. Price deflation can only be used when current price annual data is available from the balanced national accounts.

4.2.2 Compilation of Seasonally Adjusted GDP Data Series

Seasonal adjustment means using analytical techniques to break down a series into its components. The purpose is to identify the different components of the time series and thus provide a better understanding of the behavior of the time series. Seasonal adjustment therefore, serves to facilitate an understanding of the development of the economy over time, that is, the direction and magnitude of changes that have taken place. Such understanding can be best pursued through the analyses of time series.

Seasonal variations occur in many quarterly series. These may be caused by several factors, such as the effect of Christmas on household spending patterns, or the influence of seasons on stock building in the dairy industry. The extent and nature of seasonality varies markedly between series. Not all seasonal influences are regular, strong, or of sufficient duration to permit reliable seasonal adjustment.

Seasonal adjustment attempts to remove seasonal variation from a series allowing the remaining sources of change (trend and irregular components) to be more easily observed.

To measure economic growth in a quarter, some economies use year-on-year change in GDP (GDP in the reference quarter compared with that in the same quarter of the preceding year). However, this approach eliminates the influence of seasonal variations on GDP growth to a certain extent. In addition, analysis on a year-on-year basis has the practical merit that it is generally well understood by data users. However, it is not sensitive enough to reveal changes in economic cycles. Therefore, quarter-to-quarter changes in the seasonally adjusted series, with the seasonal variations removed, can normally capture the turning points over the economic cycle more accurately than the year-on-year series, and hence is more useful for analysis of short-term fluctuations.

Therefore, more sophisticated procedures are needed to remove seasonal patterns from the series. Various well-established techniques are available for this purpose. The most commonly used technique is the Census X-11/X-12 (“X-11 ARIMA”) method. Other available seasonal adjustment methods include TRAMO-SEATS, DEMETRA, SABLE, and STAMP.

The “X-12 ARIMA” method is the most commonly used in compiling seasonally adjusted GDP data series and has been adopted by Ghana. This method was developed by Statistics Canada and is used commonly worldwide. Under this method, diagnostic tests on the presence of seasonality in a data series are first carried out. Data series which do not display a distinct seasonal pattern or in which the irregular elements are predominant fail to pass the diagnostic tests and seasonal adjustment should not be performed on these. The diagnostic tests also check for the presence of stable seasonality throughout the time series. Stable seasonality refers to the situation in which the seasonal effects are recursive in the same period each year throughout the time series.

For data series that display abrupt changes in the seasonal patterns from one period to another, seasonal adjustment is not done. In the case of data series that show a clear and stable seasonal pattern, the data series are subject to iterative cycles in which seasonal factors are computed at various stages. A final set of seasonal factors is then derived for application in seasonal adjustment.

The seasonal adjustment method used by Ghana Statistical Service (GSS) for quarterly national accounts is the X-12 ARIMA of the seasonal adjustment programme. The technique uses all observations in a series to determine the seasonal pattern, extra periods added to the series can alter the pattern and cause revisions.

The level at which data series are seasonally adjusted is important. The indirect approach seasonally adjusts the individual component series of the main economic variables and then sums them up. For example, seasonally adjusted total Agriculture is the sum of its 4 sub-component series, most of which are individually seasonally adjusted. Component series that cannot be seasonally adjusted are still included in the total.

The indirect approach, however, may produce unsatisfactory results if a high proportion of the component series cannot be seasonally adjusted, that is, seasonality in the component series is not sufficiently strong to warrant adjustment. When such groups of non-seasonal series are added together, the underlying seasonality often becomes more apparent and can be adjusted. To remove this residual seasonality, a number of series are seasonally adjusted at the total level, independently of the seasonal adjustment of their components. The seasonal adjustment of the total of an aggregate series is called a direct seasonal adjustment.

A summary of the method of seasonal adjustment for the production-based series is listed below.

When an industry is indirectly adjusted, it may be done at the lowest level of aggregation, the level immediately below the published level or at a mixture of levels. For example, seasonally adjusted agriculture is calculated by seasonally adjusting value added for total farming and total agricultural services and aggregating the results.

Seasonally adjusted manufacturing is calculated by adjusting the components of manufacturing production groups, and aggregating to total manufacturing. Seasonal adjustment can be done at any level in a series hierarchy that results in the seasonally adjusted published form of that series.

CHAPTER FIVE

FUTURE DEVELOPMENTS

There are some key areas for future development in Ghana's national accounts over the coming years, some of which will be done concurrently.

Compilation of Quarterly GDP using the expenditure approach. The HFCE forms over 70 percent of GDP_E. Data from the Annual Household Income and Expenditure survey (AHIES) will provide data for the estimation of quarterly HFCE for the compilation of quarterly GDP by the expenditure approach.

There is the need to accurately estimate the HFCE on an annual and quarterly basis. The data for the estimation of the HFCE is obtained from the Ghana Living Standard Survey (GLSS) conducted every five years. In between the years that GLSS is conducted, the HFCE is estimated as a residual component in the GDP_E.

The compilation of a system of national accounts generates various time series and these reflect the performance of the economy that has been expressed in terms of a common valuation. Over time, comparisons using values will not be very meaningful, as the changes observed may only be a reflection of varying price levels rather than the volume of goods and services produced or consumed.

To overcome this problem, it is recommended that rebasing is done every five years. Activities towards the next rebasing have commenced. In view of this, if most of the surveys and censuses used are undertaken, the next rebasing of Ghana's GDP will be done in 2026 with the base year of 2022.

In addition, GSS is planning to produce time series in chain-linking volume measures with the aim to further improve the volume GDP estimates.

Moreover, GSS is planning to compile the regional GDP by production approach. In addition, an estimation of annual regional HFCE will be compiled using the new annual household income and expenditure survey data.

Appendix 3A: Gross Domestic Product

Table A1: Gross Domestic Product (GDP) at Current Market Prices by Economic Activity (Gh¢ Million)

		2013	2014	2015	2016	2017	2018	2019	2020*
1.	AGRICULTURE	25,356	31,076	36,673	45,773	51,408	55,967	61,765	73,840
1.01	Crops	18,521	22,403	26,574	34,965	39,730	43,801	48,925	59,927
	<i>o.w. Cocoa</i>	2,597	4,267	4,781	5,028	5,490	5,694	5,793	6,659
1.02	Livestock	3,058	3,914	4,251	4,583	4,987	5,288	5,655	6,134
1.03	Forestry and Logging	2,014	2,844	3,398	3,483	3,988	4,168	4,257	4,128
1.04	Fishing	1,762	1,916	2,450	2,742	2,703	2,710	2,929	3,651
2.	INDUSTRY	42,434	53,791	57,112	60,813	78,714	96,211	110,913	114,046
2.01	Mining and Quarrying	15,558	22,265	17,137	16,851	26,268	39,296	47,460	43,908
	<i>o.w. Oil***</i>	6,649	9,556	4,692	1,027	9,023	16,971	21,335	13,793
2.02	Manufacturing	14,425	17,487	20,368	23,761	26,680	31,229	36,229	40,166
2.03	Electricity	1,341	1,393	3,009	3,522	4,435	4,221	4,377	4,758
2.04	Water and Sewerage	703	730	1,577	1,846	2,324	2,212	2,294	2,464
2.05	Construction	10,408	11,916	15,020	14,833	19,007	19,252	20,552	22,750
3.	SERVICES	50,524	59,370	74,356	96,437	114,272	134,786	160,948	172,608
3.01	Trade; Repair Of Vehicles, Household Goods	13,877	16,842	21,645	29,505	35,315	44,713	53,766	55,766
3.02	Hotels and Restaurants	4,675	5,384	5,905	7,417	9,453	10,807	12,473	8,974
3.03	Transport and Storage	7,055	7,801	10,057	13,259	17,294	21,083	23,530	26,117
3.04	Information and Communication	1,949	2,890	3,801	4,473	5,237	7,056	10,177	12,831
3.05	Financial and Insurance activities	5,883	7,110	9,437	13,359	11,876	11,613	12,637	14,022
3.06	Real Estate	1,173	1,368	2,228	3,556	5,700	6,263	9,006	10,992
3.07	Professional, Administrative & Support Service activities	1,671	2,192	2,762	3,229	3,813	4,284	5,016	5,217
3.08	Public Administration & Defence; Social Security	4,585	4,891	5,630	6,990	8,436	9,942	11,643	12,998
3.09	Education	5,325	5,888	7,125	7,826	9,129	10,076	12,155	14,237
3.10	Health and Social Work	2,700	3,214	3,555	4,112	5,101	5,999	7,234	7,998
3.11	Other Service Activities	1,630	1,789	2,212	2,710	2,918	2,948	3,312	3,457
4.	GROSS DOMESTIC PRODUCT at basic prices	118,314	144,237	168,141	203,023	244,394	286,964	333,626	360,494
	Net indirect Taxes	6,164	14,447	15,384	16,572	18,404	21,623	22,918	22,992
5.	GROSS DOMESTIC PRODUCT in purchasers' value	124,478	158,684	183,526	219,595	262,798	308,587	356,544	383,486
	Low informal GDP at purchasers' value	36,288	44,197	52,019	64,926	73,794	81,722	90,051	101,383
	*Provisional								
	*** Oil means Oil and Gas								

Table A2: Gross Domestic Product (GDP) at Constant 2013 Prices by Economic Activity (Gh¢ Million)

		2013	2014	2015	2016	2017	2018	2019	2020*
1.	AGRICULTURE	25,356	25,584	26,111	26,824	28,491	29,880	31,271	33,583
1.01	Crops	18,521	19,035	19,355	19,788	21,207	22,447	23,636	25,703
	<i>o.w. Cocoa</i>	2,597	2,709	2,493	2,318	2,531	2,625	2,768	2,821
1.02	Livestock	3,058	3,214	3,383	3,564	3,766	3,969	4,184	4,412
1.03	Forestry and Logging	2,014	1,983	1,905	1,960	2,026	2,073	2,037	1,851
1.04	Fishing	1,762	1,352	1,467	1,513	1,492	1,391	1,414	1,618
2.	INDUSTRY	42,434	42,914	43,408	45,285	52,355	57,854	61,537	59,344
2.01	Mining and Quarrying	15,558	16,394	15,040	15,004	19,619	24,192	27,240	24,244
	<i>o.w. Oil***</i>	6,649	7,266	7,412	6,255	11,279	12,175	13,932	13,288
	<i>o.w. Gold</i>	8,422	8,564	6,940	8,134	7,907	9,459	8,927	7,841
2.02	Manufacturing	14,425	14,055	14,569	15,723	17,219	17,933	19,066	19,331
2.03	Electricity	1,341	1,358	1,598	1,506	1,799	1,898	2,012	2,171
2.04	Water and Sewerage	703	744	848	748	793	765	731	747
2.05	Construction	10,408	10,363	11,352	12,303	12,926	13,067	12,488	12,851
3.	SERVICES	50,524	53,154	54,683	56,191	58,128	59,761	64,317	65,260
3.01	Trade; Repair Of Vehicles, Household Goods	13,877	14,160	14,232	14,168	15,331	15,754	16,330	16,155
3.02	Hotels and Restaurants	4,675	4,746	4,939	5,052	5,439	5,612	5,950	3,880
3.03	Transport and Storage	7,055	7,463	7,659	7,747	8,440	8,533	8,903	9,229
3.04	Information and communication	1,949	2,528	2,830	2,987	3,112	3,520	5,158	6,318
3.05	Financial and Insurance Activities	5,883	7,141	8,062	8,707	7,165	6,577	6,681	7,046
3.06	Real Estate	1,173	1,170	1,207	1,245	1,292	1,208	1,448	1,629
3.07	Professional, Administrative & Support Service activities	1,671	1,785	1,810	1,734	1,784	1,788	1,879	1,769
3.08	Public Administration & Defence; Social Security	4,585	4,424	4,311	4,693	4,889	5,099	5,287	5,673
3.09	Education	5,325	5,309	5,285	5,406	5,747	5,973	6,535	7,045
3.10	Health and Social Work	2,700	2,773	2,650	2,756	3,145	3,854	4,256	4,605
3.11	Other Service Activities	1,630	1,654	1,697	1,696	1,786	1,842	1,890	1,911
4.	GROSS DOMESTIC PRODUCT at basic prices	118,314	121,652	124,201	128,300	138,974	147,496	157,125	158,187
	Net indirect Taxes	6,164	6,380	6,547	6,859	7,172	7,711	8,182	7,805
5.	GROSS DOMESTIC PRODUCT in purchasers' value	124,478	128,033	130,748	135,159	146,146	155,207	165,308	165,993
	Low informal GDP at purchasers' value	36,288	37,086	38,119	39,156	41,562	42,648	45,156	44,783
	*provisional								
	***Oil means Oil and Gas								

Table A3: Quarterly Gross Domestic Product at current prices by economic activity and respective sectoral distribution

Appendix 1- Quarterly Gross Domestic Product at current prices by economic activity and respective sectoral distribution													
Year Quarter	Value Added (GHC Million)								% of GDP (@ basic prices)				
	Agriculture	Industry	Services	Total Value Added (GDP @ basic prices)	Net Indirect Taxes	Total (GDP in purchaser's value)	own Informal (GDP in purchaser's value)	Total Non-Oil (GDP in purchaser's value)	Agriculture	Industry	Services	Total Value Added (GDP @ basic prices)	own Informal (GDP in purchaser's value)
2013_Q1	6,698.2	11,056.7	10,733.0	28,487.9	1,319.6	29,807.5	9,155.8	28,038.9	23.5	38.8	37.7	100.0	30.7
2013_Q2	5,521.8	10,753.2	12,632.2	28,907.2	1,507.6	30,414.8	8,289.1	28,715.7	19.1	37.2	43.7	100.0	27.3
2013_Q3	5,933.7	10,335.5	12,666.1	28,935.2	1,514.2	30,449.4	8,646.8	28,924.8	20.5	35.7	43.8	100.0	28.4
2013_Q4	7,202.2	10,288.8	14,492.4	31,983.5	1,822.4	33,805.9	10,196.4	32,149.4	22.5	32.2	45.3	100.0	30.2
2014_Q1	8,008.4	10,889.4	11,653.6	30,551.4	3,189.8	33,741.2	10,558.9	32,301.4	26.2	35.6	38.1	100.0	31.3
2014_Q2	6,749.9	12,717.3	14,930.9	34,398.1	3,358.4	37,756.5	9,973.4	35,475.4	19.6	37.0	43.4	100.0	26.4
2014_Q3	7,356.8	15,459.3	16,912.4	39,728.6	3,671.1	43,399.7	11,138.6	40,426.8	18.5	38.9	42.6	100.0	25.7
2014_Q4	8,961.1	14,725.0	15,872.6	39,558.8	4,227.8	43,786.6	12,525.7	40,924.6	22.7	37.2	40.1	100.0	28.6
2015_Q1	9,528.0	13,111.5	17,669.7	40,309.2	3,652.8	43,962.1	13,105.1	42,016.2	23.6	32.5	43.8	100.0	29.8
2015_Q2	7,885.1	15,330.2	18,629.0	41,844.3	3,602.4	45,446.7	11,785.8	44,003.5	18.8	36.6	44.5	100.0	25.9
2015_Q3	8,712.4	13,938.0	18,115.6	40,766.0	3,776.1	44,542.1	12,441.7	43,680.7	21.4	34.2	44.4	100.0	27.9
2015_Q4	10,547.8	14,732.3	19,941.5	45,221.7	4,353.0	49,574.7	14,686.6	49,133.4	23.3	32.6	44.1	100.0	29.6
2016_Q1	12,099.8	14,969.4	22,294.6	49,363.8	3,801.2	53,165.0	16,582.3	53,070.6	24.5	30.3	45.2	100.0	31.2
2016_Q2	9,690.3	14,882.7	23,556.0	48,129.0	4,355.5	52,484.5	14,364.4	52,440.4	20.1	30.9	48.9	100.0	27.4
2016_Q3	10,870.7	15,127.1	24,036.0	50,033.8	3,814.4	53,848.2	15,622.9	53,636.2	21.7	30.2	48.0	100.0	29.0
2016_Q4	13,112.2	15,833.7	26,550.3	55,496.2	4,600.7	60,096.9	18,356.4	59,420.3	23.6	28.5	47.8	100.0	30.5
2017_Q1	12,478.6	18,401.6	27,420.0	58,300.2	3,968.8	62,269.0	17,799.0	60,905.3	21.4	31.6	47.0	100.0	28.6
2017_Q2	10,039.7	19,210.8	29,674.0	58,924.5	4,331.0	63,255.5	15,792.4	61,179.2	17.0	32.6	50.4	100.0	25.0
2017_Q3	12,689.8	21,206.5	29,499.0	63,395.2	4,843.1	68,238.3	18,555.6	65,330.0	20.0	33.5	46.5	100.0	27.2
2017_Q4	16,199.7	19,895.0	27,679.1	63,773.8	5,261.4	69,035.1	21,647.0	66,361.0	25.4	31.2	43.4	100.0	31.4
2018_Q1	15,053.6	24,271.9	32,874.8	72,200.3	5,242.7	77,443.0	21,286.2	72,938.6	20.8	33.6	45.5	100.0	27.5
2018_Q2	12,228.9	23,411.1	31,201.3	66,841.3	4,917.0	71,758.3	18,142.1	67,897.1	18.3	35.0	46.7	100.0	25.3
2018_Q3	12,983.5	25,402.2	35,007.9	73,393.6	5,368.0	78,761.7	19,791.2	74,147.8	17.7	34.6	47.7	100.0	25.1
2018_Q4	15,701.0	23,125.5	35,702.4	74,528.9	6,095.5	80,624.4	22,502.7	76,632.8	21.1	31.0	47.9	100.0	27.9
2019_Q1	17,536.5	26,376.3	38,436.5	82,349.4	5,752.2	88,101.5	24,127.3	82,086.7	21.3	32.0	46.7	100.0	27.4
2019_Q2	13,595.0	26,911.4	39,874.0	80,380.4	5,528.6	85,909.0	20,531.7	80,556.8	16.9	33.5	49.6	100.0	23.9
2019_Q3	14,227.0	29,533.8	41,504.1	85,264.8	5,691.6	90,956.4	21,683.5	85,495.6	16.7	34.6	48.7	100.0	23.8
2019_Q4	16,406.5	28,091.3	41,133.6	85,631.4	5,945.9	91,577.3	23,708.5	87,070.5	19.2	32.8	48.0	100.0	25.9
2020_Q1*	19,832.7	25,195.7	55,778.8	100,807.2	4,493.5	105,300.7	28,653.8	100,459.9	19.7	25.0	55.3	100.0	27.2
2020_Q2*	15,458.3	26,424.5	41,531.0	83,413.8	5,056.3	88,470.1	21,923.2	85,661.5	18.5	31.7	49.8	100.0	24.8
2020_Q3*	17,869.3	29,897.6	37,057.3	84,824.2	6,739.1	91,563.4	23,784.9	88,504.8	21.1	35.2	43.7	100.0	26.0
2020_Q4*	20,679.4	32,528.4	38,241.2	91,449.0	6,702.9	98,151.8	27,021.0	95,067.1	22.6	35.6	41.8	100.0	27.5
2021_Q1*	27,335.9	28,091.4	60,470.9	115,898.2	5,914.0	121,812.1	35,014.9	116,037.5	23.6	24.2	52.2	100.0	28.7
2021_Q2*	19,801.3	27,873.1	50,658.8	98,333.2	7,057.1	105,390.3	26,473.2	101,273.0	20.1	28.3	51.5	100.0	25.1
2021_Q3**	24,049.0	31,732.7	44,923.5	100,705.2	9,405.7	110,111.0	30,377.8	105,627.3	23.9	31.5	44.6	100.0	27.6

*revised ** provisional

Table A4: Quarterly value added and GDP at constant 2013 prices by economic activity

Appendix 2 - Quarterly value added and GDP at constant 2013 prices by economic activity															
Year	Quarter	Quarterly Value Added (Ghc Million)							Year-on-Year change (%)						
		Agriculture	Industry	Services	Total Value Added (GDP @_basic prices)	Net indirect Taxes	Total (Oil GDP in purchaser's value)	ow Informal GDP in purchaser's value	Total (Non Oil GDP)***	Agriculture	Industry	Services	Total (Oil GDP)**	ow Informal GDP in purchaser's value	Total I (Non-oil GDP)**
2013_Q1		6,698.2	11,056.7	10,733.0	28,487.9	1,319.6	29,807.5	9,155.8	28,038.9						
2013_Q2		5,521.8	10,753.2	12,632.2	28,907.2	1,507.6	30,414.8	8,289.1	28,715.7						
2013_Q3		5,933.7	10,335.5	12,666.1	28,935.2	1,514.2	30,449.4	8,646.8	28,924.8						
2013_Q4		7,202.2	10,288.8	14,492.4	31,983.5	1,822.4	33,805.9	10,196.4	32,149.4						
2014_Q1		6,594.6	9,859.3	11,780.5	28,234.3	1,243.8	29,478.1	9,206.1	27,670.0	-1.5	-10.8	9.8	-1.1	0.5	-1.3
2014_Q2		5,534.3	10,803.0	13,432.7	29,770.0	1,549.1	31,319.1	8,432.7	29,627.1	0.2	0.5	6.3	3.0	1.7	3.2
2014_Q3		6,065.7	11,178.2	13,825.6	31,069.5	1,761.0	32,830.5	9,034.1	31,013.8	2.2	8.2	9.2	7.8	4.5	7.2
2014_Q4		7,389.6	11,073.6	14,115.4	32,578.6	1,826.6	34,405.3	10,412.7	32,455.8	2.6	7.6	-2.6	1.8	2.1	1.0
2015_Q1		6,818.0	10,852.6	13,698.7	31,369.4	1,298.9	32,668.3	9,814.2	30,825.5	3.4	10.1	16.3	10.8	6.6	11.4
2015_Q2		5,575.5	11,129.0	13,985.7	30,690.2	1,653.0	32,343.2	8,651.2	30,582.9	0.7	3.0	4.1	3.3	2.6	3.2
2015_Q3		6,161.5	10,456.1	12,965.0	29,582.6	1,713.6	31,296.2	9,011.6	29,563.9	1.6	-6.5	-6.2	-4.7	-0.2	-4.7
2015_Q4		7,555.5	10,970.4	14,033.4	32,559.3	1,881.2	34,440.5	10,642.2	32,363.5	2.2	-0.9	-0.6	0.1	2.2	-0.3
2016_Q1		6,891.9	10,870.9	13,415.6	31,178.4	1,350.0	32,528.3	9,858.6	31,058.9	1.1	0.2	-2.1	-0.4	0.5	0.8
2016_Q2		5,746.5	10,551.5	13,679.6	29,977.7	1,564.1	31,541.8	8,708.0	30,807.0	3.1	-5.2	-2.2	-2.5	0.7	0.7
2016_Q3		6,355.9	12,036.7	14,407.1	32,799.7	1,979.6	34,779.3	9,546.6	32,969.0	3.2	15.1	11.1	11.1	5.9	11.5
2016_Q4		7,829.8	11,825.4	14,688.8	34,344.0	1,965.5	36,309.5	11,042.9	34,069.5	3.6	7.8	4.7	5.4	3.8	5.3
2017_Q1		7,302.5	12,643.8	13,654.3	33,600.6	1,410.9	35,011.6	10,400.1	32,731.3	6.0	16.3	1.8	7.6	5.5	5.4
2017_Q2		5,980.8	12,483.0	15,311.9	33,775.8	1,699.7	35,475.5	9,338.5	33,248.0	4.1	18.3	11.9	12.5	7.2	7.9
2017_Q3		6,907.8	13,664.5	14,719.2	35,291.6	1,930.3	37,221.9	10,246.2	34,049.8	8.7	13.5	2.2	7.0	7.3	3.3
2017_Q4		8,299.8	13,564.1	14,442.5	36,306.4	2,130.6	38,437.0	11,577.7	34,838.4	6.0	14.7	-1.7	5.9	4.8	2.3
2018_Q1		7,825.8	14,475.4	14,989.2	37,290.4	1,532.0	38,822.4	11,000.5	35,992.5	7.2	14.5	9.8	10.9	5.8	10.0
2018_Q2		6,440.1	13,606.8	14,783.9	34,830.7	1,823.3	36,654.0	9,524.6	34,119.6	7.7	9.0	-3.4	3.3	2.0	2.6
2018_Q3		6,996.0	15,403.5	15,110.5	37,510.1	2,160.7	39,670.8	10,307.7	36,365.3	1.3	12.7	2.7	6.6	0.6	6.8
2018_Q4		8,618.1	14,368.6	14,877.8	37,864.6	2,195.2	40,059.8	11,814.9	36,554.8	3.8	5.9	3.0	4.2	2.0	4.9
2019_Q1		8,307.1	15,641.9	15,629.0	39,578.0	1,525.5	41,103.5	11,698.7	37,938.7	6.2	8.1	4.3	5.9	6.3	5.4
2019_Q2		6,773.7	15,503.7	15,703.7	37,981.1	2,001.1	39,982.2	10,181.7	36,692.3	5.2	13.9	6.2	9.1	6.9	7.5
2019_Q3		7,313.6	16,060.1	16,246.2	39,619.9	2,146.6	41,766.5	10,871.8	37,948.4	4.5	4.3	7.5	5.3	5.5	4.4
2019_Q4		8,876.7	14,331.6	16,737.8	39,946.1	2,509.2	42,455.3	12,403.7	38,795.8	3.0	-0.3	12.5	6.0	5.0	6.1
2020_Q1*		9,157.3	15,861.9	17,549.0	42,568.2	1,431.3	43,999.5	12,209.1	40,948.1	10.2	1.4	12.3	7.0	4.4	7.9
2020_Q2*		7,151.8	14,291.8	14,493.5	35,937.0	1,773.2	37,710.3	9,598.6	34,580.9	5.6	-7.8	-7.7	-5.7	-5.7	-5.8
2020_Q3*		7,671.3	14,910.7	15,702.4	38,284.4	2,155.9	40,440.3	10,381.9	36,823.7	4.9	-7.2	-3.3	-3.2	-4.5	-3.0
2020_Q4*		9,602.8	14,279.6	17,515.3	41,397.7	2,444.9	43,842.6	12,593.4	40,352.1	8.2	-0.4	4.6	3.3	1.5	4.0
2021_Q1*		10,010.4	16,075.1	18,253.1	44,338.5	1,495.5	45,834.0	12,747.4	43,275.8	9.3	1.3	4.0	4.2	4.4	5.7
2021_Q2*		8,001.3	13,675.9	16,084.0	37,761.1	1,853.7	39,614.8	10,326.6	36,822.5	11.9	-4.3	11.0	5.1	7.6	6.5
2021_Q3**		8,375.3	14,614.2	17,801.8	40,791.4	2,302.2	43,093.5	11,001.5	39,974.4	9.2	-2.0	13.4	6.6	6.0	8.6

*revised ** provisional

Table A5: GDP at current prices by expenditure (in million Ghana Cedis) - Percentage Distribution

	Household final consumption expenditure	General government final consumption expenditure	NPISH final consumption	Consumption	Gross fixed capital formation	Change in stock: Reforestation	Change in stock: Crude Oil	Change in stock: Livestock	Gross capital formation	Domestic Demand	Exports of goods and services	Imports of goods and services	Net Exports	Gross Domestic Expenditure
	1	2	3	4=1+2+3	5	6	7	8	9= 5+6+7+8	10= 4+9	11	12	13= 11-12	14
2013	94,065.2	10,933.1	939.6	105,938	29,923.2	429.0	93.3	389.9	30,835.3	136,773	31,668.1	43,963.7	(12,295.6)	124,477.6
2014	113,074.4	13,119.7	1,030.9	127,225	41,928.9	654.7	157.3	417.5	43,158.4	170,383	44,799.5	56,498.9	(11,699.4)	158,684.0
2015	133,325.5	14,095.7	1,274.9	148,696	49,575.1	849.2	210.4	451.3	51,086.0	199,782	62,089.9	78,346.3	(16,256.4)	183,525.6
2016	156,306.6	17,319.3	1,562.2	175,188	54,516.9	891.7	578.0	476.7	56,463.4	231,651	68,498.7	80,555.6	(12,056.9)	219,594.6
2017	196,057.5	18,283.0	1,681.5	216,022	49,633.1	1,008.8	2,964.0	514.2	54,120.1	270,142	89,027.7	96,371.9	(7,344.2)	262,798.0
2018	218,306.8	21,924.5	1,699.4	241,931	65,417.7	1,166.1	2,759.2	550.0	69,893.0	311,824	103,237.6	106,473.8	(3,236.2)	308,587.4
2019	266,276.4	25,112.1	1,909.0	293,298	64,314.1	1,459.5	3,748.8	589.8	70,112.4	363,410	133,524.4	140,390.0	(6,865.6)	356,544.3
2020*	289,854.6	30,702.3	1,992.5	322,549	69,219.7	1,517.9	3,380.9	632.7	74,751.2	397,301	123,561.0	137,375.5	(13,814.6)	383,486.1

Table A6: GDP by expenditure at 2013 constant prices (in million Ghana Cedis) and growth rate

	Household final consumption expenditure	General government final consumption expenditure	NPISH final consumption	Consumption	Gross fixed capital formation	Change in stock: Reforestation	Change in stock: Crude Oil	Change in stock: Livestock	Gross capital formation	Domestic Demand	Exports of goods and services	Imports of goods and services	net Exports	Gross Domestic Expenditure
	1	2	3	4= 1+2+3	5	6	7	8	9= 4+5+6+7	10= 3+8	11	12	13= 11-12	14
2013	94,065.2	10,933.1	939.6	105,938	29,923.2	429.0	93.3	389.9	30,835.3	136,773	31,668.1	43,963.7	(12,295.6)	124,477.6
2014	89,249.4	11,769.3	953.0	101,972	31,451.5	436.0	124.7	311.1	32,323.3	134,295	31,365.1	37,627.1	(6,262.1)	128,033.0
2015	91,172.8	10,768.6	978.4	102,920	30,594.6	440.2	181.7	329.9	31,546.4	134,466	36,893.9	40,611.8	(3,717.9)	130,748.2
2016	89,190.3	11,428.1	977.5	101,596	34,337.2	444.6	645.4	341.9	35,769.2	137,365	37,961.5	40,167.6	(2,206.1)	135,159.0
2017	92,844.3	10,191.3	1,029.5	104,065	34,690.4	452.7	2,832.6	361.4	38,337.2	142,402	46,992.5	43,248.9	3,743.6	146,145.9
2018	96,413.9	10,378.0	1,061.8	107,854	39,253.5	497.2	2,516.9	379.1	42,646.7	150,500	50,101.7	45,395.0	4,706.7	155,207.1
2019	109,836.7	10,936.6	1,089.4	121,863	35,319.2	442.5	3,407.6	398.7	39,567.9	161,431	56,481.2	52,604.3	3,876.9	165,307.6
2020*	111,255.1	12,041.5	1,101.5	124,398	35,944.5	429.0	3,528.4	420.2	40,322.1	164,720	49,257.4	47,985.0	1,272.4	165,992.7

Appendix B : Gross Domestic Product

Table B1: Supply and Use tables

Description		In million GHC	Structure
Supply	Domestic supply	213,403	81.0%
	Imports of goods and services	43,964	16.7%
	Net taxes on products	6,164	2.3%
	TOTAL SUPPLY at purchases prices	263,531	100.0%
Use	Intermediate consumption	95,090	36.1%
	Final consumption Households	94,065	35.7%
	Final consumption Government	10,933	4.1%
	Final consumption NPISH	940	0.4%
	Gross Capital formation	30,835	11.7%
	Exports of goods and services	31,668	12.0%
	TOTAL USE at purchases prices	263,531	100.0%

Table B2: Supply tables at current prices for year 2013, in GHC millions

ISIC Rev 4								
CPC 2.1	Agriculture	Industry	Service	Total output	Imports CIF	CIF/FOB adjustment	MTT*	Total Supply at Purchases Prices
Agriculture	42,676	-	-	42,676	924		14,319	57,919
Industry	-	68,492	54	68,546	37,141		31,218	136,905
Service	47	2,858	99,276	102,181	8,535	(2,637)	(39,372)	68,707
Cif/ fob adjustments						2,637		
Total output by activity	42,723	71,350	99,330	213,403	46,601	-	6,164	263,531

Trade, transport margins and net taxes on products

Table B3: Use tables at current prices for year 2013, in GHC millions

ISIC Rev.4	Agriculture	Industry	Service	Total Intermediate Consumption	FD*	Tot Use at purchases prices
CPC 2.1						
Agriculture	7,802	3,912	3,448	15,162	42,757	57,919
Industry	5,212	19,711	29,566	54,489	82,416	36,905
Service	4,354	5,293	15,792	25,439	43,268	68,707
Total intermediate consumption/final use at purchasers' prices	17,367	28,916	48,807	95,090	168,441	263,531
Value added at basic prices	25,356	42,434	50,524	118,314		

*** Total Final Demand: Final expenditures of households, government, NPISH, Gross Capital formation and Exports*

Table B4: Supply table at Purchases' prices, Year 2013

No.	Code	ISIC Rev 4 / Activities CPC 2.1/product	A	B-E	F	G, H, I	J	K	L, M, N	O, P, Q	R, S, T	Total output	Imports	CIF/FOB adjustment	Total supply at Basic prices	Net Taxes in products	Margins	Total supply at Purchases Prices
1	P01-03	Agriculture, forestry and fishing	42,676	0	0	0	0	0	0	0	0	42,676	924	0	43,601	1,717	12,602	57,919
2	P11-49	Industry	0	47,380	0	0	32	0	22	0	0	47,435	36,106	0	83,540	3,474	27,570	114,584
3	P53-54	Construction	0	22	21,089	0	0	0	0	0	0	21,112	1,035	0	22,147	173	0	22,321
4	P61-68	Trade; transport; accommodation and food services	47	971	448	62,086	1	0	16	19	3	63,590	886	-2,382	62,094	462	-40,172	22,384
5	P71	Financial and insurance services	0	0	0	0	0	7,643	0	0	0	7,643	755	-256	8,142	0	0	8,142
6	P72-89, excl	Real Estate, Professional, scientific, administrative and support	0	1,439	0	2,753	209	0	4,506	0	430	9,338	5,298	0	14,636	22	0	14,658
7	P84	Information and communication	0	0	0	0	3,610	0	0	0	0	3,610	878	0	4,488	282	0	4,770
8	P91-93	Public administration, education, human health	0	0	0	0	0	0	0	15,794	0	15,794	98	0	15,892	0	0	15,892
9	P95-98	Arts, entertainment and recreation services and other	0	0	0	0	0	6	0	0	2,201	2,207	620	0	2,827	33	0	2,860
10	Total		42,723	49,813	21,537	64,839	3,857	7,643	4,544	15,813	2,634	213,403	46,601	(2,637)	257,367	6,164	-	263,531
11	DP7A	Cif/ fob adjustments												2,637				
12	P.1	Total output	42,723	49,813	21,537	64,839	3,857	7,643	4,544	15,813	2,634	213,403		-				

(at section level by products and industries)

Table B5: Use table at Purchases' prices, Year 2013

No.	Code	ISIC Rev 4 / Activities CPC 2.1/product	A	B-E	F	G, H, I	J	K	L, M, N	O, P, Q	R, S, T	Total Intermediate Consumption	Household Final Consumption Expenditures	NPISH	General Government Final Expenditure consumption	Gross Fixed Capital Formation	Changes Inventories	Exports (Fob)	Total final demand	Total use at Purchases Prices
1	P01-03	Agriculture, forestry and fishing	7,802	3,380	532	3,446	0	0	2	0	0	15,162	36,845	0	0	0	819	5,093	42,757	57,919
2	P11-49	Industry	5,202	10,488	9,038	25,393	531	560	911	1,598	574	54,295	31,478	0	0	6,938	93	21,779	60,289	114,584
3	P53-54	Construction	9	0	184	0	0	0	0	0	0	193	394	0	0	21,527	0	206	22,127	22,321
4	P61-68	Trade; transport; accommodation and food services	3,075	283	283	2,815	203	0	202	393	0	7,254	13,823	0	0	0	0	1,308	15,131	22,384
5	P71	Financial and insurance services	871	1,628	501	1,941	328	1	119	518	67	5,975	2,037	0	0	0	0	130	2,167	8,142
6	P72-89	Real Estate, Professional, scientific, administrative and support services	400	1,876	570	3,213	774	679	412	440	173	8,536	1,950	141	0	1,458	0	2,573	6,122	14,658
7	P84	Information and communication	0	15	12	2,339	38	393	18	0	27	2,842	1,824	0	0	0	0	103	1,928	4,770
8	P91-93	Public administration, education, human health	0	96	0	2	10	98	12	235	21	473	3,566	627	10,933	0	0	293	15,419	15,892
9	P95-98	Arts, entertainment and recreation services and other services	8	20	10	83	24	30	24	19	142	360	2,148	172	0	0	0	181	2,500	2,860
10	Total		17,367	17,786	11,129	39,232	1,908	1,760	1,700	3,203	1,004	95,090	94,065	940	10,933	29,923	912	31,668	168,441	263,531
11	DP6A	Cif/ fob adjustments on exports						-				-								-
12	P.2	Total intermediate consumption/f	17,367	17,786	11,129	39,232	1,908	1,760	1,700	3,203	1,004	95,090								
13	B1.g	Value added at basic prices	25,356	32,026	10,408	25,607	1,949	5,883	2,845	12,610	1,630	118,314								
14	P.1	Output at basic prices	42,723	49,813	21,537	64,839	3,857	7,643	4,544	15,813	2,634	213,403								

(at section level by products and industries)

Further Reading

Eurostat (1999), Handbook on Quarterly National Accounts, Luxembourg: European Communities

A. M. Bloem, R. J. Dippelsman, and N. O. Maehle (2001), Quarterly National Accounts Manual - Concepts, Data Sources, and Compilation, Washington DC: International Monetary Fund

Commission of European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations and World Bank (1993): System of National Accounts 1993.

International Standard Industrial Classification of All Economic Activities Revision 4
Department of Economic and Social Affairs, Statistics Division United Nations New York, 2008.

SNA (2008) System of National Accounts 2008. Inter-Secretariat Working Group on National Accounts. Commissions of the European Communities-Eurostat, International Monetary Fund, OECD, United Nations, World Bank. Brussels/Luxembourg, New York, Paris, Washington, DC.