

Compilation of Production-based Gross Domestic Product of Macao

Compilation of Macao's Gross Domestic Product (GDP) is in accordance to the concepts, definitions and classifications of *System of National Accounts 1993* (SNA 1993), with considerations to the characteristics of the local economy. In Macao, quarterly and annual GDP at current prices and constant prices are compiled using the expenditure approach, while GDP measured under production approach is compiled only annually at current prices due to lack of sufficient data. Therefore, expenditure-based GDP is the principal indicator used to measure the economic growth of Macao.

Macao's annual production-based GDP at basic prices is compiled based on the recommendations of SNA 1993, which is the sum of Gross Value Added (GVA) of all economic activities at basic prices, adding taxes on products, less Financial Intermediation Services Indirectly Measured (FISIM). GVA at basic prices equals value of Gross Output (GO) at basic prices, less value of Intermediate Consumption (IC) at purchasers' prices. Besides, GVA at producers' prices (including some of taxes on product) is an important reference to Macao, this is because concession tax (part of taxes on product) collected from concessionaire of water supply, electricity supply, telecommunications, public car parks, as well as operators of the gaming sector in Macao is deducted from the respective gross receipts or sales revenues, different from value added tax that is collected separately. Hence, concession tax is considered as part of the output generated from activities of the industry and should be included in GVA.

As the leading industry of Macao, gaming sector generates enormous amount of tax revenues; however, inclusion of gaming tax in its output will bring in considerable change to both the gaming sector and structure of the entire economy. As supplementary information, Macao compiles and provides GDP estimates at producers' prices.

Data Sources and Methods for Compiling Production-based GDP

Economic activities of Macao's production-based GDP are classified according to the *Classification of Economic Activities of Macao – Revision 1* (CAM-Rev.1). Data sources adopted for calculating gross value added (GVA) are figures collected from annual survey on principal economic activities, household survey, administrative data from government departments and private organizations. Estimation of gross output (GO), intermediate consumption (IC) and gross value added (GVA) by economic activities is as follows:

1. MINING AND QUARRYING; MANUFACTURING ; ELECTRICITY, GAS AND WATER SUPPLY

Main data source is the annual Industrial Survey, with value of sales adjusted by changes in inventories of finished goods and work-in-progress. Additional to production of goods, manufacturers also provide services to other manufacturers, in which the output is value of services provided to other parties (i.e. value of contract work). For sales of unprocessed goods, output is the resale margin (i.e. difference between sales price and purchase cost). Gross Output (GO) also includes rentals from leasing fixed assets for production, commissions and fees received for services rendered, etc.

Intermediate Consumption (IC) comprises cost of materials used in production adjusted with changes in inventories of materials, plus different types of operating expenses of the establishment, as well as payments of industrial services acquired. Payment to outworkers is part of compensation of employees.

Similar data sources and methods are applied to the mining and quarrying, production and distribution of electricity, gas and water sectors.

2. CONSTRUCTION

After 1991, main data source is the annual Construction Survey when the survey was conducted for the first time. Estimates prior to 1991 are based on the rate of change of expenditure on construction of buildings and other construction works of the expenditure-based GDP. Gross Output is the value of construction work carried out within the reference period (i.e. sum of actual receipts and the amount receivable for construction work performed).

Construction Survey covers both the main contractors and the sub-contractors; however, there are 2 kinds of sub-contractor, “fee sub-contractor” is responsible to build a specific part of a construction, including material and human resources; “labour-only sub-contractor” is responsible to ensure provision of human resources; consequently, value of construction work of the sub-contractors is included in the output of both the main and the sub-contractors. To avoid double counting, GO is the sum of value of construction of the main contractors and sub-contractors, less payment to fee sub-contractors, plus rentals from leasing of property or other fixed assets, commissions and fees for provision of consultant and other services. Payment to labour-only sub-contractors is part of compensation of employees.

Intermediate Consumption (IC) includes cost of construction materials, supplies on sites and other materials used in the course of construction, plus expenses on leasing, repair and maintenance, transport, insurance, technical consultancy, etc.

3. WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES, MOTORCYCLES AND PERSONAL AND HOUSEHOLD GOODS

Main data source is the annual Wholesale and Retail Survey. Gross Output (GO) is the gross margin realized from trading of goods, i.e. value of goods resale less cost of goods sold, plus revenues from other services provided. Intermediate Consumption (IC) is the sum of operating costs and expenses on other services.

4. HOTELS AND RESTAURANTS

For the hotel sector, main data source is the annual Hotel and Similar Establishment Survey and supplemented with data provided by Macao Hotel Association. Gross Output (GO) is the receipts of room sales, plus sales margin of food & beverages and other revenues. For the restaurant sector, main data source is the annual Restaurant and Similar Establishment Survey. Gross Output (GO) is the sales receipt of food and beverages.

Intermediate Consumption (IC) of the hotels and restaurants is similar to that of the above-mentioned economic activities.

Apart from the annual survey, total receipts of restaurants also include data collected from the Household Budget Survey (households' expenses on meals bought away from home) and the Visitor Expenditure Survey (visitors' spending on food and beverages).

5. TRANSPORT, STORAGE AND COMMUNICATIONS

Main data source is the annual Transport, Storage and Communications Survey conducted for the first time in 1993. Gross Output (GO) is the sum of receipts of transport services (passenger and cargo) provided, storage, rentals from leasing of equipment, commissions and other revenues. For the travel agencies, Gross Output (GO) is the total value of sales, less expenditure on purchase of tickets (sea, land and air transport) and costs of package tours and sightseeing tours. Prior to 1993, estimate of maritime and land transport is based on the rate of growth of the population, as well as changes of transport component of the Consumer Price Index (CPI).

Before 1999, main data source of receipts of postal, telephone and other telecommunications services was the annual report of the Post Office and the Macao Telecommunication Company, replaced later by the annual Transport, Storage and

Communications Survey. Gross Output (GO) is the receipt of services provided, including telephone, plus the margin realized from sales of goods, other fees and commissions received for services rendered.

Intermediate Consumption (IC) of this sector is similar that of the above-mentioned economic activities.

6. FINANCIAL INTERMEDIATION

Main data source is information provided by The Monetary Authority of Macao (AMCM), from which of Gross Output (GO), Intermediate Consumption (IC) and Gross Value Added (GVA) are estimated. Gross Output (GO) of the banking sector is the total value of FISIM, plus commissions received, rentals and other revenues. In Macao, estimate of FISIM or “Financial Intermediation Services Indirectly Measured” is the difference between total interest received from loans and total interest paid to bank deposits, less value of property income from investment of own funds. As regards Forex trading firms, estimate of GO is the net revenues from foreign currencies trading under different exchange rates, plus revenues for other services provided.

Estimate of GO of insurance sector is based on the following:

Total premium actually earned

plus Premium supplements (income from investment of technical reserves)

less Claims due

less Increase of actuarial reserves and reserves for with-profits insurance (or plus the decrease)

plus Net result of reinsurance (reinsurance premium received less reinsurance premium paid)

Gross Output (GO) of services of insurance and reinsurance agents is the sum of honorariums, commissions and other revenues received.

Intermediate Consumption (IC) of this sector is similar that of the above-mentioned economic activities.

7. REAL ESTATE, RENTING AND BUSINESS ACTIVITIES

Estimate of Gross Output of real estate development activities is sum of real estate developers' margin, plus service charge collected from transaction of property, rental and other receipts. Gross Output of real estate agent is the commissions received from trading and leasing of properties, plus other receipts. For business services, estimate of Gross Output

is the sum of honorariums, commissions and rentals from leasing of property, machinery and equipment, less charges paid on behalf of clients to the third party.

In Macao, real estate developer's margin is the difference between total value of sales of new properties (first hand) and total costs of land, construction, engineering, architecture and other services. For the on-going construction work, however, valuation of real estate development is based on the work-in-progress, in which estimate of real estate developer's margin is compiled by the total area built and the estimated market price of the property transaction. Data source of market price of property transaction includes information on transaction price of premises and residential units provided by the Construction Association and Finance Services Bureau. Nevertheless, resale of second hand properties is considered as holding gain or loss.

In national accounts, ownership of premises is considered as an economic activity to cater for the rentals paid and received of owner-occupied dwellings. Data sources include information from Household Budget Survey for the actual and imputed rentals of housing, Register of Buildings for total area of occupied dwellings and Rent Survey for the changes of rentals of housing.

Intermediate Consumption (IC) is similar that of the above-mentioned economic activities.

8. PUBLIC ADMINISTRATION

Main data source is the *Public Sector Accounts* of the Macao Government. Gross Valued Added (GVA) is sum of the total value of remuneration, subsidies and contributions paid, in cash or in kind, to all civil servants, plus consumption of fixed capital. Intermediate Consumption (IC) is the value of purchases of goods and services for own use. Gross Output (GO) is the sum of the GVA and the IC.

9. EDUCATION

Main data sources include the annual Education Survey, Demographic Statistics and the government accounts. For the public schools and institutions, calculation of GVA, IC and GO are similar to those of Public Administration sector. For the private schools and institutions, Gross Output is the total value of tuition fees and other receipts paid by students. Intermediate Consumption is value the purchases of goods and services; Gross Value Added is the difference between GO and IC. For the non-profit private schools and institutions, cost approach is applied to estimate GVA, IC and GO.

10. HEALTH AND SOCIAL WORK

Main data sources include the annual Health Survey and accounts of the Health Bureau. For the public health facilities, calculation of GVA, IC and GO are similar to those of Public Administration and Education sectors. For the health facilities of the private sector, Gross Output is the total value of fees and charges received from provision of medical services, plus sales of medicine and other revenues. Intermediate Consumption is the operating costs of the facilities; Gross Value Added is the difference between GO and IC.

Data source of social work provided by government organizations and institutions is the *Public Sector Accounts* of the Macao Government. For social work provided by the private sector, mostly non-profit organizations and institutions, data source is information collected from Household Budget Survey, and government subsidies received.

11. OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES

Estimate of Gross Output, Intermediate Consumption and Gross Value Added of sanitation, sewage and refuse disposal services are derived from accounts information from the Incineration Centre and the concessionaires of sewage and refuse disposal services.

As regards activities of membership organizations, mostly non-profit associations and organizations, due to lack of information, estimate is based on the amount of subsidies provided by the Government, as recorded in the *Public Sector Accounts*.

Main data sources for the estimate of Gross Value Added of activities of cinema, theatre, radio and television stations include residents' expenses figures from the Household Budget Survey, and the accounts information of the television and radio stations.

Gross Value Added of activities of nightclubs, karaoke, discos, etc. accounts for a significant share to the total of this economic activities. Main data source is information collected from the Household Budget Survey, Tourism Statistics and corresponding services of CPI, supplemented by information from Macau Government Tourism Office (MGTO).

For services of libraries, archives, museums, botanical and zoological gardens, and other cultural activities, main data source is the *Public Sector Accounts* of the Government. Similar service of the private sector is ignored due to its insignificance.

Gaming sector is the most important economic activity of the economy, a major component of GDP, an essential source of fiscal revenue. Main data sources include administrative data from the Gaming Coordination and Inspection Bureau, Finance Services Bureau and the annual Survey on Gaming Sector.

Estimate of Gross Output (GO) of other recreation businesses is based on information collected from the Household Budget Survey; Intermediate Consumption (IC) is an estimated percentage share of Gross Output; Gross Value Added is the difference between GO and IC.

Other service activities

Main data source for estimate of Gross Value Added of other services activities is mainly information collected from Household Budget Survey, the annual Service Sector Survey on selected services, as well as data from Visitor Expenditure Survey, with adjustment made according to supplementary administrative data from other Government departments, corresponding component of CPI and other indicators.

12. HOUSEHOLDS WITH EMPLOYED PERSONS

Main data sources included respective expenses of the Household Budget Survey, median employment earnings of domestic helpers from the Employment Survey and data on the number of imported domestic workers from administrative records.

ADJUSTMENT ITEM : FISIM

As mentioned previously, value of FISIM is included in Gross Output of the Financial Intermediation sector; therefore, it is necessary to deduct charges paid indirectly to banks when compiling estimate of Gross Value Added of other economic activities. However, in the absence of a proper indicator to allocate the value of FISIM as an intermediate consumption item of various economic activities, Macao follows the widely accepted practice of deducting value of FISIM from the aggregate Gross Value Added of all producers.

CHALLENGES AND FUTURE IMPROVEMENTS

Challenges

1. Lack of sufficient data for compiling production-based GDP at constant prices, e.g. deflator of intermediation consumption and gross output is not completely available.
2. Lack of an indicative method to evaluate cost of land, an important element of Gross Output. The difficulty lies in very few transactions of land in the property market; land auction is rarely seen.

3. As regards allocation of FISIM, we are able to obtain information to estimate effective interest rates of deposits and loans, with the collaboration of the Monetary Authority of Macao (AMCM). The problems lie in the data quality, for instance, interest rate of deposits is higher than that of loans, reference rates fall outside the range of the deposit and loans interest rates, etc.
4. Lack of data on business activities, especially professional services; current estimate of GVA, GO and IC are derived from indirect information collected in different surveys or data sources.
5. Difficulties of reconciling the discrepancy between the demand and supply side of an economic activity or various activities, e.g. restaurant service.

Future improvements

Starting this year, AMCM collects detailed information on interest income and expenses breakdown by major currencies, which is helpful to tackle the problems related to estimate of FISIM.

At present, we have just concluded the 2007/2008 Household Budget Survey that provides latest data on sources of household income and expenditure.

In medium-term, improvement plan on national account compilation is undergoing a step-by-step approach, e.g. feasibility studies on expanding data sources of economic activities not covered by the annual economic survey, compilation of appropriate price indices by economic activity to facilitate annual estimate in volume terms, improvement on methods and data sources for compiling quarterly production-based GDP.