

ASEAN Workshop on Short-term Indicators
Bangkok, 6-10 August 2001
(Compilation of Quarterly GDP)

1 Introduction

The Singapore Department of Statistics (DOS) compiles annual estimates of gross domestic product (GDP) at both the current and constant prices, using the output and expenditure approaches since the 1960s. With the compilation of nominal GDP using the income approach since the mid-1990s, annual estimates of nominal GDP are available for all the three approaches.

Since the mid-1970s, DOS has also compiled quarterly estimates of real GDP using the output approach. A complementary quarterly series on expenditure-based GDP was compiled since the late 1980s. Quarterly estimates of output-based nominal GDP was also developed in 1997. These estimates are crucial short-term timely indicators of our economic performance

2 Timeliness

DOS publishes preliminary quarterly GDP estimates no later than nine weeks after the end of the reference quarter. In view of the increasing demand for timely GDP estimates in recent years, DOS also releases (since 2Q 2000) advance estimates of quarterly real (constant price) output-based GDP estimates. Advance GDP estimates are published no later than ten days after the end of the reference quarter.

3 Coverage

The categories for which advance GDP estimates data are published include: Goods Producing Industries, Services Producing Industries and Gross Domestic Product. In the preliminary releases, the full output-based GDP estimates are disseminated showing a breakdown by industry in accordance with the Singapore Standard Industrial Classification 1996.

Data on the expenditure-based constant price GDP are disseminated showing the following breakdown; private consumption expenditure; government consumption expenditure; gross fixed capital formation; increase in stocks; and net exports of goods and services.

4 Methods of Compilation

DOS follows closely the concepts and methodology as recommended in the United Nations publication 'A System of National Accounts (SNA)', and has implemented progressively the recommendations of the 1993 SNA.

The compilation of timely GDP estimates for the production approach, particularly the quarterly estimates, are based on a large number of timely, reliable, short-term economic indicators. Extensive research and monitoring have been conducted to ensure the continuing relevance and reliability of the indicators used. New indicators have to be continuously developed to assess the extent and level of economic activity for new, emerging industries.

In the compilation of quarterly real GDP estimates, indicators used can be broadly categorised into volume and value indicators. Where volume indicators are available, growths in the volume indicators are used to derive real GDP estimates through the extrapolation of current price GDP estimates in the base year. On the other hand, value indicators are deflated using appropriate price indices to obtain real GDP estimates.

GDP estimates for the expenditure approach (GDE) are compiled mainly using a commodity flow approach. Data sources are mainly the following:

- External trade statistics
- Census of Industrial Production
- Income and expenditure accounts of various statutory boards
- Government financial statements
- Censuses and surveys of the Services sectors
- Balance of payments statistics

Constant price estimates are obtained by deflating the current price estimates by appropriate price indices, such as the relevant sub-indices of the consumer price index and import price index.

5 Sources of Data

The quarterly GDP estimates are compiled using a wide range of data sources, including both administrative data and monthly and quarterly surveys conducted by DOS and Research and Statistics Units of other government agencies. To ensure timeliness and reduce respondent burden, these surveys generally collect minimal information from a relatively small number of companies or establishments. Some of these surveys are:

Monthly Survey of Industrial Production
Monthly Survey of Retail Trade
Monthly Survey of Catering Trade
Quarterly Survey of Wholesale Trade
Quarterly Survey of Financial Institutions
Survey of Quarterly Business Receipts
Survey of Quarterly National Income Estimates

The Survey of Quarterly National Income Estimates is a survey designed specifically to collect the necessary data for the compilation of the national accounts, in particular estimates of GDP. The scope of the survey is not restricted to any specific economic sector; its coverage extends across several economic sectors. The expansion of the scope and coverage of this survey contributed substantially to the compilation of quarterly estimates of nominal GDP. An overview of the data sources by the major economic sectors is as follows:

Manufacturing

The index of industrial production, which reflects the level of output of the manufacturing sector with reference to the base year is used to estimate the value added at constant prices. Nominal value added are derived from Monthly Survey of Industrial Production conducted by Economic Development Board (EDB).

Construction

Data on the monthly progress certified payments collected by Building and Construction Authority (BCA) constitute the main data source for the construction sector. Additional estimates are required for minor and renovation, maintenance and repair works. These are estimated based on the number and the costs of renovating and maintaining the houses and flats.

Utilities

The performance of utilities is estimated based on sales indicators of electricity, gas and water consumed, as well as quarterly statements of income and expenditure obtained from utility companies and Public Utilities Board.

Wholesale and Retail Trade

In view of the importance of entrepot trade to Singapore's economy, the estimates are based on entrepot and domestic trade, which is the equivalence of

wholesale and retail trade. The main source of data is the external trade from Trade Development Board. Value added estimates on both entrepot and domestic trade are derived from the gross 'markup' margin on the value of re-exports, retained imports and local production less the costs of transport and other intermediate expenses. The markup applied varied according to the type of goods. An assortment of price indices, such as import price index and Singapore manufactured products price index, is used as deflators. DOS's wholesale trade index and retail sales index provide complementary indicators, which are used to corroborate the quarterly GDP estimates.

Hotels and Restaurants

Estimates for this sector are based on several indicators supplied by Singapore Tourism Board, such as hotel revenue, room days occupied, average room rates, and food and beverage revenue from restaurants. DOS catering trade index is used to estimate the output of other eating outlets. The estimated earnings of food stalls and itinerant vendors are used as the basis for determining their output.

Transport and Communications

Indicators used for this sector ranged from bus fare receipts, number of registered taxis, air and sea cargo handled, number of passenger departures and revenue from data network and internet access services. Additional output data are provided by the major transport companies, the Port of Singapore Authority and the telecommunication companies in the responses to the Survey of Quarterly National Income Estimates.

Financial Services

Output indicators are available from the Quarterly Survey of Financial Institutions conducted by MAS. This survey is a fairly comprehensive survey where the coverage includes commercial banks, merchant banks, Asian Currency Units, finance companies, stock brokers, investment advisors, money brokers and insurance companies. Administrative data on loans and advances, and assets/liabilities of selected financial institutions are also used as supplementary indicators.

Business Services

Administrative data for this sector is relatively limited. Other than data on property transactions and employment data from the Central Provident Board (CPF), most of the indicators are derived from the Quarterly Survey of Business

Receipts and the Survey of Quarterly National Income Estimates. Indicators derived from these surveys include rental income, advertising expenditure and the sales receipts of firms engaged in IT, engineering and management consultancy.

Other Services Industries

Indicators on the output of government are based on government financial data on wages and salaries. Output indicators on medical, education and recreational services are obtained mainly from the Survey of Quarterly National Income Estimates. For selected cultural and recreational activities, data on the sales of admission tickets are used as supplementary indicators.

6 Benchmarking Quarterly GDP Estimates

The 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 accounts compiled from more comprehensive and reliable data sources. Thus, the yearly sums of the quarterly estimates would not be expected to be equal to the independently compiled annual estimates.

This means that it is necessary to re-align or benchmark the quarterly estimates with the annual data. Benchmarking of quarterly estimates to annual estimates will ensure consistency in these estimates. Benchmarking has the additional advantage that by incorporating the usually more accurate annual information into the quarterly estimates, it increases the accuracy of the quarterly time series. It also ensures an optimal use of the quarterly and annual data in a time-series context.

The ideal procedure is to obtain a series of re-aligned quarterly estimates through quadratic minimisation, which parallels the original series but whose annual totals equal the annual estimates. What this procedure does is to minimise the differences between the re-aligned and original series subject to the constraint that the yearly sums of the re-aligned estimates 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 by 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.