Latest Developments in the Compilation of National Income Statistics of Hong Kong

Speakers: Ms Sharon NG, Senior Statistician
          Ms Peggy LEE, Statistician
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(I) Latest developments in the compilation of national income statistics in Hong Kong
Implementation of the latest international statistical standards

- Latest international standards - the System of National Accounts 2008 (2008 SNA) were implemented in September 2012

- Major enhancements:
  - Capitalisation of research and development expenditure
  - Change of ownership principle in recording trade in goods sent abroad for processing
  - The term Gross National Product (GNP) is replaced by Gross National Income (GNI)
Capitalisation of research and development (R&D) expenditure

- R&D is long regarded as important capital investment, i.e. part of the Gross Domestic Fixed Capital Formation

- However, the statistical measurements are not straightforward
  - Most R&D activities are in-house, without market value
  - 2008 SNA recommends to use sum of costs to estimate R&D output
Capitalisation of research and development (R&D) expenditure (cont’d)

- Under Gross Domestic Fixed Capital Formation (GDFCF), a new term “intellectual property products” was introduced to replace “computer software”
  - Include computer software, database and expenditure on R&D

- GDP level was raised by around 0.4% - 0.5% in recent years
  - R&D expenditure accounted for around 0.8% of GDP
  - Private sector and universities/tertiary institutions accounted for around 40% and over 50% of in-house R&D activities respectively
Change of ownership principle in recording goods sent abroad for processing

• Concept:
  – Old standard: trade recorded when goods cross customs boundary
  – Change of ownership principle: trade occurs when buying and selling activities take place (i.e. ownership of goods is transferred)
Example: iPhone
Change of ownership principle in recording goods sent abroad for processing

• Benefits:
  – Better reflect genuine international trade flows
  – Facilitate analysis of impact of globalisation on international trade
Change of ownership principle in recording goods sent abroad for processing

• Classification:
  – **Goods sent abroad for processing** are **not** recorded as trade in goods because they do not involve actual buying and selling activities (i.e. no change of ownership)
  – **Processing fees** are recorded as trade in services (imports of manufacturing services)
  – **Merchanting**: value of goods sold is recorded as exports of goods, while the value of goods acquired is recorded as negative exports of goods, though the goods have not passed through Hong Kong
  – **Overall balance of trade in goods and services unaffected**, implying that the levels and growth rates of overall GDP also unaffected
Impact of implementing the change of ownership principle

- Trade in goods balance: generally changed from **deficit to surplus** (except 2011 & 2012)
Impact of implementing the change of ownership principle

- Trade in services balance: generally changed from *surplus* to *deficit* (except 2009 – 2012)
Special dissemination arrangement of trade figures in GDP

- Main tables of GDP reports: trade statistics based on the old standards
- Supplementary tables of GDP reports: trade statistics based on the new standards
- Consideration: provide a transition period for data users to adapt to the new set of trade figures in GDP
Gross National Product v.s. Gross National Income

• The term “Gross National Product” has been replaced by “Gross National Income”

• The term “net external factor income flows” has been replaced by “net external primary income flows”
  – To follow international recommendations and practices of other economies
  – To better emphasize the fact that this indicator is a measure of income
(II) Fundamental concepts and uses of GDP
What is Gross Domestic Product (GDP)?

- **Gross Domestic Product** (GDP): measure of the total value of production (product) of all resident producing units of an economy (domestic) in a specified period, before deducting the consumption of fixed capital (gross).
Three approaches for compiling GDP
Three approaches to measure GDP

1. **Production measure of GDP**
   sum of value added of all economic activities

2. **Expenditure measure of GDP**
   final expenditures on consumption, capital formation, and exports less imports

3. **Income measure of GDP**
   sum of compensation of employees and operating surplus of entrepreneurs
Given there can be 3 alternative approaches to compile GDP, are we supposed to have 3 figures of GDP or one single figure of GDP?

**In theory**
GDP estimates by the 3 approaches should be the same

**In practice**
Statistical discrepancy exists, as different data sources are used for different approaches
Availability of GDP statistics in Hong Kong

- **Expenditure-based GDP**
  - Annual series from 1961
  - Quarterly series from 1973

- **Production-based GDP**
  - Annual series traced back to 1980
  - Quarterly series from 2000

- **Income-based GDP**
  - Once compiled for 1970 - 1980, but had discontinued since 1981
Which approach is adopted for compiling and presenting the GDP figures?

<table>
<thead>
<tr>
<th></th>
<th>GDP(E) as the headline GDP, supplemented by GDP(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>GDP(E) as the headline GDP</td>
</tr>
<tr>
<td>US</td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>GDP(P) as the headline GDP, supplemented by GDP(E)</td>
</tr>
</tbody>
</table>
Uses of GDP
Why is GDP so important?

- Measure of economic growth
GDP is commonly used for charting the economic growth of an economy

- Measured by change in the *volume measure* of GDP over time (growth rate in *real terms*)

- Positive growth: expansion of economic activities

- Negative growth: contraction of economic activities
GDP as an indicator for measuring the economic growth

- **Year-on-year percentage change**
  - GDP in real terms of a quarter compared with that of the same quarter last year

  e.g. In the first quarter of 2013, the GDP increased by 2.8% in real terms over a year earlier.

  \[ \left( \frac{\text{GDP in real terms for Q1 2013}}{\text{GDP in real terms for Q1 2012}} - 1 \right) \times 100\% \]

  \[ = \left[ \frac{486,594^*}{473,191^*} - 1 \right] \times 100\% = 2.8\% \]

  * In chained (2011) HK$Mn
GDP as an indicator for measuring the economic growth (Cont’d)

Seasonally adjusted GDP series

- Seasonally adjustment: remove the seasonal effects which repeat each year in a systematic manner

- Quarter-to-quarter percentage change
  - seasonally adjusted GDP of a particular quarter compared with that of last quarter
  - capture turning point more promptly
Economic growth cycles in Hong Kong tracked by the real growth of GDP

HK GDP real growth rate (%)

Average annual real growth

1991-2000: 4.0%  2001-2010: 4.1%  2003-2012: 4.5%
Economic slow-down in the late-1960s

HK GDP real growth rate (%)

1967 social unrest
Economic slow-down in the mid-1970s

HK GDP real growth rate (%)

1974-75 Oil Crisis
Economic slow-down in the mid-1980s

HK GDP real growth rate (%)

1985 global slow down in external trade
Economic down-turn in the late-1990s

HK GDP real growth rate (%)

1997/98 Asian Economic Crisis
Economic down-turn in the late-2000s

HK GDP real growth rate (%)

Global financial tsunami in latter part of 2008
Uses of different measures of GDP

- **Production measure**
  - Indicate the relative contribution of different economic activities to the total GDP

- **Expenditure measure**
  - Analyse the relative economic significance of household, government and investment expenditure
  - Indicate the degree of external orientation of an economic territory

- **Income measure**
  - Study the relative shares of compensation of employees and gross operating surplus of companies
Methods and data sources for compiling GDP
Statistical system for GDP

- Trade statistics
- Establishment survey
- Gov’t Account
- Household survey
- Price data
- Admin. data

GDP
## Data sources for compilation of GDP(E)

<table>
<thead>
<tr>
<th>Component</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Private consumption expenditure (PCE) = CXDM + REA - NXDM</td>
<td></td>
</tr>
<tr>
<td>Consumption expenditure in domestic market (CXDM) - goods</td>
<td>Monthly Survey of Retail Sales</td>
</tr>
<tr>
<td>CXDM - services</td>
<td>Quarterly Survey of Restaurant Receipts and Purchases; government revenue statistics; administrative data from HK Jockey Club, MTR, bus companies, ferry companies</td>
</tr>
<tr>
<td>Expenditure of residents abroad (REA)</td>
<td>Household surveys on expenditure abroad; Immigration Department</td>
</tr>
<tr>
<td>Expenditure of non-residents in the domestic market (NXDM)</td>
<td>Data from Hong Kong Tourism Board (HKTB)</td>
</tr>
</tbody>
</table>
## Data sources for compilation of GDP(E) (Cont’d)

<table>
<thead>
<tr>
<th>Component</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Government consumption expenditure (GCE)</td>
<td>General revenue accounts; income and expenditure data from quasi-government institutions (e.g. HKTB, HKMA, HA, etc)</td>
</tr>
<tr>
<td>= CE + Purchase - Sales</td>
<td></td>
</tr>
<tr>
<td>3. Gross domestic fixed capital formation (GDFCF)</td>
<td></td>
</tr>
<tr>
<td>Cost of ownership transfer</td>
<td>Stamp duties collected by IRD; no. of property transfer cases registered with the Land Registry</td>
</tr>
<tr>
<td>Building and construction</td>
<td>Quarterly Survey of Construction Output; data from government accounts, quasi-government institutions and public corporations (e.g. MTR, AA, etc)</td>
</tr>
<tr>
<td>Machinery, equipment and computer software</td>
<td>Trade data; data from government accounts, quasi-government institutions and public corporations; data from economic surveys</td>
</tr>
</tbody>
</table>
## Data sources for compilation of GDP(E) (Cont’d)

<table>
<thead>
<tr>
<th>Component</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Changes in inventories</td>
<td>Quarterly Survey of Industrial Production; Quarterly Survey of Services Industries; Monthly Survey of Retail Sales; data on hydrocarbon oil from Electrical and Mechanical Services Department</td>
</tr>
<tr>
<td>5. Exports and imports of goods</td>
<td>Trade data</td>
</tr>
<tr>
<td>6. Exports and imports of services (e.g. transportation, travel, trade services, financial services)</td>
<td>Data from HKTB and Immigration Department; Survey of Imports and Exports of Services; household surveys on expenditure abroad</td>
</tr>
</tbody>
</table>
Value added at basic prices v.s. at factor cost

- The valuation of value added has been changed from factor cost to basic prices to follow international standard. This can better reflect the prices actually paid and received by the producers.

- The basic price, measures the amount retained by the producer, is the price most relevant for the producer’s decision making.

- The valuation at basic prices had been adopted by most of the statistically advanced economies, like the UK, Australia, Canada and Singapore. The adoption of such approach in Hong Kong will enhance the international comparability of Hong Kong’s estimates.
# Factor cost vs Basic prices vs Market prices

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value added at basic prices</td>
<td>$= \text{Value added at factor cost} + \text{Taxes on production}$</td>
</tr>
<tr>
<td></td>
<td>(e.g. government rent and rates and business registration tax)</td>
</tr>
<tr>
<td>Value added at market prices</td>
<td>$= \text{Value added at basic prices} + \text{Taxes on products}$</td>
</tr>
<tr>
<td></td>
<td>(e.g. alcoholic beverages, tobacco and hydrocarbon oil)</td>
</tr>
</tbody>
</table>

* Payable per unit of goods and services
## Factor cost vs Basic prices vs Market prices (Cont’d)

<table>
<thead>
<tr>
<th>Value added at factor cost</th>
<th>Taxes on production</th>
<th>Taxes on products</th>
<th>GDP at market prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>+ 12</td>
<td>+ 8</td>
<td>= 100</td>
</tr>
</tbody>
</table>

Value added at basic prices + Taxes on products + 8 = 100

80 + 12 = 92 + 8 = 100
How is ‘Implicit Price Deflator’ of GDP compiled?

**Implicit** price deflators (IPD) of GDP and its expenditure components

\[
\text{Implicit Price Deflator} = \frac{\text{GDP at current prices}}{\text{GDP in volume terms}} \times 100
\]

**GDP in volume terms**
IPD of GDP

In contrast to a deflator, an implicit price deflator is **NOT** an input for GDP in volume terms (a misconception)

✗ GDP in volume terms = \( \frac{\text{Current price GDP}}{\text{IPD of GDP}} \)

✓ IPD of GDP = \( \frac{\text{Current price GDP}}{\text{GDP in volume terms}} \)
Implicit Price Deflator of GDP (IPD) and Consumer Price Index (CPI)

**CPI**
- a measure of price changes encompassing goods and services purchased by *households*

**IPD of GDP**
- a *broad measure of economy-wide inflation*, encompassing a wide varieties on goods and services for consumption, capital formation (investment), exports and imports
(III) Chain volume measures of GDP
Chain Volume Measures of GDP

- C&SD has replaced the constant price measures by the chain volume measures of GDP

- Why?
  - Align with the latest international statistical guidelines
  - Provide a better measure of the real growth rate of the aggregate economic activity in an economy as compared with the constant price volume measure of GDP
Basic concepts of the volume measures of GDP
Change over time in the value of GDP can be factored into **two components** \( (v = p \times q) \)

① **Change in prices** of goods and services

<table>
<thead>
<tr>
<th>Year</th>
<th>Price (each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$10</td>
</tr>
<tr>
<td>2009</td>
<td>$20</td>
</tr>
<tr>
<td>2010</td>
<td>$20</td>
</tr>
</tbody>
</table>
Value in 2009 increases by 20%, purely due to inflation
Value in 2010 surges by 50%, as prices increase from $12 to $18
② **Change in their volumes**

Changes in value at price fixed at $10 reflect changes in volume.
International guidelines on volume measures of GDP

- C&SD follows the 1993 SNA / 2008 SNA

- The 1968 SNA: fixed-weighted volume index approach
  - constant price measure of GDP

- The 1993 SNA / 2008 SNA: annually re-weighted chain linking approach
  - chain volume measure of GDP
Compilation of volume measures of GDP
Constant price measures of GDP

- Adopt the price structure of a fixed base year (say 2000) (hence the concept of “fixed-weighted”)

- Update the base year (rebasing) once every 5 or 10 years
### Constant price measures of GDP

Example of linking up the constant price series at 1990 and 2000 prices

<table>
<thead>
<tr>
<th>Year</th>
<th>At constant 1990 prices</th>
<th>yoy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1,095</td>
<td>-6.0</td>
</tr>
<tr>
<td>1998</td>
<td>1,029</td>
<td>2.6</td>
</tr>
<tr>
<td>1999</td>
<td>1,056</td>
<td>8.0</td>
</tr>
<tr>
<td>2000</td>
<td>1,140</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>1,140</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>1,140</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>1,140</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>At constant 2000 prices</th>
<th>yoy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>1,508</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>1,535</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>1,581</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>1,581</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>1,581</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>1,581</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Year</th>
<th>At constant 2000 prices</th>
<th>yoy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1,440</td>
<td>-6.0</td>
</tr>
<tr>
<td>1998</td>
<td>1,354</td>
<td>2.6</td>
</tr>
<tr>
<td>1999</td>
<td>1,389</td>
<td>8.0</td>
</tr>
<tr>
<td>2000</td>
<td>1,500</td>
<td>0.5</td>
</tr>
<tr>
<td>2001</td>
<td>1,508</td>
<td>1.8</td>
</tr>
<tr>
<td>2002</td>
<td>1,535</td>
<td>3.0</td>
</tr>
<tr>
<td>2003</td>
<td>1,581</td>
<td></td>
</tr>
</tbody>
</table>
Chain volume measures of GDP

- Adopt the price structure of preceding year (e.g. for 2011 GDP, use 2011 as base year) and compile the value of GDP

- Compile the real growth rate

- Choose a reference year (e.g. 2010), based on the current value of the reference year, convert the time series of real growth rates into chained dollar series
  - The choice of the reference year does not affect the real growth rates
### Illustration of compilation of chain volume measure

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values at current prices ($)</td>
<td>1,000</td>
<td>1,200</td>
<td>1,300</td>
<td>1,400</td>
<td>1,600</td>
</tr>
</tbody>
</table>

1. Compile the value of GDP using the price structure of the preceding year

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values at preceding year prices ($)</td>
<td>1,160</td>
<td>1,140</td>
<td>1,300</td>
<td>1,500</td>
<td></td>
</tr>
</tbody>
</table>

2. Compile the real growth rate

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real growth rate (%)</td>
<td>16.0</td>
<td>-5.0</td>
<td>0</td>
<td>7.1</td>
<td></td>
</tr>
</tbody>
</table>

3. Choose a reference year, based on the current value of the reference year, convert the time series of real growth rates into chained dollar series

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values at chained (2010) dollars ($)</td>
<td>1,271</td>
<td>1,474</td>
<td>1,400</td>
<td>1,400</td>
<td>1,499</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values at chained (2007) dollars ($)</td>
<td>1,000</td>
<td>1,160</td>
<td>1,102</td>
<td>1,102</td>
<td>1,180</td>
</tr>
</tbody>
</table>
Base year vs Reference year

- **Base year** is the year from which the price structures are used for deriving the aggregate values:
  - For constant price values, the base year is fixed, e.g. 1990, 2000
  - For chain volume measure, the base year is always the preceding year in principle

- **The reference year** provides a reference time point to convert the time series of real growth rates into a time series in dollar value:
  - The choice of the reference year does not affect the real growth rates
Chained dollar values are non-additive

✓ Components at constant prices can be added up to total

✗ Chained dollar value are in general not additive
Merits of the chain volume measure of GDP over the constant price measure

- Better accommodate changes in product mix
- Take account of latest price structures
- Chain volume measures can better gauge the contributions of components to the real growth of the GDP aggregate
(IV) Commonly asked questions on the concepts of GDP
Q1. How are economic activities related to the development of Kai Tak Cruise Terminal captured in GDP by expenditure approach?

- **Construction** of Kai Tak Cruise Terminal: GDFCF
- **Incoming visitors** through Kai Tak Cruise Terminal: Exports of travel services
- **Outbound travels by HK residents** through Kai Tak Cruise Terminal: Imports of travel services
- Services provided by Kai Tak Cruise Terminal to non-resident cruises: Exports of transport services

Note that services provided to resident cruises are not captured in trade in services.
Q2. How are redevelopment projects recorded in GDP by production approach?

- Redevelopment projects mainly involve the following economic activities:
  
  1. **Construction activity**: A construction contractor is engaged to demolish the old building and build a new building. These construction activities are covered in the Construction Sector.
  
  2. **Real estate development activity**: The gross margin (i.e. value of new building less costs) is included in the Real Estate Sector. Costs of real estate developer include: the value of the old building and the payment to contractor, other project development outlays (e.g. architectural, engineering, and other professional fees, marketing, brokerage fees etc.).
  
  3. **Architectural design, surveying, engineering activities**: relevant professional sector.
Q3. People regard the purchase of a residential flat an investment. Is it included in GDFCF of GDP during the period when the flat is purchased?

- No.

- The value of the flat has already been included in GDFCF of GDP previously when the flat was built.

- The purchase of a flat is a transfer of ownership rather than creation of a new asset. Therefore, no new capital formation is captured in GDP.

- However, SNA states that costs incurred in the transfer of ownership of the asset e.g. brokerage fees, legal fees and stamp duties, are included in GDFCF during the period when the flat is purchased.
Q4. Is donation (say to Community Chest) included in GDP?

- Donation is a kind of *transfer* payment. This means that the party receiving the donation (say Community Chest) does *not* provide goods and services to the donor in return for the donation. Hence, no production activity is involved and GDP is not affected.

- Following this concept, GDP in a period will not increase because of more donation in that period nor decrease because of less donation.
Q5. Is the natural growth of fish in sea included in the production boundary of GDP?

- The growth of natural resources without human involvement or direction is not included in the production boundary.

- According to the System of National Accounts, a necessary condition for an activity to be treated as production is that the activity should be carried out under the responsibility, control and management of a unit (SNA para. 1.20).

- Therefore, the natural growth of fish in open sea is not regarded as production whereas the catching of fish in open sea and the culture of fish in fish ponds or rafts are regarded as production activities.
Q6. Should ‘Illegal Transactions’ be included in GDP?

- In theory, the answer is YES (1993 SNA’s recommendation) due to the following reasons.

  1. Incomes from illegal production can be spent on purchasing legal goods and services.
  2. Illegal goods and services can be purchased using incomes from the legal sources.
  3. Discrepancies will appear in the account if such production is omitted.

- Practically, reliable estimates are difficult to be produced.

- In Hong Kong, only unlicenced hawkers are included in GDP.
(V) Q&As
The End