The treatment of difficult-to-measure products and services in Japan

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Outline

- 2015 Revision and review for Japanese CPI
- Viewpoints and outline on the review and revision
- Revised items for adapting economic condition change
- Elaborated items by review
2015 Revision and review for Japanese CPI

- Revision of the CPI base period to 2015
- Weight revision
- Revision of items (Presented at the Ottawa Group 2015)
- Release the series including fresh food calculated by chain index not annually but monthly (Presented at the Ottawa Group 2015)
- Review and revise the calculating method for difficult-to-measure products and services
Difficult-to-measure products and services

- Base
  - Dutot index by municipality
  - Data collected by enumerators

- Compiling indices by special methods
  (90 / 585 items)
  - Model based estimation
  - Hedonic method
  - Jevons index
  - Web data collection
Viewpoints on the review and revision

- Economic changes in Japan
  - Decreasing household size
  - Aging population
  - Increasing female workers with young children
  - Introduction of IT
  - Preparing for huge disasters

- Improving methods efficiently
Outline of review and revision

- Revised items for adapting economical condition change
  - Electricity, Gas supply, Water supply (COICOP 04.4-04.5)
  - Cultural services (09.4.2)
  - Nutritional supplementary foods (06.1.1)
  - Nursery fees (12.4)
  - Educational services (10)
  - Telecommunication services (08.3)
  - Digital content (09)
  - Cameras (09.1.2)
  - Insurances connected with the dwellings (12.5.2)
Outline of review and revision

- Elaborated items by review
  - Services for repair and maintenance of houses (04.3.2)
  - Medical and dental services (06.2-06.3)
  - Airline fees (07.3.3)
  - Paper magazines (09.5.2)
  - Package holidays to foreign countries (09.6)
  - Restaurants and cafes (11.1.1)
  - Brand-name handbags (12.3.2)
  - Insurance connected with the motor cars (12.5.4)

- Simplified items by review
  - Fees for administrative certificates (12.7)
  - Admission fees for sports stadium (09.4.1)
  - Refuse collection for recycling durables (04.4.2)
Electricity

Current estimation

<table>
<thead>
<tr>
<th>Consumption amounts</th>
<th>Unit prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-120kWh</td>
<td>¥20/kWh</td>
</tr>
<tr>
<td>120-300kWh</td>
<td>¥24/kWh</td>
</tr>
<tr>
<td>300-</td>
<td></td>
</tr>
<tr>
<td>kWh</td>
<td>¥26/kWh</td>
</tr>
</tbody>
</table>

- We need to check the price movements for both light users and heavy users
- The model cases established by the consumption amount distribution of households, the data for which is provided by the Family Income and Expenditure Survey
Electricity

Points of 2015 revise

- Decreased electricity consumption per households due to the decreasing household size
- We will revise model consumption amount

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 model</td>
<td>180kWh</td>
<td>270kWh</td>
<td>350kWh</td>
<td>450kWh</td>
<td>700kWh</td>
</tr>
<tr>
<td>2015 model</td>
<td>160kWh</td>
<td>250kWh</td>
<td>330kWh</td>
<td>440kWh</td>
<td>720kWh</td>
</tr>
</tbody>
</table>

- We allocate the weights to each case corresponding to the consumption distribution by district, which reflected the differences in household size
Nursery fees

- Current estimation
  - Collect the price of one case in large cities only

- Points of 2015 revise
  - Each local government decides nursery fees considering household income and age of children
  - Expanding demands for nursery

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple with children under 7 years old</td>
<td>4.40</td>
<td>4.28</td>
</tr>
<tr>
<td>Whose female spouse is labor force</td>
<td>1.93</td>
<td>2.30</td>
</tr>
</tbody>
</table>

- We decide to collect various price of model cases including various incomes and cities as multiple ages of children
Cell phone fees

Current estimation
- Cell phone fees depend on
  - Data traffic
  - Talk time
  - Smartphones or older-type mobile phones
- Cell phone carriers provide various price plans
- We set multiple model cases (XX GB data uses and YY minutes talk per month)
- In each model case, we estimated the cheapest fees and reflected it in the price index
Cell phone fees

Points of 2015 revise

- Expanding weights

913 hundred yen per household in 2015

- We expand the number of model cases
  *We have reflected this issue for current CPI (since price change in Oct. 2015)

- We revise the setting of model cases (XX GB and YY minutes) reflecting increasing data traffic and decreasing talk time based on temporary household survey

Expenditures of cell phone fees (hundred yen)

Distribution of smartphone

Distribution of cell phone

913 hundred yen per household in 2015
Digital content

- Current estimation
  - We collected the price of music content (charged by each download type) only

- Points of 2015 revise
  - Distribution of smartphones has expanded demand for various digital contents
  - We decide to collect various charges of contents
    - Music contents (both the charged by each download type and charged a constant amount monthly type)
    - Video distribution on the internet
    - Charged application for smartphones
    - Digital books
Insurances connected with dwellings

- **Current estimation**
  - Collect the service charges for insurance against fire, theft, water damage only

- **Points of 2015 revise**
  - The huge earthquake in 2011 has caused people to be more aware of preparation for disasters in Japan
  - Insurance against earthquake, optional service for fire insurance, are distributed to households in Japan (48.1% (2010) → 59.3% (2014))
  - We decide to collect charge of earthquake insurance
Airline fees

- **Current estimation**
  - Pricing of airline fees depends on
    - Departure and Arrival location
    - Boarding date
    - Date of reservation and payment
  - We select 10 major airlines
    Tokyo-Sapporo, Tokyo-Fukuoka, etc.
  - We estimate the **cheapest fees** among all reservation dates for each airline and each boarding date
  - We survey the fees of **all boarding dates** throughout one month
Airline fees

- Points of 2015 revise
  - Improving representative of collected prices
    - We have collected the prices of flights departing from metropolitan cities to rural cities
    - Many Japanese travel from metropolitan cities to rural cities at the end of Dec. They come back at the beginning of Jan.
    - This causes an underestimation for prices in Jan. due to only detecting cheap vacant flights
    - We will introduce the price collection of flights departing from rural cities to metropolitan cities for half of the surveyed flights
  - Introduction of simplified web-scraping method
    - We collect many price data from airline carriers’ websites
    - Exclude irrelevant data for ticket prices that couldn’t be used to board
Package holidays to foreign countries

- Current estimation
  - We select 6 major destination with weights on the number of Japanese travelers

- Points of 2015 revise
  - Travelers includes persons for business purpose
  - We will change the weights and destination based on an estimation for the number of sightseeing travelers

- Next issues
  - Expanding collected prices by web-scraping
    (as well as “Accommodation services of hotels and inns”)

Insurance connected with the motor cars

Current estimation

- We set the model cases depending mainly on the driver’s age
- We ask the insurance companies to estimate insurance fees in each case (each insurance fee is confidential)

Points of 2015 revise

- Insurance fees depend on
  - Age of driving experience
  - Driver’s age
  - Experience of accident
  - Possessing car type
- We set multiple model cases regarding various factors
  *We have reflected this issue for current CPI (since price change on Oct. 2015)
Introduction the Jevons index

- Brand-name handbags
  - We will expand the surveyed brands from one brand to multiple brands
  - There are large price differences among each brand-name handbag
  - We will introduce the Jevons index for this item

\[
I_{t,a} = \frac{P_{t,a}}{P_{0,a}} \quad (1)
\]

\[
I_t = \prod_{\alpha} \left( I_{t,a} \right)^{\frac{1}{n}} \quad (2)
\]
Summary

- We reviewed the calculating method for difficult-to-measure products and services.
- We reflect the economical changes such as:
  - Decreasing household size for “Electricity, Gas, Water supply”
  - Aging for “Cultural services”, “Nutritional supplementary foods”
  - Increasing female workers with young children for “Nursery fees”
  - Introducing of IT for “Telecommunication”, “Digital contents”
  - Preparing for huge disasters for “Insurance for earthquakes”
- We also improved the method for
  - “Airline fees”, “Package holidays”, etc.
- We will release the revised CPI on Aug. 2016.