BANK OF JAPAN

Services Producer Price Index for Air passenger transportation

Bank of Japan
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*The views expressed in the slides are those of the author and do not necessarily represent the position of the Bank of Japan. All the examples are hypothetical.

Price surveys procedure

Ⅱ-1	Surveyed “Item” selection
Ⅱ-2	Preparatory work for initialization
Ⅱ-3	Survey respondents initialization
Ⅱ-4	Tentative price collection and follow-ups
Ⅱ-5	Ongoing price surveys

We will focus on Ⅱ-2 and Ⅱ-3 in the following slides.

Topics

1. Service definition
2. Weight calculations
3. Price determining characteristics
4. Sample design
5. Pricing methods
6. Quality adjustments
7. 2015 rebasing project of this price index
8. Index developments

1. Service definition

- The air passenger transportation is defined in JSIC 461 Air transport.
- The JSIC 461 is corresponding to the ISIC 5110 Passenger air transport.
- ISIC 5110 Passenger air transport:

  Transport of passengers by air over regular routes and on regular schedules.

1. Service definition

- Service Producer Price index

→ Our scope is only on business travelers, leisure travelers are out of our scope.

- We publish the following price indexes:
  - Air passenger transportation
  - International air passenger transportation
  - Domestic air passenger transportation

2.Weight calculations

Main data source

- The "Input-Output Tables" of Japan

Item	Main data source: IO-Tables
International air passenger transportation	5751-011 International air transport
Domestic air passenger transportation	5751-012 Domestic air passenger transport

Market size and weight at the year 2015

Item	Market size	Weight
International air passenger transportation	164billion yen	1.2/1000
Domestic air passenger transportation	819billion yen	6.0/1000

3.Price determining characteristics

- Specific issue of the air passenger transportation pricing strategy
  - Different prices in the same flight (e.g., flight on an economy-class seat) based on the yield management.
  - Yield management pricing strategy:
    Within limited capacity(=seats), high-fares for later-booking passengers, low-fares for early-booking passengers*

* For details, please see some textbooks for micro economics, e.g., Robert Philips “Pricing and Revenue Optimization”, Stanford University Press, 2005

3.Price determining characteristics (continuous)

Specific issue of the air passenger transportation (continuous)

- Various types of price determining characteristics
  - Route: departure and destination
  - Airlines
  - Seat class: first, business, economy
  - Day of week: weekdays, weekend
- Moreover,
  - Round trip or one way trip
  - Flight ticket sales channel: direct from airline, travel agencies
  - Time of flight ticket reservation: 30 days prior to departure, day of departure
  - Reservation cancellation availability
  - Baggage fee included or not included

3.Price determining characteristics (continuation)

- An example of flight tickets category– Air china's website

	First Standard	First Flex	Business Standard	Business Flex	Premium Standard	Premium Flex	Economy Standard	Economy Flex	Economy Saver	Economy Supersaver
Booking Class	F	A	J,C	D,Z,R	G	E	Y,B,M	U,H,Q	V,W,S,T,L,K	N
Rebooking Fee Before Departure	Free	Free	Free	¥ 600	Free	¥ 600	Free	¥ 600	¥ 600	Not Permitted
Rebooking Fee After Departure	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	Not Permitted
Refund Fee Before Departure	Free	¥ 1200	Free	¥ 1200	Free	¥ 1200	Free	¥ 1200	¥ 1200	Refund is not available (Fuel Surcharge are not refundable)
Refund Fee After Departure	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	¥ 1200	Refund is not available (Fuel Surcharge are not refundable)	Refund is not available (Fuel Surcharge are not refundable)

4.Sample design: three steps

International air passenger transportation

(1) Specify main price determining characteristics

- Route
  - From/to Japan to/from North America
  - From/to Japan to/from Europe
  - From/to Japan to/from Asia
  - Services providers
    - Full service carrier
    - Low cost carrier
- The market share of route and service providers is calculated by using other statistics and/or approximate Information from industrial organizations.

		Service providers				
		FSC 75%			LCC 25%	
		A inc. 40 %	B inc. 20%	C inc. 15%	D 10%	Others
Route	North America 40%					
	Europe 30%					
	Asia 20%					
	Others 5%					

(Note) This chart is hypothetical. Names of respondents and number of sample prices are strictly kept confidential.

4.Sample design: three steps

(2) Number of sample prices

- Number of sample prices is dependent on how big this service market is and how different price movements are in each service.
- Number of sample prices is set 12 for this example.

		Service providers				
		FSC 75%			LCC 25%	
		A inc. 40 %	B inc. 20%	C inc. 15%	D 10%	Others
Route	North America 40%	●●	●●	●		
	Europe 30%	●	●●	●		
	Asia 20%	●			●●	
	Others 5%					

(Note) This chart is hypothetical.
Names of respondents and number of sample prices are strictly kept confidential.

4.Sample design : three steps

(3) Specifying survey respondents candidates

- A.inc, B.inc, C.inc, and D.inc are regarded as respondents candidates.

		Service providers				
		FSC 75%			LCC 25%	
		A inc. 40 %	B inc. 20%	C inc. 15%	D 10%	Others
Route	North America 40%	●●	●●	●		
	Europe 30%	●	●●	●		
	Asia 20%	●			●●	
	Others 5%					

(Note) This chart is hypothetical.
Names of respondents and number of sample prices are strictly kept confidential.

II-3 Survey respondents initialization

II-3-1	Contact right people
II-3-2	Specify representative transactions
II-3-3	Select pricing methods (see section 3)
II-4-1	Collect tentative price data
II-4-2	Follow up tentative price collection

We will focus on Ⅱ-3-2 and Ⅱ-3-3 in the following slides.

5. Pricing method: The Model Pricing Method

- In air passenger transportation services, there are various types of pricing strategies based on their yield management. It is difficult to specify one representative transaction, which reflects their pricing strategies sufficiently.
- We use the Model Pricing Method, in order to include as many representative transactions as possible.
- When setting model for surveying prices, we assume the representative passengers, in order to survey prices with constant quality.
- We have the following three steps to calculate the model prices.(a) Specify the model passengers, (b)Identify prices for each model passenger, and, (c)Calculate the model prices using each passenger's price and weight.

5. Pricing method: The Model Pricing Method
(a) Specify model passengers

- We ask respondents the important conditions for typical business travelers.
- For example,

What route do business travelers usually use on business?

What seat do they usually take on business?

Do they usually use the same airline for their round trips?

Do they usually use two different airlines for their round trips since they do not know when they return?

When do they usually book flight tickets?

Do they usually change departing flight reservation?

5. Pricing method: The Model Pricing Method (a) Specify model passengers (continuation)

- We set the representative passengers by combining the following conditions.
  - Route: e.g., From/to Dalian to/from London
  - Seat class: First, Business, Economy
  - Round trip airline: Round trip provided by the same airline or round trip provided by two different airlines
  - Time of ticket reservation: 30 days prior to departure, the day of departure
  - Departing flight reservation change: Needed, not needed

5. Pricing method: The Model Pricing Method (a) Specify model passengers (continuation)

- Example From Dalian to London, Economy class, XXX Airlines

  The following passengers A~H are set as the model passengers in this example.

Passenger		A	B	C	D	E	F	G	H
Needs	1. Round trip airline	Round trip provided by the same airlines				Round trip provided by two different airlines			
	2. Time of ticket reservation	30 days prior to departure		The day of departure		30 days prior to departure		The day of departure	
	3.Departing flight reservation changes	Needed	Not needed	Needed	Not needed	Needed	Not needed	Needed	Not needed

5. Pricing method: The Model Pricing Method (a) Specify model passengers (continuation)

- Let's think about what flight fare the passengers A~H would buy.
- Additionally, we assume each passenger buys the lowest price ticket when conditions of the ticket meets the passenger's needs.

5. Pricing method: The Model Pricing Method (b) Identify prices for each model passenger (continuation)

An example of ticket category

		Economy standard	Economy flex	Economy saver	Economy hyper saver
Conditions	1.Airline availability	Any airlines	Any airlines	XXX airline only	XXX airline only
	2.Purchase deadline	The day of departure	5 days prior to departure	10 days prior to departure	60 days prior to departure
	3.Departing flight reservation changes	Free of charge	Free of charge	\600 charge	Not permitted
Price		\300,000	\200,000	\150,000	\80,000

Passenger A's needs and ticket selection

1.Airline availability: Round trip provided by XXX airline

2.Time of ticket reservation: 30 days prior to departure

3. Departing flight reservation change: Needed

5. Pricing method: The Model Pricing Method
(b) Identify prices for each model passenger(continuation)

- An example of ticket category

		Economy standard	Economy flex	Economy saver	Economy hyper saver
Conditions	1.Airline availability	Any airlines	Any airlines	XXX airline only	XXX airline only
	2.Purchase deadline	The day of departure	5 days prior to departure	10 days prior to departure	60 days prior to departure
	3.Departing flight reservation changes	Free of charge	Free of charge	\600 charge	Not permitted
Price		\300,000	\200,000	\150,000	\80,000

Lowest price

- Passenger A's needs and ticket selection

1.Airline availability: Round trip provided by XXX airline
2.Time of ticket reservation: 30 days prior to departure
3. Departing flight reservation change: Needed

→ "Economy saver" will be selected.

5. Pricing method: The Model Pricing Method (b) Identify prices for each model passenger(continuation)

- Question: What ticket will Passenger D select?

		Economy standard	Economy flex	Economy saver	Economy hyper saver
Conditions	1.Airline availability	Any airlines	Any airlines	XXX airline only	XXX airline only
	2.Purchase deadline	The day of departure	5 days prior to departure	10 days prior to departure	60 days prior to departure
	3.Departing flight reservation changes	Free of charge	Free of charge	\600 charge	Not permitted
Price		\300,000	\200,000	\150,000	\80,000

- Passenger D's needs and ticket selection

1.Airline availability: Round trip provided by XXX airline

2.Time of ticket reservation: <u>The day of departure</u>

3. Departing flight reservation change: <u>Not needed</u>

5. Pricing method: The Model Pricing Method
(b) Identify prices for each model passenger(continuation)

- Question: What ticket will Passenger D select?

		Economy standard	~~Economy flex~~	~~Economy saver~~	~~Economy hyper saver~~
Conditions	1.Airline availability	Any airlines	Any airlines	XXX airline only	XXX airline only
	2.Purchase deadline	The day of departure	~~5 days prior to departure~~	~~10 days prior to departure~~	~~60 days prior to departure~~
	3.Departing flight reservation changes	Free of charge	Free of charge	\600 charge	Not permitted
Price		\300,000	\200,000	\150,000	\80,000

- Passenger D's needs and ticket selection

1.Airline availability: Round trip provided by XXX airline

2.Time of ticket reservation: <u>The day of departure</u>

3. Departing flight reservation change: <u>Not needed</u>

→ "Economy standard" will be selected.

5. Pricing method: The Model Pricing Method
(c) Calculate model prices

- Model price= Weight averaged flight fares + Fuel surcharges
  = (0.1*\150,000 + … + 0.8*\300,000)/3.6 + \50,000
  = \256.944 + \50.000 = \ 306.944

Passenger		A	B	C	D	E	F	G	H
Weight		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Needs	1. Round trip airline	Round trip provided by the same airlines				Round trip provided by two different airlines			
	2. Time of ticket booking	30 days prior to departure		The day of departure		30 days prior to departure		The day of departure	
	3.Departing flight reservation changes	Needed	Not needed	Needed	Not needed	Needed	Not needed	Needed	Not needed
Selected ticket category		Economy saver	Economy saver	Economy standard	Economy standard	Economy flex	Economy flex	Economy standard	Economy standard
Price		\150,000	\150,000	\300,000	\300,000	\200,000	\200,000	\300,000	\300,000

The Model Pricing Method

- To decrease respondents' burden, we use list prices derived from the airlines' websites to calculate model prices.
- However, these model prices are needed to be improved, in order to include the various types of discounts e.g., corporate discounts.
- Further, in recent years, fare pricing by airline companies has become more varied, as exemplified by the expanded introduction of fares depending on seat availability, under which a fare changes in line with the predicted number of empty seats for each flight.
- For details, please see the following "Rebasing" slides.

6.Quality adjustment

- Ideally, quality adjustments for the following quality changes of the services due to technical improvements should be implemented.
  - Shorter flight time
  - Better temperature and humidity control
  - Enlarged personal space
  - More environmentally friendly
- However, the BOJ does not quality-adjust, since adequate information is not currently available.

- How about in your country?

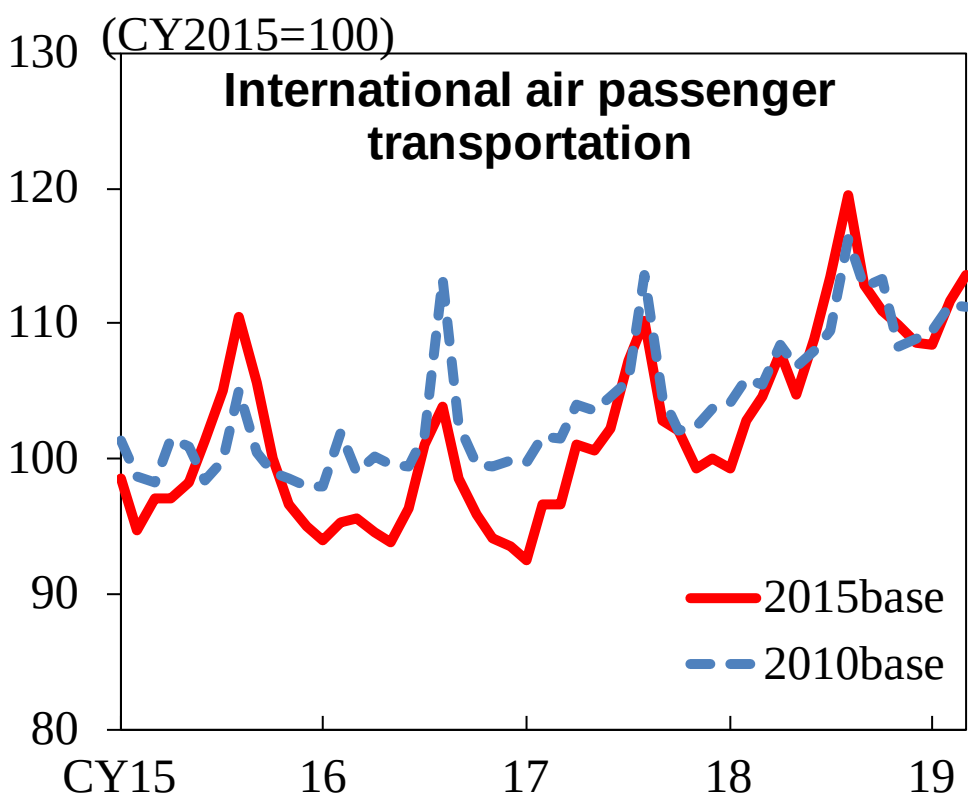
7.Rebasing

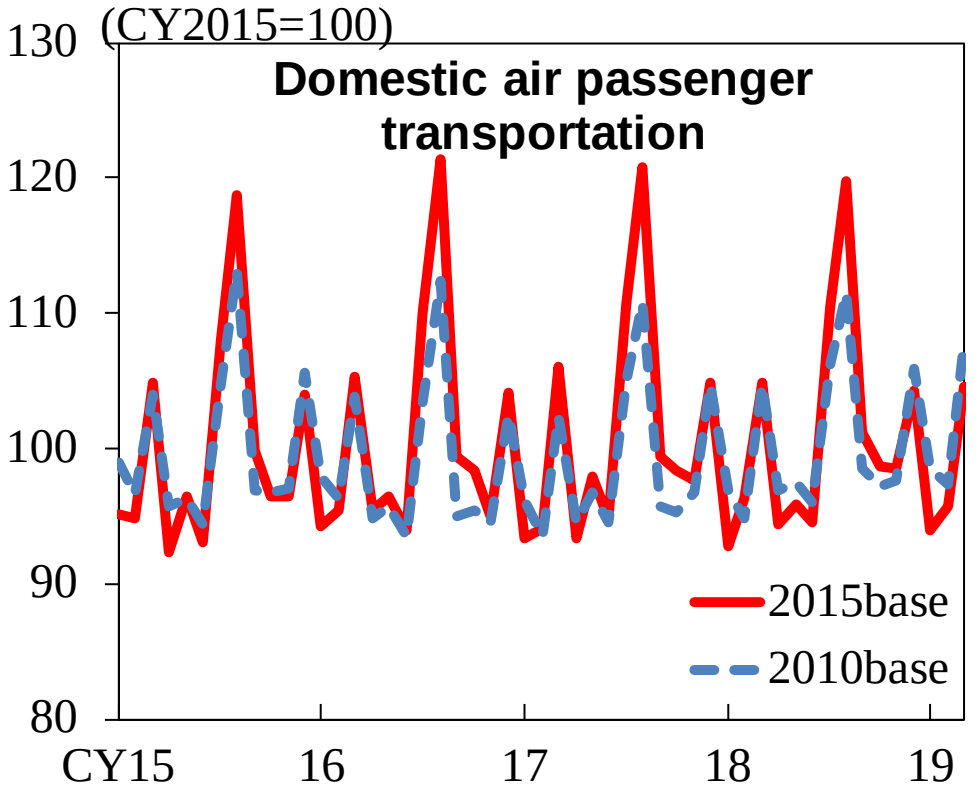
- We rebased this index from the 2010 base to the 2015 base. In rebasing project, we did the following things.
- Improved the pricing method from the Model pricing method using published catalog prices to the Unit values, “the average price per seat” using actual transaction prices obtained from the respondents.
- “Average price per seat” is compiled by specifying conditions such as departing and destination airports, travel class, and fare type. “Average price per seat” is dividing total sales revenue by number of seats sold.

7.Rebasing (continuation)

- “Average price per seat” allows the Bank to capture overall price developments, including those of fares depending on seat availability, which cannot be obtained from price catalogues.
- This method also allows the Bank to incorporate actual price developments that vary depending on the type of sales channels (e.g., sales through an agent) into statistical data.

7. Index developments





International air passenger transportation prices have recently increased mainly due to increase in fuel surcharges. Domestic air passenger transportation prices have not increased because fuel surcharges are not currently included in flight ticket prices. Domestic air passenger transportation prices fluctuate due to their seasonality.

(Note)For comparison, the 2010 base indexes in CY 2015 are set as 100.

謝謝！Thank you for your attention!

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