

Quality adjustment method in prepackaged software in Japan's 2000 base Corporate Service Price Index

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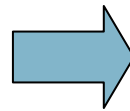
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“Information services” in the CSPI

1995 base

Subgroup	Item
Software development (41.2)	Software development (41.2)
Other information services (23.3)	Data processing (23.3)
	Providing databases (3.0)
	Market research (1.5)



2000 base

Subgroup	Item
Software development (61.3)	Custom software (44.1)
	Prepackaged software (17.2)
Other information services (44.8)	Data processing services (24.2)
	System management and operation services (11.9)
	Providing database services (4.3)
	Market research (4.4)

Figures in parentheses indicate the weight of each grouping and item expressed as one-thousandths of all items.

Prepackaged software in Japan

- ◆ The inter-corporate transaction value of Japanese pre-packaged software industry was 2.01 trillion yen.
- ◆ 1.6 percent of the total transaction value of the 2000 base CSPI



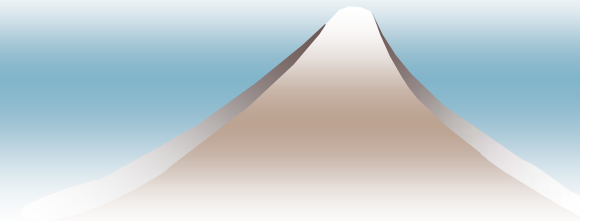
Samples in the 2000 base CSPI

(Types)

- ◆ Inner management software
 - accounting and payroll management
- ◆ Database software for sales or customer management
- ◆ Middleware for computer operation
- ◆ Computer aided engineering software

(Price data)

- ◆ Actual transaction prices
 - Discount sales are not currently common in Japan's pre-packaged software market.



Why is the quality adjustment critical?

- ◆ Pre-packaged software is periodically upgraded without any change in prices .
- ◆ Therefore, the movements of the CSPI count on the price change caused by the quality change in upgrading.

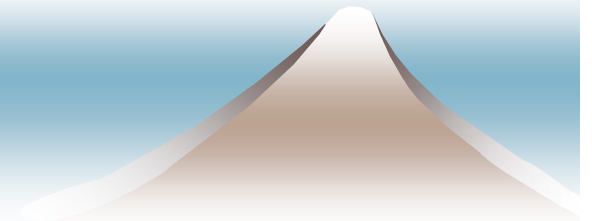


Which quality adjustment method is applicable?

- ◆ Overlap method
 - The moment a new version is introduced, an old one usually disappears ☐_x
- ◆ Hedonic regression method
 - Problems with model specification and lack of relevant data ☐_x
- ◆ Production cost method
 - It depends on the availability of cost information.
 - Under the Japanese accounting guideline software companies are obliged to divide development costs into costs stemming from quality improvement and maintenance cost.

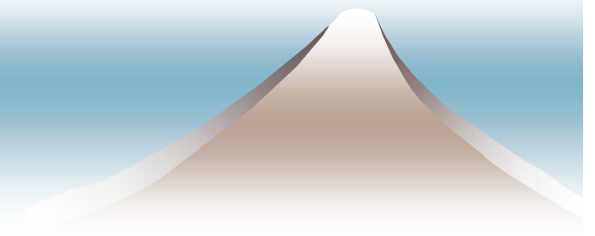
Characteristics of software products

- ◆ The marginal production cost of software is negligible, while fixed costs such as R&D costs are sunk.
- ◆ Thus, the production costs for the additional upgrading of pre-packaged software mean not marginal production costs but unit production costs.



Application of the production cost method in practice(1)

- 1 Collect the following information from software publishers regularly
 - ◆ Information about new version
 - ◆ Cost of upgrading (excluding maintenance costs --only costs that leads to quality improvement)
 - ◆ Expected sales quantity of new versions
 - ◆ Transaction price per license of surveyed package



Application of the production cost method in practice(2)

2 Judge whether the new version includes additional improvement

- ◆ If the upgrading is a mere program change for the maintenance or the removal of bugs and errors, we use the direct comparison method.



Application of the production cost method in practice(3)

3 Calculate proxy for value of quality improvement as follows:

$$\text{Proxy for value of quality improvement} = \frac{\text{Total cost of upgrading}}{\text{Expected sales quantity}}$$



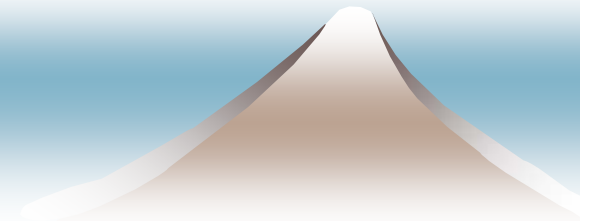
Expected sales quantity

- ◆ If we do not obtain expected sales quantity, we treat sales quantity of old version in the past one year as the proxy for expected sales quantity.



Problems of cost information

- ◆ If we do not obtain expected sales quantity, we treat sales quantity of old version in the past one year as the proxy for expected sales quantity.
- ◆ When available cost information include upgrading costs for several software products, we calculate the revenue share of our sample product to the total products and use this share as that of the production costs of the sampled products to the total products.



Example

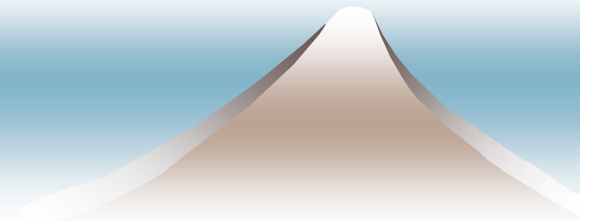
Product	Product A (stand-alone edition)	Product A consists of stand-alone and enterprise server edition.
Frequency of upgrades	About once a year	
Transaction price	160,000 yen (no change)	No change for a few years
Period of new version release	February 2003	
Period of previous version release	December 2001	
Total upgrade cost including enterprise server edition.	30 million yen	This development cost including enterprise server edition.
Revenue share of stand-alone edition	0.74	Use for estimating the development cost of stand-alone edition.
Expected shipment of new version in stand-alone edition	1,710	Shipment of stand-alone edition at last year.
Average cost of upgrading	$22.2 \text{ million yen} / 1,710 = 12,982 \text{ yen}$	Value of quality improvement.

Calculation of price index

- ◆ Quality ratio (quality of old version/quality of new version) is

$$\frac{160,000\text{yen}}{(160,000\text{yen} + 12,982\text{yen})} = 0.925$$

- ◆ In this case, transaction price remained unchanged. As a result, the upgrading decreases the CSPI by 7.5 percent.



Concluding Remarks

- ◆ The price movement of prepackaged software in the CSPI depends on the evaluation of upgrades because it is often the case that the list price remains unchanged for upgrades.
- ◆ Without applying the production cost method, we could not have opened up the introduction of prepackaged software to the CSPI.
- ◆ However, it should be noted that the above method calculates unit production costs by dividing the expected sales quantity or realized sales quantity of the old version.

