

**The 2005 Base Corporate Goods Price Index
Hedonic Regression Model for Quality Adjustment¹
– Computer Printers –**

The Bank of Japan (BOJ) compiles the Corporate Goods Price Index (CGPI) which focuses on the prices of goods traded among corporations. BOJ surveys the prices of the representative products in each commodity category and when they lose their representativeness in the market, they are replaced accordingly. To account for price changes with the quality being constant, quality adjustments between old and new products need to be done. BOJ employs various quality adjustment methods and hedonic regression method is one of them. BOJ updated the regression models² for “computer printers.” See the appendix 1 and 2 for the estimation results.

The details of samples for the estimation are as follows.

- I. The price data for printers are taken from “BCN Ranking,” the BCN Inc. database. The price data for printers are retail prices at the large-size electrical appliance retailers, unlike sample prices of CGPI, which are transaction prices among corporations.
- II. Specifications for each product are taken from the “BCN Ranking” and brochures of the products.
- III. The number of the observations for inkjet and laser printers are 85 and 65, respectively. The data from 2009/Q3 to 2011Q2 are used to estimate the hedonic regression models, which are adopted from October 2011 for the quality adjustment. When the observations include the data of the same products as shipped in several quarters, the first data are used for the estimation³.

¹ For more details, see the [Outline of “Corporate Goods Price Index \(CGPI, 2005 base\)”](#) on BOJ website.

² BOJ adopts two hedonic regression models, one for inkjet printers and one for laser printers. Laser printers include LED printers.

³ Sample prices of CGPI are usually replaced by the prices of corresponding new products soon after the release. Therefore, the use of the first observation to estimate may be the best corresponding to quality adjustment of sample prices.

Estimation Result for Inkjet Printers

Estimated Model Box-Cox Parameter of Dependent Variable	2009/Q3~2011/Q2	(Ref.)2009/Q1~2010/Q2
	Box-Cox Model	Box-Cox Model
	0.182	-0.214
Intercept	22.897 ***	3.907 ***
Input Paper Capacity, Max (Standard, sheets)	--	3.717E-12 ***
Box-Cox Parameter	--	3.921
Input Paper Capacity, Max (Standard and optional, sheets)	1.053E-03 ***	--
Box-Cox Parameter	1.339	--
Number of Ink	6.754E-04 ***	--
Box-Cox Parameter	4.980	--
Number of Nozzle	--	3.878E-04 ***
Box-Cox Parameter	--	0.664
Fax Memory (pages)	6.798E-06 ***	0.003 ***
Box-Cox Parameter	2.388	0.439
Dummy Variables		
A3 Size	3.794 ***	0.088 ***
Wireless LAN (Standard and optional)	1.198 ***	0.031 ***
Camera Direct Printing	1.148 **	--
Direct Printing	--	0.038 **
Double Printing	1.167 **	--
Producer		
Producer A	--	0.204 ***
Producer B	1.252 ***	0.107 ***
Producer C	--	0.080 ***
Period		
2009/Q2	--	-0.008
2009/Q3	--	0.011
2009/Q4	0.383	-0.019
2010/Q1	0.396	-0.004
2010/Q2	8.986 ***	0.119 ***
2010/Q3	0.670	--
2010/Q4	1.009	--
2011/Q1	-8.595E-04	--
2011/Q2	-0.859	--
R ²	0.817	0.843
Adjusted R ²	0.777	0.788
Standard Error of Regression	1.572	0.030
Mean of Dependent Variable	28.702	4.127
Number of Observations	85	55

Note: ***, **, * denote significance at the 1%, 5%, 10% level respectively.

Estimation Result for Laser Printers

Estimated Model Box-Cox Parameter of Dependent Variable	2009/Q3~2011/Q2	(Ref.) 2009/Q1~2010/Q2
	Semi Box-Cox Model	Log-Linear Model
	0.305	--
Intercept	37.001 ***	6.271 ***
Print Speed (Black, ppm)	1.175 ***	0.564 ***
Print Speed (Color, ppm)	--	0.175 ***
Input Paper Capacity, Max (Standard, sheets)	0.012 **	0.342 ***
Memory, Standard (MB)	0.030 **	0.165 ***
Dummy Variables		
Color Printing	24.071 ***	--
A3 Size	16.400 ***	0.301 ***
Copy or Scan Function	--	0.433 ***
Copy, Scan, Fax Function	10.587 ***	--
Producer		
Producer D	5.583 ***	--
Producer E	--	-0.357 ***
Producer F	--	-0.419 ***
Producer G	--	-0.335 **
Period		
2009/Q2	--	-0.060
2009/Q3	--	-0.089
2009/Q4	-1.938	0.061
2010/Q1	-3.370	-0.006
2010/Q2	-13.848 ***	-0.343 ***
2010/Q3	-6.617 *	--
2010/Q4	-9.167 ***	--
2011/Q1	-10.247 ***	--
2011/Q2	-5.028	--
R ²	0.942	0.885
Adjusted R ²	0.926	0.852
Standard Error of Regression	4.831	0.214
Mean of Dependent Variable	90.256	11.087
Number of Observations	65	65

Note:

1. ***, **, * denote significance at the 1%, 5%, 10% level respectively.
2. Laser printers include LED printers.