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**2000 Base Corporate Goods Price Index
Hedonic Regression Model for Quality Adjustment¹
– Computer Printers –**

The Bank of Japan compiles the index of “computer printers” in the 2000 base Corporate Goods Price Index (CGPI). When the sample prices of this commodity surveyed for compilation of the index are replaced, the quality difference between the old and new sample prices are adjusted by the hedonic regression method.² The Bank updated the hedonic regression model. The details of the estimation are as follows.

1. The Data Source

The data we used for the analysis is as follows.

- I. The price data for ink jet and laser printers are taken from “Japan Printer Quarterly Model Analysis”, the data base of IDC Japan.
- II. Spec data for each product are taken from IDC data and brochures of the products.
- III. The number of the observations for ink jet and laser printers is 66 and 116 respectively. The data from 2004/1Q to 2006/Q2 for ink jet and from 2005/1Q to 2006/2Q for laser printers are used to estimate the hedonic regression model, which is adopted from November 2006 for the CGPI. When the observations include the data of the same products as shipped in consecutive quarters, the first data is selected.³
- IV. The data of All-In-One Printer (i.e., the peripheral devices which include printer, scanner, copier and etc. in one unit) are excluded from samples, because the sample prices of computer printers are researched for printers without other functions like scanner or copier in the CGPI.

¹ For more detail, see the “Explanation of Corporate Goods Price Index (CGPI)” on the Bank of Japan (BOJ) website, <http://www.boj.or.jp/en/theme/research/stat/pi/cgpi/index.htm>.

² The hedonic regression method is one of the quality adjustment methods. This method is used to calculate the part of the price changes that correspond to the change in quality accompanying the shift to the new sample prices.

³ The sample price of CGPI is usually replaced by the price of corresponding new product soon after its release. Therefore, use of first observation of the data to estimate may be the best corresponding to quality adjustment of the sample price.

2. Estimation Results

Estimation Result for Ink Jet Printer

Sample Range	2004/Q1~2006/Q2	(Ref.) 2004/Q1~2005/Q2
Box-Cox Parameter	-0.159	0.315
Estimsated Model	Box-Cox Model	Box-Cox Model
Intercept	-37.384 ***	-1,744.080 ***
Number of Nozzles (Color + Monochrome)	39.026 ***	1,389.900 ***
Box-Cox Parameter	-0.919	-0.770
Paper Handling, Standard	1.932E-04 **	0.005 ***
Box-Cox Parameter	1.095	1.508
Support A3 Size	0.130 ***	13.915 ***
Support IEEE1284	0.065 **	10.727 **
Support USB2.0	---	6.927 **
Support Wireless LAN	---	9.760 ***
Support PC Card	---	9.187 ***
For Business	---	24.829 ***
Dummy for Producer		
Producer A	---	12.040 **
Producer B	0.087 ***	23.206 ***
Producer C	-0.153 ***	---
Dummy for Period		
2004/2S	---	
2005/1S	---	
2005/2S	-0.107 ***	
2006/1S	-0.081 **	
(Ref.) Dummy for Period (Previous estimation)		
2004/2Q		---
2004/3Q		---
2004/4Q		-6.526 **
2005/1Q		---
2005/2Q		---
R ²	0.770	0.940
Adjusted R ²	0.738	0.921
Number of Observations	66	47
Mean of Dependent Variable	5.042	89.568
Standard Error of Regression	0.079	7.006

Note:

1. *, **, *** denotes significance at the 10%, 5%, 1% level respectively.
2. The estimated results above are White heteroscedasticity consistent estimator.
3. To avoid a perfect multicollinearity, we drop the dummy variable for the 2004/1S, and also, dummy variables whose parameters are not estimated significantly are dropped from the estimation.
4. In the column of Dummy for Period above, "Q" denotes quarter and "S" denotes semester.

Estimation Result for Laser Printer

Sample Range	2005/Q1~2006/Q2	(Ref.) 2004/Q1~2005/Q2
Box-Cox Parameter	0.177	0.216
Estimsated Model	Box-Cox Model	Box-Cox Model
Intercept	22.472 ***	35.368 ***
Print Speed (Monochrome)	5.953E-10 ***	0.142 ***
Box-Cox Parameter	6.420	1.243
Paper Handling, Standard	0.070 ***	1.65E-04 ***
Box-Cox Parameter	0.551	1.507
Print Speed (color)	0.154 ***	0.369 ***
Memory, Standard	2.739 ***	---
Box-Cox Parameter	-0.146	---
Support A3 Size	2.287 ***	2.443 ***
Support Post Script	1.239 **	2.065 **
IEEE 1284	1.157 **	---
Support LAN	---	3.141 ***
Adapt Law on Promoting Green Purchasing	---	1.894 **
Dummy for Producer		
Producer A	---	3.326 ***
Producer B	---	4.607 ***
Producer C	---	---
Producer D	-3.489 ***	---
Producer E	-6.314 ***	---
Dummy for Period		
2004/2Q	---	
2004/3Q	---	
2004/4Q	---	
2005/1Q	---	
2005/2Q	---	
(Ref.) Dummy for Period (Previous estimation)		
2005/2Q		---
2005/3Q		---
2005/4Q		---
2006/1Q		---
2006/2Q		---
R ²	0.881	0.868
Adjusted R ²	0.870	0.854
Number of Observations	116	104
Mean of Dependent Variable	40.175	56.253
Standard Error of Regression	2.183	3.701

Note:

1. *,**,*** denotes significance at the 10%, 5%, 1% level respectively.
2. The estimated results above are White heteroscedasticity consistent estimator.
3. Print Speed (Color) is not Box-Cox transformed since the print speed will be zero in the case of monochrome printer.
4. To avoid a perfect multicollinearity, we drop the dummy variable for the 2004/Q1, and also, dummy variables whose parameters are not estimated significantly are dropped from the estimation.