

**2000 Base Corporate Goods Price Index
Hedonic Regression Model for Quality Adjustment¹
– Personal Computers –**

The Bank of Japan compiles the index of “personal computers (PCs)” in the 2000 base Corporate Goods Price Index (CGPI). When the sample prices of this commodity surveyed for the compilation of the index are replaced, the quality difference between 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.

- I. The price data for PCs are retail prices at the large-size household electrical appliance retailers, provided by the editorial departments of “Nikkei Pasokon” (Nikkei Personal Computer).
- II. Spec. data for each product are taken from the “Nikkei Best PC plus Digital” and brochures of the products.
- III. The sample range for analysis is the last four quarters, and the number of the observations is 380 for notebook PCs and 245 for desk top PCs respectively. The data used for estimation of the hedonic regression model which is adopted from August 2007 Cooperate Goods Price Index (CGPI) are the data of products shipped from 2006/Q3 to 2007/Q2. In the cases that the data of the product shipped in consecutive quarters are included in the sample, first observation of the data in the sample range is selected.³
- IV. Unlike sample prices of CGPI, which is transaction prices between corporations, retail prices are used for the estimation due to availability of data set.

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 to assure representation of the product in the market. Therefore, use of first observation of the data to estimate, may be the best corresponding to quality adjustment of the sample price.

Estimation Result for Desktop Personal Computers

	2006/3Q-2007/2Q	(Ref.) 2006/1Q-2006/4Q
Box-Cox Parameter	0.431	-0.053
Estimated Model	Semi Box-Cox Model	Box-Cox Model
Intercept	279.532 ***	8.383 ***
Hard Drive Memory (GB)	0.141 ***	0.002 ***
Box-Cox Parameter	--	0.694
Second Level Cache (KB)	--	0.012 ***
Box-Cox Parameter	--	0.193
Second Level Cache, over 4MB (Dummy)	42.013 ***	--
Display Size (inches)	2.069 ***	0.012 ***
CPU		
Core 2 Duo	18.155 **	0.066 **
TV tuner		
TV tuner (Hardware Encord)	--	0.033 ***
Dual TV tuners	31.237 ***	--
Digital Terrestrial Broadcasting	36.693 ***	0.081 ***
Operating System		
Windows XP Professional/Media Center Edition	--	0.033 *
Windows XP Professional/Media Center Edition/ Vista Home Premium/Business	21.256 ***	--
Optical Drives		
Super Multi-drive or Super Multi Double Layer Drive	--	0.034 **
Blu-ray Disc	--	0.234 ***
Communications		
10/100/1000 Base Ethernet	--	0.042 ***
Wireless LAN (IEEE 802.11)	28.400 ***	0.056 ***
LCD		
Glossy LCD	33.205 ***	--
Pre-installed Application		
Microsoft Office 2003	--	0.064 ***
Microsoft Office 2007	27.172 ***	--
Wireless Keyboard	32.303 ***	--
Dummy for Producer		
Producer A	--	--
Producer B	--	0.049 ***
Producer C	--	0.053 ***
Producer D	--	-0.142 ***
Producer E	--	-0.120 ***
Producer F	--	0.099 **
Dummy for Period		
2006/4Q	--	
2007/1Q	-22.794 ***	
2007/2Q	-37.331 ***	
(Ref.) Dummy for Period (Previous estimation)		
2006/2Q		-0.027 **
2006/3Q		-0.055 ***
2006/4Q		-0.108 ***
Adjusted R ²	0.856	0.949
Standard Error of Regression	29.975	0.568
Mean of Dependent Variable	401.997	8.865
Number of Observations	245	271

Notes:

1. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.
2. The coefficients estimated above are White heteroscedasticity consistent estimator.

Estimation Result for Notebook Personal Computers

	2006/3Q-2007/2Q	(Ref.) 2006/1Q-2006/4Q
Box-Cox Parameter	0.412	0.224
Estimated Model	Box-Cox Model	Box-Cox Model
Intercept	9.000E+06 ***	84.395 ***
Main Memory (MB)	997.877 ***	0.161 ***
Box-Cox Parameter	-0.740	0.337
Hard Drive Memory (GB)	2.130 ***	0.232 ***
Box-Cox Parameter	0.459	0.551
Weight (g)	-1.532E+07 ***	-8.712 ***
Box-Cox Parameter	-1.702	-0.183
Second Level Cache (KB)	--	0.006 ***
Box-Cox Parameter	--	0.731
Second Level Cache, over 4MB (Dummy)	17.062 ***	--
Max. Battery Life (minutes)	--	0.009 ***
Box-Cox Parameter	--	0.857
Max. Battery Life, over 4 hours (Dummy)	11.436 ***	--
Resolution (width, dpi)		3.480E-09 ***
Box-Cox Parameter	--	2.876
Resolution, over 1,470,000 dpi (Dummy)	13.422 ***	--
CPU		
Pentium M	--	1.668 ***
Core 2 Duo / Core Duo / Core Solo	--	1.916 ***
Core Solo	19.300 ***	--
Core 2 Duo / Core Duo	25.176 ***	--
Communications		
10/100/1000 Base Ethernet	17.478 ***	1.906 ***
TV tuner		
TV tuner	18.398 ***	1.235 ***
Digital Terrestrial Broadcasting	18.416 ***	1.297 **
Operating System		
Windows XP Professional /Media Center / Tablet	--	1.799 ***
Windows XP Professional /Media Center / Tablet / Vista Home Premium/Business	6.283 ***	--
Pre-installed Application		
Microsoft Office 2003	--	2.183 ***
Microsoft Office 2003/2007	26.319 ***	--
Microsoft Office OneNote 2003/2007	8.430 ***	--
Optical Drives		
Super Multi-drive or Super Multi Double Layer Drive	18.268 ***	0.932 ***
Blu-ray Disc	57.932 ***	--
Dummy for Producer		
Producer A	-18.274 ***	-2.438 ***
Producer B	--	-0.706 **
Producer C	--	-1.031 ***
Producer D	--	-3.574 ***
Producer E	--	-1.871 ***
Dummy for Period		
2007/1S	-7.027 ***	
(Ref.) Dummy for Period (Previous estimation)		
2006/3Q		-0.913 ***
2006/4Q		-2.196 ***
Adjusted R ²	0.856	0.863
Standard Error of Regression	15.943	1.622
Mean of Dependent Variable	348.062	62.280
Number of Observations	380	372

Notes:

1. * ** and *** denote significance at the 10%, 5% and 1% level, respectively.
2. The coefficients estimated above are White heteroscedasticity consistent estimator.
3. In the column of Dummy for Period above, "Q" denotes quarter and "S" denotes semester.