All industrial activities dragged down by personal services after the tax increase

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URL of the Analysis of All Industrial Activities :
Analysis Objectives of This Report

➢ After consumption tax rate was increased to 8% from 5% in April in 2014, Japan’s overall industrial activities floundered.
➢ In this analysis, we will confirm the trends of the “Service Industry” whose downturn was outstanding during the second quarter of 2014 after the tax increase, by comparing the first quarter of 2009, which was the bottom after the Lehman crisis.
➢ Also, we will additionally consider how changes in price after the tax increase affected the “Service Industry”.

(Note)
“Business services” and “personal services” used in this report are the words replaced in simpler terms from “broad-ranging business services” and “broad-ranging personal services”, and they do not designate the same “business services” and “personal services” of released components in the Indices of Tertiary Industry Activity.
Changes in the indices of all industrial activities (Compared to the previous quarter, contribution ratio to growth rate) - Before and after the tax increase -

- The indices of all industrial activities decreased by 3.4% from the previous quarter after the tax increase (the second quarter of 2014).
- Looking at the components of the decrease, the contribution of the indices of tertiary industry activity to the change from the previous quarter was -2.51% points, accounting for approximately 70% of the decrease in the indices of all industrial activities.

(2005=100, seasonally adjusted)

(Note) Since the indices of Agriculture, Forestry & Fisheries Production contain no data corresponding to the Indices of All Industrial Activities (for quarters), these figures in the above graph were calculated without them.

Source: Created based on “METI: Indices of All Industrial Activities”
Changes in the indices of all industrial activities (Compared to the previous quarter, contribution ratio to growth rate) - After the Lehman crisis -

- Meanwhile, the indices of all industrial activities decreased by 6.3% from the previous quarter after the Lehman crisis (the first quarter of 2009).
- Looking at the components, industrial production made a contribution of -3.52% points to the change from the previous quarter, and tertiary industry activity made a contribution of -2.03% points. The largest contribution to the decrease was observed in industrial production, while the contribution of tertiary industry activity to the decrease remained approximately 30% of the total.
- After the tax increase (the second quarter of 2014), all industrial activities did not decrease as much as in the aftermath of the Lehman crisis, but we can see the negative impact by tertiary industry activity was relatively large compared to the overall decrease.

(Note) Since the indices of Agriculture, Forestry & Fisheries Production contain no data corresponding to the Indices of All Industrial Activities (for quarters), these figures in the above graph were calculated without them.

Source: Created based on “METI: Indices of All Industrial Activities”
The contributions of business services and personal services to changes from the previous quarter for the overall tertiary industry activity

- After the Lehman crisis (the first quarter of 2009), business services made a contribution of -2.94% points to a 3.1% decrease from the previous quarter for the overall tertiary industry activity, accounting for approximately 90% of the total.

- Meanwhile, after the tax increase (the second quarter of 2014), business services made a contribution of -2.3% points, and personal services made a contribution of -1.5% points to a 3.8% decrease for the overall tertiary industry activity. A significant decrease was observed in personal services as well, which was not identified after the Lehman crisis.
Factorial analysis on contributions of broad-ranging personal services
(Contribution to % change from the previous quarter)

- After the Lehman crisis (the first quarter of 2009), a decrease was observed in “Accommodations, Eating and Drinking Services”, while the overall personal services decreased by 0.2% from the previous quarter, remaining in the proximity of zero.

- Meanwhile, the overall personal services substantially decreased by 3.4% after the tax increase (the second quarter of 2014). Looking at the details of the decrease, “Retail Trade” made a contribution of -2.12% points, accounting for approximately 60% of the total decrease and largely depressing the total.

(2005=100, seasonally adjusted)

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for individual customers”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
Changes in the indices of “Broad-ranging personal services” and “Services except Retail Trade”

- However, when looking at changes in the indices excluding “Retail Trade”, the indices also decreased by 1.0% from the previous quarter after the tax increase (the second quarter of 2014).
- We can see the tax increase affected not only “goods”, but also “services” on which we cannot stock up.

Source: Created based on “METI: Indices of Tertiary Industry Activity”
Changes in the indices of “Broad-ranging personal services” and “Services except Retail Trade”

- When drawing an approximate line of polynomial of degree six averaging the indices trends of “Broad-ranging personal services” and “Services except Retail Trade” (Broad-ranging personal services: \( R^2 = 0.9168 \), Services except Retail Trade: \( R^2 = 0.9387 \))\(^{(Note)}\), the lines gradually curve downward from 2014 after peaking in the second half of 2013.
- The rise before the tax increase (the first quarter of 2014) and the drop after the tax increase (the second quarter of 2014) had as great an impact as the curve shown by the approximate lines.

\[ R^2 = 0.9168 \]
\[ R^2 = 0.9387 \]

\( \text{(Note)} 1. \) An approximate line of polynomial is a regression line which tries explaining the trend variation (trends) of given data. Polynomial of higher degree assumedly raise the interpretability of the approximate line by capturing more given data for the line (\( R^2 \) designated in the following sentence tends to close to 1.)

\( \text{2. } R^2 \text{ represents the coefficient which measures the degree of interpretability which the regression-estimated values (the approximate line) have, without deviating from the original data, showing } 0 \leq R^2 \leq 1. \text{ When the values with higher interpretability, the figure of } R^2 \text{ is closer to 1.} \)

Source: Created based on “METI: Indices of Tertiary Industry Activity”

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\( (2005=100, \text{seasonally adjusted}) \)
Factorial analysis of “Broad-ranging personal services (except Retail Trade)” (Contribution to % change from the previous quarter)

When looking closely at the trends of “Services except Retail Trade”, the indices decreased by 0.5% from the previous quarter after the Lehman crisis (the first quarter of 2009), and decreased by 1.0% from the previous quarter after the tax increase (the second quarter of 2014). The width of decrease expanded more than that after the Lehman crisis.

(2005=100, seasonally adjusted)
(%, % points)
Comparison of contributions of broad-ranging personal services (except Retail Trade) “After the Lehman crisis (the first quarter of 2009)” and “After the tax increase (the second quarter of 2014)” (Contribution to % change from the previous quarter)

- After the Lehman crisis (the first quarter of 2009), “Accommodation, Eating and Drinking Services” made a contribution of -0.34% points to the change from the previous quarter, accounting for nearly 70% of the decrease of the overall “Services except Retail Trade”.

- Meanwhile, after the tax increase (the second quarter of 2014), decreases in contributions to the change from the previous quarter were observed in various industry sectors, including “Living-Related and Personal Services & Amusement Services” (-0.34% points), and “Transport & Postal Activities” (-0.21% points).

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for individual customers”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
Factorial analysis on contributions of broad-ranging business services
(Contribution to % change from the previous quarter)

- The indices decreased by 5.0% from the previous quarter after the Lehman crisis (the first quarter of 2009). Looking at the components, a significant decrease was observed in “Wholesale Trade” whose contribution to the change from the previous quarter was -3.67 % points, accounting for approximately 70% of the overall business services.
- Meanwhile, the indices decreased by 4.2% from the previous quarter after the tax increase (the second quarter of 2014). Decrease remained less than that after the Lehman crisis. Looking at the components, as was expected, “Wholesale Trade” made a contribution of -2.2% points, which accounts for approximately 50% of the overall business services, largely depressing the total.

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for businesses”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
When looking at the changes in the indices of “Broad-ranging business services” excluding “Wholesale Trade”, the indices decreased by 1.7% after the tax increase (the second quarter of 2014).

Also in business services, we can see the tax increase affected not only “goods”, but also “services”.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (2005=100, seasonally adjusted)
Changes in the indices of “Broad-ranging business services” and “Services except Wholesale Trade”

- When drawing an approximate line of polynomial of degree six averaging the indices trends of “Broad-ranging business services” and “Services except Wholesale Trade” (Broad-ranging business services: $R^2=0.9373$, Services except Wholesale Trade: $R^2=0.928$)(Note), the lines gradually curve downward from 2014 after peaking in the fourth quarter of 2013.

- Also in business services, the rise before the tax increase (the first quarter of 2014) and the drop after the tax increase (the second quarter of 2014) had as great an impact as the curve shown by the approximate lines.

(Note) Refer to the note on page slide 7.
Source: Created based on “METI: Indices of Tertiary Industry Activity” (2005=100, seasonally adjusted)
Factorial analysis on contributions of “Broad-ranging business services (excluding Wholesale Trade)” (Contribution to % change from the previous quarter)

When closely looking at the trends of “Services except Wholesale Trade”, the indices decreased by 2.2% from the previous quarter after the Lehman crisis (the first quarter of 2009), while the indices decreased by 1.7% from the previous quarter after the tax increase (the second quarter of 2014). The width of decrease remained smaller than that after the Lehman crisis.

(2005=100, seasonally adjusted)

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for businesses”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
Comparison of contributions of broad-ranging business services (except Wholesale Trade) “After the Lehman crisis (the first quarter of 2009)” and “After the tax increase (the second quarter of 2014)” (Contribution to % change from the previous quarter)

-0.75% points to the change from the previous quarter, “Electricity, Gas, Heat Supply & Water” made a contribution of -0.41% points, and “Finance & Insurance” made a contribution of -0.36% points. These three industry sectors account for nearly 70% of the decrease of the overall services excluding Wholesale Trade.

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for businesses”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
Comparison of contributions of broad-ranging business services (except Wholesale Trade) “After the Lehman crisis (the first quarter of 2009)” and “After the tax increase (the second quarter of 2014)” (Contribution ratio to % change from the previous quarter)

- Meanwhile, after the tax increase (the second quarter of 2014), “Finance & Insurance” made a contribution of -0.49% points to the change from the previous quarter, which contributed to the decrease more than after the Lehman crisis, while the decreases in the other two industry sectors remained smaller, -0.45% points made by “Transport & Postal Activities” and -0.09% points made by “Electricity, Gas, Heat Supply & Water”.

(Note) The components of the above graph were seasonally adjusted by direct adjustment after creating the original indices by accumulating final components of each industry sector “for businesses”. Therefore, the total accumulated figures of the components may not match the overall figures.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (estimates)
The indices of tertiary industry activity in the third quarter of 2014 (Provisional values)

- During the third quarter of 2014, the indices increased slightly, but did not recover enough to compensate the decrease width of the second quarter of 2014 after the tax increase.
- However, comparing September with several months after the tax increase, an increase in the number of the components which showed a positive change from the previous month gives an impression of recovery.

(Seasonally adjusted)

<table>
<thead>
<tr>
<th>Period</th>
<th>Tertiary Industry</th>
<th>Broad-ranging Personal Services</th>
<th>Broad-ranging Business Services</th>
<th>Retail Trade</th>
<th>Living-Related and Personal Services &amp; Amusement Services (for individual)</th>
<th>Transport &amp; Postal Activities (for individual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>(%) changes from the previous month (quarter)</td>
<td>Index</td>
<td>(%) changes from the previous month (quarter)</td>
<td>Index</td>
<td>(%) changes from the previous month (quarter)</td>
<td>Index</td>
</tr>
<tr>
<td>Q1</td>
<td>101.8</td>
<td>1.8</td>
<td>106.4</td>
<td>1.7</td>
<td>98.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Q2</td>
<td>97.9</td>
<td>-3.8</td>
<td>102.8</td>
<td>-3.4</td>
<td>94.3</td>
<td>-4.2</td>
</tr>
<tr>
<td>Q3</td>
<td>98.2</td>
<td>0.3</td>
<td>103.4</td>
<td>0.6</td>
<td>94.4</td>
<td>0.1</td>
</tr>
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<td>Jan.</td>
<td>101.5</td>
<td>1.5</td>
<td>106</td>
<td>1.0</td>
<td>98.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Feb</td>
<td>100.6</td>
<td>-0.9</td>
<td>104.7</td>
<td>-1.2</td>
<td>97.6</td>
<td>-0.6</td>
</tr>
<tr>
<td>Mar</td>
<td>103.2</td>
<td>2.6</td>
<td>108.5</td>
<td>3.6</td>
<td>99.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Apr</td>
<td>97.3</td>
<td>-5.7</td>
<td>102</td>
<td>-6.0</td>
<td>93.7</td>
<td>-5.6</td>
</tr>
<tr>
<td>May</td>
<td>98.2</td>
<td>0.9</td>
<td>103.3</td>
<td>1.3</td>
<td>94.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Jun</td>
<td>98.2</td>
<td>0.0</td>
<td>103</td>
<td>-0.3</td>
<td>94.5</td>
<td>-0.3</td>
</tr>
<tr>
<td>Jul</td>
<td>97.9</td>
<td>-0.3</td>
<td>102.7</td>
<td>-0.3</td>
<td>94.4</td>
<td>-0.1</td>
</tr>
<tr>
<td>Aug</td>
<td>97.8</td>
<td>-0.1</td>
<td>103.4</td>
<td>0.7</td>
<td>93.9</td>
<td>-0.5</td>
</tr>
<tr>
<td>Sep</td>
<td>98.8</td>
<td>1.0</td>
<td>104.2</td>
<td>0.8</td>
<td>94.9</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: Created based on “Indices of Tertiary Industry Activity” (Partly, estimates)
Decrease in service demand caused by cost-push price increase
Correlation between “Broad-ranging personal services” and “Consumer price index”

- Comparing the distribution including realizations after the tax increase with the distribution which does not include them, there is a difference in the correlation coefficient, but both of them have an “inverse” correlation between the amount of service activity and consumer price.
- In “Personal services”, the amount of service activities decreases when consumer price increases.

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100),(estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- Realizations after the tax increase (after Apr. 2014) exist on the upper left of the scatter diagram (in the circle in red dotted line), but they do not specifically deviate from the distribution of the targeted period of analysis.
- A downturn of “Personal services” after the tax increase is a “natural” move occurring in connection with the price increase.

[Including realizations after the tax increase (after Apr. in 2014) ]
Correlation coefficient = -0.74

y = -0.888x + 1.6466
R² = 0.5484

The distribution width after the tax increase is 1.1 ~ 3.9
Max. distribution width is 6.2

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- However, we can see the realizations significantly shifted to the upper left after the tax increase.
- As the realizations in the scatter diagram are an intersection point of demand and supply, there is a possibility that supply functions which are expected to shift to the upper right significantly shifted to the upper left after the tax increase.

Correlation coefficient = -0.74

![Graph showing correlation between ITA Broad-ranging personal services and CPI Weighted index of corresponding items.](image)

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- It is commonly considered that the upper shift of supply functions is caused by an “increase in supply cost”.
- In addition to the increase in consumption tax, an increase in supply-side cost caused by weak yen and the increase in wages is considered to significantly raise the distribution of realizations for “Personal services” to the upper left.

[Including realizations after the tax increase (after Apr. in 2014)]

Correlation coefficient = -0.74

\[ y = -0.888x + 1.6466 \]

\[ R^2 = 0.5484 \]

(NOTE) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
In other words, a cost-push on the supply side has been decreasing the amount of service activities rather than the demand for “Personal services” itself decreasing.

In the above diagram, the correlation between “Broad-ranging personal services” and “Consumer price index” is represented. The correlation coefficient is -0.74, indicating a strong negative correlation. The equation of the regression line is given as \( y = -0.888x + 1.6466 \) with a coefficient of determination \( R^2 = 0.5484 \).

The graph shows two sets of supply functions: one before the tax increase and another after the tax increase. The data points are weighted indices of corresponding items and are marked according to the change from the same month of the previous year.

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- When comparing (a) the approximate line in the distribution including realizations in the ten months before the tax increase with (b) the approximate line in the distribution including all realizations before the tax increase, (a) the approximate line in the distribution in the ten months before the tax increase is located higher.

- Since being “a type of demand function” representing a negative correlation between price and the activity amount, both approximate lines, (a) and (b), indicate a demand increase in the ten months before the tax increase.

![Graph showing correlation between CPI and ITA changes](image)

[Not-including realizations after the tax increase (After Apr. in 2014)]

Comparison with the approximate line in the ten months before the tax increase

\[
y = -0.2946x + 0.5333 \\
R^2 = 0.1199
\]

\[
y = -0.4245x + 1.689 \\
R^2 = 0.1398
\]

Demand functions shift upward

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- Comparing (d) the approximate line in the distribution including all realizations during the analysis period with (c) the approximate line in the distribution including the realizations after the tax increase and realizations in the ten months before the tax increase, (c) the approximate line in the distribution including realizations after the tax increase and realizations in the ten months before the tax increase is located higher.

- In other words, the demand still continues increasing after the tax increase as it did in the ten months before the tax increase.

[Including realizations after the tax increase (After Apr. in 2014) ]

Comparison with the distribution in the ten months before the tax increase and that after the tax increase

\[ y = -0.888x + 1.6466 \]
\[ R^2 = 0.5484 \]

\[ y = -1.1154x + 2.5149 \]
\[ R^2 = 0.7726 \]

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- From the point that demand functions continued shifting upward from the ten months before the tax increase to after the tax increase, “continuity” can be seen before and after the tax increase.
- It means that the demand for “personal services” increased from around ten months before the tax increase, and there was no substantial change in consumer sentiment after the tax increase.

<table>
<thead>
<tr>
<th>CPI Weighted index of corresponding items (%) change from the same month of the previous year</th>
<th>ITA Broad-ranging personal services (%) change from the same month of the previous year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand functions of all realizations in the targeted period of analysis</td>
<td>Demand functions in the ten months before the tax increase and those after the tax increase</td>
</tr>
<tr>
<td>[Including realizations after the tax increase (After Apr. in 2014)]</td>
<td>[Not-including realizations after the tax increase (After Apr. in 2014)]</td>
</tr>
</tbody>
</table>

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging personal services” and “Consumer price index”

- In “Personal services” after the tax increase, the upper shift of supply functions occurred due to cost-push, and the amount of service activity decreased along with the price increase.
- However, after considering that strengthened consumer sentiment and an increase in demand functions were observed in the ten months right before the tax increase, “Personal services” did not decrease more than the upper shift of supply functions.

(Note) 1. The “Consumer price index” used in the above diagram is a weighted index created by extracting items corresponding to the survey scope of “Broad-ranging personal services”.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “MIC: Consumer Price Index” (CPI, 2010=100). (estimates)
Correlation between “Broad-ranging business services” and “Services producer price index”

- The distribution including realizations after the tax increase (after Apr. 2014) shows a negative correlation shifting slightly to the lower right, while the correlation coefficient is low.
- Meanwhile, the distribution which does not include realizations after the tax increase shows a slightly positive correlation.

[Including realizations after the tax increase (After Apr. in 2014) ]
Correlation coefficient = -0.42

\[ y = -0.4115x + 0.1625 \]
\[ R^2 = 0.1767 \]

[Not-including realizations after the tax increase (After Apr. in 2014) ]
Correlation coefficient = 0.58

\[ y = 0.3241x - 0.946 \]
\[ R^2 = 0.3338 \]

(Note) 1. “Overall average” of the Services Producer Price Index (2010 Average) does not include the index for wholesale trade. Therefore the correlation with changes from the same month of the previous year for the indices of “Broad-ranging business services” excluding “Wholesale Trade” (seasonally adjusted) is observed.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “Bank of Japan: Services Producer Price Index” (SPPI, 2010=100). (estimates)
Correlation between “Broad-ranging business services” and “Services producer price index”

The correlation in the distribution including realizations after the tax increase shows negative after being pulled by realizations of six points of time (Apr. - Sep. 2014) after the tax increase, so a genuine correlation between services producer price and the amount of service activity in “Business services” is shown in the diagram on the right.

[Including realizations after the tax increase (After Apr. in 2014) ]
Correlation coefficient = -0.42

Pulled by realizations after the tax increase

\[ y = -0.4115x + 0.1625 \]
\[ R^2 = 0.1767 \]

[Not-including realizations after the tax increase (After Apr. In 2014) ]
Correlation coefficient = 0.58

Genuine correlation

\[ y = 0.3241x - 0.946 \]
\[ R^2 = 0.3338 \]

(Note) 1. “Overall average” of the Services Producer Price Index (2010 Average) does not include the index for wholesale trade. Therefore the correlation with changes from the same month of the previous year for the indices of “Broad-ranging business services” excluding “Wholesale Trade” (seasonally adjusted) is observed.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.
Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “Bank of Japan: Services Producer Price Index” (SPPI, 2010=100). (estimates)
Correlation between “Broad-ranging business services” and “Services producer price index”

- The realizations showing the correlation between the price and the activity amount of “Business services” are found in the vicinity of supply functions which are assumed to shift to upper right.
- However, the realizations after the tax increase (in the red dotted circle) are positioned at the upper left from the distribution before the tax increase, so it is considered that supply functions shifted upward.

![Graph showing correlation coefficients and distribution shifts](image)

**[Including realizations after the tax increase (After Apr. in 2014)]**
Correlation coefficient = -0.42

**[Not-including realizations after the tax increase (After Apr. in 2014)]**
Correlation coefficient = 0.58

(Note) 1. “Overall average” of the Services Producer Price Index (2010 Average) does not include the index for wholesale trade. Therefore the correlation with changes from the same month of the previous year for the indices of “Broad-ranging business services” excluding “Wholesale Trade” (seasonally adjusted) is observed.
2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “Bank of Japan: Services Producer Price Index” (SPPI, 2010=100). (estimates)
Correlation between “Broad-ranging business services” and “Services producer price index”

- Unlike “Personal services”, the upper shift of demand functions is not observed in “Business services”, so “Business services” is directly affected by the upper shift of supply functions.
- These are considered as factors of weaker recovery in “Business services” during the third quarter of 2014, compared with “Personal services”.

\[
\text{Correlation coefficient} = -0.42
\]

\[
\text{Correlation coefficient} = 0.58
\]

(Note) 1. “Overall average” of the Services Producer Price Index (2010 Average) does not include the index for wholesale trade. Therefore the correlation with changes from the same month of the previous year for the indices of “Broad-ranging business services” excluding “Wholesale Trade” (seasonally adjusted) is observed.

2. Targeted period of the data is from Jan. 2010 to Sep. 2014. However, Mar. and Apr. in 2011 when the earthquake occurred, Mar. and Apr. in the following year, 2012 when the reaction of the earthquake was received, and Mar. 2014 when the last-minute demand before the tax increase was observed, are excluded as outliers.

Source: Created based on “METI: Indices of Tertiary Industry Activity” (ITA, 2005=100) and “Bank of Japan: Services Producer Price Index” (SPPI, 2010=100). (estimates)
During the second quarter of 2014 after the increase in consumption tax, a significant decrease was observed in all industrial activities, and a decrease in the “Tertiary Industry Activity” explained most of the factors of the decrease.

In the background, having characteristics of weakness in “Personal services” which was not observed after the Lehman crisis, decreases were seen mainly in the services related to individual consumption such as “Retail Trade” and “Living-Related and Personal Services & Amusement Services”.
Also, this downturn of “Personal services” has a background of cost-push on the supply side after the tax increase, and it is confirmed that the price increase caused by the upper shift of supply functions affected the activity amount.

However, in “Personal services”, the upward shift of demand functions and strengthened consumer sentiment were confirmed in the ten months right before the tax increase, and they continued after the tax increase. Therefore, there is a possibility that the decrease of the activity amount caused by the upper shift of supply functions becomes slightly moderate.

Meanwhile, “Business services” after the tax increase, unlike “Personal services”, were directly affected by the upper shift of supply functions, and it is assumed that this difference would be apparent in the delayed recovery in the third quarter of 2014.