

Rebasing the Input-Output Price Index of the Manufacturing Industry by Sector (IOPI) to the Base Year 2011

1. Introduction

The Research and Statistics Department of the Bank of Japan (hereinafter, "the Bank") has revised the "Input-Output Price Index of the Manufacturing Industry by Sector (IOPI)" from the base year 2005 to 2011. The revised data is available on the BOJ website.

The IOPI is a collection of indexes that focuses on the input and output of the manufacturing industry. The Input Price Index covers goods and services used for production activities and the Output Price Index covers goods that are produced in the manufacturing industry. This index is used for comparative analyses of input and output price changes for various sectors in the manufacturing industry.

This document explains the major points of the revision and presents an outline of the 2011-based IOPI.

2. Major points of the revision

The IOPI is rebased to maintain the statistical accuracy and to enhance the convenience for users. Major changes of the revision from 2005 to 2011 base are as follows.

(1) Revision of the base year from 2005 to 2011

The base year for both indexes and weight calculation have been revised from 2005 to 2011 to conform to the revision of the *Input-Output Tables (I-O Tables)*, published by the Ministry of Internal Affairs and Communications.

(2) Restructuring of the classification

To conform to the changes in the classification of the *I-O Tables*, the number of categories titled "Major sector" in the 2011-based IOPI has increased from 16 to 18.

"General-purpose machinery," "Production machinery," and "Business oriented machinery" are added in the 2011-based IOPI by rearranging "General machinery" and "Precision instruments." "Plastic and rubber products" -- formerly included in "Miscellaneous manufacturing products" -- are shown separately as a single category.

The Chart 1 shows the Input Price Index and Output Price Index of "Plastic and rubber products" and "Miscellaneous manufacturing products." There is a clear difference in price trends between the two categories. Both the Input Price Index and Output Price Index of "Plastic and rubber products" decline significantly from 2015 onwards, which suggests that they are more influenced by oil prices.

Those classification changes (Chart 2) enable users to analyze in more detail the industrial structures and price changes of relevant industries.

(3) Improvement in the statistical accuracy

The IOPI has been compiled by using price data of the "Corporate Goods Price Index (CGPI)" and "Services Producer Price Index (SPPI)." To reflect the latest revision of the CGPI and SPPI, the 2011-based IOPI has been expanded to include the new indexes of the CGPI and SPPI, such as "Steelworks," "Bridges," and "Steam & gas turbines." As a result, the statistical accuracy has improved with the inclusion of more relevant price data.

As Chart 3[1] shows, the coverage of Major sector "Metal products" for the Output Price Index has increased by nearly 20 percentage points by incorporating the indexes of

"Steelworks" and "Bridges." The coverage of "General-purpose machinery" has also increased by nearly seven percentage points.

Looking at Chart 3 [2][3], the 2011-based Output Price Indexes for "Metal products" and "General machinery" have shifted upward compared with the 2005-base, a trend that reflects newly introduced indexes.

(4) Publication of Linked Indexes for the previous category

The Bank continues to publish Linked Indexes for the previous categories of "Electrical machinery," "General machinery," "Precision instruments," and "Miscellaneous manufacturing products" as reference (See also **3. (9)**). The indexes are also available, going back as far as January 1980 so that users can conduct long-term analyses.

3. Outline of the 2011 base index

This section briefly explains the outline of the 2011-based IOPI.

(1) Basic Structure

The IOPI is composed of the Input Price Index and Output Price Index. The Input Price Index measures prices of raw and intermediate materials¹, fuel and energy (including both domestic goods and imports), and services that are consumed in each process as they move along the production chain. The Output Price Index covers prices of manufactured goods (including both domestic goods and exports)¹.

(2) Number of Commodity groups

The number of Commodity groups adopted for the Input Price Index is 368 (of 502 Commodity groups in the *I-O Table*) and that for the Output Price Index is 336 (of 372 Commodity groups) (Chart 4).

¹ Input and output goods include scrap and by-products.

(3) Base year for the Index and the Weight Calculation

The base year is 2011 for both the index calculation and the weight calculation.

In principle, the base year of the IOPI is revised every five years (years ending with either 0 or 5) in accordance with the revision of the *I-O tables* as well as that of the CGPI and the SPPI. To conform to the latest revision of the *I-O tables* from 2005 to 2011, the IOPI is also based on the calendar year 2011² (Chart 5).

(4) Coverage and Weights

For the Input Price Index, the weights are based on the input value of goods and services in the manufacturing industry during the base year. These weights are derived from purchasers' prices in the *I-O Tables*. The total input values in the 2011 *I-O Tables* amounts to 207 trillion yen.

For the Output Price Index, the weights are based on the output value of domestic goods in the manufacturing industry. Those weights are derived from producers' prices in the *I-O Tables*. The total output values in the 2011 *I-O Tables* amounts to 289 trillion yen.

The coverage of the Input Price index (Input values covered by the 2011-based IOPI / Total input values in the 2011 *I-O Tables*) is 87.1 percent, while that of the Output Price Index (Output values covered by the 2011-based IOPI / Total output values in the 2011 *I-O Tables*) is 94.0 percent (Chart 6).

(5) Classification

The IOPI contains two levels of sector classifications: "Manufacturing industry sector"^{3,4}; and "Major sector." The former consists of one category and the latter consists of 18 categories.

Each sector classification contains three levels of commodity groups: "Aggregated major

² Weights assigned to Commodity group are calculated based on the weights of Commodity of the Corporate Goods Price Index (CGPI) and those of Item of the Services Producer Price Index (SPPI).

³ With regard to the "Manufacturing industry sector," the Input Price Index contains sub-indexes of "Domestic goods," "Imports," and "Services." The Output Price Index contains those of "Domestic goods" and "Exports."

⁴ For the "Manufacturing industry sector," the Input Price Index has a reference index for "Goods" (domestic goods and imports).

commodity group"⁵, "Major commodity group," and "Commodity group."

As reference indexes, the Bank compiles sub-indexes for "General machinery (2005 IOPI Classification)," "Electrical machinery (2000 IOPI Classification)," "Precision instruments (2005 IOPI Classification)," and "Miscellaneous manufacturing products (2005 IOPI Classification)."

(6) Price data

Commodity group indexes of the IOPI are compiled by using the following two data source: Commodity indexes of the CGPI and Item indexes of the SPPI. The number of selected Commodities and Items amounts to 1,277 for the Input Price Index and 1,263 for the Output Price Index. Both the Input Price Index and the Output Price Index exclude the consumption tax.

(7) Index formula

The index formula is the fix-weighted Laspeyres formula.

(8) Publication

In principle, the preliminary figures are released at 8:50 a.m. on the 20th working day of the month following the survey month. The release date may be brought forward a few working days and other reasons.

Retroactive revisions are made to the released indexes four times a year (in March, April, September, and October, along with the release of the preliminary figures for the February, March, August, and September indexes).

(9) The 2011 Base Linked Indexes

The 2011 Base Linked Indexes are available for the "Manufacturing industry sector" from January 1975 and those for the "Major sector" from January 1980.

⁵ In the Output Price Index, the category of "Major sector" corresponds to that of "Aggregated major commodity group."

The following linked indexes for "Major sector" are compiled in accordance with the 2000-base and 2005-base classifications: "Electrical machinery (2000 IOPI Classification)"; "General machinery (2005 IOPI Classification)"; "Precision instruments (2005 IOPI Classification)"; and "Miscellaneous manufacturing products (2005 IOPI Classification)."

The data for the Input Price Index up until December 1999 are calculated using only inputs from goods, not covering those from services. Therefore, it should be noted that there is a discontinuity in the index resulting from the break between December 1999 and January 2000.

(10) Notes on Usage

Please note that not all price data used for compiling the Input Price Index and the Output Price Index meet the definition of "purchasers' prices" and "producers' prices." Price data obtained from the PPI include some data collected from wholesalers. Those from the EPI and IPI are collected at the time when cargo is loaded/unloaded in Japan.

4. Closing

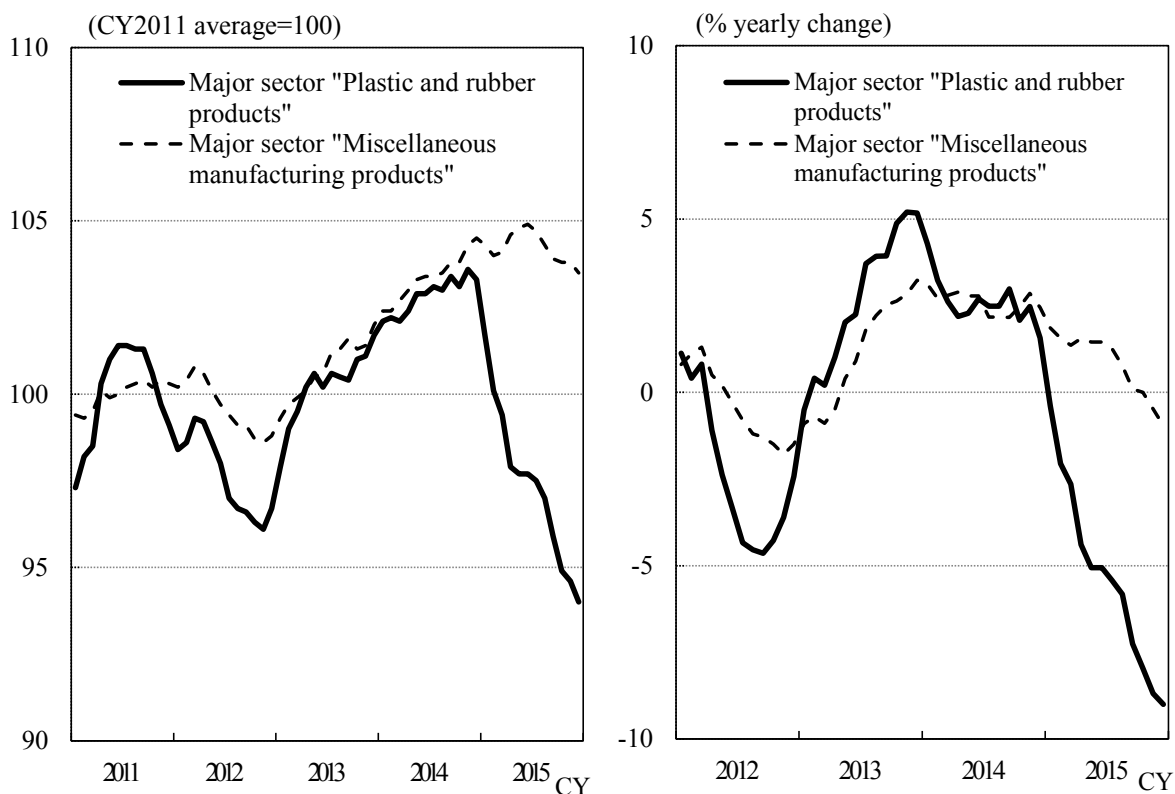
The IOPI has been compiled by using price data of the CGPI and SPPI. The Bank would like to take this opportunity to express its gratitude for so much cooperation from relevant companies and industry groups, academics and economists, and the statistical departments of the relevant government agencies.

In recent years, statistics that offer an accurate reflection of the economy have played an increasingly important role as economic conditions change significantly, both at home and abroad. The Bank will unceasingly maintain its efforts to review and improve index creation methods and will continue to provide highly reliable statistics.

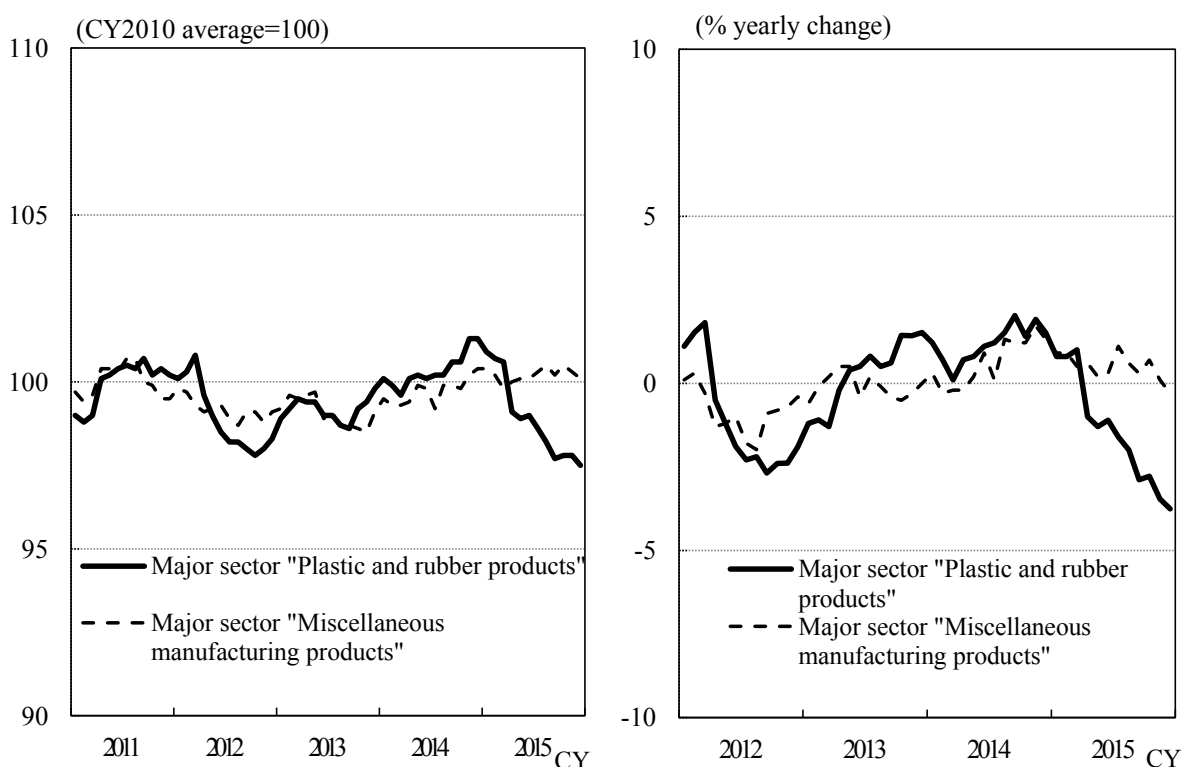
The Bank therefore asks for your continued cooperation and comments from a variety of perspectives concerning the statistics.

2011 Base Indexes for "Plastic and rubber products" and "Miscellaneous manufacturing products"

1. Input Price Index



2. Output Price Index



(Chart 2)

Changes in Sector Classifications and Commodity Groupings

1. Input Price Index

1-1. By Sector Classification

2005 base	2011 base
Major sector	Major sector (Weights)
Beverages and Foods	Beverages and Foods (109.032)
Textile products	Textile products (9.416)
Pulp, paper and wooden products	Pulp, paper and wooden products (38.997)
Chemical products	Chemical products (98.234)
Petroleum and coal products	Petroleum and coal products (84.326)
	Plastic and rubber products (46.661)
Ceramic, stone and clay products	Ceramic, stone and clay products (17.385)
Iron and steel	Iron and steel (94.618)
Non-ferrous metals	Non-ferrous metals (36.648)
Metal products	Metal products (31.794)
General machinery	General-purpose machinery (28.903)
	Production machinery (41.046)
	Business oriented machinery (20.105)
Electrical machinery	Electronic components (47.843)
Information and communication electronics equipment	Electrical machinery (51.853)
Electronic components	Information and communication electronics equipment (28.557)
Transportation equipment	Transportation equipment (189.578)
Precision instruments	
Miscellaneous manufacturing products	Miscellaneous manufacturing products (25.004)

1-2. By Commodity Grouping

2005 base	2011 base
Aggregated major commodity group	Aggregated major commodity group (Weights)
Agriculture, forestry and fishery	Agriculture, forestry and fishery (41.543)
Mining	Mining (99.198)
Beverages and Foods	Beverages and Foods (42.960)
Textile products	Textile products (7.711)
Pulp, paper and wooden products	Pulp, paper and wooden products (44.047)
Chemical products	Chemical products (99.680)
Petroleum and coal products	Petroleum and coal products (34.324)
	Plastic and rubber products (57.316)
Ceramic, stone and clay products	Ceramic, stone and clay products (18.279)
Iron and steel	Iron and steel (123.485)
Non-ferrous metals	Non-ferrous metals (61.177)
Metal products	Metal products (28.478)
General machinery	General-purpose machinery (16.815)
	Production machinery (11.504)
	Business oriented machinery (3.616)
Electrical machinery	Electronic components (55.248)
Information and communication electronics equipment	Electrical machinery (26.914)
Electronic components	Information and communication electronics equipment (3.056)
Transportation equipment	Transportation equipment (114.305)
Precision instruments	
Miscellaneous manufacturing products	Miscellaneous manufacturing products (10.682)
Electricity, gas and heat supply	Electricity, gas and heat supply (22.072)
Water supply and waste disposal business	Water supply (1.958)
	Waste management service (0.671)
Finance and insurance	Finance and insurance (4.284)
Real estate	Real estate (2.776)
Transport	Transport and postal services (6.935)
Information and communications	Information and communications (10.973)
Education and research	Education and research (0.825)
Business services	Business services (47.723)
Personal services	Personal services (0.587)
Office supplies	Office supplies (0.856)

Note: Weights are expressed as one-thousandths of the input value for the "Manufacturing industry sector" covered by the IOPI.
There are cases where the total figures are not equal to 1,000 due to rounding.

(Chart 2)

Changes in Sector Classifications and Commodity Groupings (cont'd)

2. Output Price Index

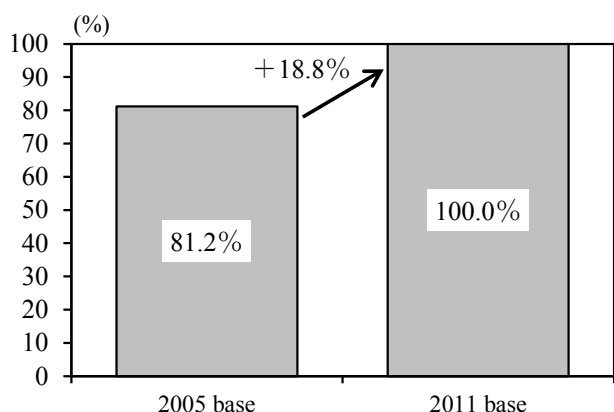
2005 base	2011 base
Major sector = Aggregated major commodity group	Major sector = Aggregated major commodity group (Weights)
Beverages and Foods	Beverages and Foods (124.085)
Textile products	Textile products (11.224)
Pulp, paper and wooden products	Pulp, paper and wooden products (40.968)
Chemical products	Chemical products (101.113)
Petroleum and coal products	Petroleum and coal products (71.748)
	Plastic and rubber products (47.614)
Ceramic, stone and clay products	Ceramic, stone and clay products (23.750)
Iron and steel	Iron and steel (86.274)
Non-ferrous metals	Non-ferrous metals (31.687)
Metal products	Metal products (37.493)
General machinery	General-purpose machinery (34.761)
	Production machinery (48.918)
	Business oriented machinery (18.217)
Electrical machinery	Electronic components (49.798)
Information and communication electronics equipment	Electrical machinery (55.444)
Electronic components	Information and communication electronics equipment (29.108)
Transportation equipment	Transportation equipment (155.401)
Precision instruments	
Miscellaneous manufacturing products	Miscellaneous manufacturing products (32.399)

Note: Weights are expressed as one-thousandths of the input value for the "Manufacturing industry sector" covered by the IOPI.
There are cases where the total figures are not equal to 1,000 due to rounding.

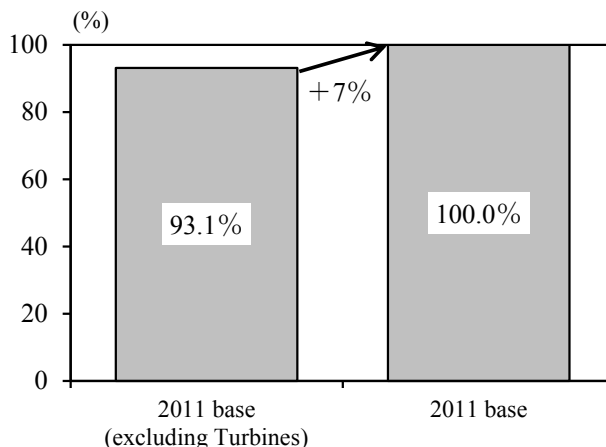
Impact of Newly Adopted Commodities of the CGPI

1. Increase in Coverage

(1) Output Price Index of Major Sector "Metal products"



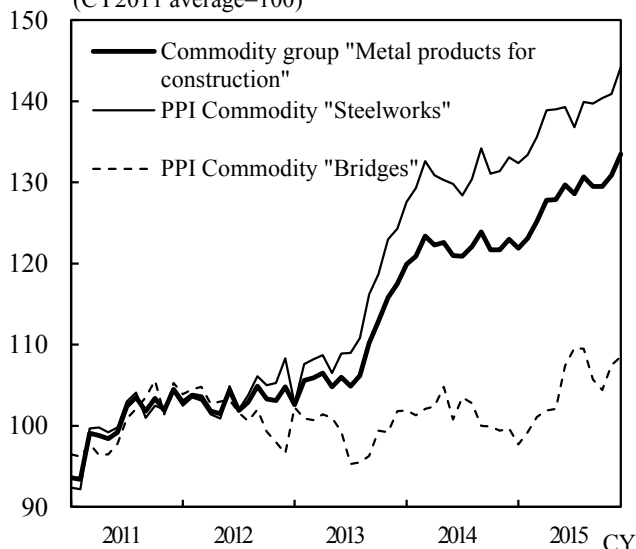
(2) Output Price Index of Major Sector "General-purpose machinery"



2. Output Price Index of Major Sector "Metal products"

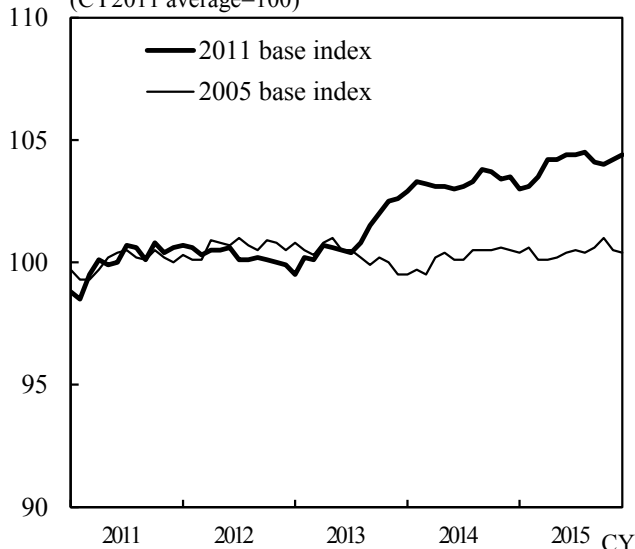
(1) Commodity Group "Metal products for construction" PPI Commodity "Steelworks" and "Bridges"

(CY2011 average=100)



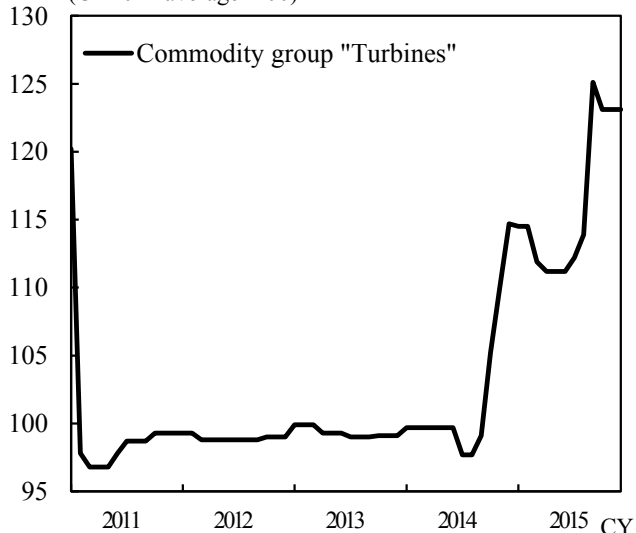
(2) Output Price Index of Major Sector "Metal products"

(CY2011 average=100)

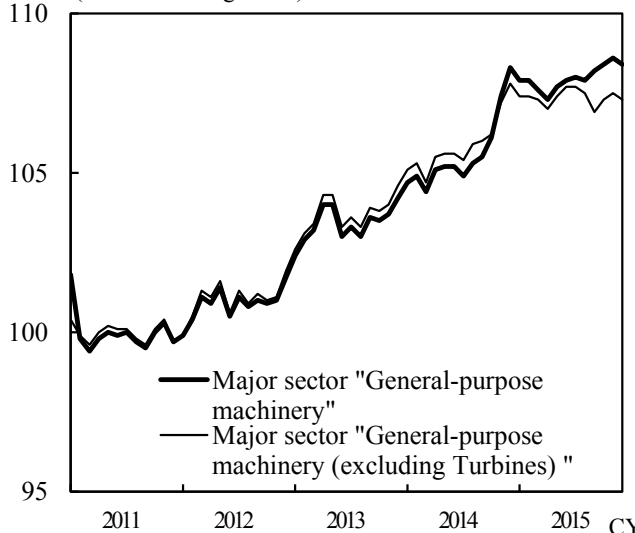


3. Output Price Index of Major Sector "General-purpose machinery"

(CY2011 average=100)



(CY2011 average=100)



Note: The 2005 base indexes are converted by the average of CY2011=100.

Changes in the Number of Commodity Groups

1. Input Price Index

Aggregated major commodity group	2011 base (A)	2005 base (B)	Change (A)-(B)				
				Newly selected	Abolished	Combined	Divided
Manufacturing industry	368	370	-2	+18	-20	-4	+4
Agriculture, forestry and fishery	25	26	-1	0	-1	0	0
Mining	10	10	0	0	0	0	0
Beverages and Foods	39	39	0	0	0	0	0
Textile products	14	14	0	0	0	0	0
Pulp, paper and wooden products	19	18	+1	0	0	0	+1
Chemical products	52	53	-1	+1	-2	0	0
Petroleum and coal products	10	10	0	0	0	0	0
Plastic and rubber products	11	0	+11	+11	0	0	0
Ceramic, stone and clay products	16	16	0	0	0	0	0
Iron and steel	18	18	0	0	0	0	0
Non-ferrous metals	11	11	0	0	0	0	0
Metal products	11	10	+1	+1	0	0	0
General-purpose machinery	9	34	-3	+1	-3	-2	+1
Production machinery	15						
Business oriented machinery	7						
Electronic components	7	6	+1	0	0	0	+1
Electrical machinery	14	15	-1	0	-1	0	0
Information and communication electronics equipment	10	10	0	0	0	0	0
Transportation equipment	8	8	0	+1	0	-1	0
Miscellaneous manufacturing products	12	23	-11	+1	-11	-1	0
Electricity, gas and heat supply	2	2	0	0	0	0	0
Water supply	3	5	0	0	0	0	0
Waste management service	2						
Finance and insurance	3	3	0	0	0	0	0
Real estate	1	1	0	0	0	0	0
Transport and postal services	12	11	+1	+1	0	0	0
Information and communications	9	10	-1	0	-1	0	0
Education and research	1	1	0	0	0	0	0
Business services	14	14	0	0	-1	0	+1
Personal services	2	1	+1	+1	0	0	0
Office supplies	1	1	0	0	0	0	0

Note : Figures for "Miscellaneous manufacturing products" of the 2005 base are counted based on the 2005-base classification that includes "Plastic and rubber products."

Figures for "General-purpose machinery," "Production machinery," and "Business oriented machinery" of the 2005 base are the total number of 2005-based two categories, "General machinery" and "Precision instruments."

Changes in the Number of Commodity Groups (cont'd)

2. Output Price Index

Aggregated major commodity group	2011 base (A)	2005 base (B)	Change (A)-(B)				
				Newly selected	Abolished	Combined	Divided
Manufacturing industry	336	335	+1	+23	-21	-4	+3
Beverages and Foods	42	41	+1	+1	0	0	0
Textile products	15	15	0	0	0	0	0
Pulp, paper and wooden products	22	20	+2	+1	0	0	+1
Chemical products	61	59	+2	+2	0	0	0
Petroleum and coal products	13	13	0	0	0	0	0
Plastic and rubber products	13	0	+13	+13	0	0	0
Ceramic, stone and clay products	21	21	0	0	0	0	0
Iron and steel	22	22	0	0	0	0	0
Non-ferrous metals	10	10	0	0	0	0	0
Metal products	13	12	+1	+1	0	0	0
General-purpose machinery	10	39	-5	+4	-8	-2	+1
Production machinery	17						
Business oriented machinery	7						
Electronic components	9	8	+1	0	0	0	+1
Electrical machinery	19	19	0	0	0	0	0
Information and communication electronics equipment	12	12	0	0	0	0	0
Transportation equipment	15	16	-1	0	0	-1	0
Miscellaneous manufacturing products	15	28	-13	+1	-13	-1	0

Note : Figures for "Miscellaneous manufacturing products" of the 2005 base are counted based on the 2005-base classification that includes "Plastic and rubber products."

Figures for "General-purpose machinery," "Production machinery," and "Business oriented machinery" of the 2005 base are the total number of 2005-based two categories, "General machinery" and "Precision instruments."

(Chart 5)

Changes in Weights of Aggregated Major Commodity Groups in the Manufacturing Industry Sector

1. Input Price Index

	2011 base (A)	2005 base (B)	(A)-(B)
Manufacturing industry	1000.0	1000.0	—
Manufacturing industry (Goods)	924.8	909.3	+15.5
Manufacturing industry (Services)	75.2	90.7	-15.5
Agriculture, forestry and fishery	41.5	40.9	+0.6
Mining	99.2	74.0	+25.2
Beverages and Foods	43.0	35.9	+7.1
Textile products	7.7	9.0	-1.3
Pulp, paper and wooden products	44.0	44.4	-0.4
Chemical products	99.7	92.6	+7.1
Petroleum and coal products	34.3	24.9	+9.4
Plastic and rubber products	57.3	—	—
Ceramic, stone and clay products	18.3	17.1	+1.2
Iron and steel	123.5	100.5	+23.0
Non-ferrous metals	61.2	50.1	+11.1
Metal products	28.5	30.3	-1.8
General-purpose machinery	16.8	45.4	-13.5
Production machinery	11.5		
Business oriented machinery	3.6		
Electronic components	55.2	73.8	-18.6
Electrical machinery	26.9	30.2	-3.3
Information and communication electronics equipment	3.1	4.7	-1.6
Transportation equipment	114.3	139.2	-24.9
Miscellaneous manufacturing products	10.7	72.5	-61.8
Electricity, gas and heat supply	22.1	20.5	+1.6
Water supply	2.0	4.2	-1.5
Waste management service	0.7		
Finance and insurance	4.3	6.7	-2.4
Real estate	2.8	2.2	+0.6
Transport and postal services	6.9	8.3	-1.4
Information and communications	11.0	14.2	-3.2
Education and research	0.8	0.7	+0.1
Business services	47.7	56.5	-8.8
Personal services	0.6	0.1	+0.5
Office supplies	0.9	1.2	-0.3

Notes : 1. Figures for "Miscellaneous manufacturing products" of the 2005 base are counted based on the 2005-base classification that includes "Plastic and rubber products."

Figures for "General-purpose machinery," "Production machinery," and "Business oriented machinery" of the 2005 base are the total number of 2005-based two categories, "General machinery" and "Precision instruments."

2. Weights are expressed as one-thousandths of the manufacturing industry sector, rounded off the first decimal place.

Changes in Weights of Aggregated Major Commodity Groups in the Manufacturing Industry Sector (cont'd)

2. Output Price Index

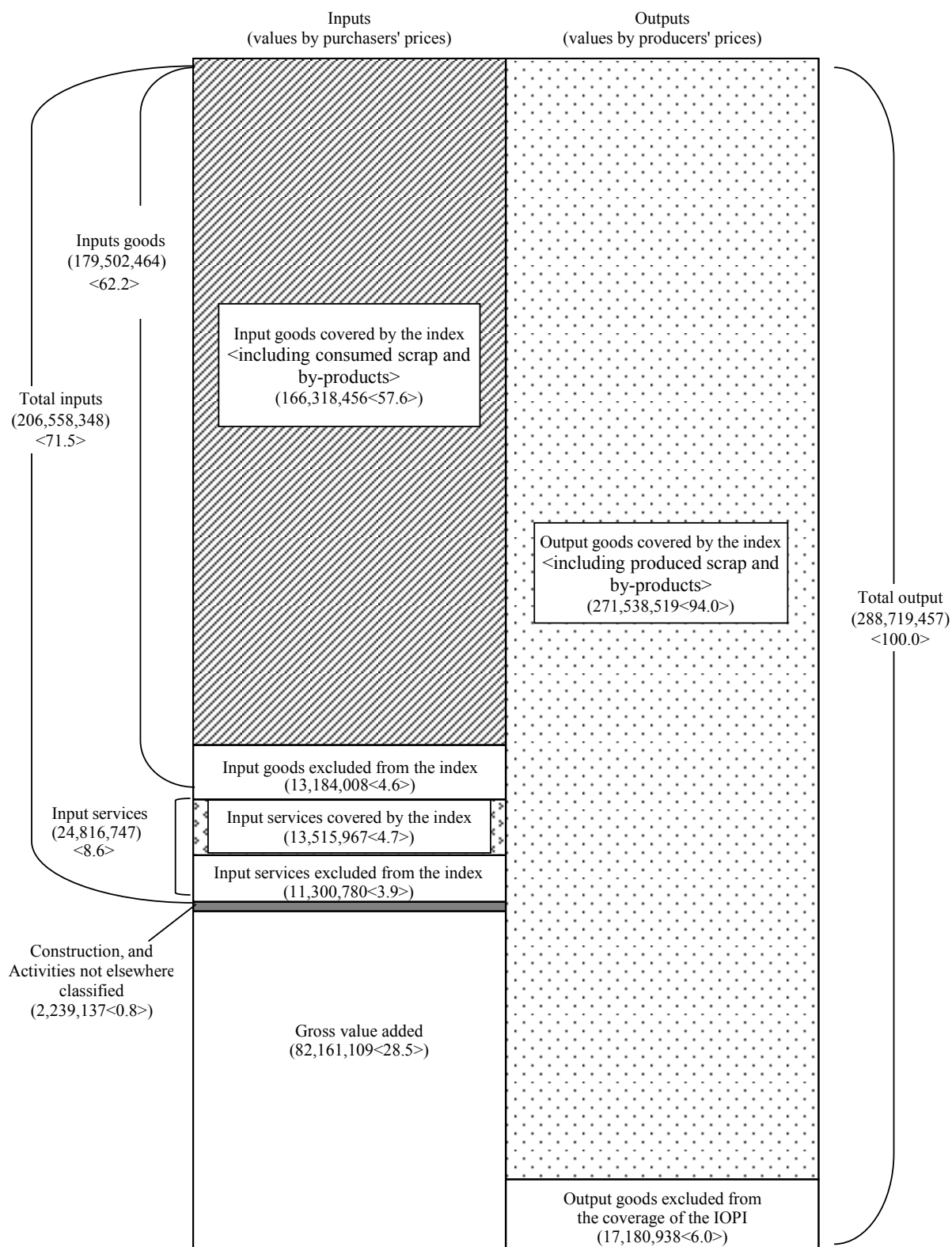
	2011 base (A)	2005 base (B)	(A)-(B)
Manufacturing industry	1,000.0	1,000.0	—
Beverages and Foods	124.1	116.1	+8.0
Textile products	11.2	13.6	-2.4
Pulp, paper and wooden products	41.0	44.7	-3.7
Chemical products	101.1	93.5	+7.6
Petroleum and coal products	71.7	57.7	+14.0
Plastic and rubber products	47.6	—	—
Ceramic, stone and clay products	23.8	24.9	-1.1
Iron and steel	86.3	69.6	+16.7
Non-ferrous metals	31.7	24.9	+6.8
Metal products	37.5	35.4	+2.1
General-purpose machinery	34.8	110.4	-8.5
Production machinery	48.9		
Business oriented machinery	18.2		
Electronic components	49.8	56.4	-6.6
Electrical machinery	55.4	55.1	+0.3
Information and communication electronics equipment	29.1	38.3	-9.2
Transportation equipment	155.4	175.1	-19.7
Miscellaneous manufacturing products	32.4	84.3	-51.9

Notes : 1. Figures for "Miscellaneous manufacturing products" of the 2005 base are counted based on the 2005-base classification that includes "Plastic and rubber products."

Figures for "General-purpose machinery," "Production machinery," and "Business oriented machinery" of the 2005 base are the total number of 2005-based two categories, "General machinery" and "Precision instruments."

2. Weights are expressed as one-thousandths of the manufacturing industry sector, rounded off the first decimal place.

Correspondence between Input and Output Value Covered by the IOPI (2011 base) and 2011 I-O Tables



Note: 1. Figures in parentheses() indicate values in million yen.

2. Figures in brackets<> denote percentages to the total outputs.

Source: Ministry of Internal Affairs and Communications, "2011 Input-Output Tables"