Explanation of Final Demand-Intermediate Demand price indexes (FD-ID price indexes) (2020 base)

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1. Overview, Purpose and Function

(1) Overview

The Final Demand-Intermediate Demand price indexes (FD-ID price indexes) are a price index series by stage of demand that are comprised of the final demand price index (FD price index) and four intermediate demand price indexes (ID price indexes).

Name	・Final Demand-Intermediate Demand price indexes (FD-ID price indexes)
Frequency of compilation	・Monthly
Time of release	・In principle, figures are released at 2 p.m. on the 20th business day of the following month (two business days after the release of the Services Producer Price Index).
Method of release	・Bank of Japan's website
Index series classification	・The total number of indexes in the basic and special series is 112. ・In the basic series, the intermediate demand indexes from Stage 1 to Stage 4, categorized by upstream production flows, and the final demand index are each compiled into 109 series, classified by type of goods/services and domestic/import. ・In the special series, the three final goods price indexes within the Index by Stage of Demand and Use (ISDU) in the CGPI, (*Final goods*, *Final goods/capital goods* and *Final goods/consumer goods*, all of which cover domestic goods), are substituted by index within the FD price index[1]. The linked indexes are compiled and published, with historical data dating back to January 1970.
Commencement of data	・Basic series: January 2015 ・Special series: January 1970
Index calculation formula	・Fixed-weight Laspeyres formula
Base year	・Calendar year 2020 is used as the base year for the indexes. Considering the impact of COVID-19, the average value of 2019 and 2020 is used for the base year weight as a special case.
Price concept/price data	・In principle, producer prices at the time of shipment by producers are used. Therefore, the Corporate Goods Price Index (CGPI) and the Services Producer Price Index (SPPI) are used in principle, while some commodity-level indexes within the Consumer Price Index (CPI)* are also used. ・CGPI: 907 commodities; SPPI: 152 commodities; CPI: 166 commodities[2] *Compiled by the Ministry of Internal Affairs and Communications
Calculation of weights	・The base year weight is calculated based on the 2020 Input-Output Table*, the 2019 Updated Input-Output Table (2015 base)**, and the 2020 Updated Input-Output Table (2015 base)**. *Compiled by the Ministry of Internal Affairs and Communications **Compiled by the Ministry of Economy, Trade and Industry
Revision of indexes	・Revision is made in accordance with the revision of the CGPI and the SPPI.
Others	・If there is no corresponding price index for a row sector in the Input-Output table (I-O table), the sector is excluded from the aggregation. ・When price indexes are rebased, revisions are made in accordance with commodity amendment (adopting new commodities; deleting, splitting, or consolidating existing ones), with the weights of row sectors in the Input-Output table remaining fixed.

[1] The ISDU was compiled and published as a reference index for the CGPI until the 2015 base year.

[2] As a result of the rebasing of the price indexes, the number of commodities used for the indexes may differ in the period after 2025.

(2) Purpose and function

One of the primary functions of the Producer Price Index (PPI) is to serve as an aggregate price index that appropriately represents the supply-demand condition of goods and services on a whole economy. In this respect, the Bank publishes the CGPI and the SPPI for all commodities as aggregate price indexes for producer prices in Japan with respect to goods and services, respectively.[3] However, a price index that integrates goods and services would be more useful for tracking inflationary and deflationary pressures in the entire economy. There are presumably some user needs for tracking supply-demand trends in the entire economy, including goods and services sectors, by stage of demand, such as in the upstream or downstream of the production flow.

Moreover, when using the index for all commodities, the so-called *multiple counting problem* makes it somewhat difficult to track supply-demand trends for goods and services. In other words, as the index for all commodities is compiled by aggregating commodities in different stages of demand through weighted-averaging by gross trade value, the effects of price changes in an upstream stage of demand may be counted again in a downstream stage. As a result, for the CGPI in particular, the effect of resource prices, such as crude petroleum, tends to be overrepresented in the index for all commodities.

The Final Demand-Intermediate Demand price indexes (FD-ID price indexes) have been developed in order to address these problems. The FD-ID price indexes are characterized by the following four features: (i) aggregating prices of goods and services in an integrated manner; (ii) dividing demand into the stage of final demand and the stages of intermediate demand, and compiling the Final Demand price Index (FD price index) and the Intermediate Demand price Indexes (ID price indexes); (iii) dividing intermediate demand into four stages in the production flow, from upstream to downstream, and compiling the ID price indexes for Stage 1 (the most upstream stage) to Stage 4 (the most downstream stage); and (iv) excluding transactions conducted within stages (internal flow) from the calculation of weights for the ID price indexes. Using the FD-ID price indexes makes it possible to track the process of transmission of price changes across goods and services and also to avoid the multiple counting problem.

Based on these characteristics, the FD-ID price indexes are regarded as satellite series that complement the indexes for all commodities of the CGPI and SPPI.

(3) Method of compiling the FD-ID price indexes (overview)

When compiling the FD-ID price indexes, the Bank used the compilation method used by the U.S. Bureau of Labor Statistics as a reference, which started compiling and publishing the indexes earlier. For example, the structure of the Japanese FD-ID price index series, comprised of the FD price index and four ID price indexes, follows the U.S. methodologies. Even so, the Japanese FD-ID price indexes have some original features. For example, taking into consideration the distinctive characteristics of

[3] As for the SPPI, the all commodities index is called the *index of all items* in the official statistics.

Japan's economic and industrial structures, the Japanese indexes are designed so as to cover not only domestic products but also imports.

The overview of the method of compiling the FD-ID price indexes are as described below. (i) to (iii) correspond to Sections 4 to 6, respectively, of this paper.

(i) Stage assignments: Goods and services sectors are each assigned to one of the four stages of intermediate demand in a way that is consistent with the production flow in Japan as described in the I-O table. The optimal assignment of sectors is achieved by seeking to maximize the value, which is obtained by subtracting the value of goods and services that move from downstream to upstream in the production flow from the value of goods and services that move from upstream to downstream.

(ii) Calculating weights: After the completion of assignment of goods and services sectors to their respective stages, weights used in aggregation for compiling the FD-ID price indexes are calculated. The weights used in aggregation for compiling the FD price index are the weights in final demand sectors in the I-O table. As for the ID price indexes, the weights of goods and services sectors input to each of the four stages of intermediate demand categorized based on stage assignments are used.

(iii) Matching of price data (commodity-level indexes): Following the calculation of the weights of sectors for the FD and ID price indexes, the FD-ID price indexes are calculated by matching sectors with price data (commodity-level indexes). In the matching process, commodity-level indexes in the CGPI and the SPPI are used in principle. However, with respect to some sectors that are not covered by those indexes, such as services for households and household-use electric power, commodity-level indexes in the CPI are also used.

Thus, the FD-ID price indexes, which aggregate the price indexes of goods and services demanded by individual sectors of goods and services classified into each stage, are characterized as input price indexes.

2. Scope and Coverage

(1) Scope

As the FD-ID price indexes are aggregate producer price indexes integrating prices of goods and services, their scope covers the whole of goods and services transactions, including transactions not only in domestic products (domestically produced goods and services) but also in imports.[4] As shown

[4] The Bank follows the U.S. Bureau of Labor Statistics' method for compiling the FD-ID price indexes. However, as the U.S. FD-ID price indexes cover only domestically produced goods and services, they do not directly take into consideration the effects of imports. On the other hand, in Japan, industries depend on imports for most of the raw materials needed for their production, and imports also play an important role in each stage of demand. Therefore, in order to examine the inflationary trend and the transmission process of price changes, it is important to take into consideration the effects of not only domestic prices but also import prices on price changes in each stage of demand. Therefore, for the compilation of the Japanese FD-ID price indexes, imports are included in aggregation.

in Chart 1, while ID price indexes, which cover intermediate demand, include domestic products and imports, the FD price index, which covers final demand, includes domestic products, imports and exports. If we look at the scope of the FD-ID price indexes in reference to the I-O table, we see that those indexes are distinctive in that goods and services sectors are classified by stage of demand in the flow of production (column sectors of the I-O table), rather than by type of goods or services (row sectors of the I-O table).[5]

Chart 1. Scope of Japanese FD-ID Price Indexes
(Conceptual Diagram Based on the Input-Output Table)

Commodity type (row sector)	Production sector	Demand sector (column sector)															
		Intermediate demand												Final demand			
		Stage 1			Stage 2			Stage 3			Stage 4			PC	CI	Gov	Exp
		2	3	9	1	4	10	5	7	8	6	11	12				
Goods	1																
	2																
	3																
	4																
	5																
	6																
Services	7																
	8																
	9																
	10																
	11																
	12																
Imports																	

Stage 1 Stage 2 Stage 3
Stage 4 Final demand

Note: PC, CI, Gov, and Exp stand respectively for personal consumption, capital investment, government expenditure, and exports.

(2) Coverage

The coverage of the FD-ID price indexes is obtained by calculating the percentage ratios of the value of transactions in the sectors covered by the respective indexes to the total value of transactions minus the value of transactions within stages (internal flow). The overall coverage of the FD-ID price indexes is approximately 75 percent, which is generally considered sufficient for an aggregate price index based on producer prices that integrates both goods and services (Chart 2).[6]

[5] In this respect, the ISDU, which was compiled and published as a reference index for the CGPI until the 2015 base year, is a price index aggregating goods classified by commodity type (row sectors of the I-O table), rather than by stage of demand (column sectors). As a result, *Raw materials* and *Intermediate materials* in the ISDU in the CGPI are very different in scope from the ID price indexes, as goods are aggregated on the basis of the level of processing by commodity type (row sectors). On the other hand, regarding *Final goods*, it is mostly the same as the FD price index (goods) in scope, as goods are classified by stage of demand (column sectors).

[6] The United States has shifted to an FD-ID aggregation system because in recent years, the coverage of services has surpassed 70%, a level comparable to the coverage of goods. In Japan as well, the coverage of services rose from 50.5 percent to 71.3 percent (including wholesale service prices) as a result of the rebasing of the SPPI to 2015, so the

Chart 2. Coverage

	Intermediate demand (ID)				Final demand including exports (FD)	FD+ID
	Stage 1	Stage 2	Stage 3	Stage 4		
The value of transactions covered by indexes/ The total value of transactions	88%	81%	87%	88%	69%	76%

3. Index Series Classification

There are a total of 112 indexes, including the basic and special series of indexes (Chart 3). For more detailed information, refer to the tables in the appendix of this paper.

(1) Basic series

There are 109 indexes classified (i) by type of goods/services and (ii) by domestic products/imports with respect to each of the ID price indexes for Stage 1 to Stage 4 and the FD price index.

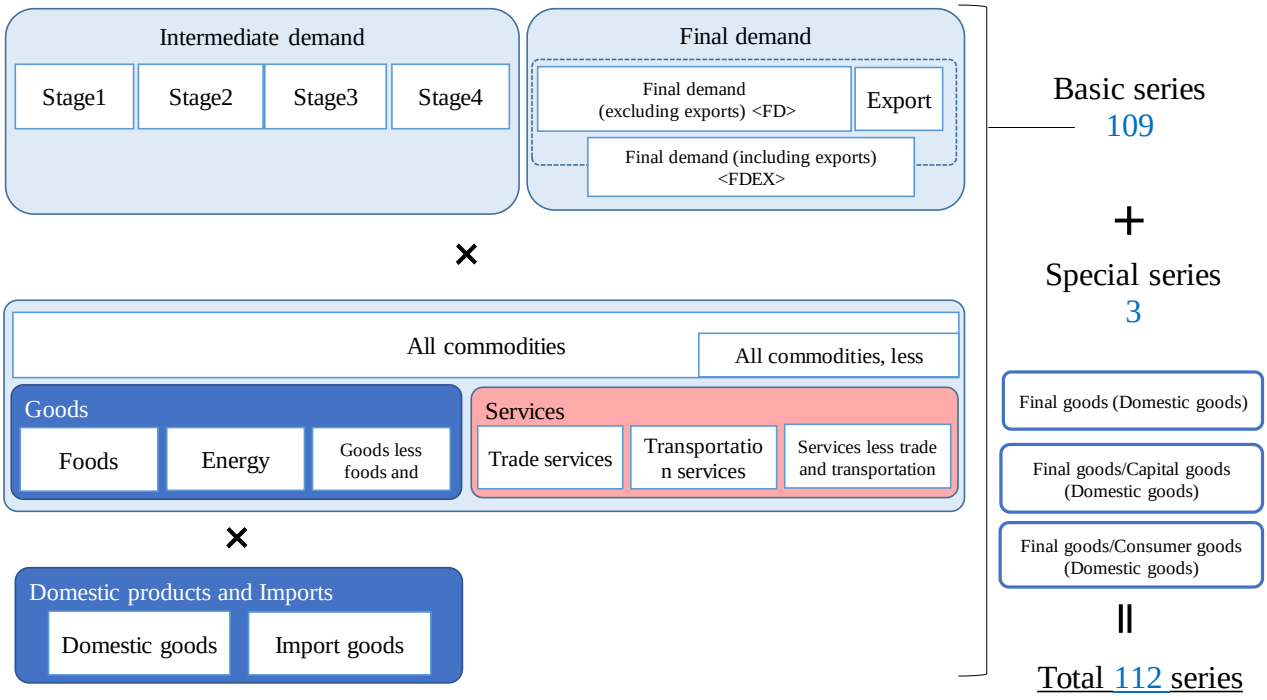
(2) Special series

With respect to the three final goods price indexes within the ISDU in the CGPI (*Final goods*, *Final goods/capital goods*, and *Final goods/consumer goods*, all of which cover domestic goods), the Bank publishes linked indexes using indexes within the FD price index as substitutes[7].

prerequisite for compiling the FD-ID price indexes has been met. Therefore, the starting time of data for the basic series is January 2015.

[7] *Final goods* refers to domestic goods used as inputs in final demand sectors. *Final goods/capital goods* refers to domestic goods used as inputs in capital investment sectors. *Final goods/consumer goods* refers to domestic goods used as inputs in personal consumption sectors. These indexes are linked with the ISDU prior to December 2014.

Chart 3. Index Series Classification



At present, the Bank does not compile or publish indexes classified by demand sector (e.g., personal consumption and capital investment) within the FD price index. Going forward, the Bank will consider flexible revisions to the classification of the FD-ID price indexes in light of changes in the underlying data, such as the I-O table, price indexes, and changes in user needs.

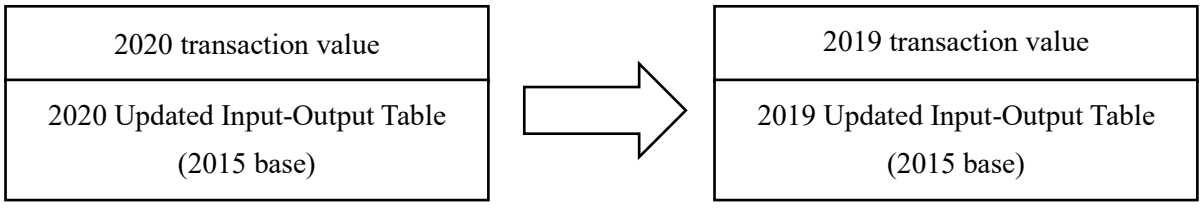
4. Stage Assignments

In the process of compiling the FD-ID price indexes, in principle, the I-O table corresponding to the base year is used for the assignment of sectors to demand stages and the calculation of aggregation weights. The I-O table is a matrix that shows in which stages of intermediate demand or final demand (column sectors of the I-O table) outputs of goods and services (row sectors of the I-O table) are consumed.

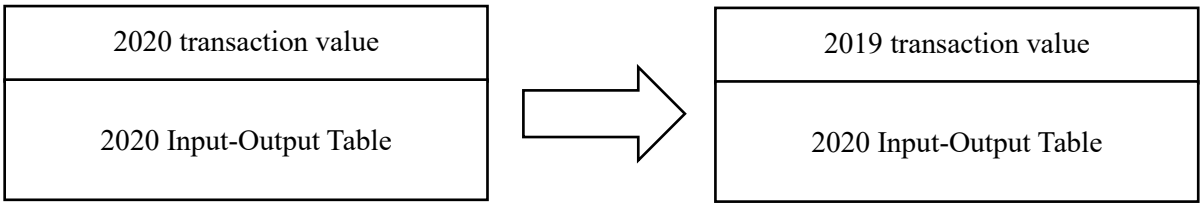
In the 2020 base index, considering the impact of COVID-19, the average value of 2019 and 2020 is used as a special case for the assignment of sectors to demand stages and the calculation of aggregation weights. It is calculated based on the 2020 Input-Output Table, the 2019 Updated Input-Output Table (2015 base), and the 2020 Updated Input-Output Table (2015 base) (Chart 4).

Chart 4. Estimation Framework of the Average Transaction Value based on the 2020 I-O Table

1. The ratios of 2019 to 2020 are calculated using the Updated Input-Output Table (2015 base).



2. Using the ratios calculated in 1, the 2019 values based on the 2020 Input-Output Table are estimated.



3. The average transaction values for 2019 and 2020 based on the 2020 Input-Output Table are estimated[8].

For the FD-ID price indexes, the classification of sectors at the commodity-level based on the I-O table is used in order to precisely identify the input-output structure in Japan by classifying sectors in the greatest possible detail.[9]

When sectors are classified at the commodity-level and import commodities are included in the coverage as described above, there are a total of 896 sectors (448 sectors each of domestic products and imports) on the production side and 390 sectors on the demand side (intermediate demand).[10]

In order to compile the FD-ID price indexes, it is necessary to assign 390 sectors on the demand side to four stages of intermediate demand. The assignment of sectors is conducted in such a way that the value, which represents the value of transactions that flow from upstream to downstream in the production flow minus the value of transactions that flow from downstream to upstream, is maximized.

More specifically, the maximization of the value of net forward flow is pursued through the

[8] Since the Updated Input-Output Table does not provide import values corresponding to each production sector for each demand sector, the 2019 values based on the 2020 Input-Output Table are estimated using the ratio of import values to the producer prices in the 2020 Input-Output Table.

[9] As a result, the calculation of the value of inputs for *petroleum products* includes only input factors necessary for production of petroleum products (e.g., gasoline and naphtha) and excludes input factors related to goods and services produced as by-products in the petroleum refining industry (e.g., chemical products).

[10] Excluding *Activities not elsewhere classified*. In practice, 394 sectors are treated in the process of stage assignments in order to match the sectors on the production and demand side. Specifically, three sectors (*Inland water fishery and inland water aquaculture*, and *Electricity*) are integrated, three sectors (*Used paper*, *Scrap iron*, and *Non-ferrous metal scrap*) are added, and *Wholesale trade* is divided into the five sectors corresponded to the SPPI.

following three stages: (1) provisional assignment of sectors to stages, (2) additional optimization, and (3) judgment-based adjustments.

(1) Provisional assignment of sectors to stages

(i) Defining stages

First, the four stages of intermediate demand are defined as follows (Chart 5).

Chart 5. Definition of Stages of Intermediate Demand

Stage 4: Sectors in which X% or more of the value of output is sold to final demand.
Stage 3: Sectors in which Y% or more of the value of output is sold to final demand or Stage 4 and which are not included in Stage 4.
Stage 2: Sectors in which Z% or more of the value of output is sold to final demand, Stage 4 or Stage 3 and which are not included in Stage 3 or Stage 4.
Stage 1: Sectors which do not meet either of the above conditions.

As can be seen from the above, Stage 4 is the closest to final demand, namely the most downstream stage of intermediate demand. Stage 4 is preceded by Stage 3, Stage 2, and Stage 1 in that order, with Stage 1 as the most upstream stage of intermediate demand. The values X, Y, and Z in the above chart are cut-off variables used to determine the boundaries between the stages. Regarding cut-off variables, a grid search is conducted in increments of 5 points within the preset search range of $50 \leqq X, Y, Z \leqq 90$, with 729 combinations of the values of cut-off variables (X, Y, and Z) set up. From among those combinations, the one that achieves the greatest possible consistency with the production flow in the I-O table is searched.

(ii) Setting the criteria for evaluating the production flow

The I-O table covers a multitude of sectors of goods and services. When assigning those sectors to the four stages of intermediate demand, it is necessary to use some criteria for conducting comprehensive evaluation as to whether the assignment of sectors to stages is consistent with the production flow in the I-O table. For the FD-ID price indexes the Bank uses an indicator called *net forward flow* (hereinafter referred to as *"NFF"*), following the United States. More specifically, NFF is defined as the value obtained by subtracting the total value of inter-sector transactions that flow from downstream to upstream demand stages (back flow) from the total value of inter-sector transactions that flow from upstream to downstream demand stages (forward flow) (Chart 6). In the calculation of the value of NFF, only the value of transactions for domestic products is used (the value of imports is not included) in order to ensure an assignment of sectors to stages of demand that is consistent with the production flow in Japan.

Chart 6. Definition of Net Forward Flow

Net forward flow (NFF)

= the total value of inter-sector transactions that flow from upstream to downstream demand stages (forward flow)

– the total value of inter-sector transactions that flow from downstream to upstream demand stages (back flow)

The calculation method of NFF is as shown in Chart 7.

Chart 7. Calculation Method of Net Forward Flow

		Demand Sector				
		Stage 1	Stege 2	Stage 3	Stage 4	FD
Production Sector	Stage 1	A	B	C	D	E
	Stege 2	F	G	H	I	J
	Stage 3	K	L	M	N	O
	Stage 4	P	Q	R	S	T

Net forward flow = the total value of inter-sector transactions that flow from upstream to downstream demand stages (forward flow)

- the total value of inter-sector transactions that flow from downstream to upstream demand stages (back flow)

= (the value of output provided by upstream sectors to downstream sectors + the value of input received by downstream sectors from upstream sectors)

- (the value of output provided by downstream sectors to upstream sectors + the value of input received by upstream sectors from downstream sectors)

= {(B+C+D+E+H+I+J+N+O+T)+(B+C+H+D+I+N)}

- {(F+K+L+P+Q+R)+(F+K+P+L+Q+R)}

As a result of the calculation of the value of NFF, around 10 cases are selected as candidates from among the 729 provisional assignment cases. In this process, in addition to the top five cases in terms of the value of NFF, the top five cases in terms of the value of forward flow (ranked within the top 20 or so in terms of the value of NFF) are selected as candidates for optimizing the provisional assignment. Not only NFF but also forward flow is used as criteria for selecting candidates in order to prevent the risk that the range of selection options may be limited if emphasis is placed exclusively on NFF when conducting a grid search regarding the cut-off variables (X, Y, and Z).

(2) Additional optimization

With respect to each candidate case selected through the provisional assignment, sectors of goods and services are moved, one by one, from their original stages under the provisional assignment to new stages, and the impact on NFF is measured. By repeatedly implementing this procedure, assignment cases that achieve a marginal improvement of NFF below a certain threshold are identified. From among assignment cases selected through this additional optimization procedure, those which are ranked high in terms of the value of NFF are adopted as final candidates.

(3) Judgment-based adjustments

With respect to the final candidate cases selected through additional optimization, adjustments are made based on judgments. For example, sectors where the upstream/downstream relationship in the production flow is clear but the respective stages are assigned in reverse should be corrected (e.g., the relationship between hot rolled steel and cold rolled steel in the production flow of steel products). Meanwhile, sectors for which the export ratio is high tend to be assigned to Stage 4, but even among those sectors, the ones whose commodities are mostly intermediate goods in nature should be transferred to a different stage on condition that the value of NFF increases (e.g., iron scrap).

As a result of the optimization procedures described in (1) to (3), the values of the cut-off variables were fixed at: X=75, Y=70, and Z=55.

As for the shares of inter-stage transactions regarding the ID price indexes calculated as a result of the optimization, forward flow accounts for 84.0 percent of the overall output value, while the share of back flow is only 4.3 percent. On the whole, our assessment is that the Japanese FD-ID price indexes can capture net forward production flow accurately. The share of internal flow, which represents trade within the same stage, is 11.7 percent. Internal flow is excluded from the final calculation of aggregation weights in order to avoid the multiple counting problem. However, our findings show that even if internal flow is excluded, around 90 percent of the overall value of transactions is covered (Chart 8).

Chart 8. Shares of Transactions between Stages of Demand[11,12]

(%)

		Demand sector				
		Stage 1	Stage 2	Stage 3	Stage 4	FD
Production sector	Stage 1	3.0	5.0	2.4	2.6	2.6
	Stage 2	1.5	4.7	5.0	6.0	6.9
	Stage 3	0.5	1.0	2.8	5.6	11.0
	Stage 4	0.3	0.6	0.3	1.1	36.8

(%)

Forward flow			Back flow	Internal flow
	Next stage	Skip		
84.0	52.5	31.5	4.3	11.7

Next stage: The percent of total shipments sold by sectors to sectors classified in the next forward stage of production

Skip: The percent of total shipments sold by sectors to sectors classified in forward stages of production other than to the next stage

Back flow: The percent of total shipments sold by sectors to sectors classified in earlier stages of production

Internal flow: The percent of total shipments sold by sectors to sectors classified within the same stage of production

Let us look at which representative sectors have actually been assigned to which stages. Stage 1, the most upstream stage of intermediate demand, includes raw materials, such as crude petroleum, commodities directly using raw materials as input factors, such as petroleum refinery products and crude steel, and, among services, worker dispatching services. Worker dispatching services were assigned to a relatively upstream stage presumably because they themselves do not require much input from other sectors while being used as an input factor in a broad range of industries.

Stage 2, one level further downstream than Stage 1, includes plastic and steel products, which are manufactured by processing commodities included in Stage 1, such as petroleum refinery products and crude steel. This captures the structure of production flow in manufacturing industries. As for services, Stage 2 includes those which are used in a relatively broad range of industries, such as financial service, fixed telecommunications and internet based services.

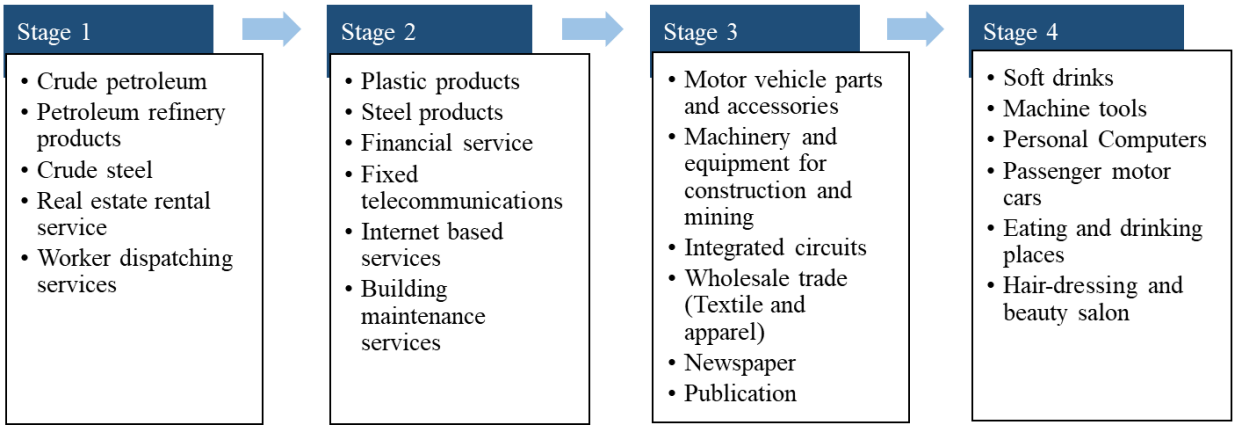
[11] Based on the Input-Output Table published in June 2024. These are calculated based on domestic transactions.

[12] There may be cases where the total does not add up to 100% due to rounding.

Stage 3 includes motor vehicle parts, which are manufactured by processing plastic and steel products, machinery and equipment for construction and mining and integrated circuits as well as services which are close to final demand, such as wholesale trade of textile and apparel, newspaper and publication.

Stage 4 includes goods and services such as soft drinks, machine tools, personal computers, passenger motor cars, eating and drinking places, and hair-dressing and beauty salon, which are sold to final demand (Chart 9).

Chart 9. Examples of Assignment of Goods and Services Sectors to Stages



Looking at the lineup of sectors thus assigned to the stages of demand, we can see that the above classification is presumed to appropriately capture the supply chain structure.

The detailed results of the stage assignments are published in the *FD-ID Stage assignments* on the website of the Bank.

5. Calculating Weights

(1) Calculating the transaction value

After the assignment of sectors of goods and services to stages, the next step is to calculate weights used for aggregation to compile the FD-ID price indexes.

The calculation of weights for aggregation to compile the ID price indexes must be implemented stage by stage. In principle, the value of inputs to goods and services sectors at each stage (the value of intermediate inputs from the row sectors on a producer price basis in the I-O table for the base year) is used in the calculation. Please note that for the corresponding measures taken in response to the impact of the COVID-19 pandemic in the 2020 base index, refer to Section 4. In the case of the ID price indexes, in order to avoid the multiple counting problem, the value of internal flow is excluded from the weight calculation. This means that internal flow, which represents the trade of inputs within the same stage, is nothing more than intra-stage horizontal trade, and therefore, it is not regarded as the flow that may cause price pass-through from upstream to downstream stages of

demand.[13]

For aggregation to compile the FD price index, the value of inputs for final demand by sector in the I-O table (the value of sales by row sector on a producer price basis in the I-O table) is used as the weight of each sector.

When calculating the weights, the Bank makes some adjustments to improve the accuracy of the indexes, such as subdividing the *wholesale trade* sector in the I-O table into five subsectors in line with the classification within the SPPI.

After calculating the sector weights, if multiple price indexes correspond to a single row sector, the weights of those indexes are prorated according to the respective weights of the CGPI, SPPI, and CPI. In cases where there is any row sector to which no price index corresponds, the weight of that sector is deemed to be zero.

(2) Calculating the percentage ratio

The percentage ratios of the weights of sectors and indexes calculated in (1) to the total value of inputs into each stage of demand are calculated down to the third decimal point. Regarding final demand sectors, the calculation is made in such a way that the total weight of *Final demand (including exports)* is 100. As a result, the weights of the indexes for *Final demand (excluding exports)* does not add up to 100, and neither do the weights of the special series of indexes.

The weights of sectors are published in the *FD-ID Weights* on the website of the Bank.

6. Matching of Price Data (Commodity-level indexes)

Commodity-level indexes within the CGPI, the SPPI, and the CPI that correspond to the row sectors in the I-O table are used as price data.[14] As the FD-ID price indexes exclude the consumption tax, indexes excluding the consumption tax (yen-based indexes for exports and imports) are used for the CGPI and the SPPI. As CPI includes consumption tax, it is used adjusting so as to exclude it.

At the time of the 2020 base index release, the number of commodities used was 907 for the CGPI, including 515 for the Producer Price Index (PPI), 209 for the Import Price Index (IPI), 183 for the Export Price Index (EPI), 152 for the SPPI, and 166 for the CPI (Chart 10).

[13] With respect to imports, the value of transaction is not excluded from aggregation even if the trade is within the same stage because imports are equivalent to input factors actually allocated from foreign sectors to domestic sectors and because the domestic and foreign sectors may be different in substance.

[14] The *house rent (imputed house rent)* sector represents an imputed value for housing services such as owner-occupied housing, company-provided housing, and dormitories. Considering the characteristics of the sector, no price index is corresponding to the sector, and it is excluded from the aggregation of the FD-ID price indexes.

Chart 10. Numbers of Commodity-level indexes Used for the FD-ID Price Indexes

Number of commodities		Intermediate demand (ID)				Final demand including exports (FD)	FD+ID
		Stage 1	Stage 2	Stage 3	Stage 4		
CGPI		596	418	487	531	655	907
	PPI	420	255	322	360	339	515
	IPI	176	163	165	171	133	209
	EPI	0	0	0	0	183	183
SPPI		86	101	121	139	62	152
CPI		71	62	50	22	165	166
Total		753	581	658	692	882	1,225

With respect to goods, although the CGPI is used in principle, the CPI is used in the case of products not covered by the scope of the CGPI (fresh food, etc.). Regarding services, although the SPPI is used in principle, the CPI is used in the case of services for personal consumption.

7. Calculation of Indexes

The fixed-weight Laspeyres formula, which represents a weighted arithmetic mean based on the value weights fixed at the levels in the base year, is used.

8. Linked Indexes

A linked index, which is compiled with due consideration given to the convenience of users of long time series data, dates back to a past period on the same basis as a new index.

The 2020 base-linked index is an adjusted version of the indexes from previous base years, with the level set to 100 based on the annual average of 2020. For the basic series, the data is retroactively calculated back to January 2015. For the special series, the data is retroactively calculated back to January 1970.

<Calculation formula of the 2020 base linked index>

$$\text{2020 base linked index} = \text{2015 base index} \times \underbrace{\frac{\text{2020 annual average index with the base year 2020 (=100)}}{\text{2020 annual average index with the base year 2015}}}_{\text{(Linkage coefficient)}}$$

9. Release and Revision of Indexes

In principle, figures are released at 2 p.m. on the 20th business day of the following month (two business days after the release of the SPPI).

Revision is made as necessary in accordance with the revision of commodity-level indexes used as price data (the CGPI and the SPPI).

10. Treatments for the Rebasing of Underlying Data

The FD-ID price indexes are compiled using the CGPI, the SPPI, and the CPI. When those underlying price indexes have been rebased, price data are replaced. More specifically, the following two procedures are implemented: (1) updating of commodity-level indexes corresponding to row sectors of the I-O table; and (2) linkage with indexes before replacement of price data. Replacement of price data is retroactively reflected in the FD-ID price indexes, starting with indexes in January in the new base year.

(1) Updating of commodity-level indexes corresponding to row sectors of the I-O table

When price indexes are rebased, revisions are made in accordance with commodity amendment (adopting new commodities; deleting, splitting, or consolidating existing ones), with the weights of row sectors in the Input-Output table remaining fixed. In other words, in and after January of the base year, commodity-level indexes and the weights of commodities with the new base year are used for the calculation.

In the case of newly adopted commodities, if the corresponding row sectors in the I-O table have their own weights, price data are reorganized. When commodities are deleted, price data for the corresponding row sectors are also reorganized. In that case, if there is no corresponding price index with the new base year for the row sectors, the last indexes are carried forward, with the weight of the sectors fixed.

(2) Linkage with indexes before replacement of price data

When price indexes are rebased, commodity-level indexes used for the calculation of the FD-ID price indexes will be replaced by those with a new base year. However, since the base year of the FD-ID price indexes remains unchanged at 2020, the level of indexes need to be adjusted.

The FD-ID price indexes for January 2025 and onwards will be adjusted to the level of the January 2025 index calculated using price data with the base year 2020. More specifically, the linkage coefficient is calculated based on the indexes calculated using price data with the base year 2020 and those calculated using price data with the base year 2025, and the FD-ID price indexes for January 2025 and onwards are compiled by multiplying the post-replacement indexes by the coefficient.[15]

[15] Therefore, weighted average of commodity-level indexes that correspond to each series based on its weights doesn't coincide with each series data released officially. With due consideration given to the convenience of users of long time series data, *All commodities* is the weighted average of *Goods* and *Services*, and *All commodities, less imports* is the weighted average of *Domestic goods* and *Services*. In addition, *Goods*, *Domestic goods*, and *Import goods* are the weighted average of *Foods*, *Energy* and *Goods less food and energy*. *Services* is the weighted average of *Trade services*, *Transportation services* and *Services less trade and transportation*.

<Calculation formula of the FD-ID price indexes after the rebasing of underlying indexes>

$$\text{Index for the period from January 2025} = \text{Index calculated using price data with the base year 2025} \times \underbrace{\frac{\text{January 2025 index calculated using price data with the base year 2020}}{\text{January 2025 index calculated using price data with the base year 2025}}}_{\text{(Linkage coefficient)}}$$

11. Rebasing of the FD-ID Price Indexes

The rebasing of the FD-ID price indexes to 2025 is scheduled to be implemented after the publication of the 2025 I-O table, separately from the rebasing of price statistics (the CGPI, the SPPI, and the CPI).

(Appendix)

Index Series Classification of FD-ID price indexes

1. Basic series

Intermediate demand / Final demand	Series		Series No.
Stage 1	All commodities		1
	All commodities, less imports		2
	Goods		3
		Foods	4
		Energy	5
		Goods less foods and energy	6
	Services		7
		Trade services	8
		Transportation services	9
		Services less trade and transportation	10
	Domestic goods		11
		Domestic foods	12
		Domestic energy	13
		Domestic goods less foods and energy	14
	Import goods		15
		Import foods	16
		Import energy	17
		Import goods less foods and energy	18
Stage 2	All commodities		19
	All commodities, less imports		20
	Goods		21
		Foods	22
		Energy	23
		Goods less foods and energy	24
	Services		25
		Trade services	26
		Transportation services	27
		Services less trade and transportation	28
	Domestic goods		29
		Domestic foods	30
		Domestic energy	31
		Domestic goods less foods and energy	32
	Import goods		33
		Import foods	34
		Import energy	35
		Import goods less foods and energy	36
Stage 3	All commodities		37
	All commodities, less imports		38
	Goods		39
		Foods	40
		Energy	41
		Goods less foods and energy	42
	Services		43
		Trade services	44
		Transportation services	45
		Services less trade and transportation	46
	Domestic goods		47
		Domestic foods	48
		Domestic energy	49
		Domestic goods less foods and energy	50
	Import goods		51
		Import foods	52
		Import energy	53
		Import goods less foods and energy	54

1. Basic series (continued)

Intermediate demand / Final demand	Series		Series No.
Stage 4	All commodities		55
	All commodities, less imports		56
	Goods		57
		Foods	58
		Energy	59
		Goods less foods and energy	60
	Services		61
		Trade services	62
		Transportation services	63
		Services less trade and transportation	64
	Domestic goods		65
		Domestic foods	66
		Domestic energy	67
		Domestic goods less foods and energy	68
	Import goods		69
		Import foods	70
		Import energy	71
		Import goods less foods and energy	72
Final demand (excluding exports)	All commodities		73
	All commodities, less imports		74
	Goods		75
		Foods	76
		Energy	77
		Goods less foods and energy	78
	Services		79
		Trade services	80
		Transportation services	81
		Services less trade and transportation	82
	Domestic goods		83
		Domestic foods	84
		Domestic energy	85
		Domestic goods less foods and energy	86
	Import goods		87
		Import foods	88
		Import energy	89
		Import goods less foods and energy	90
Final demand (including exports)	All commodities		91
	All commodities, less imports		92
	Goods		93
		Foods	94
		Energy	95
		Goods less foods and energy	96
	Services		97
		Trade services	98
		Transportation services	99
		Services less trade and transportation	100
	Domestic goods		101
		Domestic foods	102
		Domestic energy	103
		Domestic goods less foods and energy	104
	Import goods		105
		Import foods	106
		Import energy	107
		Import goods less foods and energy	108
	Export goods		109

2. Special series

Series	Series No.
Final goods (Domestic goods)	110
Final goods/Capital goods (Domestic goods)	111
Final goods/Consumer goods (Domestic goods)	112

Note: Special series are compiled using indexes within the FD index.