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Key Features of Japan's Final Demand-Intermediate Demand Price Indexes during the Post-2020 Inflationary Episode

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Abstract

The period of rising prices since 2020 has heightened interest in how price pressures from upstream stages are transmitted downstream. This study investigates the price developments over the period 2020-2025 using the *Final Demand-Intermediate Demand Price Indexes* (FD-ID price indexes), which reorganize producer prices by stage of production. We first compare FD-ID price indexes for Japan and the United States. The results show that, in Japan, price increases varied substantially across production stages, whereas such cross-stage dispersion was relatively limited in the United States. A decomposition of the Japan-U.S. differences in price increases by stage indicates that, at upstream stages, Japan experienced larger price increases than the United States, particularly for goods such as energy and raw materials. At downstream stages however, Japan recorded smaller price increases than the United States across a wide range of goods-producing sectors. We then examine developments in Japan's FD-ID price indexes. The evidence suggests that, across many sectors, price increases at upstream stages were accompanied by stronger price increases at downstream stages than in the past. Taken together, these results suggest that (i) even during the post-2020 inflationary episode, the overall degree of goods price pass-through by Japanese firms remained relatively restrained when compared with the United States and that (ii) goods price pass-through in Japan nevertheless became more active across many sectors relative to the pre-2020 period.

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1. Introduction

Since 2020, in response to the outbreak of COVID-19 and the escalation of the Russia-Ukraine conflict, Japan and many other economies have experienced inflation rates not seen for several decades. As this inflationary episode was initially driven by rising commodity prices, including crude oil, public attention increasingly focused on the extent to which price increases for goods located upstream in interfirm supply chains were passed through into prices at more downstream stages. Given Japan's prolonged experience of low inflation in particular, the degree of price pass-through across inter-firm transactions, from upstream to downstream stages, has become a critical determinant of the inflation ultimately faced by final demanders.

To assess price pass-through in inter-firm transactions using price indexes, it is essential to employ price measures organized by stages of demand. A notable recent development in this regard is the availability of the *Final Demand-Intermediate Demand Price Indexes* (FD-ID price indexes), which reorganize and aggregate producer prices for goods and services by classifying them from upstream to downstream stages of the economy-wide production flow. The FD-ID price indexes were first developed on an experimental basis by the U.S. Bureau of Labor Statistics (BLS) in 2011 and have been compiled and published as headline Producer Price Index (PPI) measures since 2014. Specifically, goods and services are classified into a Final Demand (FD) stage and four Intermediate Demand (ID) stages, consistent with production flows in the Input-Output table, to illustrate the propagation of price changes along the production chain.

In Japan, Inoue et al. (2021) examined the applicability of the BLS methodology to Japanese data. Building on this work, the Research and Statistics Department of the Bank of Japan has been compiling and releasing Japan's FD-ID price indexes on a regular monthly basis since June 2022. The underlying item-level price indexes used to construct Japan's FD-ID price indexes are drawn primarily from the Corporate Goods Price Index (CGPI) for goods and the Services Producer Price Index (SPPI) for services. By largely following the U.S. methodology—such as classifying intermediate demand into four stages—Japan's FD-ID price indexes are designed to facilitate cross-country comparisons of price developments at each stage of demand between Japan and the United States.

Using the FD-ID price indexes, this study provides a statistical examination of the key features of price developments during the 2020-2025 inflationary episode, focusing on two perspectives. The first perspective is a comparison between Japan and the United States. As noted above, Japan's FD-ID price indexes are constructed in line with the methodology originally developed for the United States. Comparing the movements of FD-ID price indexes across the two economies therefore makes it possible to shed light on cross-country differences in inflationary developments by stage of demand. In fact, a comparison of the movements of the FD-ID price indexes for Japan and the United States during the inflationary period since 2020 reveals several features: (i) in Japan, the variation in price increases across stages is large, whereas in the United States, the variation is small; (ii) in Japan, price increases tend to be larger at upstream stages and smaller at downstream stages, whereas in the United States, price increases do not necessarily follow the sequence of the production flow; and (iii) when compared stage by stage, price increases in Japan are larger than those in the United States at upstream stages, while the opposite holds at downstream stages. This study groups the FD-ID price indexes for Japan and the United States into several sectors and then breaks down the indexes to conduct a detailed examination of the underlying factors.

The second perspective concerns developments over time in Japan. Micro-level survey data on corporate price pass-through indicate that the pass-through rates of Japanese firms increased after 2020. Against this background, the present study examines how the characteristics of Japan's FD-ID price indexes have changed in the inflationary episode since 2020 compared with earlier periods. Specifically, the study examines whether, and to what extent, price changes at upstream stages of the production flow have been accompanied by price changes at downstream stages during the post-2020 inflationary episode. Through this examination, the study seeks to provide insights into the possibility that changes in firms' price pass-through behavior have influenced observed price developments.

Related studies using FD-ID price indexes include Weinhagen (2016) for the United States and Inoue et al. (2021) and Yagi et al. (2025) for Japan, who apply vector autoregression (VAR) models to show that shocks originating at upstream stages of intermediate demand are transmitted to downstream stages and final demand prices. In contrast to these studies, the present study does not employ formal time-series modeling. Instead, it contributes by examining the statistical properties of the FD-ID price indexes and

identifying key features of price developments during the post-2020 inflationary episode.

The remainder of the study is organized as follows. Section 2 outlines the methodology used to construct the FD-ID price indexes. Section 3 examines the main features of the movements in the FD-ID price indexes in Japan and the United States during the post-2020 inflationary episode. Section 4 focuses on goods-related FD-ID price indexes, classifying goods into groups and comparing their composition between Japan and the United States. Section 5 investigates the factors underlying cross-country differences in the magnitude of price increases in goods-related FD-ID price indexes. Section 6 examines developments over time in the relationship between price changes at upstream and downstream stages in Japan's FD-ID price indexes. Section 7 concludes.

2. Overview of the FD-ID Price Indexes

This section provides an overview of the compilation method of the FD-ID price indexes. It briefly introduces the scope and coverage as well as the method of compilation of Japan's FD-ID price indexes. For a more detailed explanation, see Research and Statistics Department, Bank of Japan (2025).

2.1. Features of the FD-ID Price Indexes

The FD-ID price indexes are a series of producer price indexes classified by stage of demand. They are comprised of the Final Demand price index (FD price index) and the Intermediate Demand price indexes (ID price indexes), and comprehensively cover the Producer Price Index (PPI) for both goods and services. Their main features are as follows: First, goods and services are aggregated in an integrated manner. Second, demand stages are classified into final demand and intermediate demand, and the indexes are compiled as the "Final Demand price index (FD index)" and the "Intermediate Demand price indexes (ID indexes)." Third, intermediate demand is further divided into four stages along the production flow, from upstream to downstream. Specifically, intermediate demand price indexes are compiled for each stage, from Stage 1 (the most upstream stage) to Stage 4 (the most downstream stage). Fourth, in calculating the weights for the intermediate demand indexes, transaction values within the same stage (internal flows) are excluded.[1]

[1] As explained in Inoue et al. (2021), this fourth feature is intended to address the so-called "multiple

Because the FD-ID price indexes are aggregate indexes on a producer price basis that integrate goods and services, their scope covers transactions for all goods and services. As noted above, the compilation of Japan's FD-ID price indexes basically follows the U.S. methodology. However, reflecting the characteristics of Japan's economic and industrial structure—namely, its heavy reliance on imports for many raw materials—the indexes cover not only domestically produced goods but also imported goods, unlike in the United States. From the perspective of the Input–Output tables, a key feature of the FD-ID price indexes is that sectors for goods and services are classified not by type of goods and services (Row Sector) but by stage of demand in the production flow (Column Sector) (Figure 1).

2.2. Compilation Process of the FD-ID Price Indexes

The FD-ID price indexes are compiled through the following processes (i)–(iii):

(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 Input-Output table. The optimal assignment of sectors is achieved by seeking to maximize the value (Net forward flow), which is obtained by subtracting the value of goods and services that move from downstream to upstream in the production flow (back flow) from the value of goods and services that move from upstream to downstream (forward flow).[2]

The method for calculating the Net forward flow is as follows:

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counting problem." If price indexes are compiled using gross transaction values as weights for items at different stages of demand, the influence of price changes in upstream stages of the production flow (such as crude oil prices) may be overstated. Excluding internal flows helps mitigate this issue.

[2] The four stages of intermediate demand are defined as follows.
The values of X, Y and Z that maximize the Net Forward Flow (NFF) are determined through a grid search.
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.

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

- total value of inter-sector transactions that flow from downstream to upstream demand stages

= (the value of output upstream sector provides to downstream + the value of input downstream sector receives from upstream)

- (the value of output downstream sector provides to upstream + the value of input upstream sector receives from downstream)

= {(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)}

(ii) Weights calculation

The weights used for aggregating the FD price index and the ID price indexes are calculated using the Input–Output tables. For aggregation to compile the FD price index, the value of inputs for final demand by sector in the Input–Output table (i.e., the value of sales by row sector on a producer price basis in the Input–Output table) is used as the weight of each sector. The calculation of weights for aggregation to compile the ID price indexes is carried out on a stage-by-stage basis. In principle, the value of inputs to goods and services sectors at each stage (i.e., the value of intermediate inputs from the row sectors on a producer price basis in the Input–Output table for the base year) is used in the calculation. In the case of the ID price indexes, in order to avoid the multiple counting problem, the value of internal flows is excluded from the weight calculation. Internal flows represent trade of inputs within the same

stage and therefore are not regarded as flows that may cause price pass-through from upstream to downstream stages of demand.[3]

(iii) Correspondence between Sectors and Price Data (Commodity-level Indexes)

Commodity-level indexes within the Corporate Goods Price Index (CGPI), the Services Producer Price Index (SPPI), and the Consumer Price Index (CPI) that correspond to the row sectors in the Input-Output table are used as price data. 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.

In summary, the main steps in compiling the FD-ID price indexes are as follows. First, individual goods and services sectors (column sectors in the Input–Output table) are classified into four intermediate demand stages and final demand. Second, weights are calculated for all goods and services sectors (row sectors in the Input–Output table) that are input into each stage and final demand. Third, item indexes are matched to each goods and services sector (row sector in the Input–Output table), and weighted-average price indexes are compiled. Thus, the FD-ID price indexes can be regarded as input price indexes.

3. Key Features of Price Increases in Japan and the United States based on the FD-ID Price Indexes

This section examines the trends in the FD-ID price indexes for Japan and the United States and summarizes their key features. Both countries experienced significant inflationary pressures, especially after 2020. Therefore, particular attention is paid to the differences in the patterns of inflation that emerged during this period.

3.1. Trends of FD-ID Price Indexes in Japan and the United States

Here we examine the trends of the FD-ID price indexes in both Japan and the United States. The U.S FD-ID price indexes has been published from November 2009 and since January

[3] With respect to imports, the value of transactions is not excluded from aggregation, even if the trade occurs within the same stage. This is because imports correspond to input factors actually allocated from foreign sectors to domestic sectors, and domestic and foreign sectors may differ in substance.

2015 for Japan. For the comparison, the starting point for this analysis is January 2015, with the end period set to December 2025.[4] Figure 2 shows the time-series trends of the FD-ID price indexes for both countries. As discussed in the previous section, the FD-ID price indexes consist of Intermediate Demand (ID) indexes, which classify production stages from upstream to downstream into stages 1 to 4, and the Final Demand (FD) index.

When comparing the trends of the indexes in both countries, we observe that between 2015 and 2019, Japan had slightly more significant price fluctuations in upstream stages (such as stages 1 and 2). However, in downstream stages such as stage 4 and the FD index, both countries exhibited relatively stable price trends, indicating that, overall, price fluctuations were subdued during this period.

In contrast, during the inflationary period after 2020, clear differences in the trends of FD-ID price indexes between Japan and the United States emerged. Both countries saw price increases across all stages due to the impacts of COVID-19 and the Russia-Ukraine conflict. Focusing on the relationship between price increases at different stages, however, there are notable differences between Japan and the United States, as follows:

(i) In Japan, the variation in price increases across stages is greater compared to the U.S., where the variation is relatively smaller.

(ii) In Japan, these price increases are larger at upstream stages and generally become smaller the further the downstream stage. In contrast, in the U.S., for example, around 2022, price increases in Stage 2 surpassed those in Stage 1, showing that the price increase pattern does not always follow the upstream-to-downstream order.

(iii) When comparing price increases by stage, particularly in Stage 1 (the most upstream stage), Japan's price increases are larger than those in the U.S., while in downstream stages such as Stage 4 and the FD index, Japan's price increases are smaller than in the U.S.

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[4] While the present study focuses primarily on the inflationary episode since 2020, for longer-term analysis, the "FD-ID 2020 base historical data" published by the Bank of Japan is available. This dataset extends the 2020-base FD-ID price indexes back to January 2000-December 2014 by linking it to the stage information, weight information, and 2015-base connected indexes for the individual price indexes used in the 2015-base FD-ID price indexes. For further details, see Bank of Japan, Statistics Department (2025).

These three points summarize the main differences in the trends of FD-ID price indexes between Japan and the United States during the post-2020 inflationary episode. The following sections will investigate the factors behind these differences in more detail.

3.2. Breakdown by Sector: Goods and Services

To further investigate the reasons behind the differences observed in the previous section, we will begin by breaking down the trends of FD-ID price indexes into goods and services.

Figure 3 presents the FD-ID price indexes for goods. The trends for goods show patterns similar to those of the FD-ID price indexes in the post-2020 period (points i-iii discussed above). Specifically, the variation in price increases between stages is larger in Japan than in the U.S. Furthermore, while Japan's price indexes follow the sequence of the production flow, in the U.S., for example, the price increases of Stages 2 and 3 around 2022 exceeded those of stage 1, indicating that price changes do not strictly follow the production flow order. Additionally, when comparing the peak price increases for each stage post-2020, Japan shows larger price increases than the U.S. in Stages 1 and 2 but smaller price increases in Stages 3, 4, and the FD index.

One major reason for the differing relationship between the price increases seen in Stages 1 and 2 between Japan and the U.S. is the difference in the two countries' energy-related industrial structures. Japan is a net importer of crude oil, so crude oil is primarily used in Stage 1, the most upstream stage. In contrast, the U.S. has a large domestic crude oil production capacity, and crude oil is mainly used in Stage 2. As a result, in the U.S., Stage 2 experiences greater fluctuations in crude oil prices than Stage 1.[5]

Next, Figure 4 shows the FD-ID price indexes for services. Both Japan and the U.S. saw price increases in services across all stages post-2020, but there are some notable differences compared to goods. Specifically, there is less variation in the price trends for services across stages. In particular, Japan's price increases for services exhibit much less variation than those for goods. Additionally, in both countries, the price increases for services do not always

[5] For Japan, not only is crude oil heavily concentrated in Stage 1, but energy-related items such as imported liquefied natural gas, coal, and domestically produced gasoline are also heavily concentrated in Stage 2. As a result, Stage 2, like Stage 1, reflects fluctuations in energy market conditions, leading to significant price changes.

follow the production flow sequence.

Since many services are labor-intensive and wages are a primary factor in determining service prices, Figure 4 also includes wage indexes for both countries. This shows that the movements in the intermediate demand stages and the FD index for services generally align with the wage increase trends in both countries. This suggests that, for services, price trends are more influenced by wage changes than by the pass-through of price changes along the production flow.[6]

Furthermore, comparing Japan and the U.S., Japan's wage increase rate is generally lower than the U.S., and this difference is reflected in the smaller price increases for services in Japan compared to the U.S. This is one of the reasons behind the feature pointed out in Section 3-1, point (iii), that the comparison of the FD-ID price indexes by stage, including both goods and services, shows that Japan's price increases at downstream stages, such as Stage 4 and the FD index, are smaller than those in the United States.

However, as already mentioned, even when excluding services and focusing solely on goods, Japan's price increases in Stage 4 and the FD index remain smaller than those in the U.S. Therefore, a more detailed examination of the price movements in goods is required to understand the reasons behind the smaller price increases in Japan in downstream stages. In the next section, we will classify goods into groups to facilitate a comparison of the FD-ID price indexes for goods between Japan and the U.S., and analyze the sectoral composition of the ID and FD indexes in both countries.

[6] In Yutani et al. (2024), the 'Services Producer Price Index (SPPI)' categories in Japan are classified based on the proportion of labor costs in production costs, with separate calculations made for high-labor-cost and low-labor-cost services.

4. Grouping of Goods and Comparison of Composition between Japan and the U.S.

This section outlines the grouping of goods used in the subsequent analysis. This classification is not part of the officially published FD-ID price indexes but has been created specifically for this study to facilitate comparisons between Japan and the U.S.

4.1. Grouping of Goods

The analysis focuses on examining the price trends of goods within the FD-ID price indexes for both Japan and the U.S. A detailed item-level breakdown would be too specific and complicate meaningful comparisons. For this reason, a broader categorization was adopted to make the comparison more practical and informative. To ensure comparability, goods within the FD-ID price indexes of both countries are classified into the following seven groups:[7]

Grouping of the FD-ID Price Indexes for Goods

Groups	Japan	U.S.
Foods	Beverages and foods Agriculture, forestry and fishery products	Processed foods and feeds Farm products
Energy	Petroleum and coal products Energy within minerals Electric power, gas and water (excluding water)	Fuels and related products and power
Materials	Textile products Lumber and wood products Pulp, paper and related products Chemicals and related products Plastic products Ceramic, stone and clay products	Textile products and apparel Lumber and wood products Pulp, paper and allied products Chemicals and allied products Rubber and plastic products Nonmetallic mineral products

[7] Some items included in Japan's food products and agricultural, forestry, and fishery products (such as logs, tobacco, cut flowers, etc.) and some items included in the U.S. categories of Farm products and Processed foods and feeds (such as raw cotton, hay and hayseeds, pet food, oilseeds, etc.) are excluded from the FD-ID price indexes for food products. Therefore, this study follows the same definition and excludes these items from the definition of food products.

Transportation Equipment	Transportation equipment	Transportation equipment
Machinery	General purpose machinery Production machinery Business oriented machinery Electronic components and devices Electrical machinery and equipment (excluding household use) Information and communications equipment	Machinery and equipment
Metals	Iron and steel Nonferrous metals Metal products Scrap and waste Metal ores within minerals	Metals and metal products
Other goods	Electrical machinery and equipment (household use) Other manufacturing industry products Minerals (excluding energy and metal ores) Electric power, gas and water (water)	Hides, skins, leather, and related products Furniture and household durables Miscellaneous products

4.2. Differences and Similarities between Japan and the United States in the Composition of the FD-ID Price Indexes for Goods

Based on the grouping of goods, Tables 1 to 5 organize the groups and main categories included in the ID price indexes for goods and FD price indexes for goods for Japan and the United States, along with their composition (weights). The following examines particularly the differences and similarities in the composition of groups and categories included in the price indexes at each stage.

First, with respect to Stage 1 of the ID price indexes for goods in Table 1, the following notable differences between Japan and the United States are observed: (1) Japan has a larger

weight for energy (Japan: 36.3, U.S.: 14.4), (2) the U.S. has a larger weight for materials (Japan: 6.6, U.S.: 21.5), and (3) Japan has a larger weight for machinery (Japan: 8.9, U.S.: 4.3). Regarding (1) energy, Japan tends to have a particularly high weight for energy in upstream stages because most of its energy is imported, while the U.S. produces a larger proportion of its energy domestically, including crude oil. Regarding (2) materials, the U.S. is notably weighted more heavily in chemical products. Regarding (3) machinery, Japan's weight is notably higher in electronic components and devices, as well as production machinery.

Stage 2 in Table 2 shows that there is no significant difference between Japan and the U.S. in terms of the weight of any group. However, when looked at more closely, Japan imports more liquefied natural gas, coal, and coking coal, while in the U.S. domestically produced crude oil has a larger weight in Stage 2 than in Stage 1.

For Stage 3 in Table 3, Japan has a larger weight for metals (Japan: 14.1, U.S.: 8.3), especially for steel and other metals. Conversely, the U.S. has a larger weight for energy (Japan: 5.4, U.S.: 9.9). For other groups, there is no significant difference between Japan and the U.S.

The U.S. has a larger weight in materials in Stage 4 in Table 4, (Japan: 11.6, U.S.: 17.1), while Japan has a larger weight in transportation equipment, such as automotive parts (Japan: 10.9, U.S.: 6.1).

Finally, the FD index in Table 5 shows that Japan's weight for machinery is notably larger (Japan: 8.8, U.S.: 3.8). In Japan, a number of imported goods, such as mobile phones and computers, as well as domestic production and industrial machinery, are included. For groups other than machinery, there is no significant difference in the weights between Japan and the U.S.

In summary, there are several differences in the composition of the price indexes at each stage. Specifically, Japan's role as an energy-importing country contrasts with the U.S.'s more self-sufficient energy production. In light of this, due to differences in the construction methodology, where Japan's FD-ID price indexes include imported goods while the U.S. index does not, it is particularly important to note that, in Stage 1 (the upstream stage), Japan has a larger weight for energy, and in Stage 2, Japan includes imported goods that are subject

to significant price fluctuations linked to international commodity market. In contrast, at downstream stages such as Stage 3, Stage 4, and the FD index, although there are partial differences in the weight of certain groups, there are no significant differences in the overall composition of the stages between Japan and the U.S.

5. Decomposition of the Increase in the FD-ID Price Indexes for Goods

In this section, to explore the underlying reasons for the differences in the FD-ID price indexes for goods between Japan and the United States, we decompose the FD-ID price indexes for each country based on the groupings from Section 4. For expositional convenience, the seven groups defined in Section 4 are hereafter referred to as "sectors."

5.1. Decomposition of the Increase in Japan's FD-ID Price Indexes for Goods

Figure 5 shows the decomposition of the increase in Japan's FD-ID price indexes for goods since 2020, based on the groupings from Section 4. Specifically, for each stage, the deviation from the 2020 average value is decomposed into seven sectors: "Foods," "Energy," "Materials," "Transportation equipment," "Machinery," "Metals," and "Other goods."

First, regarding Stage 1, most of the price increases since 2020 have been driven by 'Energy.' This reflects the significant rise in energy prices, including crude oil, during the same period, and as seen in Table 1, Japan's high dependence on energy imports results in the relatively large weight of energy raw materials at the upstream Stage 1. As a result, the impact of price increases in other sectors is less noticeable.

In Stage 2, the contribution from "Energy" is also significant. As shown in Table 2, Stage 2 also has a large weight for energy items such as LNG and gasoline, which experienced substantial price increases. However, compared to Stage 1, the contribution from "Materials," including chemicals, is also more pronounced.

Stage 3 stands out in that price increases are driven by a wide range of sectors other than "Energy." Specifically, the contributions from "Metals," "Materials," and "Foods" are significant, along with some contribution from "Machinery." Stage 3 is situated in the middle of the production flow for the whole economy, and these sectors, which involve a significant share of intermediate goods production (Table 3), make a notable contribution to price

increases in this stage.

Stage 4 is similar to Stage 3 in that price increases are driven by a wide range of sectors, but it is also marked by the clear contribution from price increases in transportation equipment. Stage 4, being the most downstream in intermediate demand, includes intermediate goods that are directly used to produce final goods, such as automotive parts (Table 4), and the increase in their prices is reflected in the rise of the price index.

Finally, the FD index shows that price increases across a wide range of sectors have contributed, with the most significant contributions coming from "Foods" and "Machinery." The sharp increases in the prices of items with a relatively large weight for final demanders, such as food products, agricultural products, and electrical appliances (Table 5), have made a major contribution to the overall price increase.

We also examine the impact of imported goods on Japan's FD-ID price indexes at each stage. As mentioned earlier, Japan's FD-ID price indexes include imported goods in its price index calculations, using both domestic producer price indexes and import price indexes for each stage. Figure 6 shows the contribution of imported goods extracted from the decomposition in Figure 5. It can be seen that, in upstream stages such as Stage 1 and Stage 2, most of the price fluctuations in the price indexes are due to fluctuations in the prices of imported goods. For Stage 3, Stage 4, and the FD index, while the contribution from domestic goods is relatively higher, the contribution from imported goods still stands out. This highlights the significant impact of imported goods on Japan's price fluctuations.

Furthermore, Figure 7 shows the impact of exchange rate fluctuations on price changes at each stage. Specifically, using item indexes in contract currency basis from the import price index, we separate the contribution of imported goods in yen basis into the contributions from imported goods in contract currency basis and exchange rate factors. It can be seen that, especially after 2022, exchange rate factors have pushed up the price indexes at each stage to a certain degree. The extent of this impact is particularly large in Stage 1 and Stage 2, reflecting the large weight of imported goods in these upstream stages. Compared to the contribution from imported goods in contract currency basis, the contribution from exchange rate factors was smaller during the peak price increases in 2022. However, in the period after 2022 while the contribution of imported goods in contract currency basis decreased, the contribution from exchange rate factors did not decline significantly, and the relative

contribution from exchange rate factors became larger. In Stage 3, Stage 4, and the FD index, although smaller than in Stage 1 and Stage 2, exchange rate factors have still contributed to pushing up prices in these downstream stages to some extent. It should be noted that the exchange rate factor examined here captures only the direct impact of converting imported goods prices from contract currency terms to yen and does not include the effect of firms passing exchange rate fluctuations onto the prices of domestic goods.

5.2. Decomposition of the Increase in the U.S. FD-ID Price Indexes for Goods

Figure 8 presents the decomposition of the increase in the U.S. FD-ID price indexes for goods since 2020. As mentioned previously, it should be noted that the impact of imported goods is not included in the price indexes for each stage in the U.S.

In Stage 1, contributions from sectors such as "Energy," "Materials," and "Metals" are relatively large, reflecting the weight of these sectors. one characteristic is that price fluctuations in Stage 1 are influenced by sectors other than "Energy" to a significant extent.

In contrast, Stage 2 is predominantly driven by the contribution of "Energy." This is because domestically produced crude oil is included in the "Energy" in Stage 2, so the sharp rise in crude oil prices during this period is primarily reflected in the prices of Stage 2.

For Stages 3 and 4, a broader range of sectoral price increases contribute compared to the upstream stages. In Stage 3, the contribution from "Food" stands out, while in Stage 4, the contribution from "Energy" is relatively small, and contributions from "Materials" and "Metals" are more prominent. Additionally, "Machinery" and "Transportation Equipment," which did not stand out in upstream stages, also show a positive contribution in Stage 4.

Finally, in the FD index, price increases across a broad set of sectors contribute. Among these, the dominant contribution comes from "Energy," reflecting increases in residential electricity and gasoline prices. Additionally, "Food" also shows a relatively large contribution.

5.3. Decomposition of the Differences between Japan and the United States in the Increase in the FD-ID Price Indexes for Goods

In this section, we have decomposed the increase in the FD-ID price indexes for goods for each of Japan and the United States since 2020. To understand the factors behind the stage-

to-stage variations in price increases seen in the FD-ID price indexes for Japan and the United States in Section 3, it is useful to conduct a decomposition of the differences in the price increases of the FD-ID price indexes for goods between the two countries.

Figure 9 shows the difference in the price increase of the FD-ID price indexes for goods between Japan and the United States from 2020 onwards (specifically, the difference between Figures 5 and 8). By examining this, we can see which sectors have contributed to the differences in the price increases of the FD-ID price indexes for goods at each stage.

First, in Stage 1, it is evident that from 2021 onwards, "Energy" has had a significant positive contribution, indicating that Japan's contribution to the price increase in this sector was larger than that of the United States. As previously mentioned, Japan's high dependence on energy imports and the significant impact of rising import prices for energy raw materials such as crude oil are reflected in this. On the other hand, "Materials" has had a consistent negative contribution since 2021, reflecting the larger contribution to price increases in this sector in the United States.

In Stage 2, from mid-2020 to mid-2022, the price difference between Japan and the United States was negative, indicating that the price increase in the U.S. was larger than in Japan. The main factor here is the contribution of "Energy." However, after mid-2022, the price difference turned positive, with the contribution from "Energy" becoming positive as well. This shift reflects the fact that, in the United States, the early rise in domestic crude oil prices after 2020 made a large contribution, but since mid-2022, the contribution from rising energy prices imported by Japan has surpassed the U.S. contribution. Additionally, in sectors other than "Energy," since mid-2022, "Materials" has also contributed positively to the price difference, and from around 2024, the contribution from "Metals" has also become more noticeable.

In Stage 3, unlike upstream stages, the price difference between Japan and the U.S. has been negative since 2021. Particularly between mid-2021 and 2022, the difference was significantly negative, driven largely by the contributions of "Energy" and "Foods," as well as a negative contribution from "Materials." Since mid-2022, "Metals" has contributed positively, but this has been outweighed by the negative contributions from "Energy" and "Foods."

In Stage 4, the price difference between Japan and the U.S. has remained negative since 2021, but the reasons for this differ slightly from Stage 3. Notably, "Materials" has had a significant negative contribution, and "Metals" also saw a negative contribution from 2021 to 2022. On the other hand, from mid-2022 onwards, "Transportation Equipment" has made a positive contribution, and from the latter half of 2023, "Foods" and "Other goods" have also contributed positively.

Finally, with respect to the FD index, the difference between Japan and the U.S. has been significantly negative since 2021. The main factor behind this is "Energy," as price increases at the final demand stage in the U.S. have been dominated by this sector since 2021 (Figure 8). In contrast, Japan's contribution from this sector has not been as large (Figure 5).

So far, we have decomposed the differences in the price increases of the FD-ID price indexes for goods between Japan and the United States since 2020. In these decompositions, however, two factors are mixed: (1) the difference in the price increases of each sector between Japan and the U.S. (price difference factor) and (2) the difference in the sector weights between the two countries (weight difference factor). The first factor purely reflects the price difference between Japan and the U.S. for each sector, while the second factor represents the differences in sectoral composition between the two countries. When interpreting the differences in the FD-ID price indexes (goods) between Japan and the U.S., it is important to distinguish between these two factors.

In the following, the difference in the contributions of each sector to the FD-ID price indexes for goods between Japan and the U.S. is decomposed into two factors: the 'price difference factor' and the 'weight difference factor'. Specifically, the weight of sector *s* in the FD-ID price indexes (from 2020) is denoted as ω_s^{JP} and ω_s^{US} for Japan and the U.S., respectively. Additionally, the price index for sector *s* at time *t* (measured as the deviation from 2020) is represented as $x_{s,t}^{JP}$ and $x_{s,t}^{US}$ for Japan and the U.S., respectively. In this case, the contribution of sector *s* to the difference in the FD-ID price indexes (from 2020) between Japan and the U.S. at time *t* ($\omega_s^{JP} x_{s,t}^{JP} - \omega_s^{US} x_{s,t}^{US}$) can be decomposed into the following two factors;

$$\omega_s^{JP} x_{s,t}^{JP} - \omega_s^{US} x_{s,t}^{US}$$

$$= \left(\omega_s^{JP} - \frac{\omega_s^{JP} + \omega_s^{US}}{2}\right) x_{s,t}^{JP} - \left(\omega_s^{US} - \frac{\omega_s^{JP} + \omega_s^{US}}{2}\right) x_{s,t}^{US} + \frac{\omega_s^{JP} + \omega_s^{US}}{2}\left(x_{s,t}^{JP} - x_{s,t}^{US}\right)$$

$$= \underbrace{\left(\omega_s^{JP} - \omega_s^{US}\right)\frac{x_{s,t}^{JP} + x_{s,t}^{US}}{2}}_{\text{weight difference factor}} + \underbrace{\frac{\omega_s^{JP} + \omega_s^{US}}{2}\left(x_{s,t}^{JP} - x_{s,t}^{US}\right)}_{\text{price difference factor}}.$$

The weight difference factor is the product of the weight difference between the two countries and the average of the price indexes (deviations from 2020) for both countries. The price difference factor is the product of the average weight between the two countries and the difference in their price indexes (deviations from 2020).

Figure 10 decomposes the Japan-U.S. difference in the FD-ID price indexes for goods into the weight difference factor and the price difference factor, based on the decomposition method outlined above. As seen from this figure, the contribution from the weight difference factor is relatively large in Stage 1, but in all stages, it does not dominate. This reflects the fact that, as explained in Section 4-2, there is no significant difference between the sector weights in the stages of Japan and the U.S., except for the larger weight of "Energy" in Stage 1 in Japan compared to the U.S.

Figure 11 isolates the price difference factor to show the contribution by sector, which reflects the difference in price trends between Japan and the U.S. after adjusting for differences in sectoral weights between the two countries. Because the weight difference factor was relatively small, the contribution by sector in each stage is not significantly different from what was observed in Figure 9. However, upon closer inspection, some differences can be identified. For instance, in Stage 1, compared to Figure 9, the negative contribution of "Materials" after 2021 has become less prominent, while "Metals" has contributed positively. In Stage 2 and Stage 3, the contribution from "Energy" has slightly diminished. Additionally, in Stage 3, the negative contribution of "Metals" between 2021 and mid-2022 has increased, while the positive contribution from this sector after mid-2022 has almost disappeared. In Stage 4, the large negative contribution of "Materials" that was noticeable in Figure 9 has significantly reduced, and the positive contribution from "Transportation equipment" has also decreased. In the FD index, the negative

contribution from "Energy" has diminished, while "Foods" has consistently made a negative contribution since 2021.

By adjusting for the weight difference factor, it has become possible to more directly capture the impact of sectoral price differences between Japan and the U.S. To explain the factors behind the differences in the price increases in the FD-ID price indexes for goods between Japan and the U.S. as discussed in Section 3, two key points can be identified: (i) in the upstream stages, such as Stage 1 and Stage 2, Japan's price increases are larger, driven mainly by "Energy" and "Materials"; and (ii) in the downstream stages from Stage 3 onward, the price increases in Japan are smaller than those in the U.S. across a broad range of sectors. This suggests that, in the post-2020 period, Japan has generally shown a more restrained pass-through of price increases from upstream stages to downstream stages compared to the U.S.

However, as illustrated in Figures 9 and 11, the negative gap in the price difference between Japan and the U.S. in the downstream stages reached its peak around mid-2022 and has been gradually narrowing since then. This is mainly because, from 2023 onward, the price indexes for the U.S. downstream stages have remained relatively flat (Figure 8), while Japan has continued to show a moderate upward trend (Figure 5). One possible reason for this is that, since 2020, Japan may have seen a stronger pass-through of price increases from upstream stages to downstream stages. Therefore, in the next section, we will examine the time-series changes in the properties of the FD-ID price indexes for goods, focusing primarily on Japan.

6. Changes in Time Series Properties of Japan's FD-ID Price Indexes for Goods

This section examines how the properties of Japan's FD-ID price indexes for goods have changed in the inflationary period since 2020 compared to earlier periods. The focus here is on whether the price indexes for each stage have become more sensitive to price fluctuations in upstream stages, potentially reflecting the increased aggressiveness of firms in passing on price increases. Below, we first examine the time-series changes for the overall goods index, then break it down by sector for a more detailed analysis.

6.1. Changes in Time Series Properties of the Overall Goods Price Index

Here, we use the overall FD-ID price indexes for goods to observe changes in time-series properties. Specifically, we investigate the degree to which price changes in upstream stages are associated with price changes in downstream stages using scatter plots and recursive estimations.

Figure 12 plots the logarithmic differences in price indexes (from 2020) for upstream stages (including both domestic and imported goods) on the x-axis and for downstream stages (domestic goods only) on the y-axis. The data are divided into three periods: (i) 2016 to 2020, (ii) 2021 to 2022, and (iii) 2023 to 2025. We include imported goods in the upstream stage price index because the prices of imported raw materials are important cost factors for downstream producers. The downstream price index only includes domestic goods, as companies set prices only for domestic goods. Additionally, given that upstream price changes may affect downstream prices with a lag, we check the cross-correlation (Table 6) and apply the lag length that maximizes this correlation to generate the scatter plot.

The scatter plots between stages show two key characteristics: (1) an upward-sloping relationship, and (2) the relationship tends to be less steep than the 45-degree line, indicating that price changes in upstream stages are accompanied by price changes in downstream stages, but the relationship is less than one-to-one. However, the second characteristic does not hold for all stages or periods. For example, the relationship between Stages 3 and 4 is closer to the 45-degree line, and in the period after 2021, the slope seems steeper in some periods. Additionally, the scatter plot for Stage 4 to FD shows a non-linear trend after 2021.

Figure 13 presents recursive estimations of the parameters (slopes) obtained from linear regression where upstream stage price indexes are regressed on downstream stage price indexes for the data shown in Figure 12. The estimation starts in January 2016, with the end period gradually extended after 2018. The results show that for all stages, the slope is below 1, reflecting the fact that the scatter plots in Figure 12 are generally flatter than the 45-degree line. In terms of time-series changes, the parameter for Stage 3 to 4 has notably increased since 2021. To examine this point, Table 7 compares the 95% confidence intervals of the estimated parameters based on data up to 2020 with those based on data up to 2025. For Stage 3 to 4, the confidence interval of the parameter is observed to have shifted upward. In contrast, for the other stage pairs, there is no clear statistical evidence of a shift in the parameters.

6.2. Changes in Time Series Properties by Sector

To further investigate the changes in the time-series properties of Japan's FD-ID price indexes for goods, we perform recursive estimations using sector-specific data, breaking down the index by sectors. Specifically, we use the price indexes for the sectors identified in Section 4 (instead of the overall goods index) to investigate how the relationship between stages has changed over time. For the energy sector, due to its distinct pricing mechanisms and product processing levels compared to other sectors, we first conduct the analysis excluding energy.

Figure 14 shows the results of sector-specific estimations. The data for the upstream stage price indexes (logarithmic differences) include imported goods as in Section 6-1, and the lag periods are based on the peaks identified in Table 6. This figure reveals time-series changes that were not as apparent in the overall price index. Notably, (i) the parameter for "Foods" has increased across all stages since around 2022, and (ii) many other sectors, especially in the downstream stages, have seen an increase in their parameters from around 2022. Indeed, Table 8 shows that the 95% confidence intervals of the parameters shift upwards statistically for "Foods" across multiple stages, as well as for "Materials" and "Transportation equipment" from Stage 3 to 4, and for "Transportation equipment," "Machinery," and "Metals" from Stage 4 to FD.

Regarding (i), the increase in the "Foods" parameter suggests that since 2022 prices in each stage have diverged from their relationship with upstream stage prices, likely due to factors such as the rising cost of imported raw materials. Tables 1 to 5 show that upstream stages include materials such as soybeans, rapeseed, and animal feed, while downstream stages include products like meat, dairy, vegetables, rice, and processed foods. Figure 15 shows a scatter plot using the logarithmic differences in food prices, where it is evident that, particularly from 2021 onwards, food prices have increased non-linearly in response to price rises in upstream stages, with the trend being most pronounced in the Stages 3 to 4 and Stage 4 in the FD index. This suggests that since 2022, foods have experienced a higher degree of pass-through from upstream stage price increases than before, largely due to the soaring costs of imported raw materials.

Regarding (ii), several sectors in the downstream stages have experienced an increase in their parameters since 2022. Scatter plots for these sectors (Figures 16 and 17) show that, particularly from 2021 onwards, the upward slope has become steeper than previously

observed, and in some cases, it has become nonlinear, crossing the 45-degree line. This indicates that these sectors have seen price increases diverging from their historical relationships with upstream stage prices. This is likely due to firms becoming more aggressive in passing on price increases. Indeed, surveys on price pass-through (Figure 18) show that during the same period, firms increased their pass-through rates in response to rising input costs such as raw materials. The increase in parameters observed across a wide range of sectors in Figure 14 is consistent with the results of these micro-level surveys on price pass-through.

In summary, the increase in parameters for many sectors (excluding energy) since around 2021 to 2022 contrasts with the relatively stable parameters for the overall goods index observed in Section 6-1, except for the Stage 3 to 4. The reason for this discrepancy appears to be the influence of the energy sector.

Figure 19 shows the price index for "Energy" at each stage. Energy prices are unique in that price changes in upstream energy goods directly influence energy prices in downstream stages due to the existence of price formulas. Additionally, energy goods in downstream stages are generally less processed than goods in other sectors, making them less susceptible to the price movements of other sectors. Therefore, in Figures 20 and 21, the relationship between the price index for "Energy" (domestic and imported goods) at each stage (logarithmic differences) and the price index for "Energy" (domestic goods) at the next stage down (logarithmic differences) is examined using recursive estimation and scatter plots. The results show a noticeable decline in the recursive estimation parameters for Stages 1 to 2 as well as Stage 4 to FD after 2022. Furthermore, the scatter plots show that, during the same period, the points are positioned significantly below the 45-degree line.

These movements in energy prices may reflect the impact of government measures to alleviate energy-related burdens. In January 2022, the Japanese government introduced subsidies to oil wholesalers to mitigate the sharp rise in gasoline and kerosene prices caused by soaring crude oil prices. Subsequently, the policy was extended and revised several times, and starting in May 2025, a measure was introduced to provide subsidies to reduce fuel prices by a fixed amount. As shown in Tables 2 to 5, fuel oil prices such as gasoline and kerosene are included in Stages 2 to 4 and the FD index in the FD-ID price indexes, and these price control measures likely contributed to reducing the parameters between stages. Additionally,

starting in January 2023, the Japanese government implemented electricity and gas price reductions, which may have contributed to reducing parameters between Stages 3 to 4 and the FD index (Tables 3 to 5).

7. Conclusion

This study investigated the characteristics of price developments over the period 2020-2025 using the *Final Demand-Intermediate Demand Price Indexes* (FD-ID price indexes), which reorganize producer prices by stage of production, distinguishing upstream from downstream interfirm transactions. The key findings are summarized as follows.

First, when comparing the FD-ID price indexes of Japan and the United States during the same period, it was observed that in Japan price increases varied substantially across production stages, whereas such cross-stage dispersion was relatively limited in the United States. A decomposition of the Japan-U.S. differences in price increases for goods by stage indicates that at upstream stages, Japan experienced larger price increases than the United States, particularly for goods such as energy and raw materials. By contrast, at downstream stages, Japan recorded smaller price increases than the United States across a wide range of goods-producing sectors. Furthermore, these characteristics did not change significantly even after adjusting for the differences in the sectoral weights between the two countries.

Next, we examined developments over time in Japan's FD-ID price indexes for goods. Specifically, we investigated the extent to which changes in the price indexes for upstream stages were accompanied by changes in the price indexes of the stage directly downstream. The results using the overall index did not show clear-cut tendency partly because of the influence of government energy-related relief measures. However, when data was broken down by sector, increases at upstream stages were accompanied by stronger price increases at downstream stages than in the past, across a broad set of sectors-including food products, raw materials, metals, machinery, and transportation equipment-price.

Taken together, these results have two key implications. First, even during the post-2020 inflationary episode, the overall degree of goods price pass-through by Japanese firms remained relatively restrained when compared with the United States. Second, goods price pass-through in Japan nevertheless became more active across a wide range of sectors relative to the pre-2020 period. In particular, the latter point is consistent with the trends in price pass-

through rates observed in micro-level survey data conducted on Japanese firms.

Evidence presented in this study is based solely on statistical observations over the limited period from 2020 to 2025. Therefore, it should be noted that the present study does not provide an analysis of the underlying causes or mechanisms behind price changes, nor the factors behind changes in firms' price pass-through stances. In particular, examining Japan's FD-ID price indexes (especially for goods) through 2025, the variation in price increases across stages is evident. An interesting question from an economic perspective is whether this variation will eventually be resolved over the long term through the progress of inter-stage price pass-through, or whether it will persist due to relative changes in productivity or markup rates across stages. This issue should be examined in the future as more data become available, allowing the application of time-series analysis and other methods. Through such analyses, it is hoped that the FD-ID price indexes will provide further insights into price developments in Japan.

References

Inoue, Moegi, Atsushi Kawakami, Ayako Masujima, Ichiro Muto, Shogo Nakano, Izumi Takagawa (2021), "Final Demand-Intermediate Demand Aggregation System of Japan's Producer Price Index," *Monetary and Economic Studies* vol.39, pp. 143-189.

Bank of Japan Research and Statistics Department (2025), "Explanation of Final Demand-Intermediate Demand price indexes (FD-ID price indexes)."

Yagi, Tomoyuki, Yoshiyuki Kurachi, Masato Takahashi, Kotone Yamada, and Hiroshi Kawata (2025), "Pass-through of cost-push pressures to consumer prices," *Japanese Economic Review*, June 2025, pp. 1-32.

Yutani, Takemaro, Edmundmichikazu Howard, Tomoaki Yoshino, Masato Higashi (2024), "Special aggregate index of the Services Producer Price Index (SPPI) based on labor cost ratio," *Bank of Japan Review*, 2024-E-6.

Weinhagen, Jonathan C. (2016), "Price Transmission within the Producer Price Index Final Demand-Intermediate Demand Aggregation System," *Monthly Labor Review*, U.S. Bureau of Labor Statistics.

Table 1. Composition and Weights of Stage 1

1. Japan

Groups	Weights	Main categories	Weights	Main commodities
Foods	2.883	(I)Beverages and foods and agriculture products for food, (P)Beverages and foods	2.662	(I)Feed and forage crops, (I)Rape seeds, (I)Vegetable oil cakes, (P)Vegetable oil cakes, (P)Wheat flour
Energy	36.293	(I)Petroleum, coal and natural gas	29.286	(I)Crude petroleum, (I)Naphtha, (I)Coal for general use, (I)Coal for coke making
Materials	6.646	(P)(I)Chemicals and related products	2.441	(P)Perfume and flavor materials, (P)Industrial inorganic chemicals for batteries, (P)Bleaching agents, (I)Synthetic dyes, (I)Lithium carbonates
		(I)(P)Pulp, paper and related products	0.987	(I)Bleached paper kraft pulp (P)Corrugated packaging containers, (P)Coated printing paper
Transportation equipment	1.053	(I)(P)Transportation equipment	1.053	(I)Aircraft engine and parts (P)Forklift trucks and parts
Machinery	8.927	(P)Electronic components and devices	2.481	(P)Connecting components, (P)Printed circuit boards, (P)Liquid crystal panel, (P)Condensers for electronic equipment
		(P)Production machinery	2.317	(P)Presses, (P)Wrapping and packing machinery, (P)Excavators, (P)Lathes
		(P)General purpose machinery	1.506	(P)Conveyors, (P)Ball bearings, (P)Metal valves
Metals	8.767	(I)Metals and related products	7.003	(I)Iron ores, (I)Platinum and copper scrap, (I)Unwrought aluminum, (I)Unwrought primary and secondary aluminum alloys, (I)Ferro-chromium
Other goods	3.015	(P)Other manufacturing industry products	2.327	(P)Planograph printed matter, (P)Special printed matter on non-paper, (P)Rubber vibration isolators

2. U.S.

Groups	Weights	Main categories	Weights	Main commodities
Foods	2.894	Processed foods and feeds	1.506	Soybean cake, meal, and other byproducts Confectionery materials
		Farm products	1.388	Corn Wheat
Energy	14.364	Fuels and related products and power	14.364	No. 2 diesel fuel Commercial electric power
Materials	21.528	Chemicals and allied products	12.532	Other basic organics Primary basic organic chemicals
		Pulp, paper and allied products	3.855	Paper boxes and containers Writing and printing papers
		Nonmetallic mineral products	1.970	Construction sand, gravel and crushed stone Ready-mix concrete
		Rubber and plastic products	1.875	Plastic construction products Plastic packaging products
		Lumber and wood products	1.030	Logs, bolts, timber, pulpwood and wood chips General millwork
		Textile products and apparel	0.266	Miscellaneous textile products/services Screen printed textile and apparel materials and embroideries
Transportation equipment	0.882	Transportation equipment	0.882	Motor vehicles parts Railway maintenance of way equipment & parts, railcar parts, & other railway vehicles
Machinery	4.302	Machinery and equipment	4.302	Service industry machinery and parts Metal valves, except fluid power
Metals	9.897	Metals and metal products	9.897	Carbon steel scrap Other nonferrous scrap (including lead, zinc and precious metals)
Other goods	0.690	Miscellaneous products	0.536	Photographic supplies Medical and surgical appliances and supplies
		Furniture and household durables	0.132	Nonwood partitions and fixtures Household cooking appliances
		Hides, skins, leather, and related products	0.022	Finished and unfinished leather Hides, skins, and pelts, made in slaughtering plants

Note: (P) indicates the Producer Price Index (Japan), (I) indicates the Import Price Index (Japan), and (C) indicates the Consumer Price Index (Japan).

Table 2. Composition and Weights of Stage 2

1. Japan

Groups	Weights	Main categories	Weights	Main commodities
Foods	3.023	(P)Beverages and foods, (I)Beverages and foods and agriculture products for food	2.708	(P)Formula feeds, (P)Starch, (P)Pet food, (I)Soybeans, (I)Feed and forage crops, (I)Rape seeds
Energy	16.180	(I)Petroleum, coal and natural gas, (P)Petroleum and coal products	15.850	(I)Liquefied natural gas, (I)Coal for general use, (I)Coal for coke making, (P)Gasoline, (P)Gas oil, (P)Heavy oil B and C, (P)Jet fuel oil
Materials	13.313	(I)(P)Chemicals and related products	7.597	(I)Synthetic dyes, (I)High function resins, (I)Thermoplastics resins, (I)Lithium carbonates (P)Polypropylene resins, (P)Xylene
		(P)Pulp, paper and related products	3.242	(P)Corrugated cardboard, (P)Paper tubes, (P)Newsprint
		(I)Other primary products and manufactured goods	1.032	(I)Plastic films and sheets, (I)Medical and sanitary plastic products
Transportation equipment	0.187	(P)Transportation equipment	0.187	(P)Rolling stock
Machinery	1.195	(I)Electric and electronic products, (P)Electronic components and devices	0.833	(I)Solar cells, (I)MOS logic integrated circuits, (I)MOS memory integrated circuits, (P)Connecting components, (P)Integrated circuits
Metals	5.586	(I)Metals and related products	4.280	(I)Copper ores, (I)Platinum and copper scrap, (I)Hot rolled steel strips, (I)Coated steel plates and sheets
		(P)Nonferrous metals	1.079	(P)Rolled and drawn aluminum, (P)Rolled, hammered and stamped precious metals, (P)Aluminum alloy die castings
Other goods	1.463	(P)Other manufacturing industry products	0.695	(P)Stationery, (P)Motor vehicle tires, (P)Lifesaving and protective goods

2. U.S.

Groups	Weights	Main categories	Weights	Main commodities
Foods	3.865	Farm products	1.984	Oilseeds Corn
		Processed foods and feeds	1.881	Formula feeds Miscellaneous feedstuffs other than pet food
Energy	14.517	Fuels and related products and power	14.517	Crude petroleum (domestic production) Natural gas
Materials	13.366	Chemicals and allied products	6.558	Thermoplastic resins and plastics materials Other basic organics
		Pulp, paper and allied products	4.360	Paperboard, excluding corrugated paperboard Writing and printing papers
		Lumber and wood products	0.985	Softwood lumber, not edge worked Logs, bolts, timber, pulpwood and wood chips
		Rubber and plastic products	0.637	Other plastic products Laminated plastics plates, sheet (excluding packaging), and shapes
		Nonmetallic mineral products	0.526	Ready-mix concrete Clay and stone mining and quarrying
		Textile products and apparel	0.300	Screen printed textile and apparel materials and embroideries Noncellulosic fibers
Transportation equipment	0.303	Transportation equipment	0.303	Motor vehicles parts Other transportation equipment, incl. golf carts, vehicle trailers, and all-terrain vehicles
Machinery	2.723	Machinery and equipment	2.723	Machine shop products Parts & accesories for turbines, turbine generators, and turbine generator sets
Metals	6.123	Metals and metal products	6.123	Hot rolled steel sheet and strip, including tin mill products Aluminum mill shapes
Other goods	0.398	Miscellaneous products	0.260	Photographic supplies Medical and surgical appliances and supplies
		Furniture and household durables	0.135	Wood office furniture and store fixtures Nonwood partitions and fixtures
		Hides, skins, leather, and related products	0.003	Finished and unfinished leather

Note: Same as Table 1.

Table 3. Composition and Weights of Stage 3

1. Japan

Groups	Weights	Main categories	Weights	Main commodities
Foods	9.392	(P)Agriculture, forestry and fishery products	6.267	(P)Brown rice, (P)Beef, (P)Raw milk, (P)Pork, (P)Chicken
		(P)Beverages and foods, (I)Beverages and foods and agriculture products for food	3.125	(P)Formula feeds, (I)Cheese, (I)Wheat
Energy	5.368	(P)Electric power, gas and water	4.014	(P)Electricity, (P)Gas supply, (P)Water for end users except industrial users
		(P)Petroleum and coal products	1.005	(P)Gas oil, (P)Fuel oil A, (P)Lubricating oil
Materials	15.024	(P)Plastic products	4.651	(P)Plastic parts for transportation equipment, (P)Plastic films and sheets, (P)Medical and sanitary plastic products
		(P)(I)Chemicals and related products	4.270	(P)Catalyst, (P)Industrial inorganic chemicals for batteries, (P)Synthetic resin paints, (I)Synthetic dyes, (I)Lithium carbonates
		(P)Pulp, paper and related products	2.609	(P)Corrugated packaging containers, (P)Newsprint, (P)Paper boxes
Transportation equipment	1.265	(I)Transportation equipment	1.265	(I)Motor vehicle parts, (I)Internal combustion engines for motor vehicles
Machinery	6.431	(I)Electric and electronic products, (P)Electronic components and devices	3.435	(I)MOS logic integrated circuits, (I)MOS memory integrated circuits, (P)Printed circuit boards
		(P)Electrical machinery and equipment	1.851	(P)Wiring harnesses
Metals	14.108	(P)Iron and steel	4.706	(P)Shearing and slitting steel products, (P)Forgings, (P)Iron castings for machinery, (P)Hot rolled steel strips, (P)Heavy and medium steel plates
		(P)Metal products	4.650	(P)Aluminum window sash, (P)Bolts and nuts, (P)Springs, (P)Metal sashes and doors (except aluminum window sash)
		(P)Nonferrous metals	2.570	(P)Copper, (P)Aluminum alloy die castings
Other goods	3.441	(P)Other manufacturing industry products	2.791	(P)Planograph printed matter, (P)Rubber vibration isolators, (P)Special printed matter on non-paper

2. U.S.

Groups	Weights	Main categories	Weights	Main commodities
Foods	11.877	Farm products	10.598	Raw milk Slaughter steers and heifers
		Processed foods and feeds	1.279	Shortening, cooking oil, and margarine Other miscellaneous processed foods
Energy	9.900	Fuels and related products and power	9.900	Unleaded regular gasoline Jet fuel
Materials	13.905	Chemicals and allied products	5.478	Primary basic organic chemicals Inorganic chemicals, other than alkalies and chlorine
		Pulp, paper and allied products	3.295	Paper boxes and containers Paper, plastic, and foil bags
		Rubber and plastic products	2.024	Unsupported plastic film, sheet and other shapes Plastic packaging products
		Nonmetallic mineral products	1.473	Cement, hydraulic Construction sand, gravel and crushed stone
		Lumber and wood products	0.855	Logs, bolts, timber, pulpwood and wood chips General millwork
		Textile products and apparel	0.780	Industrial and other fabricated products Noncellulosic fibers
Transportation equipment	1.128	Transportation equipment	1.128	Motor vehicles parts Aircraft engine and engine parts
Machinery	4.598	Machinery and equipment	4.598	Machine shop products Integrated microcircuits
Metals	8.258	Metals and metal products	8.258	Other metal products Hot rolled steel sheet and strip, including tin mill products
Other goods	0.356	Miscellaneous products	0.216	Surgical and medical instruments Medical and surgical appliances and supplies
		Furniture and household durables	0.111	Nonwood partitions and fixtures Cutlery, flatware (except precious), razors and razor
		Hides, skins, leather, and related products	0.029	Finished and unfinished leather Hides, skins, and pelts, made in slaughtering plants

Note: Same as Table 1.

Table 4. Composition and Weights of Stage 4

1. Japan

Groups	Weights	Main categories	Weights	Main commodities
Foods	6.422	(P)Beverages and foods	3.303	(P)Beer containing not less than 66.7% by weight of malt, (P)Wheat flour, (P)Sugar
		(I)Beverages and foods and agriculture products for food, (P)Agriculture, forestry and fishery products	3.119	(I)Pork, (I)Beef, (I)Dry fruits and nuts, (C)Fresh vegetables, (P)Polished rice, (P)Beef
Energy	5.615	(P)Electric power, gas and water	4.178	(P)Electricity, (P)Gas supply, (P)Water for end users except industrial users
		(P)Petroleum and coal products	0.964	(P)Gas oil, (P)Fuel oil A
Materials	11.644	(P)(I)Chemicals and related products	2.934	(P)(I)Pharmaceutical products (except agents used for animals)
		(P)Plastic products	2.456	(P)Plastic parts for transportation equipment, (P)Plastic films and sheets
		(P)Ceramic, stone and clay products	2.422	(P)Ready-mixed concrete, (P)Concrete products for roads, (P)Fiber reinforced cement sidings
Transportation equipment	10.864	(P)Transportation equipment	10.864	(P)Chassis and body parts, (P)Drive, transmission and steering parts, (P)Parts of internal combustion engines for motor vehicles, (P)Suspension and brake parts
Machinery	6.909	(P)Electronic components and devices, (I)Electric and electronic products	4.225	(P)Liquid crystal panel, (P)Printed circuit boards, (P)Connecting components, (P)Integrated circuits, (I)MOS logic integrated circuits, (I)MOS memory integrated circuits
		(P)Electrical machinery and equipment	1.250	(P)Wiring harnesses
Metals	9.236	(P)Metal products	4.251	(P)Steelworks, (P)Aluminum window sash, (P)Metal sashes and doors (except aluminum window sash)
		(P)Iron and steel	3.231	(P)Shearing and slitting steel products, (P)Hot rolled steel strips, (P)Zinc-coated steel sheets
Other goods	3.291	(P)Other manufacturing industry products	2.655	(P)Planograph printed matter, (P)Motor vehicle tires, (P)Special printed matter on non-paper

2. U.S.

Groups	Weights	Main categories	Weights	Main commodities
Foods	5.770	Processed foods and feeds	4.794	Natural cheese, except cottage cheese Beef and veal products, fresh or frozen
		Farm products	0.976	Other fruits and berries Corn
Energy	4.906	Fuels and related products and power	4.906	Commercial electric power No. 2 diesel fuel
Materials	17.127	Nonmetallic mineral products	4.030	Ready-mix concrete Construction sand, gravel and crushed stone
		Rubber and plastic products	4.022	Plastic construction products Plastic packaging products
		Chemicals and allied products	3.907	Biological products, excluding diagnostic, for human use Diagnostics
		Pulp, paper and allied products	2.423	Paper boxes and containers Sanitary paper products, including stock
		Lumber and wood products	1.979	General millwork Softwood lumber, not edge worked
		Textile products and apparel	0.766	Nonwoven fabrics and felts Noncellulosic fibers
Transportation equipment	6.145	Transportation equipment	6.145	Motor vehicles parts Other aircraft parts and equipment
Machinery	5.579	Machinery and equipment	5.579	Machine shop products Heat transfer equipment, including heat pumps
Metals	7.841	Metals and metal products	7.841	Other metal products Fabricated structural metal
Other goods	1.569	Miscellaneous products	1.209	Surgical and medical instruments Medical and surgical appliances and supplies
		Furniture and household durables	0.340	Wood office furniture and store fixtures Other major household appliances including room air-conditioners
		Hides, skins, leather, and related products	0.020	Hides, skins, and pelts, made in slaughtering plants Finished and unfinished leather

Note: Same as Table 1.

Table 5. Composition and Weights of Final Demand

1. Japan

Groups	Weights	Main categories	Weights	Main commodities
Foods	8.602	(P)Beverages and foods, (I)Beverages and foods and agriculture products for food	6.391	(P)Sushi, box lunches and rice balls, (P)Meat products, (P)Buns, (P)Take-out dishes
		(P)Agriculture, forestry and fishery products	2.211	(C)Fresh vegetables, (P)Polished rice, (C)Fresh fish & seafood, (P)Beef
Energy	3.644	(P)Electric power, gas and water	2.330	(C)Electricity, (C)Gas, manufactured & piped, (C)Water charges
		(P)Petroleum and coal products	1.229	(P)Gasoline, (P)Kerosene
Materials	2.241	(I)Textile products	0.981	(I)Shirts and sweaters, etc., (I)Women's or girls' outerwear, (I)Men's or boys' outerwear
		(P)Chemicals and related products	0.787	(P)Makeup and skin care products, (P)Hair care products, (C)Health drinks
Transportation equipment	4.121	(P)(I)Transportation equipment	4.121	(P)Passenger motor cars, (P)Trucks, (P)Aircraft parts, (I)Passenger motor cars
Machinery	8.833	(I)Electric and electronic products	2.530	(I)Cellular phones, (I)Personal computers, (I)Carrier transmission equipment
		(P)Production machinery	2.074	(P)Metal molds, (P)Semiconductor manufacturing equipment (except flat panel and display manufacturing equipment), (P)Excavators
		(P)General purpose machinery	1.330	(P)Commercial air conditioners, (P)Conveyors, (P)Boilers, (P)General-purpose internal combustion engines
Metals	0.269	(P)Metal products	0.161	(P)Gas equipment for cooking, boiling and heating, (P)Food cans
Other goods	3.150	(P)Beverages and foods, (I)Beverages and foods and agriculture products for food	0.941	(P)Tobacco products
		(I)Other manufacturing industry products	0.199	(I)Baggage, handbags and small leather cases

2. U.S.

Groups	Weights	Main categories	Weights	Main commodities
Foods	5.672	Processed foods and feeds	5.207	Other miscellaneous processed foods Beef and veal products, fresh or frozen
		Farm products	0.465	Fresh vegetables, except potatoes Other fruits and berries
Energy	5.123	Fuels and related products and power	5.123	Residential electric power Unleaded regular gasoline
Materials	3.651	Chemicals and allied products	2.239	Pharmaceuticals acting on the central nervous system and the sense organs Pharmaceuticals affecting neoplasms, the endocrine system, & metabolic diseases
		Pulp, paper and allied products	0.603	Sanitary paper products, including stock Writing and printing papers
		Rubber and plastic products	0.487	All other consumer, institutional, and commercial products Tires
		Textile products and apparel	0.168	Women's, girls', and infants' cut and sew apparel Textile house furnishings
		Nonmetallic mineral products	0.095	Paving mixtures and blocks Cut stone and stone products
		Lumber and wood products	0.059	All other miscellaneous wood products General millwork
Transportation equipment	4.161	Transportation equipment	4.161	Trucks, truck tractors, & bus chassis 14,000 lb or less, incl. minivans & suvs Passenger cars and chassis
Machinery	3.800	Machinery and equipment	3.800	Search, detection, navigation & guidance systems and equipment X-ray and electromedical equipment
Metals	0.296	Metals and metal products	0.296	Metal tanks Other metal products
Other goods	2.448	Miscellaneous products	1.536	Cigarettes, excluding electronic Surgical and medical instruments
		Furniture and household durables	0.876	Upholstered household furniture Bedding
		Hides, skins, leather, and related products	0.036	Men's footwear (size 6 and larger), excluding athletic Luggage and small leather goods

Note: Same as Table 1.

Table 6. Cross-Correlation

Japan

	S1→S2	S2→S3	S3→S4	S4→FD
-6	0.52145	0.30517	0.62147	0.51594
-5	0.58733	0.40658	0.70056	0.57406
-4	0.65460	0.50387	0.77105	0.62663
-3	0.74795	0.59695	0.83513	0.67881
-2	0.84933	0.68720	0.89130	0.72741
-1	0.92806	0.76875	0.93607	0.76749
0	**0.94808**	0.83660	0.96711	**0.79564**
1	0.90150	0.87665	**0.97675**	0.79189
2	0.82623	0.89857	0.96869	0.77542
3	0.74391	**0.90549**	0.94583	0.74930
4	0.66903	0.89552	0.90920	0.72199
5	0.60478	0.86884	0.86135	0.69327
6	0.53565	0.82571	0.80304	0.66785

Note: The figures show the cross-correlations between the year-on-year log differences of the "Goods (Domestic and Imports)" index at upstream stages and the "Domestic Goods" index at the immediately downstream stage. For example, "S1→S2" represents the cross-correlation between the year-on-year log difference of the Stage 1 "Goods" index and the Stage 2 "Domestic Goods" index.

Table 7. Confidence Intervals for Regression Coefficients (Japan, Goods)

	S1→S2		S2→S3		S3→S4		S4→FD	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Up to 2020	0.43	0.49	0.20	0.24	0.45	0.53	0.38	0.51
Up to 2025	0.39	0.45	0.18	0.23	0.63	0.70	0.32	0.43

Notes:

1. This table shows the 95% confidence intervals for the time-series changes in regression coefficients that represent the relationship between the year-on-year log changes of the upstream "Goods (Domestic and Imports)" index and the downstream "Domestic Goods" index. For example, "S1→S2" shows the 95% confidence interval for the time-series changes in the regression coefficient, where the Stage 1 "Goods" index is the explanatory variable and the Stage 2 "Domestic Goods" index is the dependent variable. Additionally, "Up to 2020" represents the confidence interval estimated using data up to 2020, while "Up to 2025" represents the confidence interval estimated using data up to 2025.

2. For the shaded areas, the 95% confidence intervals of the parameters estimated using data up to 2025 have shifted upwards compared to the same confidence intervals estimated using data up to 2020.

Table 8. Confidence Intervals for Regression Coefficients (Japan, by Sector)

ID_Stage1 → ID_Stage2

	Foods		Materials		Transportation equipment		Machinery		Metals		Other goods	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Up to 2020	0.06	0.17	0.29	0.34	-0.03	0.00	0.03	0.06	0.24	0.40	0.04	0.05
Up to 2025	0.25	0.36	0.33	0.44	0.00	0.02	0.01	0.04	0.29	0.40	0.06	0.10

ID_Stage2 → ID_Stage3

	Foods		Materials		Transportation equipment		Machinery		Metals		Other goods	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Up to 2020	-0.01	0.06	0.11	0.16	0.00	0.00	0.02	0.07	0.23	0.30	0.00	0.02
Up to 2025	-0.11	0.02	0.15	0.20	0.00	0.00	0.05	0.09	0.25	0.30	-0.01	0.03

ID_Stage3 → ID_Stage4

	Foods		Materials		Transportation equipment		Machinery		Metals		Other goods	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Up to 2020	-0.02	0.07	0.20	0.30	0.01	0.09	0.21	0.27	0.78	0.85	-0.05	0.10
Up to 2025	0.23	0.40	0.48	0.58	0.25	0.35	0.20	0.28	0.85	0.94	0.10	0.23

ID_Stage4 → FD

	Foods		Materials		Transportation equipment		Machinery		Metals		Other goods	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Up to 2020	-0.06	0.03	0.21	0.29	-0.04	0.01	-0.06	0.04	0.13	0.39	-0.28	0.17
Up to 2025	0.07	0.32	0.20	0.30	0.04	0.12	0.13	0.25	0.42	0.67	0.13	0.31

Notes:

1. This table shows the 95% confidence intervals for the time-series changes in regression coefficients that represent the relationship between the year-on-year log changes of the upstream "Goods (Domestic and Imports)" index and the downstream "Domestic Goods" index. For example, "ID_Stage1 → ID_Stage2, Foods" shows the 95% confidence interval for the time-series changes in the regression coefficient, where the Stage 1 "Goods" index is the explanatory variable and the Stage 2 "Domestic Goods" index for foods is the dependent variable. Additionally, "Up to2020" represents the confidence interval estimated using data up to 2020, while "Up to 2025" represents the confidence interval estimated using data up to 2025.

2. Same as Table 7.

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

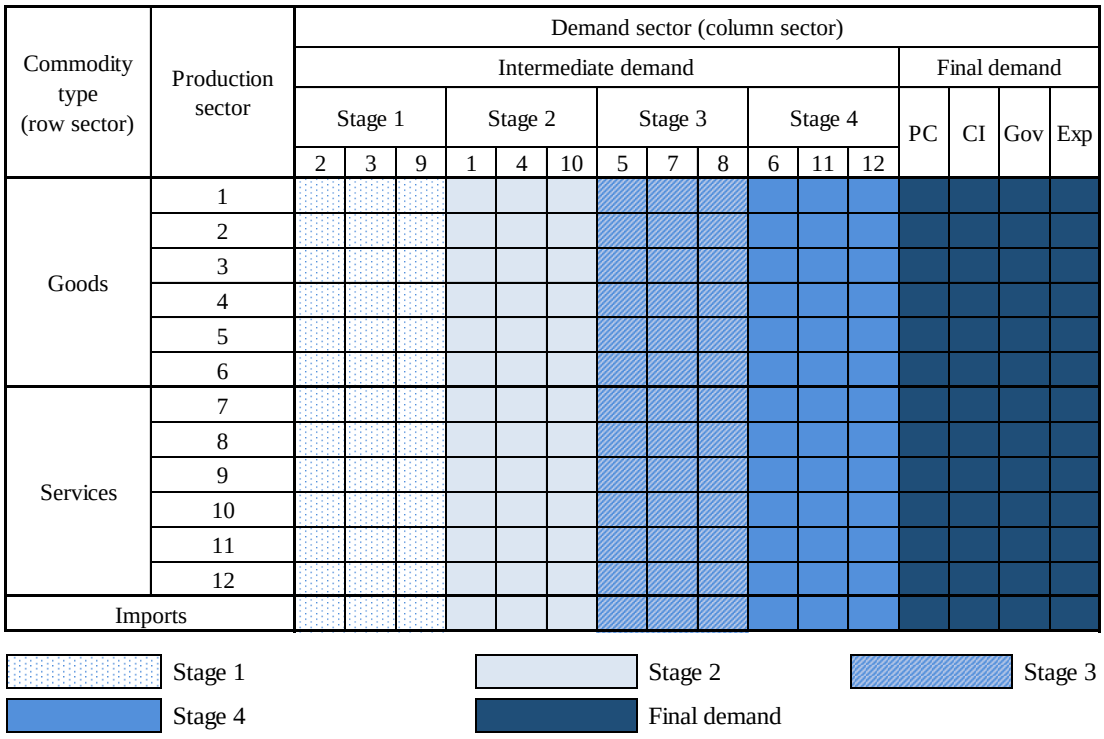
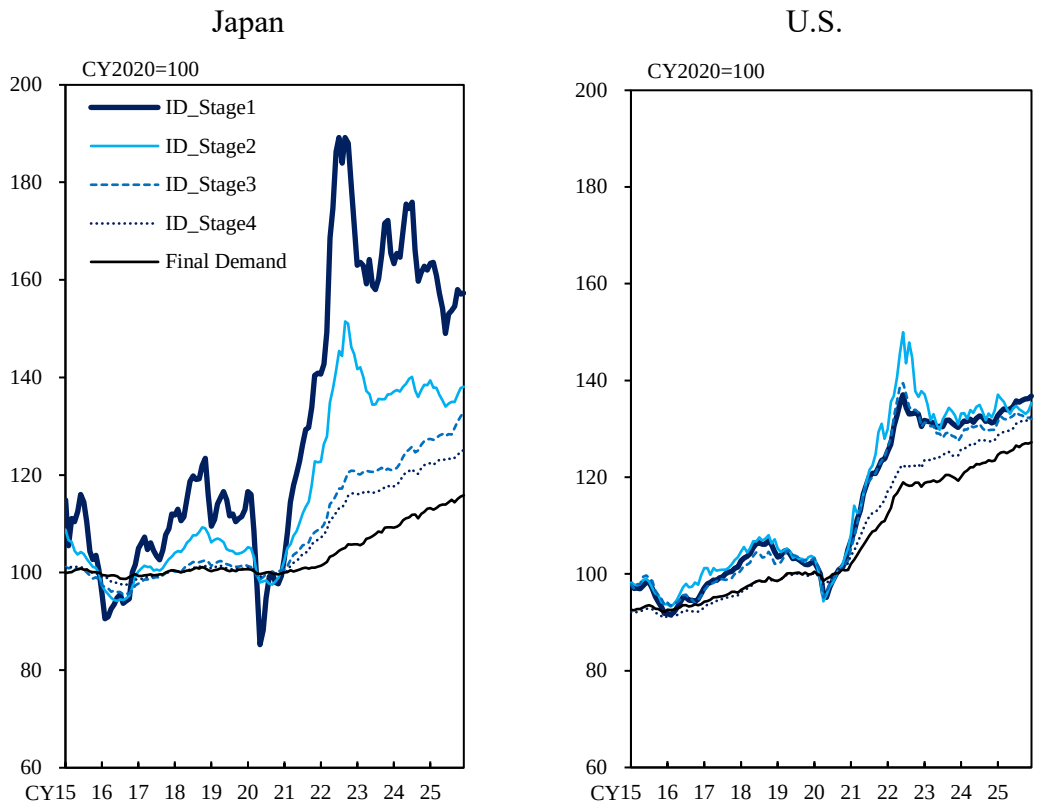


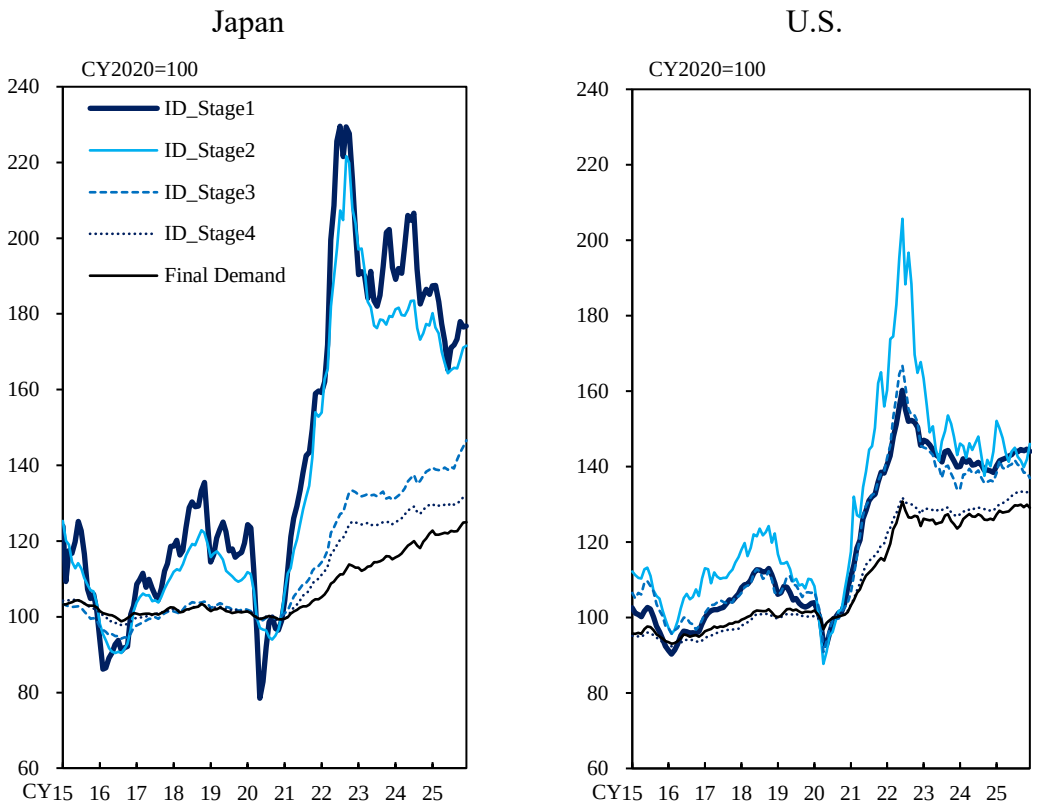
Figure 2. Japan–U.S. Comparison of the FD-ID Price Indexes (All Commodities)



Note: Japan's FD-ID price indexes include imported goods, while those of the U.S. do not. For final demand, Japan excludes exports, whereas the U.S. includes them.

Sources: Bank of Japan; U.S. Bureau of Labor Statistics

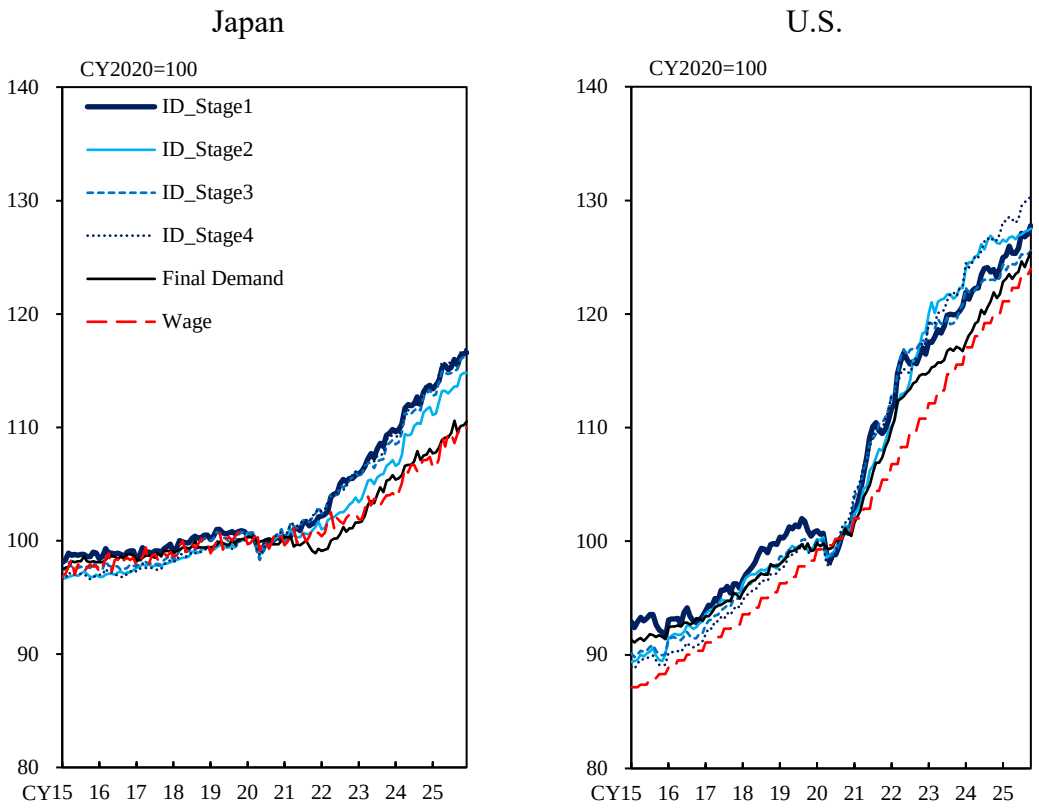
Figure 3. Japan–U.S. Comparison of the FD-ID Price Indexes (Goods)



Note: Same as Figure 2.

Sources: Bank of Japan; U.S. Bureau of Labor Statistics

Figure 4. Japan–U.S. Comparison of the FD-ID Price Indexes (Services)



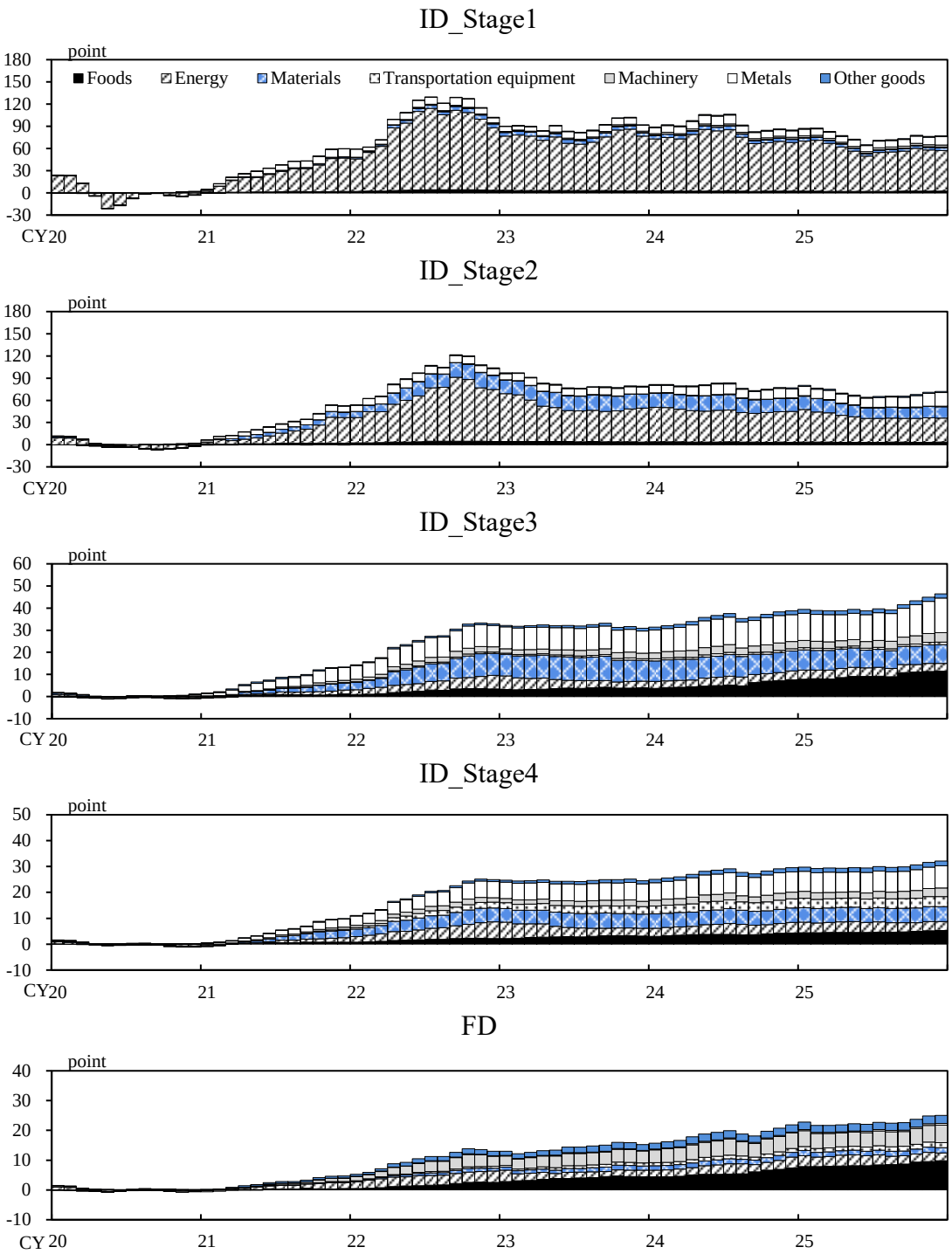
Notes:

1. Same as Figure 2.

2. Japan's wage index is based on scheduled cash earnings from the Monthly Labour Survey (establishments with five or more employees, general workers). The U.S. wage index is based on the Wage and Salaries component of the Employment Cost Index.

Sources: Bank of Japan; Ministry of Health, Labour and Welfare; U.S. Bureau of Labor Statistics

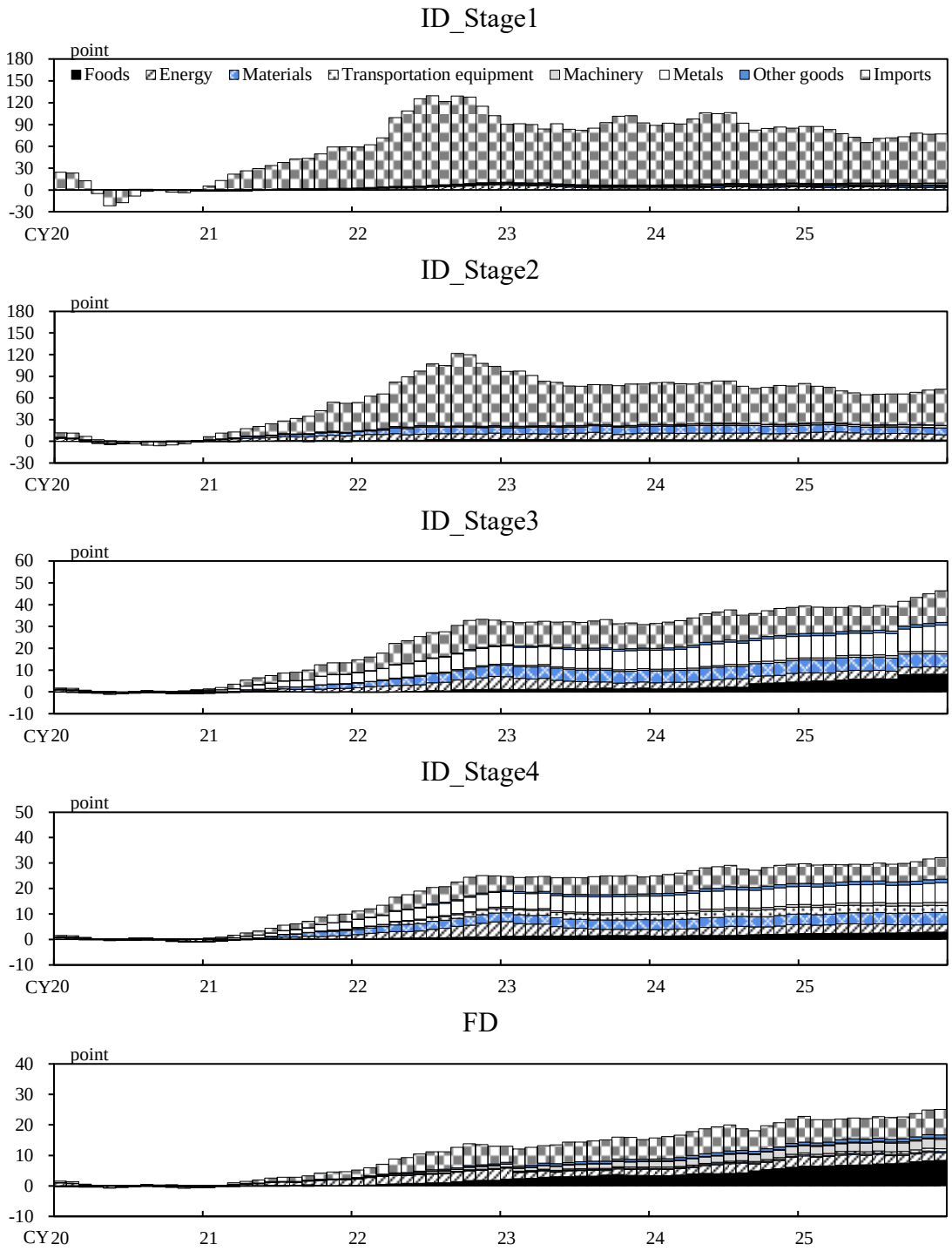
Figure 5. Decomposition of the "Goods" Index (Japan)



Notes:

1. All figures represent deviations from the 2020 average.
2. All indexes include imported goods. FD excludes exports.

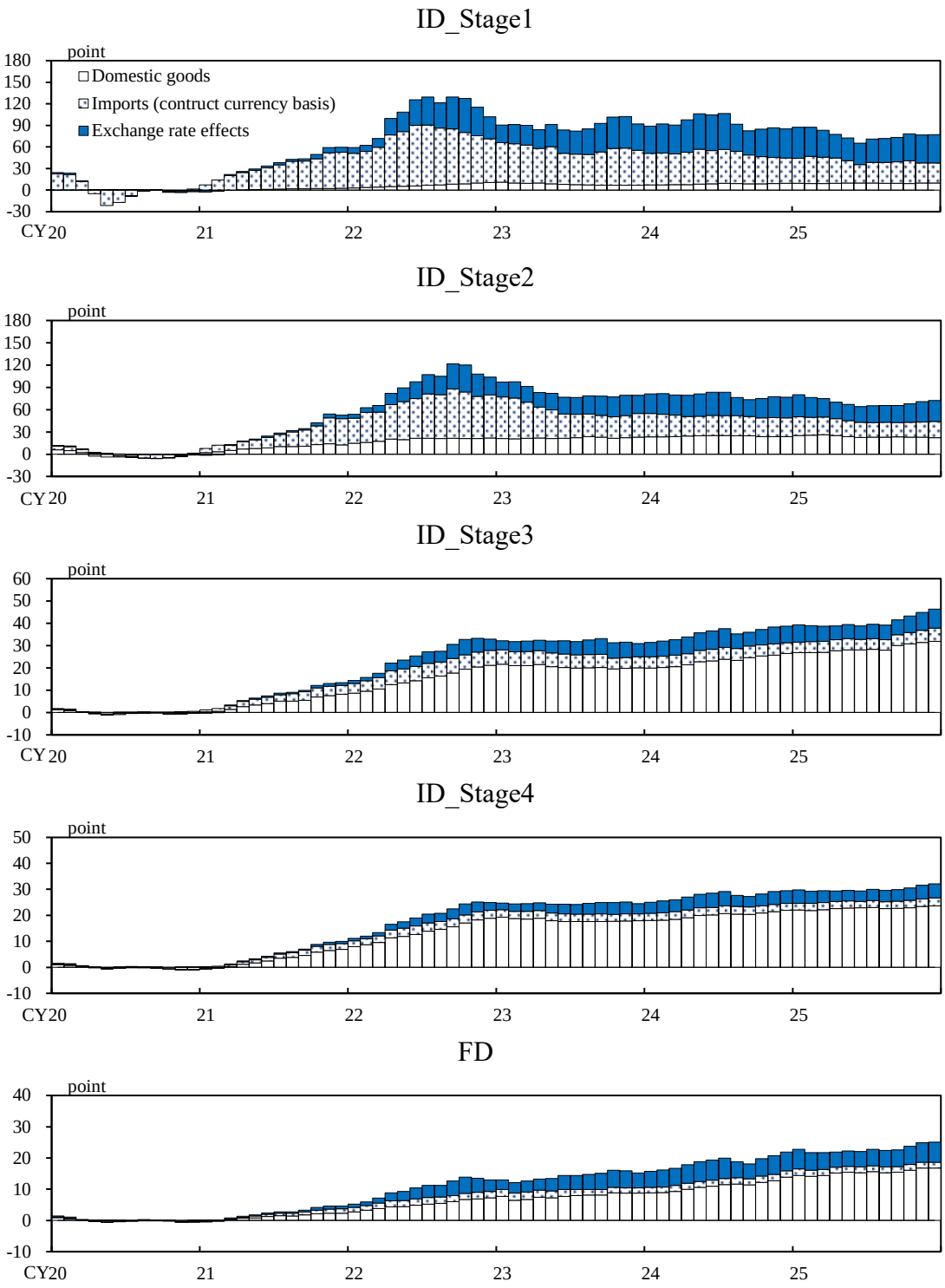
Figure 6. Decomposition of the "Goods" Index
(Japan, with Imports Separated)



Note: Same as Figure 5.

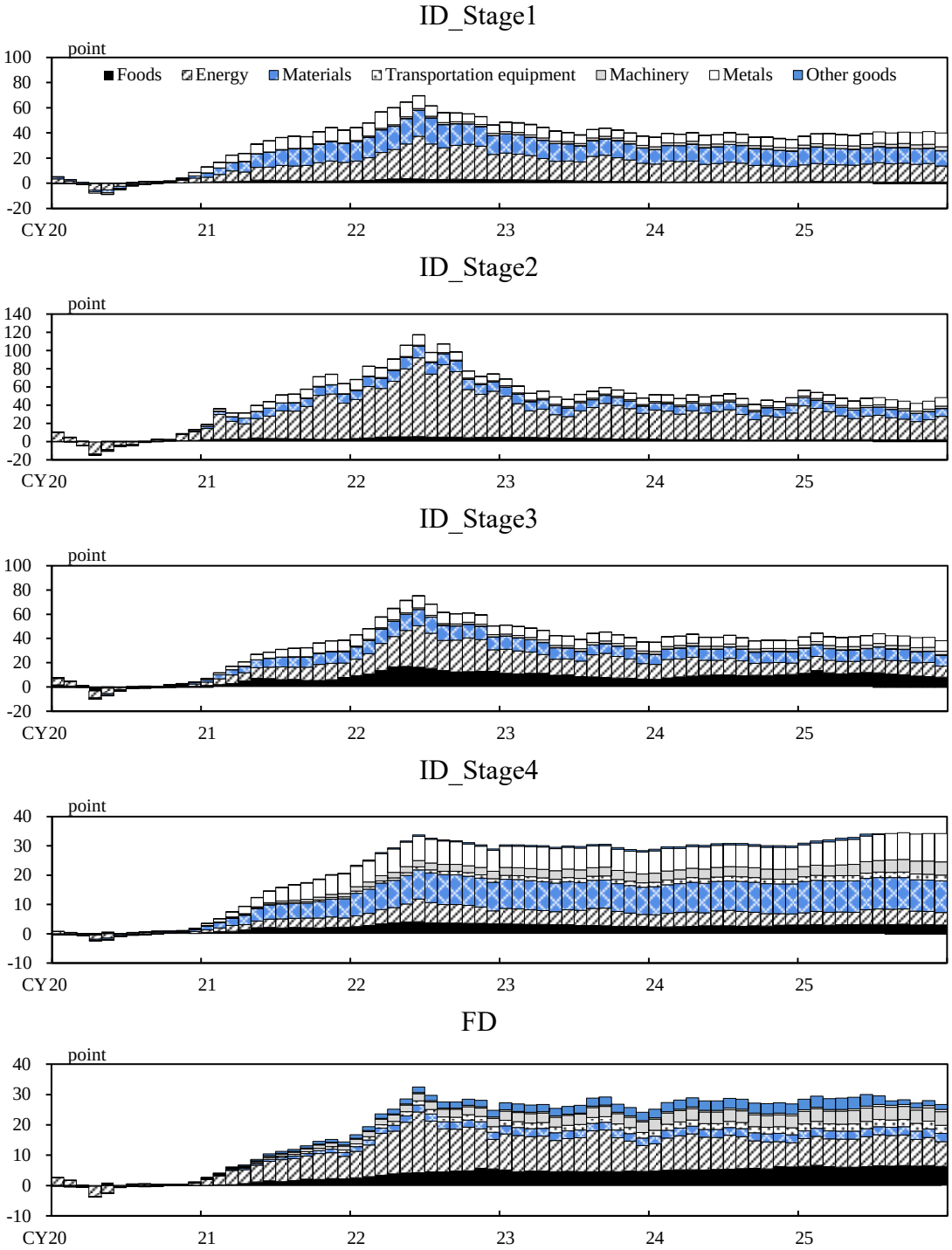
Figure 7. Decomposition of the "Goods" Index

(Japan, with Domestic Goods, Imports, and Exchange Rate Effects Separated)



Note: Same as Figure 5.

Figure 8. Decomposition of the "Goods" Index (U.S.)



Notes:

1. All figures represent deviations from the 2020 average.
2. All indexes exclude imported goods. FD includes exports.

Figure 9. Decomposition of the "Goods" Index

(Japan–U.S. Difference)

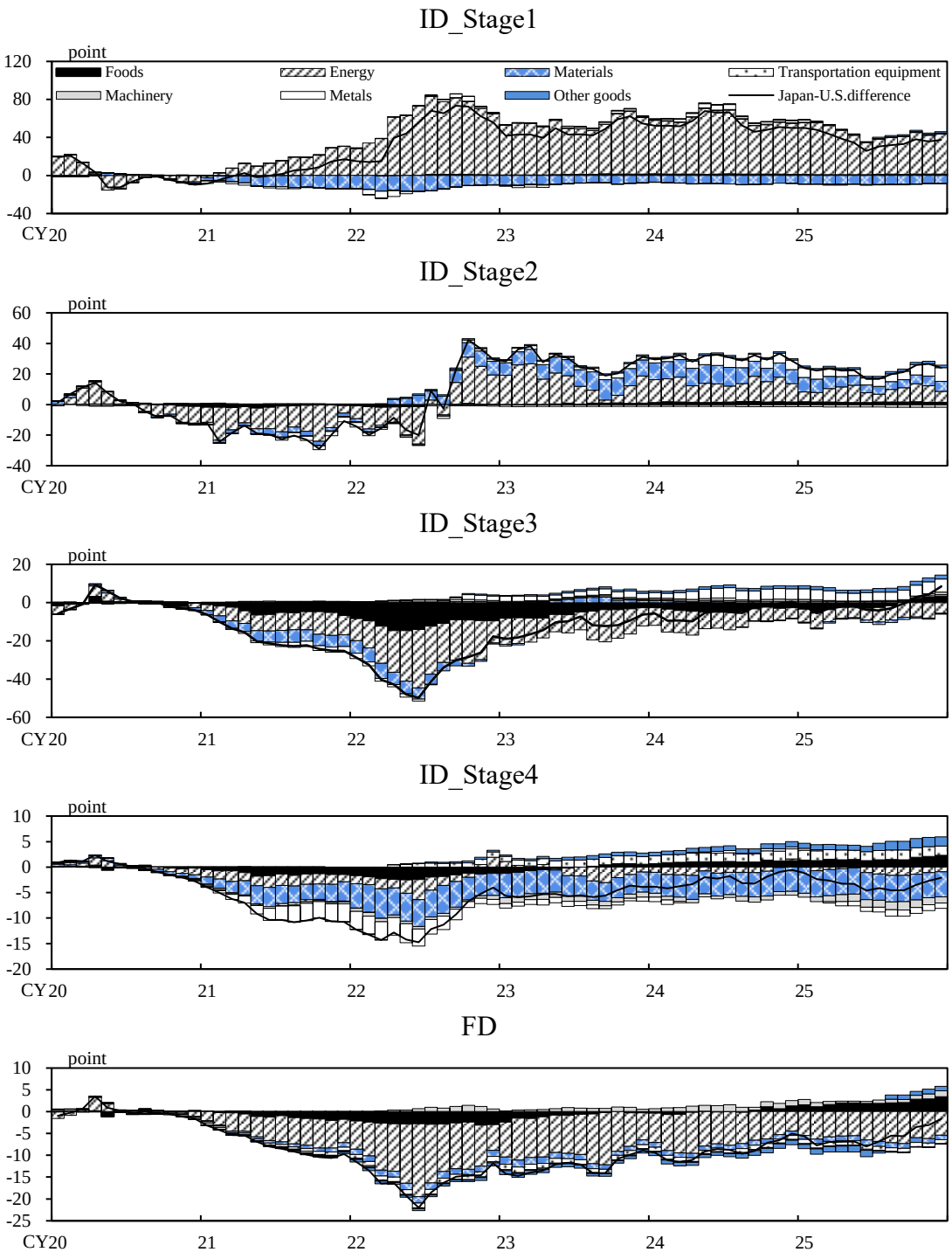


Figure 10. Decomposition of the "Goods" Index

(Japan-U.S. Difference, by Weight Difference Factor and Price Difference Factor)

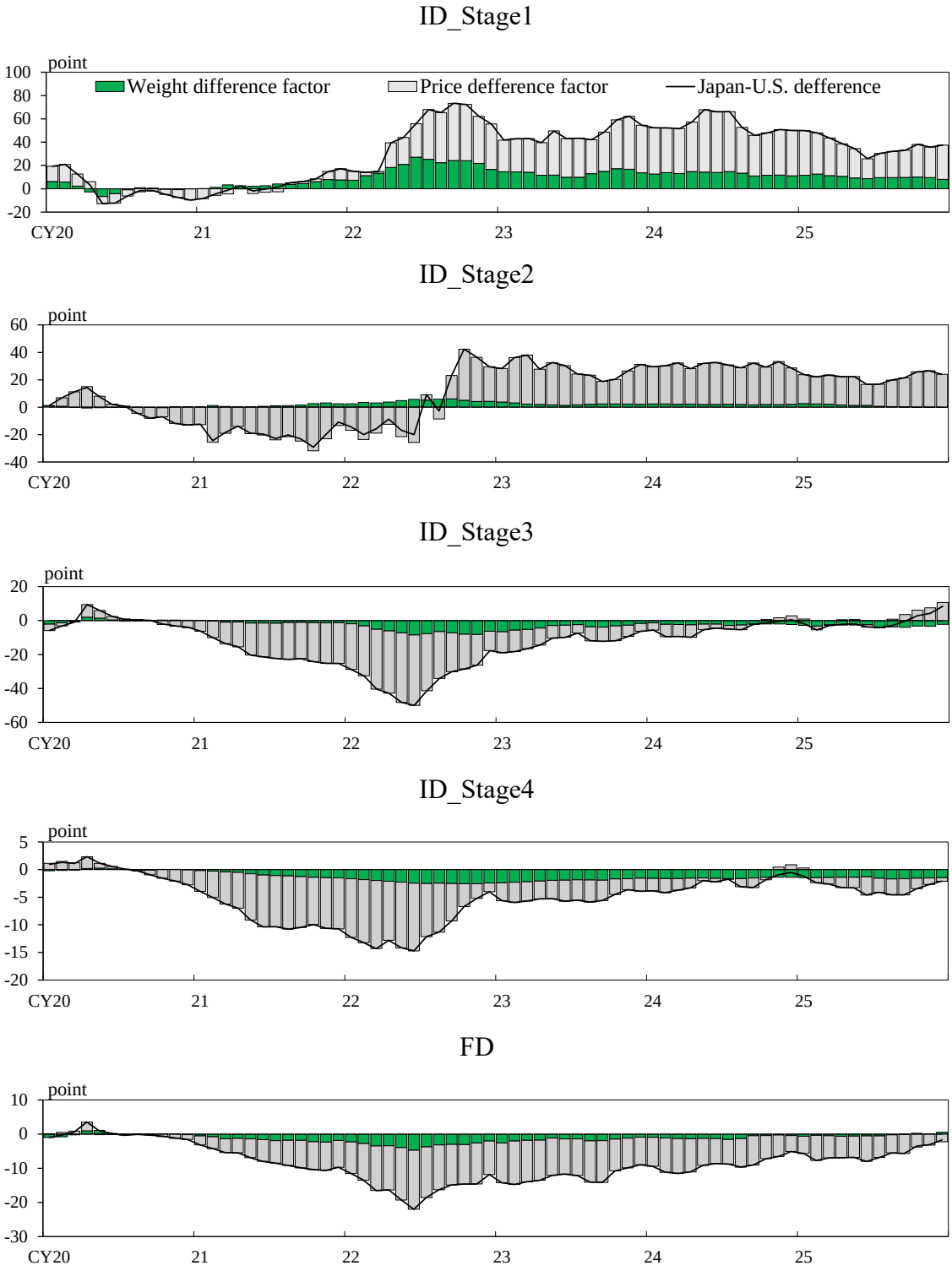


Figure 11. Decomposition of the "Goods" Index

(Japan–U.S. Difference, Breakdown of the Price Difference Factor)

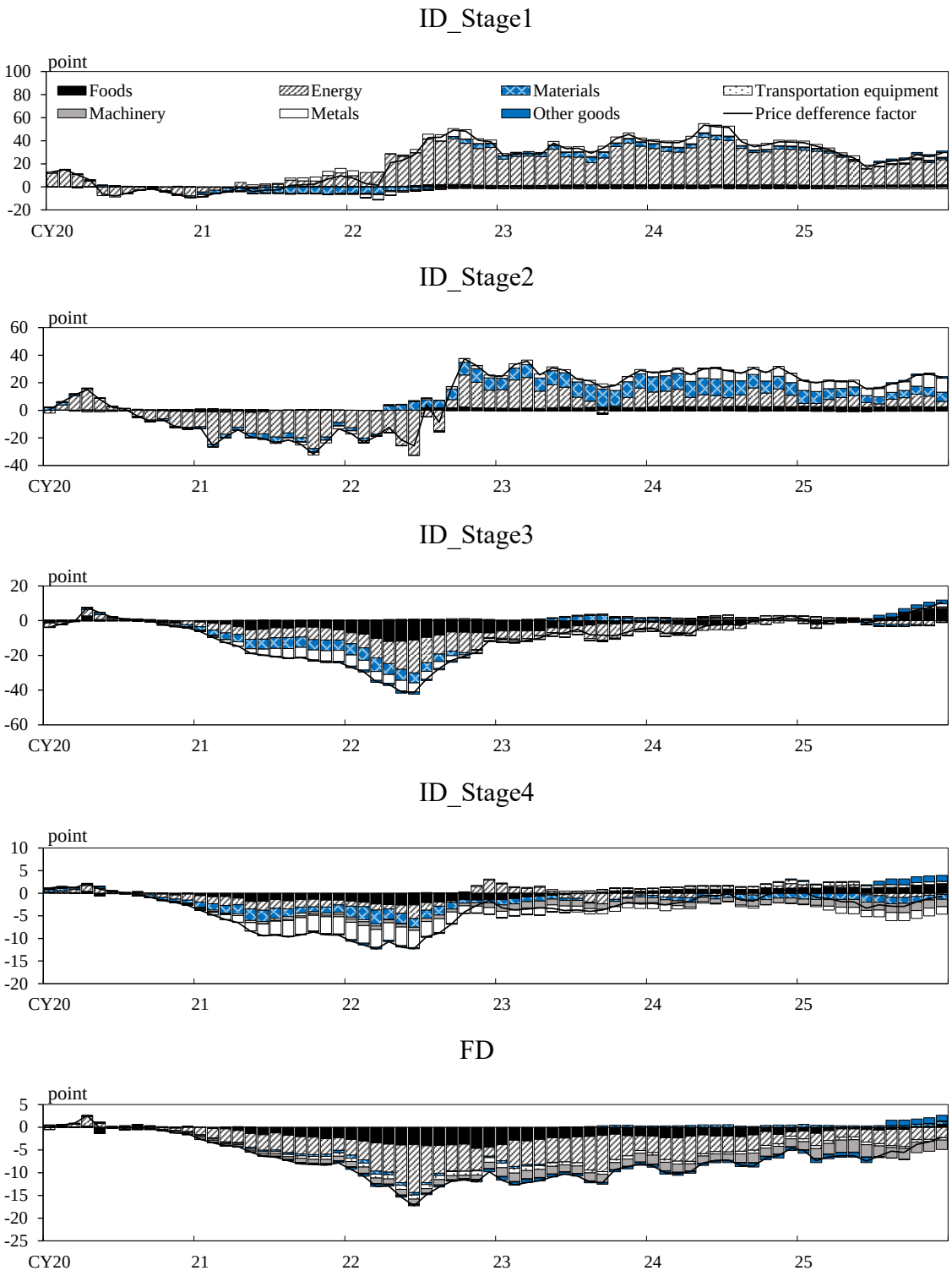
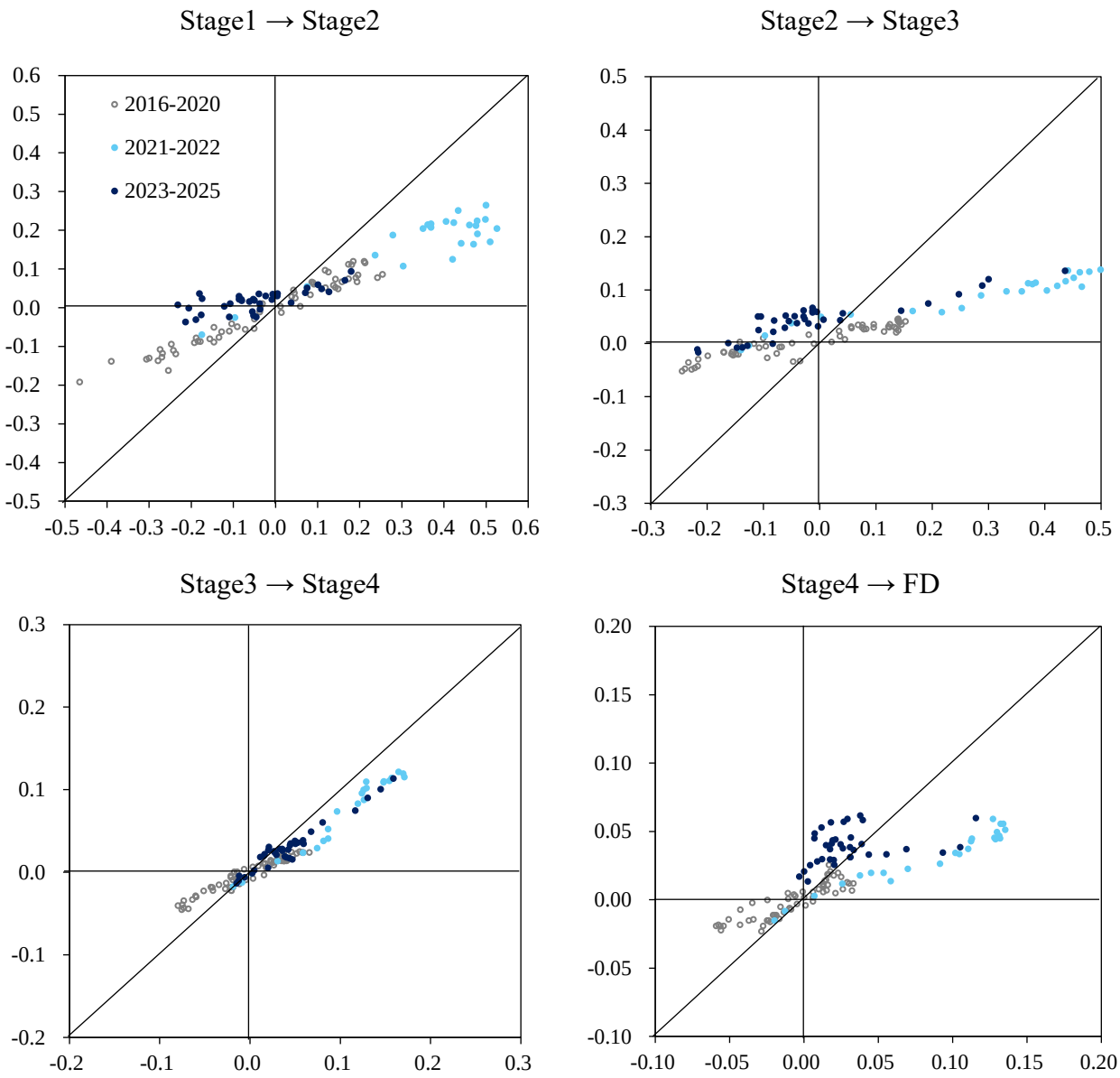
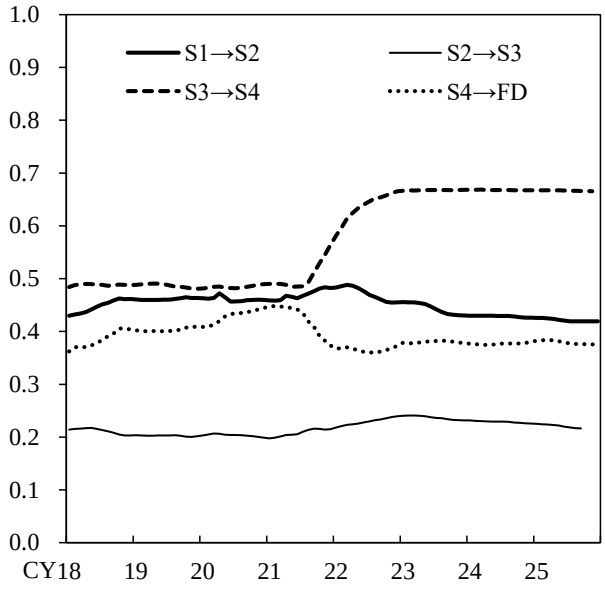


Figure 12. Scatterplot of the Upstream "Goods" Index and Downstream "Domestic Goods" Index (Japan)



Note: The horizontal axis shows the year-on-year log changes of the upstream "Goods (Domestic and Imports)" index, and the vertical axis shows the year-on-year log changes of the downstream "Domestic Goods" index. For example, "Stage 1 → Stage 2" shows the year-on-year log change of the Stage 1 "Goods" index on the horizontal axis and that of the Stage 2 "Domestic Goods" index on the vertical axis.

Figure 13. Recursive Estimation of Year-on-Year Changes in the Upstream "Goods" Index and Downstream "Domestic Goods" Index (Japan)

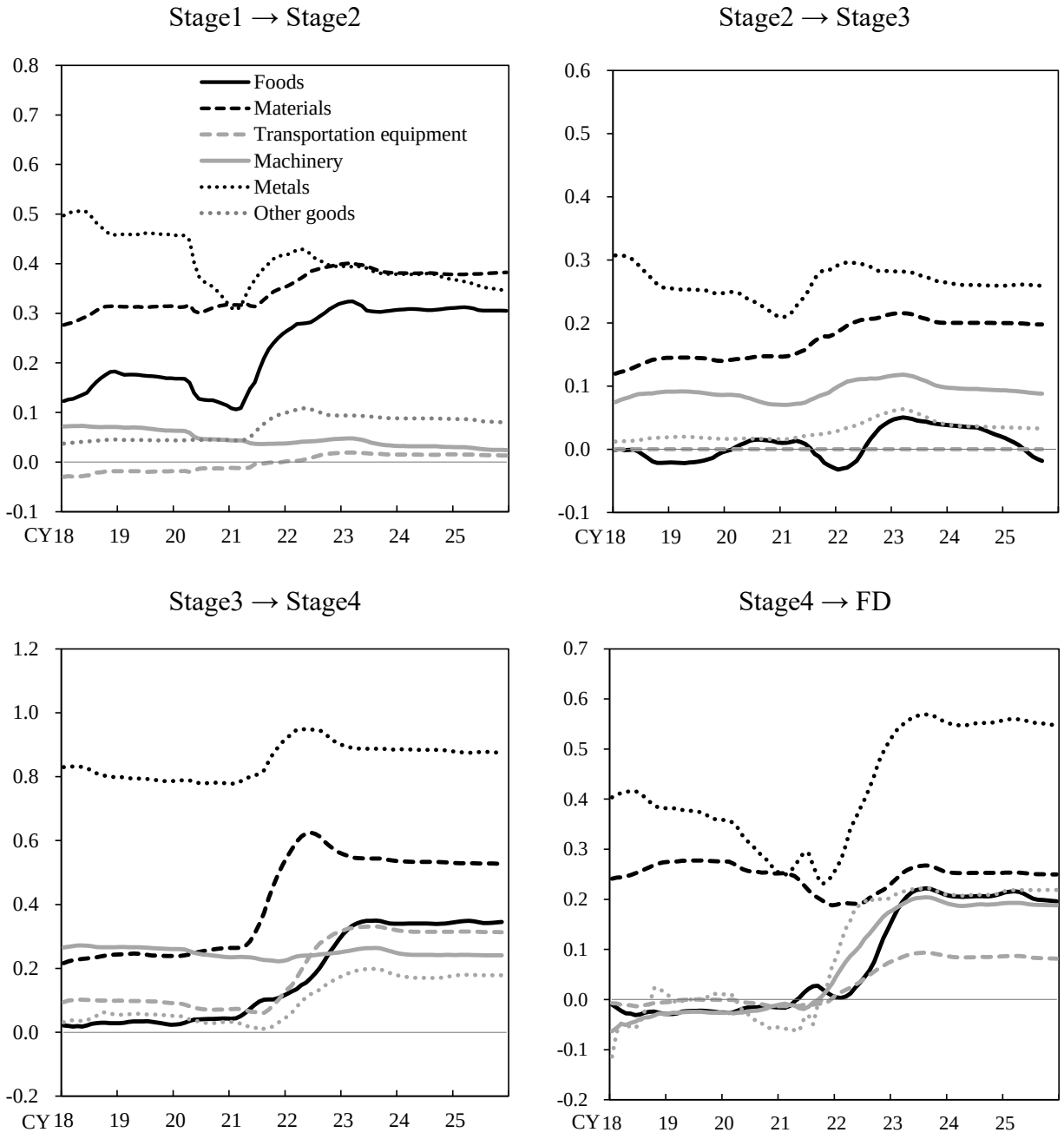


Notes:

1. This figure shows the time series evolution of the regression coefficients that represent the relationship between the year-on-year log changes of the upstream "Goods (Domestic and Imports) " index and the downstream "Domestic Goods" index. For example, "S1 → S2" shows the coefficients from a regression with the Stage 1 "Goods" index as the explanatory variable and the Stage 2 "Domestic Goods" index as the dependent variable.

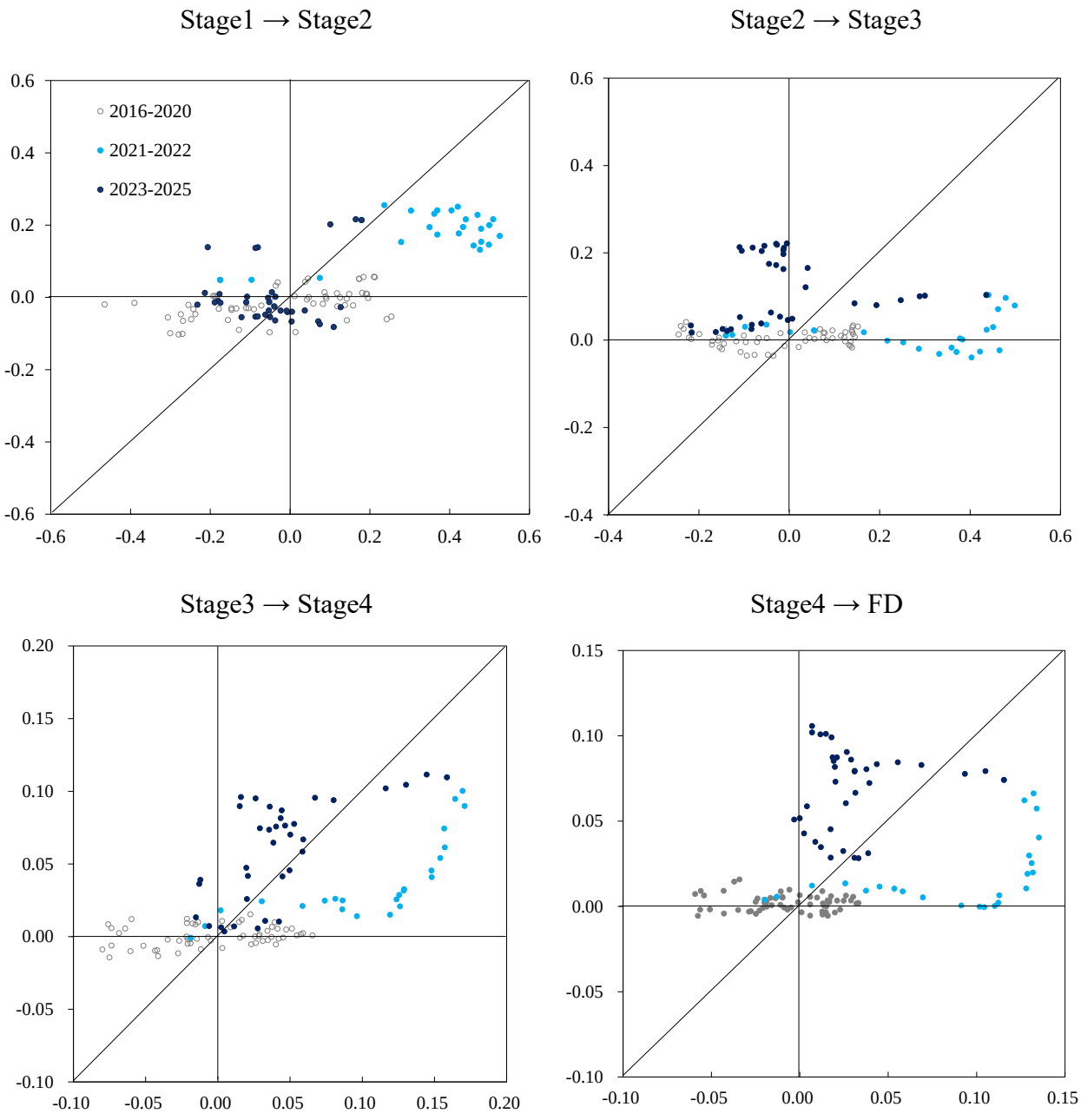
2. Recursive estimation is a method in which the data period starts at a fixed point and is updated sequentially as additional periods of data are added.

Figure 14. Recursive Estimation of Year-on-Year Changes in the Upstream "Goods" Index and Downstream "Domestic Goods" Index by Sector (Japan, Excluding Energy)



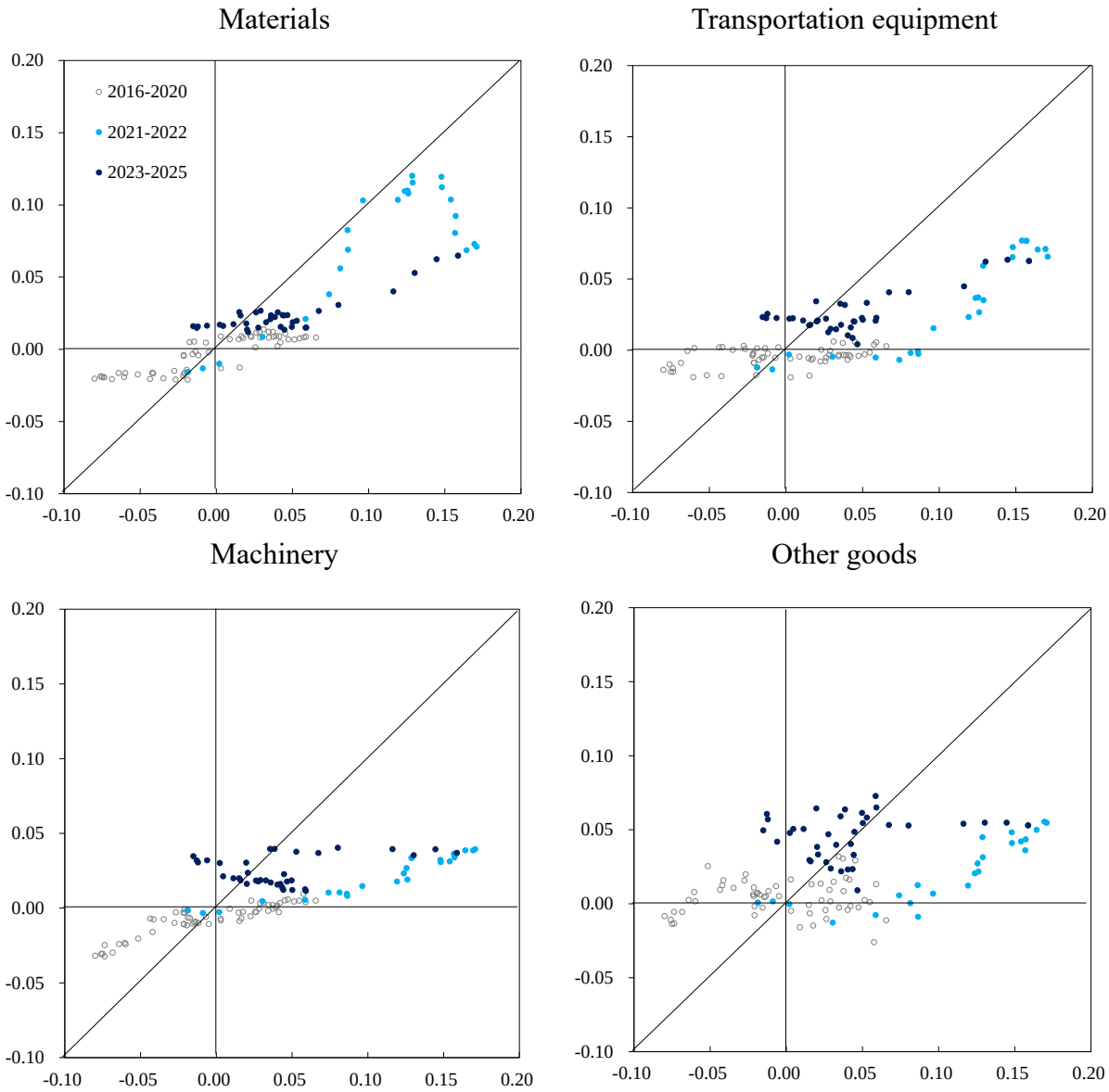
Note: This figure shows the time-series evolution of the regression coefficients that represent the relationship between the year-on-year log changes of the upstream "Goods (Domestic and Imports) " index and the downstream "Domestic Goods" index.

Figure 15. Scatterplot of the Upstream "Goods" Index and Downstream "Domestic Goods" Index (Japan, Foods)



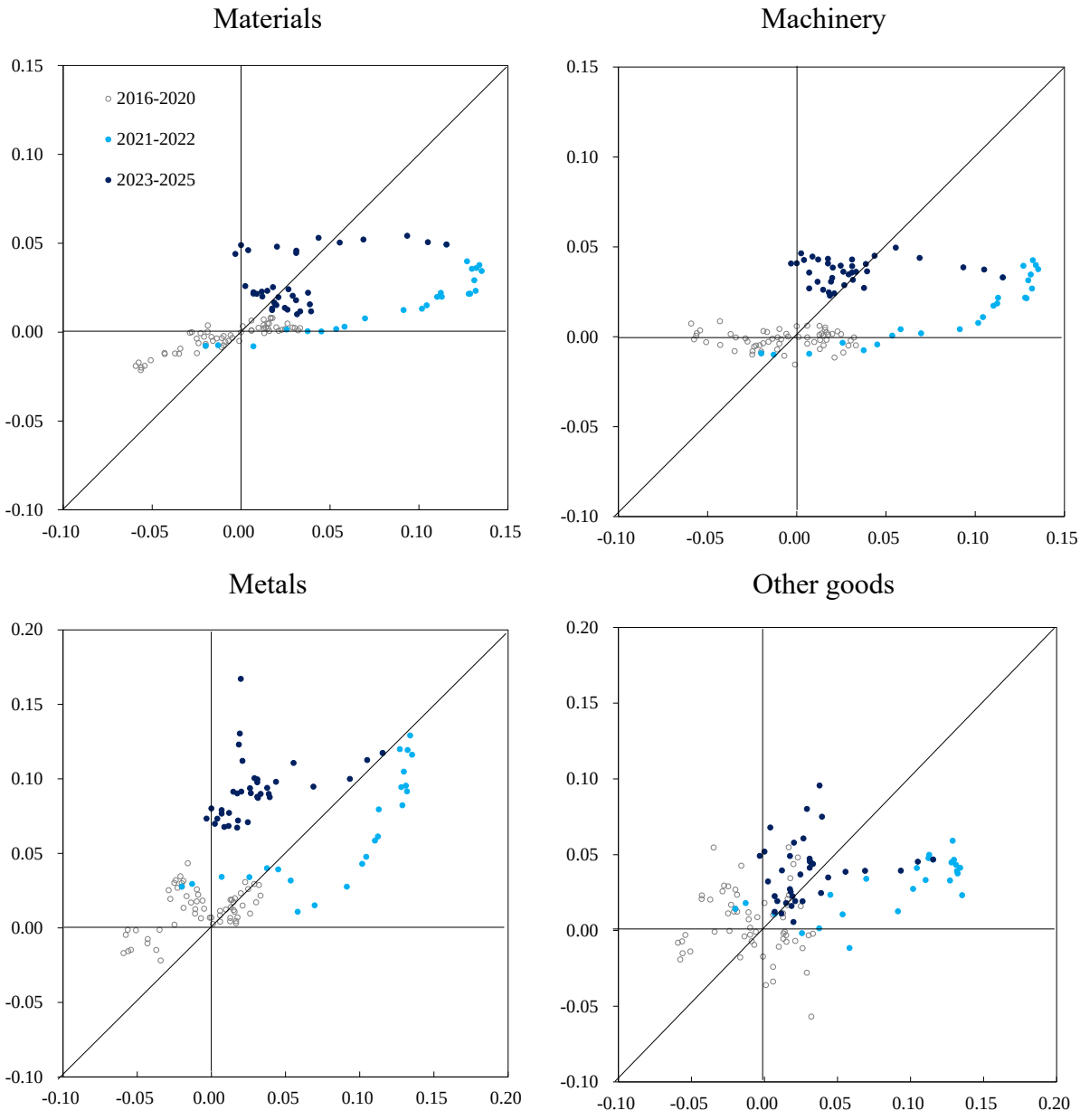
Note: The horizontal axis shows the year-on-year log changes of the upstream "Goods (Domestic and Imports) " index, and the vertical axis shows the year-on-year log changes of the downstream "Domestic Goods" index for foods sector. For example, "Stage 1 → Stage 2" plots the Stage 1 "Goods" index on the horizontal axis and the Stage 2 "Domestic Goods" index for foods on the vertical axis.

Figure 16. Scatterplot of the Upstream "Goods" Index and Downstream "Domestic Goods" Index (Japan, Non-Food Sectors, Stage 3 to Stage 4)



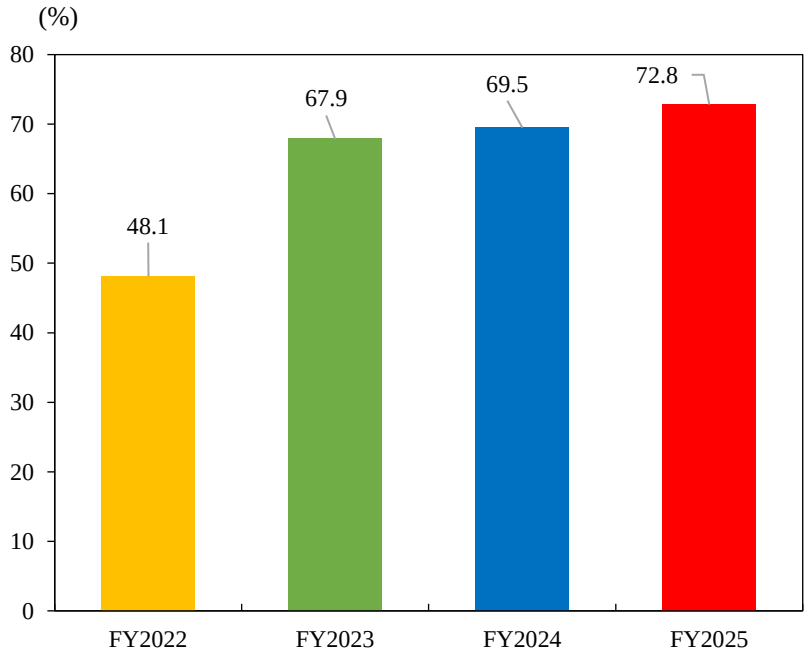
Note: The horizontal axis shows the year-on-year log changes of the upstream "Goods (Domestic and Imports) " index, and the vertical axis shows the year-on-year log changes of the downstream "Domestic Goods" index for each sector. For example, for the Materials sector, the horizontal axis shows the Stage 3 "Goods" index, and the vertical axis shows the Stage 4 "Domestic Goods" index for Materials.

Figure 17. Scatterplot of the Upstream "Goods" Index and Downstream "Domestic Goods" Index (Japan, Non-Food Sectors, Stage 4 to Final Demand)



Note: The horizontal axis shows the year-on-year log changes of the upstream "Goods (Domestic and Imports) " index, and the vertical axis shows the year-on-year log changes of the downstream "Domestic Goods" index for each sector. For example, for the Materials sector, the horizontal axis shows the Stage 4 "Goods" index, and the vertical axis shows the Final Demand "Domestic Goods" index for Materials.

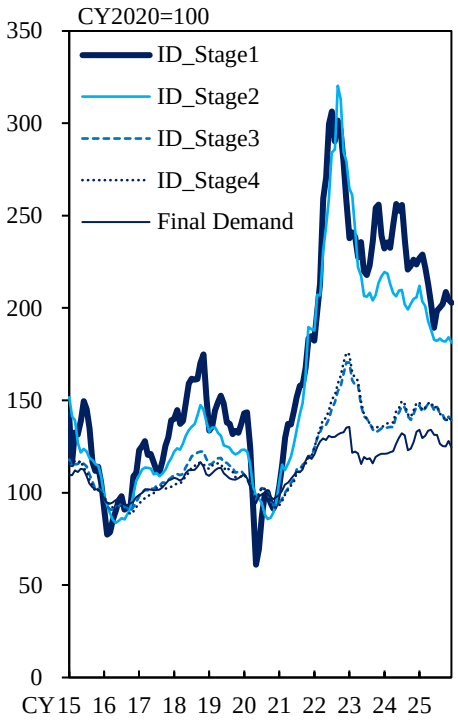
Figure 18. Pass-Through Rates of Prices by Firms in Survey Data



Note: This figure shows the acceptance rate of price increase requests across all industries, based on the Japan Fair Trade Commission's Special Survey on Initiatives for Smooth Price Pass-Through. The acceptance rate is the percentage of the requested price increase that was actually accepted by the buyer when a supplier requested a price adjustment. However, it should be noted that the requested amount may not reflect the full increase in actual costs; suppliers may have limited their requests to the amount they expected the buyer would accept.

Figure 19. "Energy" Index by Stage (Japan)

Goods (Domestic Goods and Imports)



Domestic Goods

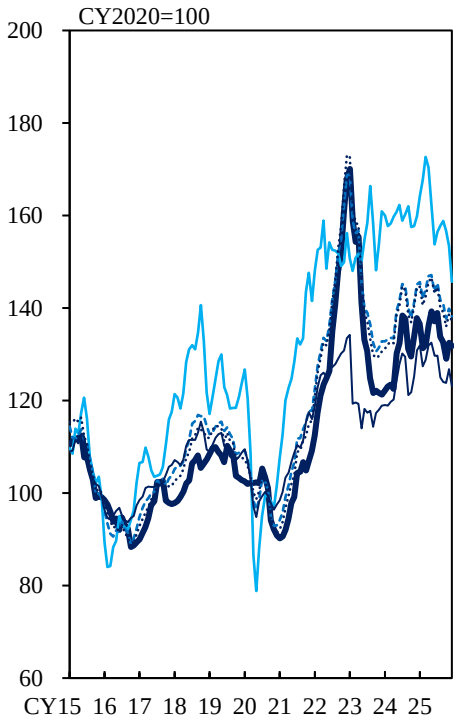
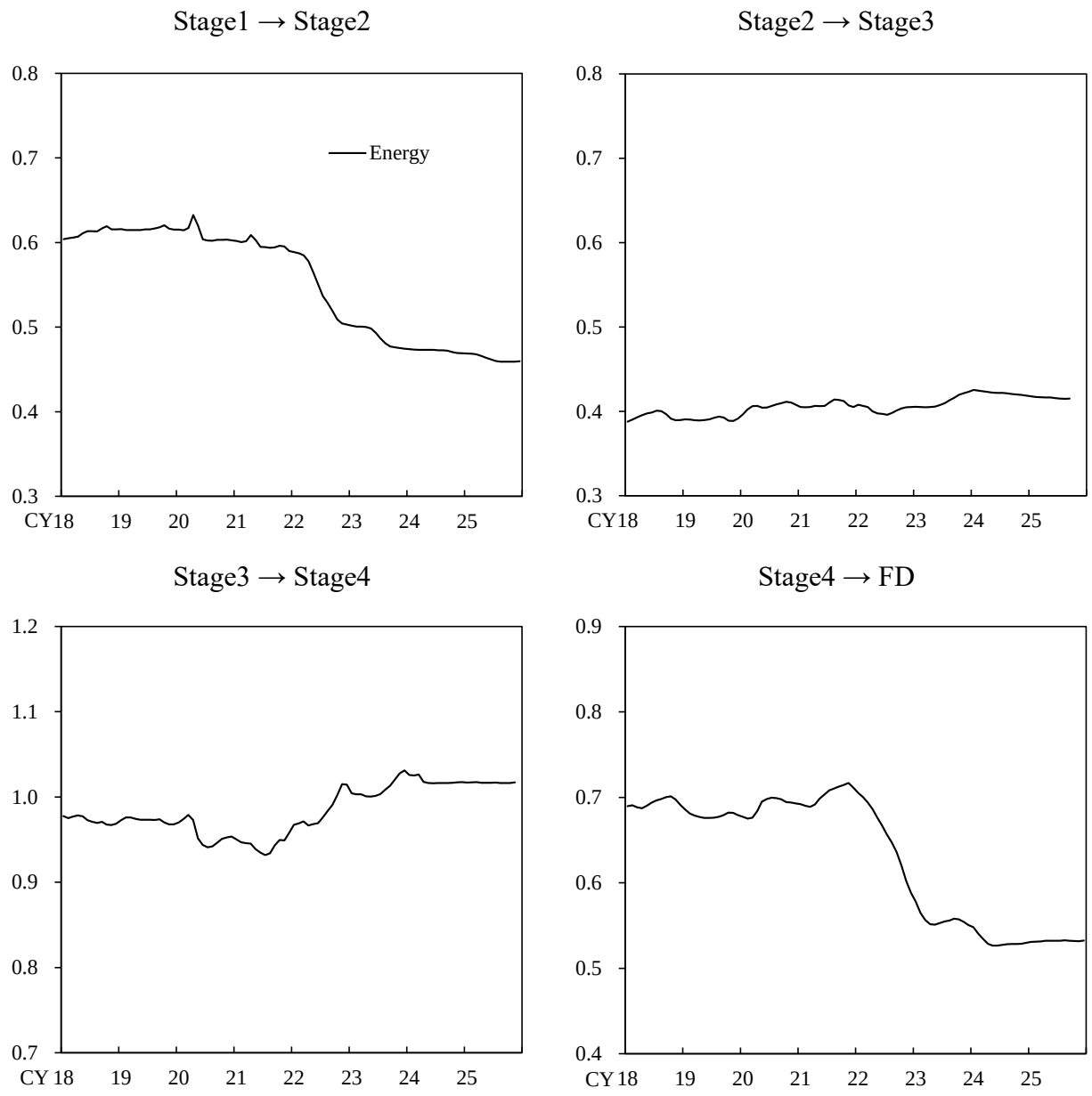
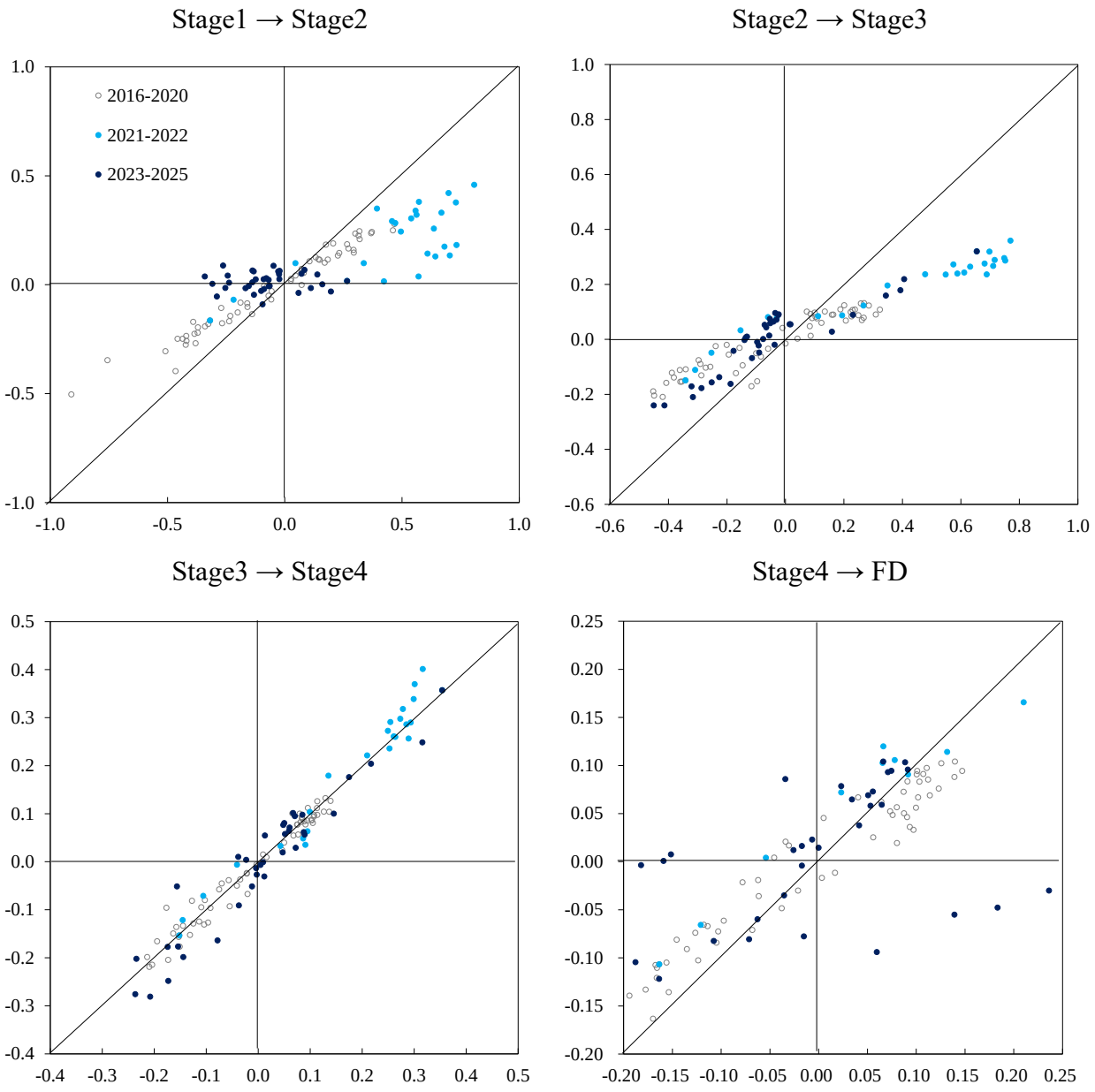


Figure 20. Recursive Estimation of Year-on-Year Changes in the Upstream "Energy (Domestic and Imports)" Index and Downstream "Energy (Domestic)" Index (Japan)



Note: This figure shows the time-series evolution of the regression coefficients that represent the relationship between the year-on-year log changes of the upstream "Energy (Domestic and Imports)" index and the downstream "Energy (Domestic)" index.

Figure 21. Scatterplot of the Upstream "Energy (Domestic and Imports)" Index and Downstream "Energy (Domestic)" Index (Japan)



Note: The horizontal axis shows the year-on-year log changes of the upstream "Energy (Domestic and Imports)" index, and the vertical axis shows the year-on-year log changes of the downstream "Energy (Domestic)" index.