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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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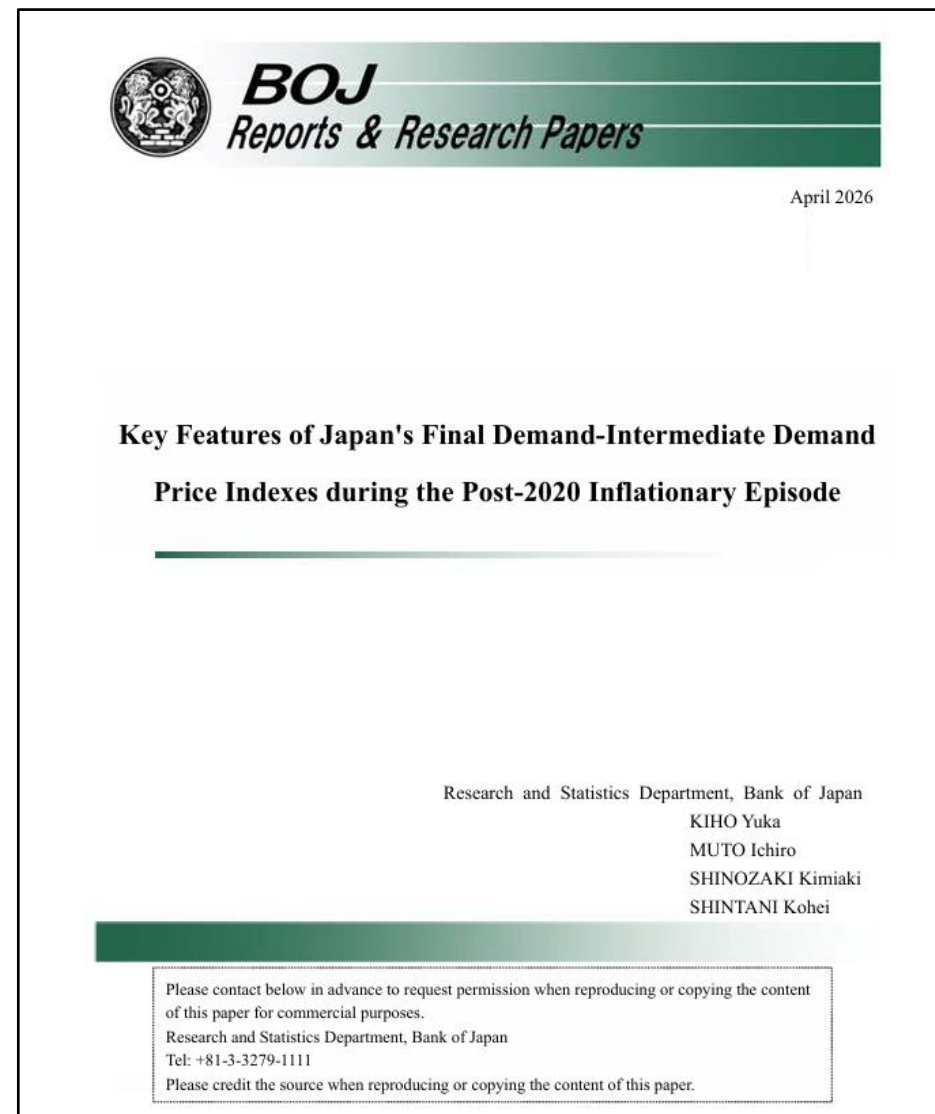
- Source Paper

Kiho, Y., Muto, I., Shinozaki, K.,
and Shintani, K. (2026),

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

Available on the Bank of Japan website.

https://www.boj.or.jp/en/research/brp/ron_2026/ron260406a.htm



- The period of rising prices since 2020 has increased interest in the transmission of price pressures from upstream to downstream.
- However, conventional producer price indexes do not necessarily capture price transmission along the production chain.
- This study investigates price developments over the period from 2020 to 2025 using **the *Final Demand-Intermediate Demand Price Indexes* (FD-ID price indexes)**.
- These indexes are organized by demand stage according to the Input-Output table.



- Introduction to Japan's FD-ID price indexes
 - ✓ Development by the Bank of Japan
 - ✓ Features of FD-ID price indexes
- Comparison with the U.S. FD-ID price indexes
- Price developments in Japan's FD-ID price indexes for goods
 - ✓ Transmission of inflationary pressures across production stages
- Concluding remarks



Introduction to Japan's FD-ID price indexes



Price indexes published by the Bank of Japan

- The Bank of Japan publishes various price indexes covering business transactions, including PPI (Producer Price Index), EPI (Export price Index) and IPI (Import price Index) as well as SPPI (Services Producer Price Index).
- In June 2022, the Bank began releasing **the Final Demand-Intermediate Demand (FD-ID) Price Indexes** for business-to-all transactions.

	B to B transactions		B to All transactions
	PPI, EPI, IPI	SPPI	FD-ID Price Indexes
Structure	The headline index is published as a "All commodities," calculated by aggregating individual item price indexes using the weights of gross transaction values.		Indexes are published separately for final demand and intermediate demand stages. Indexes are calculated using PPI, IPI, SPPI, CPI.*
Scope	Goods	Services	Goods & Services

* Consumer Price Index



Features of Japan's FD-ID price indexes

Conceptual diagram based on the Input-Output table

(1) Integrating
goods and services

		Demand sector															
		Intermediate demand												Final demand			
		Stage1			Stage2			Stage3			Stage4			PC	CI	Gov	Exp
		a	b	c	d	e	f	g	h	i	j	k	l				
Supply sector	Commodity type																
	Unprocessed goods	a															
		b															
		c															
		d															
	Processed goods	e															
		f															
		g															
		h															
	Services	i															
		j															
		k															
		l															
	Imports	m															

(3) Dividing intermediate demand into four stages in the production flow, from upstream to downstream

(4) Excluding transactions conducted within stages from the calculation of weights

(2) Dividing demand stage into **final demand** and **intermediate demand**

(5) Including both domestic products and imports



FD-ID price index construction

STEP 03 Matching of price data

Match commodity-level price indexes to the row sectors of the Input-Output table.

STEP 01 Stage Assignment

Classify demand sectors for goods and services into demand stages within the production flow.

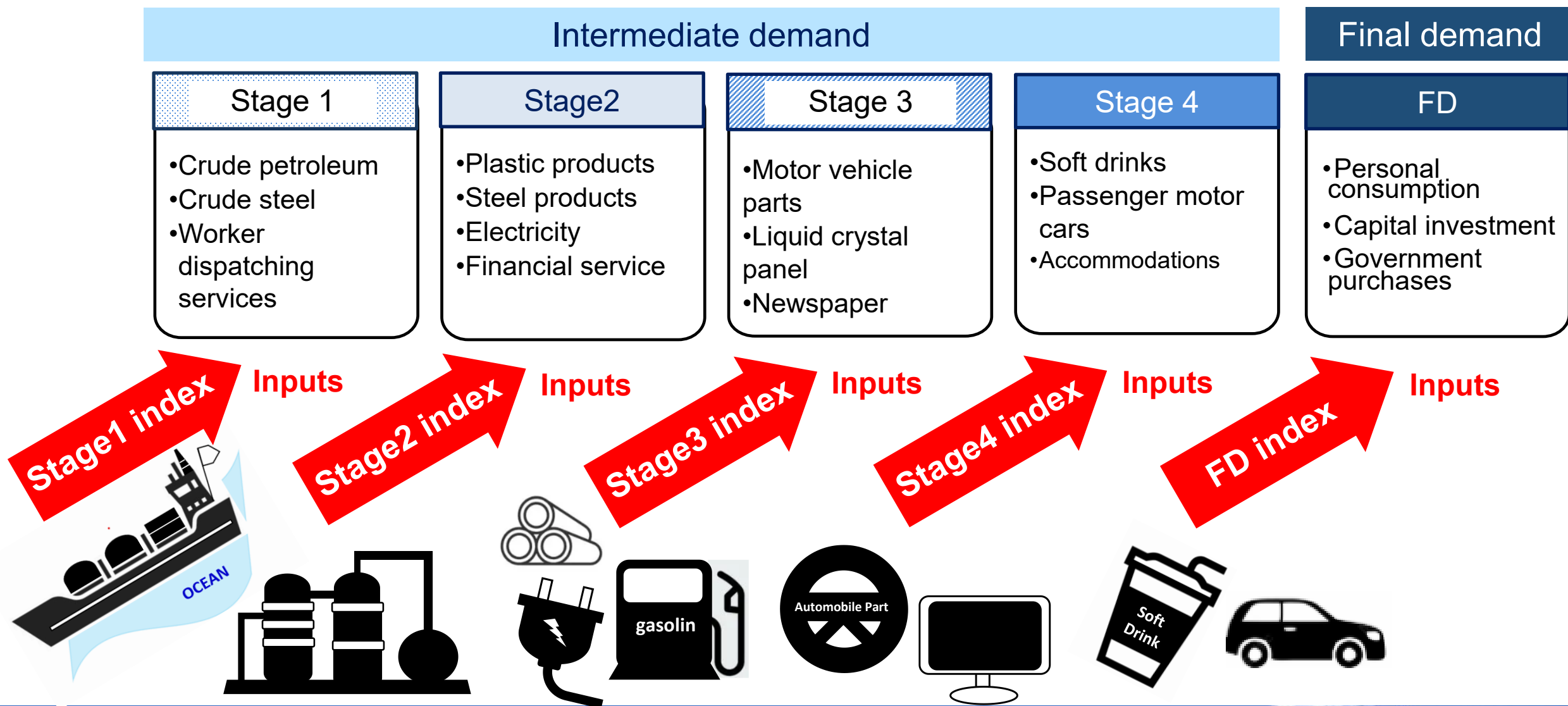
		Demand sector															
		Intermediate demand												Final demand			
		Stage1			Stage2			Stage3			Stage4			PC	CI	Gov	Exp
		a	b	c	d	e	f	g	h	i	j	k	l				
Supply sector	Unprocessed goods	a															
		b															
		c															
		d															
	Processed goods	e															
		f															
		g															
		h															
	Services	i															
		j															
		k															
		l															
	Imports	m															

STEP 02 Weight Calculation

Calculate weights for aggregating price indexes using the input amounts for each demand stage.

The FD-ID price indexes are aggregated by using the prices of goods and services input to each demand stage, with transaction-value weights.

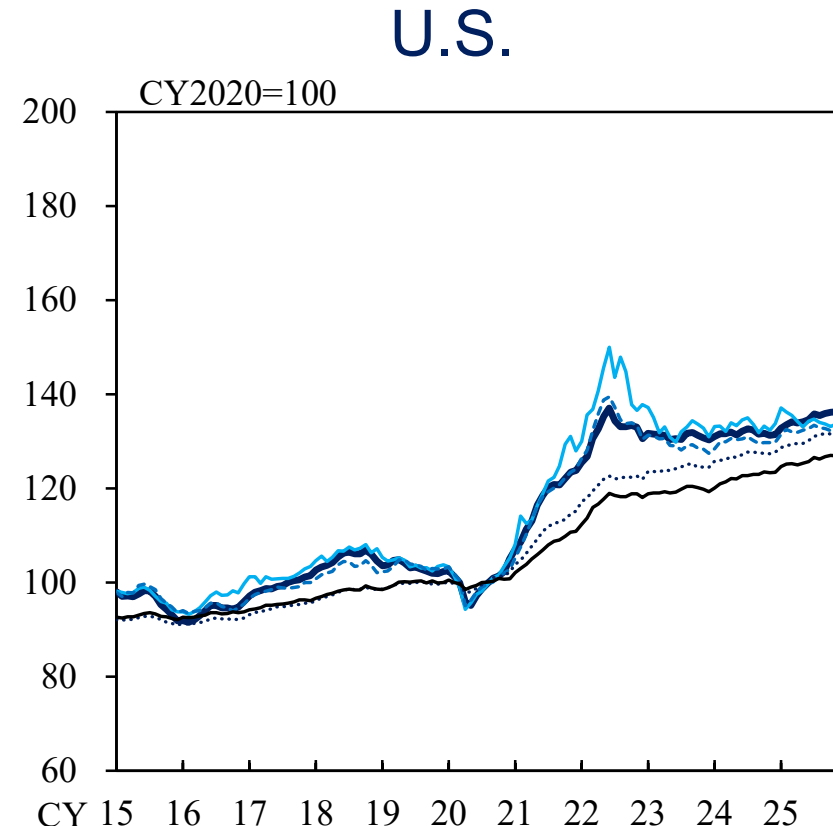
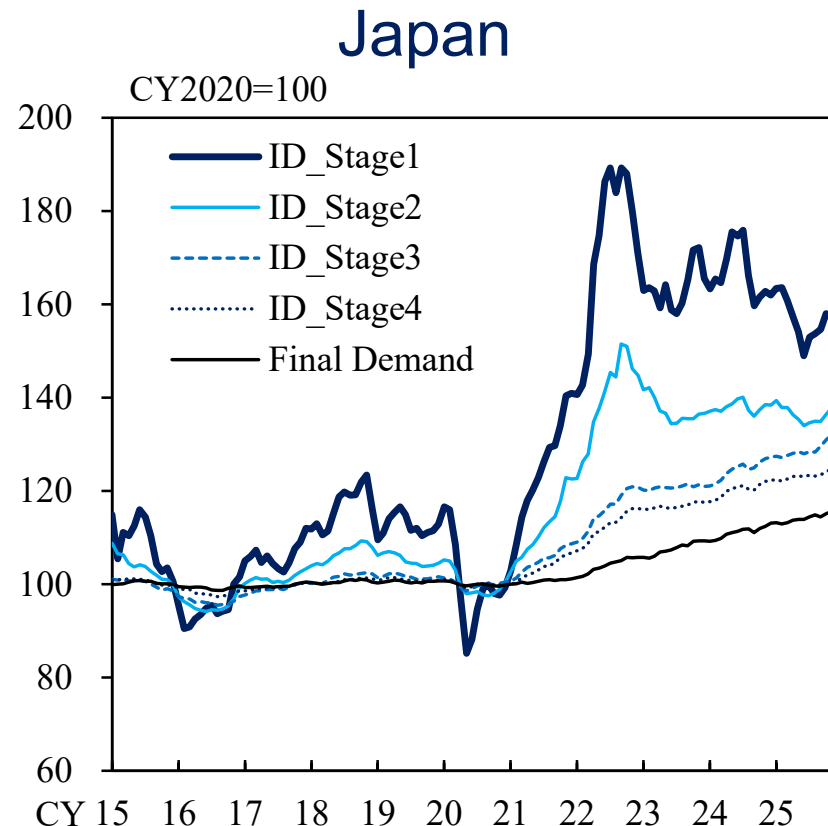
Demand stages and the FD-ID price indexes



Comparison with the U.S. FD-ID price indexes



- Since 2020, there have been clear differences in the trends of the FD-ID price indexes between Japan and the United States.

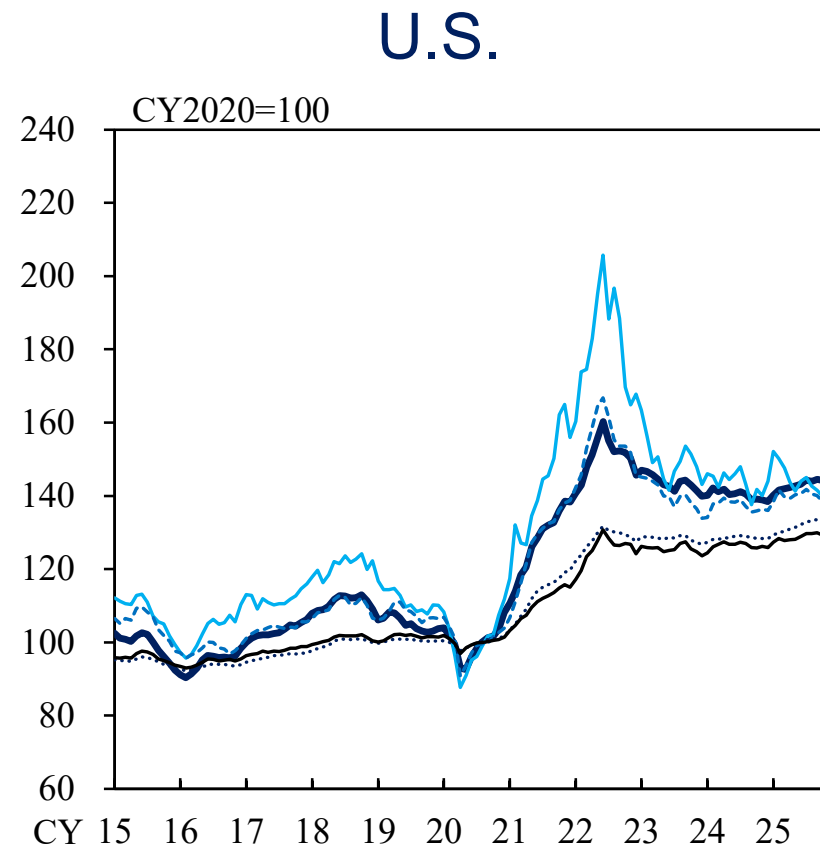
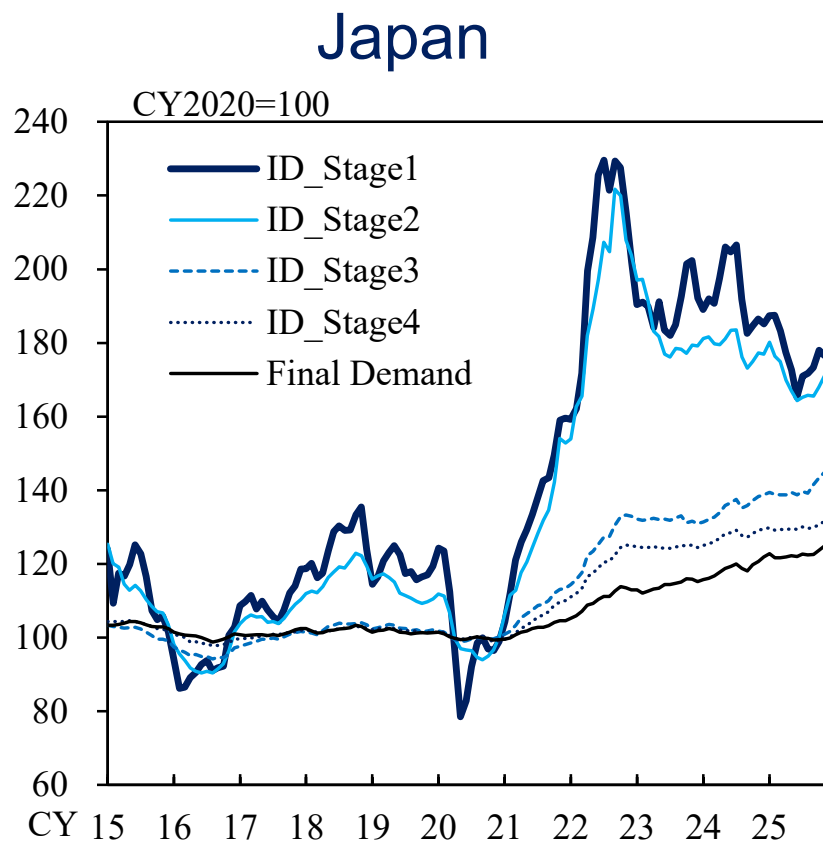


1. In Japan, there is a **large variation** in price increases between stages, whereas the variation is **smaller** in the United States.
2. In Japan, price increases tend to be **larger in upstream stages** and **smaller in downstream stages**. In contrast, in the United States, price increases **do not necessarily follow the order of the production flow**. For example, around 2022, the increase in ID_Stage2 exceeded that of ID_Stage1.
3. Comparing corresponding stages, price increases in Japan are **larger than those in the U.S.**, particularly in ID_Stage1, whereas in downstream stages such as ID_Stage4 and Final Demand, price increases in Japan are **smaller than those in the U.S.**



Goods price indexes: Japan and the U.S.

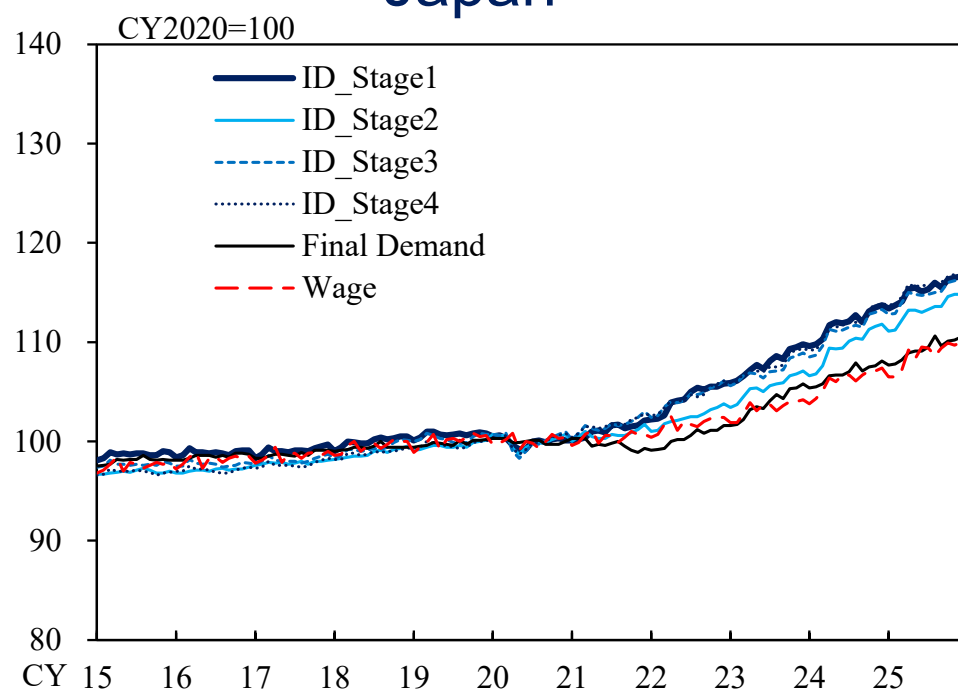
- For goods, the same three key differences observed in the overall FD-ID price indexes since 2020 are also evident.



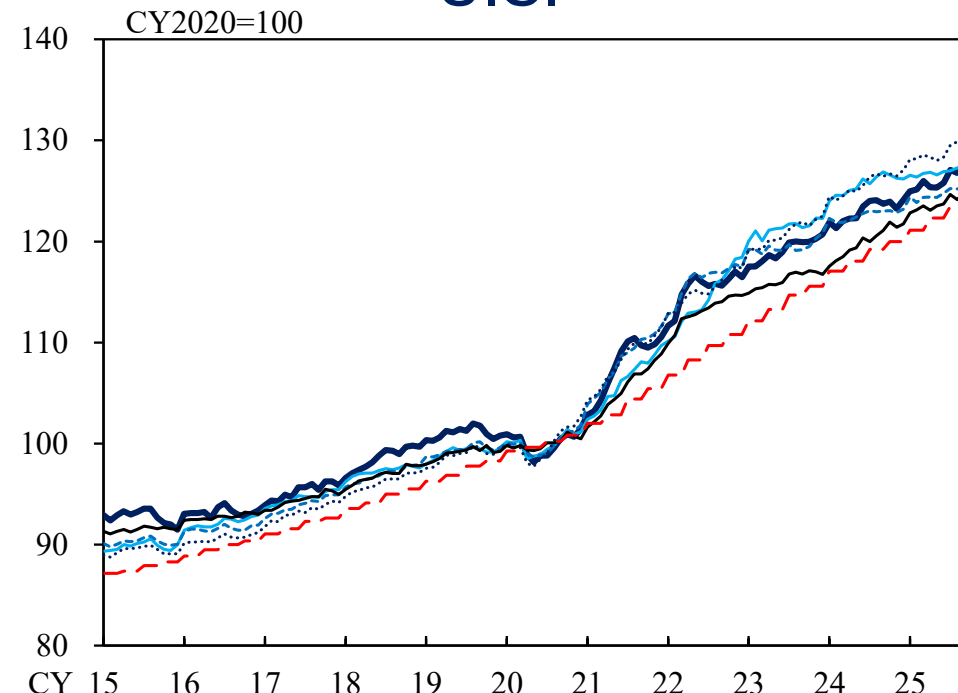
Services price indexes: Japan and the U.S.

- For services, there are no significant differences in index trends across stages.
- The figures below also show **wage indexes** for both countries.
- These figures suggest that service **price trends are more influenced by wage changes than by price transmission** along the production flow.

Japan



U.S.



- To compare Japan-U.S. price developments in detail, we grouped the goods price indexes into seven industry groups:

Group	Japan	U.S.
Foods	Beverages and foods Agriculture, forestry and fishery products	Processed foods and feeds Farm products
Energy	Petroleum and coal products Electric power, gas and water	Fuels and related products and power
Materials	Chemicals and related products Pulp, paper and related products	Lumber and wood products Chemicals and allied products
Metals	Iron and steel Metal products	Metals and metal products
Machinery	Production machinery Electrical machinery and equipment	Machinery and equipment
Transportation Machinery	Transportation equipment	Transportation equipment
Others	Beverages and foods Other manufacturing industry products	Processed foods and feeds Furniture and household durables

Note: Major industries have been extracted from both Japan and the U.S.

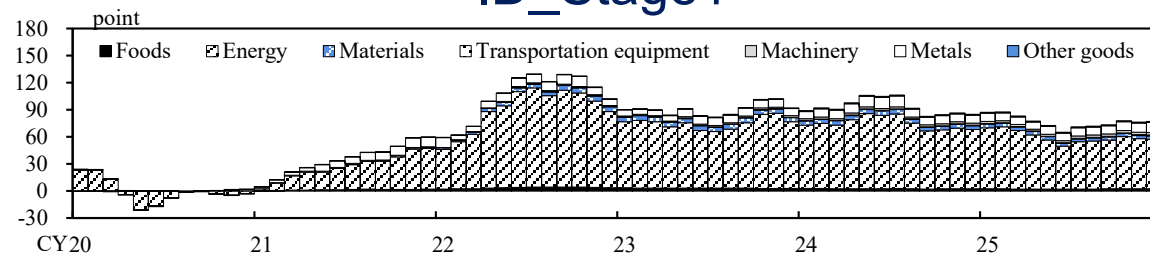


What drives price increases in Japan?

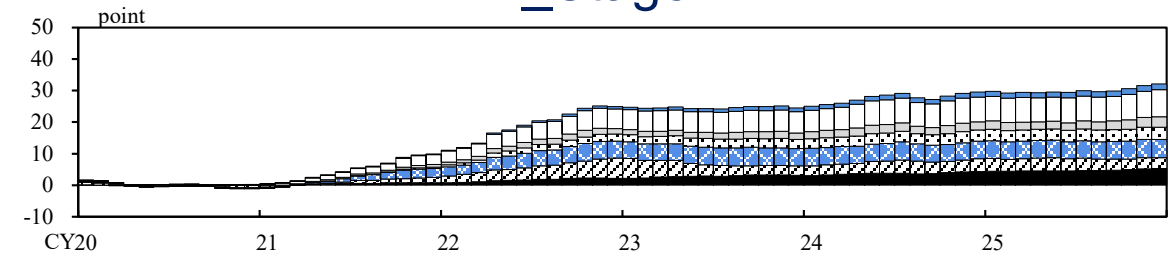
Japan

■ Foods ▨ Energy ■ Materials ▨ Transportation equipment □ Machinery □ Metals ■ Other goods

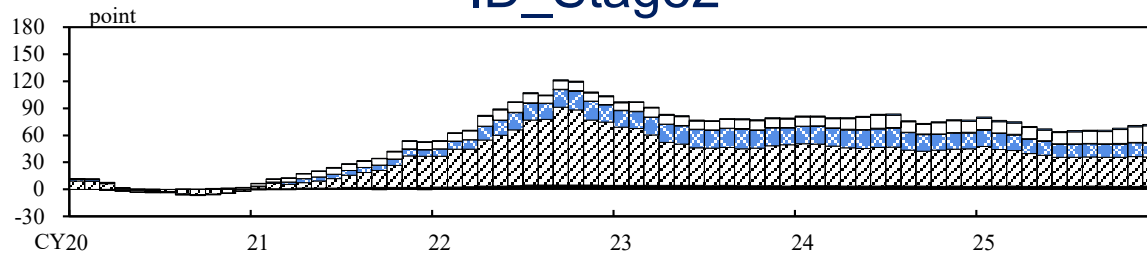
ID_Stage1



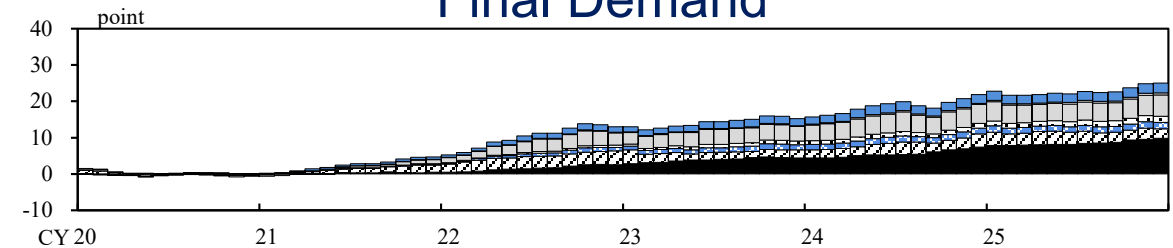
ID_Stage4



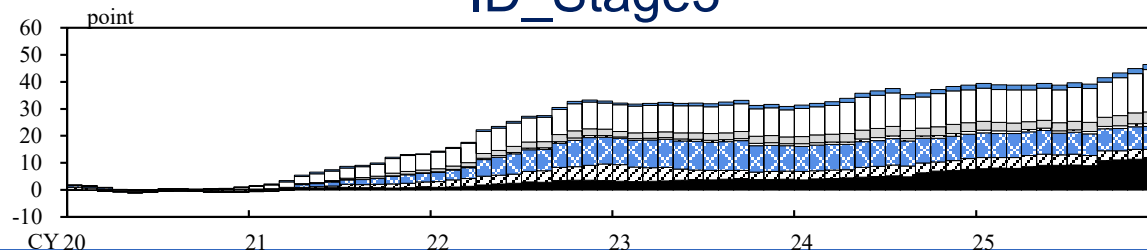
ID_Stage2



Final Demand



ID_Stage3



Note: All represent the deviation from the 2020 average value.

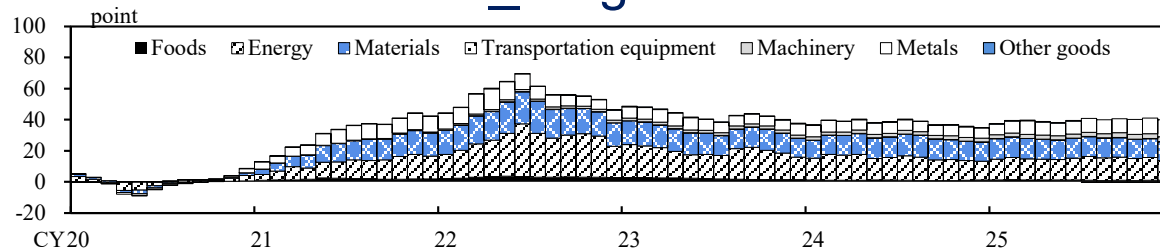


What drives price increases in the U.S.?

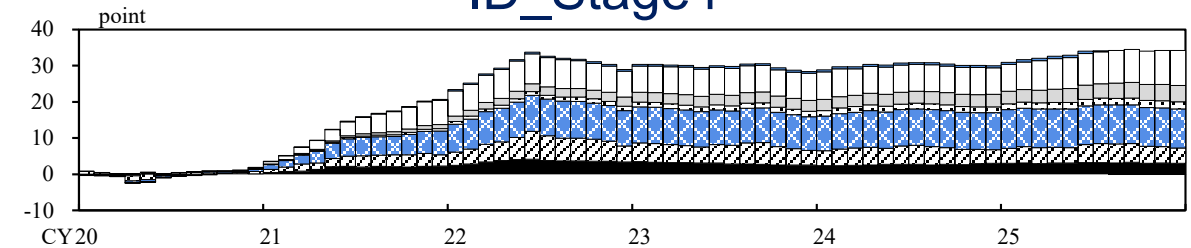
U.S.

■ Foods ▨ Energy ■ Materials ▨ Transportation equipment □ Machinery □ Metals ■ Other goods

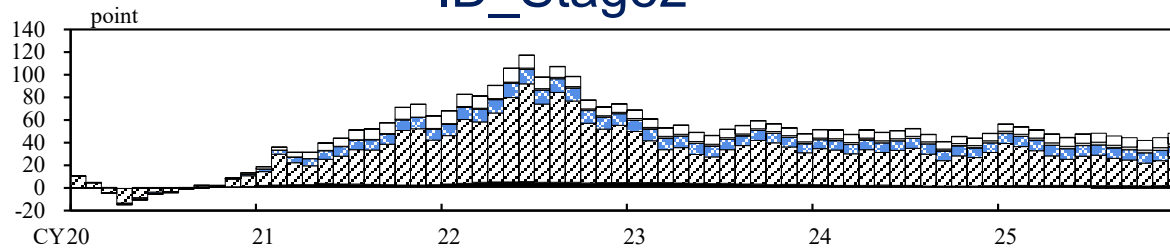
ID_Stage1



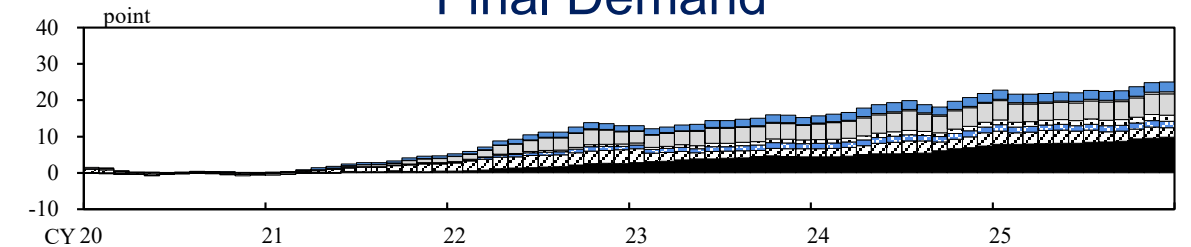
ID_Stage4



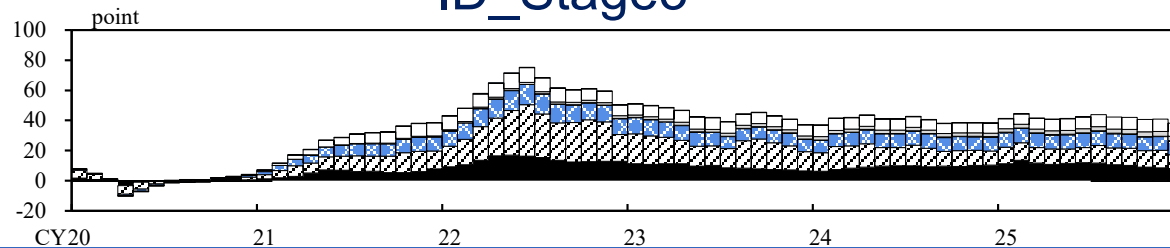
ID_Stage2



Final Demand



ID_Stage3

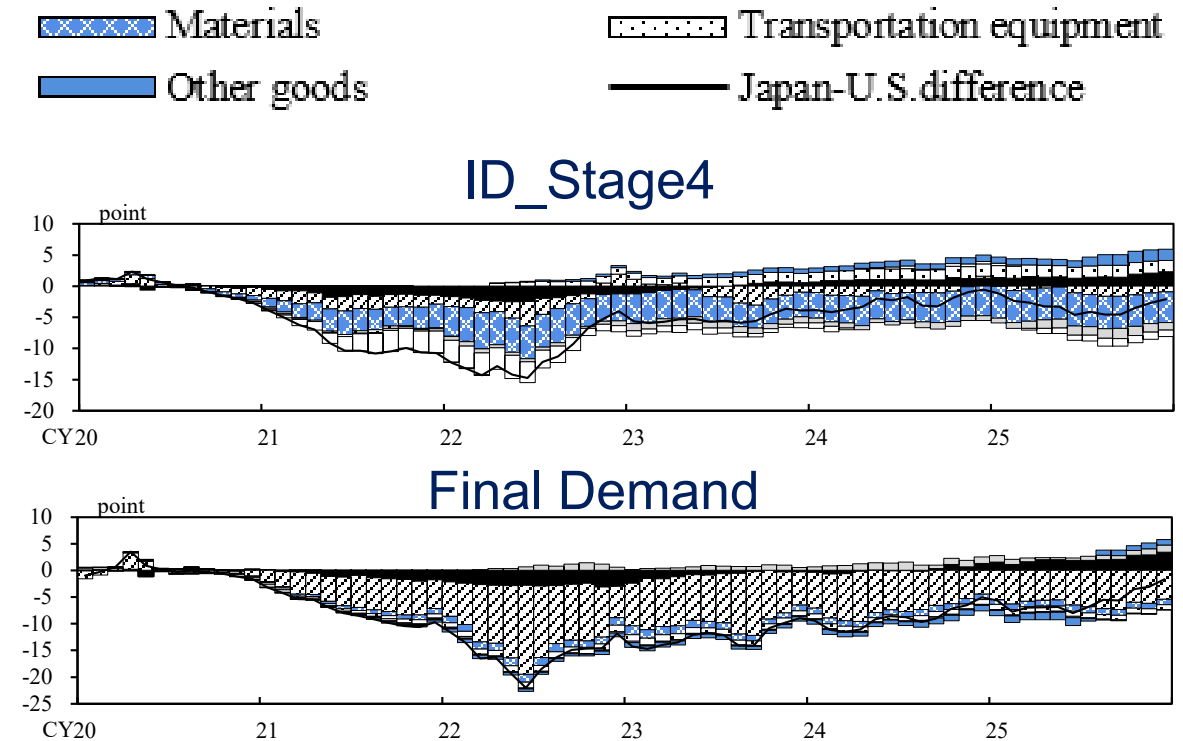
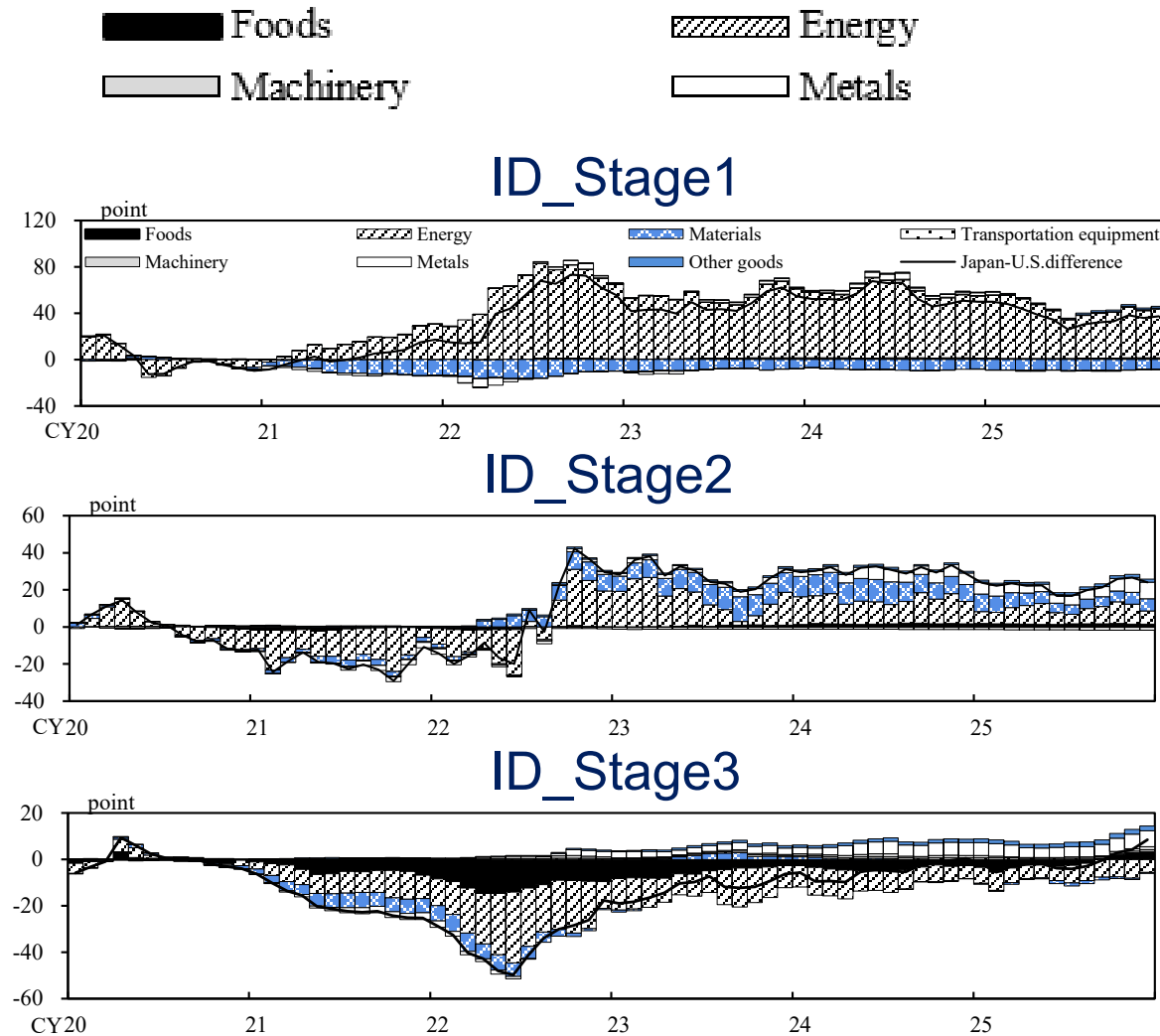


Note: All represent the deviation from the 2020 average value.



What explains the Japan-U.S. difference?

Japan-U.S. differences



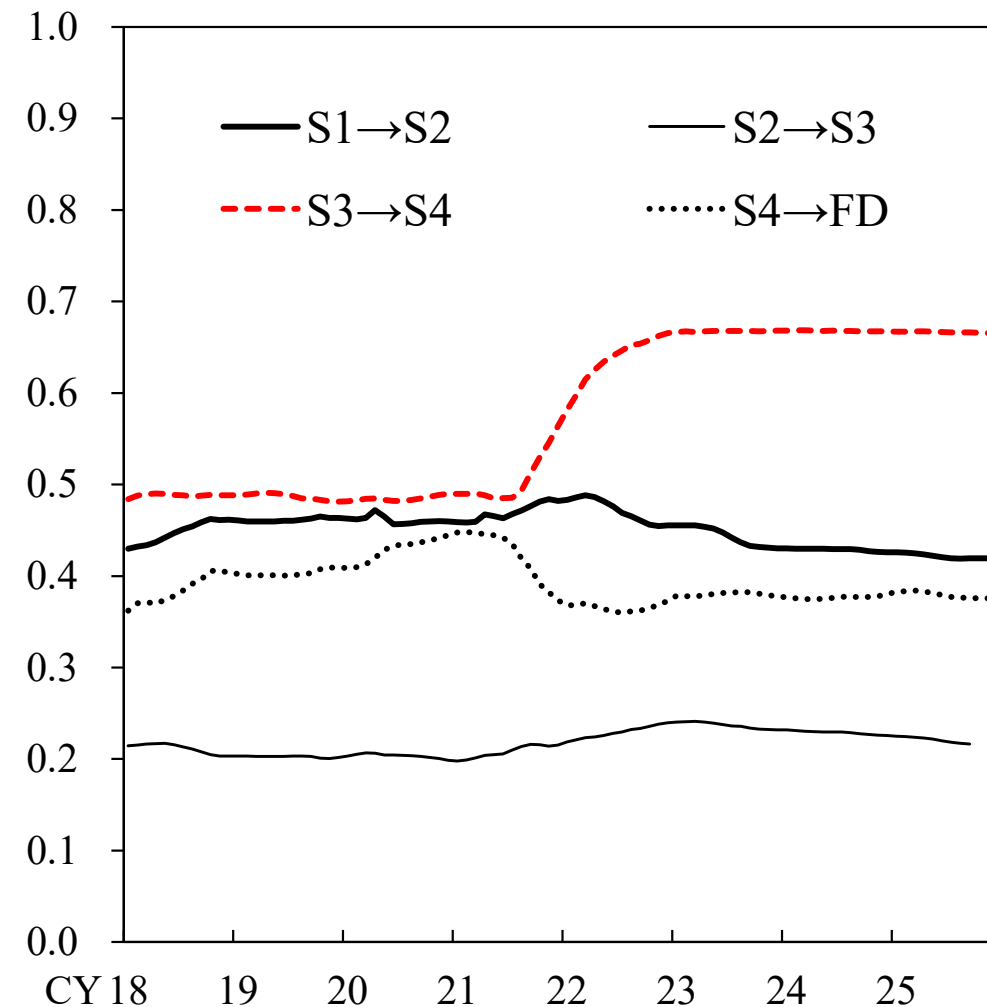
Note: All represent the deviation from the 2020 average value.



Price Developments in Japan's FD-ID Price Indexes for Goods



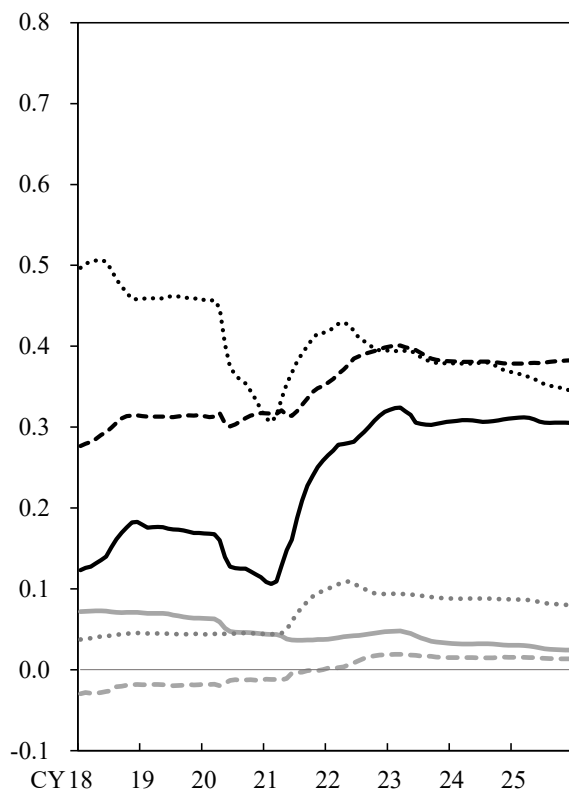
- The figure on the right presents recursive estimates of the parameters (slopes) from linear regressions in which downstream stage price indexes are regressed on upstream stage price indexes.
- Over time, the parameter for the relationship between ID_Stage3 and ID_Stage4 has increased notably since 2021, indicating stronger price transmission from upstream to downstream in this stage.



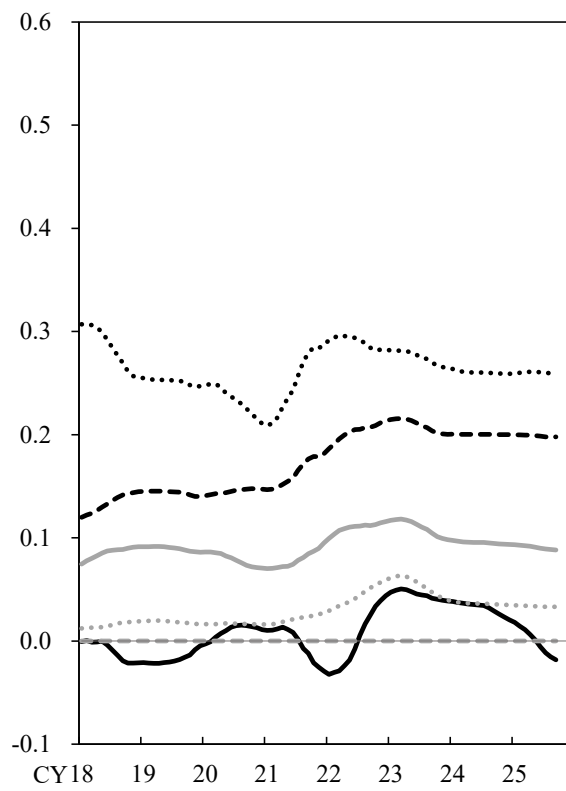
Changes in price transmission across sectors in Japan

— Foods ---- Materials --- Transportation equipment — Machinery Metals Other goods

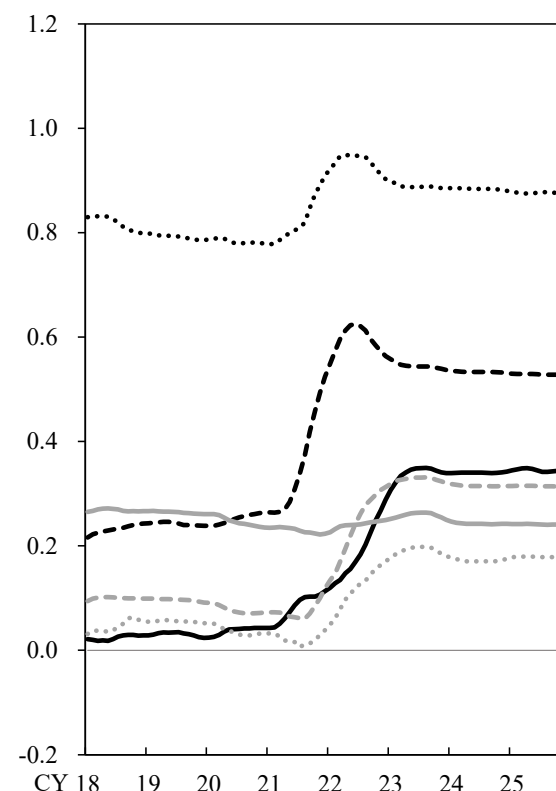
Stage1→Stage2



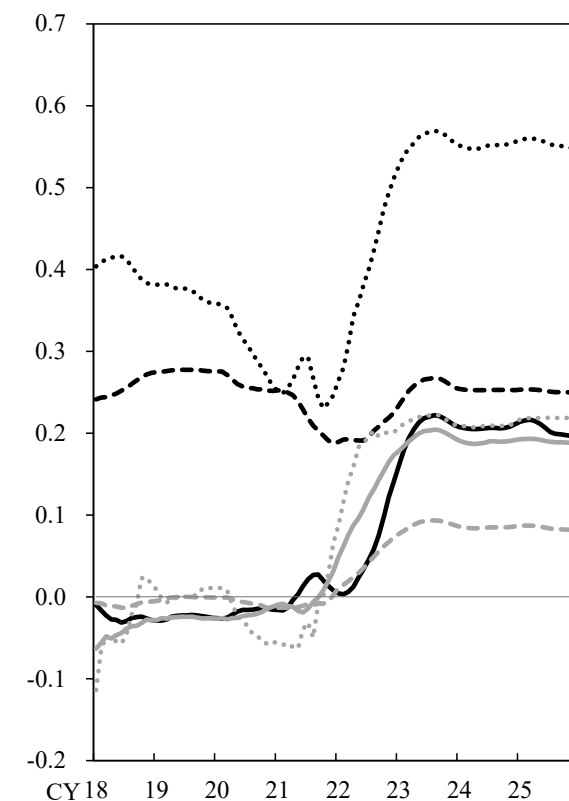
Stage2→Stage3



Stage3→Stage4



Stage4→FD



Concluding Remarks



- Price increases in Japan varied substantially across production stages, whereas variation across stages was relatively limited in the United States.
- Decomposing Japan-U.S. differences by stage shows that, **at upstream stages, Japan experienced larger price increases than the United States**, particularly for goods such as energy and raw materials.
- In contrast, **at downstream stages, Japan recorded smaller price increases than the United States** across a wide range of goods-producing sectors.
- Focusing on Japan's own time-series price developments, increases in upstream stage prices have been accompanied by **stronger price increases at downstream stages than in the past** across a wide range of sectors.



- These results have two key implications;
- First, even during the post-2020 inflationary episode, the overall path-through of goods prices by Japanese firms **remained relatively restrained** compared with the United States.
- Second, however, goods price pass-through in Japan increased **across a wide range of sectors** relative to the pre-2020 period.

We hope that similar price indexes will be developed in other countries.

This would enable broader international comparisons.



THANK YOU.



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 those of 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 Stage1 "Goods" index and the Stage2 "Domestic Goods" index.



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 Stage1 "Goods" index is the explanatory variable and the Stage2 "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.



(Appendix) Confidence Intervals for Regression Coefficients

Japan, Goods, by Sector

S1→S2

	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

S2→S3

	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

S3→S4

	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

S4→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 tables show 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 timeseries changes in the regression coefficient, where the Stage1 "Goods" index is the explanatory variable and the Stage2 "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 previous table.

