

REVISED FIGURES & TABLES

Decomposition of Japan's Trade Balance^{*}

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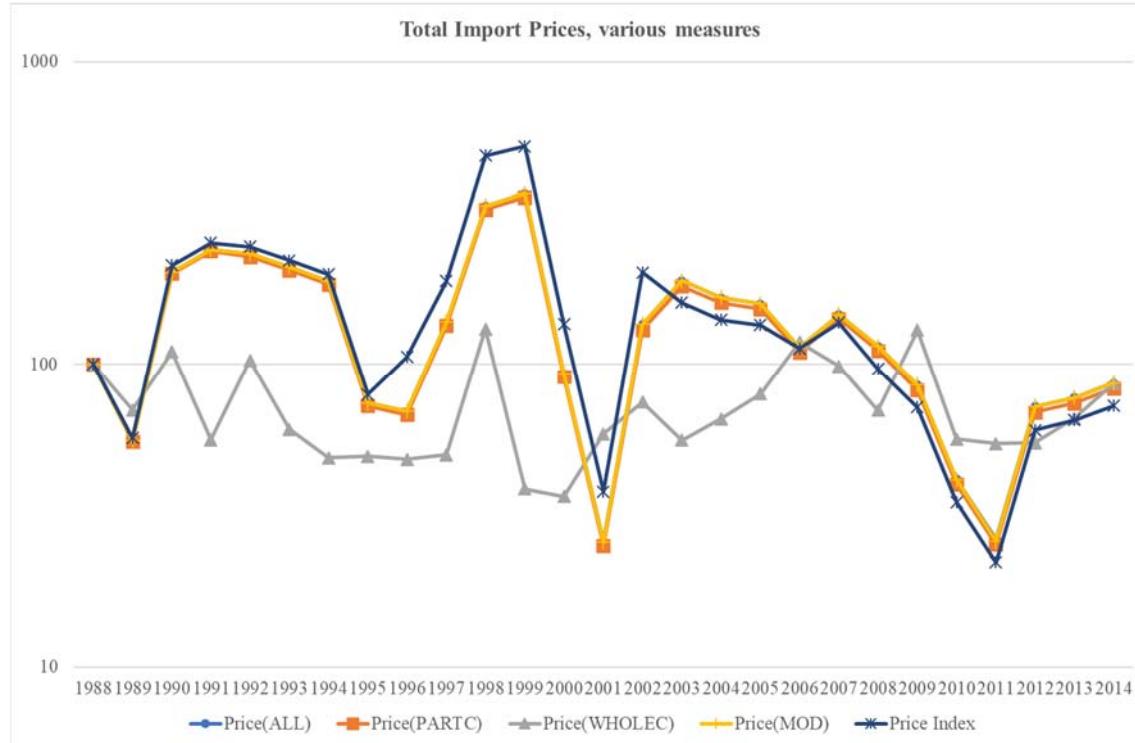
* This study is conducted as a part of the Project “Exchange Rate and International Currency (ERIC)” undertaken at the Research Institute of Economy, Trade, and Industry (RIETI). We thank Eiji Ogawa, Shugo Yamamoto and other participants at the RIETI ERIC meeting and the Japan Monetary Economics Conference for their comments on a presentation of the earlier version of this paper. Both authors acknowledge financial support from KAKENHI 15K03557. Yoshida also acknowledges financial support from KAKENHI C26380295. ⁺Yuri Sasaki, 1-2-37, Shiroganedai, Minato-ku, Tokyo, 108-8636 Japan; e-mail (yurissk@eco.meijigakuin.ac.jp). ⁺⁺Yushi Yoshida (corresponding author), 1-1-1, Banba, Hikone, Shiga, 522-8522 Japan; e-mail (yushi.yoshida@biwako.shiga-u.ac.jp).

Figure 2. Prices of aggregate exports and imports by various measures

(a) exports (1988=100)



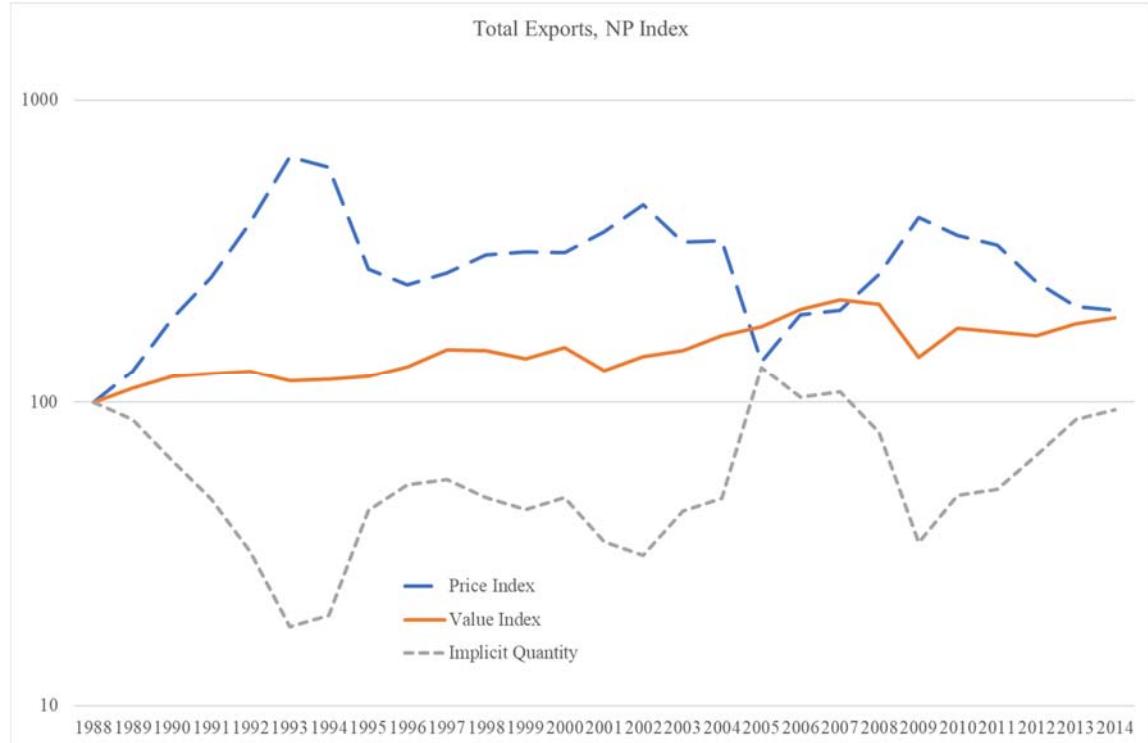
(b) imports (1988=100)



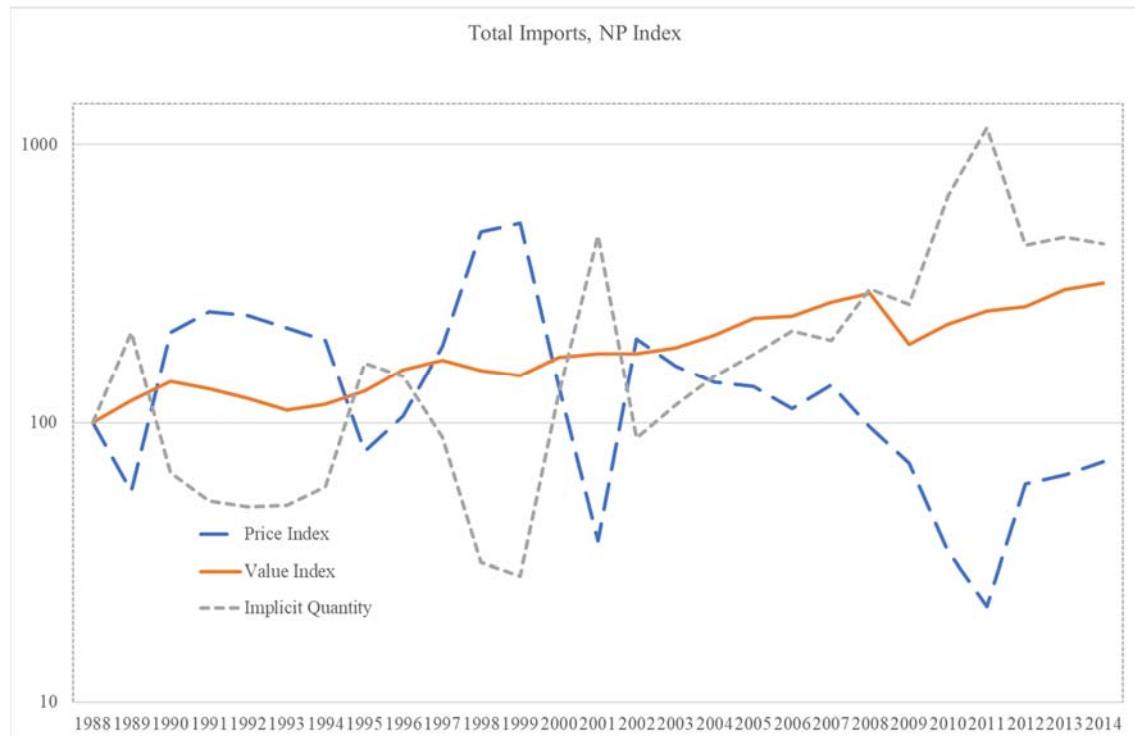
Note: The prices are calculated based on the various definitions of indices. The detailed descriptions for these indices are given in Appendix C.

Figure 3. Aggregate exports and imports by NP index

(a) exports



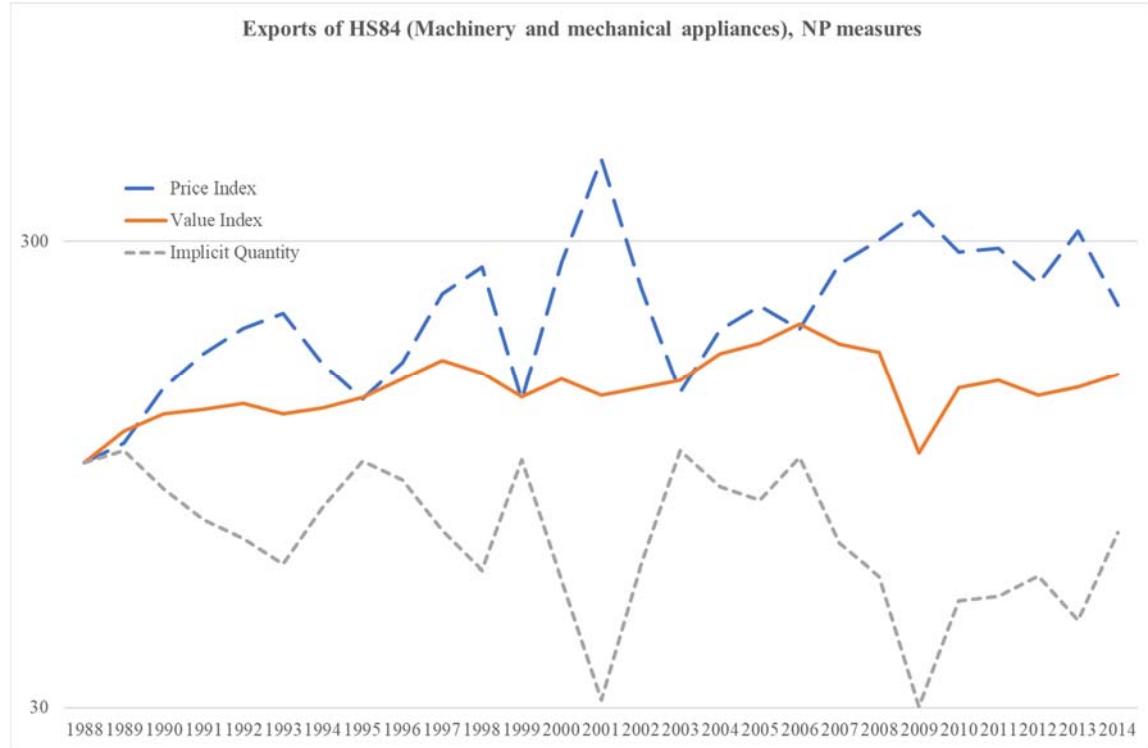
(b) imports



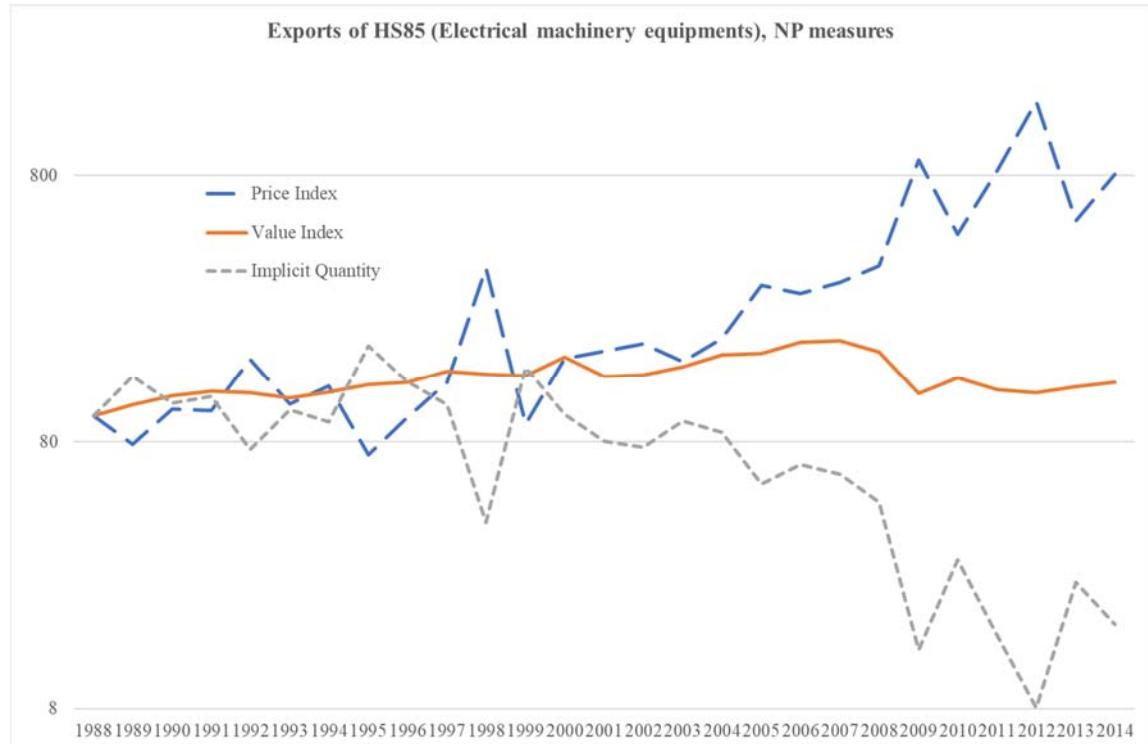
Note: For the sake of clearer presentation, the vertical axis in the figures is shown in a logarithmic scale.

Figure 4. Major HS 2-digit exports by NP measure

(a) HS 84 (machinery and mechanical appliances)



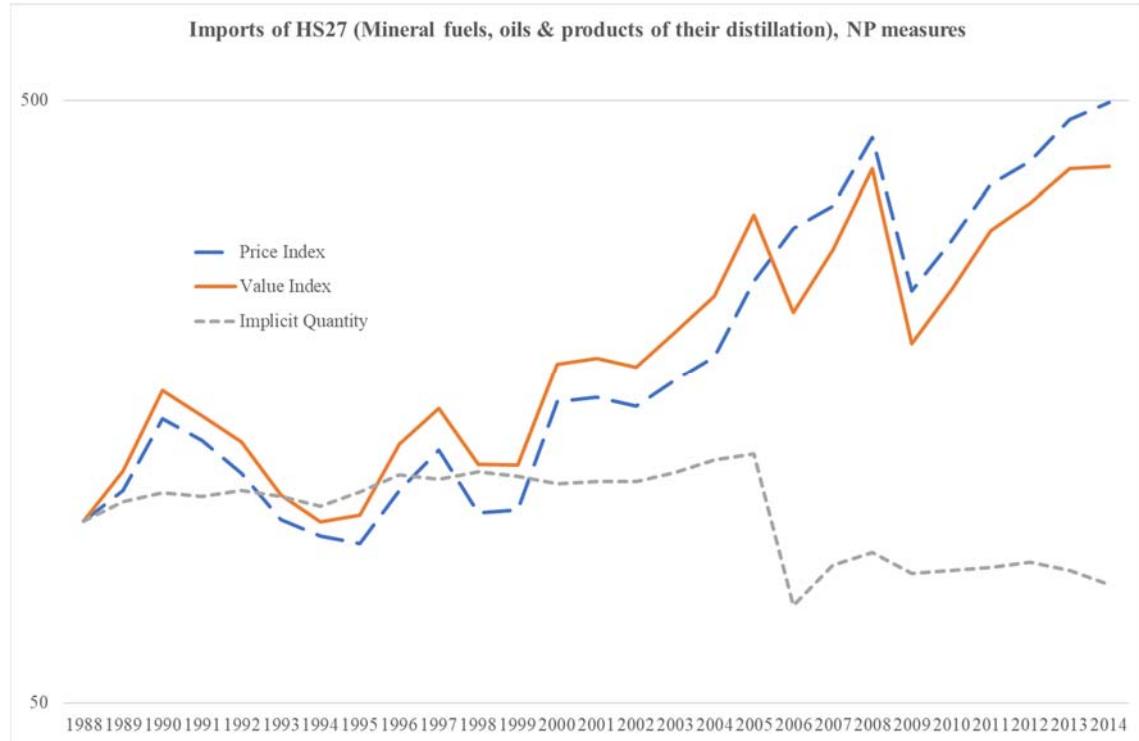
(b) HS 85 (electrical machinery equipment)



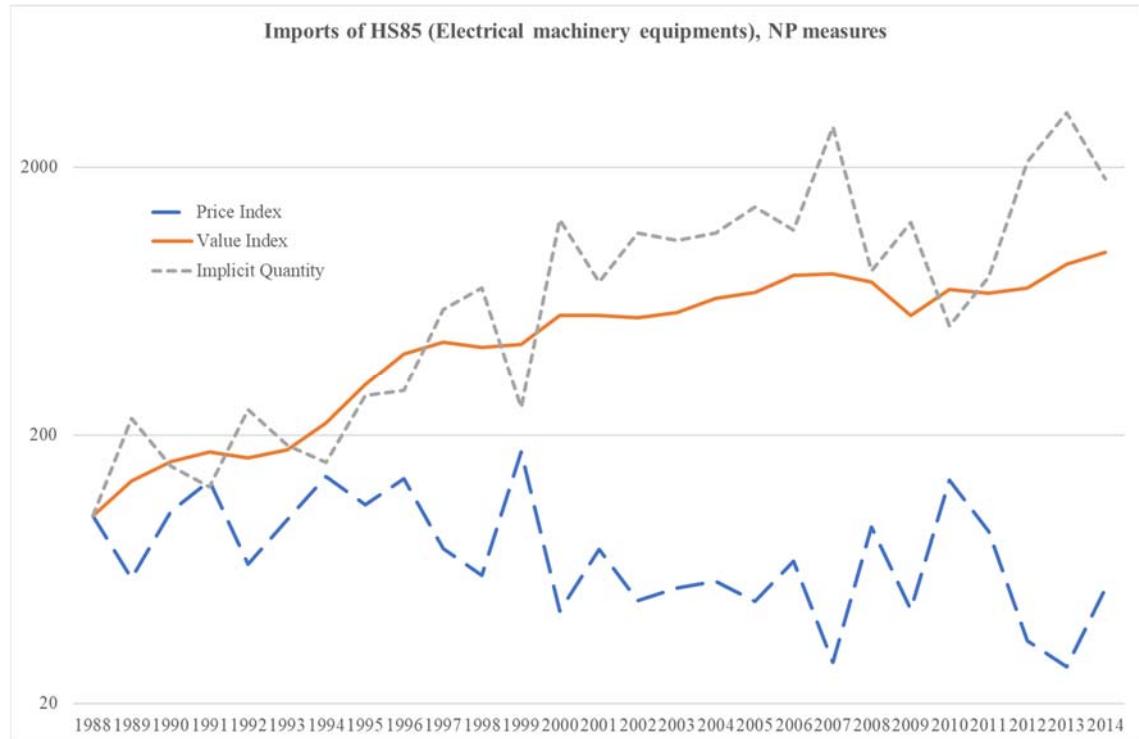
Note: For the sake of clearer presentation, the vertical axis in the figures is shown in a logarithmic scale.

Figure 5. Major HS 2-digit imports by NP measure

(a) HS 27 (mineral fuels and oils)

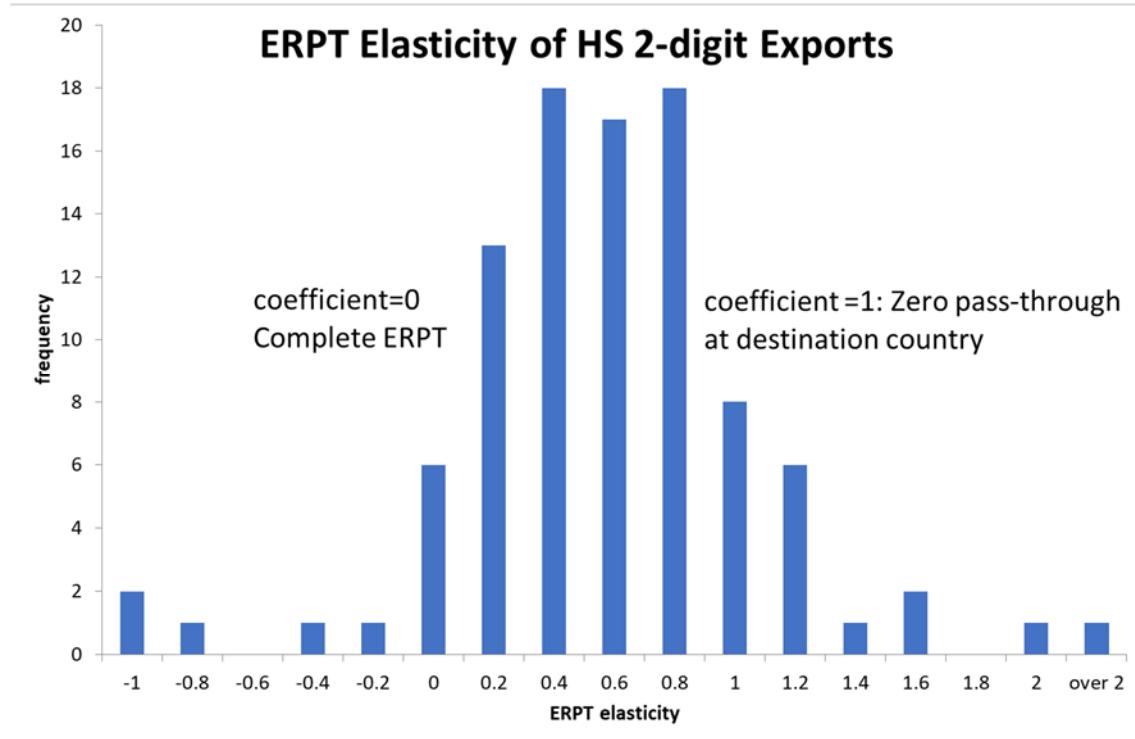


(b) HS 85 (electrical machinery equipment)



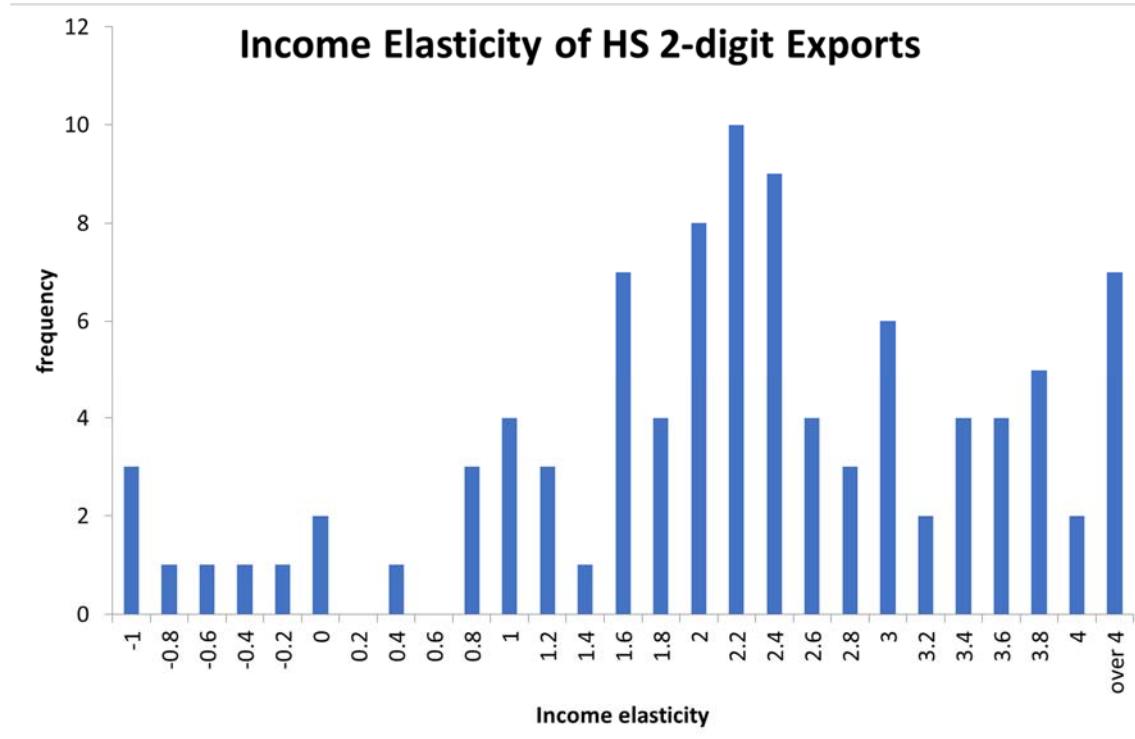
Note: For the sake of clearer presentation, the vertical axis in the figures is shown in a logarithmic scale.

Figure 6. ERPT elasticity of HS 2-digit exports (1988-2014)



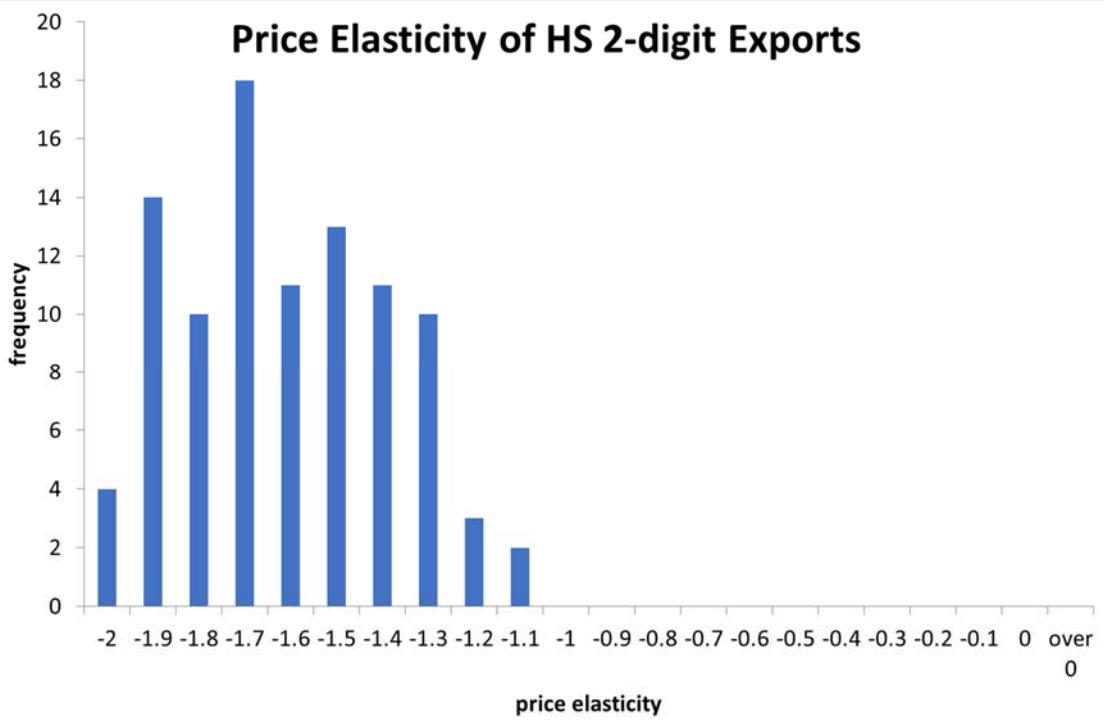
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese exports are summarized. These estimates are also shown in Table 1.

Figure 7. Income elasticity of HS 2-digit exports (1988-2014)



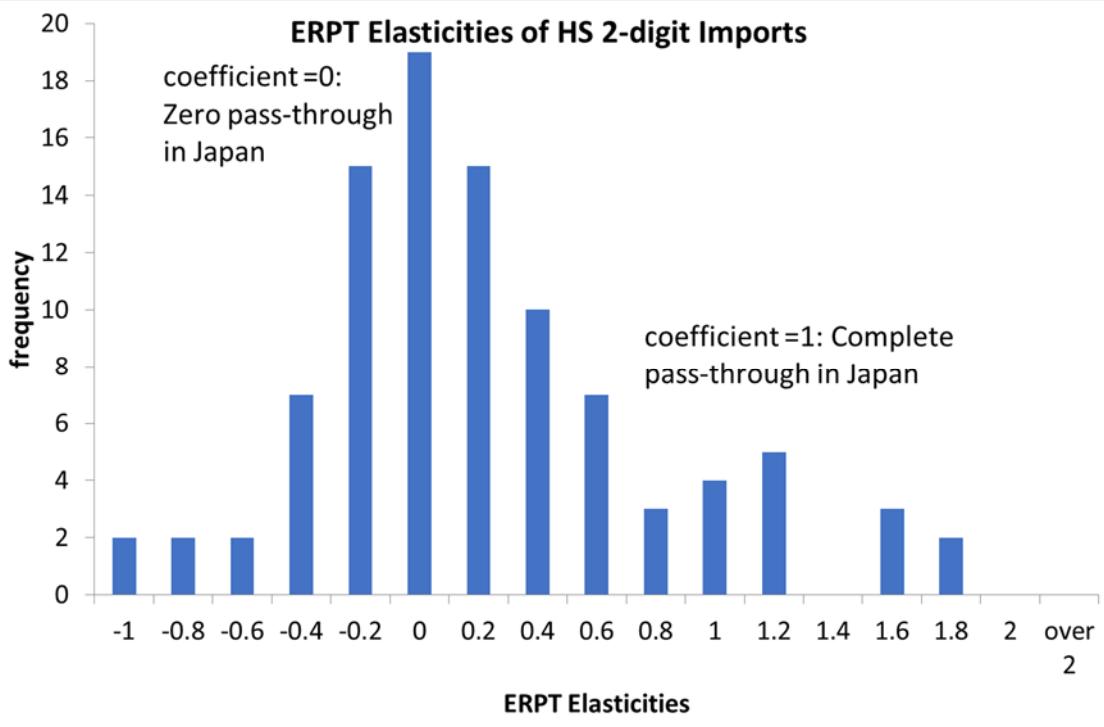
Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese exports are summarized. These estimates are also shown in Table 2.

Figure 8. Price elasticity of HS 2-digit exports (1988-2014)



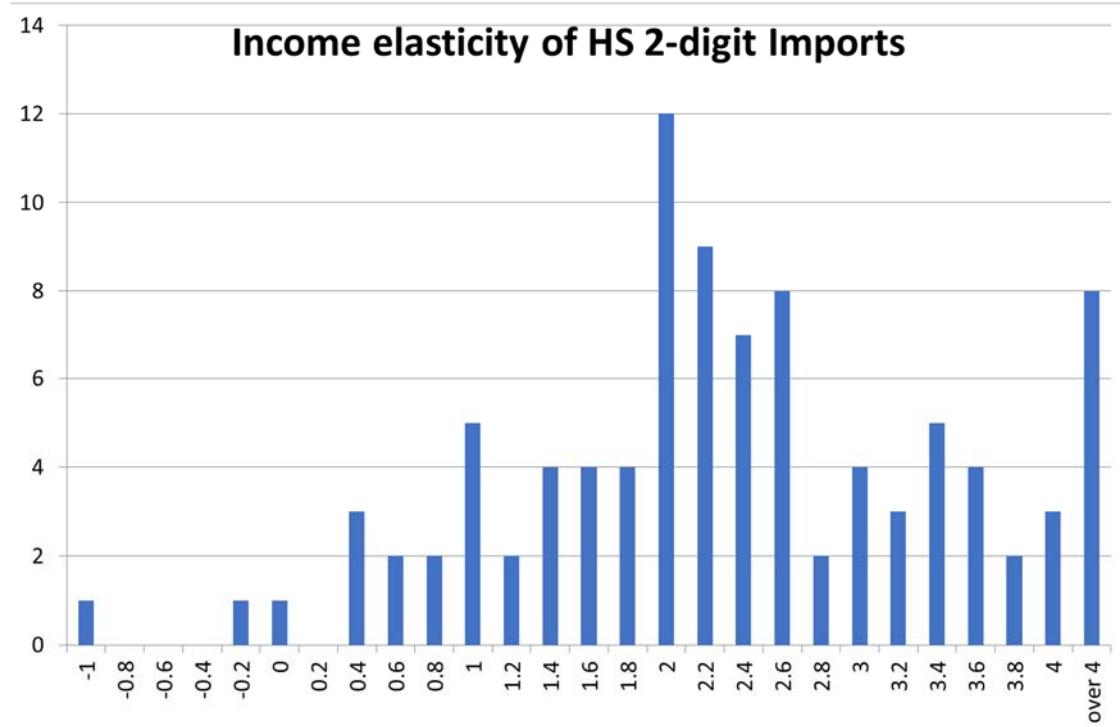
Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese exports are summarized. These estimates are also shown in Table 2.

Figure 9. ERPT elasticity of HS 2-digit imports (1988-2014)



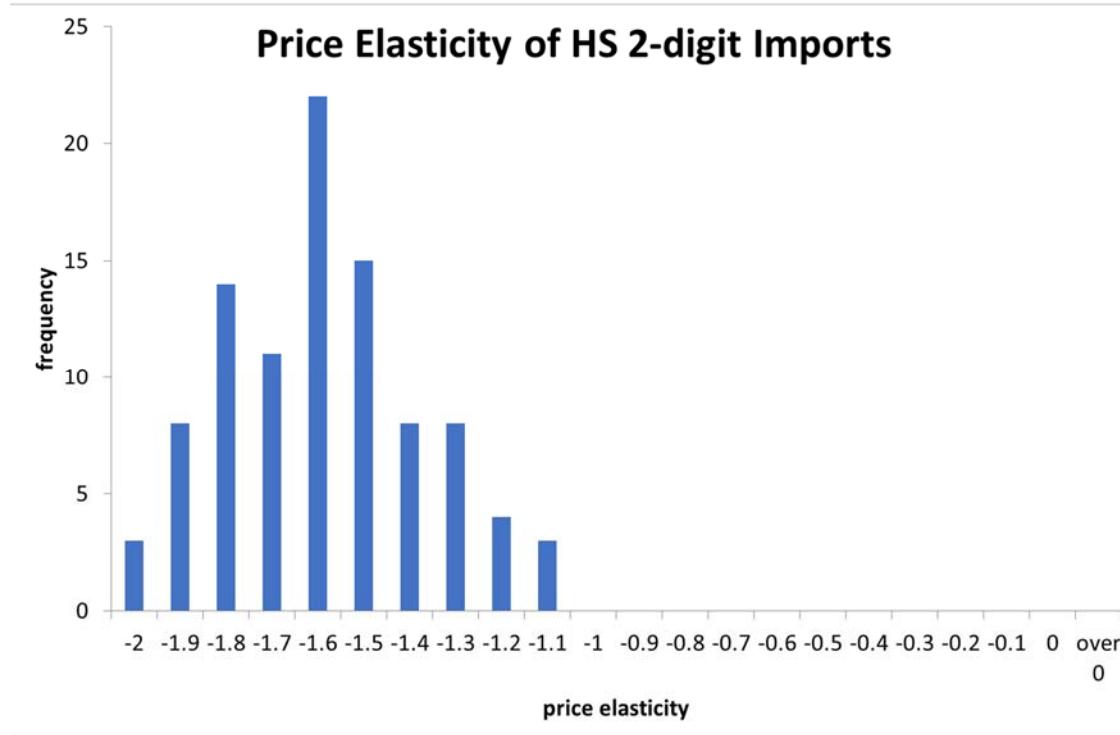
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese imports are summarized. These estimates are also shown in Table 3.

Figure 10. Income elasticity of HS 2-digit imports (1988-2014)



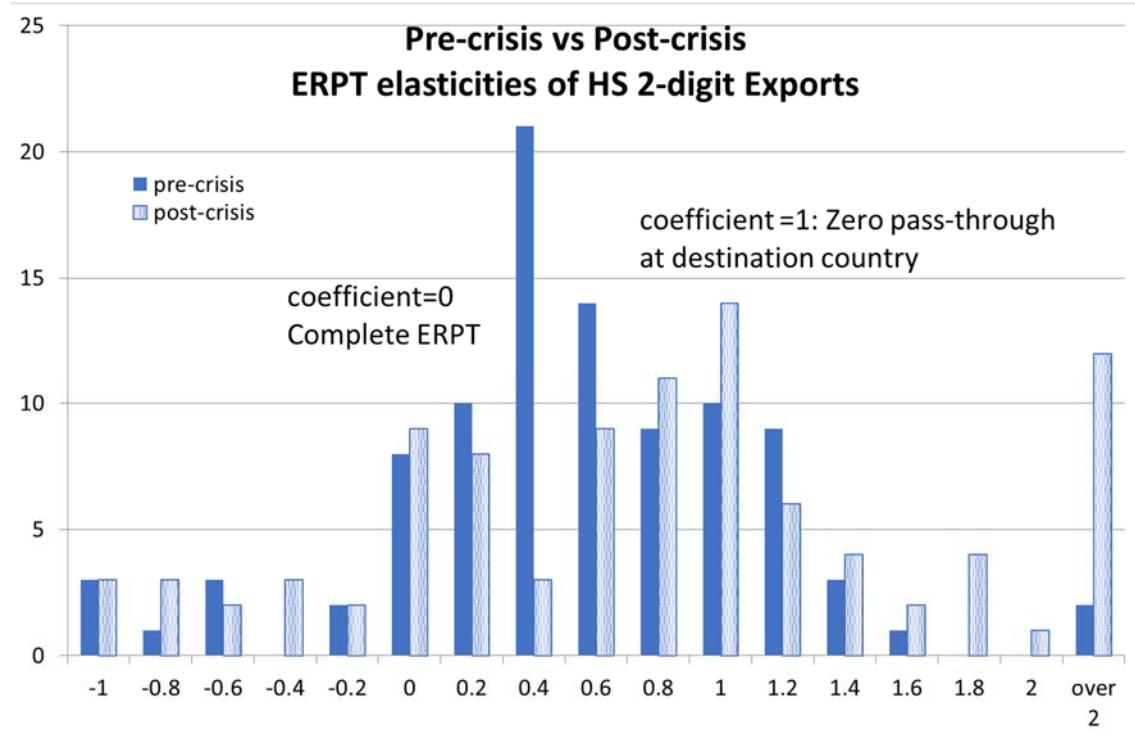
Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese imports are summarized. These estimates are also shown in Table 4.

Figure 11. Price elasticity of HS 2-digit imports (1988-2014)



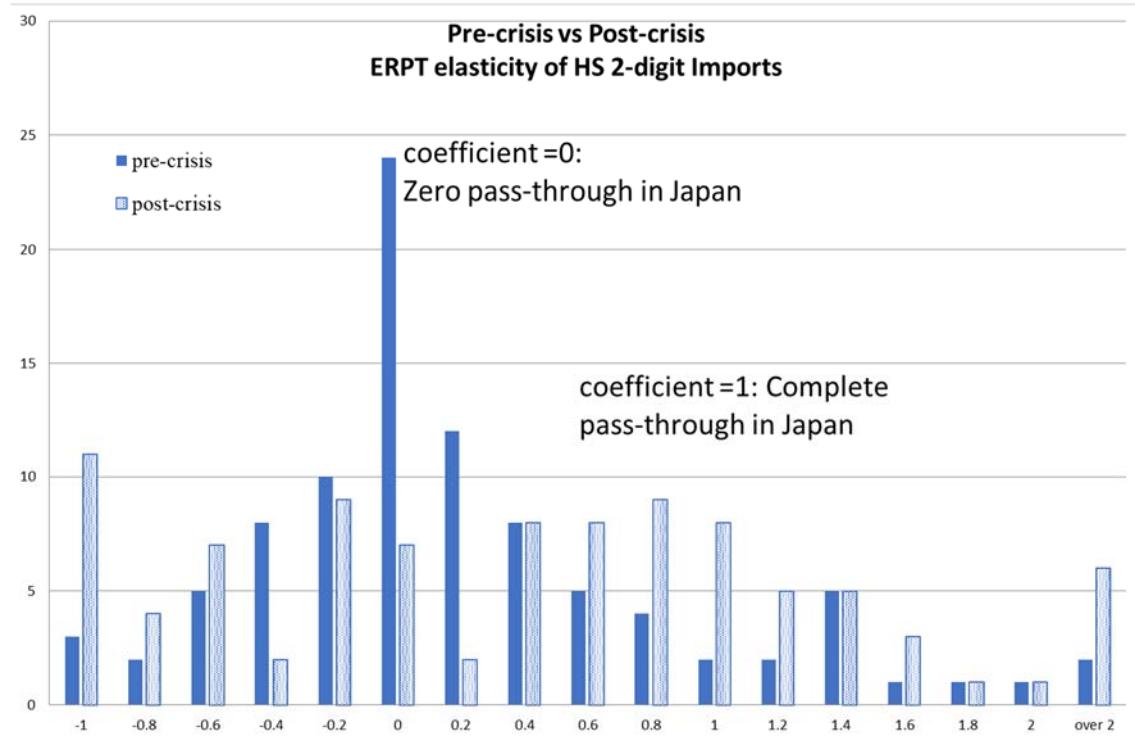
Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese imports are summarized. These estimates are also shown in Table 4.

Figure 12. Pre-crisis versus post-crisis ERPT elasticity of HS 2-digit exports



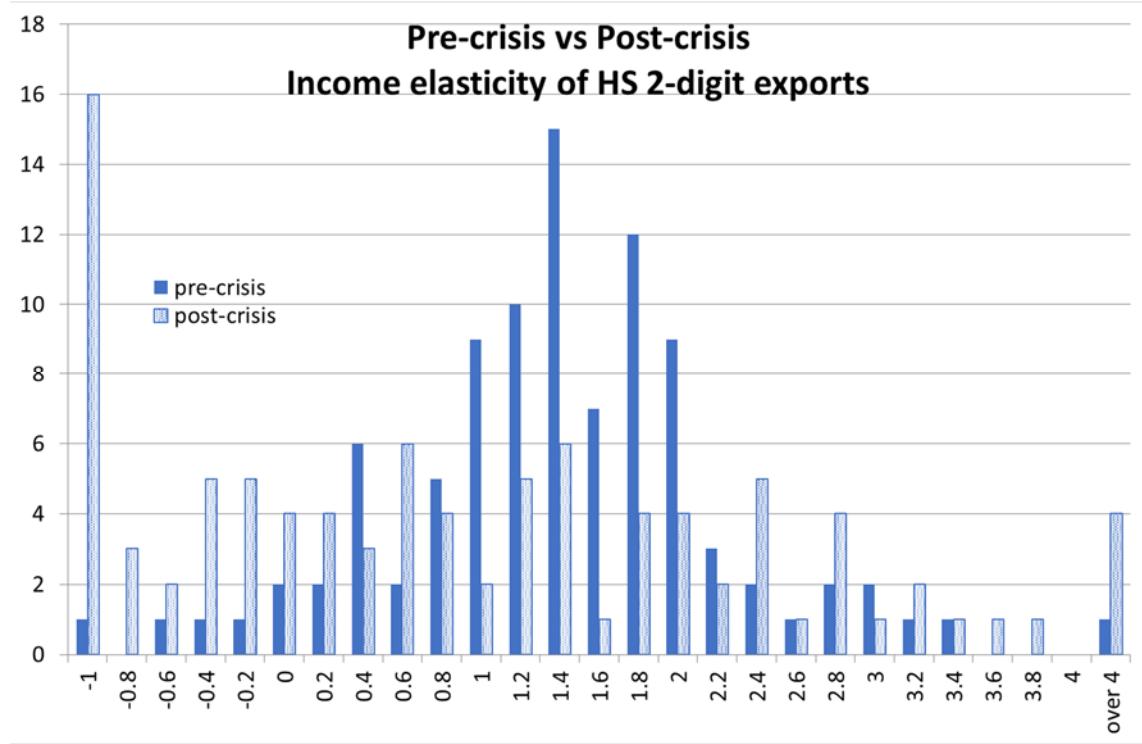
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese exports are summarized for the pre-crisis and post-crisis subsamples.

Figure 13. Pre-crisis versus post-crisis ERPT elasticity of HS 2-digit Imports



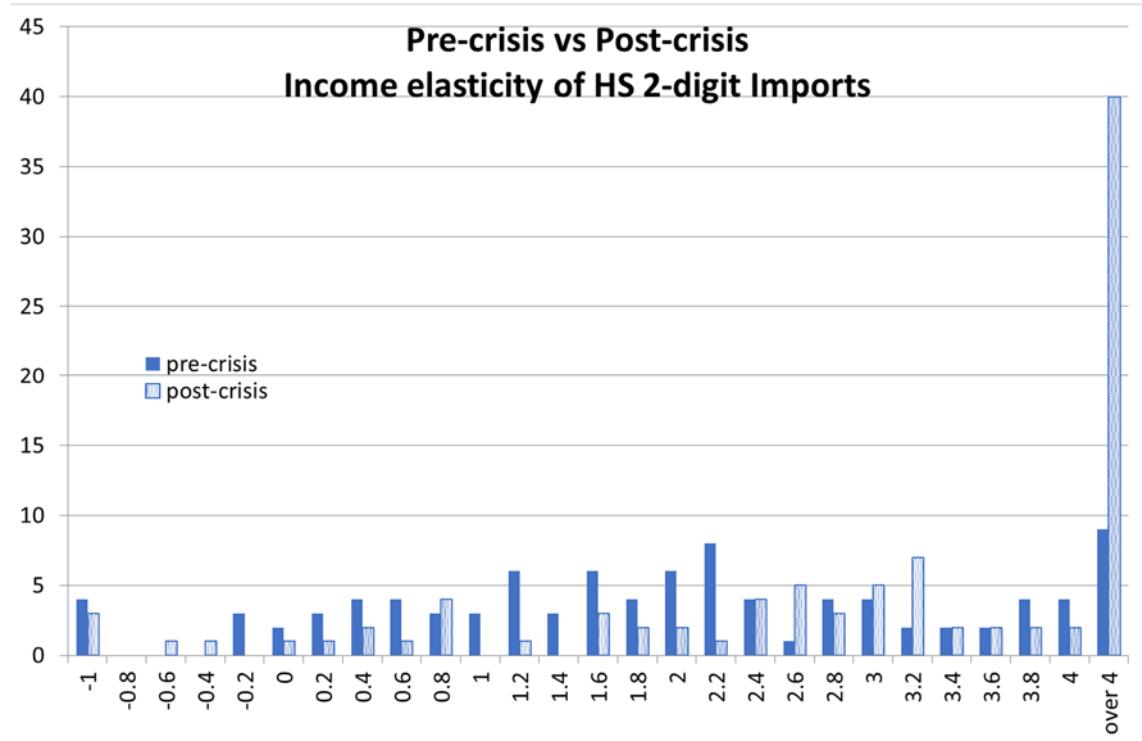
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese imports are summarized for the pre-crisis and post-crisis subsamples.

Figure 14. Pre-crisis versus post-crisis income elasticity of HS 2-digit exports



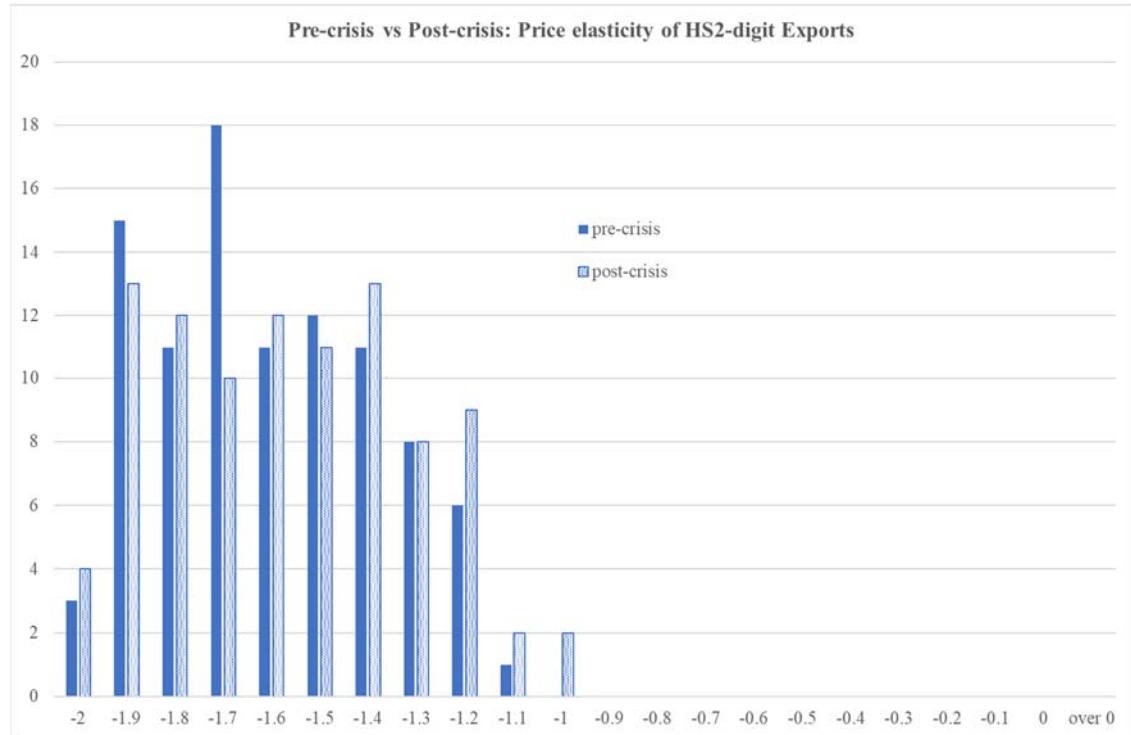
Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese exports are summarized for the pre-crisis and post-crisis subsamples.

Figure 15. Pre-crisis versus post-crisis income elasticity of HS 2-digit imports



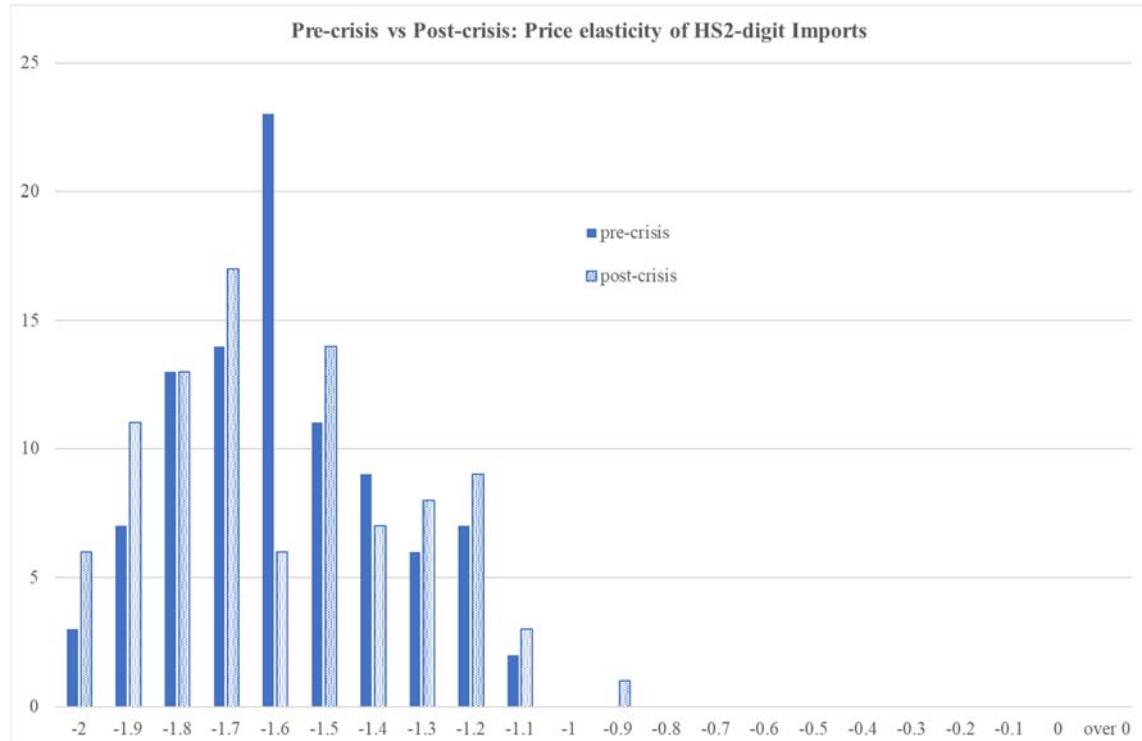
Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese imports are summarized for the pre-crisis and post-crisis subsamples.

Figure 16. Pre-crisis versus post-crisis price elasticity of HS 2-digit Exports



Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese exports are summarized for the pre-crisis and post-crisis subsamples.

Figure 17. Pre-crisis versus post-crisis price elasticity of HS 2-digit Imports



Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese imports are summarized for the pre-crisis and post-crisis subsamples.

Table 1. ERPT elasticities of HS 2-digit Exports (1988-2014)

HS2	ERPT elasticity	H0: complete pass-through		H0: zero pass-through		Structural break		ERPT elasticity	H0: complete pass-through		H0: zero pass-through		Structural break
		t-stat ($\beta=0$)	t-stat ($\beta=1$)	F	D	HS2	t-stat ($\beta=0$)	t-stat ($\beta=1$)	F	D	t-stat ($\beta=0$)	t-stat ($\beta=1$)	
1	0.242	0.18	-0.58			51	0.145	0.51			-3.03***	*	
2	0.654	0.55	-0.29			52	0.617	3.17***			-1.97**		
3	0.648	1.59	-0.86			53	0.229	0.57			-1.91*		
4	0.530	0.71	-0.63			54	0.139	0.80			-4.99***	**	
5	0.452	0.48	-0.59			55	0.164	1.20			-6.14***		
6	-0.040	-0.05	-1.31	*		56	0.141	0.88			-5.34***		
7	-0.164	-0.27	-1.90*			57	2.273	4.19***			2.35**		
8	0.642	1.31	-0.73			58	0.416	1.53			-2.14**		
9	0.189	0.94	-4.01***	*		59	0.188	0.87			-3.76***		
10	-4.437	-4.76***	-5.83***	***		60	0.518	1.78*			-1.66*		
11	0.249	0.38	-1.15			61	1.179	3.77***			0.57		
12	0.471	1.00	-1.12	*	**	62	0.370	1.12			-1.91*		
13	0.944	2.31**	-0.14			63	0.218	0.59			-2.14**		
14	0.534	0.70	-0.61			64	0.782	2.62***			-0.73		
15	0.090	0.12	-1.24			65	1.088	3.50***			0.28		
16	1.126	3.03***	0.34			66	0.328	0.34			-0.70		
17	1.425	2.93***	0.87			67	0.352	0.52			-0.95		
18	0.072	0.18	-2.26**			68	0.945	4.62***			-0.27		
19	0.824	4.13***	-0.88			69	1.157	2.86***			0.39	**	
20	0.949	3.69***	-0.20			70	0.450	1.69*			-2.07**		
21	0.547	3.51***	-2.90***			71	0.649	0.92			-0.50		
22	0.349	1.63	-3.04***			72	0.645	3.24***			-1.78*		
23	-0.256	-0.87	-4.29***			73	0.602	2.73***			-1.80*		
24	0.331	0.41	-0.82			74	0.392	1.40			-2.17**		
25	1.854	4.11***	1.89*			75	-0.401	-0.56			-1.97**		
26	0.894	1.09	-0.13			76	1.173	3.06***			0.45		
27	0.692	1.03	-0.46			78	0.542	0.71			-0.60	**	
28	-0.158	-0.40	-2.91***			79	0.943	1.81*			-0.11	*	
29	0.156	0.34	-1.83*			80	0.749	1.54			-0.52		
30	0.166	0.68	-3.42***	**		81	1.114	2.74***			0.28		
31	0.220	0.50	-1.77*	*		82	0.678	2.07**			-0.98		
32	0.565	2.38**	-1.83*	*		83	0.797	5.33***			-1.36	***	
33	0.344	2.63***	-5.01***			84	0.806	1.82*			-0.44	**	
34	0.516	2.07**	-1.94*			85	-0.198	-0.36			-2.20**		
35	0.698	3.05***	-1.32			86	-1.385	-1.13			-1.95*		
36	0.962	1.78*	-0.07			87	0.753	4.74***			-1.56		
37	0.765	1.46	-0.45			88	-0.962	-1.03			-2.11**		
38	0.245	0.79	-2.44**			89	0.456	0.59			-0.70		
39	0.482	3.81***	-4.09***	***		90	0.038	0.15			-3.94***		
40	0.553	3.46***	-2.80***			91	0.510	1.45			-1.40		
41	0.290	0.71	-1.74*			92	0.199	1.34			-5.38***		
42	0.439	1.00	-1.27			93	0.365	0.51			-0.89		
43	1.355	1.40	0.37			94	0.700	1.81*			-0.77		
44	-0.027	-0.06	-2.28**			95	0.001	0.00			-2.37**		
45	-0.038	-0.03	-0.80			96	0.419	2.10**			-2.92***	***	
46	1.506	1.97**	0.66			97	0.613	0.93			-0.59		
47	0.338	0.41	-0.79										
48	0.285	1.47	-3.69***										
49	0.608	1.57	-1.01										
50	0.342	0.79	-1.52										

Note: The log of the export price index is regressed on the first difference of the log of the exchange rate. Both null hypotheses of complete pass-through ($\beta = 0$) and zero pass-through ($\beta = 1$) are tested. F is the structural break test by the Chow-test, and D is the post-crisis dummy that interacts with the exchange rate. The asterisks *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 2. Income and price elasticity of HS 2-digit exports (1988-2014)

HS2	Structural break						Structural break							
	income elasticity		price elasticity		F		Dummy		income elasticity		price elasticity		F	
					*	*	income	price					*	**
1	3.999		-2.061***						51	-0.083		-1.322***		
2	2.055		-1.383***						52	0.781**		-1.333***		
3	1.078***		-1.433***						53	0.482		-1.246***		
4	-0.022		-1.437***						54	1.492***		-1.754***		
5	1.595		-1.874***						55	0.841***		-1.335***		
6	0.616		-1.872***		***				56	1.277***		-1.558***		***
7	1.683*		-1.803***			**	**		57	1.797**		-1.471***		
8	0.951		-1.496***						58	1.448***		-1.549***		**
9	0.384		-1.338***						59	1.454***		-1.669***		***
10	3.667***		-1.342***						60	1.361***		-1.343***		** ***
11	0.954		-1.856***						61	1.653***		-1.522***		
12	0.980**		-1.916***		*				62	2.315***		-1.530***		*
13	1.467**		-1.730***						63	1.640***		-1.787***		**
14	2.297*		-1.608***						64	1.245***		-1.325***		
15	-0.472		-1.944***						65	2.525***		-1.603***		
16	1.053**		-1.412***						66	1.069		-1.679***		
17	0.300		-1.760***						67	-0.017		-1.774***		*** ** ***
18	1.084**		-1.187***		*				68	1.302***		-1.761***		
19	-0.121		-1.193***		*				69	2.196***		-1.916***		
20	0.950**		-1.439***		*	*			70	1.479***		-1.776***		**
21	0.251		-1.251***		**				71	1.981***		-1.898***		*** ** **
22	1.410***		-1.540***			**	**		72	1.526***		-1.449***		
23	0.726		-1.571***		**	***	***		73	1.301***		-1.746***		*
24	0.408		-1.231***						74	1.699***		-1.682***		***
25	1.770***		-1.791***						75	2.272**		-1.727***	*	** ***
26	2.755**		-1.798***						76	1.569***		-1.782***		
27	0.901		-1.409***		***	**	**		78	1.274		-1.614***		
28	2.191***		-1.936***						79	1.013*		-1.560***		*** *
29	1.526***		-2.006***		***	**			80	1.574**		-1.472***		
30	0.430		-1.806***		***	**			81	0.559		-1.566***		
31	2.459***		-1.518***						82	1.269***		-1.715***		
32	1.798***		-1.858***			**			83	1.387***		-1.685***		*
33	0.798***		-1.345***		***	**			84	2.339***		-1.995***		
34	1.062***		-1.569***		**	*			85	2.067***		-1.978***		*
35	1.174***		-1.715***			*			86	-3.173		-1.962***		
36	1.036		-1.611***						87	1.713***		-1.538***		
37	1.119***		-1.972***		*	**			88	1.063		-2.019***	*	*
38	1.520***		-1.924***			*			89	0.455		-2.410***		*
39	1.323***		-1.641***						90	1.543***		-1.917***		
40	1.753***		-1.858***						91	0.915*		-1.713***		** **
41	0.919		-1.582***						92	0.860***		-1.403***		**
42	1.738***		-1.825***						93	-0.412		-1.638***		
43	0.517		-1.491***						94	1.793***		-1.913***		**
44	1.973***		-1.937***		**	*			95	1.258**		-1.748***		
45	1.460		-1.910***			*			96	1.244***		-1.820***		**
46	0.692		-1.641***						97	1.835		-1.713***		
47	3.033***		-1.399***											
48	1.141***		-1.758***			**								
49	1.740***		-1.989***											
50	0.608		-1.528***											

Note: Implicit quantity indices are regressed on the destination countries' income and price indices along destination fixed effects. F is the structural break test by the Chow-test, and income and price under D are the post-crisis dummies that interact with income and price, respectively. The asterisks *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 3. ERPT elasticities of HS 2-digit imports (1988-2014)

HS2	ERPT elasticity	H0: zero pass-through ($\beta=0$)	H0: complete pass-through t-stat ($\beta=1$)	Structural break		HS2	ERPT elasticity	H0: zero pass-through ($\beta=0$)	H0: complete pass-through t-stat ($\beta=1$)	Structural break	
		F	D	F	D			F	D	F	D
1	0.430	0.56	-0.75			51	0.638	1.38	-0.78		
2	-0.999	-1.49	-2.99***			52	0.906	2.44**	-0.25		
3	-0.632	-3.63***	-9.38***	*		53	-0.798	-2.34**	-5.27***		
4	-0.199	-0.42	-2.52**			54	0.368	0.93	-1.59	*	
5	0.452	0.96	-1.16			55	-0.076	-0.19	-2.66***	***	
6	-0.304	-1.33	-5.69***			56	-0.243	-0.70	-3.58***		
7	0.497	1.27	-1.29			57	0.149	0.62	-3.57***		
8	0.314	1.45	-3.17***			58	0.039	0.09	-2.08**		
9	0.468	1.90*	-2.17**			59	0.038	0.11	-2.69***		
10	0.522	0.86	-0.79			60	-0.058	-0.16	-2.89***		
11	-0.353	-0.69	-2.65***			61	1.086	4.39***	0.35		
12	0.179	0.73	-3.32***			62	0.001	0.00	-3.17***		
13	0.026	0.11	-4.14***			63	-0.486	-1.88*	-5.76***		
14	-0.069	-0.17	-2.69***			64	0.507	1.93*	-1.87*		
15	-0.234	-0.80	-4.23***			65	0.212	0.72	-2.68***		
16	-0.083	-0.41	-5.42***			66	1.695	2.70***	1.11		
17	-0.077	-0.23	-3.26***			67	1.191	2.71***	0.44		
18	0.300	1.35	-3.15***			68	0.393	1.15	-1.77*		
19	-0.244	-1.03	-5.26***			69	0.612	1.88*	-1.19		
20	-0.178	-0.89	-5.92***	**		70	-0.016	-0.05	-3.46***		
21	0.013	0.06	-4.28***	***		71	0.103	0.18	-1.53		
22	-0.449	-1.56	-5.04***			72	-0.247	-0.80	-4.04***	**	
23	-0.311	-1.18	-4.98***			73	0.947	2.94***	-0.16		
24	-0.109	-0.17	-1.73*			74	0.233	0.81	-2.65***	***	
25	-0.052	-0.28	-5.63***			75	0.389	0.80	-1.26		
26	-0.343	-0.82	-3.22***			76	0.017	0.08	-4.77***	**	**
27	-0.110	-0.40	-4.07***			78	-0.249	-0.29	-1.44		
28	1.712	3.57***	1.49			79	-0.531	-0.75	-2.17**	*	
29	0.831	1.86*	-0.38	** *		80	0.040	0.10	-2.41**	***	
30	-1.080	-2.32**	-4.47***			81	0.235	0.45	-1.46		
31	0.021	0.07	-3.11***			82	0.009	0.02	-2.38**	**	
32	-0.123	-0.26	-2.41**			83	-0.192	-0.97	-6.03***		
33	-0.162	-0.67	-4.79***			84	-0.130	-0.33	-2.86***		
34	-0.267	-0.62	-2.94***			85	-0.513	-1.08	-3.19***		
35	0.051	0.09	-1.61			86	1.567	1.57	0.57		
36	-1.128	-1.80*	-3.40***			87	0.552	1.68*	-1.36		
37	-0.497	-0.95	-2.87***			88	0.647	0.75	-0.41	**	
38	1.152	2.20**	0.29			89	1.036	1.22	0.04		
39	-0.962	-2.90***	-5.92***			90	1.575	3.87***	1.41		
40	1.084	2.50**	0.19	***		91	1.431	2.77***	0.83		
41	-0.466	-1.59	-5.00***			92	-0.140	-0.30	-2.41**		
42	0.935	2.74***	-0.19			93	-0.384	-0.47	-1.70*		
43	-0.384	-0.82	-2.94***			94	0.041	0.13	-3.10***		
44	-0.511	-2.99***	-8.84***	*		95	-0.056	-0.16	-2.98***		
45	-0.206	-0.24	-1.41			96	-0.064	-0.19	-3.22***		
46	0.334	0.71	-1.41			97	0.200	0.49	-1.97*	*	
47	-0.021	-0.06	-2.79***								
48	-0.226	-0.80	-4.31***								
49	0.106	0.23	-1.96*								
50	-0.223	-0.58	-3.20***								

Note: The log of the export price index is regressed on the first difference of the log of the exchange rate. Both null hypotheses of zero pass-through ($\beta=0$) and complete pass-through ($\beta=1$) are tested. F is the structural break test by the Chow-test, and D is the post-crisis dummy that interacts with the exchange rate. The asterisks *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

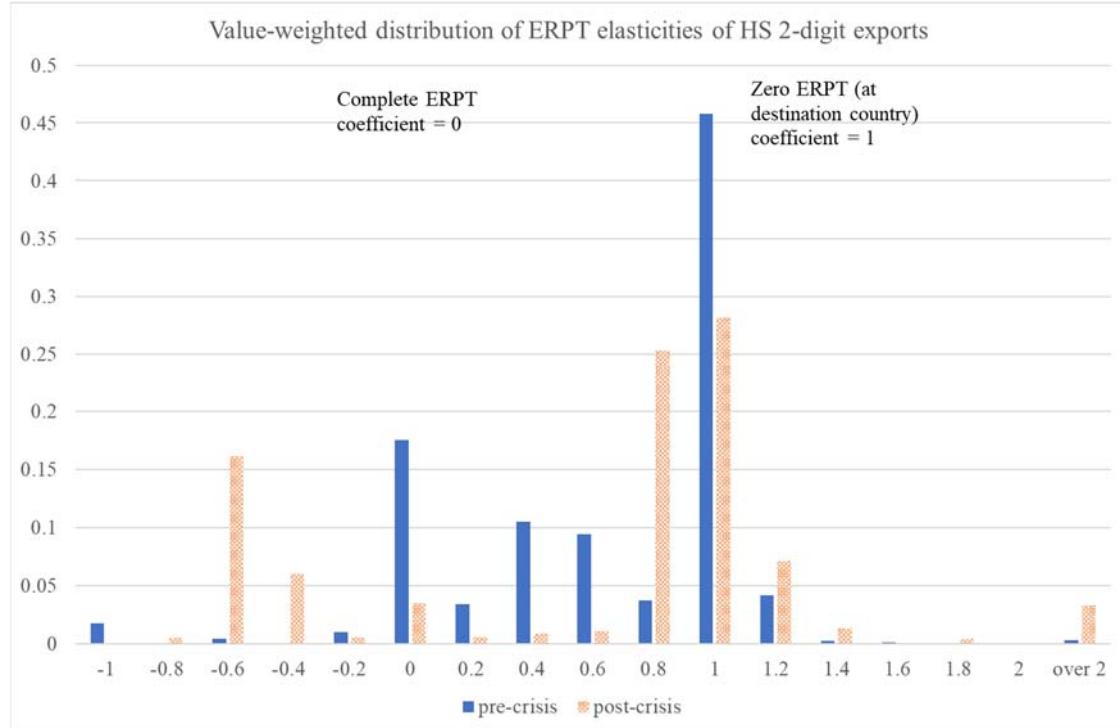
Table 4. Income elasticity of HS 2-digit imports (1988-2014)

HS2	Structural break						Structural break								
	Dummy			F	income			HS2	income			F	Dummy		
		income	price			income	price			income	price		**	*	
1	1.953	-2.005***						51	0.561	-1.320***					
2	1.319**	-1.179***						52	1.987**	-1.378***					
3	1.150**	-1.320***						53	0.217	-1.418***	***				
4	1.825	-1.668***		*				54	2.761***	-1.433***	*	*			
5	-0.382	-1.814***						55	2.695***	-1.335***					
6	2.972***	-1.831***	***		**			56	2.195***	-1.525***					
7	0.977	-1.758***						57	2.209**	-1.672***					
8	0.792	-1.462***						58	2.586***	-1.596***					
9	1.919**	-1.641***	**					59	1.932***	-1.370***	***	**			
10	0.351	-1.257***	***	***				60	2.061***	-1.290***					
11	3.388***	-1.692***						61	3.533***	-1.648***					
12	1.498	-1.686***						62	4.134***	-1.582***					
13	1.489	-1.567***						63	1.750**	-1.852***					
14	0.876	-1.612***						64	2.957***	-1.650***	***	**			
15	1.762***	-1.537***	***	**	**			65	2.415***	-1.671***					
16	2.408***	-1.747***						66	4.934***	-1.704***					
17	1.123*	-1.840***			**			67	1.641	-1.615***					
18	0.728*	-1.245***			*			68	3.101***	-1.819***					
19	1.861***	-1.296***	***					69	1.865*	-1.921***	**				
20	2.007***	-1.428***						70	2.327***	-1.629***	*				
21	0.896	-1.549***						71	1.956	-1.731***	***	*	**		
22	0.824	-1.537***						72	2.053***	-1.323***					
23	1.914***	-1.510***						73	2.547**	-1.691***					
24	0.243	-1.146***	***		**			74	2.448***	-1.415***	*	***			
25	1.415*	-1.451***						75	3.882***	-1.540***	***				
26	2.314*	-1.688***	*	**				76	0.930*	-1.407***	***	***			
27	4.295***	-1.471***		***				78	2.114	-1.549***		***			
28	1.925*	-1.752***						79	3.234**	-1.571***					
29	1.886**	-1.778***	***	***				80	2.420*	-1.583***	***				
30	-0.137	-1.787***						81	3.529**	-1.685***	***	***			
31	1.773***	-1.364***	**	***				82	3.348***	-1.707***	*				
32	3.098***	-1.664***		*				83	3.776***	-1.659***					
33	1.565**	-1.631***			*			84	3.467***	-1.959***	***				
34	2.403***	-1.772***						85	3.282***	-1.946***					
35	1.347	-1.849***						86	9.076***	-1.960***	**				
36	2.079	-1.579***						87	4.691***	-1.989***					
37	-1.314	-1.813***						88	1.389	-2.020***					
38	1.902**	-1.883***	***					89	2.229	-2.146***					
39	2.002***	-1.678***	***					90	4.152***	-1.856***					
40	2.492***	-1.719***	**	***				91	4.492***	-1.896***					
41	2.293***	-1.676***			**			92	4.720***	-1.924***					
42	3.250***	-1.715***	***	*				93	2.805*	-1.673***					
43	0.558	-1.646***						94	3.959***	-1.907***					
44	2.215***	-1.689***						95	3.567***	-1.824***					
45	3.910**	-1.804***						96	2.192***	-1.816***					
46	2.950***	-1.539***						97	3.748	-1.861***					
47	2.202**	-1.156***													
48	1.265	-1.580***	***	***											
49	3.086***	-1.919***													
50	2.198**	-1.396***		***											

Note: Implicit quantity indices are regressed on Japanese income and price indices along exporters' fixed effects. F is the structural break test by the Chow-test, and income and price under D are the post-crisis dummies that interact with income and price, respectively. The asterisks *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

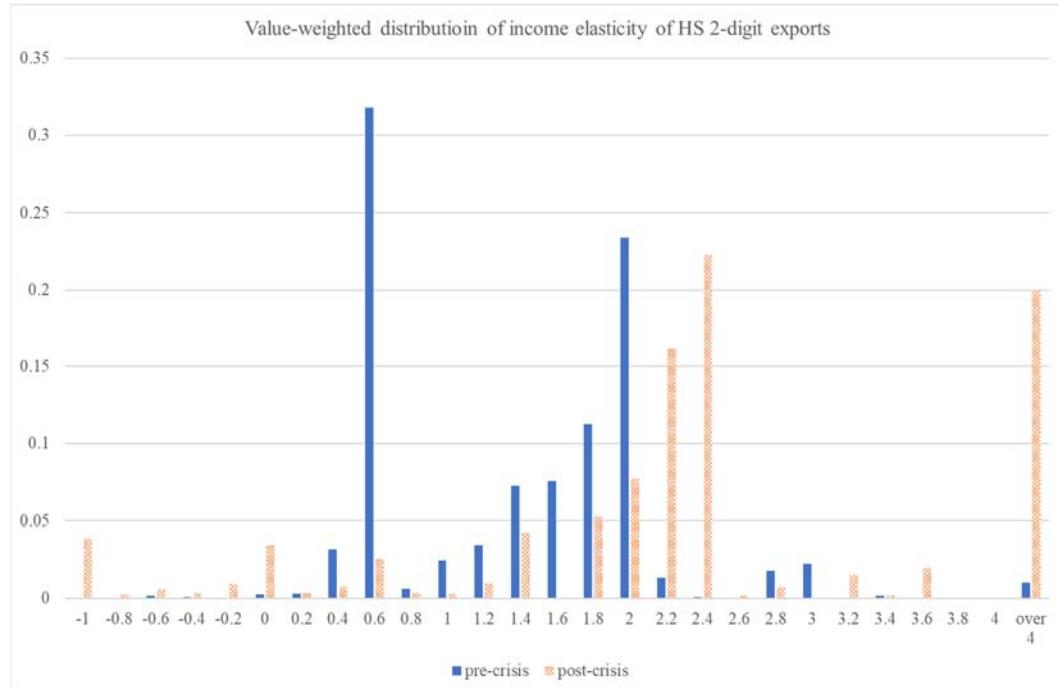
Appendix E. Value-weighted Distribution of Estimated Elasticities

Figure E1. Pre-crisis versus post-crisis ERPT elasticity of HS 2-digit exports



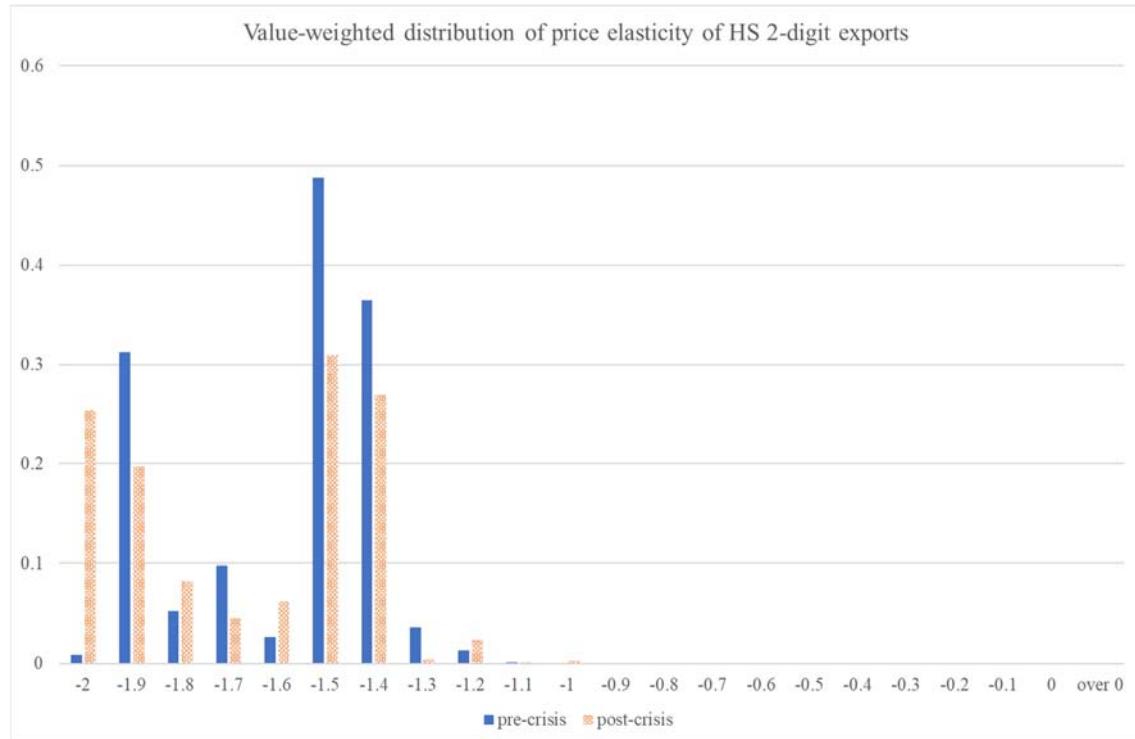
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese exports are weighted by the trade share for the pre-crisis and post-crisis subsamples.

Figure E2. Pre-crisis versus post-crisis income elasticity of HS 2-digit Exports



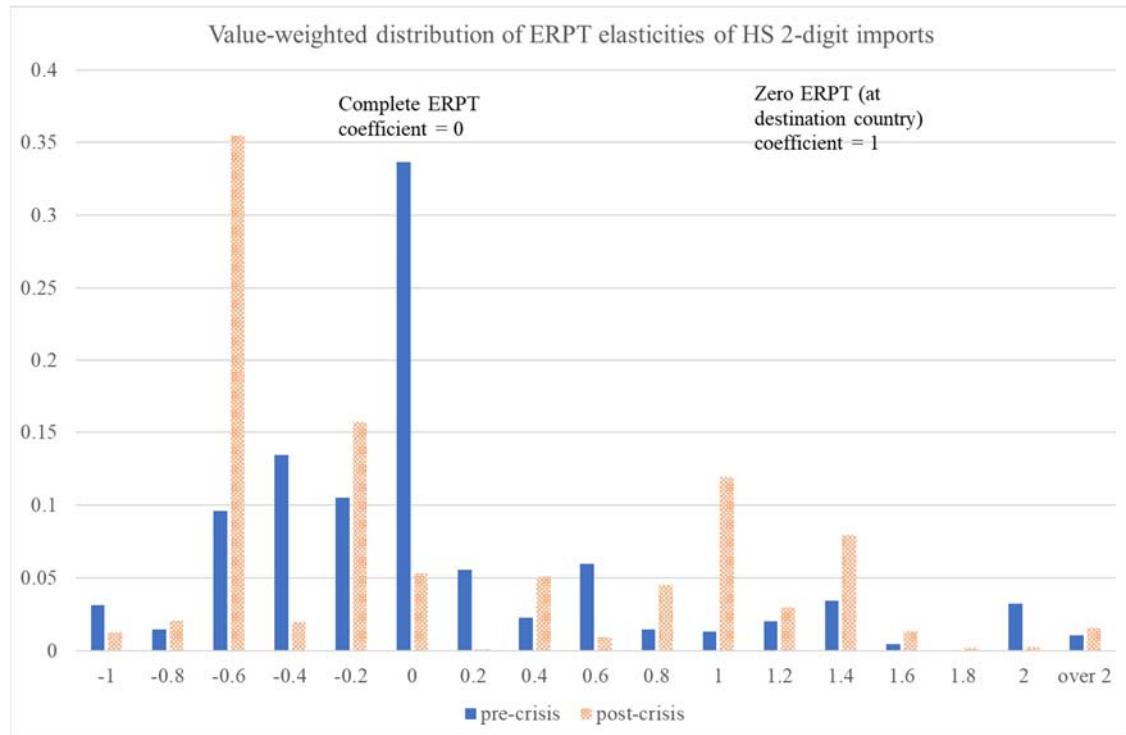
Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese exports are weighted by the trade share for the pre-crisis and post-crisis subsamples.

Figure E3. Pre-crisis versus post-crisis price elasticity of HS 2-digit exports



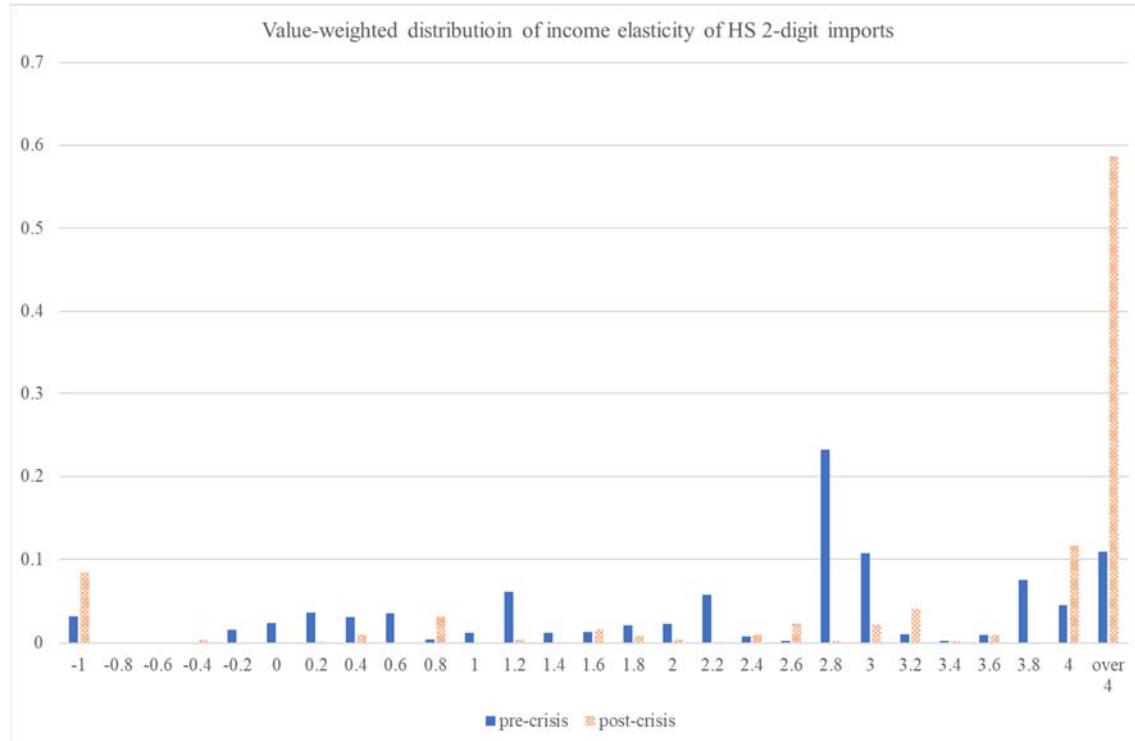
Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese exports are weighted by the trade share for the pre-crisis and post-crisis subsamples.

Figure E4. Pre-crisis versus post-crisis ERPT elasticity of HS 2-digit imports



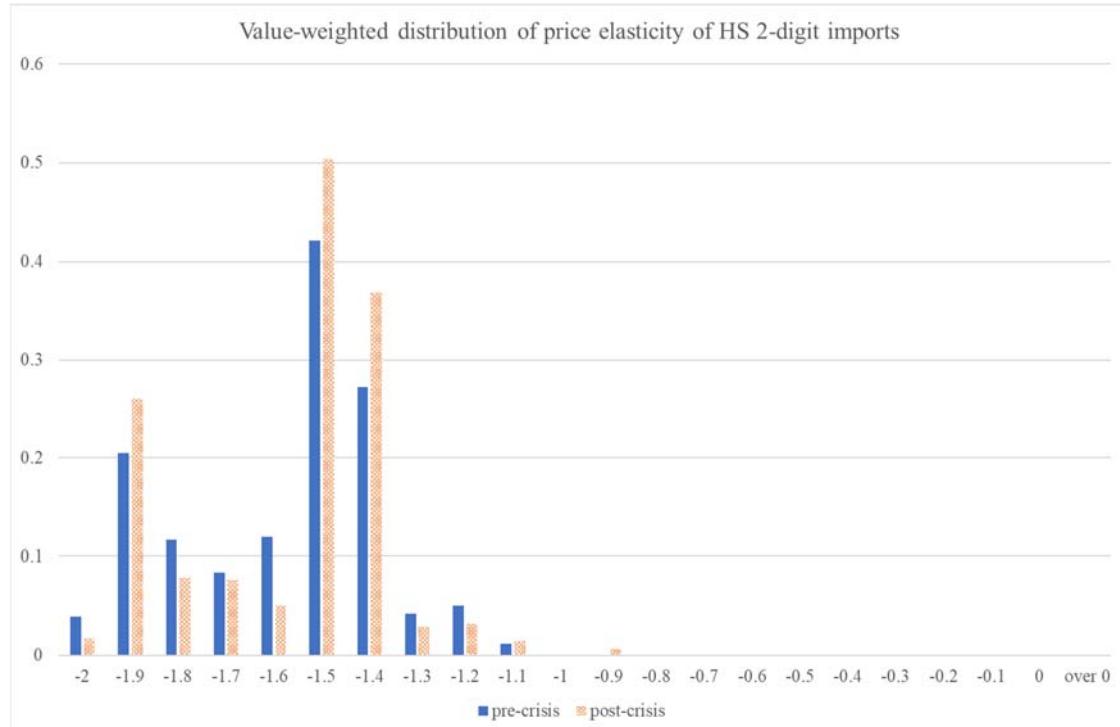
Note: The point estimates of ERPT elasticity coefficients of HS 2-digit Japanese imports are weighted by the trade share for the pre-crisis and post-crisis subsamples.

Figure E5. Pre-crisis versus post-crisis income elasticity of HS 2-digit imports



Note: The point estimates of income elasticity coefficients of HS 2-digit Japanese imports are weighted by the trade share for the pre-crisis and post-crisis subsamples.

Figure E6. Pre-crisis versus post-crisis price elasticity of HS 2-digit imports



Note: The point estimates of price elasticity coefficients of HS 2-digit Japanese imports are weighted by the trade share for the pre-crisis and post-crisis subsamples.