Chapter 4　Trade and economic relation between Japan and the world as seen through the damage caused by Great East Japan Earthquake

Due to the impact of Great East Japan Earthquake, which occurred on March 11, 2011 (hereafter, in sections 1 and 2 of this chapter, referred to as "this earthquake") the Tohoku area of Japan suffered wide ranging damages and the production base of the Japanese industry were seriously damaged. In such a dire situation, since some parts of the Japanese automotive and electronic parts (such as semiconductors) industries, and related industrial manufacturing materials necessary for those productions are located in the three severely damaged Tohoku prefectures of Iwate, Miyagi, and Fukushima and neighborhood areas of Ibaraki etc. (herein after referred to as "disaster-stricken area"), a concern was expressed from various quarters that supply of parts and materials from disaster-stricken areas may be delayed or interrupted. In fact, some of the domestic and foreign production activities were affected.

Therefore, in this chapter we have analyzed importance of trade and economic relations between Japan and the world as seen through Great East Japan Earthquake damage, from the point of view of "Supply chain in global production activities" (production, distribution, and sale represent a flow of a series of activities starting from material production, to procurement of the parts, thereby constituting a global supply-chain).

In Section 1, after having surveyed the situation of production and export by Japanese manufacturers before and after this earthquake disaster, we will demonstrate that the percentage of export directly from the trade base located in the disaster-stricken area out of Japan's entire export volume is small and that the percentage of parts such as automobile parts or electronic parts which exert powerful influence on global supply-chain is also not so large, although some individual export items from the area concerned have a greater impact on Japanese trade.

In Section 2, we confirm that the reason why great concern to the global supply-chain had been expressed till now is due to the fact that export of automobile parts is relatively big in the entire export volume and in fact, it has great influence on the car production of various countries/regions. And we also explain the recent export structure of parts including electronic parts, which are widely used for the car production. In conjunction with the above viewpoint, it is necessary to understand the actual situation that parts are not only exported to the overseas production base directly from the supply base of the disaster-stricken area, but they are also delivered indirectly to global supply-chain from other areas such as Kanto area, which have direct connection with overseas countries. And it is also necessary to examine the route of the product supply and extent of the effect caused by the delay in supply. On that account, we focused our attention on automobile and electronic parts industries with greater delivery percentage among machine industries of the Kanto area, which are the main intermediate delivery destination of the manufacturing industry of Tohoku area. We demonstrate the fact that the damage to the production base of the disaster-stricken area by this earthquake has a big indirect effect on the export. and the area concerned has more connection with the global supply-chain than direct export relationship. And this is done by confirming supply, production, and export structure and also the importance of Tohoku area in the structure to do this. In Section 3, we summarize the influence of this earthquake

disaster and subsequent accident in the nuclear power plant on Japanese economy, Japan's export commodities, and on distribution, sightseeing, and airline industries. And we point out the process of the public-private action and efforts by Japanese authorities for dissemination of quick and accurate information to the global community, and to make use of this experience for a better future. We also indicate the need for Japan to take the lead in international discussions on measures for countering such an emergency and devise plans for an international cooperation system.

Section 1 The impact of the earthquake on Japanese production and trade

1. Status of production and export by Japanese manufacturers before and after the earthquake disaster

Due to this earthquake disaster, the production in the production base of the disaster-stricken area came to a halt, and rolling blackouts were conducted in Tohoku and Kanto areas to counter electricity shortage, which exerted a powerful influence on the production activities in Japan.

The industrial production of Japan in March, 2011 decreased by 15.5% throughout the entire industrial circle on a month-to-month basis (seasonally-adjusted). This exceeds records registered following the Hanshin Awaji great earthquake disaster (2.6% decrease) of 1995 and the world economy crisis (8.6% decrease at the maximum) of 2008. This is the lowest decline since February, 1953. Especially, in the disaster-stricken areas of Tohoku area and Ibaraki prefecture, the decline was much more greater than the above (Table 4-1-1-1). According the type of industry affected, the transportation equipment industry including car and automobile parts decreased by 46.7% on a month-to-month basis (the production of car decreased by 54.2%, and the automobile parts decreased by 42.1%), resulting in the largest negative contribution among all types of industries. Considering the level of production in chronological order, the production in transportation equipment industry in March and April 2011 sharply dropped to a level which is lower than the recent lowest level recorded just after the world economic crisis (Figure 4-1-1-2). The production in April, 2011 was generally picking up in addition to the above data including the general machine industry, and further recovery is anticipated in the future.[1]

[1] According to Ministry of Economy, Trade and Industry "SEIZOKOGYO SEISANYOSOKU CHOSA (manufacturing industry production forecasting survey)"conducted in May, 2011 (published on May 31, 2011), a 8.0% increase is anticipated in May, 2011, on a month-to-month basis (seasonally-adjusted), and a further 7.7% increase is expected in June, 2011.

Table 4-1-1-1 Trend of Japanese industrial production (by business category) in March and April, 2011

○ Trends of production by business category of the whole country

Business category	March		April	
	Contribution (% point)	Month-to-month basis (seasonally-adjusted, %)	Contribution (% point)	Month-to-month basis (seasonally-adjusted, %)
Whole industries	-15.5%	-15.5%	1.0%	1.0%
Transportation equipment industry	-8.0%	-46.7%	-0.2%	-1.5%
(passenger car)	-4.8%	-54.2%	-0.5%	-9.9%
(automobile parts)	-2.1%	-42.1%	0.0%	1.4%
General machine industry	-1.8%	-14.5%	1.6%	12.8%
Electronic parts, device industry	-0.7%	-6.6%	-1.5%	-12.7%
(IC (integrated circuit))	-0.5%	-11.7%	-0.5%	-13.1%
Food, tobacco industry	-0.7%	-8.7%	-	-
Manufacture of iron and steel	-0.6%	-10.2%	-0.1%	-2.0%
Electrical machine industry	-0.6%	-10.2%	0.3%	4.6%
Metal product industry	-0.5%	-10.7%	0.1%	2.3%
Other industry	-0.5%	-9.4%	0.3%	6.0%
Plastic industry	-0.4%	-11.9%	0.2%	5.7%
Nonferrous metal industry	-0.3%	-16.5%	0.0%	2.2%
Information and communication machine industry	-0.3%	-8.0%	-0.6%	-17.2%
Manufacture of chemical	-0.3%	-2.3%	-	-
(manufacture of chemical (except pharmaceutical products))	-0.9%	-11.2%	-0.1%	-1.4%
Pulp, paper, processed paper products	-0.2%	-8.3%	0.0%	-0.4%
Precision machine industry	-0.1%	-12.9%	0.3%	24.7%
Ceramics, stone and clay products industry	-0.1%	-5.1%	0.0%	0.5%
Petroleum and coal products industry	-0.1%	-12.3%	0.0%	-0.4%
Textile industry	0.0%	-1.8%	0.0%	-0.6%

Notes: Arranged in descending order of negative contribution in March, 2011. Number of March, 2011 is authentic value, number of April is quick estimation.
"-" refers to the value which is not released at the quick estimation stage. The shaded area refers to the type of industry which month-to-month basis (seasonally-adjusted) value was minus moth in March and April 2011.

Source: Indices of Industrial Production (Ministry of Economy, Trade and Industry),

○ Trends of production of the Tohoku region by business category

Type of industry	Contribution (% point)	Month-to-month basis (seasonally-adjusted, %)
Whole industries	-35.0%	-35.0%
Electronic parts, device industry	-6.9%	-28.5%
(IC (integrated circuit))	-3.1%	-33.0%
Manufacture of chemical	-4.1%	-47.1%
(pharmaceutical products, pesticide)	-3.0%	-45.6%
Transportation equipment industry	-3.3%	-43.8%
(passenger car)	-1.6%	-56.6%
(automobile parts)	-1.6%	-35.7%
Food, tobacco industry	-3.2%	-36.0%
General machine industry	-2.7%	-26.7%
Information and communication machine industry	-2.2%	-29.1%
Manufacture of iron and steel	-2.2%	-65.6%
Pulp, paper, processed paper products	-2.0%	-59.3%

Notes: Arranged in descending order of negative contribution in March, 2011. Number of March, 2011 is authentic value,

Source: "Tohoku region Indices of Industrial Production" (Ministry of Economy, Trade and Industry, Tohoku Bureau of Economy, Trade and Industry)

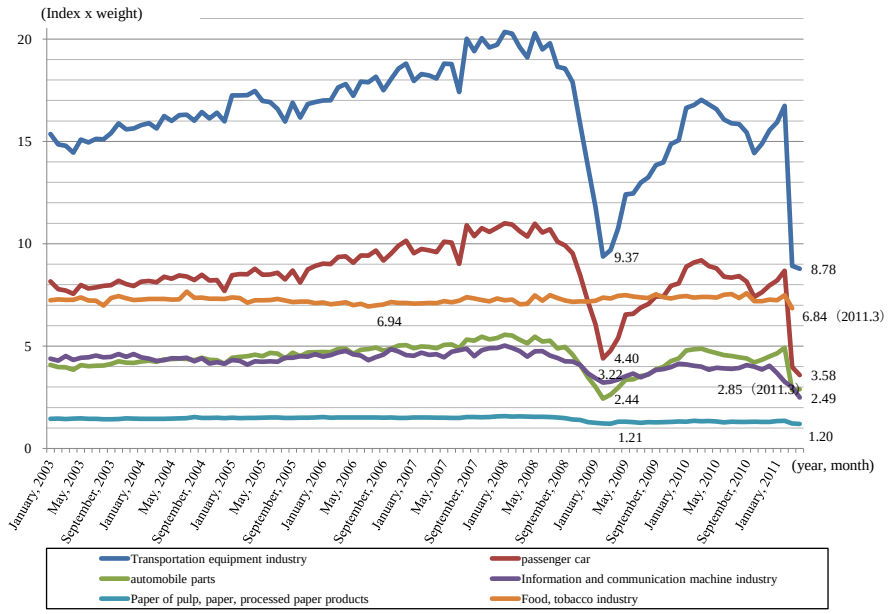
○ Trends of production of Ibaraki prefecture by business category

Type of industry	Contribution (% point)	Month-to-month basis (seasonally-adjusted, %)
Whole industries	-38.1%	-38.1%
Manufacture of chemical	-9.0%	-52.3%
General machine industry	-6.6%	-38.7%
Manufacture of iron and steel	-5.8%	-56.3%
Food, tobacco industry	-4.0%	-33.4%
Electrical machine industry	-2.8%	-26.4%
Plastic industry	-2.5%	-37.1%
Metal product industry	-2.0%	-35.9%

Notes: Arranged in descending order of negative contribution for industries with more than 2.0% point of negative contribution

Source: "Ibaraki prefecture Indices of Industrial Production" (Ibaraki prefecture)

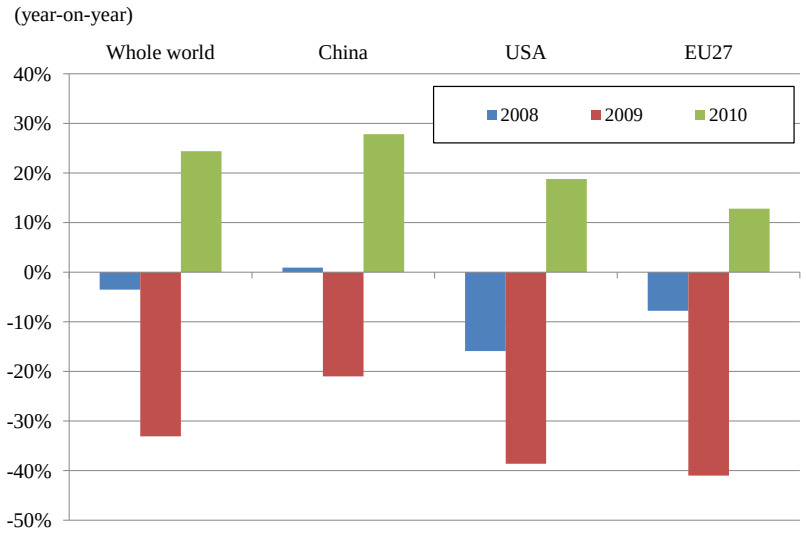
Figure 4-1-1-2 The production trend of major industry and item which Japanese production of March and April 2011 was in minimized level in late years



Notes: Main industries and items which have the lowest index in March, 2011 (authentic value) or in April (quick estimation-Food, tobacco industry was not released) after January, 2003 in industrial-production index (seasonally-adjusted), are extracted (although for automobile parts the third lowest value in March, 2011 next to March and February, 2009), and the product of index and weight for each month is calculated. Main industries and items here referred to those which have at least product of index and weight more than 1. In index 2005=100. The numbers in the figure show number in March, or April 2011 and in the month which has next lowest ones (as for the food, tobacco industry in July, 2006, as for the paper of pulp, paper, processed paper products paper in March, 2009, and other industries in February, 2009)
Source: Indices of Industrial Production (Ministry of Economy, Trade and Industry)

The status of Japan's export in 2010 before this earthquake disaster was on the track to recovery, making a complete turn from decrease of export in 2009 due to the world economy crisis (Figure 4-1-1-3). Even in this year, the export in January/February, 2011, recorded high growth particularly in general machine and electric apparatus (Tables 4-1-1-4 and 4-1-1-5). The export in the beginning of March, 2011 just before the earthquake disaster showed 14.8% increase year-on-year basis. By having been struck by this earthquake disaster under such a situation, the export of March, 2011 decreases by 2.3% in year-on-year basis (seasonally adjusted, month-to-month basis, a 7.7% decrease).

Figure 4-1-1-3 Change of export from Japan to major countries/regions



Source: "Foreign trade statistics" Ministry of Finance

Table 4-1-1-4 Trend of Japanese export from early 2011

2011	January	February	March	April
Whole world	1.4%	9.0%	-2.3%	-12.4%
China	0.9%	29.1%	3.7%	-6.8%
USA	6.0%	2.0%	-3.5%	-23.3%
EU27	-0.7%	12.7%	4.2%	-10.7%

Notes: The value shows year-on-year basis.
Source: "Foreign trade statistics" Ministry of Finance

Table 4-1-1-5 The items that marked double-digit growth in Japanese export year on year basis both in January and February, 2011

Items / 2011	Mineral fuel	Steel	General machinery	Metalwork machinery	Machinery for construction and mines	Cargo-handling machine	Cargo-handling machine	Bearing	Television set	Electrical measurement equipment
January 2011	44.4%	11.1%	19.3%	45.5%	58.0%	29.7%	12.3%	19.6%	13.2%	13.7%
February 2011	28.4%	20.5%	23.2%	60.1%	49.7%	50.7%	62.9%	24.6%	43.2%	21.0%

Notes: The value is year-on-year basis.
Source: "Foreign trade statistics" Ministry of Finance

Particularly, the transportation equipment decreases by 19.1% on year-on-year basis (the

automobile parts decrease by 5.0% in the same basis), resulted in the largest negative contribution in all items (Table 4-1-1-6). Similarly, in April 2011 decrease was 12.4% in all, transportation equipment greatly decreases by 43.2% (the automobile parts decrease by 14.8%), after all resulting in the largest negative contribution in all items. In addition, the decline of the IC (electronic parts) was big. In addition to above, the export from the port located in the disaster-stricken area decreases sharply.

Table 4-1-1-6 Trends of Japanese export in March and April 2011

○ Trend of export (by item) in the whole country

Item	March		April	
	Contribution (a % point)	Year-on-year basis (%)	Contribution (a % point)	Year-on-year basis (%)
Whole industries	-2.3%	-2.3%	-12.4%	-12.4%
Transportation equipment	-4.5%	-19.1%	-9.8%	-43.2%
(passenger car)	-3.3%	-27.3%	-7.7%	-67.9%
(automobile parts)	-0.2%	-5.0%	-0.7%	-14.8%
Electric appliance	-1.1%	-6.1%	-2.3%	-12.5%
(IC (integrated circuit))	-0.3%	-8.6%	-1.0%	-24.0%
Others	-0.1%	-0.8%	-0.5%	-4.3%
Food	0.0%	4.7%	-0.1%	-22.9%
Raw material	0.1%	7.3%	-0.2%	-12.6%
Mineral fuel	0.4%	26.7%	-0.8%	-46.1%
Chemicals	0.7%	6.6%	0.8%	8.0%
Manufactured goods	0.9%	6.8%	0.2%	1.6%
General machinery	1.4%	7.0%	0.3%	1.5%

Notes: Arranged in descending order of negative contribution in March, 2011. Values of March and April are confirmed report values in March, 2011. The shaded area for both March and 2011shows the item that have dropped on year-on-year basis .

Source: "Foreign trade statistics" Ministry of Finance

○ Trend of export from the ports located in the disaster-stricken area

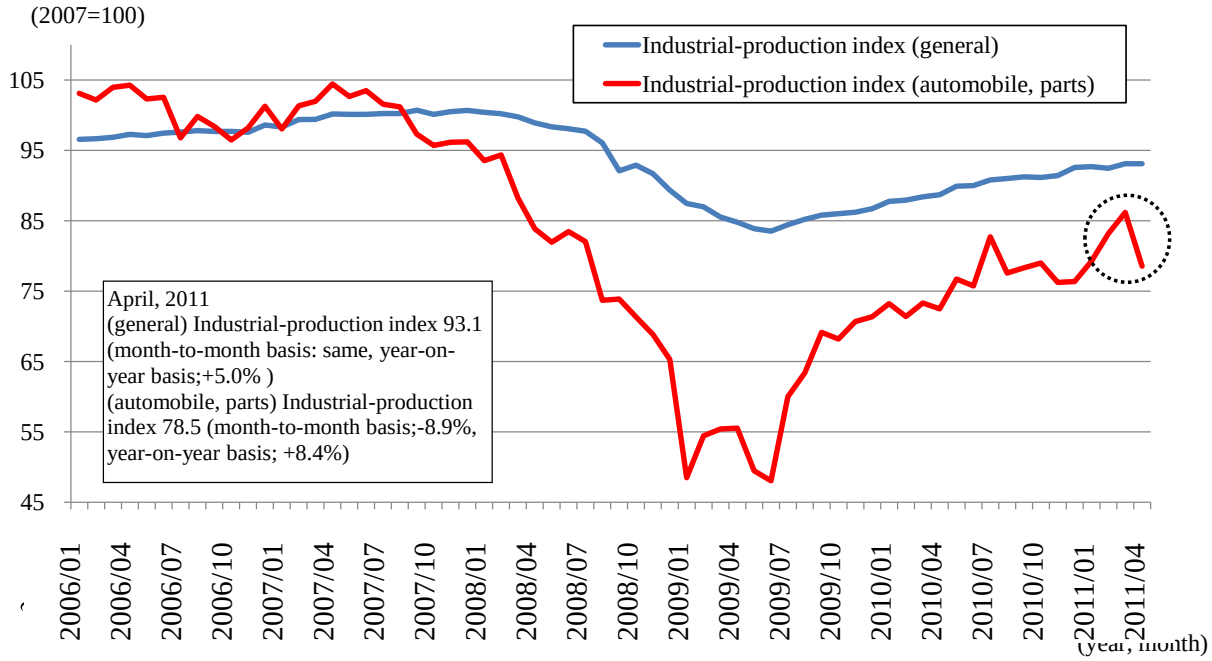
Port name	Prefecture	March	April
		Year-on year basis (%)	Year-on-year basis (%)
Aomori	Aomori	19.1%	15.9%
Hachinohe		-37.4%	-90.6%
Aomori Airport		-	-
Miyako	Iwate	-	-100.0%
Kamaishi		-45.3%	-98.4%
Ofunato		-27.6%	-5.4%
Shiogama, Sendai	Miyagi	-48.2%	-95.7%
Ishinomaki		43.6%	-100.0%
Kesennuma		-88.1%	-100.0%
Sendai Airport		-49.6%	-100.0%
Onahama	Fukushima	-31.2%	-55.6%
Soma		-48.7%	-87.4%
Fukushima Airport		-	-100.0%
Kashima	Ibaraki	-23.1%	-61.3%
Hitachi		-30.3%	-68.6%
Tsukuba		-5.9%	-9.3%

Notes: The numerical value is quick estimation. "-" indicates that there is no record.
Source: "Foreign trade statistics" Ministry of Finance

As described above, the most affected industry in production and export just after this earthquake disaster was transportation machine industry. Of the above, the delayed production of motor parts caused by the damage has influence on the overseas production through global supply-chain. For example, triggered by the decrease of export of motor parts from Japan, the production of automobile and parts in April 2011 of U.S.A. significantly decreased by 8.9% on a month-to-month basis (seasonally-adjusted)[2] (Figure 4-1-1-7).

[2] In a document released, dated May 17, 2011, FRB says that this is "mainly because of parts shortages that resulted from the earthquake in Japan".

Figure 4-1-1-7 Trends of the industrial production of U.S.A.



Notes: Seasonally-adjusted.
Source: Compiled from the data of FRB, CEIC Database.

Below, we investigate once more into importance of the trade and economic relation between Japan and the world which we have a glimpse from the generation of this earthquake disaster, through structural analyses on production/trade activities and production/export of parts industry such as the automobile parts having been performed in disaster-stricken area till now.

2. Influence of the direct import and export from disaster-stricken area

(1) The real facts of the trade value of the disaster-stricken area

At first, in order to clarify the percentage of the import and export that is conducted directly at trade base such as customs located in the disaster-stricken area in Japan's entire export and import, we confirmed the trade trend of 2010 from foreign trade statistics of the prefectures where customs agencies[3] did not perform all or a part of the work due to this earthquake disaster temporarily (five prefectures of Aomori, Iwate, Miyagi, Fukushima and Ibaraki, hereafter referred to as 5 disaster-affected prefectures) (Table 4-1-2-1).

[3] The customs agencies, which are located in the 5 disaster-affected prefectures, are divided into two jurisdiction areas of Hakodate Customs House and Yokohama Customs House. The details are as follows.
However, after that, recovery is made rapidly, and reopening of the work is planned in various government agencies one after another.
(Data source - the latest edition of "Work operation information" of above mentioned customs).

Table 4-1-2-1 Trade trends of the 5 disaster-affected prefectures in 2010

Prefecture	Export			Import		
	Amount (million yen)	Growth rate year-on-year basis	Whole country ratio	Amount (million yen)	Growth rate year-on-year basis	Whole country ratio
Aomori	160,932	30.4%	0.24%	143,031	14.1%	0.24%
Iwate	18,888	73.7%	0.03%	18,129	5.8%	0.03%
Miyagi	349,169	24.3%	0.52%	568,153	30.4%	0.94%
Fukushima	52,789	64.3%	0.08%	412,283	18.6%	0.68%
Ibaraki	794,849	46.4%	1.18%	1,288,000	16.0%	2.12%
Total of 5 disaster-affected prefectures	1,376,627	39.0%	2.04%	2,429,596	19.4%	4.00%
Whole countries	67,399,627	24.4%	100%	60,764,957	18.0%	100%

Source: "Foreign trade statistics" (2010 total amount) (Ministry of Finance)

In entire Japan as a whole, trade value made a complete turn from decrease in 2009, and the import and export significantly improved with the increase of 20% level n 2010, and the trade value of the 5 disaster-affected prefectures has made sharp recovery more than the nationwide average (39.0% increase in export in year-on-year basis, 19.4% increase in the import in the same basis), and also increase trend was continuing even in the beginning of 2011. However, from the point of absolute amount of the trade, the trade value of 2010 from 5 disaster-affected prefectures were in export approximately 1,380 billion yen, and in import approximately 2,430 billion yen. The percentage in entire Japan value, remain at the level of approximately 2% in export and approximately 4% in import.

Furthermore, trade value in 2010 and operation situation of the customs work just after this earthquake disaster in each port where the customs agency is located are shown below; (Table 4-1-2-2). Total trade value amount in 2010 of the bases of these ports in which all or a part operation stopped as of March 17, 2011, were approximately 570 billion yen in export (0.85% of the total) and approximately 1,120 billion yen in import (1.84% of the total). The amount is less than half of the trade value of the whole 5 disaster-affected prefectures; the percentage in Japanese overall trade of this value is naturally much small. Furthermore, the amount of the bases where all the operation stopped at that time was export approximately 120 billion yen (0.18%), and import approximately 520 billion yen (0.86%).

Judging only from the direct trade value in the disaster-stricken area based on the above data, the value marks small percentage in Japan's "entire" trade, and the influence on Japan's whole trade is considered to be limited.

Table 4-1-2-2 Trade trends of ports located in the 5 disaster-affected prefectures in 2010

<<Export>>

Ranking	Port name	Prefecture	Export amount (million yen)	Constituent ratio	Operational status (as at March 17, 2011)
28	Kashima	Ibaraki	350,020	0.52%	○
29	Hitachi	Ibaraki	343,457	0.51%	○
31	Shiogama, Sendai	Miyagi	298,790	0.44%	△
42	Hachinohe	Aomori	151,688	0.23%	△
54	Tsukuba	Ibaraki	101,372	0.15%	○
77	Onahama	Fukushima	38,808	0.06%	×
81	Iahinomaki	Miyagi	31,424	0.05%	×
86	Sendai airport	Miyagi	18,367	0.03%	×
92	Soma	Fukushima	13,915	0.02%	×
95	Kamaishi	Iwate	10,387	0.02%	×
98	Aomori	Aomori	9,244	0.01%	○
100	Ofunato	Iwate	8,461	0.01%	×
123	Kesennuma	Miyagi	588	0.00%	×
135	Fukushima airport	Fukushima	65	0.00%	○
137	Miyako	Iwate	40	0.00%	×
	Complete suspension ports		121,990	0.18%	×
	Total of complete suspension ports, partial suspension port and 5 disaster-affected prefectures		572,468	0.85%	× or △
	Total of 5 disaster-affected prefectures		1,376,627	2.04%	
	Whole countries		67,399,627	100%	

<<Import>>

Ranking	Port name	Prefecture	Export amount (million yen)	Constituent ratio	Operational status (as at March 17, 2011)
15	Kashima	Ibaraki	1,046,369	1.72%	○
23	Shiogama,Sendai	Miyagi	474,062	0.78%	△
35	Onahama	Fukushima	323,748	0.53%	×
40	Hitachi	Ibaraki	230,527	0.38%	○
48	Hachinohe	Aomori	118,867	0.20%	△
55	Soma	Fukushima	88,303	0.15%	×
66	Ishinomaki	Miyagi	48,652	0.08%	×
69	Sendai Airport	Miyagi	44,633	0.07%	×
87	Aomori	Aomori	24,003	0.04%	○
100	Kamaishi	Iwate	12,427	0.02%	×
103	Tsukuba	Ibaraki	11,104	0.02%	○
121	Ofunato	Iwate	4,375	0.01%	×
130	Miyako	Iwate	1,327	0.00%	×
133	Kesennuma	Miyagi	806	0.00%	×
138	Fukushima airport	Fukushima	232	0.00%	○
139	Aomori airport	Aomori	161	0.00%	○
	Complete suspension ports		524,271	0.86%	×
	Total of complete suspension ports, partial suspension port and 5 disaster-affected prefectures		1,117,200	1.84%	×or△
	Total of 5 disaster-affected prefectures		2,429,596	4.00%	
	Whole countries		60,764,957	100%	

Notes: There are no import and export from Ibaraki Airport, and export from Aomori Airport. "Ranking" refers to the ranking in the trade value by major important port of Japan (2010 confirmed value). "operational status" shows the operational status of the customs work, ○ means normal operation, △ means that only the response at the window is possible (NACCS (system processing), telephone, FAX works suspended), X shows that all works were suspended. As for Hakodate Customs House jurisdiction (Aomori, Iwate) and the Yokohama Customs House jurisdiction (Miyagi, Fukushima, Ibaraki prefecture), data based on renewal information as of 17:00 on March 17, 2011. In Shiogama, Sendai Customs House branch, only the correspondence at the window of the Shiogama office was possible.

Source: "Foreign trade statistics" (2010 total amount) (Ministry of Finance)

(2) Influence on global trade seen from the trade situation of the disaster-stricken area by trade items

On the other hand, in the trade of the specific item, it is considered that the temporary stop of export from 5 disaster-affected prefectures can exert significant influence partially on the global trade. Therefore, we inspected the export trend of export from every port in 5 disaster-affected prefectures in 2010 by item and export destination country.

At first, in the export items from the port in which all of the customs work stopped as of March 17, 2011, we sorted out the export commodities of high percentage in Japan's entire export in 2010 period[4] (Table 4-1-2-3). There are six items exported from these ports, which account for more than 10% in total Japanese export. The six items are (a) "Vinyl chloride" (a polymer of vinylidene chloride) from port of Onahama (53.9% in whole country ratio, export amount) 38,400,000 dollars, major export destination: China (33.4% of import from the whole world), Vietnam):

(b) From the Ishinomaki Port "Paper-products" (more than 10% pulp content) (42.6% in whole country ratio, export amount approximately 99,100,000 dollars), major export destination: Australia (80.3% of import from the whole world) New Zealand, South Korea),

(c) From the Ofunato Port "Paper-products" (plastic coated) (18.9% in whole country ratio)
Export amount 46,600,000 dollars, major export destination: Netherlands, United States, China)

(d) From Kamaishi Port "Steel product (rod of iron or non-steel alloy) (round shape in cross section))" (16.7% in whole country ratio), export amount 101,500,000 dollars, major export destination: China, United States, Malaysia)

(e) From Sendai Airport "movement for watch" (16.7% in whole country ratio, export amount

---

Hakodate Customs House jurisdiction
(Aomori prefecture) Hachinohe Customs House branch, Aomori Customs House branch, Aomori Airport branch office
(Iwate prefecture) Miyako Customs House branch, Ofunato Customs House branch, Kamaishi branch office
Yokohama Customs House jurisdiction
(Miyagi prefecture) Sendai Shiogama Customs House branch, Shiogama office, Ishinomaki branch office, Kesennuma branch office, Sendai Airport Customs House branch
(Fukushima prefecture) Onahama customs branch, Soma branch office, Fukushima Airport branch office
(Ibaraki prefecture) Kashima Customs House branch, Hitachi branch office, Tsukuba branch office, Ibaraki Airport office
In March 17, 2011 just after the Great East Japan Earthquake, of the above mentioned customs agencies, in the Hakodate Customs House jurisdiction, all the works were stopped in all the Iwate prefecture government agencies, and a part of the work of the Hachinohe Customs House branch was stopped in Aomori. In the Yokohama Customs House jurisdiction, in government agency in Miyagi except the front office works of Sendai Shiogama Customs House branch Shiogama office, all works were stopped. In Fukushima all the works of the government agency except the Onahama customs branch Fukushima Airport branch office were stopped. In Ibaraki prefecture, until that day a part of work was not performed at Kashima Customs House branch Hitachi branch office, usual work is possible from the same day, and in all government agencies usual work became possible.
(Data Source for the above, Ministry of Finance Hakodate Customs House "Hakodate Customs House work operation information" (updated March 17, 2011 17:00))
Yokohama Customs House "Yokohama Customs House work operation information" (updated March 17, 2011 17:00) and "About Bond/Customs clearance-related procedure in customs agencies of Tohoku district affected by Great East Japan Earthquake" (Notice of partial recovery) (March 17, 2011 partially updated)).
However, after that, recovery is made rapidly, and reopening of the work is planned in various government agencies one after another.
(Data source - the latest edition of "Work operation information" of above mentioned customs).

[4] To check them against the trade data in the export country for each item, we use "World Trade Atlas" by Global Trade Information Services, Inc., The unit of export is U.S. dollar. "Whole country ratio" is a value calculated by "export amount from the relevant port / total export amount of whole country" for the item concerned. HS cords “000000” are excepted in the above.

16,400,000 dollars),
(f) From the above airport "prepared marine products" (other than shrimps or crabs) (11.0% in whole country ratio, export amount 54,300,000 dollars)
"Parts of Turbojet or turbo propeller" from the Soma Port accounts for 8.5% in whole country ratio, of which more than 60% are for United States, but percentage of import from the Soma Port of the relevant item to the United States (for import from the whole world) remain in around 1.0%.

Next, we sorted out the export commodities of high percentage in Japan's entire export in 2010 of the items exported from the port in which a part of the work of the customs stopped as of March 17, 2011 (Hachinohe Port, Sendai Kamaishi Port), and the main important port of the Pacific side of the 5 disaster-affected prefectures among the ports which operated normally (Kashima Port, Hitachi Port) (Table 4-1-2-4). There are nine items exported from these ports, export amount of which are more than 100 million dollars and which account for more than 10% in whole country ratio. The nine items are;
(a) "Ferronickel" from the Hachinohe Port (91.0% in whole country ratio, export amount 575,100,000 dollars), major export destination: Taiwan, South Korea, China, India)
(b) "Tire" (rubber pneumatic tire for passenger car) from Sendai Shiogama Port (19.4% in whole country ratio, export amount 671,500,000 dollars, major export destination: United States, Canada, Germany, U.K.),
(c) "Iron pipe" (line pipe for transportation of oil or gas) from Kashima Port (32.1% in whole country ratio, export amount 305,300,000 dollars, major export destination: Malaysia, Saudi Arabia, France, UAE),
(d) "Vinyl chloride (not mixed)" from the above port (24.1% in whole country ratio, export amount 159,600,000 dollars, major export destination: China (approximately 60% of total),
(e) "Paraxylene" from the above port (20.1% in whole country ratio, export amount 476,600,000 dollars, major export destination: Taiwan, South Korea, and China),
(f) "Steel product" (flat roll products of iron or non-steel alloy with thickness more than 10 millimeters) from the above port, (17.8% in whole country ratio, export amount 460 million dollars, major export destination: South Korea (approximately 70% of total)),
(g) "Dump truck" from the Hitachi Port, (81.4% in whole country ratio, export amount 722,500,000 dollars, major export destination: Indonesia (approximately 60% in total)),
(h) "Mechanical shovels (upper structure of which rotates 360 degrees)" from the above port
(14.4% in whole country ratio, export amount 1,022,800,000 dollars, major export destination: China, Australia, the Netherlands, Indonesia),
(i) "Front end type shovel loader" from the above port (13.3% in whole country ratio, export amount 130,800,000 dollars).

As for the individual items, approximately 10 items are confirmed as the item having high percentage in Japan's entire export and high degree of dependence on export in the export destination country. It is considered that these items might have much significant degree of the

influence.[5] However, as for the significant influence on global supply-chain due to the stop or delay in production or distribution of automobile parts or electronic parts in the disaster-stricken area, as far as judging from only the direct export from the area, we understand that it accounts for relatively small percentage in Japan's entire export.

Table 4-1-2-3 High rank export items from the ports which suffered the big damage (2010 total, six digits of HS cord bases)

• Onahama port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	900211	Lense for camera etc.	47.6	2.7%
2	720449	Waste of steel (except cast iron, steel alloy)	39.2	1.4%
3	390450	Polymer of vinylidene chloride	38.4	53.9%
4	720421	Waste of steel alloy	27.6	9.2%
5	843149	Parts for crane, bulldozer etc.	23.6	0.9%

• Ishinomaki port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	890190	Cargo boats (except tanker, reefer)	114.4	0.7%
2	481029	Paper-products (more than 10% of pulp content)	99.1	42.6%
3	890120	Tanker	76.7	0.9%
4	720449	Waste of steel (except cast iron, steel alloy)	32.1	1.2%
5	720421	Waste of steel alloy	11.7	3.9%

• Sendai airport

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	160590	Processed goods of marine products (other than shrimps etc.)	54.3	11.0%
2	854239	Integrated circuit (except processors etc.)	44.0	0.4%
3	911011	Movement of portable clock	16.4	16.7%
4	854232	Parts of integrated circuit	10.8	0.1%
5	852990	Parts for digital camera etc.	6.9	0.1%

Notes: Top five items of export value from each port which export value more than 1 million dollars are extracted. Miyako Port has no applicable export item.
Source: "World Trade Atlas" (Global Trade Information Services, Inc.)

[5] Although many companies, which are considered to be the production entity of these items, stopped production due to the damage incurred, after that they are starting production activity rapidly with their persistent recovery activity. In fact a lot of companies have already accomplished complete recovery.

• Soma port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	841191	Parts of turbojet or turbo propeller	133.9	8.5%
2	870422	Truck (heavier than 5 tons and below 20 tons)	4.2	0.1%
3	720449	Waste of steel (except cast iron, steel alloy)	3.8	0.1%
4	848340	Transmission	2.5	0.1%
5	870423	Truck (heavier than 20 tons)	1.6	0.1%

• Ofunato port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	481151	Paper-products (plastic coated)	46.6	18.9%
2	854190	Parts of semiconductor device etc.	17.5	2.5%
3	731210	Steel cable etc.	6.7	2.8%
4	030379	Frozen fish (herring, saury)	5.5	3.4%
5	842240	Packing machinery	3.7	1.3%

• Kamaishi port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	721391	Pole of iron or non-steel alloy (circular cross section)	101.5	16.7%
2	722790	Pole of steel alloy (Others)	16.0	3.2%
3	721399	Pole of iron or non-steel alloy (Others)	1.2	0.8%

• Kesennuma port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	030379	Frozen fish (herring, saury)	4.5	2.8%

Source: "World Trade Atlas" (Global Trade Information Services, Inc.)

Table 4-1-2-4 High rank export items from the ports which suffered the damage (2010 total, six digits of HS cord bases)

• Shiogama, Sendai Port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	401110	Rubber pneumatic tire for passenger car	671.5	19.4%
2	844399	Parts of printing machine	664.5	5.4%
3	840991	Parts for automobile engine	214.9	3.7%
4	290122	Propene (propylene)	92.1	11.2%
5	722790	Pole of steel alloy (Others)	88.5	17.4%

• Hachinohe port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	720260	Ferronickel	575.1	91.0%
2	844399	Parts of printing machine	425.9	3.4%
3	890120	Tanker	316.9	3.9%
4	848630	Machinery for flat-panel display manufacture	135.7	3.1%
5	890130	Reefer and refrigerated carrier	99.7	50.8%

• Kashima port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	290243	Paraxylene	476.6	20.1%
2	720851	Flat roll product of iron or non-steel alloy (thickness more than 10 millimeters)	460.0	17.8%
3	271019	Kerosene, light oil etc.	305.4	3.0%
4	730511	Iron pipe(line pipe for transportation of oil or gas)	305.3	32.1%
5	390410	Vinyl chloride (no mixture)	159.6	24.1%

• Hitachi port

Ranking	HS code	Item name	Export value (million dollars)	Whole country ratio
1	870324	Passenger car (cylinder capacity more than 3000cc^3)	1083.4	3.9%
2	842952	Mechanical shovel (upper structure turns 360 degrees)	1022.8	14.4%
3	870410	Dump truck	722.5	81.4%
4	842951	Front end type shovel loader	130.8	13.3%
5	870323	Passenger car (cylinder capacity more than 1500 and below 3000cc^3)	130.6	0.3%

Notes: Top five items of export value from each port are extracted
Source: "World Trade Atlas" (Global Trade Information Services, Inc.)

In addition, in some cases, products produced in disaster-stricken area may be exported from the port or airport other than the relevant area. In fact, a lot of related companies of automobile parts and the electronic parts industry in the Tohoku area are located in the manufacturing area developed along the national highway No. 4 that is a local main road or Tohoku Expressway, it is considered that their products are exported via a trade base in Kanto area such as Keihin port and Narita Airport. Therefore, as for the distribution trend of the export cargo (Table 4-1-2-5), the place of production of cargo exported from Tokyo Port, Yokohama Port or Narita airport which are the export base of Kanto area is basically Kanto area, and there is little percentage that Hokkaido, Tohoku area is a straight production center for percentage among 10.3% and the whole in 4.0%, Narita Airport in 10.0%, Yokohama Port in the Tokyo Port. In addition, the export of industrial products of the Tohoku area from Nagoya port is much less. On the other hand, as for the status of

transportation of containerized cargo[6], 28.1% of cargo produced in Hokkaido and Tohoku area are packed into container in Kanto area (68.4% are packed within the production areas). Moreover, as for the cargo packed into a container in Hokkaido, Tohoku areas, nearly half of them are shipped from the ports of Kanto area such as Yokohama Port (26.9% of the whole) and Tokyo Port (26.1% of the whole).

Particularly, as for the export of automobile parts produced in Tohoku area, approximately three-fourths of them are exported from the ports of the other area, mainly from the ports in Kanto area. In particular, the prefectures that have convenience of the traffic access to the Kanto area such as Fukushima and Miyagi are high in the ratio (Table 4-1-2-6). However, export from Tohoku area is around 1% of total export of Japanese automobile parts (Table 4-1-2-7), and total export from three North Kanto prefectures (Ibaraki, Tochigi, and Gunma) account for only around 6.6%. In short, the export of disaster-stricken area account for very little proportion in the total export, even if the portion of export by way of the other area such as Kanto area (which route has become possible by the development of the domestic distribution network) is taken into consideration.

Therefore, products manufactured in the disaster-stricken area supports other local production as "intermediate input", and if this "intermediate input is impeded, it will have an influence on the global supply-chain. We will analyze this influence, in other word influence by the decrease in "indirect export", in the following section.

Table 4-1-2-5 The export from major ocean ports, airports from where cargo produced in Hokkaido, Tohoku areas are shipped

Major ocean freight shipping port	Percentage in whole country (%)	Percentage of production area in Hokkaido and Tohoku region	Prefecture with largest production and the percentage	
Tokyo port	8.5	10.0%	Fukushima prefecture	5.2%
Yokohama port	16.8	4.0%	Fukushima prefecture	2.1%
Nagoya port	17.6	1.6%	Iwate prefecture	1.6%
Major air freight shipping airport	Percentage in whole country (%)	Percentage of production area in Hokkaido and Tohoku region	Prefecture with largest production and the percentage	
Narita airport	62.9	10.3%	Fukushima prefecture	4.5%

Notes: The percentage is based on monetary amount.
Source: "Distribution trends survey of import and export cargo" (September, 2008 survey) (Ministry of Finance)

[6] Ministry of Land, Infrastructure and Transport (2009) "Whole National import and export purpose containerized cargo flow working papers in 2008".

Table 4-1-2-6 Export direction of automobile parts produced in Tohoku region

Production area	Quantity of export cargo and share in the region		Quantity of export cargo from the ports in Tohoku region and ratio		Quantity of export cargo from the ports of other regions and ratio	
Total Tohoku region	7,086	100.0%	1,691	23.9%	5,395	76.1%
Aomori prefecture	586	8.3%	399	68.1%	187	31.9%
Iwate prefecture	504	7.1%	144	28.6%	360	71.4%
Miyagi prefecture	1,707	24.1%	190	11.1%	1,517	88.9%
Akita prefecture	1,309	18.5%	747	57.1%	562	42.9%
Yamagata prefecture	870	12.3%	166	19.1%	704	80.9%
Fukushima prefecture	2,110	29.8%	45	2.1%	2,065	97.9%

Notes: The unit of quantity of export cargo is freight ton / month. Total of share may not become 100% due to rounding off.

Source: Compiled from the data prepared by Tohoku international distribution strategy team secretariat ("Tohoku international distribution strategy team the fifth main conference information (c) February, 2011) based on "Import and export containerized cargo flow surveys in 2008 of the whole country"(Ministry of Land, Infrastructure and Transport)

Table 4-1-2-7 Percentage of automobile parts exported from Japan by production area

Production area	Quantity of export cargo	Percentage	(reference) Estimated export value (hundred million yen)
Hokkaido	5,370	0.81%	269
Tohoku	7,086	1.07%	354
Kanto	252,707	38.08%	12,642
Chubu	299,660	45.15%	14,991
Kinki	62,934	9.48%	3,148
Chugoku	23,518	3.54%	1,177
Shikoku	1,220	0.18%	61
Kyushu	10,863	1.64%	543
Okinawa	270	0.04%	14
Total whole country	663,628	100%	33,200
Tohoku plus three prefectures of North Kanto	44,067	6.64%	2,205

Notes: The unit of quantity of export cargo is freight ton / month. Three prefectures of North Kanto are Ibaraki Tochigi and Gunma. The estimation of the export value in region was obtained as follows; the annual export value which is calculated by multiplying the declared value in the survey period (one month of November, 2008) by 12, then the value is allocated in proportion of each prefectures, and added up according to region.

Source: Compiled by the date of report "Import and export containerized cargo flow surveys in 2008 of the whole country"(Ministry of Land, Infrastructure and Transport)