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[Field Research]

Trade Structural Analysis of the Steel Distribution Industry between Japan and USA*

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Abstract

Purpose – This study evaluates the mutual influential power regarding the trade volumes of Japan and USA, based on a literature review and an empirical analysis. Through the literature review, I could evaluate each country's actual import-export volume and its status. Further, I could evaluate how each country could influence its trade outcome, through empirical analysis.

Research design, data, and methodology – This study aims to review the trade structure to improve Japan-USA economic and social cooperation, as the two countries have reciprocal complementary features, and to examine trade weaknesses and analyze factors influencing trade and its direction, as well as to identify ways to expand trade.

Results – The intra-economic potential cooperation fields are numerous. Additionally, anticipated profits from these fields are stable as compared to other fields in the regional economic integration.

Conclusion – The interrelations between the two economic identities can provide optimal opportunities for industrial technology cooperation. Under the current aggravated competition in industrial fields, it is advisable to identify ways to secure stable resource suppliers, including the development of export markets.

Keywords: Trade Specialization, Partner relationship, Trade Intensity, Trade Structure, Steel Industry, Revealed Comparative Advantage.

1. Introduction

Steel industry is major industry that provides inevitably necessary basic materials to other industries. Additionally, as a capital-intensive mechanism industry, it has a great ripple effect to affect other industries.

That's the reason why most of countries foster steel industry in advance to industrialization. Again, steel industry gives a great influences to domestic major industries such as auto, ship, assembled metal.

From more than 10years ago, steel supply surpassed steel demand and furthermore, new entry into steel industry made fierce competition in the world steel industry. Especially, labor cost increase in steel industry is one of the factors in the management environment change.

Labor cost increasing rate of almost every developed countries extremely exceeded labor productivity and productivity of value added, of which weakened competitiveness of steel industry. In order to overcome fierce international competition and continue to make business in the steel business, first of all, competitions and cooperations are needed among domestic steel enterprises. Namely, enterprises should strengthen constitution to survive international competitions by way of promoting competitions among enterprises as well as should maximize establishment efficiency to adjust investment scale and time for investment through inter-enterprises bilateral cooperations by considering it a large scaled mechanism industry.

The second way of strengthening competitiveness is price of steel product should be gradually liberalized and organize price mechanism based on market principle. Steel commodity's price control which is much less than import price will cause insolvency of steel business enterprises as well as will result in distortion of supply-demand structure.

The third way is to secure stable supply of scrap as well as to develop substitutional goods which can substitute these scraps.

The fourth way is to increase investment for technology development to promote production rate of high value-added steel

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commodities as technology level is basically low under the production structure of the weak steel industry. As the large scaled production structure which is not supported by technological power has severely low countermeasure of moderate demand during economic recession, production structure should be transformed to produce high value-added commodity by conducting technological development in boom period.

The fifth way is to strengthen steel distribution enterprise's function and to save logistical cost. As steel commodity is heavy and bulky, transportation is not freely available compared to other products, importance of distribution is bigger than other industries. However, as most of steel distribution companies carry out simple mediating role, they do not conduct to match level of steel enterprise's growth. So, steel distribution company should improve their capability to meet steel industry's requirements.

Europe and Japan are decline in developed markets. However, only the United States maintains recovery which results in towing a global sales.

In emerging markets, China has the continued growth while major emerging countries such as Brazil, India, Russia showed sluggish reduction market. Market specific earnings are also favorable to firms who focused on the markets of the United States and China according to strong markets of the United States and China. GM, Ford and Volkswagen increased, whereas a decrease in most of the European companies.

The worldwide sales in 2014 is expected to increase by 4.1% thanks to continue growth in China, restoration of other emerging economies and conversion of the increase in the European market.

In developed markets, Europe is expected transition of increase from six consecutive years decrease, but a full-fledged recovery is unlikely in view while the United States conducts the exit strategy which slow recovery is expected.

In 2013, The United States and China are driving growth in the global auto market. In 2014, China is expected to drive most of the growth whereas other key emerging markets including India are expected increase as the base effect according to previous year's weakness. However, growth momentum seems to be limited .

Thus, the purpose of this research is evaluating trade structure to fortify two countries economic cooperations, analyze factor that affect trade structure to find out trade problems and to search for way of trade increase.

This study is arranged as under; Chapter 2 explains this paper related precedent study and statistic data which are used at empirical analysis. Chapter 3 review structural characteristic of Japan-USA steel industry taking advantage of general trade statistics. Chapter 4 decompose and measure interrelated trade relationship by way of International Trade Center including UN COMTRADE statistics including Revealed Comparative Advantage Index, Trade Intensity Index and Trade Specialization Index. Finally, Chapter 5 summarizes analysis result of this research and gives final conclusions.

2. Precedent research and statistic data

Trade intensity index was used to analyze trade determinants between 2 countries by taking advantage of Japanese Yamazawa (2010) theory, "Intensity Analysis of World Trade Flow" *Histotsubashi Journal of Economics* of trade intensity.

To analyze these trade determinant, detailed factor should be identified. However, realistically, there are a lot of unidentified factors including its diversity that is difficult to explicate specifically. Therefore, Trade structure factor as analysis of trade determinant is focussed in my research. Analysis period is from 2001 to 2013. From 2001 to 2007 and 2013 are restricted for both 2 countries trade determinant analysis as recent international statistical data are not publicize or are hard to take these data. Per reviewing precedent research, Chang(2008), Hwang(2006), Lee(2011), Lee(2012) by trade specialization index, there are analysis research for Cha(2013), Han(2005), Kim(2009), Lee(2007) by revealed comparative advantage index and Jeong(2012), Kim & Kim(2012), Lee(2012), Han & Yu(2012) by trade intensity index.

Empirical research analysis was conducted according to statistical data, especially, trade analysis between Japan and USA are evaluated in view of objective assess. Thus, two countries' positions were reviewed as a counterpart country with a focus on Japan. The statistical data published by international organization were mainly used. The main data were made based on UN Comtrade, Korea Customs Office, Korea International Trade Association and mainly, International Trade Center. The statistic data is notionally meaning as statistic about cargo exchanges between national economy and other countries. Every commodities of delivered-in and delivered-out from a certain country's economic zone to increase its country's physical resources or to diminish physical resources are counted for record. The commodities that simply pass a certain country or temporarily delivered-in & out commodity are not included into trade statistics because they are not increasing or diminishing volume of its country's physical resources.

3. Present status and characteristic for Japan-USA steel Industry

Japanese economic cycle is quite different from other Asian countries.

During other Asian economies are stepping on growth process, Japanese economy is in the hibernating stage. Fortunately, the Japanese economy is now recovering.

According to the IMF, Japanese GDP growth rate in 2013 was anticipated 2% based on most recent performance and so far, the expected figure is exceeded. It is presumed that 3% growth rate could be achieved afterwards.

Monetary easing as well as fiscal spending policy with several growth policies are being applied in the Japanese economy.

The minus economic record in the second quarter of 2013 is

the private inventory(stock quantity adjustment according to production increase). However, housing and investment export are all recorded plus growth.

Therefore, reviewing second quarter of 2013 could be understood almost 4% growth. The reason why inventory investment of private sector is diminished is consumption is continuously increasing, on the other hand, the stock is insufficient. Even though it could be loss, it is better situations compared to that of previous years. Definitely, it is not sure how long this kind of growth could be maintained.

There are 3 major policies in the Japanese economic policies. The first one is an easy-money policy. Adjustment of exchange rate and quantitative easing are essential matter in this first policy. Japanese deflation has been continued from the end of 1990. However, they have been starting to escape from deflation trap successfully. They are strong enough to achieve its target.

The second one is stimulative fiscal policy. A lot of persons criticize that Japanese government too much focus on public sector and even though reform for public sector bias has been conducted during democratic party regime, direction of public sector policy is changed since 2012 earthquake as well as increase of 8% value added tax which results in not only hindrance to growth but also support to public sector finance.

The third one is growth-oriented policy. Currently, to make enterprises who do not conduct things related to Abenomics in private sector to be conducted something, of which is imminent task. There is one additional thing that Abenomics is recognized. The fact that they support the more women and the old could participate in economic activities. Accordingly, they could easily attract the young people more briskly could attend labor market and eventually, they intend to have labor market's movement and flexibility.

The next one is energy sector and agricultural sector. Japanese government is trying to attend TPP(Trans-Pacific Partnership) which is quite different from EPA(US Environmental Protection Agency) and FTA(Free Trade Agreement). Japanese stimulate fiscal policy with Yen-Dollar exchange rate increase and quantitative easing must comply with US government's implied consent. As everybody knows, it is burden to Japanese government as most of them, price pressure will be given through TPP. Among them, energy sector and agricultural sector are the biggest and the most important.

The reform for agricultural sector needs a contingency plan.

As farmers' average ages are higher and productivity is getting lower, agricultural sector's reform is prerequisite in the view of price mechanism. To make specific economic zone in order to reform and Japanese government needs policy to give exemption of corporate tax in order to make attractive place for the specific economic zone as well as attract foreign direct investment. Actually, the amount of foreign direct investment inflow into Japan is smaller than that of north Korea. Every possible measurements should be done to support Trans-Pacific-Partnership including Foreign Direct Investment.

Whenever Japan encounters something difficult, they always insist it is external pressure. External pressure such as Trans-

Pacific-Partnership has been always existed not only past times but also future. However, they are good signs that positive macro-economic environment is created as well as negotiation of Trans-Pacific-Partnership is going on.

On the other hand, in case of USA, USA fiscal policy didn't take effect during 2013. Structural financial deficit for 2%~4% volume of GDP was occurred. The reason is that dollar value is down as a key currency. In 2013, USA got a shut-down situation and economist anticipated that the GDP for fourth of quarter will drop into 0.5%. However, US economy escaped from debt liability criteria and even though it is not a best scenario, at least, it is expected that economy will be rising in the first of quarter of 2014 and situation improvement is possible till September of fiscal year based on mid & long term-viewpoint.

As gradually reducing quantitative easing for overall monetary policy in the USA, it will affect world market till end of 2014 and there is no property sale while total affected volume will be over US\$1,500billion and it will be predicted that unemployment rate will get out from 6.5% in March 2015.

It is predicted that financial situation of normal household economy is persistently improved. As normal household financial situation is improved, domestic demand is boosted, criteria of loan condition is eased and eventually, investment with business situations will be also improved. However, in case of labor market, it will remains weak situation. Even though it can be predicted that unemployment will be gradually improved, job related skill standard will be deteriorated due to elderly society which weakens belief of labor power and first of all, needs for looking for job are diminishing which results in the matter of social structural unemployment.

This is very serious situations because, eventually, competitiveness of labor market will be decline. It is predicted that participation rate to labor market will continuously drop in terms of periodic statistics and viewpoint of long-term base prediction.

The next is currency market situation. The matter of inflation is main issue in this matter. US inflation will not reach target for Federal Reserve Committee. At present, inflation will maintain stably. Even though supported by IMF, federal government's income & expenditure is 73% against GDP in 2013. In case it is maintained continuously, loan rate will be increased after 2018. When the matter of loan is solved, it is possible to adjust inflation.

The problem is US productivity is becoming lower, of which needs structural change. US situation is a little bit optimistic. US has still a lot of potential power and a large-scaled country. USA has a diversity phase & various economic structures. Additionally, as US has been conducting currency policy for over 200 years, of which makes adaptability power excellent. In terms of economist viewpoint, what USA now needs is to pursue policy direction for benefits to the whole world. Even though it is not USA era which means ratio to international community is diminished, USA will still remain a major player.

The surge in U.S. imports of steel products intensified protectionism.

U.S. steel industry filed a lawsuit against South Korea for

dumping suspicion of directional, non-directional electrical steel as well as they submit anti-dumping and anti-subsidy investigation petition against steel pipe for nine countries including Korea on July 2013 as they sell them with a extremely low price. US industry insists that Korean imported steel price is only 71% of total average price.

Korean steel industry announce that US steel industry too many frequently files a lawsuit against foreign enterprises for anti-dumping and Korean industry have received safe judgement from US International Trade Committee after they had investigation about Korean steel products in 2007.

International Trade Committee unanimously gave preliminary judgment of anti-dumping(8 countries) and a countervailing duty(2 countries) for steel pipe in August 16, 2013.

US Steel industry's frequent filing lawsuit against Korean steel product means protectionism against US steel products is intensified.

Its target is Korea and Japan.

In September 25, 2013, American Iron and Steel Association announced press release that steel import volume in August in USA has been increased 13.9% compared to that of last month and expressed concern about rapid import increase.

Especially, import of steel product of Korean and Japan in August, 2013 have been increased 16.8% and 23% respectively compared to that of July while import of steel product of China and Taiwan in August, 2013 have been decreased -38% and -

18.2% respectively which are contrasted.

As targeting Korean and Japanese products, US steel industry could file a lawsuit, anti-dumping and give a judgement of a countervailing duty, our government and Korean steel industries need to prepare countermeasure urgently.

Per reviewing <Table 1> and <Table 2>, we can easily find out that trade balance of Japanese steel business has been continuously deteriorating. Especially, During 2008-2010, the annual deficit of trade balance is approximately, US\$7million which is the biggest trade deficit for whole research period from 1995 to 2014. The total trade deficit amount is US\$71,501,659 during whole research period from 1995 to 2014.

On the other hand, US steel business is on the contrary to Japanese steel business as they have been continuously trade surplus for whole research period from 1995 to 2014 even though 1995, 1996, 1997 had severely trade deficit. However, optimistically, from year 1998, trade surplus has been started considerably. Under the current situation of both 2 countries, we can easily figure out that Japanese steel industry has been always trade deficit for whole research period while USA steel industry has been always trade surplus during whole research period except a few years. However, I must examine and analyze that does this phenomenon always makes Japanese steel industry comparative disadvantage? and does USA steel industry always have comparative advantage? These propositions are research target that I have to conduct in this thesis.

<Table 1> Japanese Steel Import & Export to world market

Unit: USD1,000, Ton								
Year	Country	Item	HS	Export weight	Export Amount	Import Weight	Import Amount	Trade Balance
1995	Japan	Steel	72	2,957,440	1,612,808	3,304,381	2,151,797	-538,989
1996	Japan	Steel	72	3,046,521	1,311,534	4,264,132	2,210,744	-899,209
1997	Japan	Steel	72	3,402,926	1,364,221	4,808,515	2,114,423	-750,202
1998	Japan	Steel	72	2,697,574	987,181	4,839,580	1,415,752	-428,571
1999	Japan	Steel	72	2,572,272	998,892	7,418,181	2,086,872	-1,087,980
2000	Japan	Steel	72	2,705,131	1,163,132	7,230,699	2,651,322	-1,488,189
2001	Japan	Steel	72	2,309,680	799,619	8,382,020	2,410,915	-1,611,296
2002	Japan	Steel	72	1,826,181	639,217	11,069,826	3,231,196	-2,591,979
2003	Japan	Steel	72	1,993,027	954,765	10,825,853	4,016,469	-3,061,704
2004	Japan	Steel	72	2,305,438	1,617,626	11,606,206	5,849,519	-4,231,893
2005	Japan	Steel	72	2,771,849	2,172,866	10,514,172	6,341,484	-4,168,619
2006	Japan	Steel	72	2,519,535	1,874,456	12,148,786	7,228,305	-5,353,849
2007	Japan	Steel	72	2,787,648	2,422,327	12,783,543	8,320,771	-5,898,445
2008	Japan	Steel	72	2,861,927	2,943,644	11,555,531	10,766,974	-7,823,330
2009	Japan	Steel	72	1,867,577	1,680,935	13,597,156	8,151,598	-6,470,663
2010	Japan	Steel	72	2,793,635	2,859,596	14,267,035	10,151,676	-7,292,080
2011	Japan	Steel	72	3,675,194	4,058,097	11,776,006	10,200,713	-6,142,616
2012	Japan	Steel	72	3,802,585	3,489,371	13,066,359	9,367,942	-5,878,571
2013	Japan	Steel	72	3,536,981	2,726,939	12,460,415	7,906,163	-5,179,224
2014	Japan	Steel	72	718,764	531,810	1,727,920	1,136,059	-604,249
Total	-	-	-	53,151,885	36,209,035	187,646,317	107,710,695	-71,501,659

Source : Own

<Table 2> USA Steel Import & Export against world market

Unit: USD1,000, TON								
Year	Country	Item	HS	Export Weight	Export Amount	Import Weight	Import Amount	Trade Balance
1995	USA	Steel	72	927,883	427,690	3,780,637	901,940	-474,250
1996	USA	Steel	72	1,003,520	432,197	3,259,339	694,159	-261,962
1997	USA	Steel	72	1,175,201	498,539	3,209,735	637,964	-139,425
1998	USA	Steel	72	2,948,322	1,032,038	1,837,465	309,502	722,535
1999	USA	Steel	72	2,161,866	759,480	2,145,189	316,884	442,596
2000	USA	Steel	72	1,882,799	769,575	1,799,791	404,768	364,807
2001	USA	Steel	72	1,628,097	634,248	1,608,940	302,161	332,087
2002	USA	Steel	72	1,239,377	463,399	2,431,357	354,375	109,025
2003	USA	Steel	72	818,471	353,576	2,431,654	502,724	-149,148
2004	USA	Steel	72	1,272,193	843,611	2,484,043	914,702	-71,091
2005	USA	Steel	72	1,354,722	1,002,616	1,791,815	696,583	306,033
2006	USA	Steel	72	1,949,468	1,402,852	926,284	378,283	1,024,569
2007	USA	Steel	72	1,305,332	1,072,472	2,084,996	974,894	97,578
2008	USA	Steel	72	1,344,514	1,487,025	2,970,347	1,812,171	-325,146
2009	USA	Steel	72	839,017	626,504	2,862,054	1,024,720	-398,216
2010	USA	Steel	72	1,056,526	980,128	2,910,773	1,346,554	-366,426
2011	USA	Steel	72	1,578,980	1,574,437	2,843,981	1,626,140	-51,703
2012	USA	Steel	72	1,876,266	1,652,908	2,628,600	1,335,563	317,345
2013	USA	Steel	72	1,817,087	1,494,654	2,132,473	989,885	504,769
2014	USA	Steel	72	404,791	326,548	503,736	232,445	94,102
Total	-	-	-	28,584,433	17,834,497	46,643,211	15,756,418	2,078,079

Source : Own

4. Structural analysis of steel industry between Japan-USA

4.1. Empirical analysis model for Japan-USA Steel Industry

In order to understand the competitiveness of the steel industry between Japan and USA, It is necessary to take advantage of some sort of the more traditional analysis method.

It is trade intensity index, trade specialization index and revealed comparative advantage index.

Each measuring index for competitiveness index could be fragmentary analysis way to review only one side together with drawback is intimated. However, it is helpful to see trade structure resulting from industrial competitiveness.

Trade intensity index analyze competitive relations of oversea market between Japan and USA through relative trade intensity of competitiveness analysis indicator to consider overall import absorbing power of import country, comparative advantage of export country together with bilateral or global trade flow. Trade specialization index has some problems to consider only bilateral transaction of exporting and importing countries without considering the world's total trade flows.

Revealed comparative advantage index shows realized competitiveness of exporting country, however, has obstacle that im-

port absorbing power such as import country's market condition is not taken into account at all.

Trade is achieved at the point when importing country's import demand meets exporting country's supply power.

However, revealed comparative advantage index has disadvantage only when the relative export ratio of the exporting country is considered.

We can examine specific calculation method as well as index derived from mentioned calculation. Trade intensity index presented by I. Yamazawa shows exporting country's export comparative market intensity against importing country. Thus, trade intensity index can be defined as follows;

Economic meaning of trade intensity is if I country's export proportion against j country is bigger or j country's import ratio against world total import is smaller, this index is going up.

$$I_{ij} = \frac{(X_{ij}/M_{jw})}{(X_{iw}/M_{ww})} \text{-----} (1)$$

$$I_{ij} = I \text{ country's trade intensity against j country}$$

$$X_{iw} = I \text{ country's total export}$$

$$M_{jw} = j \text{ country's total import}$$

$$M_{ww} = \text{World total import (= Total export)}$$

In case j country export ratio among l country's total export is 1% and j country import is 1% against world total import, this index is 1. Therefore, formular<1> can be changed into formular <1'> as follows

$$I_{ij} = \frac{(X_{ij}/X_{iw})}{(M_{jw}/M_{ww})} \text{-----} (1)'$$

numerator of formular(1)' indicates l country's ratio to j country's market and denominator of formular(1)' indicates l country's world market share.

Namely, this index means l country's world market ratio to j country's market ratio, which is called comparative market intensity.

Additionally, to make in-depth analysis about Japan-USA complementary relationship, we can measure trade specialization degree through qualitative rather than quantitative indicators.

$$\text{<Formular 2> } TSI = \frac{X_i - M_i}{X_i + M_i}$$

(Xi : Export of certain industry, Mi : Import of certain industry)

As Trade specialization index(TSI) is between maximum value +1 and minimum value -1, if mentioned index is bigger, it means the competitiveness is strong. If it is 0, export amount equals to import volume which means the active intra-industry trade is conducted in reality. If it becomes closer to -1 from 0, it means import specialization degree is high and in case it becomes closer to +1 from 0, it means export specialization's degree is high. Additionally, if TSI is +1, it would be perfect export specialization, by the way, if TSI is -1, it would be perfect import specialization. As it is indicator of relative comparative advantage in the export field, it is another indicator to analyze between Japan and USA or among the world for a particular a certain market. TSI is available to analyze by item, by country at a certain point including time series comparison at the same time that is useful to explicate bilateral trade or labor partitioning structure.

Revealed Comparative Advantage index(RCA) is the most widely used index to express export competitiveness of certain goods.

If a certain country export other country a particular product containing revealed comparative advantage index with a large volume product rather than other countries, it is based on assumption that this country has export competitiveness.

RCA index has merit to compare competitiveness between countries that have different economic scale easily.

In case RCA index is bigger than +1, it equals this product has comparative advantage rather than other products in his own country.

Revealed Comparative Advantage(RCA) index suggested by Balassa(2009), Kojima(2007) can be calculated as following formular.

$$\text{<Formular 3> } RCA_i = \frac{EX_i / WEX_i}{TEX / TWEX} \times 100$$

EXi: i industry's export volume from a certain country.

WEXi: i industry's export volume against world market.

TEX: a certain country's total export volume.

TWEX: export volume of total products towards world market.

If RCA index is smaller than +1, it equals this product has comparative disadvantage rather than other products in his own country.

In the beginning, RCA index is proposed as alternative comparative advantage calculation way under the realistic condition of handiness to take relative price data and relative production cost.

Consequently, it is used comprehensive indicator of comparative advantage possibility according to relative price shift caused by factor endowments difference and technology factors, as it indicates comparative accomplishments without attributable to a particular theory of comparative advantage as well as including market share based on economic scale and possibility of trade shift.

By taking advantage of above 3 comparative index of competitiveness, I analyze competitiveness of Japan-USA steel industry at next chapter.

4.2. Empirical analysis result for Japan-USA Steel Industry

4.2.1. Revealed Comparative Advantage Index for Japan-USA Steel Industry

Now, specifically, let's calculate RCA index for Japan-USA steel industry as follows;

<Table 3> Japanese steel export to USA

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	Japan	USA	87	761,931
2007	Export	Japan	USA	87	1,036,826
2013	Export	Japan	USA	87	1,558,105

Source : Own

<Table 4> Steel export amount to World Market

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	World	World	87	111,958,042
2007	Export	World	World	87	423,855,261
2013	Export	World	World	87	422,419,171

Source : Own

<Table 5> Japanese total export amount to USA

Unit: US\$

Period	Trade Flow	Reporter	Partner	Code	Trade Value
2001	Export	Japan	USA	TOTAL	122,548,873
2007	Export	Japan	USA	TOTAL	145,624,196
2013	Export	Japan	USA	TOTAL	134,503,767

Source : Own

<Table 6> Export amount for world total commodity

Unit: US\$

Period	Trade Flow	Reporter	Partner	Code	Trade Value
2001	Export	World	World	TOTAL	6,118,895,777
2007	Export	World	World	TOTAL	13,849,310,780
2013	Export	World	World	TOTAL	18,058,027,326

Source : Own

<Table 7> RCA Index for Japan-USA Steel Industry

Unit: US\$

Year	①Japan steel export to USA/world total steel export amount	②Japan total export to USA/world total commodity export amount	RCA
2001	0.007	0.020	0.350
2007	0.002	0.011	0.182
2013	0.004	0.007	0.571

Source : Own

As we can understand above table, if a certain industry's RCA index is bigger than +1, it equals it has comparative advantage rather than other industries or if it is less than 1, it has disadvantage rather than other industries. Therefore, the calculated RCA index of 2001 is 0.350 which means that Japanese steel industry has comparative disadvantage rather than other industries against USA. As the calculated RCA index of 2007 is 0.182 and of 2013 is 0.571 respectively, when we evaluate them through time serial analysis, Japanese steel industry has comparative disadvantage against that of USA for more than 10 years from 2001 and we can figure out its comparative disadvantage degree is minimum in year 2007. But, it has been starting getting higher again in 2013.

4.2.2. Trade Specialization Index for Japan-USA Steel Industry

As TSI is between maximum value +1 and minimum value -1, in case explained index is bigger, it equals to the competitiveness is strong. If it is 0, export amount equals to import amount. In case it becomes closer to -1, it means import specialization degree is high and in case it becomes closer to +1, it means export specialization degree is high. As it is relative comparative advantage index in export, it is index for analyzing bilateral or against world market competitiveness. Therefore, per reviewing <Table 8> and <Table 9>, Japanese steel export amount to USA has been increasing more than US\$270,000-US\$500,000 almost every 6 years through time-serial analysis method from 2001 to 2013 while USA steel export amount to Japan has been gradually decreasing, amount itself

from US\$103,330 to US\$149,591 That means that US export amount is less than from 7times to 10times rather than that of Japanese export amount every 6 years. As specialization index of 2001 is 0.761 which is closer to +1 based on standard 0, Japan has export specialization degree is high and 0.527 in 2007, of which is below than year 2007. However, it is still closer to +1. Specialization index of 0.825 in 2013 which suggests that Japan's steel export specialization degree is high throughout whole survey period, on the other side, it is supposed to be that USA import specialization degree is high between 2 countries.

<Table 8> Japanese steel export to USA

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	Japan	USA	72	761,931
2007	Export	Japan	USA	72	1,036,826
2013	Export	Japan	USA	72	1,558,105

Source : Own

<Table 9> USA steel export amount to Japan

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	USA	Japan	72	103,330
2007	Export	USA	Japan	72	321,370
2013	Export	USA	Japan	72	149,591

Source : Own

<Table 10> Japan's specialization index toward USA

Unit: US\$

Year	①Japan steel export to USA - US steel export to Japan	②Japan steel export to USA + US steel export to Japan	TSI
2001	658,601	865,261	0.761
2007	715,456	1,358,196	0.527
2013	1,408,514	1,707,696	0.825

Source : Own

4.2.3. Trade intensity index for Japan-USA industrial structure

Based on traditional trade theories, it is supposed to be that international trade is conducted between 2 countries and inevitably existing geographical and institutional barriers such as transportation cost, customs duty does not exist. Under these assumption, international trade is decided through price discrepancy. Traditional theories explicate reason why this price discrepancy is gap of each country's production condition. However, real business life in the existing lots of countries has factors(transportation cost, customs duty) that affect price as well as non-price factors(cultural homogeneity and historical background) which also influence trade flow.

Thus, trade flow of real life is affected by non-comparative advantage factors. It is trade intensity analysis to explicate trade flow under lots of countries are existing. Trade intensity analysis

has assumption that trade flow is affected by both each country's comparative advantage structure and non-comparative advantage factor. Therefore, trade flow's decisive factor is explained by comparing both ex-ante total import & export amount and ex-post total import & export amount. Namely, trade intensity analysis is analysis for bilateral trade flow by contrasting ratio between domestic country and partner in the world trade, shift between partner's import product's structure and domestic export product's structure.

Per reviewing trade intensity index of 2001 in <Table 15>, TII is 1.576 which means Japanese export ratio against USA is high. In 2007 and 2013, it shows 1.385 and 1.450 which means Japanese export ratio against USA is decreasing gradually in 2007 and However, it is rebound a little bit in 2013 and it is still higher than that of 2007. As Japanese export ratio against USA is getting bigger or US import ratio from world total import is getting smaller, this index is getting higher. In other words, these indexes means Japan's world market share/USA's market share which call it as relative market intensity degree.

<Table 11> Japanese total export amount to USA

Unit: US\$

Period	Trade Flow	Reporter	Partner	Code	Trade Value
2001	Export	Japan	USA	TOTAL	122,548,873
2007	Export	Japan	USA	TOTAL	145,624,196
2013	Export	Japan	USA	TOTAL	134,503,767

Source : Own

<Table 12> Japan's total export amount to world market

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	Japan	World	Total	403,363,609
2007	Export	Japan	World	Total	714,327,036
2013	Export	Japan	World	Total	715,166,826

Source : Own

<Table 13> USA's total import amount from world market

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Import	USA	World	Total	1,180,073,832
2007	Import	USA	World	Total	2,017,120,776
2013	Import	USA	World	Total	2,330,795,906

Source : Own

<Table 14> world total export=world total import

Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2001	Export	World	World	Total	6,118,895,777
2007	Export	World	World	Total	13,849,310,780
2013	Export	World	World	Total	18,058,027,326

Source : Own

<Table 15> Japan-USA Trade Intensity Index

Year	①Japan's export to USA/USA total import	②Japan's total export /world total commodity export	TII
2001	0.104	0.066	1.576
2007	0.072	0.052	1.385
2013	0.058	0.040	1.450

Source : Own

5. Conclusions

This study empirically analyze how Japan-USA trade dependent relationship is shifted during over 10 years(2001년, 2007년, 2013년) through trade intensity index, trade specialization index and revealed comparative advantage index. By this, we can review import & export structural factor of 2 countries. Let me summarize results from empirical analysis as follows;

First, trade intensity index of 2001 is 1.576 which means Japanese export ratio to USA is high. In 2007 and 2013, it shows 1.385 and 1.450 which means Japanese export ratio to USA is decreasing gradually in 2007. However, it is rebounding again in 2013 and it is still higher than that of 2007. As Japanese export ratio against USA is getting bigger or US import ratio from world total import is getting smaller, this index is getting higher. Conclusively, these indexes means Japan's world market share/USA's market share which calls it as relative market intensity degree.

Second, Specialization index of 2001 is 0.761 which is closer to +1 based on standard 0, Japan has export specialization degree is high and 0.527 in 2007 is just a little bit down compared to 2001. Specialization index of 2013 is 0.825 which is the closest to +1 among 3 time serial figures. Namely, Japan's export specialization is high throughout whole survey period, on the other side, I can figure out that USA has import specialization degree is high between 2 countries instead of export specialization degree.

Third, the calculated RCA index of 2001 is 0.350 which means that Japanese steel industry has not comparative advantage rather than other industries against USA. AS the calculated RCA index of 2007 is 0.182 and of 2013 is 0.571 respectively when we evaluate them through time serial analysis, we can easily find out that RCA degree of Japanese steel industry is diminishing from 2001 to 2007. However, in 2013, it is just a little bit increasing compared to 2007 according to basic criterion +1. Conclusively, we can figure out Japanese steel industry has not strong comparative advantage against USA other industries throughout whole research period even though its degree is different.

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