

# The Automobile Distribution Industry's Trade Structure Analysis and Comparison between Japan and USA\*

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## Abstract

**Purpose** - This study reviews changes in the automobile export-import structure between Japan and USA through a trade related index, and focuses on analyzing comparative advantage based on time-series analysis of statistical data (2000, 2005, and 2012) by using the trade intensity index (TII), revealed comparative advantage index (RCA), and trade specialization index (TSI).

**Research design, data, and methodology** - Japan and USA have mutually complementary economic phase characteristics. Therefore, this study aimed to understand each country's trade structure, to strengthen Japan-USA economic cooperation and aimed to examine trade drawbacks to analyze causes affecting trade and ways to improve it to facilitate its expansion.

**Results** - These two economies have immense complementary potential and, further, significantly greater profits are assured from trade between them, as compared to any other integrated regional economic community.

**Conclusion** - Economic cooperation between these two powers can provide opportunities for industry technology cooperation through partnerships against the backdrop of accelerating competition among industries, by identifying opportunities to secure stable resource suppliers and enlarge the export market.

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

**JEL Classification:** F14, F17, L62, L92.

## 1. Introduction

The world auto markets in 2013 were more slow compared with last year due to emerging market's weakness except for China.

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 auto 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 paper is organized as follows; 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 auto industry taking advantage of general trade statistics. Chapter 4 decompose and measure interrelated trade relationship by way of UN COMTRADE statistics including Revealed Comparative Advantage Index, Trade Intensity Index

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and Trade Specialization Index. Finally, Chapter 5 summarizes analysis result of this research and gives final conclusions.

## 2. Precedent research and statistic data

In order to analyze trade determinants between 2 countries, trade intensity index was used to analyze 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 as well as its diversity which it is hard to explain specifically. So, I look into to focus on trade structure factor as a mentioned research point, namely, analysis of trade determinant. Analysis period is from 2000 to 2012. From 2000 to 2005 and 2012 are restricted for both 2 countries trade determinant analysis as recent statistical data of international statistical data are not announced or are difficult to get them. Per reviewing precedent research, Lee (2011), Lee (2012) by trade specialization index, there are analysis research for Cha (2013), Lee (2007) by revealed comparative advantage index and Lee (2012) by trade intensity index. The papers of Han & Yu (2012) have differentiation compared to other papers as above mentioned all 3 indexes are used for study.

This research was done empirical analysis based on 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 USA. The statistical data published by international organization were mainly used. The main data were made based on Standard International Trade Classification - Revision 3, Korea Customs Office, Korea International Trade Association and mainly, UN Comtrade. 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. data base.

## 3. Present status and characteristic for Japan-USA auto 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 pur-

sue 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.

<Table 1> Japanese Import & Export against World Auto Market, Unit: US\$

Year	Country	Item	HS	Export	Import	balance
1990	Japan	Auto	87	\$65,990,764,258	\$7,607,502,735	\$58,383,261,523
2000	Japan	Auto	87	\$89,349,094,075	\$10,351,905,213	\$78,997,188,862
2005	Japan	Auto	87	\$125,125,824,753	\$13,865,578,702	\$111,260,246,051
2012	Japan	Auto	87	\$162,829,579,487	\$21,195,549,198	\$141,634,030,289

Source: Own

<Table 2> USA Import & Export against World Auto Market, Unit: US\$

Year	Country	Item	HS	Export	Import	Balance
2000	USA	auto	87	\$61,927,570,518	\$166,710,857,265	-\$104,783,286,747
2005	USA	auto	87	\$83,160,583,184	\$203,247,901,957	-\$120,087,318,773
2012	USA	auto	87	\$132,926,222,743	\$244,200,232,272	-\$111,274,009,529

Source: Own

Per reviewing <Table 1> and <Table 2>, we can easily find out that Japanese auto business has been continuously growing up. Especially, During 2000-2005, the total surplus of trade balance is approximately, US\$400billion which is the biggest trade surplus for whole research period from 1990 to 2012.

On the other hand, US auto business is on the contrary to Japanese auto business as they have been continuously trade deficit for whole research period from 2000 to 2012. However, optimistically, after year 2005, trade deficit has been improved considerably. Under the current situation of both 2 countries, we can easily figure out that Japanese auto business has been always trade surplus for research period while USA auto business has been always trade deficit during whole research period. However, we must examine and analyze that this phenomenon always makes Japanese auto business comparative advantage while USA auto business comparative disadvantage.

#### 4. Structural analysis of steel industry between Japan-USA

##### 4.1. Empirical analysis model for Japan-USA Auto Industry

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

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

Each measuring index for competitiveness index could be fragmentary analysis method to see only one side as well as problem is implied. However, it is helpful to see trade structure resulting from industrial competitiveness.

Trade intensity index analyze competitive relations of oversea market between 2 countries by 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 export country, but, has problem that import absorbing power such as market condition of import country is not taken into account at all.

Trade is accomplished at the point that import demand of import country meets supply power of export country.

However, revealed comparative advantage index has disadvantage that only the relative export proportion 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.

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

$$\begin{aligned} I_{ij} &= I \text{ country's trade intensity against } j \text{ country} \\ X_{iw} &= I \text{ country's total export} \\ M_{jw} &= j \text{ country's total import} \\ M_{ww} &= \text{World total import (= Total export)} \end{aligned}$$

In case j country export ratio among I 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)' shows I country's share against j country's market and denominator of formular(1)' shows I country's world market share.

Namely, this index means I country's world market share against j country's market share, of which it calls comparative market intensity.

Additionally, to make in-depth analysis about Korea-Japan 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 amount which means the active intra-industry trade is done in reality. In case it comes closer into -1 from 0, it means degree of import specialization is high and if it comes closer into +1 from 0, it means degree of export specialization is high. Further more, if TSI is +1, it is perfect export specialization, on the contrary, if TSI is -1, it is perfect import specialization. As it is indicator of relative comparative advantage in the export, it is another indicator to analyze between the two countries or in the world for a particular market. TSI is available to analyze by item, by country at a certain point including time series comparison at the same time which is useful to explain bilateral trade or labor segregation structure.

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

If a certain country export a particular product of revealed comparative advantage index to other countries some extent 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.

If RCA index is bigger than 1, it means 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.

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

EX<sub>i</sub>: i industry's export amount from a certain country.  
WEX<sub>i</sub>: i industry's export amount against world market.  
TEX: a certain country's total export amount.  
TWEX: export amount of total products against world.

In case RCA index is smaller than 1, it means this product has comparative disadvantage rather than other products in his own country.

At first, RCA index is suggested as alternative comparative advantage calculation method under the realistic condition of availability to get relative production cost or relative price data.

Consequently, it is used comprehensive indicator of comparative advantage possibility according to relative price shift

caused by technical factors, factor endowments difference as it shows comparative accomplishments without attributable to a particular theory of comparative advantage as well as including market share coming from economic scale and possibility of trade shift.

By using above 3 comparative index of competitiveness, let me analyze competitiveness of Japan-USA auto industry at next chapter.

## 4.2. Empirical analysis result for Japan-USA Auto Industry

### 4.2.1. Revealed Comparative Advantage Index for Japan-USA Auto Industry

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

<Table 3> Japanese Auto Export against USA, Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2000	Export	Japan	USA	87	\$43,039,167,457
2005	Export	Japan	USA	87	\$50,327,559,079
2012	Export	Japan	USA	87	\$50,440,362,857

Source: Own

<Table 4> Auto Export Volume against World Market, Unit: US\$

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Export	World	World	87	\$337,368,208,498
2005	Export	World	World	87	\$503,129,106,775
2012	Export	World	World	87	\$671,583,017,215

Source: Own

<Table 5> Japanese Total Export Volume against, Unit: US\$

Period	Trade flow	Reporter	Partner	Code	Trade value
2000	Export	Japan	USA	TOTAL	\$142,480,029,293
2005	Export	Japan	USA	TOTAL	\$135,946,685,461
2012	Export	Japan	USA	TOTAL	\$142,040,040,745

Source: Own

<Table 6> Export Volume for World Total Commodity, Unit: US\$

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Export	World	World	Total	\$6,264,447,837,159
2005	Export	World	World	Total	\$3,672,719,979,645
2012	Export	World	World	Total	\$6,365,674,887,492

Source: Own

<Table 7> RCA Index for Japan-USA Auto Industry, Unit: US\$

Year	① Japan Auto export against USA/world total auto export	② Japan total export against USA/world total commodity export	①/② value
2000	0.127573276	0.022744228	5.609039629
2005	0.100029115	0.03701526	2.702375027
2012	0.075106668	0.02231343	3.365984896

Source: Own

As we can understand above table, if a certain industry's RCA index is bigger than 1, it means 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 2000 is 5.60 which means that Japanese auto industry has comparative advantage rather than other industries against USA. As the calculated RCA index of 2005 is 2.70 and of 2012 is 3.36 respectively, when we evaluate them through time serial analysis, Japanese auto industry has high comparative advantage against that of USA for more than 10 years from 2000 and we can figure out its comparative advantage degree is maximum in year 2000 and then, it has been a little bit getting lower in 2005. But, it has been starting getting higher again in 2012.

### 4.2.2. Trade Specialization Index for Japan-USA auto Industry

As 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 amount. In case it comes closer into -1, it means degree of import specialization is high and if it comes closer into +1, it means degree of export specialization 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 auto export volume against USA has been increasing more than US\$43billion-US\$50billion every 5 years through time-serial analysis method from 2000 to 2012 while USA auto export volume against Japan has been gradually decreasing more than US\$2.5billion-US\$1.9billion That means that US export volume is less than from 21times to 50times rather than that of Japanese export volume every 5 years. As specialization index of 2000 is 0.88 which is closer to +1 based on standard 0, Japan has export specialization degree is high and 0.93 in 2005 is much closer to +1 rather than 2000. Specialization index of 2012 0.92 in 2012 is which means that Japan's auto export specialization is high throughout whole period, on the other hand, it is assumed that USA has import specialization degree is high between 2 countries.

<Table 8> Japan Auto Export Amount against USA, Unit: US\$

Period	Trade flow	Reporter	Partner	HS Code	Trade Value
2000	Export	Japan	USA	87	\$43,039,167,457
2005	Export	Japan	USA	87	\$50,327,559,079

2012	Export	Japan	USA	87	\$50,440,362,857
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Source: Own

<Table 9> USA Auto Export Amount against Japan

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Export	USA	Japan	87	\$2,583,737,270
2005	Export	USA	Japan	87	\$1,610,613,830
2012	Export	USA	Japan	87	\$1,917,339,513

Source: Own

<Table 10> Japan Specialization Index against USA

Year	① Japan Auto export against USA - US auto export against Japan	② Japan Auto export against USA + US auto export against Japan	①/② value
2000	\$40,455,430,187	\$45,622,904,727	0.886735083
2005	\$48,716,945,249	\$51,938,172,909	0.937979573
2012	\$48,523,023,344	\$52,357,702,370	0.926759983

Source : Own

#### 4.2.3. Trade Intensity Index for Japan-USA Industrial Structure

According to traditional trade theories, they assume that international trade is done 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 explain reason of this price discrepancy is difference of each country's production condition. However, real business life that lots of countries are existing has factors(transportation cost, customs duty) that affect price as well as non-price factors(cultural homogeneity and historical background) that also affect trade flow.

Thus, trade flow of real life is affected by non-comparative advantage factors. It is trade intensity analysis to explain 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 volume and ex-post total import & export volume. 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 2000 in <Table 15>, TII is 0.13 which means Japanese export ratio against USA is high. In 2005 and 2011, it shows 0.25 and 0.14 which means Japanese export ratio against USA is increasing gradually in 2005 and it is diminishing slowly. However, it is still higher than that of 2000. 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 in-

dexes means Korea's world market share/Japan's market share which call it as relative market intensity degree.

<Table 11> Japan's Total Auto Export Volume to USA, Unit: US\$

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Export	Japan	USA	87	\$43,039,167,457.00
2005	Export	Japan	USA	87	\$50,327,559,079.00
2012	Export	Japan	USA	87	\$50,440,362,857.00

Source: Own

<Table 12> Japan's Auto Total Export Volume to World Market, US\$: US\$

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Export	Japan	World	87	\$89,349,094,075.00
2005	Export	Japan	World	87	\$125,125,824,753.00
2012	Export	Japan	World	87	\$162,829,579,487.00

Source: Own

<Table 13> USA's Auto Total Import Volume against World Market

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Import	USA	World	87	\$166,710,857,265.00
2005	Import	USA	World	87	\$203,247,901,957.00
2012	Import	USA	World	87	\$244,200,232,272.00

Source: Own

<Table 14> World Auto Total Import = World Auto Total Export

Period	Trade flow	Reporter	Partner	HS Code	Trade value
2000	Import	World	World	87	\$314,577,702,525.00
2005	Import	World	World	87	\$437,054,325,691.00
2012	Import	World	World	87	\$537,231,043,880.00

Source: Own

<Table 15> Japan - USA Trade Intensity Index

Year	① Japan export against USA/Japan total import	② Japan total export/world total commodity export	①/② value
2000	0	1	0.136815696
2005	0	1	0.25987054
2012	0	0	0.140808825

Source: Own

## 5. Conclusions

This study empirically analyze how Japan-USA trade dependent relationship is shifted during over 10 years(2000년, 2005년, 2012년) 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 2000 is 0.13 which means Japanese export ratio against USA is high. In 2005 and 2011, it shows 0.25 and 0.14 which means Japanese export ratio against USA is increasing gradually in 2005 and it is diminishing slowly. However, it is still higher than that of 2000. 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 Korea's world market share/Japan's market share which call it as relative market intensity degree.

Second, Specialization index of 2000 is 0.88 which is closer to +1 based on standard 0, Japan has export specialization degree is high and 0.93 in 2005 is much closer to +1 rather than 2000. Specialization index of 2012 is 0.92 which is just a little bit down compared to 2005. However, Japan's auto export specialization is high throughout whole period, on the other hand, it is understood that USA has import specialization degree is high between 2 countries instead of export specialization degree.

Third, the calculated RCA index of 2000 is 5.60 which means that Japanese auto industry has extremely high comparative advantage rather than other industries against USA. AS the calculated RCA index of 2005 is 2.70 and of 2012 is 3.36 respectively when we evaluate them through time serial analysis, we can easily find out that RCA degree of Japanese auto industry is diminishing from 2000 to 2012. However, it is very high or high comparative advantage against that of USA for more than 10 years from 2000 to 2012 according to basic criterion +1. Conclusively, we can figure out Japanese auto industry has been always comparative advantage against USA other industries throughout whole research period even though its degree is different.

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