

Discussion Points on Transboundary Movement of Used Vehicles and International Recycling

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(Received September 24, 2010)

1. Introduction

Waste holders often dispose of waste improperly because the government cannot monitor their behavior perfectly. There is an asymmetric information problem that waste generators cannot distinguish proper waste disposal operators. Waste generators are difficult to find proper operators in the market even if they have high environmental consciousness. They usually want to select “cheaper” operators who receive waste at lower prices. Some “cheaper” operators may reduce the cost by improper disposal of waste.

The End-of-life Vehicle (ELV) Recycling Law in Japan can solve such problems. Vehicle owners have to pay the recycling fee under the law when they purchase the vehicles. They do not have to pay some waste disposal costs by delivery of the ELVs to proper waste disposal operators. As a result, proper operators can get ELVs at higher prices than improper ones. The law gives vehicle owners an incentive to deliver ELVs to properly.

However, it does not control the export of used vehicles. The recycling fee is paid back to the last vehicle owners or exporters in this situation. Exported vehicles will become end-of-life overseas in the future. The ELVs may be disposed of improperly outside of the control of Japanese law. In order to prevent the waste problems, importing countries are required to have systems to deliver waste properly. However, they do not often have sufficient systems. Moreover, there is a case that they disregard the waste problems.

In such a situation, it is necessary to discuss whether exporting countries like Japan should take some actions. Recent studies in Japan have accumulated much information about international trade of used vehicles from Japan. However, the direction of policy is not discussed sufficiently. This paper will organize much information about international trade of used vehicles from a viewpoint of waste problem, and pick up the discussion points for policy.

2. Current Situation

The number of deregistered vehicles is calculated with the number of vehicles owned and new registration. That is close to the total number of exported used vehicles and ELVs. Japan did not have the statistical codes about used vehicles until April 2001. The Figure 1 shows the trend of the number of deregistered and exported used vehicles since 2001.

As this figure shows, the rate of exported used vehicles in deregistered vehicles has been increasing. This means that more deregistered vehicles will become end-of-life in foreign

countries in the future. Japan can avoid the payment of waste disposal cost. Even if there are some environmental problems in foreign countries, exporting countries like Japan do not have any relationship with them.

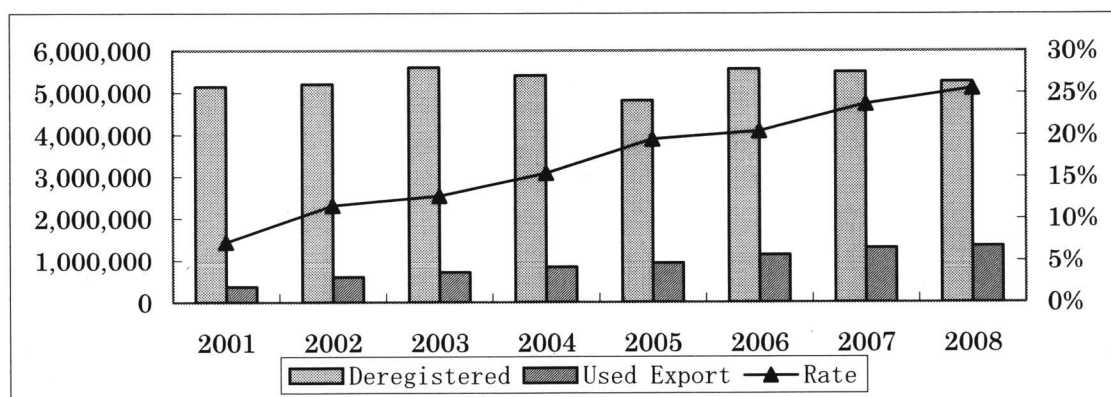


Figure 1 The number of deregistered and exported used vehicles.

Note : The left axis shows the number of vehicles and right axis shows the rate of exported used vehicles in deregistered vehicles. Data in year 2001 is from April to December.

Source : Monthly Statistics (Japan Automobile Manufacturers Association), Foreign Trade Statistics (Japan)

Japan exports used vehicles to many countries and areas. The number of the destinations of used vehicles trade is around 180, which cover most countries and areas in the world. In recent years, main countries are Russia, New Zealand and United Arab Emirates (UAE). As shown in the Table 1, these countries keep around 50 percent of share in total quantities. Other large importing countries are Chile, South Africa and Kenya. Nearby Asian countries are not observed on the upper level of the list.

Table 1 The number of exported used vehicles by main destinations

Destinations	2001	2002	2003	2004	2005	2006	2007	2008	2009
New Zealand	86,373	125,112	144,349	135,006	132,600	96,219	101,236	59,090	57,420
Russia	26,143	42,771	68,123	120,052	268,584	389,854	478,802	563,369	53,170
UAE	40,749	87,957	108,236	144,090	113,818	116,997	122,518	98,204	89,948
World	371,090	603,866	712,968	835,233	940,298	1,137,720	1,302,481	1,347,026	675,664
Share	41.3%	42.4%	45.0%	47.8%	54.8%	53.0%	53.9%	53.5%	29.7%

Source : Foreign Trade Statistics, Ministry of Finance, Japan

3. Characteristics of Used Product Trade

There are many policy studies about transboundary movement of *end-of-life* products from a viewpoint of waste problem. Kojima ed. (2005) is one of the representative studies about this field. However, there are not any policy studies about *used* products from the

same viewpoint. Many studies are interested in the effect of trade policy and free trade. For example, Fox (1957), Sen (1962), Pelletiere and Reinert (2002), Navaretti, Soloaga and Takacs (2003), Thomas (2003), Clerides (2008) are focus on used products from this viewpoint. In addition, used products have a problem of asymmetric information as Akerof (1970) shows. It is important to take into account such viewpoints in the discussion of transboundary movement of used products. In parallel, it is necessary to organize much information about actual conditions from a viewpoint of waste problem.

Kojima ed. (2005) points out the problems generated by international trade of end-of-life products and recycled resources. *End-of-life* products are often imported as *used* products and separated improperly in developing countries. In order to solve the problems, he presents concrete policies such as “strengthening regulatory enforcement on transboundary movements of hazardous wastes” and “systemizing & rationalizing trade procedures for transboundary movements of hazardous wastes”.

One of the characteristics of transboundary movement of used products is in-use process after export. This is different from the characteristics of end-of-life products. Therefore, even if customs strengthen the export and import control of used products, waste problem of used products is not solved. Import of used vehicles is often regulated from viewpoints of new vehicle sales policy and exhaust gas policy, but it is rarely restricted from a viewpoint of waste management.

From these points, the policy for used products is more important to manage the flow of products after in-use process than to control the import. Therefore, we should have a different perspective from the case of end-of-life products.

4. Discussion Points

From recent studies, the flow of used vehicles from Japan has become more visible. However, in order to make discussion on policy for transboundary movement of used vehicles, it is necessary to organize much information. In addition, we have to consider different situations depending on importing countries.

Exported used vehicles become end-of-life after in-use process in importing countries or others. There is a possibility that vehicles are moved to further countries and areas. Therefore, it is important to analyze where the vehicles are distributed and become end-of-life and how the ELVs are disposed of.

4. 1 Where do vehicles become end-of-life?

When vehicles become end-of-life in an importing country, it is important to analyze the industries and legal systems there. However, there is a case in which vehicles are further exported to some other countries. In this case, it is important to analyze where vehicles become end-of-life.

At some level, we can find the country where vehicles become end-of-life by analyzing foreign trade statistics. We can say vehicles are possible to become end-of-life within that country if the number of exported used vehicles is small. However, it is necessary to

confirm the possibility that vehicles are not counted in foreign trade statistics.

In addition, about the export to other countries, we have to separate a case that there is in-use process in importing countries and a case that there is not in-use process. In the latter case, it is possible that the number of vehicles for re-export is not counted in foreign trade statistics. Therefore, we have to check each situation.

4. 2 Are there any incentives to collect ELVs?

When we can find the place where vehicles become end-of-life, we next have to investigate whether there are some incentives to collect the ELVs in the place. If none can get profit by collecting ELVs, owners cannot deliver ELVs to anyone.

A collection operator of an ELV faces the following profit function.

$$\Pi = \sum_{i=1}^n (q_i s_i - c(s_i)) - p \geq \Pi^*$$

Here, it purchases the ELV at the price of p , and separate it into n kinds of objects. The s_i , q_i and $c(s_i)$ shows respectively the weight of object i , the price of object i , and the cost for collecting and separating the s_i . Π^* shows a profit of the collection operator by other business. This means that the ELV collection operator does not appear in the market if the profit by other business is larger than that by ELV collection business.

In addition, there is a case when the ELV and some objects are traded at negative prices. In this case, p and q_i show the cost per unit. If there is no collection cost for residue after separating $n-1$ types of objects, then $c(s_n) = 0$.

The collection operator of ELVs wants used parts and recyclable resources and does not want whole of the ELVs. Therefore, if it can get the used parts and recycled resources by other collection methods more profitably, it does not have to collect ELVs. In this case, Π^* is not necessarily zero. From these, we should analyze an incentive to collect ELVs as follows.

(1) Location of related industries

If related industries like scrap dealers, dismantlers and waste disposal operators are located in the countries, it can be showed that there is an incentive to collect ELVs. However, it does not mean that the collection operators collect all the ELVs generated within the country. In addition, it is important to analyze the existence of alternative industries like importing business of used parts and recycled resources.

(2) Analysis of the ELV prices

The location of waste and recycling industries tends to be influenced by the market condition of recycled materials. Usually, the market price is not stabilized. Therefore, the scale and the location of the industries often change with the market price. The location analysis in the above (1) does not make clear the change of time series. Therefore, it is important to analyze the change of the profit structure and ELV prices with the prices of recycled materials. If ELV prices are negative, it is showed that they can be abandoned into the environment.

(3) Barrier against generation of industries

There is a case that industries are more poorly located in some countries than in Japan. For example, restriction of immigration and international trade can shrink the market of used parts and recycled resources. Such barriers can lower the value of ELVs and influence an incentive to collect them.

4. 3 Are Legal Systems Working Properly?

When there is no incentive to collect the ELVs, the owners are difficult to find the ELV collectors in the market. As a result, the ELVs may be abandoned and disposed of improperly. Even if the improper disposal is prohibited under the law, the government cannot perfectly monitor the owners' behavior.

When someone collects ELVs, he or she is required to dispose of the residue after separating operation under the legal systems. Depending on the level of law enforcement, the environmental problems can be generated. Therefore, it is important to consider whether the ELVs are delivered to proper disposal facilities under legal systems.

In many countries, waste generators and holders are responsible for the waste disposal. In some countries, there is a legal or voluntary system in which the last owners of products have an incentive to deliver the products to the licensed recycling operators. We have to consider whether the government recognizes the necessity of such systems. Under the consideration, we will make discussion about what exporting countries should do.

5. Case Study

On the basis of the above points, I will analyze the situations in some countries. There are many destinations for export and it is difficult to analyze all the countries. As I showed earlier, quantities exported to New Zealand, Russia and United Arab Emirates have around fifty percent of share in total quantities. Therefore, in this section, I will simply try to compare these countries from the discussion points in the foregoing section.

5. 1 New Zealand

New Zealand deregulated trade barriers about the automobile industry in 1980s. As a result, the number of imported used vehicles increased. The number of deregistered vehicles in New Zealand is 110,000-140,000 annually in year 2004-2007. The number of exported used vehicles is only 2,000-4,000 annually in year 2006-2008. Therefore, many deregistered vehicles are likely to become end-of-life in New Zealand.

It is said there are 350-400 dismantlers in New Zealand, which separate ELVs and collect used parts, recyclable materials and waste. Used parts are sold to domestic vehicle repair shops and also exported to some countries. Foreign people come to New Zealand to buy and salvage used parts.

ELV hulks after salvaging parts are shredded and pressed in this country. Therefore, the market is competitive and the prices can become higher. Some pressed ELV hulks are exported, but it is unknown where and how they are recovered and disposed of. Anyway, this means waste can be generated to some countries other than New Zealand.

On the other hand, this country imports used parts from Japan. Therefore, New Zealand people do not have to salvage the ELVs generated within the country. This means that the prices of ELVs can become lower. When the prices of recyclable resources decreases, the dismantlers may not collect the ELVs within New Zealand. They may select the importing business.

Dismantlers have to comply with some requirements under Resource Management Act. In addition, there is a voluntary system in which relational agents collect and recover end-of-life tires. Under such systems, some dismantling plants have equivalent level of facilities with Japan. Therefore, some used vehicles exported from Japan can be recovered and disposed of in proper recycling facilities. On the other hand, there are some dismantling plants which do not have equivalent level of facilities with Japan. This means there is a possibility of environmental problems by ELVs.

5.2 Russia

Used vehicles exported from Japan are reused in Russia too. According to my calculation with registration data available in Japan, the number of deregistered vehicles is 500,000-1,000,000 annually. However, because the number often becomes negative, it is important to analyze the exact number of deregistered vehicles. The number of used vehicles exported from Russia is around 400 at most. This is less than 0.1 percent in the number of deregistered vehicles. Therefore, it is shown that deregistered vehicles become end-of-life within the country.

According to Japanese researchers including me, there are some dismantlers who collect and separate the ELVs in the Russian Far East. However, we cannot find so many dismantlers which salvage used parts from ELVs in Russia relatively. Instead, there are a lot of used parts importers. The dismantlers can make money by sales of used parts and recycled resources, but it is possible that they cannot get more profit than used parts importers. There seem to be some differences among Russian Far East, New Zealand and Japan in the conditions about an incentive to collect ELVs. It is necessary to analyze the differences in detail.

5.3 UAE

This country is a re-export base of used vehicles from Japan. We cannot find Japanese used vehicles driving in this country. There are a lot of dealers in free zone in Dubai who import and re-export Japanese used vehicles. The vehicles become end-of-life in these re-exported countries and others. In this case, it is important to analyze where and how many vehicles are re-exported. The number of passenger vehicles (including new vehicles) exported from UAE is downloaded by United Nations foreign trade statistics (UN comtrade) . This data shows that the vehicles are exported to Middle East, East Africa and Central Asia.

5. 4 Comparison

From this simple consideration, some points are showed. Three countries have a common point that vehicles are reused after export, but there are some differences among them. For example, about the re-export base like UAE, we have to focus on the analysis of further destinations. In addition, about countries like New Zealand and Russia, we have to analyze the difference of an incentive to collect ELV. Moreover, they have some characteristics that Japan does not have. Therefore, it is necessary to compare them with Japan, too.

Table 2 Comparison of New Zealand, Russia and UAE

Destinations	New Zealand	Russia (Far East)	UAE
How do vehicles treated after export?	Use domestically	Use domestically	Re-export
Where are vehicles end-of-life?	Within the country	Within the country	Other countries
About an incentive to collect ELVs			
Auto dismantlers	Many	Few	
Domestic market of used parts	Existence	Existence	
Export of used parts	Many	Not any	
Metal scrap dealers	Many	Few	
Export market of metal scrap	Existence	Existence (under the restriction)	
Export of Use Vehicles	Few	Not any	
Import business of used parts	Many	Many	
About systems			
Related legal systems	Existence	Existence	
Collection systems of other end-of-life products	Existence	Nonexistence	
Proper waste disposal facilities	Existence	Unclear	

6. Conclusion

As I mentioned in this paper, we have accumulated much information about transboundary movement of used vehicles. However, we had not found out what we should analyze. In order to do more research and make more discussion for policy, the organization like this paper has been needed. Of course, this paper is not sufficient and we have much work to do. Especially, more objective data are needed. Anyway, on the basis of these challenges, we have to promote discussion.

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