

The Flow of Products and Materials from Japan for Reuse and Recycling in Asia focusing on Automobiles

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ABSTRACT

In order to clear trade of products and materials for reuse and recycling in Asia, this paper analyzed the flow of products and materials flow from Japan for reuse and recycling in Asia using Japanese trade statistics focusing on automobiles. Due to the difficulty of identifying data for used products from the trade statistics, the data were estimated using the price information from the statistics. As a result, the following findings was obtained: 1) many of ELVs generated in Japan have been exported and used as used automobiles, used parts and secondary materials globally; and 2) the export quantity of ELVs from Japan to Asia is increasing by 5 times from 0.26 million tones to 1.26 million tones between 1988 and 2005; and 3) Asia has a tendency to import used parts and secondary materials more than used automobiles.

INTRODUCTION

In recent years, trade of products and materials for reuse and recycling has been increasing in Asia. For the prevention of environmental pollution and the efficient utilization of resources, it is necessary to evaluate the structure of such international product and material flows. In Japan, nearly 5 million end-of-life vehicles (ELVs) have been annually generating (see figure 1). However, it hasn't been clarified how many of these vehicles have been exported globally and used as used automobiles, used parts and secondary materials in Asia with inadequate maintenance and recycling systems.

This paper focus on the international flows of ELVs from Japan and evaluate the export of ELVs as used automobile, used parts and secondary materials from Japan using trade statistics provided by Japanese customs.

METHOD

For the evaluation of the export of ELVs from Japan, we measured the trend of the export quantities and destination according to time using the trade statistics. However, it is difficult to obtain the export data for used automobile and parts from the trade statistics directly. Because, the data recorded in the statistics are not distinguished between a new and a used product in many cases except some products and pried. Therefore, we tried to estimate the export data for used automobile and parts using the following **Step 1-2**. Moreover, the export data of used automobile as belongings not in a record object of the trade statistics were estimated by the findings of our field

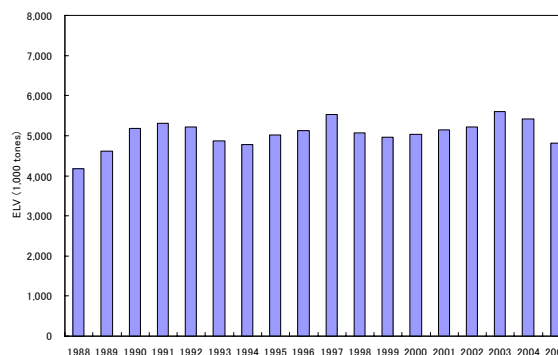


Figure 1. ELVs generated in Japan

and questionnaire survey to customs. About Secondary materials, we collected the data from trade statistics directly.

Step 1: Calculation of the price of new and used product

First, we identified a custom and a country that has often exported and imported new or used product from the data in trade statistics divided between new and used one such as automobile in 2005 and tire between 1988 and 2005. Next, we sampled the export quantity and value of automobile and parts on customs and countries identified the above. The new and used product prices of automobile and parts were calculated from the sampling data.

Step 2: Estimation of export quantity of used product

We estimated the export quantity of used automobile and parts inputting the new and used product prices obtained from **Step 1** into the following equation (1).

$$\begin{bmatrix} QN \\ QU \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ PN & PU \end{bmatrix}^{-1} \cdot \begin{bmatrix} TQ \\ TV \end{bmatrix} \quad (1)$$

Where, QN and QU are the export quantities of new and used product. PN and PU are the price of new and used product. TQ and TV are the export quantity and value included both new and used product.

RESULTS

Figure 2 shows the export quantity of used automobile, used part and secondary materials from Japan between 1988 and 2005. The results indicated that the total export quantity is increasing by 3 times from 0.82 million tones to 2.54 million tones between 1988 and 2005. In regard to the trend of the composition of used automobiles, used parts and secondary materials according to time, we obtained the results which used automobile ratio is increasing from 29% to 45% while used parts ratio is decreasing from 67% to 52% and secondary materials ratio is always changing less than 5%. Therefore, it becomes clear that many of ELVs generated in Japan have been exported and used as used automobiles, used parts and secondary materials globally.

Furthermore, the export quantity and destination of used automobiles, used part and secondary materials are shown in figure 3-5. As the results obtained from each figure, the export quantity of used automobiles is increasing by 5 times 0.23 million tones to 1.55 million tones. The export quantity of used parts is increasing by 2 times from 0.55 million tones to 1.31 million tones but the growth ratio of the increase is lower than used automobiles. While, the export quantity of secondary materials has the different trend but simple increase depend on various factors such as the market conditions. In regard to the trend of the export to Asia, the Asia ratio to the world for used automobiles is always keeping nearly 20%. Asia ratio for used parts is increasing from 34% to 71% according to time. Asia ratio for secondary materials is increasing from 70% to 95%. Therefore, it was proved that the export quantity of ELVs from Japan to Asia is increasing by 5 times from 0.26 million tones to 1.26 million tones between 1988 and 2005 and that Asia has a tendency to import used part and secondary materials more than used automobiles.

CONCLUSION

In order to clear the international flows of ELVs from Japan in Asia, we measured the export of use automobiles, used parts and secondary materials from Japan using trade statistics. As a result, the following findings was obtained: 1) Many of ELVs generated in Japan have been exported and used as used automobiles, used parts and secondary materials globally; and 2) the export quantity of ELVs from Japan to Asia is increasing by 5 times from 0.26 million tones to 1.26 million tones between 1988 and 2005; and 3) Asia has a tendency to import used part and secondary materials more than used automobile.

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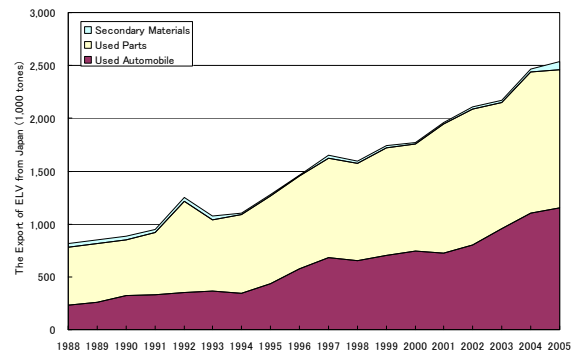


Figure 2. The export of ELV from Japan

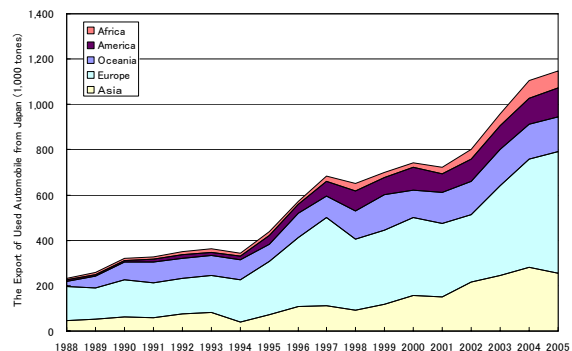


Figure 3. The export of Used Automobile from Japan

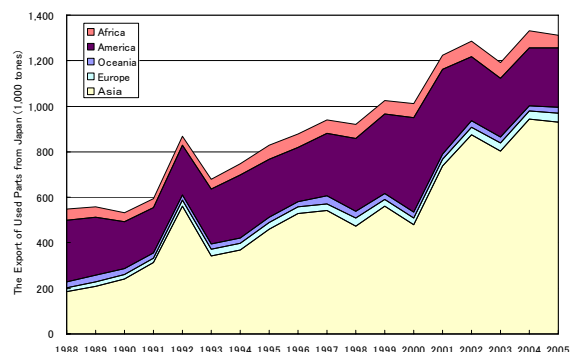


Figure 4. The export of Used Parts from Japan

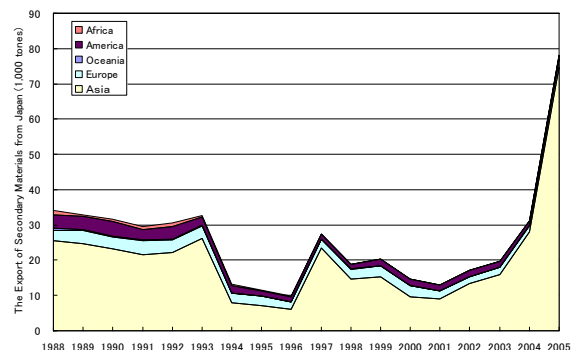


Figure 5. The export of Secondary Materials from Japan