『経済研究』（明治学院大学）第 155 号　2018 年

Used car exports from Japan

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1. Introduction

In this research note, I examine used car exports from Japan, using trade statistics issued by the Japanese Ministry of Finance. The rise of the Japanese automobile industry and the corresponding increase in the stock of vehicles in Japan has been accompanied by increased exports of cars sold and used domestically. The latest data indicate that more than one million used cars were exported from Japan in 2015, with major export destinations that included such countries as the United Arab Emirates, Singapore and New Zealand. A preliminary analysis of the determinants of used car exports finds that usual factors such as market size and income fail to explain the bilateral trade flows in used cars.

The remaining contents of this note are as follows: Trends in used car exports from Japan are presented in the next section; factors affecting Japanese used car exports are analyzed in Section 3; comments regarding further research follow in Section 4.

2. Trade statistics on used car exports from Japan

2.1 Trends

Units

Based on official international trade statistics issued by the Japanese Ministry of Finance (MOF), Figure 1 shows annual total car exports, used car exports, and the percentage share of used

cars in total car exports. In 2002, Japan exported nearly 5 million cars, including used cars. This total continued to increase, exceeding 7 million cars in 2007 and 2008. Since the global economic downturn in 2009, total car exports from Japan have been around 5 million units per year.

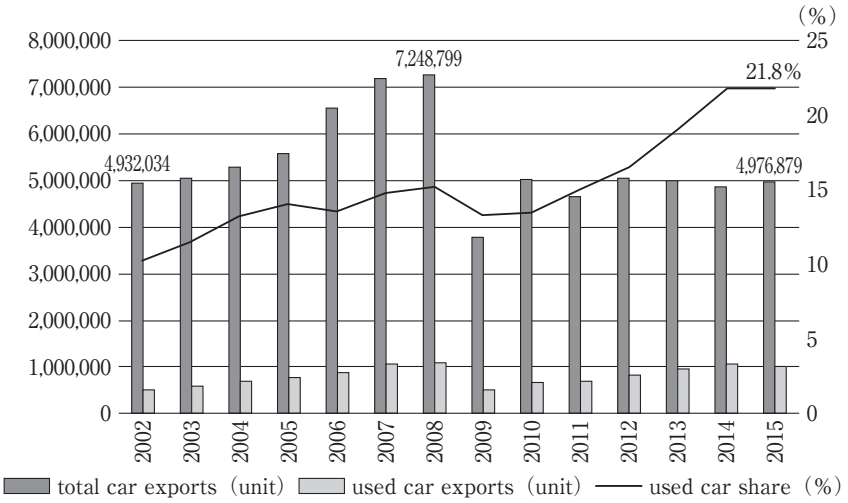
Similar to the pattern of total car exports, used car exports increased from 2002 through 2008. In 2002, 504,556 used cars were exported, which amounted to 10.2 percent of the year's total car exports. The used car share of total car exports has continued to rise, except for the years 2006 and 2009. In 2015, 1,021,712 used cars were exported, meaning that 21.8 percent of the total number of cars exported from Japan were used cars.

Value totals and unit values

The value of car exports can also be found in the MOF data. Figure 2 shows, in value terms, total car exports, used car exports, and the used car percentage share of total car exports. This figure looks similar to Figure 1. From 2002 to 2007, the total value of car exports increased from around 8 trillion yen to 12.5 trillion yen. The economic shock of 2009 caused the total to fall below 6 trillion yen, less than half of its 2007 peak. However, following this precipitous decline, the value of total car exports began to grow once again, reaching roughly 10 trillion yen today. Over the same period, the value of used car exports has also risen and currently accounts for 6.4 percent of the car export total.

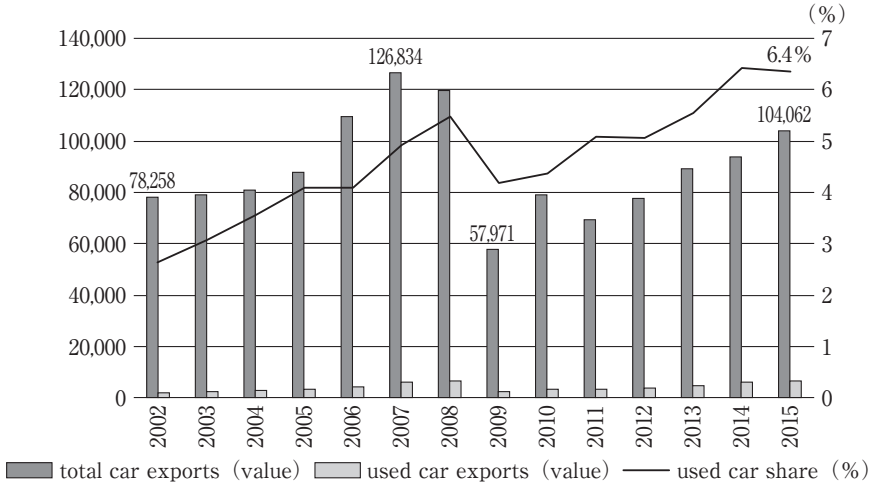
The difference between the unit share and value share of used cars in these figures reflects the lower unit values of used cars compared to new cars. Figure 3 shows the calculated average unit prices of exported Japanese used cars from 2002 to 2015. As indicated, these unit prices are in the range of approximately 400 thousand yen to 650 thousand yen. This is clearly lower than the price of

Figure 1: Total and used car exports in units, 2002-2015



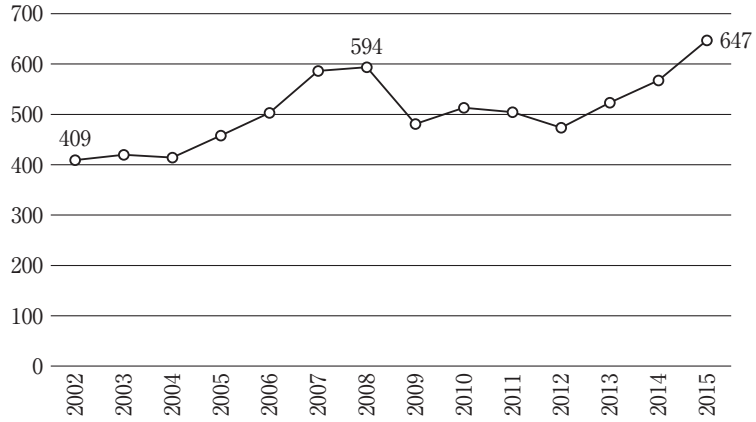
Source: Graph created by author using data from MOF trade statistics.

Figure 2: Value of total and used car exports, 2002-2015 (unit: 100 million yen)



Source: Graph created by author using data from MOF trade statistics.

Figure 3: Average unit value of exported used cars, 2002-2015 (unit: thousand yen)



Source: Graph created by author using data from MOF trade statistics.

a typical new car, which would be at least a few million yen. This explains why today the value share of used cars is only 6 percent, compared to the unit share of used cars, which exceeds 20 percent.

2.2 Destinations

Table 1 lists the top 20 export destinations for used cars in the category of 1.0 to 1.5-liter gasoline engine cars (corresponding to compact cars in HS code 8703.22.910), which is the main category of Japanese used car exports. The first column of the table shows the top 20 destination countries in unit terms; the second column shows the same in value terms. Interestingly, most countries listed here are not Japan's usual trading partners. In unit terms, the prime destination in 2016 was the

Table 1: Major destinations of used car exports from Japan, 2016

		Units			Value (1000yen)
1	United Arab Emirates	50,755	1	Singapore	33,416,449
2	New Zealand	44,335	2	Bangladesh	23,130,141
3	Myanmar	37,613	3	Sri Lanka	19,270,663
4	Chile	37,546	4	Myanmar	15,756,340
5	Sounth Africa	24,341	5	New Zealand	12,020,776
6	Kenya	23,355	6	Pakistan	9,497,958
7	Mongolia	22,150	7	Kenya	9,479,074
8	Bangladesh	20,690	8	United Arab Emirates	7,872,540
9	Georgia	20,407	9	Chile	6,818,023
10	Singapore	16,468	10	Mongolia	6,495,019
11	Russia	14,891	11	Russia	5,790,730
12	Sri Lanka	11,821	12	Mauritius	5,551,770
13	Tanzania	10,322	13	Jamaica	4,654,892
14	Jamaica	10,004	14	Cyprus	3,962,466
15	Pakistan	9,400	15	Trnidad and Tobago	3,849,271
16	Cyprus	7,412	16	Georgia	3,185,903
17	Afghanistan	6,486	17	South Africa	2,386,123
18	Trinidad and Tobago	5,823	18	Fiji	2,336,806
19	Fiji	5,677	19	Guyana	1,881,051
20	Mauritius	5,610	20	Tanzania	1,801,011

Note: 1.0 to 1.5-liter gasoline engine cars (HS code 8703.22.910)
Source: Created by author using data from MOF trade statistics.

United Arab Emirates (UAE); 50,755 cars, worth a total of 7,872,540 thousand yen, were exported there. The second major destination was New Zealand, where 44,335 cars (12,020,776 thousand yen) were exported, followed by Myanmar, Chile, South Africa, and Kenya.

In value terms, a somewhat different picture appears. In 2016, Singapore was the prime destination, with Japanese used car imports worth a total of 33,416,449 thousand yen. Ranking second was Bangladesh, followed by Sri Lanka, Myanmar and New Zealand.

The destinations include a variety of countries in Asia, the Middle East, and Africa, ranging from developing countries like Afghanistan and Bangladesh to developed countries such as Singapore and New Zealand. One notable new destination for Japanese used cars is Myanmar. In addition, a number of small island countries such as Cyprus, Trinidad and Tobago, Fiji and Mauritius are included on the list.

3. Preliminary analyses of the determinants of used car exports from Japan

3.1 Hypotheses regarding factors affecting bilateral trade flows in used cars

Given that Japan's used cars are exported to a variety of countries and that many of these countries are not among Japan's major trading partners, examining the determinants of Japanese

used car export destinations is of particular interest. What are the factors affecting the export of used cars from Japan to each country? Trade flows in general are affected by such obvious factors as market size - other things being equal, the larger the economy of the destination, the greater the exports to that destination. Along with many other factors, the role of market size is described in the so-called gravity model literature in empirical international economics.

With respect to used cars, in addition to the usual factors explaining bilateral trade flows, one would also expect there to be used-car specific factors. For example, because Japan is a right-hand-drive country (meaning that drivers sit on the right-hand-side of the car and that, as a consequence, steering wheels are positioned on the right-hand-side of the car), used cars from Japan would appear to be most suitable for similar right-hand-drive countries (otherwise, the cars would have to be converted to left-hand-drive, which would likely be costly). Another potential factor is income. Because used cars tend to be considerably cheaper than new cars, as confirmed in Figure 3, one would expect that demand for used cars would be relatively higher in lower income countries.

3.2 A preliminary examination the hypotheses

Do these factors actually explain the exports of used cars from Japan? Given the hypotheses set out above, other things being equal, one would expect larger used car exports to larger markets and right-hand-drive countries, with fewer exports of used cars to higher income countries and countries where drivers drive on the left.

Casual observation of the data suggests that because many of the major export destinations listed in Table 1 are developing countries, it would be reasonable to believe that lower incomes explain part of Japan's used car trade flow. Also from a cost point of view, many of the countries in the table are right-hand-drive countries, which suggests that this factor, too, may help explain where Japan's used cars are shipped. On the other hand, although the growing size of the Russian economy appears to support the hypothesis that market size helps explain used car exports, most other destinations listed in Table 1 are relatively small economies. Thus, whether economic size explains the flow of used cars seems not totally clear at this point.

As a first step in a more formal study the determinants of used cars exports from Japan, I present preliminary findings from cross-sectional regression analyses. The dependent variables here are export units and export values of used cars from Japan in 2016, as presented in Table 1. The explanatory variables are market size and income of the destination country, and whether the destination country is a right-hand-drive country. Market size is measured by the GDP of the destination country. The data are summarized in Table 2. A dummy variable is used to indicate whether the destination is a right-hand-drive country: The dummy is given a value of one if the destination is a right-hand-drive country and zero if it is not. Among the 188 countries in the present data set, 51 are

right-hand-drive countries.

Results of regressing the hypothesized factors on the number of units and the value of used cars exported from Japan to all destinations are shown in Table 3. Because there are a number of zeros in the dependent variables, that is, some countries do not import any used cars from Japan, the regression method used here is the Tobit model. The first column of the table shows the results of regressing the various factors on export units. In the second column, the dependent variable is export value. The third and fourth columns show results when a "hub" variable is introduced, as explained in the next section.

Findings from the two regressions can be summarized as follows: The coefficients for all the explanatory variables have the expected signs. However, the coefficients for market size and income are not statistically significant in the two regressions. Only the steering wheel position has the expected positive and statistically significant coefficient, meaning that, other things being equal, more

Table 2: Descriptive statistics

	export units	export value (1000yen)	market size (GDP) (billion dollars)	per capita income (dollars)
number of observations	188	188	188	188
minimum	0	0	0.1	260
maximum	50,755	33,416,449	17,994.1	106,140
average	2278.340	1017802.085	381.678	14342.872
standard error	7265.604	3775334.887	1592.805	20287.319

Table 3: Preliminary regression results (Tobit)

	dependent variables			
	export units	export value	export units	export value
constant	−4495.037 (−3.57)	−2761265 (−4.42)	−3664.758 (−3.75)	−2817547 (−4.56)
market size	.4927683 (1.01)	275.7473 (1.15)	.4036462 (1.07)	283.1957 (1.20)
income	−.0199958 (−0.46)	−7.330041 (−0.34)	−.0280578 (−0.82)	−9.908966 (−0.46)
right-hand-drive	9069.116 (4.96)	5530492 (6.12)	7676.518 (5.43)	5492751 (6.18)
hub	−	−	39112.88 (8.55)	6795149 (2.37)
Pseudo R^2	0.0112	0.0107	0.0358	0.0122

Note: t-values of the coefficients are shown in parenthesis.

used cars are exported to right-hand-drive countries. Hence, among the factors studied to this point, only the steering wheel position of the destination country explains at least some of the variation.

4. Comments

The above analysis is based on data from a particular year (2016) and segment (compact cars). Further studies using a richer data set are clearly required. Nevertheless, it was found that factors such as market size and income fail to explain the export destinations of Japanese used cars. Only the steering wheel position was shown to explain at least a fraction of the variation in both export units and export value. This suggests that there are other influencing factors. Below, I introduce several potentially important factors that may affect Japanese used car exports, namely, the role of hub countries, regulations in importing countries, and business networks.

Role of hub countries and entrepot trade

Drivers in the UAE are required to sit on the left-hand-side of the car, which means that Japanese cars are not suitable for driving within the UAE. It is therefore puzzling that the UAE is a prime destination for Japanese used cars (first in terms of units and eighth in terms of value). However, according to surveys and field studies conducted by Azuma et al. (2017), the UAE is a hub and functions as an entrepot for used cars from Japan. Japanese used cars are imported initially into the UAE, where the cars are converted to left-hand-drive when necessary, and then sent to final destinations in the Middle East. In the business, the conversion is called a "steering change."

According to Azuma et al. (2017), Chile and South Africa also serve as hubs of the international used car trade. Chile is an entrepot for other South American countries, including Bolivia and Paraguay. These countries are all left-hand-drive, so Japanese right-hand-drive imports need to be converted. In Africa, there a number of right-hand-drive countries where Japanese used cars can be driven without a steering change. South Africa may function as an entrepot for many of these landlocked African countries.

Taking into account such hub effects, the initial regression analyses were modified by adding "hub country" as a new explanatory variable. An appropriate dummy variable was given a value of one for the UAE, Chile and South Africa and zero for all other countries.

Regression results with the hub dummy variables added are given in the third and fourth columns of Table 3. As can be seen, the explanatory power of the model increases with the inclusion of the hub dummy variable, particularly in the units case. The coefficients for the hub dummy variable are found to be positive and statistically significant, meaning that, other things being equal, more used cars are exported to hub countries, both in terms of units and values.

The preliminary results that some of the variations in used car exports from Japan can be explained by steering wheel position and hubs suggest these supply-side or cost factors are much more important than demand-side factors such as market size and income.

Regulations in destination countries

In addition to its role as a used car hub, import regulations and road vehicle laws in the destination country, which were not included in the regression analyses in Section 3, can be important.

New Zealand suddenly became one of the major destinations for Japanese used cars in the late 1980s, immediately after the country liberalized its regulation of imports, including used cars. As a right-hand-drive country and one that is relatively proximate to Japan, it had always been a potentially rich destination for Japanese used cars. Similarly, used car exports to Russia began to increase dramatically at the end of the 1980s, despite the fact that Russia is not a right-hand-drive country. This was partly a response to the country's tariff reduction for imported cars. Its proximity to Japan may also have contributed to the rise in Japanese used car imports.

It is noteworthy that regulations do not always work to promote trade. In Russia, after the reform in 2009, import tariffs on used cars were raised, and exports to Russia suddenly dropped. This case serves as a warning that used car exports are subject to sudden policy and regulation changes, with potentially drastic consequences.

Business networks

Another supply-side factor influencing international used car trade may be business networks. For example, Azuma et al. (2017) discovered an agglomeration of ethnic business networks in the UAE, organized by traders from Pakistan and Afghanistan. These networks extend worldwide, including into Japan, where traders search, select, purchase and ship used cars to the hub. How such networks organize and locate their businesses is likely to affect the trade flows of used cars.

Acknowledgement

I appreciate the financial support of Grants-in-Aid for Scientific Research (16H06551) from the Japan Society for the Promotion of Science.

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