



## SHIPPING AIR? TRACKING AND FORECASTING THE GLOBAL SHIPMENTS OF NEW AND USED CARS

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### ABSTRACT

Flows of new cars span the globe, using dedicated car carriers carrying up to 6,500 cars. A more recent development involves the shipping of used cars. This paper presents the results from our research around the world, featuring Japan as a major used car supplier, while more recently, South Korea has emerged as a significant player. As production is increasingly localised, flows of new vehicles are declining; used vehicle flows are seen by some shipping lines as a market opportunity to improve vessel utilisation and enhance margins. Future trends will be driven by newly motorising markets. Although these could absorb considerable volumes from the established industrial countries, some governments are placing restrictions on such imports. The shippers' side has seen consolidation in recent years, as well as vertical integration. Shippers serving used car flows have split into those that have become more specialised, and those engaged in more informal flows using cars as backloads on reefers, fishing vessels, container ships and general cargo ships. The vessels themselves have seen a trend away from pure car carriers (PCC) towards more flexible pure car and truck carriers (PCTC). This in turn is also having a wider impact on shipping logistics.

**Key words:** Shipping, logistics, car shipping, used cars.

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## INTRODUCTION

This paper is based primarily on the findings of a field-survey of new and used car movements carried out during 1998 and 1999 and subsequently updated on a regular basis using the contacts and sources tapped into at that time. The field-research was global, but focused particularly on Europe, the Far East, Australasia and North America; it is the first time such an exhaustive survey on used car shipping has ever been carried out. Use was made of published data, interviews, first-hand field observations and informal information as appropriate. As a combination of published and unpublished material was used, it is not always possible to quote sources of certain information; this is especially true of used-car movements which are in many cases very profitable, somewhat informal and therefore rather jealously guarded; also reliable data are not always available on these. A central thrust of the research is to examine ways in which used-vehicle shipments may be used to complement the mostly larger volumes of new vehicles as a means of gaining economies of ship-space utilisation. A summary of findings from the original study was published in 2002 (Beresford et al. 2000), while an updated abridged version was presented in 2006 (Beresford et al. 2006).

Car manufacturers still rely very heavily on shipping. Dedicated car carriers carry between 2,000 and 6,500 tightly-packed cars across the seas, depending on the type of vessel used. The smaller vessels are largely employed for shorter haul and coastal routes, while the larger 4000-6500 car vessels are used on intercontinental deep sea routes. Not surprisingly, several car makers have become intimately involved in vehicle shipping and distribution themselves, e.g. Toyota through their Logistics Services division (Drewry, 2006). Some still have close links with fleets of car carrying vessels, with several plants located on the quayside for direct loading. Others subcontract to specialised shipping firms such as MOL or WalleniusWilhelmsen (see for example, Coia, 2007). Cars are one of the few cargos that can move themselves. This allows the use of dedicated roll-on, roll-off (RO-RO) car carriers.

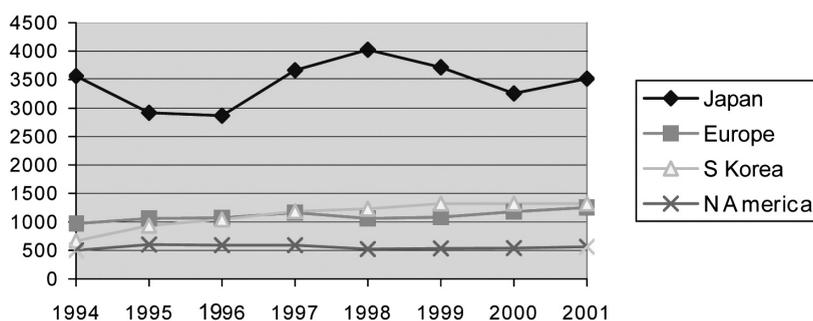
Margins are often larger on used vehicles than on new units, but volumes are smaller. Used vehicle flows can provide ideal make-up cargo, or in some cases, return loads. In both situations, the used vehicles could then become critical to a line's overall ship utilisation and, by implication, profitability. During the 1990s and early 2000s, global trade in new and used vehicles grew faster than either new unit production or consumption. This happened despite the huge shifts in production capacity under 'localisation' strategies, aimed at producing vehicles in 'transplant' facilities nearer to their markets, by principally – though not exclusively – the Japanese and Korean vehicle manufacturers. This move towards 'transplanting' had been in evidence in other industrial sectors for several decades (Dickens, 2002; Lee, et al., 2006). European transplants in North America were also increasingly evident during this period. This development was due to two key features (Wells & Nieuwenhuis 2005):



- Despite the shifts in global production capacity, there remained considerable structural imbalance in terms of supply and demand, most obviously with Japanese and Korean supply capacity vastly exceeding domestic demand;
- Vehicle manufacturers adopting policies whereby certain production locations became the global source for a product, rather than making all products in all regions, thus necessitating exchanges of certain vehicles between production sites and markets.

Evidently, the main structural cause of new car shipments remains the high level of production in the Asia-Pacific region - just over 23 million units for 2004 (ANE 2005, 6) compared with sales of about 16.8 million units. In practice, by far the most dominant source in terms of shipping new cars remains Japan because both China and India, as far less mature economies, are modest importers and almost non-existent exporters. South Korea is recovering its global exporting position through its sole surviving independent car maker, Hyundai-Kia-Asia and now General Motors (GM) -owned Daewoo, while modest exports by Samsung-Renault have only just begun (Stein, 2006a,b). Equally, by far the dominant destination region is North America, principally the US. This is a very important market for new cars produced in Japan, South Korea and Europe despite investments by firms from those regions in productive capacity in North America and despite the huge home supply. Exports from the main exporting markets are shown in figure 1.

Figure 1: New Car Exports by Source Region 1994-2001 (000s of units).



Source: Beresford et al. 2002

Clearly, in view of the investments involved, shifts in automotive production tend to be of a long-term character (Nieuwenhuis & Wells 1997; Herfort, 2002 a,b). Moreover, the ways in which individual companies choose to use the capacity available to them will vary from case to case. Note that the introduction of one really successful model can have a significant impact on overall shipping figures, as it 'stimulates' a given market and in some cases supports it almost single-handedly.

Table 1: Worldwide New Car Transport Volume

Year	1998	1999	2000	2001	2002	2003	2004	2005*	2006*	2007*
1000 Units	7,107	7,792	8,602	8,454	8,890	9,627	10,734	11,105	11,575	12,050
% change	n/a	+9.6	+10.4	-1.7	+5.2	+8,3	+10.5	+3,5	+4.2	+4.1

\* estimate \*\*forecast

Source: adapted from NYK Factbook 2005.

## USED CARS

Exports of used cars and commercial vehicles have grown steadily over the past two decades or so (Beresford et al. 2006). Although overall volumes are still lower than new car flows, they are not that far behind and still rising. Industry sources suggest that the number of used vehicles moved by ship is now around three million units per annum, although statistics are not centralised if they are recorded at all (Lloyd's List 2005). Used car flows do not fit comfortably with the larger new vehicle movements in that flows are in most cases quite different in terms of both volume and geography. There are no official figures for the total number of used cars shipped around the world, but judging from our field research and from the limited published figures available, it is clear that volumes are increasing quite rapidly despite the constraints of import restrictions in a number of countries. The main flows of used cars go:

- From Japan/Korea to Asia-Pacific (Vietnam, New Zealand, Russia, Sri Lanka, Bangladesh, etc),
- From Japan/Korea to South and Central America (mainly west coast – Peru, Chile for transit, Costa Rica),
- From Japan/Korea to the Middle East/Mediterranean (Gulf, Cyprus, Pakistan),
- From Japan/Korea to Africa,
- From Japan to Ireland/UK, from US/Canada to Central America/Caribbean, and
- From US/Canada to the Middle East (Gulf, Saudi).

Other routes are mainly overland with some minor shipping flows, e.g. from the USA to Mexico, or from Dubai to Iraq, Iran and Pakistan, Western to Eastern Europe and from the Gulf to East Africa and other areas. In addition to Japan, South Korea emerged as a key source country in the late 1990s, exporting some 87,000 used cars in 1998, mainly to SE Asia, Latin America and oriental Russia (Beresford et al. 2000). More recent developments in this market are explored below. As a level of market saturation has been reached and consumers increasingly favour new over used vehicles, the South Korean market has begun to generate levels of surplus used cars of good quality in volumes similar to those seen leaving Japan perhaps



ten years earlier. In recent years, many cars have also been exported from the European Union to East and Central Europe, where there is considerable demand for good used cars and where EU entry has forced the lifting of bans on used imports – e.g. in Poland (Drzewiecki et al. 2006).

Prestige marques such as BMW and Mercedes-Benz are also shipped in large numbers into Middle East hubs such as UAE ports (Beresford et al. 2000). This disguises final destinations for these cars in markets such as Iraq, Iran, and particularly Pakistan, which are substantial markets for Japanese, Korean and European vehicles. Flows from Europe to Africa are even longer established, using both land and sea routes. The signs are that both the push and pull factors in these trades will grow with positive consequences for shipping volumes, although the volatile nature of these trades makes a flexible and adaptable approach to shipping essential. French vehicles – especially Peugeot – have long been exported to West Africa via import gateways such as Abidjan and Dakar, as well as being transported overland, often by private individuals from the EU (Beresford et al. 2002).

## JAPAN

Japan's post-war economic miracle is nowhere more evident than in the country's volume of vehicle exports (Dicken, 1999). In around fifteen years, from the early 1960s to the late 1970s, Japan rose from its position of minor player to world leader by number of units exported; of necessity, all went by sea (Table 2). This is marked by a peak in total vehicle exports and truck exports in 1985 of 6,730,472 units and 2,238,104 units respectively. Car exports peaked in 1986 at 4,572,791, while buses/coaches peaked in 1992 at 75,046 units. After this, localised production near recipient markets caused a gradual reduction in the proportion of vehicles shipped from Japan itself. Recent years have seen a slight recovery as demand increases from newly motorising markets, particularly in the Far East.

Japanese used vehicles are exported in very large numbers, reflecting their durability and acceptability in almost all parts of the world, irrespective of the apparent disadvantage in most regions of their right-hand drive configuration. In 2004, Japan

Table 2: Japan's New Vehicle Exports 1950-2005.

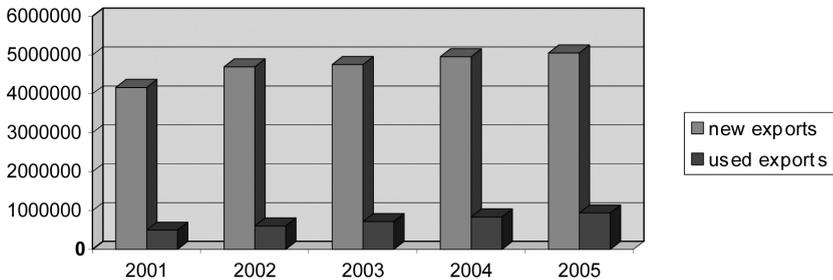
Year	Cars	Trucks	Buses	Total
1950	7	5,409	93	5,509
1960	7,013	31,028	768	38,809
1970	725,586	351,611	9,579	1,086,776
1980	3,947,160	1,953,685	66,116	5,966,961
1990	4,482,130	1,309,121	39,961	5,831,212
2000	3,795,854	617,870	41,163	4,454,887
2005	4,363,168	611,956	77,937	5,053,061

Sources: JAMA Motor Vehicle Statistics, JAN 2005 and 2006.

officially exported 837,782 used vehicles (source: Jumvea), in 2005 the official figure was 940,000 (JAN 2006) and in 2006, the million unit barrier was reached (JAN 2006b). Of these, the largest recipient markets were Oceania – primarily New Zealand –

other Asian markets, Middle East and Europe respectively (see Tables 2 and 3). It is likely that unofficial figures are in fact even higher. Traditionally, Japanese car buyers have tended to replace their cars in line with the very severe periodic test, the '*shaken*' vehicle inspection. This is due when the car is three years old, then at five years old and then every two years, so next at seven years old. It is these five and seven year peaks that have fed the used export market in the past.

Fig. 2: Japan: New and Used Vehicle Exports



(Source: adapted from JAN 2006)

Used trucks – shipped in far smaller quantities than cars – head mostly for the Gulf for onward distribution via ports such as Dubai and Jebel Ali. Other major Japanese used commercial vehicle markets include the Philippines, South Africa, Singapore, Sri Lanka, Pakistan (via UAE), North Korea, and again, Russia and New Zealand (see table 3). Singapore is perhaps unusual in that it acts as a distribution hub for trucks (over 10,400 in 2004), but it is comparatively unimportant for car movements (around 2,700 the same year) and buses (only 24 in 2004). Field evidence confirms that specialist vehicles such as cranes and trucks are sufficiently durable to last several decades, become war-damaged in some cases, and still remain exportable (Pettit et al. 2005).

Japanese used exports appear to constitute around 30% of global used vehicle exports, if the industry estimate of around three million used units shipped annually is correct (Lloyd's List, 2005). With another 300,000 units leaving South Korea every year, these two Asian countries combined account for perhaps 40% of world total used vehicle shipments. On the whole, used cars tend to be shipped from ports that also ship new cars. Virtually all the major automobile ports (about twenty in number) are located in a belt located across southern Japan. Road transport is often slow and very expensive in these countries so each port tends to serve a captive hinterland; this further solidifies the already close relationship which exists between specific assembly plants and specific ports. At import gateways, especially in Europe, several thousand new vehicles sit adjacent to several hundred used units at any one time. This has stimulated revised terminal configurations in some cases. New port



investments around Saint Petersburg, for example, have been made partly on the basis of used vehicle flows (World Cargo News 2006).

Table 3: Principal markets for Japanese used vehicles 2004

Recipient market	buses	cars	trucks	total
UAE	2433	103,912	32,758	144,103
New Zealand	1299	124,384	9,368	135,049
Russia	17	111,132	11,025	122,174
UK	21	56,868	221	57,110
South Africa	1676	28,074	8,154	37,904
Philippines	531	21,247	11,160	32,938
Chile	616	23,842	2,962	27,420

source: JUMVEA

markets. However as we see in the case of Peru, for example, LHD conversions can be cost-effective in some cases, while other LHD markets will accept RHD cars. The fact is that Japanese cars, trucks and other vehicles are accepted and respected worldwide for their quality and durability, and are attractive for conversion, or for driving as seen.

## SOUTH KOREA

Perhaps inspired by its larger neighbour, the Republic of Korea has become a major exporter of used vehicles in its own right, especially in the past few years (Table 4). In fact, the majority of used vehicles are now exported from the country, rather than remarketed or recycled internally (Kim, 2007). According to the latest information, on average by 2006 this had grown to around 1 million units a year, leaving only around 500,000 end-of-life vehicles for the conventional dismantling and recycling system (Kim 2007). This requires further investigation, as the large difference between this figure and the previous – official – data in Table 4 implies this marks a dramatic increase. In reality we may be dealing with a discrepancy between official and unofficial figures. Kim (2007) studies this issue from the point of view of vehicle dismantling, shredding and recycling, rather than vehicle trades and as a result may well have unique access to real flows on the ground, beyond the control of customs officials. Experience in Japan in the 1990s suggests, official and unofficial figures can diverge considerably (Beresford et al. 2002). We intend to carry out further investigation into this recent rise in Korean used exports. In any event, and in view of the fact that South Korea is effectively an island, these units provide good business for shipping companies.

One of the main reasons for the marked increase seen in recent years is the growth in demand from the Russian market, which was worth US\$45 million in 2004, this compares with a German market worth only \$13 million in the same year.

The UAE is also growing strongly, although this is mainly as a hub for onward shipping to other Middle East markets, as well as Pakistan and parts of East Africa. The main recipient regions for Korean used vehicles are the Middle East, with 236,000 units in 2004, Asia with 51,000 units, Europe (mainly Russia) with around 10,000, Latin America with 15,000, while other markets took some 8,000 (Korea Customs Service, 2005).

Table 4: South Korean Used Vehicle Exports 2002-04

Year:	2002	01/02 %	2003	02/03 %	2004	03/04 %
<b>Value in MUS\$</b>	358	+5%	468	+31%	793	+69%
<b>1000 units</b>	133	+10%	184	+38%	320	+74%

Source: Korea Customs Service, 2005; note values are quoted for point of export.

The high levels of shipments into Jordan and Costa Rica are largely due to the fact that these markets act as local distribution hubs for used cars. Jordan provides transit into other Middle East markets, such as Iraq and Syria. Costa Rica feeds wider Latin American markets in Central and northern South America, as well as the smaller Caribbean markets. In Germany, used Korean 4-wheel drive sport utility vehicles (SUVs) are highly prized, while in recent years both Jordan and Syria are benefiting from a boost in transhipments to Iraq (Beresford et al. 2006).

Table 5: Korean Used Vehicle Exports by Country (ranked by 2004 US\$ value)

Country	2002	2003	2004	% change 03-04
Jordan	63,679	167,216	301,082	+80
Vietnam	125,985	121,111	156,127	+29
Russia	9,629	18,000	45,151	+151
Sudan	15,224	26,845	41,101	+53
UAE	1,194	15,097	33,431	+121
Philippines	27,920	13,972	21,845	+56
Costa Rica	27,967	18,138	18,724	+3
Syria	160	4,507	15,115	+235
USA	13,220	13,096	13,340	+2
Germany	183	473	12,931	+2632
Others	72,425	69,921	134,556	+92
<b>TOTALS</b>	<b>US\$ 357,586</b>	<b>US\$ 468,378</b>	<b>US\$ 793,407</b>	<b>+69</b>

Source: Korea Customs Service, 2005.

Used Korean vehicles are now to be found in almost as many countries as are used Japanese vehicles, as respect for them grows and as repair and maintenance capabilities become embedded.



## NEW ZEALAND

The world's largest single recipient market for used cars is New Zealand. Imports of used cars from Japan grew steadily here from a mere 2,000 in 1981 to an impressive 124,000 by 2004 (Beresford et al. 2006). This compares with a new car market of only 75,000, with new sales increasingly confined to official and fleet purchasers. Many shippers use reefer vessels used for exporting crops such as kiwifruit and then bring back used cars as a backload. The prominent role of New Zealand has led to a number of local shippers taking on a key role in the trade and shipping of used cars. This business generally suits the more entrepreneurial shipping companies with the necessary flair and flexibility. Kiwi Car Carriers (KCC) was set up formally in the mid 1990s, but had been operating vessels for some years from New Zealand to Japan (Beresford et al. 2002; [www.kiwicar.com](http://www.kiwicar.com)). They are part of the Windward Passage group, based in Japan. Ships are chartered, mainly from agents in Greece and for many years also from Hyundai Merchant Marine (HMM). Shipments contain used vehicles exclusively, with some crashed cars also brought in for parts. However, KCC have carried out some new car contracts from Korea and Japan to Australia. On these they mixed loads, carrying Daewoo and some Hyundai on behalf of other shippers. New Zealand dealers were among the first to buy used vehicles directly via online auction sites which allow them to see cars and commercial vehicles being auctioned in Japan on-screen. They can then bid for these online. The vehicles are shipped via local agents and specialist carriers, such as KCC.

## VEHICLE SHIPPING

Market demand for car shipping is still high and exceeds the supply of vessels (Coia, 2007). Although shipping companies are building new vessels, demand is becoming uncertain because of the growing role of transplants – factories established by Asian manufacturers near their western markets, and Europeans in North America. Other factors include economic fluctuations, while opportunities for cross-trading are increasing in the used car market. The effects of these factors are that future sailing patterns need review and that relationships between companies may need to be developed so as to make the best use of the available vessels. It is thus essential to build flexible portfolios of geographic scope, capacity and capabilities – the latter both sea-borne and on-shore (Nieuwenhuis 2001). It is expected that EUKOR who are currently building new vessels – partly to further enhance their presence in the market – will become big cross traders as they will have over 80 vessels available. Some of this new building will be used to replace vessels which are currently older than 15/20 years and will soon be scrapped, although at present their capacity is still needed to meet demand (Nightingale 2005).

As is the case in other sectors such as container shipping (see, for example, Araujo et al. 2003), car carrying capability is concentrated into a relatively small – and shrinking as a result of consolidation – number of large or very large operators

(see Table 6). This reflects both the needs for economies of scale – translating into global service provision – and the greater bargaining power available to bigger carriers who need to interface with ever larger consolidated automotive groups. Nearly 90% of deck-metres and 87% of vessels are owned by the top seven operators (Araujo et al., 2005).

Table 6: Major Operator Ranking 2004

Ranking	Operator	Vessels	%	Capacity (cars)	%
1	NYK Line	80	17.8	383,740	18.4
2	EUKOR	72	16.0	335,102	16.0
3	“K” Line	63	14.0	294,446	14.1
4	Mitsui OSK Lines	63	14.0	287,718	13.8
5	WalleniusWilhelmsen	48	10.7	263,450	12.6
6	HUAL	33	7.3	169,816	8.1
7	Grimaldi	31	6.9	120,504	5.8
	Others	60	13.3	235,549	11.3
	TOTALS	450	100	2,090,355	100

Source: Lloyd's List, 2005.

The practice of “feeder” via hub ports may increase as operators try to match supply and demand and try to allocate vessels of different sizes to different markets (Coia, 2007). A number of major ports are competing for hub status since car trades provide considerable opportunities for value added activities in hub ports stemming from economies of aggregation. With regard to maximising load factors, although a number of lines definitely do not mix new and used vehicles on the same vessel (or if they do, it happens very rarely), other lines are happy to mix shipments (Herfort, 2002b). Some car manufacturers insist on single make loads and resent seeing their new cars ‘devalued’ by mixing new with used cars. Used cars, however, tend to be more profitable for the shipping firms, who anyway want to maximise their capacity utilisation. In their effort to maximise capacity utilisation while at the same time taking the opportunity to exploit the dynamics of the market, the carriers have adopted somewhat different strategies (Lloyd's List 2005). Some of these can be summarised as follows:

**MOL:**

- Enlarge the fleet to 90 modern vessels by 2009.
- Pursue an ‘aggressive growth’ strategy with pure car and truck carrier (PCTC) expansion as the main focus.
- Develop its ‘Four Continents’ service (this covers South Africa, Europe, US East Coast, Mexico and South America East Coast).

**NYK:**

- Match vessel capacity to demand as closely as possible
- Focus on the larger 6,000-6,500 unit vessels
- Develop hub and spoke distribution

**WalleniusWilhelmsen:**

- Offer regular services on key routes
- Match capacity to demand
- Keep flexibility of schedules and vessel deployment to handle peaks and troughs

**UECC:**

- Expand services and increase geographical coverage
- Make key investments in land facilities
- Develop IT systems to improve vehicle monitoring within the supply chain
- Focus on tracking, tracing and performance data

**K Line:**

- Build on rapid growth of 2003-5 by deploying four or five new vessels per year to refresh the fleet
- Upgrade North and South Atlantic services
- Develop North Atlantic Shuttle (NAS), link with short sea KESS network for Baltic/Scandinavia
- Expand pre-delivery inspection (PDI) and logistics services in Asia/Australia

**EUKOR:**

- Strengthen the fleet
- Upgrade services, e.g. by shortening lead and response times
- Manage steady growth by deploying three to four new vessels per year

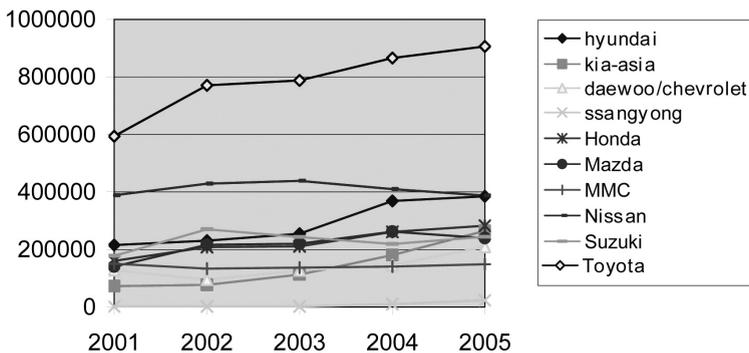
It is interesting to note that no line is explicitly targeting the growing volumes of used vehicles as a means to balance flows or raise average load factors. It has been demonstrated that, in general, used vehicle movements do not fit comfortably with the pattern of outbound new vehicle flows or with return ballast legs (Beresford et al. 2002). However, as volumes of shipped used vehicles – especially cars – rise, it is likely that critical volumes are reached on an increasing number of routes with the result that this grey trade (organised outside manufacturers' official distribution networks) will be taken into account more and more in the lines' route development strategies. Until then, this at times lucrative trade is left to smaller, more specialised, more flexible, and perhaps more entrepreneurial operators.

**FUTURE PROSPECTS****New Vehicles Manufacturers**

Significant changes to the volumes of new cars shipped seem imminent. Although much of Japanese close-to-market production is now in place through their transplant facilities in Europe and North America, they are still expanding, with new capacity in Eastern Europe and China (Nikkei Weekly 2006). For South

Korean car makers, this transplanting trend is only just beginning (Kia, 2006). Having seen their European sales rise markedly in recent years, much of this rise in Eastern Europe, Korean manufacturers are now building European plants to localise production (Phillips, 2006). Figure 3 shows European sales increases by Korean manufacturers in recent years compared with their Japanese rivals. It is evident from this that between 2001 and 2005, the Koreans more than doubled their sales in Europe. These figures include the EU members and the countries of East and Central Europe, as well as Turkey, but they exclude Russia. However, an increasingly market-driven Russia is becoming a significant sump for Korean products, welcoming new and used imports as well as locally assembled Korean cars. Daewoo's Nexia and Hyundai's Accent were among the top five sellers in Russia in 2005 (Stein and Smolchenko, 2006; Smolchenko 2007).

Fig. 3: Korean and Japanese Car Makers' Sales in Europe 2001-2005 (units)

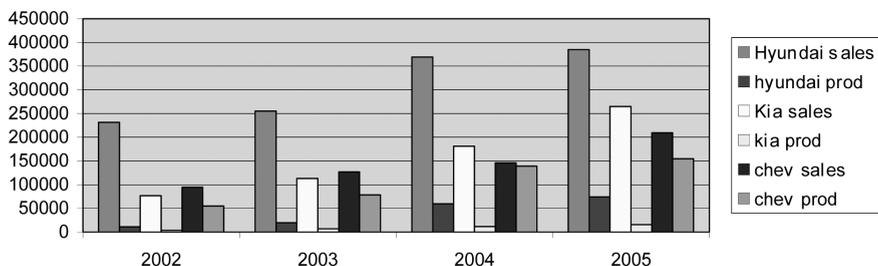


Source: JATO Dynamics, reported in Automotive News Europe, 2005.

Russian assembly of Hyundai vehicles exceeded 40,000 in 2005 while 16,000 Kias were assembled (Stein and Smolchenko, 2006). These numbers are set to rise steeply over the coming years, and it already helped Hyundai fortify its position as best selling foreign brand in Russia. As part of their expansion strategy, Korean car makers have also been localising production elsewhere in Europe. This trend was started by Daewoo in Eastern Europe well before these countries started to join the EU. Although not all of Daewoo's production and assembly capacity in the region was retained by GM when it bought the remains of Daewoo in 2002, the now re-branded Korean Chevrolet division retains significant production capacity in Europe, including joint ventures in Russia (Storey, 2003). In addition, both Hyundai and Kia have new capacity in Central Europe, adding to assembly capacity Hyundai had already established in Turkey. As a result, a growing proportion of the Korean vehicles sold in Europe are also assembled in Europe. This trend is outlined in figure 4.



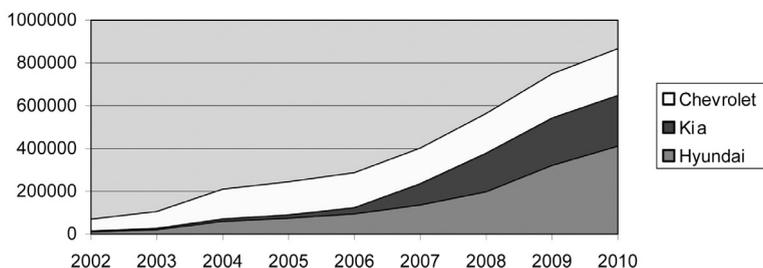
Fig. 4: European Sales and Production Korean Manufacturers (units)



Source: adapted from J D Power, 2005.

Once the new Hyundai and Kia facilities in central Europe are fully operational, the proportion of vehicles produced locally will increase further. J D Power forecasts indicate that combined Hyundai and Kia production will reach over 600,000 units annually by 2010, as outlined in figure 5 (Power, 2005). These figures also include production in Russia where GM is opening a Chevrolet assembly facility. There is existing production in the region by Chevrolet-Daewoo via ZAZ in Ukraine. Kia is building a plant in Slovakia, while Hyundai is planning a facility in the Czech Republic. A side effect of this localisation of production of low cost new cars may be a depressing effect on imports of used vehicles. This could have implications for shipments of used cars into the region, although current trends suggest both new and used can still be absorbed by these central and East European markets in some numbers, with non car-making countries, such as Bulgaria, happy to keep their borders open to used imports (Frink, 2006).

Fig. 5: European Production Forecast Korean Manufacturers to 2010 (units)



Source: adapted from J D Power, 2005.

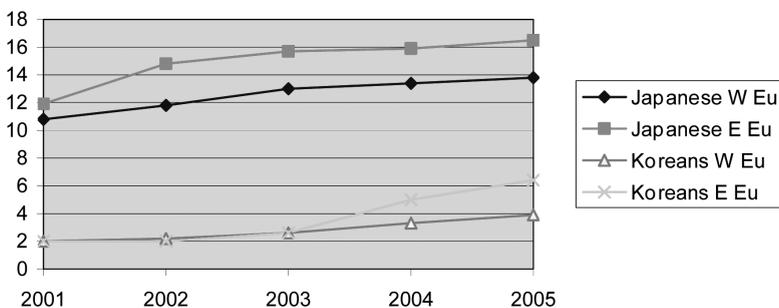
Hyundai and its Kia affiliate now consider Europe an essential part of their global strategy. Hyundai has announced that it is aiming to become Europe's second best selling Asian brand after Toyota, thus displacing Nissan, with sales of 800,000 vehicles a year by 2010 (Stein 2006a). Hyundai's sister brand Kia, meanwhile, has announced it aims to sell half a million vehicles in Europe by 2010 (Stein 2006b,

Phillips 2006). Although these targets may be somewhat overambitious, it is a clear indication of the firms' intentions. Hyundai's success in recent years is due in no small part to chairman Chung Mung-Koo's determined quality drive (AFP, 2007). European buyers have responded to this.

Ssangyong sales have also increased since the firm once again became separated from Daewoo. Now owned by Shanghai Automotive Industry Corporation (SAIC) of China, its new range of SUVs has been well received in markets such as Germany both as new and used vehicles. Renault-Nissan is also set to contribute to the Korean expansion in Europe by importing SUVs from their Samsung division (ANE, 2007). Export volumes of Samsung cars are very small at present, but planned production increases may push the firm beyond what the home market can absorb and exports may then increase further, although regional markets such as China, Philippines, Indonesia or Vietnam are likely to be targeted well before Europe. In any event, shipping will play a key role in the supply-chain.

In a saturated market such as Western Europe, such sales increases must be at the expense of others. At present this does not appear to be most of the Japanese makes, which have also shown growth. Instead, it appears that European mainstream brands have suffered most, whereby a certain amount of 'cannibalism' within GM between Daewoo-Chevrolet and Opel/Vauxhall cannot be ruled out. However, the key battleground is probably Eastern and Central Europe. Here, Daewoo established a Korean presence years before EU membership of key markets in the region, notably Poland and Romania, and this Korean presence has been maintained in East and Central Europe's markets so far. Japanese players have also managed to retain an advantage in the area, as outlined in Figure 6.

Fig. 6: Japanese and Korean Market Shares in Eastern and Western Europe 2001-2005 (%)



Source: adapted from J D Power, 2005.

It is clear that price and a newly expanded dealer network – particularly for Kia – are key elements in the Korean expansion in Europe. Low labour costs in Central Europe will also become a key element. Labour costs in Slovakia are now significantly lower than in Korea itself. Although labour costs represent only about 8-12%



of the ex-works price of a car, operating margins in volume car making are such today, that apparently small differences can easily determine whether a particular model is viable or not (Nieuwenhuis and Wells, 1997; Haglund, 2001). Add to this the cost of shipping, and the economics of building in central Europe look even more attractive. The closure of west European plants and the continuing trek eastwards by European and 'westwards' for US manufacturers are part of the response to the new competitive advantage Koreans and Japanese will be enjoying in central and Eastern Europe in the next few years as their new facilities come on stream.

### Vehicle Shipping

The likely effect of this branch-planting on shipped volumes from Korea is clear. Any Korean car sold in Europe that is built in Europe is not shipped from Korea. With Korean production capacity likely to reach a level close to half typical European market demand by 2010, new car shipping volumes from Korea to Europe will be much reduced, unless the ambitious sales projections of Korean manufacturers are realised. It is possible, however, for some cross shipments of models between Korea and Europe to occur. This would involve small volumes of models built only in one location, or for which there is a temporary shortage in another location, even though it may also be built there – the local plant may be operating at capacity, for example. Alternatively unique models may be built in each location with cross-shipments used to supply each market with the full range, sourced from different manufacturing locations. This is already happening to some extent in the case of the Japanese (see below), as well as Americans and Europeans. This would not be sufficient to sustain current new car shipping volumes from Korea. Similarly, although more mature, Japanese shipments are likely to change in nature. Japanese production in the EU and adjacent countries is still increasing as new investments are coming on stream. This has the effect of both reducing shipments from Japan, and increasing shipments of some models from Europe to other markets. Honda already imports some models from the US, rather than Japan, while Suzuki has in the past imported some cars from India, another flow that is likely to grow. On the other hand, inland shipping of cars along the Danube and Rhine is likely to show further growth; there are already early signs of this trend, due in part to increased pressure on land and rail-based car transport capacity (Ricciuti 2006, 2007).

With used vehicle markets and residual values increasingly being manipulated by the car manufacturers and their agents, the desire to push older cars from the developed markets will become stronger. This desire will grow once the implications of the European End of Life Vehicle (ELV) directive begin to bite. For the manufacturers in Europe, the ELV responsibility will be growing steadily over the next decade, while similar legislation is being implemented in Japan and Korea (Kim, 2007). Despite some scope for sales of used parts, the recycling of cars is only mar-



ginally economic, and working under the threat of a return to the depressed scrap steel prices of the turn of the century, if steel demand from China falls. In this context, exports of older cars, as well as used parts for older cars to less demanding markets may well come to be seen as an easy option, as it is already in Japan and South Korea. Long distance movements, e.g. to Africa, the Middle East and Latin America will invariably require maritime transport and a number of shipping lines are well-positioned to capitalise on these flows with ballast running for at least part of their return leg. More locally, there are significant flows of used cars from Western Europe into the new EU member states in the East, notably Poland where used imports in the first nine months of 2006 alone reached 574,405 units, despite imaginative taxation regimes designed to control this trade (Drzewiecki and Gronkiewicz 2006; Drzewiecki et al. 2006). Although driving vehicles eastwards to satisfy this demand is often the logical solution, short sea shipping also plays a major role, specially in and around the North Sea and the Mediterranean (Beresford et al., 2002). The Baltic is also playing a growing role as a conduit for used car shipments (World Cargo News, 2006).

## CONCLUSIONS

It is clear that the stable, established flows of new cars from Asia to Europe and North America are declining as production is localised in these recipient markets. We have seen this trend for the Japanese and it is clear that the same is now happening for the Korean manufacturers. Instead, much more complex flows of new cars will emerge with smaller shipments from producing emerging markets to recipient emerging markets, combining with shorter routes from established manufacturing locations – notably Japan and South Korea – to such emerging markets, particularly in Asia. From the shipping lines' point of view, cautious optimism is probably the most accurate stance to take; on mainstream routes (Japan/Korea to Europe and the US and intra-Europe) projected volumes will remain high and the key challenge will be matching vessel deck-metres to demand. Off these main routes, dexterity will be called for, in order to cope with complex hub and spoke networks and less predictable long-run demand. In any event, concentration of shipping capacity into fewer larger companies is likely to continue for the foreseeable future, but emerging markets could offer opportunities for lines to hedge (spread their risk) or build new revenue streams.

Other specific flows will involve specialist cars such as Mercedes or BMW shipped from established manufacturing locations to emerging markets, as well as mature markets (e.g. the UK market has already been supplied with BMWs and VWs sourced from South Africa). A fresh flow of new vehicles may well emerge from China to serve world markets with cheaper cars assembled at low-cost plants. Chinese manufacturers have ambitions to export to Europe and North America, but



as yet their quality and safety do not match expectations in these mature markets (Bolduc, 2006; Webb, 2006; Bursa, 2007). This is likely to be overcome by about 2010-2015 when flows of cheaper Chinese cars will start moving around the world. It will be some time before these are replaced by local manufacturing nearer the recipient markets. In the interim there could well be a decline in global new vehicle shipping volumes as Japanese and Korean production, still dominant as the source of new units distributed worldwide by sea, is localised and before significant Chinese exports begin.

Used vehicle shipments are likely to increase with the growth of emerging car markets and the increasing number of push-factors (classically legislation on environment, safety and quality) in developed markets such as Japan, South Korea and the EU. However, questions are beginning to be asked about the ethics of this trade in the longer term which could be seen as a form of 'environmental dumping' (Nieuwenhuis and Wells 1999). On the one hand, some markets may get better cars than they would otherwise have had and the cars' total life-span is extended. On the other hand, this could be portrayed as yet another attempt by the 'North' to offload an environmental problem onto the 'South', allowing manufacturers to carry on under an unsustainable 'business as usual' scenario. Facing up to reality is then left to the next generation of car bosses. All in all, the global used car trade provides a promising business opportunity, particularly for flexible and entrepreneurial companies on land and at sea, but also one that may increasingly require careful political and public relations handling, as well as clever route, fleet and logistics management.



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