

4. Transportation Machine Sector

4.1 Automobiles (four-wheeled vehicles)

4.1.1. Supply and demand trend

(1) Outline

The environment of the world's automobile industry has recently been in the period of great changes, including the steep rises in crude oil prices and growing environmental problems. Some of Japanese automobile manufacturers have taken advantage of these environmental changes to hold a dominant position in the global market, and their activities are attracting attention in Japan and abroad. However, most of Japanese automakers have problems, such as the domestic market not showing much growth, and the domestic automobile industry is not generally in good form. The present situation and future direction of the Japanese automobile industry are outlined below.

(2) Situation of domestic production

The domestic production of automobiles has been on the increase recently, and it is often said that the automobile industry has freed itself from the difficulties after the burst of the bubble economy. Figure 4-1 shows the trend of the domestic production by type of vehicle; as shown in the figure, the production has been in an expansion phase in general. By product category, the production of passenger cars in 2006 was about 9.76 million, an increase of 700,000 over the figure for 2005, i.e., 9.02 million. This was a higher growth than one in any other recent year. It is considered that the expanded production was supported by active export in most cases. Particularly, rises in gasoline prices resulting from sharp increases in crude oil prices as well as the trend of weaker yen have probably contributed to increasing export. But there may be some differences in the situations according to the type of vehicle. While the production of standard-sized and light motor cars has shown an expansion, that of small-sized cars has been on the decline.

The production of trucks has dropped in contrast to that of passenger cars. This is partly because trucks have not been able to secure the size of export as large as that of passenger cars, but more important factors will be the fact that the replacement demand generated by the control on diesel cars in Japan has reached a ceiling and that users have kept from buying new trucks in anticipation of a further control. The output of buses, especially small-sized one, increased. For buses, too, rising export, instead of domestic sales, has supported the higher production.

Fig. 4-1 Trend of domestic automobile production by type of vehicle

	Passenger cars			Subtotal	Trucks			Subtotal
	Standard-sized	Small-sized	Light motor		Standard-sized	Small-sized	Light motor	
2002	3,671,023	3,637,501	1,309,830	8,618,354	679,964	380,303	512,373	1,572,640
2003	3,753,446	3,434,662	1,290,220	8,478,328	772,727	449,462	524,427	1,746,616
2004	4,044,563	3,309,147	1,366,675	8,720,385	769,953	446,536	514,202	1,730,691
2005	4,191,360	3,416,622	1,408,753	9,016,735	723,663	436,763	546,185	1,706,611
2006	4,915,367	3,302,326	1,538,822	9,756,515	699,410	419,404	520,267	1,639,081

	Buses			Total
	Large-sized	Small-sized	Subtotal	
2002	11,141	55,180	66,321	10,257,315
2003	11,406	49,668	61,074	10,286,018
2004	12,286	48,156	60,442	10,511,518
2005	11,763	64,550	76,313	10,799,659
2006	11,063	77,574	88,637	11,484,233

Source: Prepared based on the data of the Japan Automobile Manufacturers Association.

Fig. 4-2 Trend of domestic automobile production by manufacturer

	Toyota	Nissan	Mazda	Mitsubishi	Isuzu	Daihatsu	Honda	Fuji
2002	3,485,168	1,392,439	773,418	871,304	231,053	599,541	1,386,379	436,355
2003	3,520,017	1,471,595	801,084	749,371	244,575	641,236	1,170,941	450,062
2004	3,680,946	1,439,007	818,730	639,883	218,352	679,485	1,242,528	491,792
2005	3,789,582	1,451,212	864,929	664,900	210,253	724,509	1,261,994	469,497
2006	4,194,188	1,234,400	966,547	758,478	230,807	791,291	1,332,866	482,283

	Nissan Diesel	Hino	Suzuki	GM Asia Pacific (Japan)	Mitsubishi Fuso	Others	All automakers, total
2002	26,768	54,170	999,880	241	-	599	10,257,315
2003	38,848	83,122	980,731	1,012	132,745	679	10,286,018
2004	40,107	93,837	1,045,735	-	120,118	998	10,511,518
2005	41,071	96,985	1,090,786	-	132,274	1,667	10,799,659
2006	42,833	100,122	1,206,805	-	141,503	2,110	11,484,233

Source: Same as that for Fig. 4-1.

As noted above, the steady expansion of domestic automobile production is supported by the growth of export in most cases.

Fig. 4-2 shows the situation of automobile production by manufacturer. As shown in the figure, almost all manufacturers increased their production. The output of Daihatsu and Suzuki, which mainly make light motor vehicles, shows an especially rapid expansion; this will suggest that light motor vehicles have established a firm position in the Japanese automobile industry. Mitsubishi had reduced its production as a result of the recall problem but thereafter increased the output again, recovering the 2003 level in 2006. Nissan is the only automaker that cut the production; the company had expanded the output steadily after the Ghosn reform, but a stop seems to have been put to its upward trend recently. Attention should be paid to the company's situations from now on because Nissan decreased its output in the circumstance where the Japanese automobile industry is said to have been doing well in general. As seen in the production by type of vehicle, even the manufacturers mainly making commercial vehicles have tended to expand production. All of Hino, Nissan Diesel and Mitsubishi Fuso increased their output, indicating that they have been recovering

from the temporary slump. Hino made over 100,000 units in 2006, nearly twice the level in 2002. Mitsubishi Fuso also boosted its production; after returning to the 2003 level in 2005, the company further increased its output in 2006.

As described thus far, the production of four-wheeled vehicles in Japan appears to have been raised on a steady pace. However, as seen in the case of small-sized cars and Nissan, the business was not entirely favorable. In particular, supposing that the expansion of production in recent years has been supported by export, it is highly likely that the situation of domestic production will be affected by, among others, foreign exchange fluctuations and increasing overseas production. The production of four-wheeled vehicles in Japan looks favorable from the outside but has a variety of problems, and there is the need to watch its future trend carefully.

(3) Situation of domestic sales

While the production of four-wheeled vehicles has generally shown an upward trend, their sales can be said to have been forced to have difficulty. Figure 4-3 shows the situation of domestic automobile sales by type of vehicle. The domestic sales have been on the decrease after hitting a peak in 2004. The reasons for this may include rising crude oil prices and environmental problems, such as the control on exhaust gas and diesel cars. Specifically, after reaching a peak in 2004, the sales of four-wheeled vehicles have shown a downward trend with 4.64 million units in 2006. By type of vehicle, while the turnover of standard-sized and small-sized vehicles has decreased, that of light motor vehicles has continued an upward trend: it increased from 1.39 million in 2005 to 1.51 million units in 2006. Light motor vehicles had been favorably accepted by the consumer in the period of stagnant business conditions and have remained popular even in the revival phase due mainly to increasing crude oil prices and to the introduction of attractive models. By contrast, the sales of small-sized vehicles fell again in 2006, though they had shown a little recovery in 2005, decreasing below the 2 million units mark. It is supposed that the factor behind the lower sales of small-sized vehicles is the fact that in the circumstance where light motor vehicles were received favorably, a shift from small-sized vehicles to light motor vehicles continued. This seems to be the reason for the slower sales of standard-sized vehicles, too. As if to prove this fact, Toyota quickly introduced Lexus, a high-class brand, while Nissan Infinity and Honda Acura have not put on the market yet. This is probably because both of the manufacturers consider that the premium brand market has not been established firmly in Japan.

The sales of trucks and buses have roughly leveled off. This is probably because replacement purchases as a result of the control on exhaust gas have peaked and because users are waiting and watching how the control will be strengthened in the future.

Fig. 4-3 Trend of domestic automobile sales by type of vehicle

	Passenger cars			Subtotal	Trucks			Subtotal
	Standard-sized	Small-sized	Light motor		Standard-sized	Small-sized	Light motor	
2002	674,094	2,460,103	1,307,157	4,441,354	76,035	739,502	518,843	1,334,380
2003	1,229,907	2,194,194	1,291,819	4,715,920	208,752	373,259	509,044	1,091,055
2004	1,358,281	2,037,767	1,372,083	4,768,131	186,588	361,449	519,067	1,067,104
2005	1,271,349	2,089,992	1,387,068	4,748,409	197,548	351,708	536,648	1,085,904
2006	1,225,867	1,908,267	1,507,598	4,641,732	209,283	354,870	516,021	1,080,174

	Buses			All types, total
	Large-sized	Small-sized	Subtotal	
2002	4,729	11,630	16,359	5,792,093
2003	5,862	15,341	21,203	5,828,178
2004	5,098	13,049	18,147	5,853,382
2005	5,856	11,898	17,754	5,852,067
2006	6,064	11,536	17,600	5,739,506

Note: In January 2003, the classification system for sales statistics was changed from a chassis basis into a number basis. Thus there is no continuity between the data before and after January 2003.

Source: Same as that for Fig. 4-1.

Fig. 4-4 Trend of domestic automobile sales by brand

	Toyota	Nissan	Mazda	Mitsubishi	Isuzu	Daihatsu	Honda	Fuji
2002	1,675,213	773,741	263,081	416,387	54,727	504,596	892,868	255,375
2003	1,704,717	825,090	277,783	367,034	86,104	541,855	715,119	243,824
2004	1,759,003	826,879	280,583	255,240	80,979	577,809	743,133	278,423
2005	1,703,185	866,226	286,919	244,251	84,197	601,154	714,115	258,217
2006	1,660,380	766,763	269,152	263,488	91,982	622,484	702,291	245,234

	Nissan Diesel	Hino	Suzuki	GM Asia Pacific (Japan)	Mitsubishi Fuso	Lexus	Others	All automakers, total
2002	15,694	33,210	626,090	522	-	-	280,589	5,792,093
2003	22,245	47,871	626,873	1,226	87,509	-	280,928	5,828,178
2004	19,704	50,902	662,135	-	73,293	-	245,299	5,853,382
2005	21,407	54,528	695,787	-	61,171	10,293	250,617	5,852,067
2006	19,754	53,952	691,033	-	71,414	31,097	250,482	5,739,506

Notes: 1. In January 2003, the classification system for sales statistics was changed from a chassis basis into a number basis. Thus there is no continuity between the data before and after January 2003.

2. In January 2004, the sales statistics of registrants were changed from a manufacturer basis into a brand basis. Thus there is no continuity between the data before and after January 2004.

Source: Same as that for Fig. 4-1.

Figure 4-4 shows the domestic automobile sales by the brand of vehicle. As seen in the figure, almost all manufacturers suffered declining sales. What is characteristic is the fact that Suzuki, which had supported the boom of light motor vehicles and continued to achieve good sales, had slow sales recently. Suzuki attained a higher position by introducing a new concept of Wagon R into the market of light motor vehicles. In fact, Wagon R continued to rank higher than any other brand in domestic sales after the period of stagnant business conditions and took the first place in sales as shown in Figure 4-5. However, Suzuki's inactive sales may have been the result of any other factor than Wagon R. Toyota's sales have been on the increase because the figure was 1.97 million units if Lexus is added, though its sales of own brand vehicles in 2006 decreased from the previous year. On the other hand, the brakes were put on the domestic sales of Nissan, which had continued to increase steadily; the sales in 2006 fell by about 100,000 units from the previous year, a similar level to that

in 2002. It is also said that the company managed to secure this sales level by the sales of light motor vehicles provided on an OEM basis. It is thus noteworthy what steps Mr. Carlos Ghosn will take to roll back in the months ahead.

Fig. 4-5 Ranking of the domestic sales of main models of vehicle

Ranking	2006			2005		
	Model name	Manufacturer	No. of units	Model name	Manufacturer	No. of units
1	Wagon R	Suzuki	221,065	Wagon R	Suzuki	236,701
2	Move	Daihatsu	147,731	Move	Daihatsu	196,977
3	Corolla	Toyota	143,176	Corolla	Toyota	149,810
4	Vitz	Toyota	117,641	Alto	Suzuki	143,092
5	Tanto	Daihatsu	106,410	Vitz	Toyota	131,935

Note: The shaded items are those of light automobiles.

Source: Prepared based on the statistics of the Automobile Dealers Federation, etc.

The sales of commercial vehicle manufacturers leveled off or decreased in almost all cases. Mitsubishi Fuso was on an upward trend but has not attained the 2003 level yet. What is notable is the situation of Isuzu, which is increasing its domestic sales. Isuzu owns leading diesel technology in the world. With stricter control on exhaust gas imminent, Isuzu's policies are noteworthy. Because diesel engines are attracting much attention from the standpoint of reducing CO2 emissions, there will be the need to watch Isuzu's activities in the future. In particular, Isuzu's strategies after its alliance with Toyota are expected to play an important role as those of a diesel engine supplier in the Toyota Group.

(4) Situation of export and import

Figure 4-6 shows the situation of export of four-wheeled vehicles. As seen in this figure, the export has been on the increase recently and has tended to support the sluggish domestic sales. The export of passenger cars is increasing and recorded 5.30 million units in 2006, a growth of nearly one million units over the previous year. The factors behind this are, as stated earlier, the fact that demand for fuel-efficient Japanese-made vehicles has been globally growing because of sharply rising gasoline prices resulting from advancing crude oil prices and that the yen has weakened recently. The export of standard-sized and small-sized vehicles have both been active, and because crude oil prices are expected to remain high, demand for Japanese-made vehicles will continue in the future. While the export of trucks is unlikely to grow due to high gasoline prices, that of buses is increasing though the growth rate is not very high.

Fig. 4-6 Trend of automobile export by type of vehicle

	Passenger cars			Subtotal	Trucks			Subtotal
	Standard-sized	Small-sized	Light motor		Standard-sized	Small-sized	Light motor	
2002	2,783,405	1,228,525	443	4,012,373	567,313	70,218	62	637,593
2003	2,856,312	1,222,433	1,753	4,080,498	553,406	76,787	61	630,254
2004	2,995,259	1,217,013	1,755	4,214,027	591,236	96,450	109	687,795
2005	3,164,603	1,198,273	292	4,363,168	521,856	89,938	162	611,956
2006	3,843,387	1,451,302	808	5,295,497	488,644	89,189	141	577,974

	Buses			All types, total
	Large-sized	Small-sized	Subtotal	
2002	9,332	39,430	48,762	4,698,728
2003	8,279	37,312	45,591	4,756,343
2004	11,689	44,152	55,841	4,957,663
2005	9,953	67,984	77,937	5,053,061
2006	11,565	81,636	93,201	5,966,672

Source: Same as that for Fig. 4-1.

According to Figure 4-7 that shows the situation of automobile export by region, the export has increased in main markets, including Asia, Europe and North America. As seen in the growing export to the North America region, it is considered that rising gasoline prices have greatly contributed to the growth in the export of Japanese-made vehicles. The increase in the sales to the U.S. is especially remarkable; over two million four-wheeled vehicles were exported to that country in 2006. This situation has caused some people to fear that trade friction may be reignited between the two countries.

Fig. 4-7 Trend of Japan's automobile export by region

	Asia/Middle East		Europe		North America	
	of which China		of which the EU		of which the U.S.	
2002	96,315	845,966	864,941	949,699	1,841,637	2,076,298
2003	139,807	963,680	1,019,753	1,159,706	1,594,157	1,786,387
2004	122,556	968,345	1,037,812	1,275,229	1,559,607	1,726,465
2005	62,151	939,661	897,704	1,178,197	1,662,939	1,854,438
2006	65,463	971,902	923,658	1,305,861	2,261,552	2,488,373

	Central America	South America	Africa	Oceania	Others	All regions, total
2002	142,807	144,358	144,979	385,455	9,166	4,698,728
2003	153,912	118,385	146,269	418,202	9,802	4,756,343
2004	186,930	157,914	182,451	448,671	11,658	4,957,663
2005	221,732	191,527	209,548	447,922	10,036	5,053,061
2006	247,104	232,220	269,956	441,912	9,344	5,966,672

Source: Same as that for Fig. 4-1.

What is noteworthy here is the fact that the export to so-called newly industrializing regions is rising. Specifically, the export to Asia/Middle East, Central and South America and Africa has been picking up, and it cannot be denied that economic growth in these regions has supported the growing automobile export. It has been an important subject for Japanese automobile manufacturers how to make inroads into the market of these emerging regions for future growth, in addition to the already matured markets in Japan, the U.S. and Europe. As indicated by the increasing export, the emerging

markets will be recognized more as important ones in the years ahead as motorization is expanding in these regions. But for some type of vehicles, the system for supplying from overseas production bases has been built up. In this case, there will arise the problem of how the supply from Japan and that from the overseas bases of Japanese automakers should be adjusted. In addition, Japanese automakers operate their plants in the region where the market tends to grow. If Japanese manufacturers make use of these overseas bases, it cannot be expected that their export from Japan will rapidly go up in the future, though there may be some increase in export. Furthermore, considering the situation where export is supporting expansion in domestic production as the domestic market slackens, Japanese manufacturers are faced with the problem of continuing the operation of their plants in Japan, too. Thus they are not in a position to simply aim at increasing their export. Strategies that try to adjust the balance between domestic and overseas manufacturing bases are now an important issue for the future of Japanese automakers.

Figure 4-8 shows the trend of automobile import by region. The import shows a downward trend as if to reflect sluggish domestic sales but has been on a considerably high level of roughly 300,000 units. By region, the import from Europe, the largest supplier, is decreasing, and so is the import from Africa where European automakers have their manufacturing bases. European manufacturers were probably affected directly by the inactive domestic sales in Japan.

Fig. 4-8 Trend of Japan's automobile import by region

	Asia/Middle East	Europe		North America	
		of which the EU		of which the U.S.	
2002	12,636	202,256	215,774	31,275	34,533
2003	21,297	180,900	187,000	26,036	28,521
2004	14,349	206,099	208,022	26,596	28,041
2005	17,962	192,083	192,134	23,487	25,892
2006	34,436	177,039	177,088	21,709	23,091
	Middle and South America	Africa	Oceania and others	Total	
2002	14,572	18,346	97	295,958	
2003	11,752	40,200	110	288,880	
2004	8,248	37,102	119	295,881	
2005	10,579	44,885	114	291,566	
2006	12,086	42,399	92	289,192	

Source: Prepared based on the trade statistics of the Japan Tariff Association.

By contrast, Japan's import from Asia and Middle East is increasing. This is mainly due to rising import from South Korea and so-called "reimport" from overseas plants of Japanese automakers. As for the latter, Japanese manufacturers started to introduce re-imported vehicles from Asia into the domestic market around the Asian Financial Crisis that occurred in July 1997 but the sales of these vehicles did not grow. There will be the need to watch if this trend will continue in the future. South Korean-made vehicles did not succeed well in the Japanese market that is relatively severe. But South Korean dealers are taking various steps to win over Japanese users, and attention should be paid to whether their efforts will lead to an increase in their share in Japan in the years ahead.

4.1.2. Progress of globalization and the future of the automobile industry in Japan

As discussed thus far, the expansion of domestic four-wheeled vehicle production has a strong tendency for rising export to support the slow growth of domestic sales, and reinforcing domestic marketing has been one of the challenges Japanese automakers have to combat with. Meanwhile, the automobile industry is rapidly globalizing, and the overseas manufacturing bases of Japanese manufacturers are sharply increasing in region and number. While these overseas plants need to increase their production or introduce products suited to the market so as to secure their share, it is also important to maintain the operation of factories in Japan. Manufacturing sites in Japan not only have the role to supply products to the domestic market but also serve, in most cases, as the bases of activities for assisting overseas plants. There were many cases where at the time when a new factory would start operation or when a new model would be introduced, the workers at the overseas plant were sent to Japan for necessary training, though this practice is said to decrease recently. In addition, in order to support the manufacturing activities of their overseas factory, Japanese automakers are dispatched many Japanese workers there and are making efforts to secure the same quality as in Japan. In this sense, too, the overseas plants are beyond the framework of simple manufacturing bases. Most of Japanese automakers concentrate their development site and do such activities as the introduction of a new model and the final evaluation of parts in Japan. Thus, a variety of knowledge and know-how are stored in Japan and are then supplied to overseas plants; this structure has not been changed very greatly. If continuing manufacturing activities leads to the acquisition and improvement of new knowledge and know-how, it is considered that maintaining the production at domestic plants will help Japanese manufacturers keep and strengthen their competitiveness in the global market.

On the other hand, considering the situation of the stagnant domestic market and the fact that because the Japanese market has matured, no rapid growth can be expected in the future, it is important how the manufacturing activities at domestic factories should be continued. This is also significant not simply as the domestic problem of unemployment but also from the viewpoint of how the Japanese automobile industry can continue to secure its advantage in global competition.

As the step aiming at the domestic market, the introduction of the products that meet the demand of the market is naturally important. Also important will be the so-called “product-oriented” strategy of continuously introducing the products of a concept different from conventional ones, for which new technology and know-how are adopted and thus changing the demand. To achieve this, the manufacturer will need to constantly brush up on their technology, etc., making it important for them to invest funds in this effort. Expenditure for research and development (R&D), including fundamental studies, will become especially important. The ratio of R&D expenses to the sales of Japanese automakers is relatively high at present. But the manufacturer whose R&D expenses are not very great will have to face keen competition with manufacturers from newly industrializing countries (NICs), such as South Korean ones. In such event, the automaker will need to plan the strategies for competition completely different from those in the past, and it will be an important thing where to secure the competitive advantage of Japanese automakers.

4.2 Two-wheeled vehicles

4.2.1. Supply and demand trend

(1) Outline

Globally, the two-wheeled vehicle industry in Japan may be regarded as securing competitive advantage as a whole. But a closer observation by region shows that there are some markets where it is hard to say that Japanese manufacturers have an overwhelming advantage as they are chased after by company without foreign capital affiliations. Demand continues to fall in the domestic market, which is difficult to expand greatly. In this circumstance, there are some cases where two-wheeled vehicle manufacturers have been forced to change their strategies, including the reorganization of manufacturing bases. The present situation and future direction of the Japanese two-wheeled vehicle manufacturers are outlined below.

(2) Situation of production and sales

Figure 4-9 shows the situation of production of two-wheeled vehicles by engine displacement. As seen in this figure, the domestic production of two-wheeled vehicles has been on the decline. By displacement, while the output of Type I motorbikes increased a little but almost leveled off, that of Type II motorbikes and light two-wheeled vehicles showed a decline.

By contrast, the production of small-sized two-wheeled vehicles continued to rise, suggesting that the Japanese market continuously shifted to the products with higher value added. An important factor behind this situation is the fact that because the domestic two-wheeled vehicle market is already a mature one and a global manufacture system has been constructed for models with smaller displacement, Japanese manufacturers are not yet in a situation where they could compensate their smaller domestic sales by increasing the export of their products. Moreover, the import of part of Type I motorbikes have already been started and so the role of domestic plants is now only the manufacture of part of products for the domestic market and that of high value added products. Therefore, it is unlikely that domestic production will increase rapidly in the years ahead. But there is a growing tendency for manufacturers to utilize domestic factories as the bases for the production of scooter-type small-sized two-wheeled vehicles as these vehicles have widely diffused among domestic users. It is considered that the widespread use of scooter-type small-sized two-wheelers has prepared for the manufacture of higher value added products at domestic plants. There have been some cases where European manufacturers introduced these scooter-type small-sized two-wheelers into the local market. In Europe, there has long existed the scooter market and manufacturers have tended to increase the manufacture of larger models as the market is maturing. This may affect the domestic production in Japan.

Fig. 4-9 Trend of domestic production of two-wheeled vehicles by engine displacement

	Type I motorbikes (up to 50cc), total	Type II motorbikes (51-125cc)	Light two-wheeled vehicles (126-250cc)	Small-sized two- wheeled vehicles (251cc and up)	Total
2002	588,956	543,294	241,356	741,882	2,115,488
2003	458,072	376,800	235,499	760,534	1,830,905
2004	331,449	304,622	271,126	832,387	1,739,584
2005	298,549	260,343	279,274	953,419	1,791,585
2006	306,246	149,868	276,043	1,039,229	1,771,386

Source: Prepared based on the data of the Japan Automobile Manufacturers Association.

Fig. 4-10 Trend of production of two-wheeled vehicles by manufacturer

	Honda	Suzuki	Yamaha	Kawasaki	Others	Total
2002	849,475	356,504	699,663	209,010	836	2,115,488
2003	653,941	412,342	554,858	208,752	1,012	1,830,905
2004	567,628	397,104	554,181	220,308	363	1,739,584
2005	590,251	489,005	471,254	240,648	427	1,791,585
2006	546,418	523,408	452,561	248,538	461	1,771,386

Source: Same as that for Fig. 4-9.

Figure 4-10 shows the trend of production of two-wheeled vehicles by manufacturer. As evident from the figure, while the output of the two giants, Honda and Yamaha, has declined, that of Suzuki and Kawasaki has been on the increase. Kawasaki does not make Type I motorbikes and so is not affected very much by the situation of low value added products. The structure of the Japanese two-wheeled vehicle industry has changed into the one where manufacturers should work to secure profits from a small-sized pie available. In this sense, the expanding market for large-sized scooters has an important meaning; as high hopes are placed on overseas markets, too, in the future, it is expected that a competitive environment where manufactures introduce highly profitable products one after another into the market will continue.

As noted earlier, lower domestic sales are considered to be one of the factors behind the falling production in Japan. Figure 4-11 shows the situation of domestic sales of two-wheeled vehicles by engine displacement and indicates that the downward trend of sales has continued. By the type, while some improvements are seen for Type I motorbikes, the sales of Type II motorbikes and light two-wheeled vehicles dropped in 2006 again after they grew a bit in 2005. By contrast, small-sized two-wheeled vehicles have continued to record increased sales since 2004, bringing a beam of hope in the generally inactive two-wheeler market. This is probably because the market of scooter-type two-wheelers has been established as stated above and also because demand for the two-wheelers has gone up due to their simple automatic transmission.

Yet the sales of Type I motorbikes, whose production is much higher than other types, continue to fall, though they roughly leveled off from 2005 to 2006. With declining birth rates, the population of young people, who have supported the sales of this type, is decreasing; this suggests an absolute decline in the users who would buy this type newly. As if to evidence this, the average age of Type I

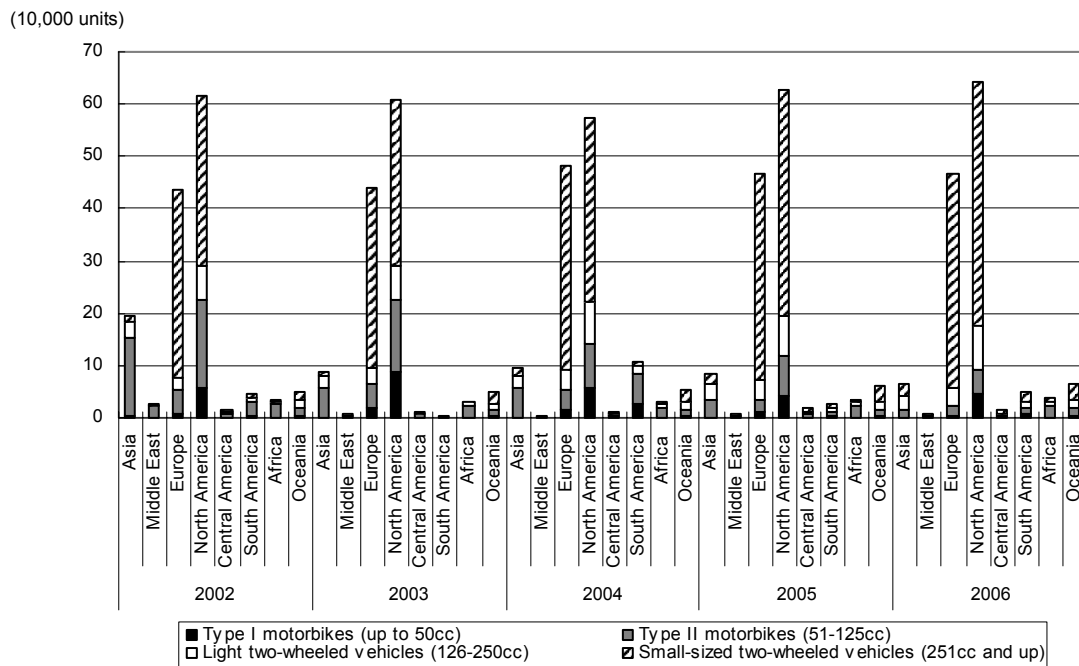
motorbike buyers is on the rise, and the market is centered on replacement demand. These facts are great hindrances to the growth of the two-wheeler market.

Fig. 4-11 Trend of the domestic sales and shipment of two-wheeled vehicles by engine displacement

	Type I motorbikes (up to 50cc), total	Type II motorbikes (51-125cc)	Light two-wheeled vehicles (126-250cc)	Small-sized two-wheeled vehicles (251cc and up)	Total
2002	535,327	94,468	94,414	46,873	771,082
2003	539,610	89,906	87,881	42,724	760,121
2004	500,388	62,780	97,135	39,718	700,021
2005	470,922	88,747	99,658	47,186	706,513
2006	478,196	82,211	91,395	48,564	700,366

Source: Same as that for Fig. 4-9.

Fig. 4-12 Trend of export of two-wheeled vehicles by region and engine displacement



Source: Same as that for Fig. 4-9.

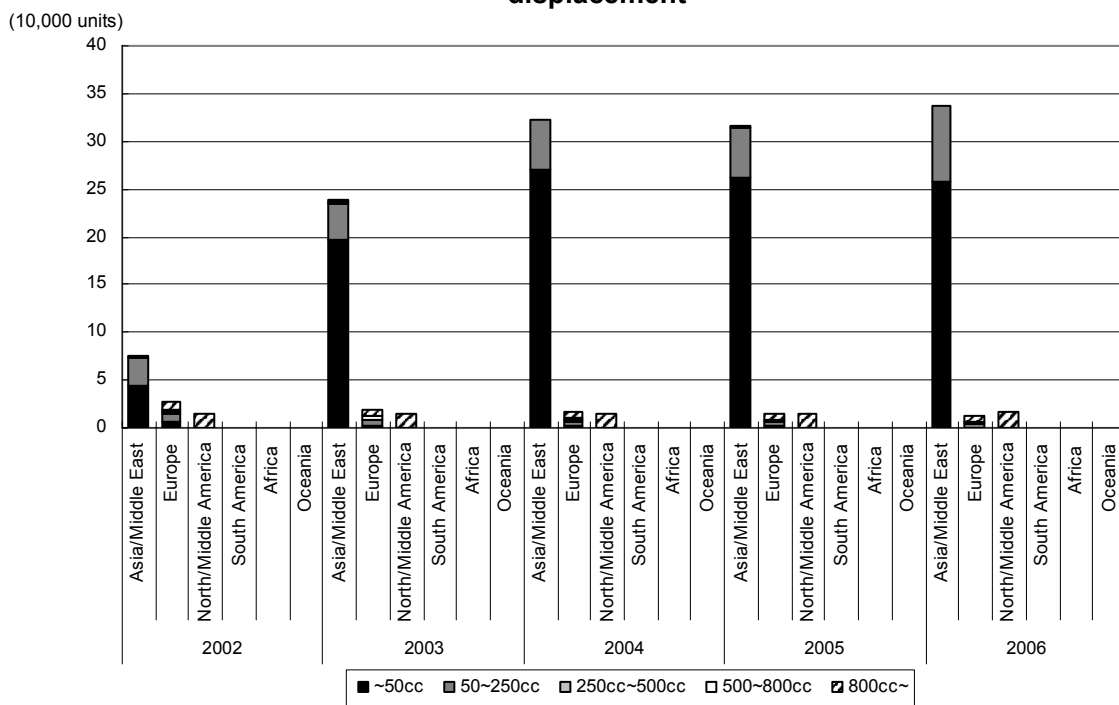
(3) Situation of export and import

Fig. 4-12 shows the trend of export of two-wheeled vehicles by region and engine displacement. As seen in this figure, North America and Europe have far greater figures than other regions, and small-sized two-wheeled vehicles account for almost all of the export. By region, the export to Asia has rapidly gone down recently. This indicates that the production at the local manufacturing bases in Asia has been well under way and has reached a level where import from Japan is no longer

needed. A similar tendency is observed for South America and Africa. In Middle East, South America and Africa, increasing import from Asia, etc. instead of Japan has contributed to the declining export from Japan. No great change is seen in the export to North America and Europe. However, by displacement, the export of light two-wheeled vehicles and lower grade products is going down, whereas that of small-sized two-wheeled vehicles is growing in a way that makes up the decline of light two-wheeled and lower engine displacement vehicles. This is probably because the export of light two-wheelers and lower value added products from Japan has been shifted to that from manufacturing bases in Asia and other regions.

These facts indicate that the two-wheeler supply system has been divided in the manufacturing bases in the world: the figure's data show that while plants in Japan serve as the bases for supplying the products with high value added and larger engine displacement to the global market, factories in Asia and other regions globally provide other two-wheelers with lower displacement. In other words, the data prove that the overseas manufacturing bases of Japanese two-wheeler manufacturers mainly in Asia have already attained global-level quality and are now playing the role as the global suppliers of small-sized two-wheelers and that the division of global two-wheeler supply systems, mainly in Japan, has almost been completed.

Fig. 4-13 Trend of import of two-wheeled vehicles by region and engine displacement



Source: Prepared based on the statistical data of the Japan Tariff Association.

Figure 4-13 shows the trend of import of two-wheeled vehicles by region and engine displacement. As evident from this figure, Japan's two-wheeler import is almost all that of products of 50cc or less, i.e., Type I motorbikes, from Asia. This means that Japan imports roughly the same

number of two-wheelers as its domestic production from Asia. Because there has been no great change in the level of import in recent years, it is supposed that the practice of procuring low value added products of Type I motorbikes mostly from Asia has been established, which also causes one to suppose that the supply system has been divided as stated above.

As discussed thus far, the global supply system of two-wheelers has been divided as a result of the downward trend of the domestic market and according to product characteristics, and this tendency is likely to increase in the future. Thus, as the domestic market is slowing down and the export has reached a limit resulting from expanding overseas production, domestic manufacturing bases will continue to live in the structure where they have to work to generate their earnings from a small-size pie by making high value added products.

4.2.2. Progress of globalization and the role of domestic manufacturing bases

As stated so far, in the field of two-wheeled vehicles, the global supply bases, including Japan, have been divided between product categories. More specifically, while high value added products for the advanced market in Japan, the U.S. and Europe are supplied mainly by Japan, products with low value added are provided by the overseas bases of Japanese manufacturers in Asia and other regions. In this sense, two-wheelers seem to have followed a flying goose pattern more than other types of products. In the market of developing countries, two-wheelers are now used mainly for the means for commuting. In most cases, the price is on a level where the middle class can buy on credit, and two-wheelers of about 100-150cc are hot-selling products in this market. As a result, when the manufacture is shifted to overseas, the products already developed and made in Japan are transferred for local production with some adaptation, if any, in virtually all cases. This means that no important concepts, such as new technology, will not be necessary and only minor improvements in the existing technology, etc. is enough when introducing a new model into the overseas market. Thus, the transfer of manufacturing bases to overseas may be easier to do than in the case of four-wheeled vehicles. In this sense, the structure of division of the global supply system according to product categories at present still has the traditional flying goose pattern of the shift of manufacturing bases to overseas that the machine industry used to follow.

When transferring manufacturing functions to overseas in this structure, the method of moving the existing technology and know-how to the manufacturing base abroad as they are and concentrating development tasks in Japan will be able to be continued long. But if the existing technology and know-how are transferred to overseas as they are, there is the possibility that none of such transferred technology and know-how remains in Japan. Building the divided supply system based on product characteristics may create the products no longer made domestically. If development functions are concentrated in Japan and technology, know-how, etc. are supplied from overseas to Japan, that means that manufacturing process for verifying such technology, know-how, etc. is not available in Japan, which may make it impossible to make full use of such information from abroad. Moreover, domestic plants serve as the bases for supporting overseas manufacturing bases as their mother plants in most cases in Japan, and there are some cases where the products no

longer made in Japan are continued to be produced abroad. Thus, some of the Japanese engineers sent to the overseas plant may have no experience in the manufacture of the product about which they are expected to give advice; in this case, technical assistance at the overseas plant may be hindered. Considering these problems, almost all of Japanese manufacturers are working to store up their past technology, know-how, etc. and make their databases. For two-wheeled vehicles, while domestic demand tends to dwindle, domestic manufacturing bases are beginning to be integrated. Specifically, Honda had decided to move its two-wheeler plant in Hamamatsu to Kumamoto, concentrate domestic production and functions for global support in Kumamoto and operate its center in Kumamoto more effectively as the base of two-wheeler production. This suggests that the company's domestic plants still play an important role in its global production network; while the company retains its development functions in Japan, its domestic plants probably have come to play a more important part as the leaders of global manufacturing bases though they still serve as manufacturing sites, too. In fact, when a manufacturing base in the developing country tries to cope with some change in the market or environmental problems or to adopt parts with higher value added, it has no domestic supplier of necessary materials and has to get them from Japan or the supply center of a neighboring country. Meanwhile, as evident from the cases in China, India, etc., a company without foreign capital affiliations often holds a relatively large share of the domestic two-wheeler market. In this situation, price competition intensifies in the market in most cases, and Japanese manufacturers cannot get competitive advantage very easily only by superior technology and quality. In such a circumstance, overseas manufacturing bases still tend to rely on their Japanese counterparts as to, among others, the evaluation of local suppliers. Thus, the role of Japanese plants should play remains important not only in improving cost competitiveness but also in introducing new technology, etc.

For domestic manufacturing bases, the divided global supply system has been established. However, domestic plants are expected to play the part not merely as the supply base of high value added products but also as the organization for global support. In light of this, they still need to store up and improve the technology, know-how, etc. on low value added products and to do so, they have to continue the manufacture of these products.

4.3 Aircraft

4.3.1. Supply and demand trend

(1) Outline

According to the quick report announced in February 2007, the production of aircraft in 2006 (calendar year) was ¥1,189.0 billion, marking an all-time high.

In July 2007, Boeing 787, the next-generation key medium-sized aircraft, was showed first at Boeing's Everett Plant. As of the end of July 2007, orders for this model reached as many as 683 units. Japanese manufacturers take charge of 35% of the model's airframe components, and demand for aircraft will develop in a full scale in the months ahead.

In Japan, in July 2007, the rollout ceremony of the P-X, next-generation fixed wing patrol plane, and the C-X, next-generation air carrier, was simultaneously held at the Gifu Plant of Kawasaki Heavy Industries, Ltd. The first products will be delivered to the Ministry of Defense by the end of FY2008.

In June 2007, Mitsubishi Heavy Industries, Ltd. exhibited at the International Aircraft Show in Paris the mockup of “MRJ,” next generation domestic regional jet passenger plane that the company is developing and will enter service in 2012.

As noted, there were many events symbolizing the transitional period from the existing to new models in 2007. In answer to the demand for newly made aircraft, Japanese aircraft-related businesses will reinforce their system for increased production.

(2) Trend of production

The results of production (sales) of the aircraft industry in FY2006¹ (Fig. 4-14) increased by 7.9% over the previous year to ¥1,138.8 billion. By product category, the output of airframes was ¥682.3 billion or an increase of 9.1% y/y, engines, ¥330.4 billion, up 7.5% y/y and related appliances, ¥126.1 billion, up 2.0% y/y.

(3) Trend of export and import

According to the customs clearance statistics, the total export of the engines, airframes, components, etc. of aircraft in 2006 (calendar year) was ¥409.9 billion or an increase of 42.1% over the previous year. The total import amounted to ¥1,036.9 billion, up 17.8% y/y (Fig. 4-15).

(4) Prospects

According to the survey conducted by the SJAC for its 28 member companies (Fig. 4-16), the estimated production for FY2007 was ¥1,117.0 billion or an increase of 1.6% y/y (¥17.7 billion).

By product category, the output of airframe-related products was estimated at ¥614.7 billion due to higher production of airframe parts, that of engine-related products, ¥328.3 billion because of boosted production of parts for export and that of equipment, ¥174.0 billion.

The estimated export in FY2007 was ¥535.4 billion reflecting the good performance of airframe components for Boeing, etc.

By product category, the export of airframe-related products was estimated at ¥284.0 billion, engines ¥225.3 billion and equipment ¥26.1 billion.

¹ The figures are those prepared by the Society of Japanese Aerospace Companies (SJAC) based on the machinery statistics of the Ministry of Economy, Trade and Industry and are the sums of the amount of production and that of repair costs.

4.3.2. Results of operation and the trend of the aircraft industry

(1) Situation of management

In May 2007, Mitsubishi Heavy Industries (MHI) shipped the main wings of compound materials for the first Boeing 787 plane. Orders for 787 have already exceeded 680 units, and the company will reinforce its system of production increase of main wings in the future. As in the previous year, MHI enjoyed greater sales in the aerospace segment of ¥495.0 billion, up 11.0% y/y, in 2006. The company is also continuing R&D activities for the “MRJ,” next generation domestic regional jet passenger plane, so as to decide the possibility of starting business for the plane in the spring of 2008; for example, MHI displayed the 1/20 mockup of the plane’s passenger cabin at the International Aircraft Show in Paris in 2007.

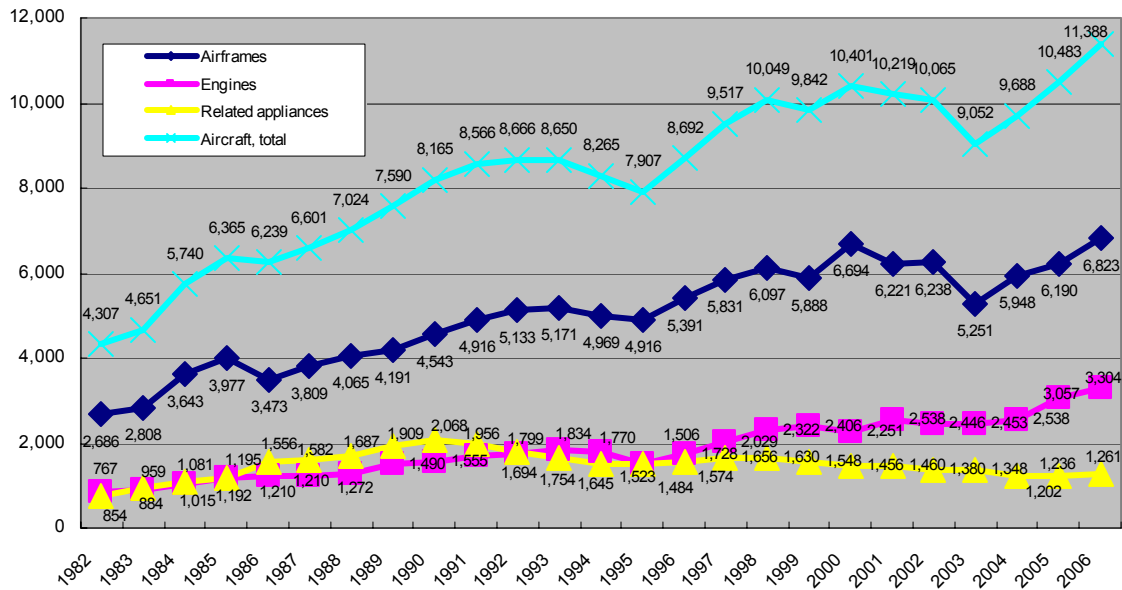
In July 2007, Kawasaki Heavy Industries (KHI) held the rollout of the next-generation fixed wing patrol plane and next-generation air carrier for the Ministry of Defense. KHI also shipped front bodies for the first 787 plane to Boeing in January 2007. The company achieved sales of ¥269.1 billion in the aircraft segment due mainly to higher sales of components for the 777.

Ishikawajima-Harima Heavy Industries Co. changed its corporate name into IHI Co. in July 2007. As a result of the reduction in the frontline equipment budget, the company is faced with a disadvantageous situation for demand for defense facilities. But in the private sector, IHI successfully continued the development of the GENx engine to be applied to Boeing’s next-generation medium-sized airbuses and received orders for F110 engines, V2500, etc. from the Ministry of Defense. As a result, the company registered sales of ¥297.9 billion in 2006.

Fuji Heavy Industries Ltd. (FHI) enjoyed good sales of combat helicopters and experimental CX/PX planes in the defense equipment segment. FHI also achieved great sales of main wings for Eclipse Aviation of the U.S. and center wings for Boeing 787 (those for the first 787 shipped in January 2006). The company’s sales in FY2006 were ¥94.0 billion, an all-time high for the second consecutive year.

In the private sector, Shinmeiwa Industries, Ltd. got orders for airframe components for a new passenger plane being developed and had steady demand for passenger planes and business jets, too. In the defense sector, the company completed the manufacture of search-and-rescue amphibian planes and the regular repair of various airplanes as planned. Shinmeiwa recorded sales of ¥24.6 billion in 2006.

Fig. 4-14 Trend of aircraft production (fiscal year)



Source: Prepared based on the data of the SJAC.

Fig. 4-15 Export and import of aircraft in 2006 (calendar year)

	(¥ million)	
	Export	Import
Aircraft engines (pistons)	66	556
Parts for aircraft engines (pistons)	2,820	1,645
Aircraft engines (turbines, etc.)	1,267	173,909
Parts for aircraft engines (turbines, etc.)	169,319	271,757
Gliders and hang gliders	6	106
Balloons and airships	620	
Aircraft with no engine		41
Helicopters, total	417	18,230
Empty weight: 2,000kg or less	148	3,972
Empty weight: over 2,000kg	269	14,258
Aircraft and other airplanes, total	75	375,278
Empty weight: 2,000kg or less	54	1,133
Empty weight: over 2,000kg but 15,000kg or less	21	15,953
Empty weight: over 15,000kg		358,192
Components, total	235,332	187,515
Aircraft propellers		1,037
Helicopter rotors (including blades)		2,218
Propellers and rotors and their components (excluding helicopter rotors)	771	3,404
Other components for aircraft or helicopters	228,700	154,455
Components for balloons, airships and gliders		
Landing devices and other components	3,823	21,277
Others	1,982	5,124
Parachutes and rotochutes and their components	20	872
Aircraft catapults, arresting gears and other similar devices and their components		303
Aircraft training devices and their components	36	6,660
Total	409,922	1,036,872

Source: Prepared based on the data of the SJAC.

Fig. 4-16 Prospects for the production and export of aircraft in FY2007

		Production (¥ million)					Export (¥ million)		
		Results in FY2005	Results in FY2006	Estimate for FY2007			Results in FY2005	Results in FY2006	Estimate for FY2007
Airframes	Bodies	196,288	179,092	169,491	Airframes	Bodies	67	77	0
	Parts	399,702	445,849	445,201		Parts	181,175	254,089	284,010
	Sub-total	595,990	624,941	614,692		Sub-total	181,242	254,166	284,010
Engines	Bodies	74,751	73,555	68,625	Engines	Bodies	17,803	26,945	26,800
	Parts	228,022	253,308	259,673		Parts	160,712	190,839	198,491
	Sub-total	302,773	326,863	328,298		Sub-total	178,515	217,784	225,291
Equipment		134,846	147,524	174,025	Equipment		22,070	21,402	26,097
Total		1,033,609	1,099,328	1,117,015	Total		381,827	493,352	535,398

Source: The SJAC, "Prospects for Production, Export and Orders of Aircraft (May 2007)."

Fig. 4-17 Financial situation of the five aircraft industries (consolidated)

		As of Mar. '02	As of Mar. '03	As of Mar. '04	As of Mar. '05	As of Mar. '06	As of Mar. '07	Year-on-year ratio
Mitsubishi Heavy Industries	Sales	28,639	25,938	23,734	25,907	27,921	30,685	9.9%
	of which the aerospace segment	4,720	5,067	3,922	4,079	4,459	4,950	11.0%
	Operating profit	786	1,153	666	147	709	1,089	53.6%
	Ordinary profit	679	781	297	125	503	830	65.0%
	Operation profit to sales ratio	2.7%	4.4%	2.8%	0.6%	2.5%	3.5%	-
Kawasaki Heavy Industries	Sales	11,445	12,395	11,602	12,415	13,224	14,386	8.8%
	of which the aerospace segment	1,610	1,548	1,737	1,882	2,185	2,691	23.2%
	Operating profit	313	305	222	247	417	691	65.7%
	Ordinary profit	142	162	121	210	308	490	59.1%
	Operation profit to sales ratio	2.7%	2.5%	1.9%	2.0%	3.2%	4.8%	-
Ishikawajima-Harima Heavy Industries (IHI)	Sales	10,824	10,190	10,474	10,890	11,271	12,349	9.6%
	of which the aerospace segment	2,329	2,438	2,414	2,383	2,695	2,979	10.5%
	Operating profit	272	246	-232	106	218	246	12.8%
	Ordinary profit	187	96	-424	42	159	215	35.2%
	Operation profit to sales ratio	2.5%	2.4%	-2.2%	1.0%	1.9%	2.0%	-
Fuji Heavy Industries	Sales	13,624	13,723	14,394	14,464	14,764	14,948	1.2%
	of which the aerospace segment	663	630	566	595	818	940	14.9%
	Operating profit	884	675	503	420	583	479	-17.8%
	Ordinary profit	782	585	566	435	468	422	-9.8%
	Operation profit to sales ratio	6.5%	4.9%	3.5%	2.9%	3.9%	3.2%	-
Shinmeiwa Industries	Sales	1,422	1,395	1,306	1,279	1,297	1,445	11.4%
	of which the aerospace segment	339	385	288	208	207	246	18.8%
	Operating profit	28	32	64	60	49	53	8.2%
	Ordinary profit	19	24	59	61	52	54	3.8%
	Operation profit to sales ratio	2.0%	2.3%	4.9%	4.7%	3.8%	3.7%	-

Source: Prepared based on the quick reports on the settlement of accounts of these companies, etc.

The manufacturers of materials for passenger planes, such as Boeing 787, and related businesses generally registered greater sales over the previous year (Fig. 4-18). Considering the situation of orders for Boeing 787, these manufacturers will continue their system for production increases.

Fig. 4-18 Financial situation of aircraft equipment manufacturers

	Sales of the segments, including aircraft (¥100 million)		Year-on-year ratio	Consolidated sales (¥ 100 million)	Segment sales to consolidated sales ratio
	FY2006	FY2005			
Toray Industries	686	527	30.1%	15,465	4.4%
Toho Tenax	340	289	17.7%	485	70.2%
Mitsubishi Rayon	1,115	931	19.8%	4,170	26.7%
Yokohama Rubber	1,247	1,162	7.3%	4,974	25.1%
Nabtesco Corp.	500	396	26.4%	1,614	31.0%
Sumitomo Precision Products	219	199	9.8%	502	43.7%
Nikkiso	313	259	21.1%	654	47.9%
Koito Industries	265	183	44.7%	558	47.4%
Japan Aviation Electronics Industry	155	128	21.1%	1,376	11.3%
Kayaba Industry	60	58	2.4%	3,561	1.7%
Koito Mfg.	31	28	11.1%	4,525	0.7%
Showa Aircraft Industry	92	76	20.5%	252	36.4%
Jamco Corp.	417	319	30.7%	417	100.0%
Shimadzu Corp.	570	525	8.7%	2,624	21.7%

Source: Prepared based on the quick reports on the settlement of accounts of these companies, etc.

(2) Future prospects and problems

As the rollout of Boeing 787 was held and the production of the new model will be increased in a full scale in the months ahead, Japanese partner businesses will need to reinforce their production increase system. This situation has offered chances for business with these partners to domestic small businesses, etc. Some companies have already entered in the metal working field.

Tier 1 businesses (primary suppliers) have been able to meet their business needs only with existing suppliers, and it is said that they have had not much interest in getting new supplier partners. But in the recent situation where it has become an urgent problem to establish a production increase system, it seems that they recognize the need to find new motivated partners having technological power and to secure new suppliers. Meetings for studying the possibility of entering the field of the new aircraft model, existing planes, engines, equipment, maintenance and others and attempts at joint order acquisition have already been held and made in such areas as Okayama, Osaka, Kanagawa, Tokyo and Suwa. According to the moves of Tier 1 businesses, activities for forming networks and cooperation mechanisms among areas and small businesses may increase further in the future. To these small businesses, obtaining the certification of JIS Q 9100, the quality management system for aerospace, and other standards, in addition to investment in the latest equipment, etc., will be the keys to new business chances.

In the U.S. market of small-sized aircraft, Honda Motor Co. exhibited, in July 2006, HondaJet, its small-sized business jet, at the "Air Venture 2006," and announced a business plan to mass-manufacture the model and newly enter the small-sized aircraft market. In August 2006, the company also published the foundation of Honda Aircraft Company, its wholly-owned subsidiary that will do the development, manufacture and sale of airframes. In the fall of 2006, Honda started to accept orders for HondaJet, the mass-manufacture model, and has already received orders for over 100 units. The company will obtain an approval for the mass production model in three to four years

and will then start the mass manufacture. It plans to deliver the first HondaJet by the end of 2010. Honda will enter into a business tie-up on the sales and service network with a U.S. aircraft manufacturer so as to meet customer needs on a high level, and attention should be paid to the company's movements in the future.