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TECHNOLOGY EXPORTS AND IMPORTS OF JAPANESE ENTERPRISES AND THE IMPACT OF THE FINANCIAL CRISIS

16-18 November 2009, OECD Headquarters, Paris

Item 8.3 of the Agenda.

This paper analyses the features of Japan's technology trade and the impact of the financial crisis and the deterioration of the global economy on Japan's technology trade. In order to make a comparison between the pre-crisis and post-crisis periods, data from September to August are taken as annual figures.

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2nd Meeting of the WPTGS
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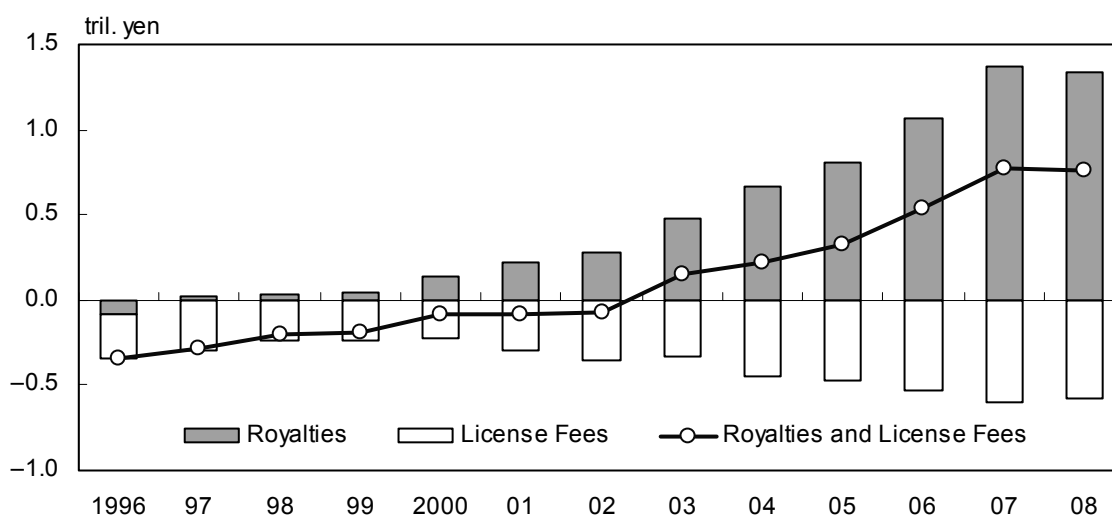
Toshie Kori, International Department, Bank of Japan

Features of Technology Trades in Japan

1. The balance of payments statistics reflect various economic activities related to the globalization of Japanese enterprises, and it is possible to analyze those features by looking into the details of BOP figures. Notable developments in recent years in this context are the increasing volume of cross-border receipts for "royalties and license fees."

2. Fees received for the licensing of patents (royalties) are recorded under "industrial processes, franchises, etc." (hereafter "royalties") of "royalties and license fees," a component of "other services." Since 1997, exports (credit) of royalties exceeds imports (debit) and its surplus has been steadily increasing for years. On the other hand, "license fees" has been deficit since 1996, mainly reflecting payments of license fees for computer software (figure1).

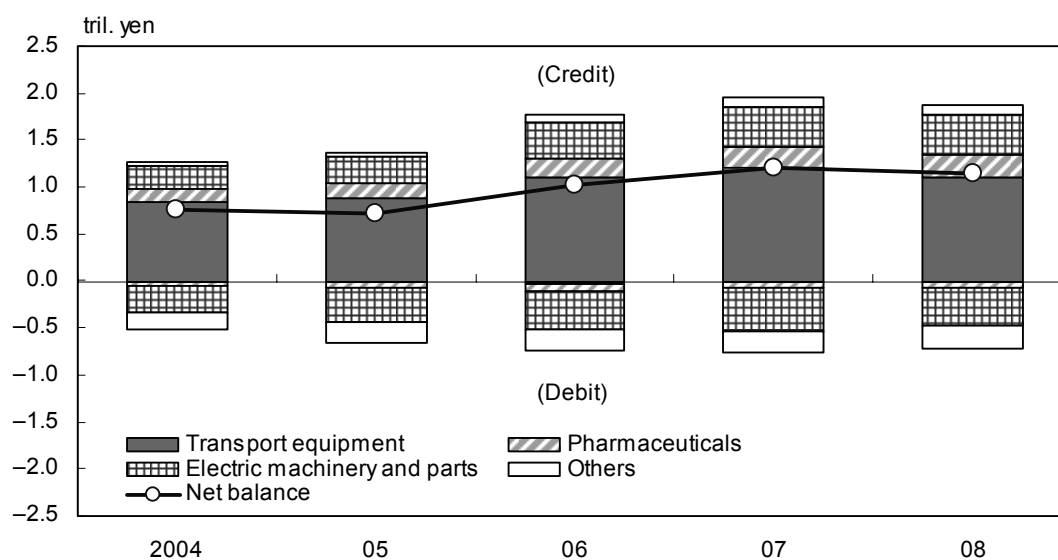
Figure 1: Royalties and License Fees



Source: Bank of Japan, "Balance of Payments."

3. A review of payments, receipts, and the net balance of "royalties" by industry, using the source data of BOP, indicates the following. The net receipts of the transport equipment industries, where the amount of receipts is large and that of payments small, account for more than 90 percent of the surplus. Furthermore, although it decelerated in 2008, the amount of surplus has been growing steadily, showing that the expansion of overseas production by Japanese motor vehicle companies is the major contributor to the increase in the overall surplus (figure 2).

Figure 2: Payments and Receipts of Royalties by Industry



Source: Bank of Japan, "Balance of Payments."

Note: Figures by industry are estimated by the International Department of the Bank of Japan. Totals do not match figures for the corresponding balance of payments components.

4. One of the reasons for the large receipts of motor vehicle-related royalties is the industry's high overseas production ratio. A comparison of overseas production ratios among manufacturing industries (table 1) shows that the ratio of the transport equipment industry, at 42.0 percent (in fiscal 2007) is more than twice as high as the average for all manufacturing industries (19.1 percent in fiscal 2007). The electrical machinery and IT-related industries also have high overseas production ratios, and these industries have also received large amounts of "royalties," which place them second only to the transport equipment industry. However, the amount of "royalty" payments is also large. This seems to be mainly because there are many cases where Japanese companies use technologies owned by companies of the United States and other countries.

Table 1: Overseas Production Ratios (By Industry)

%

	FY2004	FY2005	FY2006	FY2007
Manufacturing	16.2	16.7	18.1	19.1
Of which:				
Electrical machinery	9.5	11.0	11.8	11.5
Information and telecommunications apparatus	33.1	34.9	34.0	32.2
Transport equipment	36.0	37.0	37.8	42.0

Note: Overseas production ratio of all Japanese companies = Sales of overseas subsidiaries (manufacturing industries) / (sales of overseas subsidiaries [manufacturing industries] + Domestic sales [manufacturing industries] x 100)

Source: Ministry of Economy, Trade and Industry, "Survey of Overseas Business Activities" (fiscal 2007 actual results/July 1, 2008 survey).

5. One of the features of motor vehicle-related receipts of "royalties" is that intra-firm transactions (between parent companies and their subsidiaries) account for a major portion of total trade. According to the "Survey of Science and Technology Research, 2008" of the Ministry of Internal Affairs and Communications (table 2), the share of intra-firm transactions in total "royalty" receipts is 88.8 percent for transport equipment, 40.8 percent for pharmaceuticals, and 57.5 percent for electric machinery and IT related industries. Royalties related to motor vehicle manufacturing are generally determined on the basis of the number of motor vehicles manufactured or the total amount of sales.

Table 2: Payments and Receipts for Technology Exports and Imports (By Industry)

bil. yen, %

	Receipts for Technology Exports			Payments for Technology Imports		
	Receipts	share of total	of which: from affiliates companies	Payments	share of total	of which: to affiliates companies
All industries	2,482	100.0%	1,824	711	100.0%	115
Manufacturing	2,401	96.7%	1,792	605	85.1%	80
Of which						
Transport equipment	1,250	50.4%	1,110	36	5.0%	5
Pharmaceuticals	283	11.4%	116	37	5.2%	4
Electrical machinery	431	17.4%	248	364	51.3%	15
Chemical and allied products	73	2.9%	33	35	4.9%	18

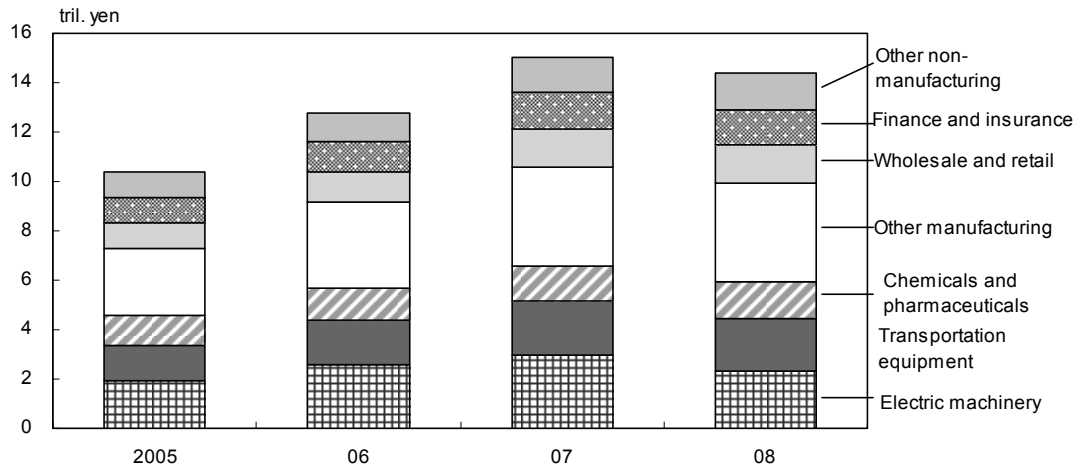
Note: "Electrical machinery" includes information and telecommunications apparatus.

Source: Statistics Bureau, Ministry of Internal Affairs and Communications, "Survey of Science and Technology Research, 2008."

6. Receipt of "royalties" by industries closely linked with Japanese enterprises' direct investment. Direct investment assets by industry (figure 3) shows that transport equipment, electric machinery, and chemicals and pharmaceuticals account for a high percentage shares to total investment, which is proportional to the technology export by industry. In other words,

Japan's receipt of "royalties" is the result of Japanese enterprises' expansion into overseas markets for production outsourcing, and associated supply of technologies.

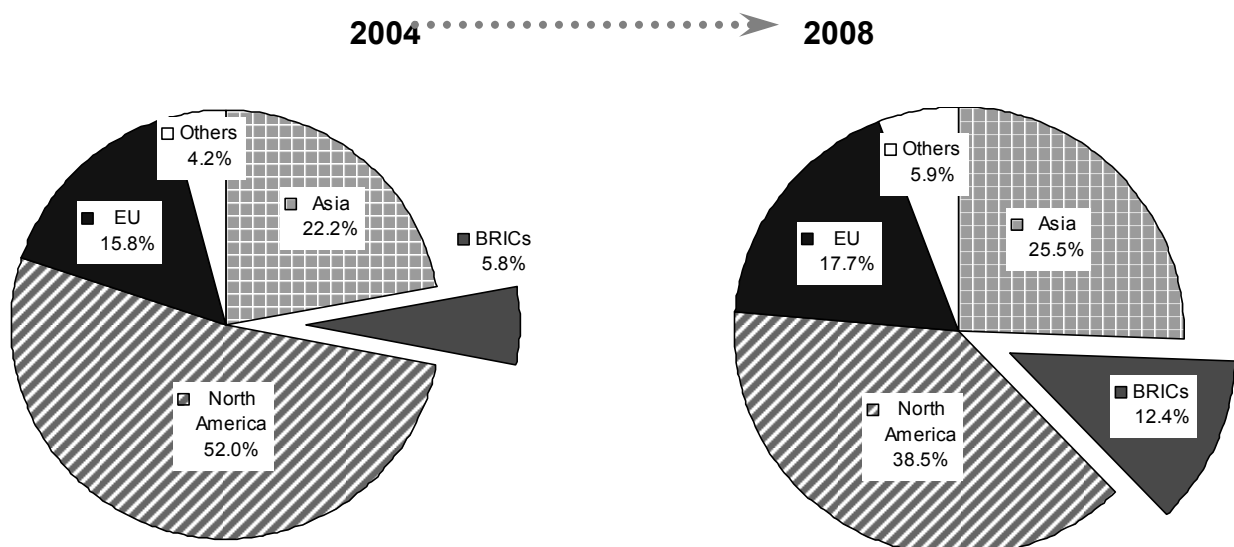
Figure 3: Direct Investment Assets by Region at Year-End



Source: "Direct Investment Position by Region and Industry," "International Investment Position."

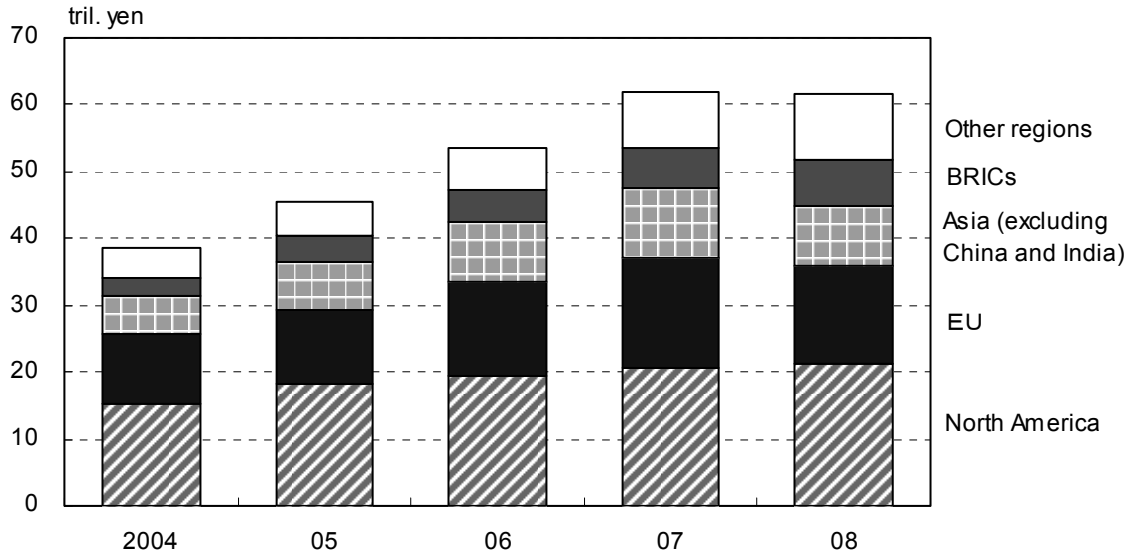
7. Receipt of "royalties" by region shows the following features. Figure 4 shows the percentage shares of receipts of "royalties" by region i.e. Asia excluding China and India, BRICs, North America, European Union, and other regions, compared between 2004 and 2008. In particular, the share of the BRICs (led by China) has been increasing from 5.8 percent to 12.4 percent, while those of North America shrank from 52 percent to 38.5 percent. This would possibly be reflecting increased investment in BRICs countries (figure 5).

Figure 4: The Regional Composition of Royalties (Total Receipts), 2004 and 2008



Source: Bank of Japan, "Balance of Payments."

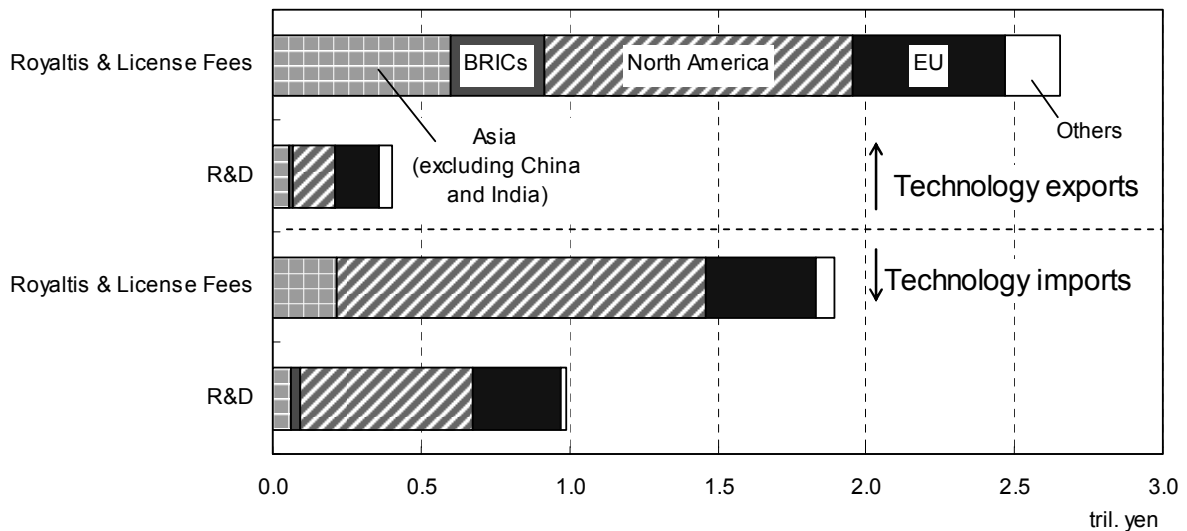
Figure 5: Direct Investment Assets by Region at Year-End



Source: Bank of Japan, "International Investment Position."

8. The growth in overseas activities of Japanese companies is also contributing to an increase in payments for technology imports. As a means of production outsourcing, enterprises import overseas technologies which result to payments for "royalties and license fees" and "R&D." By region, there is no clear regional bias in the technology export, but for the import, the United States and the European Union possess an overwhelming share for both "royalties and license fees" and "R&D" (Figure 6).

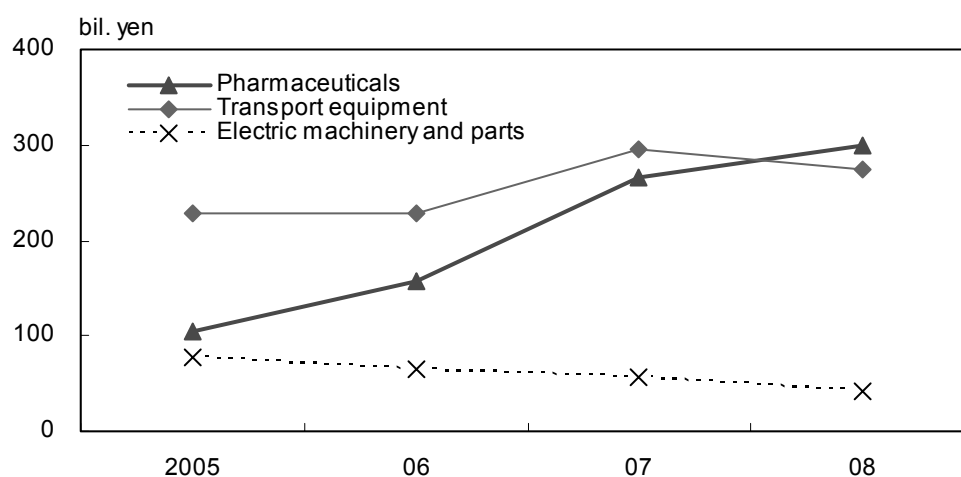
Figure 6: Technology Exports and Imports by Region for 2008



Source: Bank of Japan, "Balance of Payments."

9. A review of payments for "R&D" shows that major parts of payments are made by transport equipment companies, pharmaceutical companies, and electric machinery companies. In addition, pharmaceutical companies almost tripled its "R&D" expenses during the three-year period from 2005, while those of the other two companies are slightly decreasing. As a result, the pharmaceutical companies has become the largest "R&D" expending industry in 2008 (figure 7).

Figure 7: Payments for R&D Expenses by Industry



Source: Bank of Japan, "Balance of Payments."

Note: Figures by industry are estimated by the International Department of the Bank of Japan. Totals do not match figures for the corresponding balance of payments components.

Impacts of Financial Crisis

10. The above are the features of Japan's technology trade. In the following section, the impact of the financial crisis and the deterioration of global economy on Japan's technology trade will be examined. In order to make a comparison between the pre-crisis and post-crisis periods, data from September to August are reckoned up as annual figures.

11. The receipt of "royalties and license fees" decreased significantly (by 43% on a year-on-year basis) particularly after September 2008, which decreased to the level of three years before (Figure 8). This mainly due to the decline in global consumption, particularly for automobiles, and therefore, by industry, the transport equipment industry decreased its receipts significantly (Figure 9).

Figure 8: Royalties and License Fees (from September to August)

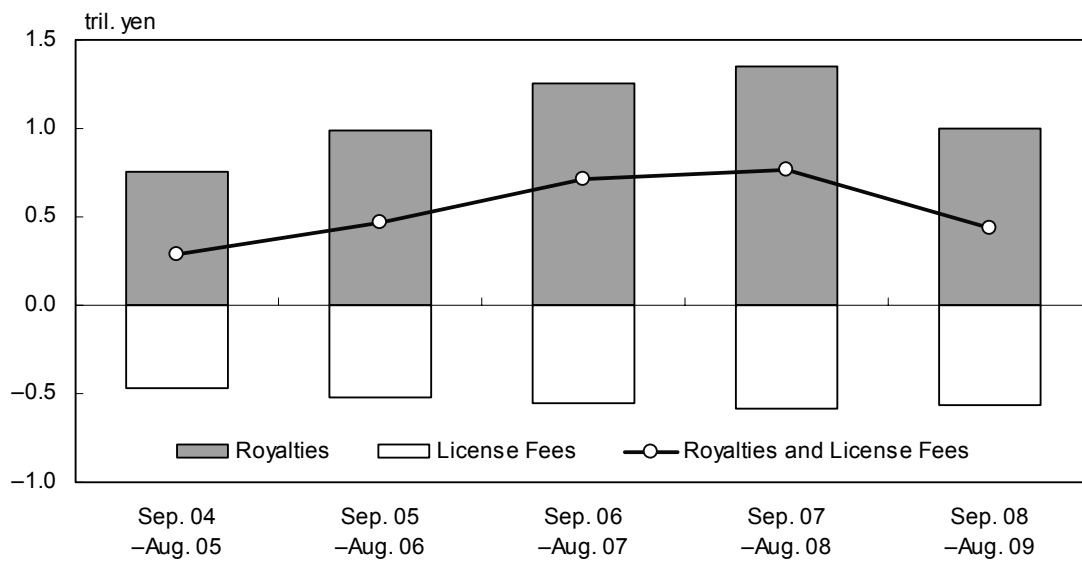
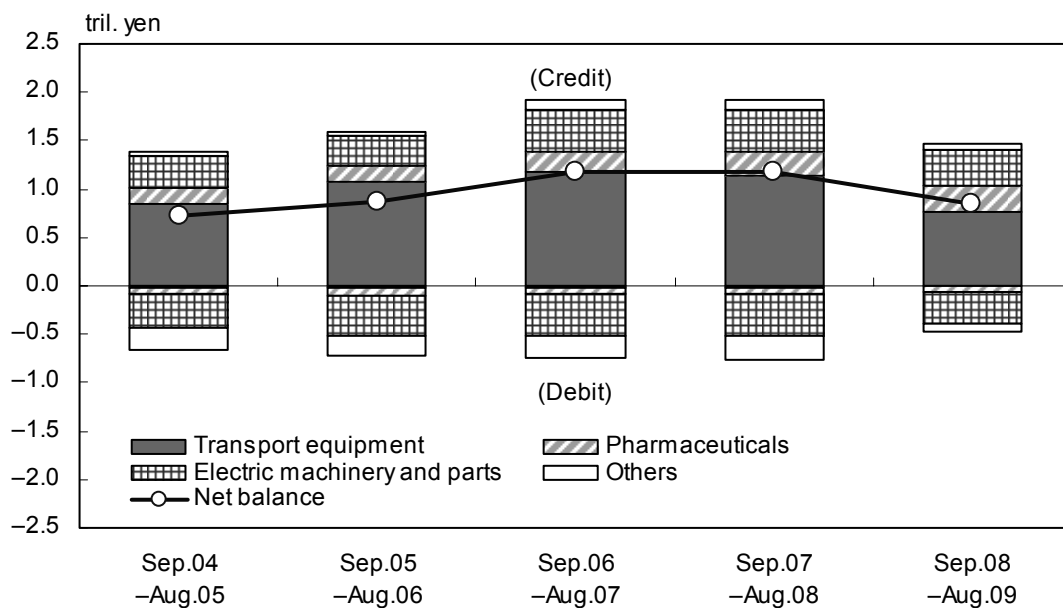


Figure 9: Payments and Receipts of Royalties by Industry (from September to August)



Source: Bank of Japan, "Balance of Payments."

Note: Figures by industry are estimated by the International Department of the Bank of Japan. Totals do not match figures for the corresponding balance of payments components.

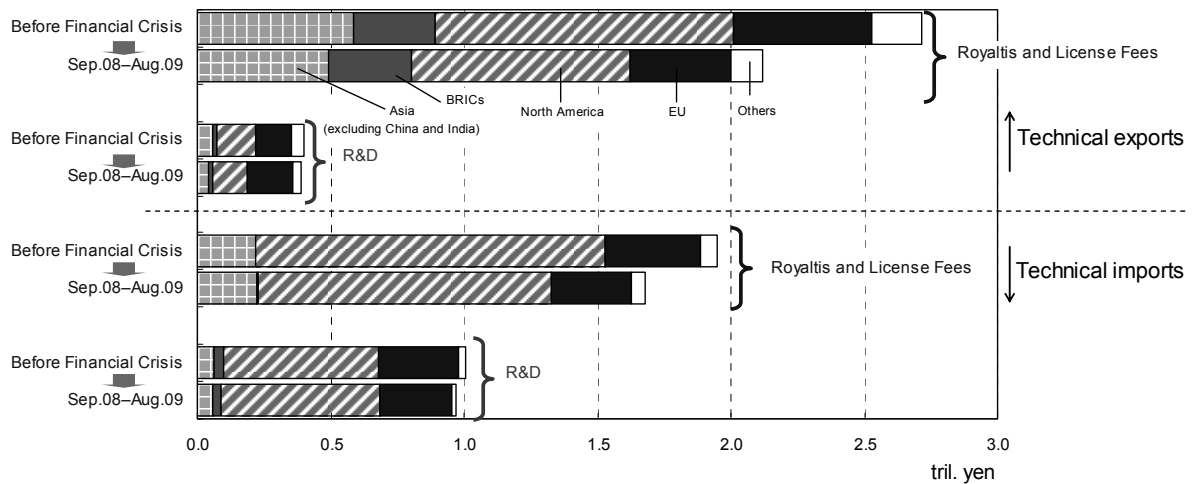
12. Figure 10 shows a comparison between the pre-crisis and post-crisis periods of receipts and payment of "royalties and license fees" and "R&D" expenses by region.

13. As aforesaid, "royalties and license fees" decreased significantly, in particular those from the United States and from other regions including European Union and Asia. Under these circumstances, BRICs countries, particularly China, maintain the same level as a year ago,

reflecting the strong car sales in China.

14. Meanwhile, as for the R&D expenses, all regions remained at the level of the previous year, in terms of both receipts and payments. The reason behind this is that the R&D expenses are made based on a long-term management plan and therefore not susceptible to short-term influences.

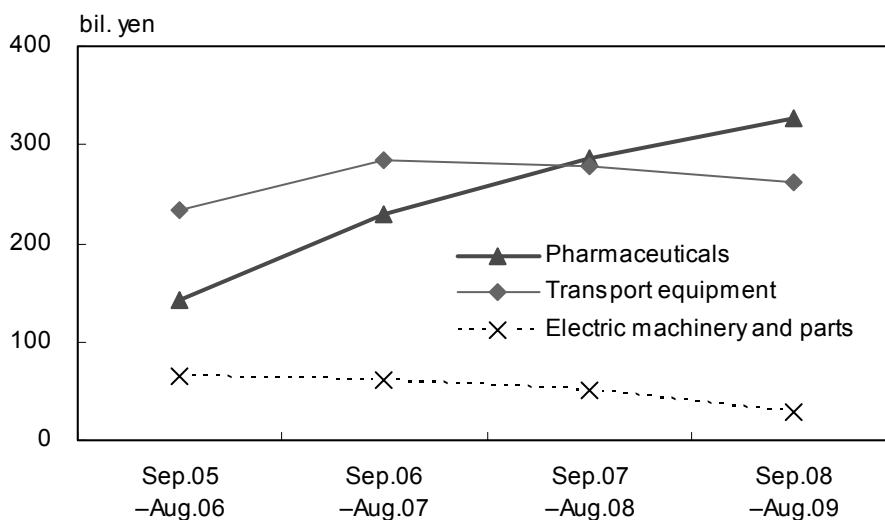
Figure 10: Comparison of Technology Exports and Imports by Region, before Financial Crisis and Afterwards



15. The payments for "R&D" expenses by industry (figure 11) shows the following features: (1) the transport equipment and electric machinery companies showed a slightly decreasing trend; however, the trend did not change substantially before and after the financial crisis; (2) payments by the pharmaceuticals industry has been increasing steadily.

16. The reasons for the steady increase in the payments for R&D expenses by the pharmaceutical industry are: (1) the industry has a long R&D period; (2) pharmaceutical companies have been accelerating their R&D activities in overseas countries (mainly in the U.S.) to respond to the expiration of patents on the flagship drugs; and (3) sales of medical products are not susceptible to changes in economic conditions.

Figure 11: Payments for R&D Expenses by Industry (from September to August)



17. In the midst of ongoing globalization, enterprises are accelerating their overseas operations, including technological transfer to and from foreign countries, relocation of R&D facilities abroad, and establishment of international alliances. In addition, it is often the case that a company acquires a patent rather than obtaining a license.

18. Under the BPM6, outright sales of the result of research and development (such as patents, copyrights, and sales of information about industrial process) are required to be recorded as a service (R&D services). Accordingly, adoption of the new manual will make it possible to get a clearer picture of global R&D activities of enterprises.

19. As for data compilers, to respond to the increasing interests in technology trades, it is necessary to consider the way to publish valuable information to the users.