Table 5.2

Average quantities of PGM-bearing waste and scrap traded in the world, and their average annual percentage trends, 1985–1989

Country region	Imports		Exports		Balance	Users	Exports
	Average kg	Trend %	Average kg	Trend %	kg	%	%
Canada*	–	–	9 348	– 94,52	– 9 348	–	9,64
Denmark	–	–	1 574	+ 13,50	– 1 574	–	1,62
France	22 491	+ 57,97	81 649	– 5,78	– 59 158	–	60,99
Germany	95 046	+ 6,69	21 769	+ 34,08	+ 73 250	37,35	–
Italy	1 784	+ 22,77	–	–	+ 1 784	0,91	–
Japan	4 472	+ 18,88	–	–	+ 4 472	2,28	–
Korea, Republic	–	–	3 940	+144,95	– 3 940	–	4,06
Netherlands	5 400	Large	9 200	+ 34,06	– 3 800	–	3,92
South Africa†	–	–	6 140	+ 84,32	– 6 140	–	6,33
Spain	533	– 77,46	–	–	+ 533	0,27	–
Switzerland	1 350	Large	14 389	Large	– 13 039	–	13,44
UK*	118 900	+127,59	6 675	+ 28,51	+112 225	57,22	–
USA*	16 565	– 39,27	12 703	+ 3,66	+ 3 862	1,97	–
Totals	**266 541**	**+ 44,64**	**167 414**	**+ 28,34**	**+ 99 127**	**100,00**	**100,00**

*Figures include small amounts of PGM in ores
†Estimate
The notes to Table 5.1 also apply

The so-called 'closed cycle' materials are derived from PGM-bearing products that become spent during the course of industrial processing. Refineries reclaim the contained PGM, and manufacture materials of the same kind for delivery to the original or new customers, thus replacing the PGM which would normally have been lost during processing. Such PGM do not become available on the normal markets. Similarly, wastes and residues from the manufacture of products containing the PGM are called 'new scrap', and are recycled immediately and returned to the manufacturing process. Again, such material has no direct relevance to the PGM markets.

The bulk of the secondary production of the PGM is reclaimed from so-called 'old scrap', referring to PGM contained in a variety of materials purchased by the metal refineries. The PGM derived from the treatment of old scrap are thus available to any consuming industry other than those mentioned above. These make up the bulk of the secondary production noted above, and are accessible to the supply side of trading markets.

The amounts of 'closed cycle' materials and 'new scrap' are thus substantial and, although they are of considerable importance to global refineries, they have no direct effect on the supply side relative to the PGM markets and trade. By contrast, the secondary metals derived from 'old scrap' have considerable trading and market implications. The amount of PGM obtained from recycling depends on a number of factors, including the prevailing prices of the metals, the PGM content of the scrap and waste materials, the logistics of collecting the waste products, the efficiency of the refining process, and the profit to be made from recycling. Generally, the supply of material available for refining is influenced more strongly by PGM prices in the case of high-grade material like discard jewellery, than for materials containing lesser amounts of PGM, such as most industrial scrap residues.

Information on PGM recycled in the USA, which publishes the only reliable information, is contained in Figure 5.3 (see also Table 3.5). For the period of 1955 to 1992 illustrated, the average annual recovery of PGM amounted to 5838 kg, showing an average decline of 3,31 per cent per year. The average metal distribution is platinum 34,06 per cent, palladium 61,98 per cent, iridium 0,60 per cent, and other 3,36 per cent — the latter refers to ruthenium, rhodium, and osmium, which from 1985 to 1992 averaged 15,49, 83,13, and 1,38 per cent respectively. A measure of the 'stability' of this inventory over the period is provided by the coefficient of variation, or CV, expressed as a percentage as follows:

Pt 55,6 per cent
Pd 34,4 per cent
Ir 85,1 per cent
other 45,1 per cent.

In 1992, the amount of platinum recycled in the Western World amounted to 15 500 kg (an increase of 0,6 per cent), and palladium (a decline of 2,6 per cent) compared to the previous year. Compared to gold (434 000 kg) and silver (3 450 000 kg), the recycled amount of these two PGM is very small. The recycled

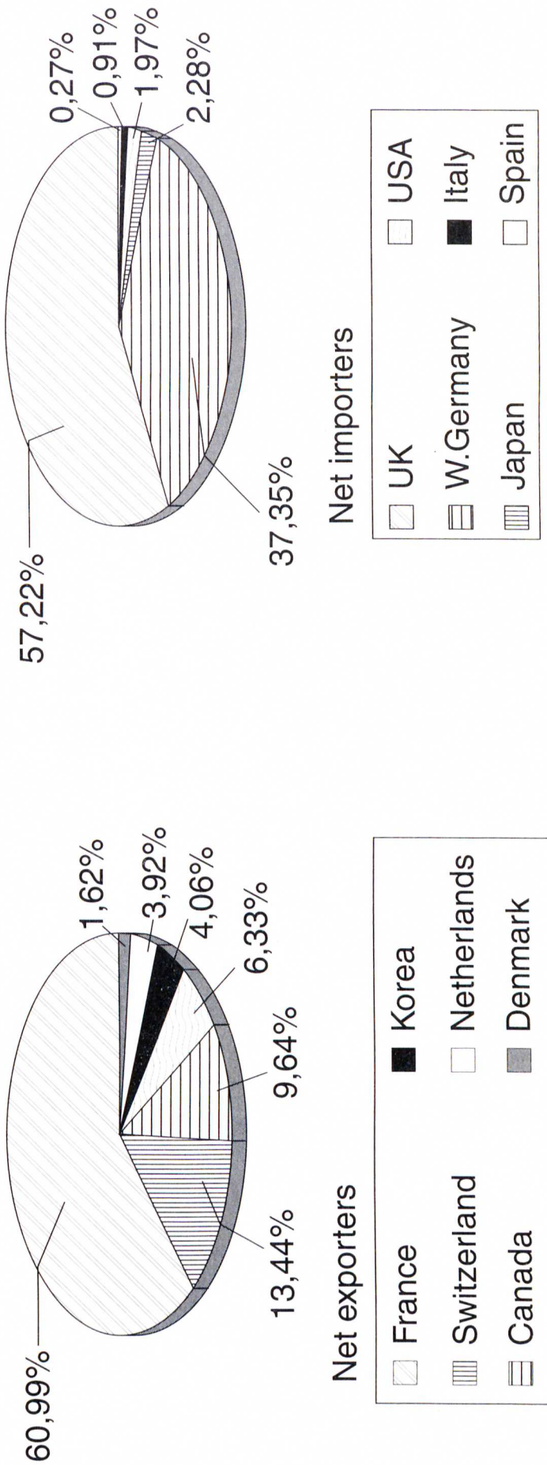

FIGURE 5.2. Average distribution of international trade in PGM-bearing waste, scrap, and raw ores or concentrates