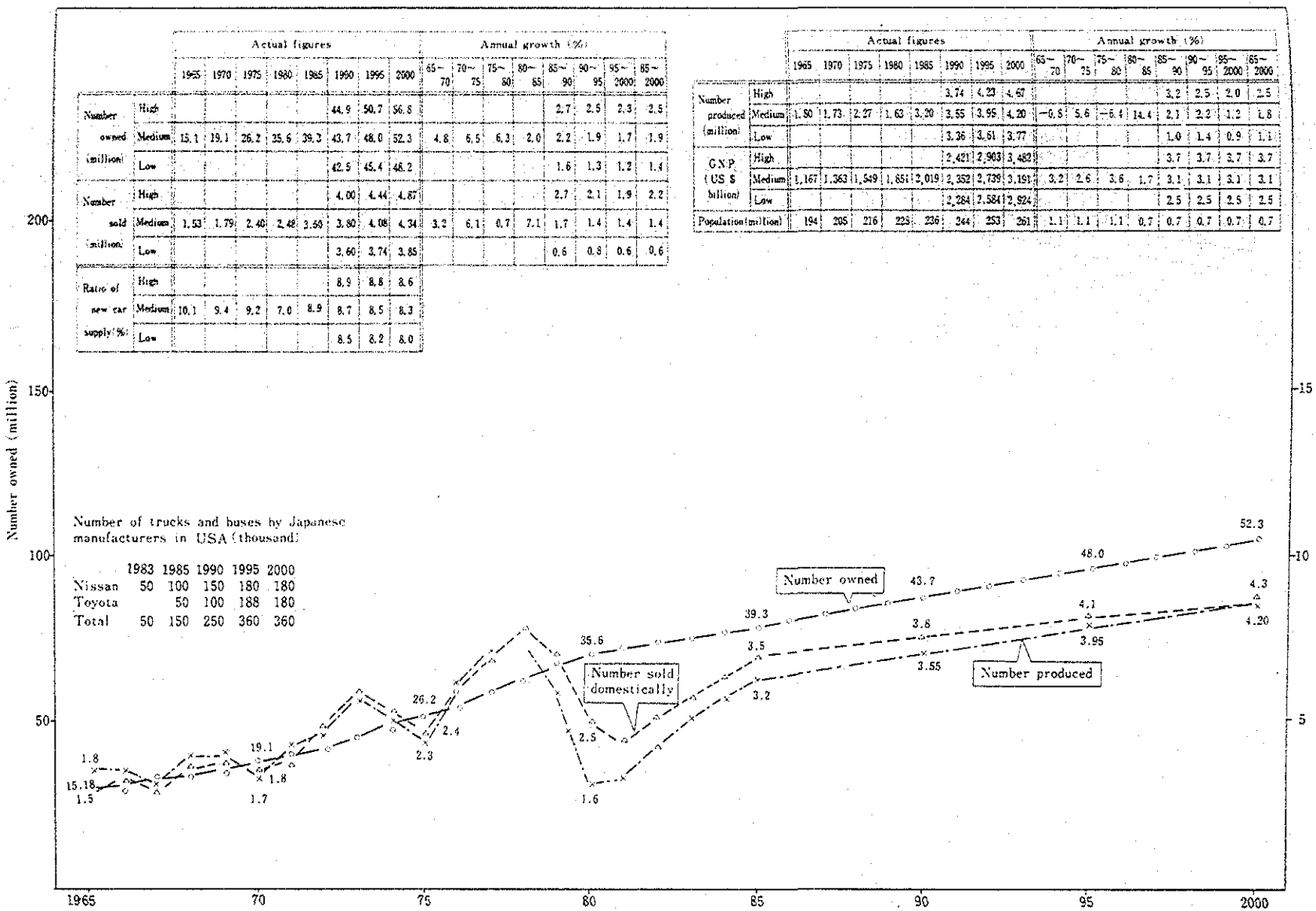
Appendix Table 20 (cont'd.)

(2) USA (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						44.9	50.7	56.8					2.7	2.5	2.3	2.5
	Medium	15.1	19.1	26.2	35.6	39.3	43.7	48.0	52.3	4.8	6.5	6.3	2.0	2.2	1.9	1.7	1.9
	Low						42.5	45.4	48.2					1.6	1.3	1.2	1.4
Number sold (million)	High						4.00	4.44	4.87					2.7	2.1	1.9	2.2
	Medium	1.53	1.79	2.40	2.48	3.56	3.80	4.08	4.34	3.2	6.1	0.7	7.1	1.7	1.4	1.4	1.4
	Low						3.60	3.74	3.85					0.6	0.8	0.6	0.6
Ratio of new car supply (%)	High						8.9	8.8	8.6								
	Medium	10.1	9.4	9.2	7.0	8.9	8.7	8.5	8.3								
	Low						8.5	8.2	8.0								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	65~2000
Number produced (million)	High						3.74	4.23	4.67					3.2	2.5	2.0	2.5
	Medium	1.80	1.73	2.27	1.63	3.20	3.55	3.95	4.20	−0.8	5.6	−6.4	14.4	2.1	2.2	1.2	1.8
	Low						3.36	3.61	3.77					1.0	1.4	0.9	1.1
GNP (US $ billion)	High						2,421	2,903	3,482					3.7	3.7	3.7	3.7
	Medium	1,167	1,363	1,549	1,851	2,019	2,352	2,739	3,191	3.2	2.6	3.6	1.7	3.1	3.1	3.1	3.1
	Low						2,284	2,584	2,924					2.5	2.5	2.5	2.5
Population (million)		194	205	216	225	236	244	253	261	1.1	1.1	1.1	0.7	0.7	0.7	0.7	0.7

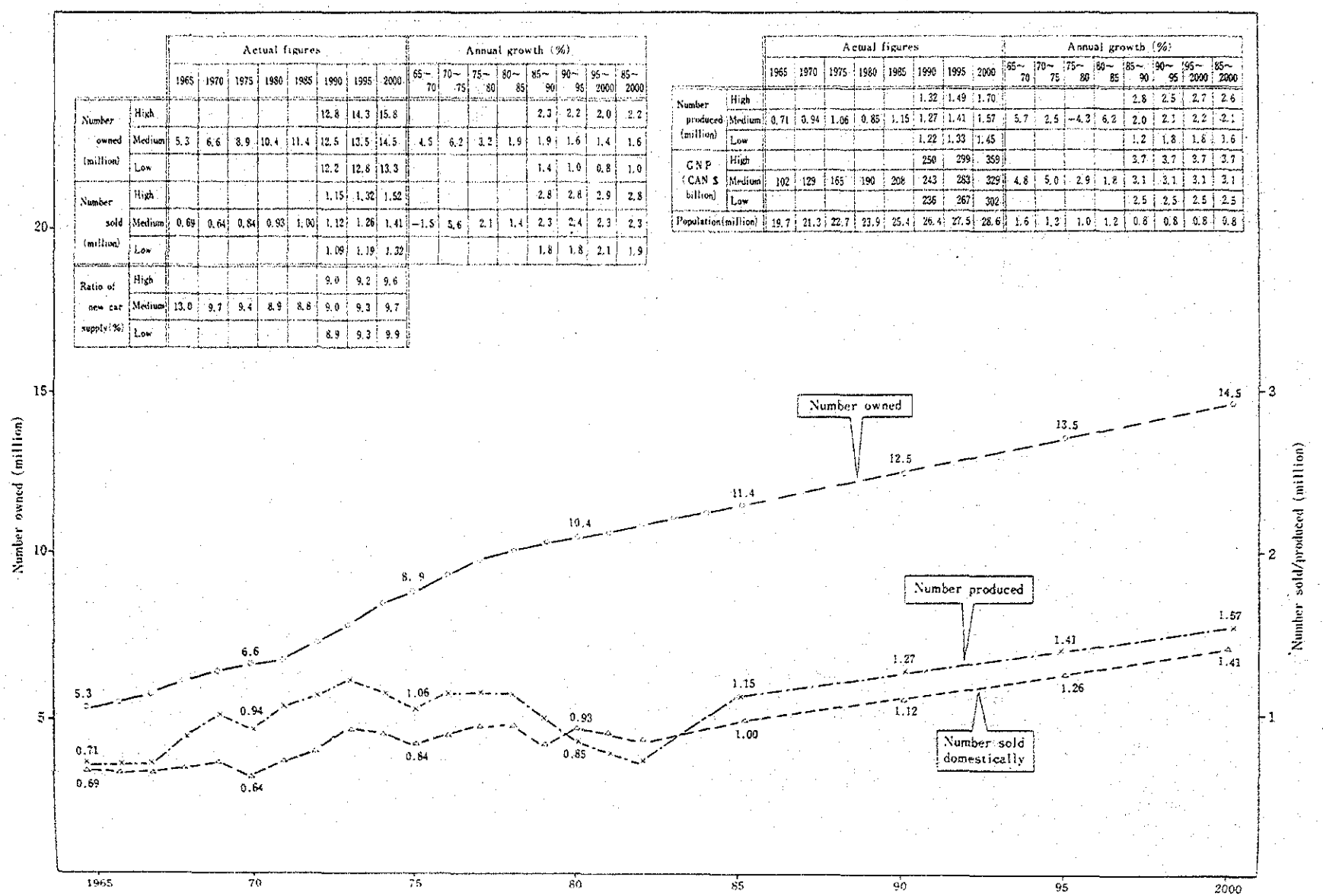


Appendix Table 20 (cont'd.)

(3) Canada (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						12.8	14.3	15.8					2.3	2.2	2.0	2.2
	Medium	5.3	6.6	8.9	10.4	11.4	12.5	13.5	14.5	4.5	6.2	3.2	1.9	1.9	1.6	1.4	1.6
	Low						12.2	12.8	13.3					1.4	1.0	0.8	1.0
Number sold (million)	High						1.15	1.32	1.52					2.8	2.8	2.9	2.8
	Medium	0.69	0.64	0.84	0.93	1.00	1.12	1.26	1.41	−1.5	5.6	2.1	1.4	2.3	2.4	2.3	2.3
	Low						1.09	1.19	1.32					1.8	1.8	2.1	1.9
Ratio of new car supply(%)	High						9.0	9.2	9.6								
	Medium	13.0	9.7	9.4	8.9	8.8	9.0	9.3	9.7								
	Low						8.9	9.3	9.9								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						1.32	1.49	1.70					2.8	2.5	2.7	2.6
	Medium	0.71	0.94	1.06	0.85	1.15	1.27	1.41	1.57	5.7	2.5	−4.3	6.2	2.0	2.1	2.2	2.1
	Low						1.22	1.33	1.45					1.2	1.8	1.6	1.6
GNP (CAN $ billion)	High						250	299	359					3.7	3.7	3.7	3.7
	Medium	102	129	165	190	208	243	283	329	4.8	5.0	2.9	1.8	3.1	3.1	3.1	3.1
	Low						236	267	302					2.5	2.5	2.5	2.5
Population (million)		19.7	21.3	22.7	23.9	25.4	26.4	27.5	28.6	1.6	1.2	1.0	1.2	0.8	0.8	0.8	0.8

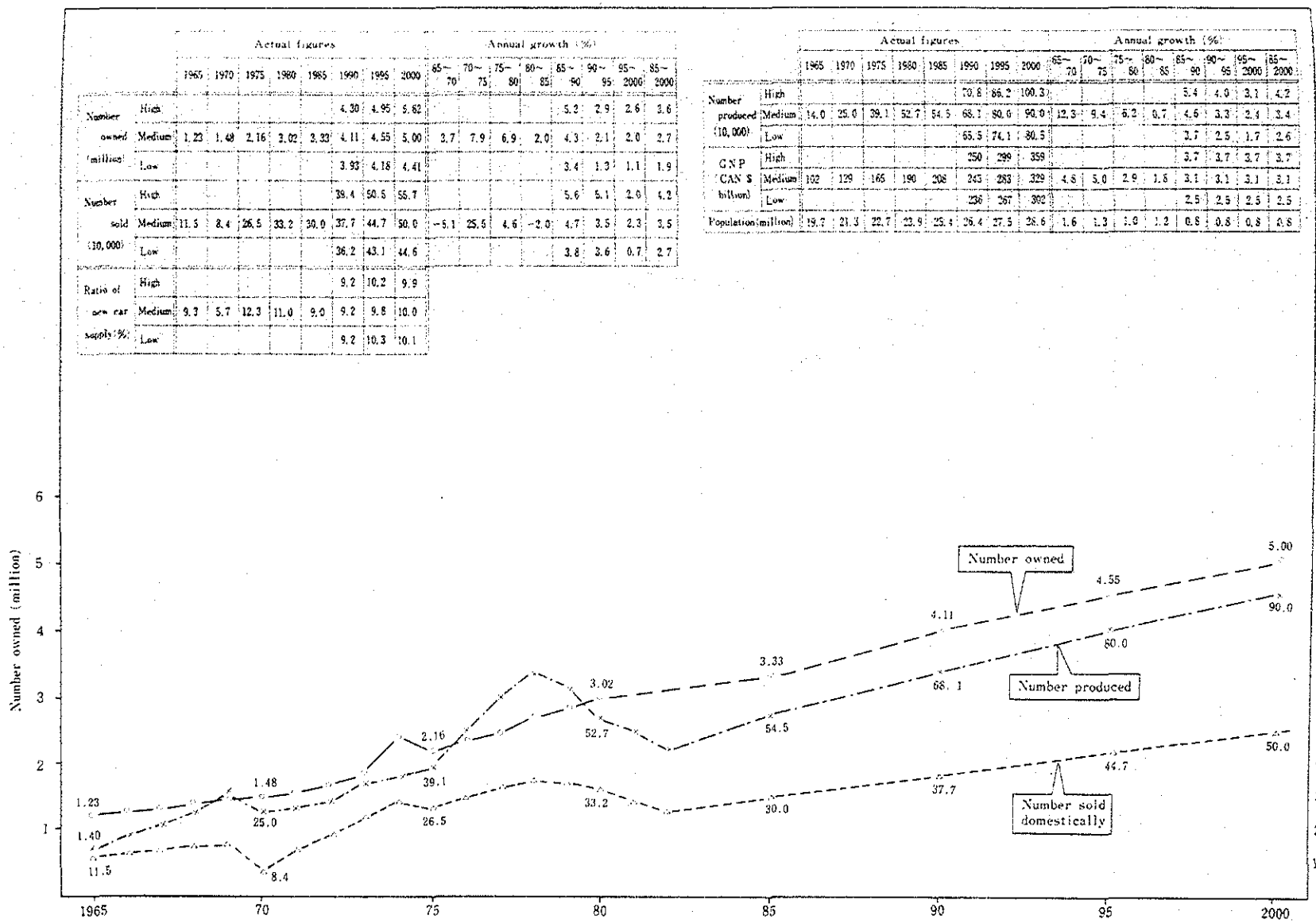


Appendix Table 20 (cont'd.)

(4) Canada (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						4.30	4.95	5.82					5.2	2.9	2.6	3.6
	Medium	1.23	1.48	2.16	3.02	3.33	4.11	4.55	5.00	3.7	7.9	6.9	2.0	4.3	2.1	2.0	2.7
	Low						3.93	4.18	4.41					3.4	1.3	1.1	1.9
Number sold (10,000)	High						38.4	50.5	55.7					5.6	5.1	2.0	4.2
	Medium	11.5	8.4	25.5	33.2	30.0	37.7	44.7	50.0	-5.1	25.5	4.6	-2.0	4.7	3.5	2.3	3.5
	Low						36.2	43.1	44.6					3.8	3.6	0.7	2.7
Ratio of new car supply (%)	High						9.2	10.2	9.9								
	Medium	9.3	5.7	12.3	11.0	9.0	9.2	9.8	10.0								
	Low						9.2	10.3	10.1								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						70.8	86.2	100.3								
	Medium	14.0	25.0	39.1	52.7	54.5	68.1	80.0	90.0	12.3	9.4	6.2	0.7	4.6	3.3	2.4	3.4
	Low						65.5	74.1	80.5								
GNP CAN $ billion)	High						250	299	359								
	Medium	102	129	165	190	208	243	283	329	4.8	5.0	2.9	1.8	3.1	3.1	3.1	3.1
	Low						236	267	302								
Population (million)		19.7	21.3	22.7	23.9	25.4	26.4	27.5	28.6	1.6	1.3	1.0	1.2	0.8	0.8	0.8	0.8

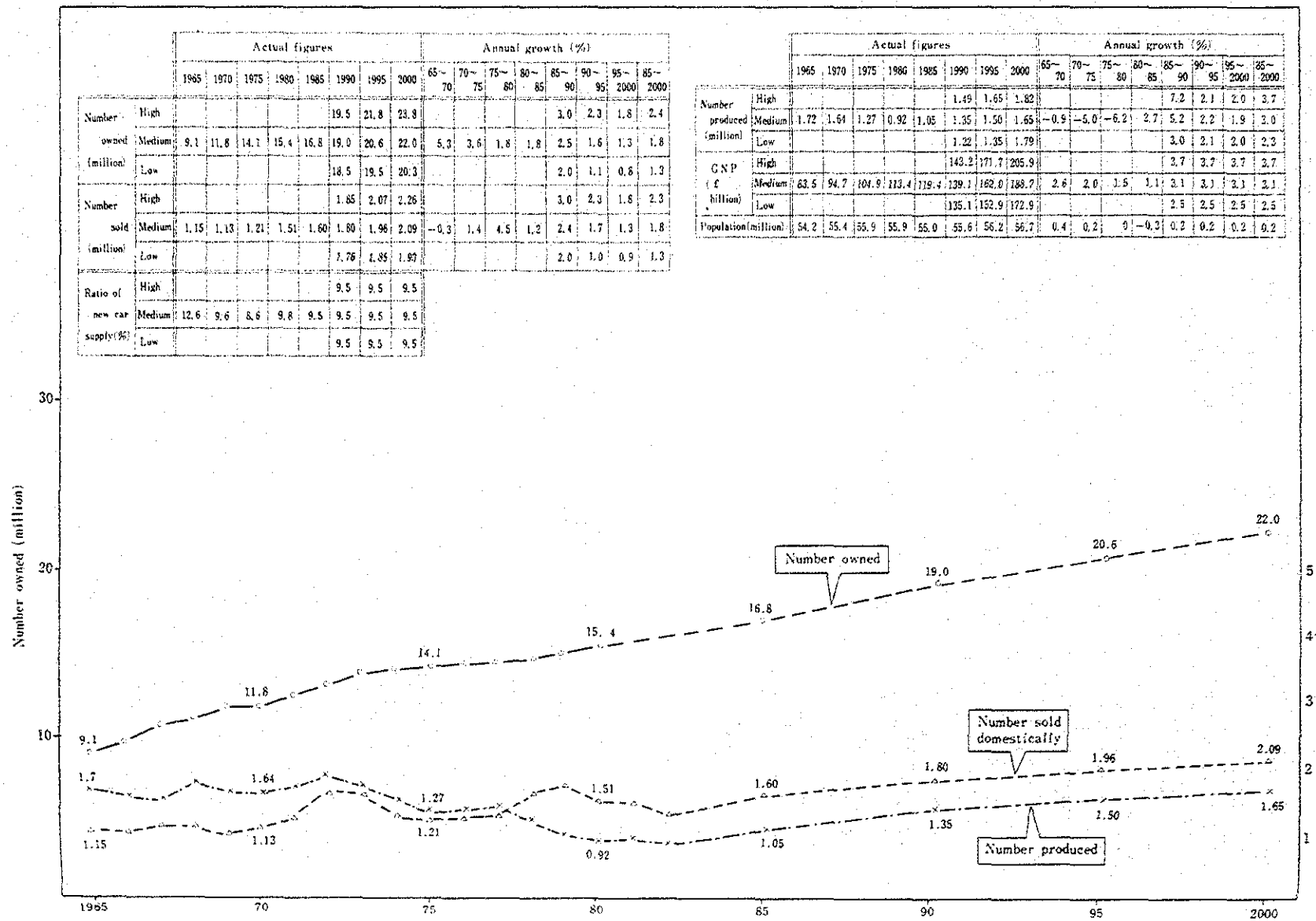


Appendix Table 20 (cont'd.)

(5) UK (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						19.5	21.8	23.8					3.0	2.3	1.8	2.4
	Medium	9.1	11.8	14.1	15.4	16.8	19.0	20.6	22.0	5.3	3.6	1.8	1.8	2.5	1.6	1.3	1.8
	Low						18.5	19.5	20.3					2.0	1.1	0.8	1.3
Number sold (million)	High						1.85	2.07	2.26					3.0	2.3	1.8	2.3
	Medium	1.15	1.13	1.21	1.51	1.60	1.80	1.96	2.09	−0.3	1.4	4.5	1.2	2.4	1.7	1.3	1.8
	Low						1.76	1.85	1.97					2.0	1.0	0.9	1.3
Ratio of new car supply(%)	High						9.5	9.5	9.5								
	Medium	12.6	9.6	8.6	9.8	9.5	9.5	9.5	9.5								
	Low						9.5	9.5	9.5								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						1.49	1.65	1.82					7.2	2.1	2.0	3.7
	Medium	1.72	1.64	1.27	0.92	1.05	1.35	1.50	1.65	−0.9	−5.0	−6.2	2.7	5.2	2.2	1.9	3.0
	Low						1.22	1.35	1.79					3.0	2.1	2.0	2.3
GNP (£ billion)	High						143.2	171.7	205.9					3.7	3.7	3.7	3.7
	Medium	63.5	94.7	104.9	113.4	119.4	139.1	162.0	188.7	2.6	2.0	1.5	1.1	3.1	3.1	3.1	3.1
	Low						135.1	152.9	172.9					2.5	2.5	2.5	2.5
Population (million)		54.2	55.4	55.9	55.9	55.0	55.6	56.2	56.7	0.4	0.2	0	−0.3	0.2	0.2	0.2	0.2

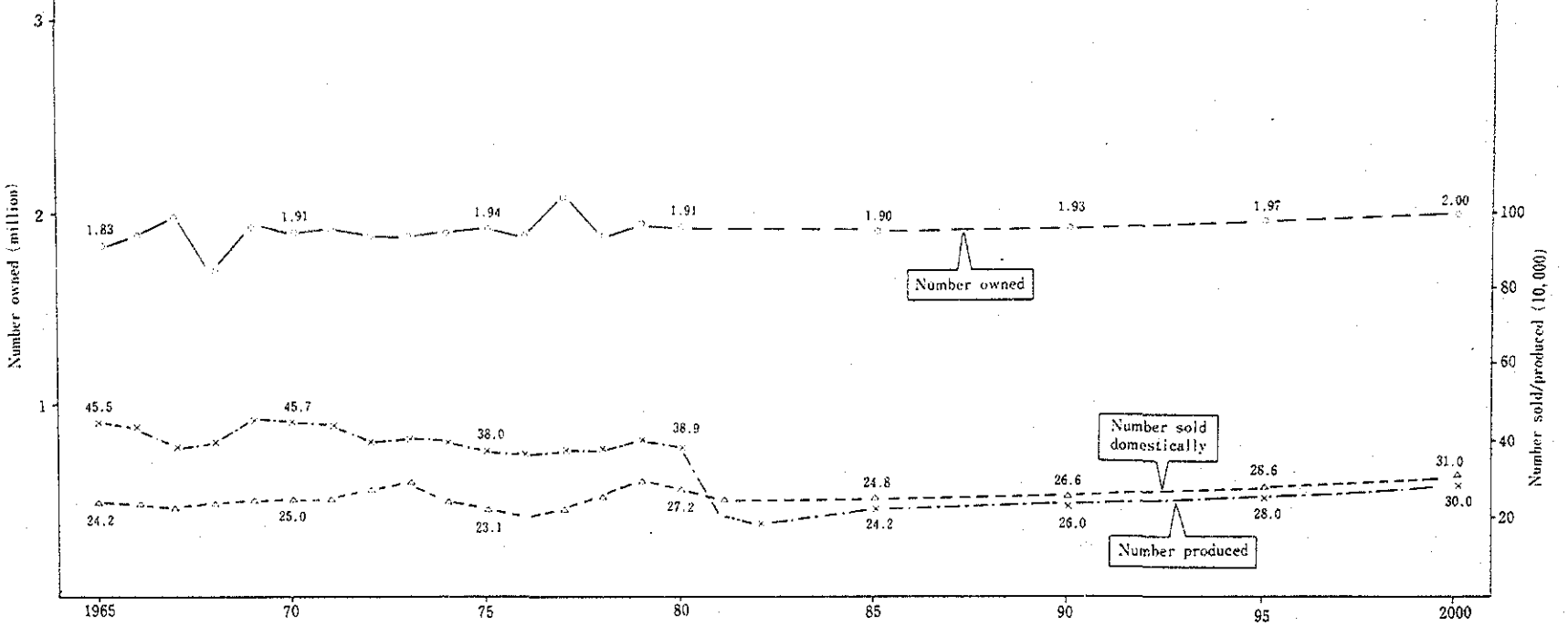


Appendix Table 20 (cont'd.)

(6) UK (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						1.93	1.97	2.00					0.3	0.4	0.3	0.3
	Medium	1.83	1.91	1.94	1.91	1.90	1.93	1.97	2.00	0.9	0.3	−0.3	−0.1	0.3	0.4	0.3	0.3
	Low						1.93	1.96	1.99					0.3	0.3	0.3	0.3
Number sold (10,000)	High						27.2	29.8	32.8					1.9	1.8	1.9	1.9
	Medium	24.2	25.0	23.1	27.2	24.8	26.6	28.6	31.0	0.7	−1.6	3.2	−1.8	1.4	1.5	1.6	1.5
	Low						25.9	27.5	29.3					0.9	1.2	1.3	1.1
Ratio of new car supply (%)	High						14.1	15.1	16.4								
	Medium	13.2	13.1	11.9	14.2	13.1	13.8	14.5	15.5								
	Low						13.4	14.0	14.7								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						26.3	29.6	33.0					1.7	2.4	2.2	2.1
	Medium	45.5	45.7	38.0	38.9	24.2	26.0	28.0	30.0	0.1	−3.6	0.5	−9.1	1.4	1.5	1.4	1.4
	Low						25.6	26.4	27.4					1.1	0.6	0.8	0.6
GNP (£ billion)	High						143.2	171.7	205.9					3.7	3.7	3.7	3.7
	Medium	83.5	94.7	104.1	113.1	119.4	139.1	162.0	188.7	2.6	2.0	1.5	1.1	3.1	3.1	3.1	3.1
	Low						135.1	152.9	172.9					2.5	2.5	2.5	2.5
Population (million)		54.2	55.4	55.9	55.9	55.0	55.6	56.2	56.7	0.4	0.2	0	−0.3	0.2	0.2	0.2	0.2

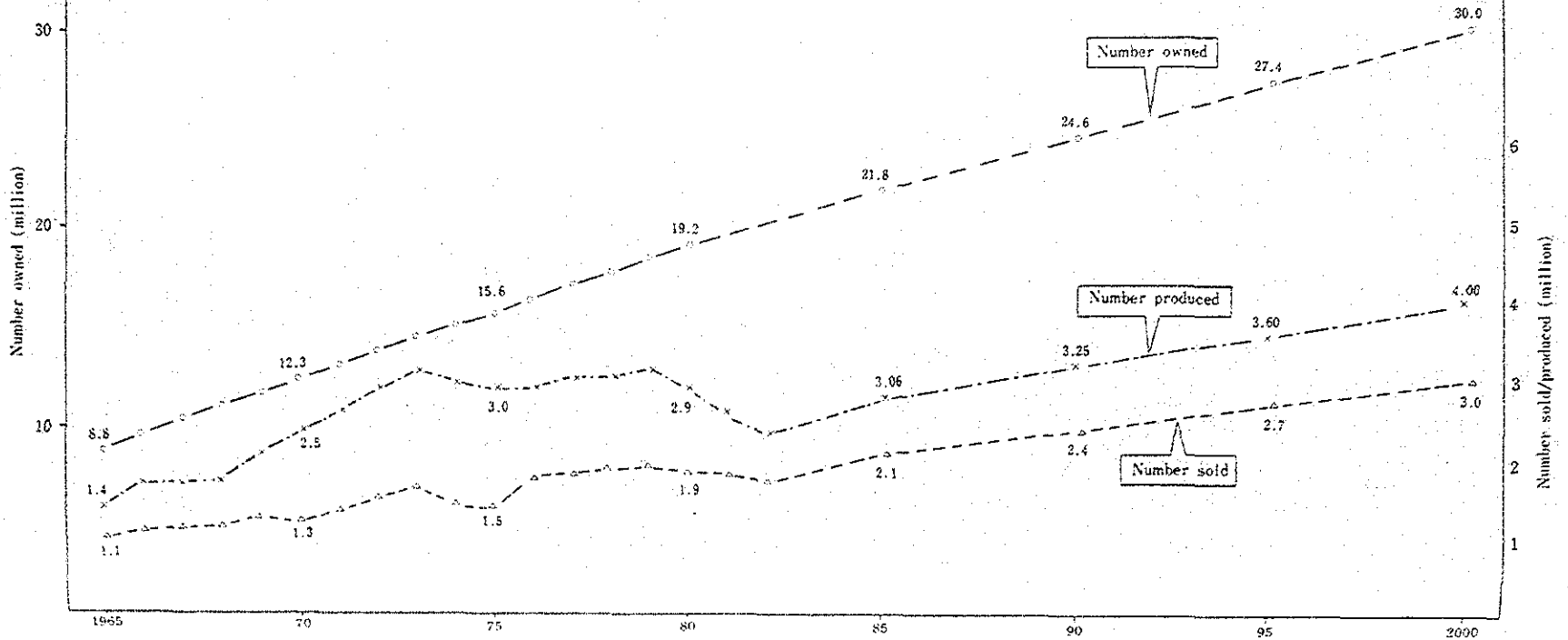


Appendix Table 20 (cont'd.)

(7) France (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						25.5	29.3	33.2					3.2	2.8	2.5	2.8
	Medium	8.8	12.3	15.6	19.2	21.8	24.6	27.4	30.0	6.9	4.9	4.2	2.6	2.4	2.2	1.8	2.2
	Low						23.8	25.6	27.1					1.8	1.5	1.2	1.5
Number sold (million)	High						2.49	2.88	3.30					3.5	3.0	2.7	3.1
	Medium	1.06	1.30	1.48	1.87	2.10	2.40	2.70	3.00	4.2	2.6	4.8	2.3	2.7	2.4	2.1	2.4
	Low						2.31	2.52	2.73					2.0	1.7	1.6	1.8
Ratio of new car supply (%)	High						9.8	9.8	9.9								
	Medium	12.0	10.6	9.5	9.7	9.6	9.8	9.9	10.0								
	Low						9.7	9.8	10.1								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						3.39	3.86	4.41					2.1	2.6	2.7	2.5
	Medium	1.42	2.46	2.95	2.94	3.06	3.25	3.60	4.00	11.5	3.7	0	0.6	1.2	2.1	2.1	1.8
	Low						3.11	3.35	3.61					0.3	1.5	1.5	1.1
GNP (FFr billion)	High						2.229	2.672	3.205					3.7	3.7	3.7	3.7
	Medium	939	1,194	1,452	1,716	1,858	2,165	2,522	2,938	4.9	4.0	3.4	1.6	3.1	3.1	3.1	3.1
	Low						2.103	2.379	2.691					2.5	2.5	2.5	2.5
Population (million)		48.8	50.8	52.8	53.7	54.8	55.9	57.0	58.2	0.8	0.8	0.3	0.4	0.4	0.4	0.4	0.4

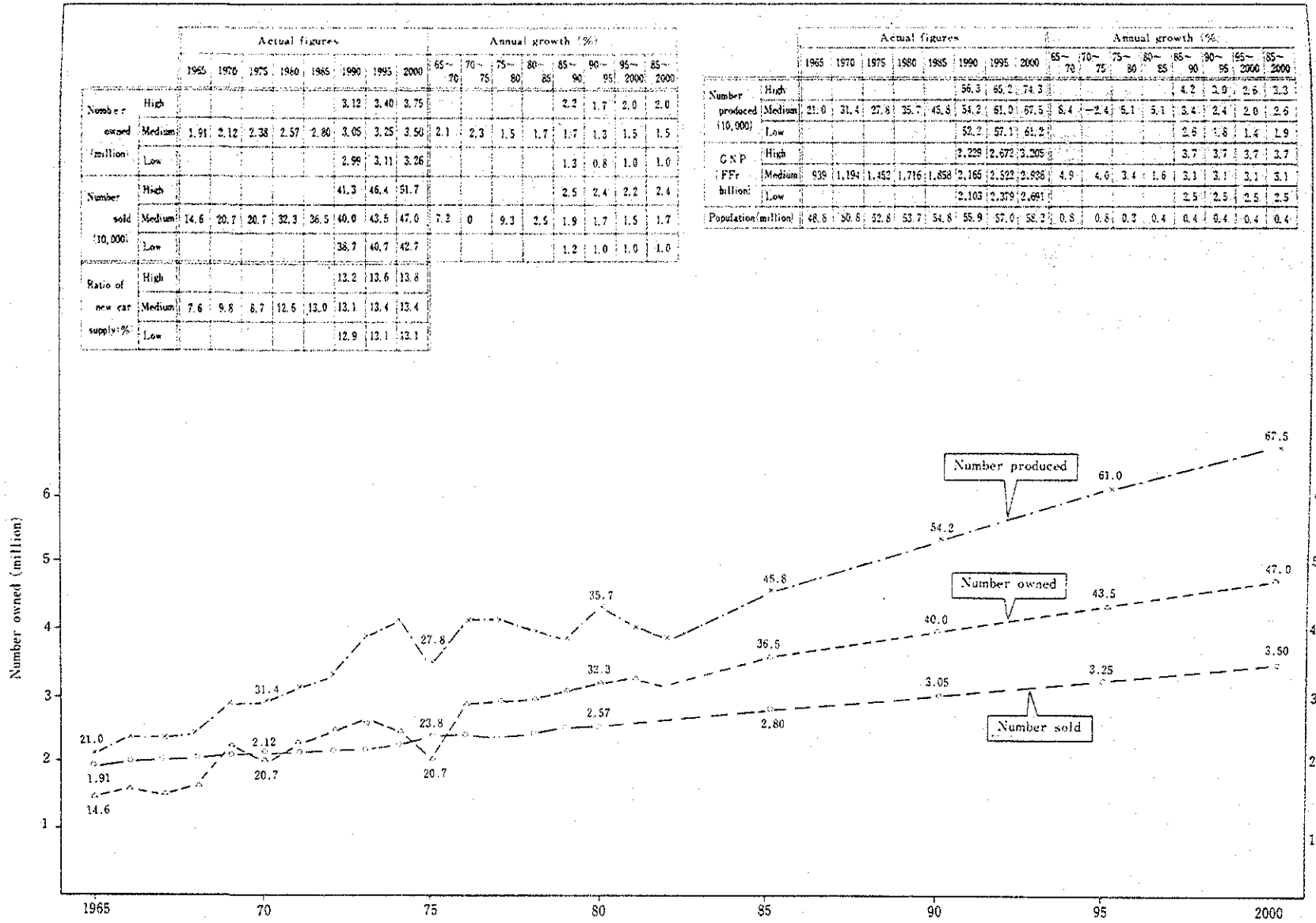


Appendix Table 20 (cont'd.)

(8) France (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						3.12	3.40	3.75					2.2	1.7	2.0	2.0
	Medium	1.91	2.12	2.38	2.57	2.80	3.05	3.25	3.50	2.1	2.3	1.5	1.7	1.7	1.3	1.5	1.5
	Low						2.99	3.11	3.26					1.3	0.8	1.0	1.0
Number sold (10,000)	High						41.3	46.4	51.7					2.5	2.4	2.2	2.4
	Medium	14.6	20.7	20.7	32.3	36.5	40.0	43.5	47.0	7.2	0	9.3	2.5	1.9	1.7	1.5	1.7
	Low						38.7	40.7	42.7					1.2	1.0	1.0	1.0
Ratio of new car supply (%)	High						12.2	13.6	13.8								
	Medium	7.6	9.8	8.7	12.5	13.0	13.1	13.4	13.4								
	Low						12.9	13.1	13.1								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						56.3	65.2	74.3								
	Medium	21.0	31.4	27.8	35.7	45.8	54.2	61.0	67.5	8.4	−2.4	5.1	5.1	3.4	2.4	2.0	2.6
	Low						52.2	57.1	61.2					2.6	1.8	1.4	1.9
GNP (FFr billion)	High						2,229	2,672	3,205					3.7	3.7	3.7	3.7
	Medium	939	1,194	1,452	1,716	1,858	2,165	2,522	2,936	4.9	4.0	3.4	1.6	3.1	3.1	3.1	3.1
	Low						2,103	2,379	2,691					2.5	2.5	2.5	2.5
Population (million)		48.8	50.8	52.8	53.7	54.8	55.9	57.0	58.2	0.8	0.8	0.3	0.4	0.4	0.4	0.4	0.4

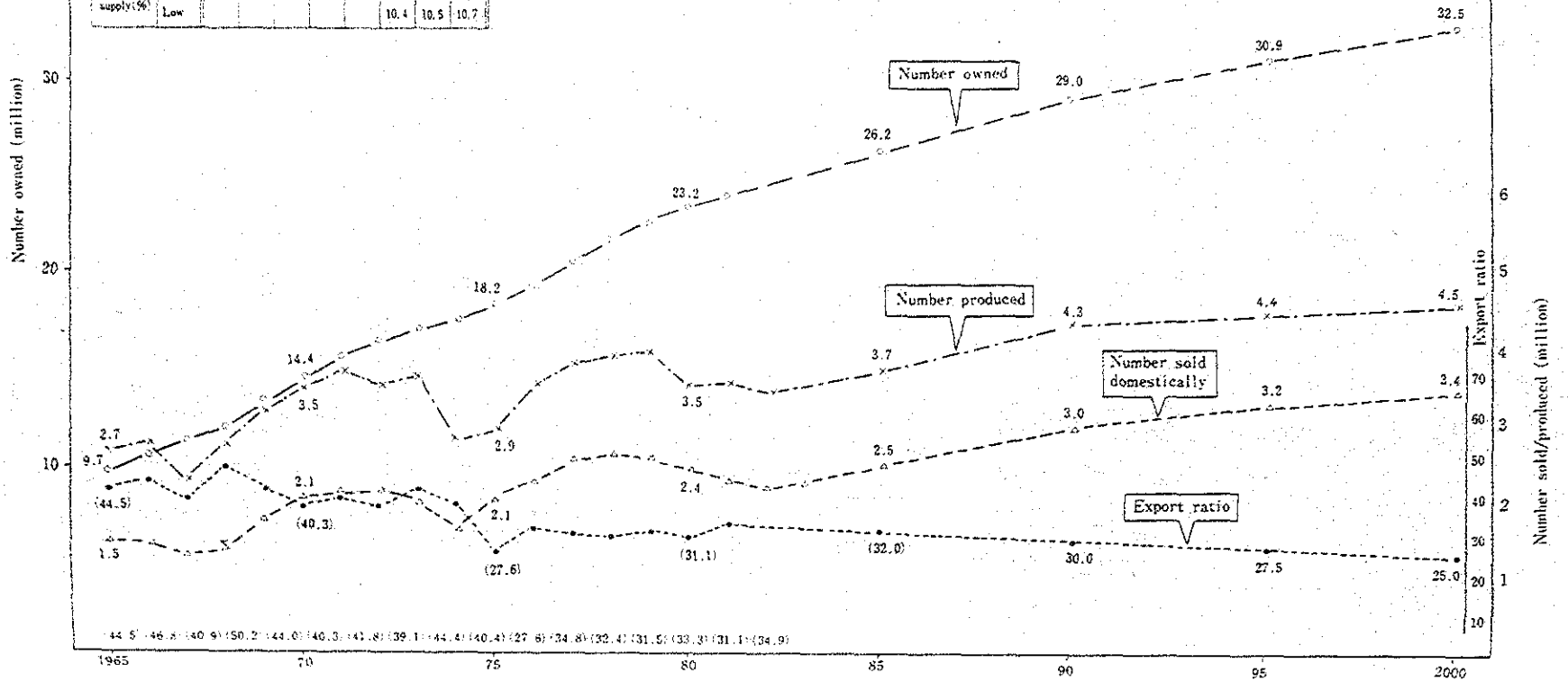


Appendix Table 20 (cont'd.)

(9) Germany, FR (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						30.2	33.4	36.3					2.9	2.0	1.7	2.6
	Medium	9.7	14.4	18.2	23.2	26.2	29.0	30.9	32.5	8.2	4.8	5.0	2.5	2.0	1.3	1.0	1.4
	Low						27.8	28.5	29.0					1.2	0.5	0.4	0.7
Number sold (million)	High						3.1	3.6	3.8					4.4	3.0	1.1	2.8
	Medium	1.5	2.1	2.1	2.4	2.5	3.0	3.2	3.4	7.0	0	2.7	0.8	3.7	1.3	1.3	2.1
	Low						2.9	3.0	3.1					3.0	0.7	0.7	1.4
Ratio of new car supply(%)	High						10.3	10.8	10.5								
	Medium	15.5	14.6	11.5	10.3	9.5	10.3	10.3	10.3								
	Low						10.4	10.5	10.7								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						4.46	4.67	4.90					3.8	0.9	1.0	1.9
	Medium	2.73	3.53	2.91	2.52	3.70	4.30	4.40	4.50	5.3	−3.8	3.8	1.0	3.1	0.5	0.5	1.3
	Low						4.15	4.14	4.13					2.3	0	0	0.7
GNP (DM billion)	High						1,562	1,874	2,248					3.7	3.7	3.7	3.7
	Medium	750	934	1,035	1,234	1,303	1,518	1,769	2,060	4.5	2.1	3.6	1.1	3.1	3.1	3.1	3.1
	Low						1,475	1,668	1,888					2.5	2.5	2.5	2.5
Population (million)		59.0	60.7	61.8	61.6	62.1	62.4	62.7	63.0	0.6	0.4	0	0.2	0.1	0.1	0.1	0.1

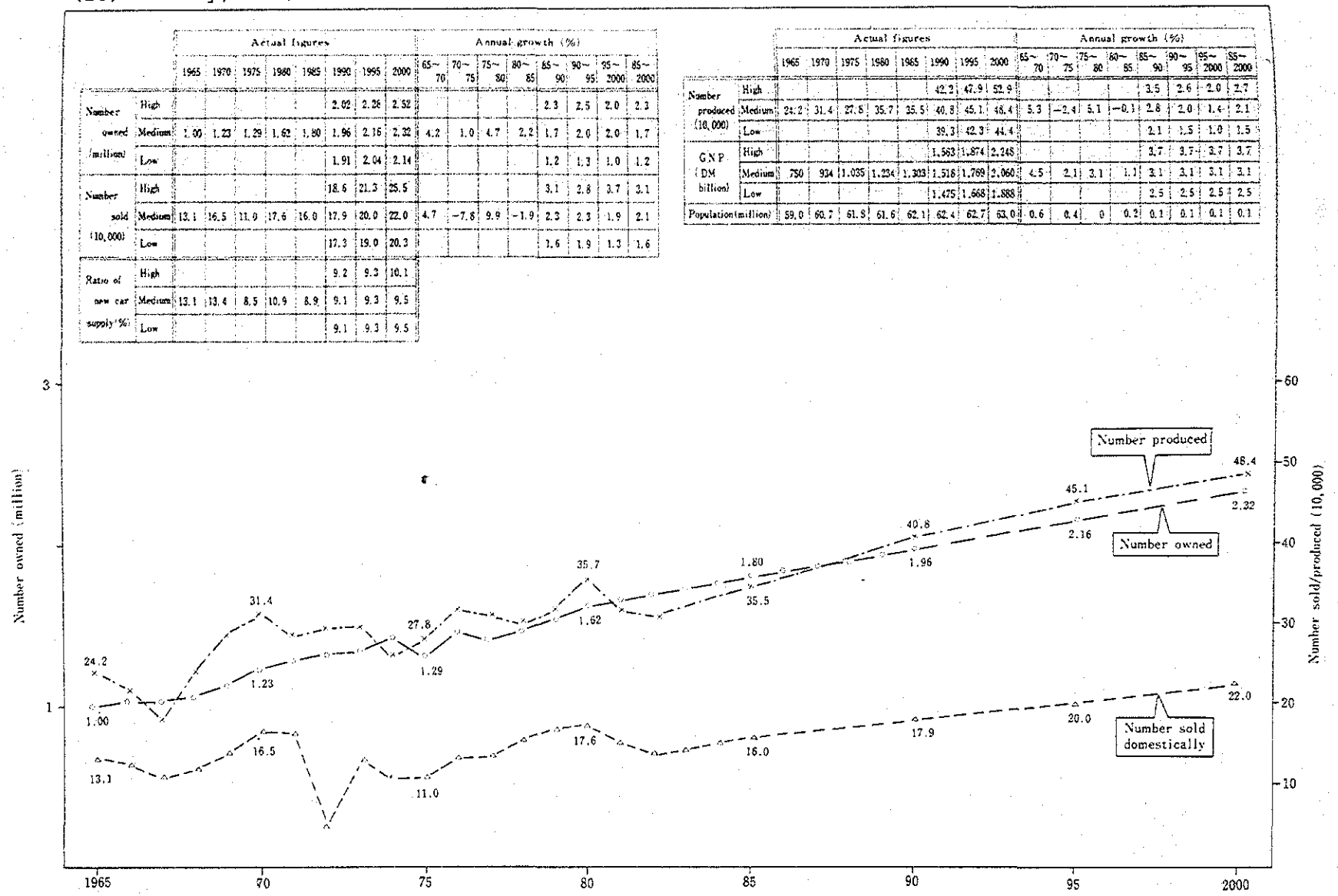


Appendix Table 20 (cont'd.)

(10) Germany, FR (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						2.02	2.28	2.52					2.3	2.5	2.0	2.3
	Medium	1.00	1.23	1.29	1.62	1.80	1.96	2.16	2.32	4.2	1.0	4.7	2.2	1.7	2.0	2.0	1.7
	Low						1.91	2.04	2.14					1.2	1.3	1.0	1.2
Number sold (10,000)	High						18.6	21.3	25.5					3.1	2.8	3.7	3.1
	Medium	13.1	16.5	11.0	17.6	16.0	17.9	20.0	22.0	4.7	−7.8	9.9	−1.9	2.3	2.3	1.9	2.1
	Low						17.3	19.0	20.3					1.6	1.9	1.3	1.6
Ratio of new car supply (%)	High						9.2	9.3	10.1								
	Medium	13.1	13.4	8.5	10.9	8.9	9.1	9.3	9.5								
	Low						9.1	9.3	9.5								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						42.2	47.9	52.9								
	Medium	24.2	31.4	27.8	35.7	35.5	40.8	45.1	48.4	5.3	−2.4	5.1	−0.1	2.8	2.0	1.4	2.1
	Low						39.3	42.3	44.4								
GNP (DM billion)	High						1,563	1,874	2,248								
	Medium	750	934	1,035	1,234	1,303	1,516	1,769	2,060	4.5	2.1	3.1	1.1	3.1	3.1	3.1	3.1
	Low						1,475	1,668	1,888								
Population (million)		59.0	60.7	61.8	61.6	62.1	62.4	62.7	63.0	0.6	0.4	0	0.2	0.1	0.1	0.1	0.1

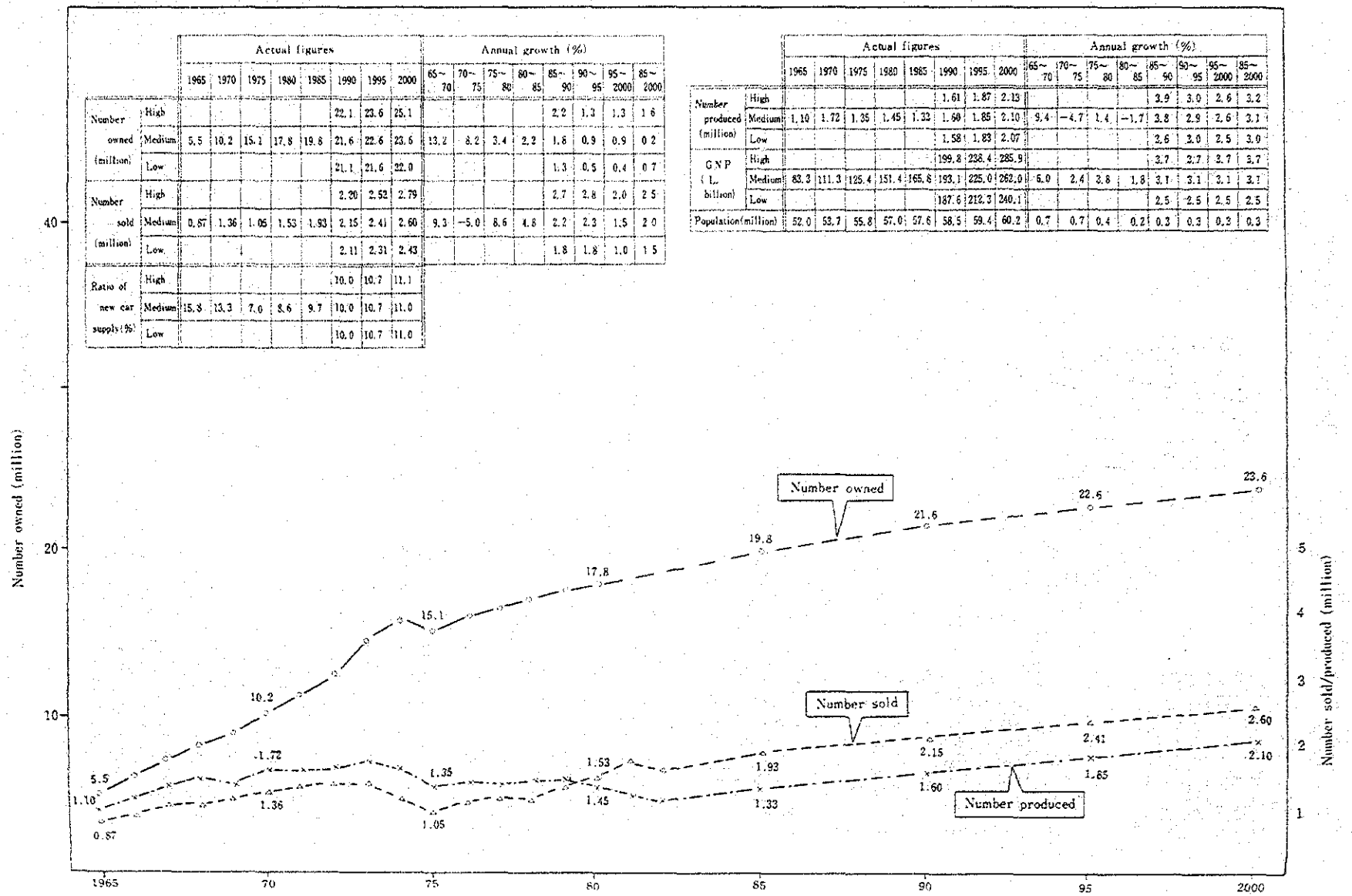


Appendix Table 20 (cont'd.)

(11) Italy (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						22.1	23.6	25.1					2.2	1.3	1.3	1.6
	Medium	5.5	10.2	15.1	17.8	19.8	21.6	22.6	23.6	13.2	8.2	3.4	2.2	1.8	0.9	0.9	0.2
	Low						21.1	21.6	22.0					1.3	0.5	0.4	0.7
Number sold (million)	High						2.20	2.52	2.79					2.7	2.8	2.0	2.5
	Medium	0.87	1.36	1.05	1.53	1.93	2.15	2.41	2.60	9.3	−5.0	8.6	4.8	2.2	2.3	1.5	2.0
	Low						2.11	2.31	2.43					1.8	1.8	1.0	1.5
Ratio of new car supply (%)	High						10.0	10.7	11.1								
	Medium	15.3	13.3	7.0	8.6	9.7	10.0	10.7	11.0								
	Low						10.0	10.7	11.0								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						1.61	1.87	2.13					3.9	3.0	2.6	3.2
	Medium	1.10	1.72	1.35	1.45	1.33	1.60	1.85	2.10	9.4	−4.7	1.4	−1.7	3.8	2.9	2.6	3.1
	Low						1.58	1.83	2.07					2.6	3.0	2.5	3.0
GNP (L. billion)	High						199.8	238.4	285.9					3.7	2.7	3.7	3.7
	Medium	83.3	111.3	125.4	151.4	165.8	193.1	225.0	262.0	6.0	2.4	3.8	1.8	3.1	3.1	3.1	3.1
	Low						187.6	212.3	240.1					2.5	2.5	2.5	2.5
Population (million)		52.0	53.7	55.8	57.0	57.6	58.5	59.4	60.2	0.7	0.7	0.4	0.2	0.3	0.3	0.2	0.3

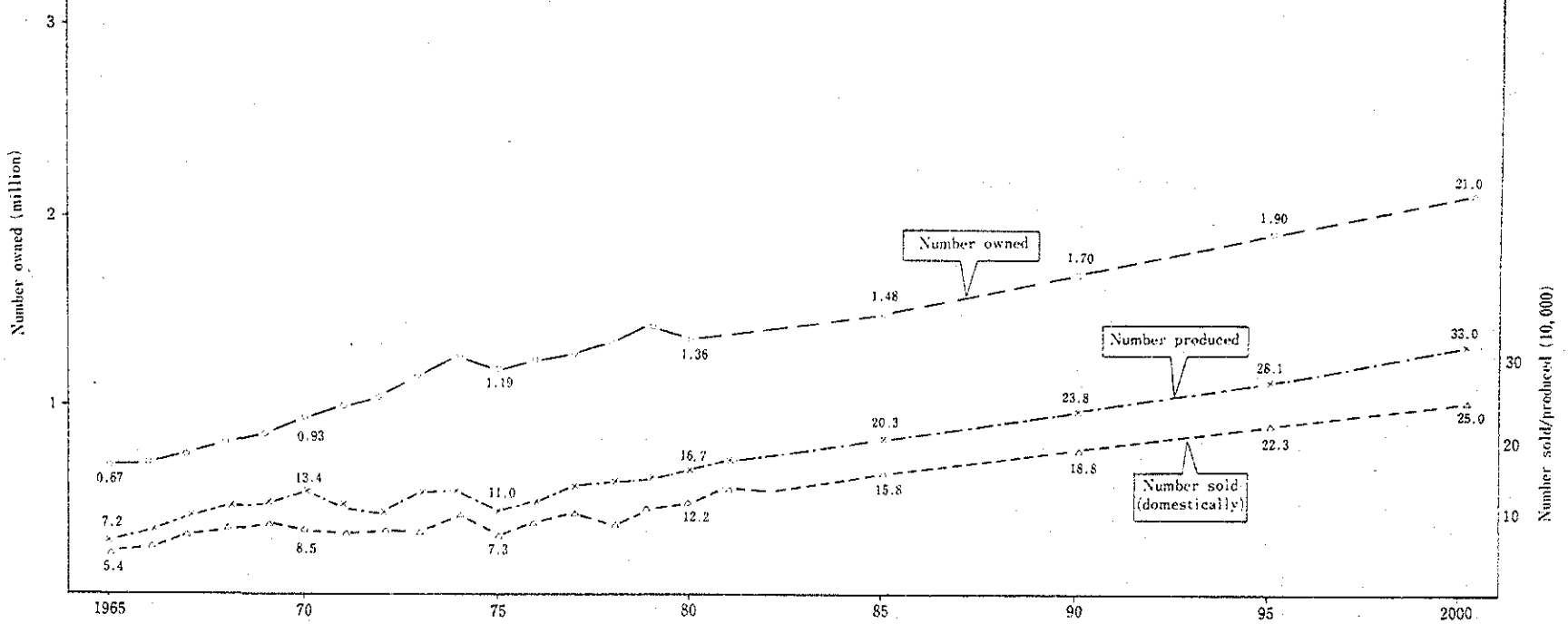


Appendix Table 20 (cont'd.)

(12) Italy (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						1.73	1.97	2.23					3.2	2.7	2.5	2.8
	Medium	0.67	0.93	1.19	1.36	1.48	1.70	1.90	2.10	6.8	5.0	2.7	1.7	2.8	2.3	2.0	2.3
	Low						1.67	1.83	1.98					2.4	1.8	1.6	2.0
Number sold (10,000)	High						19.6	23.9	27.5					4.4	4.0	2.9	3.6
	Medium	5.4	8.5	7.3	12.2	15.8	19.8	22.3	25.0	9.5	−3.0	10.8	5.3	3.6	3.5	2.3	3.1
	Low						18.1	20.9	22.6					2.8	2.9	1.6	2.4
Ratio of new car supply (%)	High						11.3	12.1	12.3								
	Medium	8.1	9.1	6.1	9.0	10.7	11.1	11.7	11.9								
	Low						10.8	11.4	11.4								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						24.7	30.0	36.2					4.0	4.0	3.8	3.9
	Medium	7.2	13.4	11.0	16.7	20.3	23.8	28.1	33.0	12.2	−3.9	8.7	4.0	3.2	3.4	3.3	3.3
	Low						23.0	26.3	30.0					2.5	2.7	2.7	2.6
GNP (L. billion)	High						198.8	238.4	285.9					3.7	3.7	3.7	3.7
	Medium	83.3	111.3	125.4	151.4	165.8	193.1	225.0	262.0	6.0	2.4	3.8	1.8	3.1	3.1	3.1	3.1
	Low						187.6	212.3	240.1					2.5	2.5	2.5	2.5
Population (million)		52.0	53.7	55.8	57.0	57.6	58.5	59.4	60.2	0.7	0.7	0.4	0.2	0.3	0.3	0.3	0.3

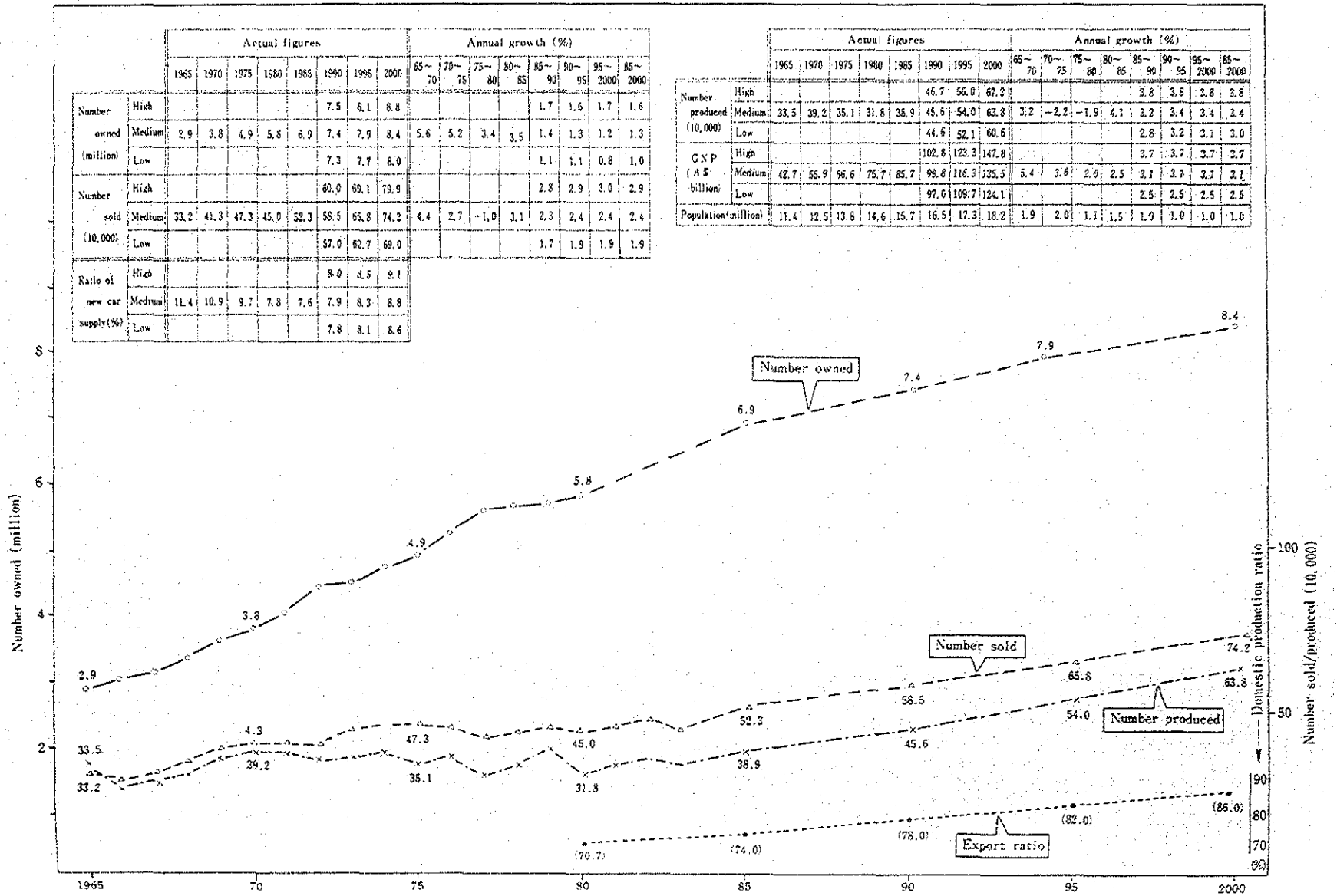


Appendix Table 20 (cont'd.)

(13) Australia (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						7.5	8.1	8.8					1.7	1.6	1.7	1.6
	Medium	2.9	3.8	4.9	5.8	6.9	7.4	7.9	8.4	5.6	5.2	3.4	3.5	1.4	1.3	1.2	1.3
	Low						7.3	7.7	8.0					1.1	1.1	0.8	1.0
Number sold (10,000)	High						60.0	69.1	79.9					2.8	2.9	3.0	2.9
	Medium	33.2	43.3	47.3	45.0	52.3	58.5	65.8	74.2	4.4	2.7	-1.0	3.1	2.3	2.4	2.4	2.4
	Low						57.0	62.7	69.0					1.7	1.9	1.9	1.9
Ratio of new car supply (%)	High						8.0	8.5	9.1								
	Medium	11.4	10.9	9.7	7.8	7.6	7.9	8.3	8.8								
	Low						7.8	8.1	8.6								

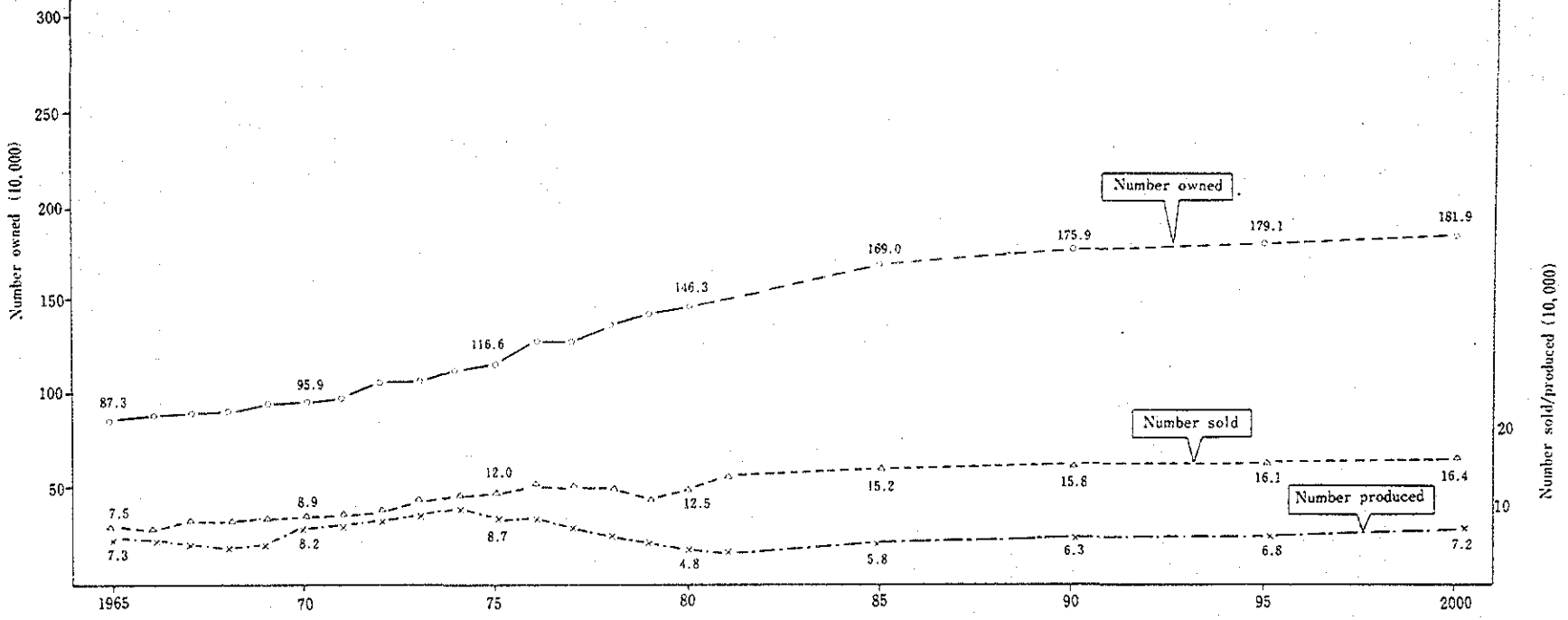
		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						46.7	56.0	67.2					3.8	3.8	3.8	3.8
	Medium	33.5	39.2	35.1	31.8	38.9	45.6	54.0	63.8	3.2	-2.2	-1.9	4.1	3.2	3.4	3.4	3.4
	Low						44.6	52.1	60.6					2.8	3.2	3.1	3.0
GNP (A$ billion)	High						102.8	123.3	147.8					3.7	3.7	3.7	3.7
	Medium	42.7	55.9	66.6	75.7	85.7	98.8	116.3	135.5	5.4	3.6	2.6	2.5	3.1	3.1	3.1	3.1
	Low						97.0	109.7	124.1					2.5	2.5	2.5	2.5
Population (million)		11.4	12.5	13.8	14.6	15.7	16.5	17.3	18.2	1.9	2.0	1.1	1.5	1.0	1.0	1.0	1.0



(14) Australia (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1965	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (10,000)	High						180.0	188.8	198.7					1.3	1.0	1.0	1.1
	Medium	87.3	95.9	116.6	146.3	169.0	175.9	179.1	181.9	1.9	4.0	4.7	2.9	0.8	0.3	0.3	0.5
	Low						171.4	168.9	163.8					0.3	−0.3	−0.6	−0.2
Number sold (10,000)	High						16.4	17.2	18.0					1.6	1.0	0.9	1.1
	Medium	7.5	8.9	12.0	12.5	15.2	15.8	16.1	16.4	3.6	6.2	0.8	4.0	0.8	0.4	0.4	0.5
	Low						15.4	15.2	15.0					0.3	−0.3	−0.3	−0.1
Ratio of new car supply (%)	High						9.1	9.1	9.1								
	Medium	8.6	9.3	10.3	8.5	9.0	9.0	9.0	9.0								
	Low						9.0	9.0	9.2								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (10,000)	High						6.6	7.4	8.1					2.6	2.3	1.8	2.3
	Medium	7.3	8.2	8.7	4.8	5.8	6.3	6.8	7.2	2.3	1.2	−11.0	3.8	1.7	1.6	1.2	1.5
	Low						5.9	6.2	6.2					0.3	1.0	0	0.4
GNP (A$ billion)	High						102.8	123.3	147.6					3.7	3.7	3.7	3.7
	Medium	42.7	55.9	66.6	75.7	85.7	99.8	116.3	135.5	5.4	3.6	2.6	2.5	3.1	3.1	3.1	3.1
	Low						97.0	109.7	124.1					2.5	2.5	2.5	2.5
Population (million)		11.4	12.5	13.8	14.6	15.7	16.5	17.3	18.2	1.9	2.0	1.1	1.5	1.0	1.0	1.0	1.0



Appendix Table 20 (cont'd.)

(15) Japan (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						32.8	37.3	41.1					3.2	2.6	2.0	2.6
	Medium	2.2	8.8	17.4	23.7	28.0	32.6	36.6	40.0	32.0	14.6	6.4	3.4	3.1	2.3	1.8	2.4
	Low						32.3	36.0	39.0					2.9	2.2	1.6	2.2
Number sold (million)	High						4.06	4.66	5.15					3.9	2.8	2.0	2.9
	Medium	0.59	2.38	2.74	2.85	3.35	3.93	4.38	4.70	32.0	2.9	0.8	3.3	3.2	2.2	1.4	2.3
	Low						3.80	4.11	4.29					2.6	1.6	0.9	1.7
Ratio of new car supply (%)	High						12.4	12.5	12.5								
	Medium	26.8	27.0	15.7	12.0	12.0	12.1	12.0	11.8								
	Low						11.8	11.4	11.0								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						8.03	8.66	9.09					2.4	1.5	1.0	1.6
	Medium	0.70	3.18	4.57	7.04	7.13	7.71	8.04	8.17	35.3	7.5	9.0	0.3	1.6	0.9	0.3	0.9
	Low						7.41	7.44	7.32					0.8	0.1	−0.3	0.2
GNP (¥ trillion)	High						262.6	314.9	377.7					3.7	3.7	3.7	3.7
	Medium	69.1	117.8	147.9	189.0	219.0	255.1	297.2	346.2	11.3	4.7	5.0	2.0	3.1	3.1	3.1	3.1
	Low						247.8	280.3	317.2					2.5	2.5	2.5	2.5
Population (million)		98.9	104.3	111.6	116.8	121.4	125.1	128.9	132.8	1.1	1.4	0.9	0.8	0.6	0.6	0.6	0.6

Estimate of KD sets (thousand)

	78	79	80	81	82	83	84	85	90	95	2000
Passenger cars	223	281	298	389	467	567	637	707	920	1,120	1,320
Trucks	107	122	141	162	133	183	283	330	530	740	840
Total	330	403	439	551	600	750	920	1,037	1,450	1,860	2,160

Number produced does not include KD sets.

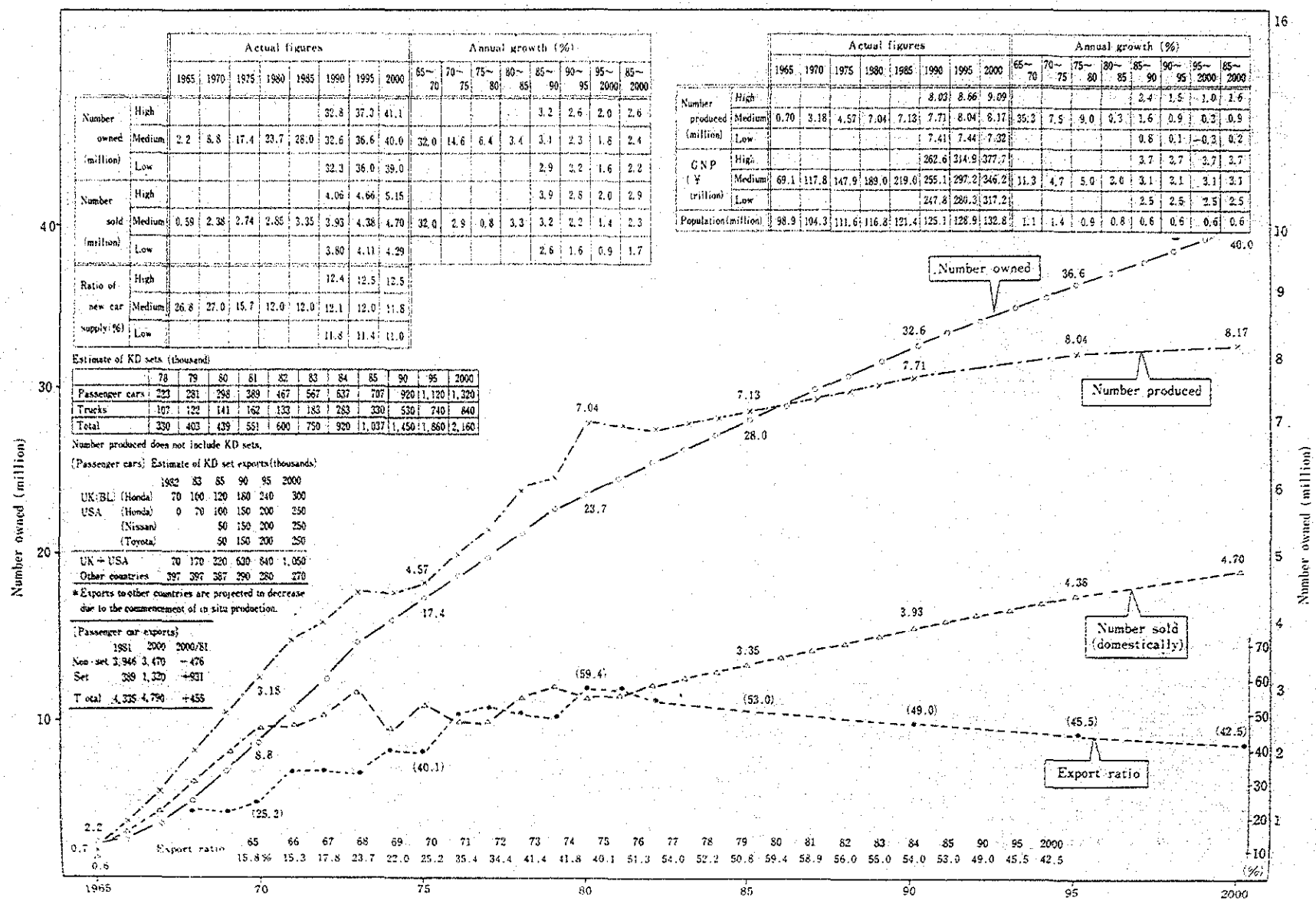
(Passenger cars) Estimate of KD set exports (thousands)

		1982	83	85	90	95	2000
UK/BL	(Honda)	70	100	120	180	240	300
USA	(Honda)	0	70	100	150	200	250
	(Nissan)			50	150	200	250
	(Toyota)			50	150	200	250
UK + USA		70	170	220	630	840	1,050
Other countries		397	397	387	290	280	270

*Exports to other countries are projected to decrease due to the commencement of in situ production.

(Passenger car exports)

	1981	2000	2000/81
Non-set	3,946	3,470	−476
Set	389	1,320	+931
Total	4,335	4,790	+455



Appendix Table 20 (cont'd.)

(16) Japan (trucks and buses)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						20.1	23.3	26.9					3.6	3.0	2.9	3.2
	Medium	4.1	8.8	10.9	14.2	16.8	19.4	21.8	24.4	16.5	4.4	5.4	3.4	2.9	2.4	2.3	2.5
	Low						18.7	20.3	22.1					2.2	1.7	1.7	1.8
Number sold (million)	High						2.81	3.26	3.60					3.2	3.0	2.0	2.7
	Medium	1.09	1.72	1.57	2.16	2.40	2.72	3.08	3.37	9.5	−1.8	6.6	2.1	2.5	2.5	1.8	2.3
	Low						2.62	2.91	3.06					1.8	2.1	1.0	1.6
Ratio of new car supply (%)	High						14.0	14.0	13.4								
	Medium	26.6	19.5	14.4	15.2	14.3	14.0	14.1	13.8								
	Low						14.0	14.3	13.8								

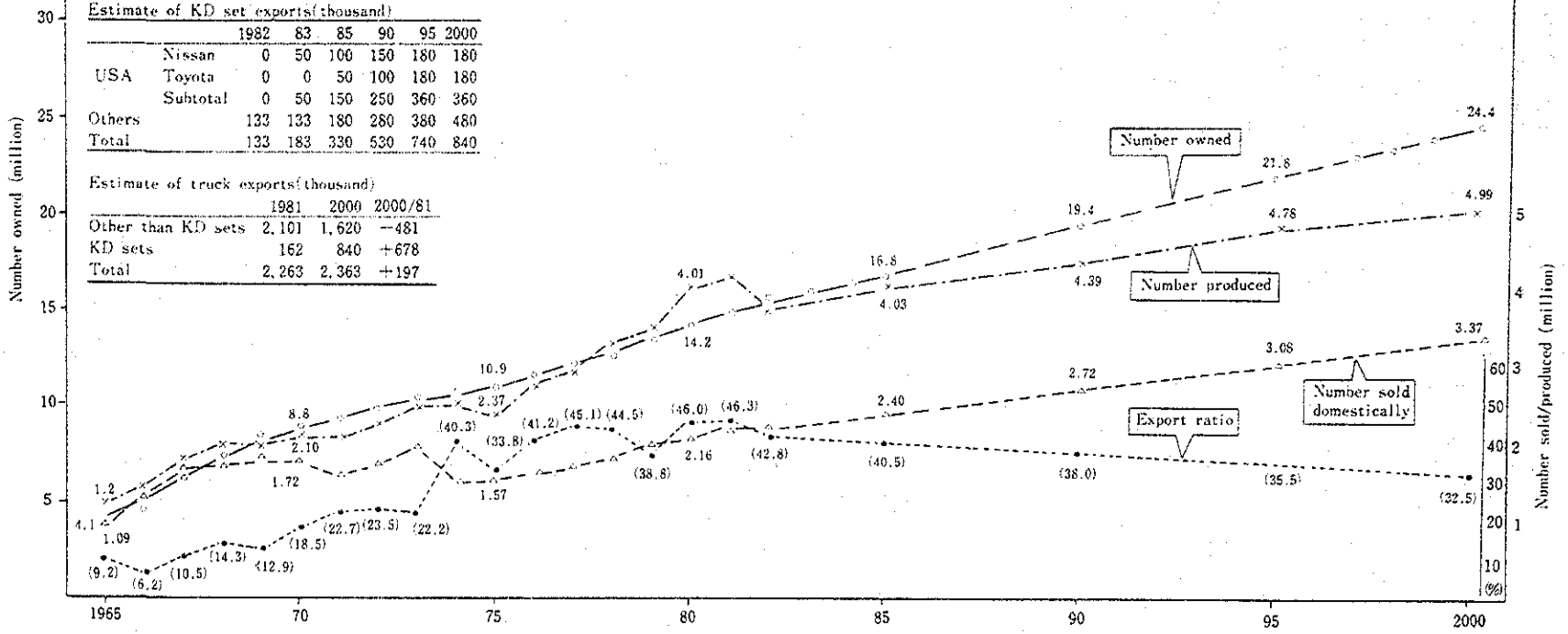
		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						4.56	5.12	5.50								
	Medium	1.20	2.10	2.37	4.01	4.03	4.39	4.78	4.99	11.9	2.5	11.1	0.1	1.7	1.7	0.9	1.4
	Low						4.23	4.47	4.52					1.0	1.1	0.2	0.6
GNP (trillion)	High						262.6	314.9	377.7					3.7	3.7	3.7	3.7
	Medium	69.1	117.8	147.9	189.0	219.0	255.1	297.2	346.2	11.3	4.7	5.0	3.0	3.1	3.1	3.1	3.1
	Low						247.8	280.3	317.2					2.5	2.5	2.5	2.5
Population (million)		98.9	104.3	111.6	116.8	121.4	125.1	128.9	132.8	1.1	1.4	0.9	0.8	0.6	0.6	0.6	0.6

Estimate of KD set exports (thousand)

		1982	83	85	90	95	2000
USA	Nissan	0	50	100	150	180	180
	Toyota	0	0	50	100	180	180
	Subtotal	0	50	150	250	360	360
Others		133	133	180	280	380	480
Total		133	183	330	530	740	840

Estimate of truck exports (thousand)

	1981	2000	2000/81
Other than KD sets	2,101	1,620	−481
KD sets	162	840	+678
Total	2,263	2,363	+197

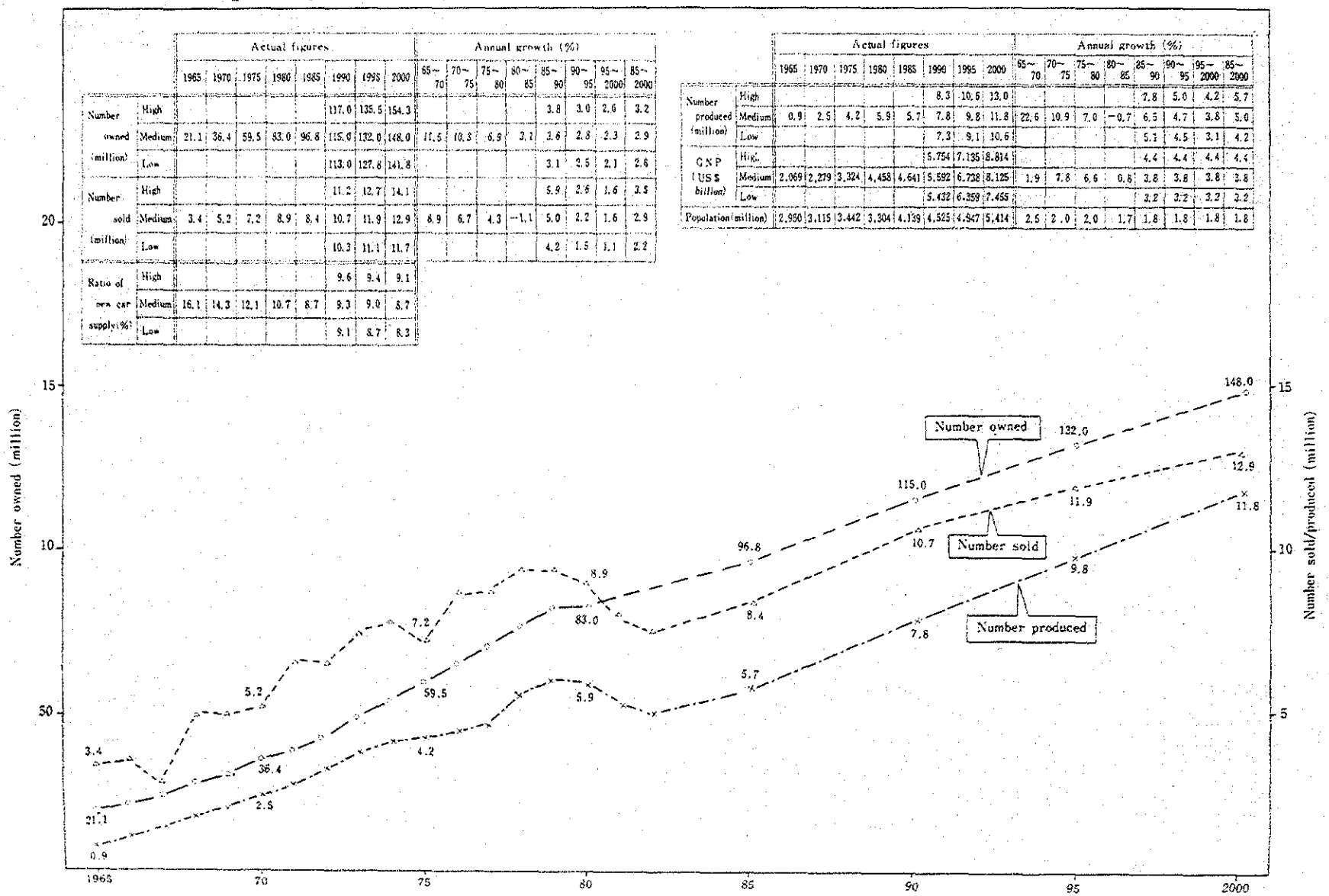


Appendix Table 20 (cont'd.)

(17) Others (passenger cars)

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						117.0	135.5	154.3					3.8	3.0	2.6	3.2
	Medium	21.1	36.4	59.5	83.0	96.8	115.0	132.0	148.0	11.5	10.3	6.9	3.1	3.6	2.8	2.3	2.9
	Low						113.0	127.8	141.8					3.1	2.5	2.1	2.6
Number sold (million)	High						11.2	12.7	14.1					5.9	2.5	1.6	3.5
	Medium	3.4	5.2	7.2	8.9	8.4	10.7	11.9	12.9	8.9	6.7	4.3	−1.1	5.0	2.2	1.6	2.9
	Low						10.3	11.1	11.7					4.2	1.5	1.1	2.2
Ratio of new car supply (%)	High						9.6	9.4	9.1								
	Medium	16.1	14.3	12.1	10.7	8.7	9.3	9.0	8.7								
	Low						9.1	8.7	8.3								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						8.3	10.6	13.0					7.8	5.0	4.2	5.7
	Medium	0.9	2.5	4.2	5.9	5.7	7.8	9.8	11.8	22.6	10.9	7.0	−0.7	6.5	4.7	3.8	5.0
	Low						7.3	9.1	10.6					5.1	4.5	3.1	4.2
GNP (US$ billion)	High						5,754	7,135	8,814					4.4	4.4	4.4	4.4
	Medium	2,069	2,279	3,324	4,458	4,641	5,592	6,738	8,125	1.9	7.8	6.6	0.8	3.8	3.8	3.8	3.8
	Low						5,432	6,359	7,455					3.2	3.2	3.2	3.2
Population (million)		2,950	3,115	3,442	3,304	4,139	4,525	4,947	5,414	2.5	2.0	2.0	1.7	1.8	1.8	1.8	1.8

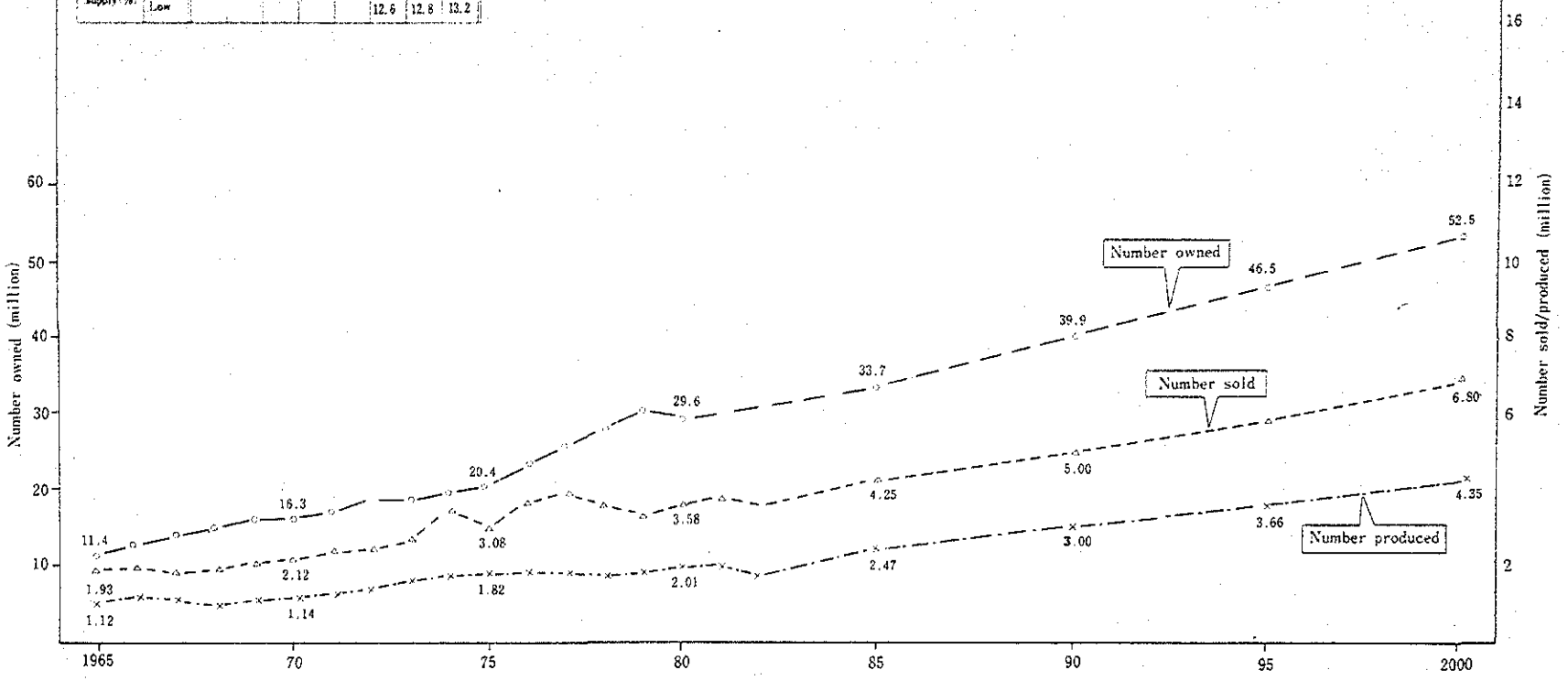


Appendix Table 20 (cont'd.)

(18) Others (trucks and buses)

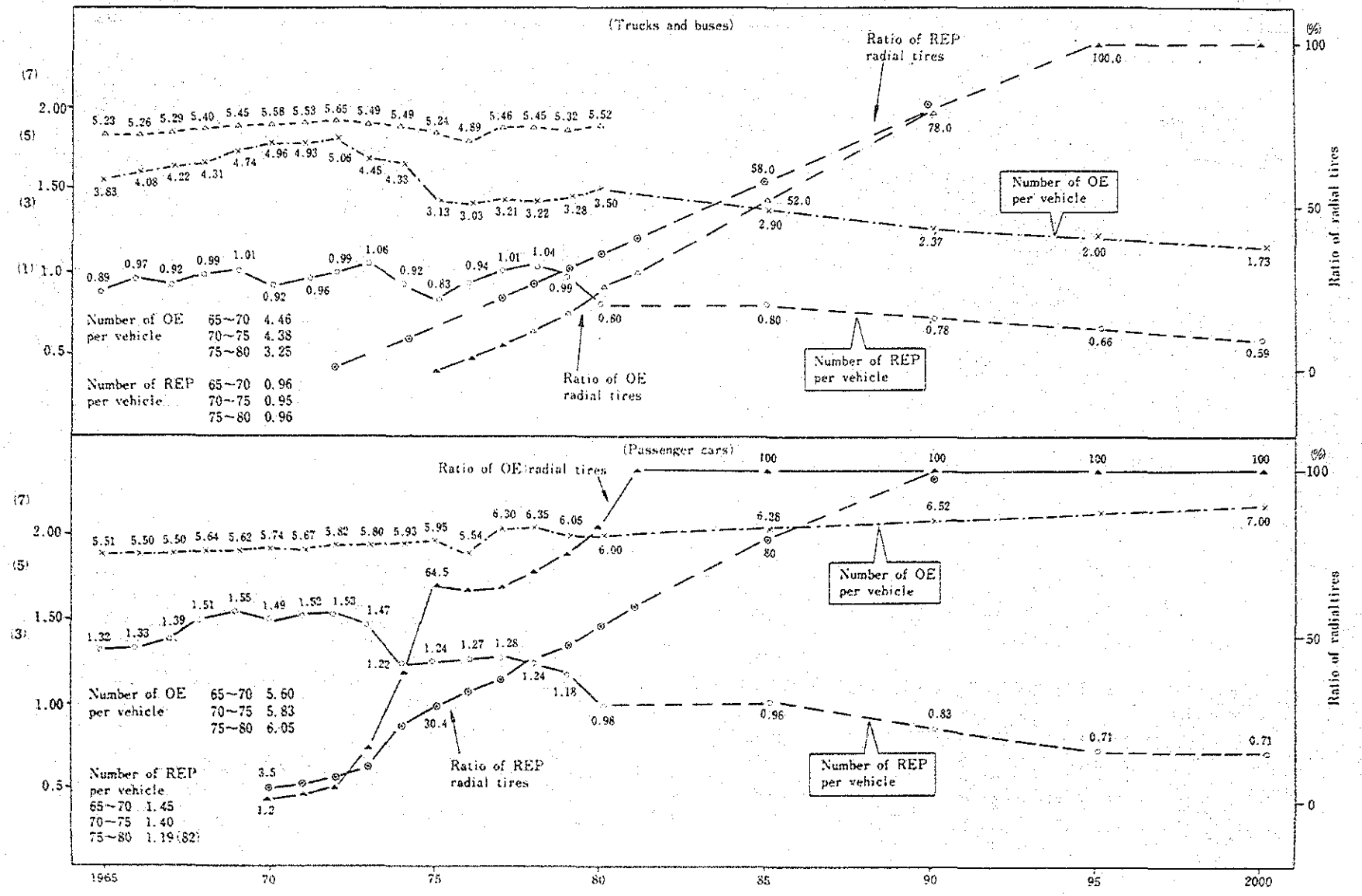
		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number owned (million)	High						40.6	48.0	54.9					3.8	3.4	2.7	3.3
	Medium	11.4	16.3	20.4	29.6	33.7	39.9	46.5	52.5	7.4	4.6	7.7	2.6	3.4	3.1	2.5	3.0
	Low						39.2	45.1	50.8					3.1	2.9	2.1	2.7
Number sold (million)	High						5.04	6.02	7.02					3.5	3.6	3.1	3.4
	Medium	1.93	2.12	3.08	3.58	4.25	5.00	5.90	6.80	1.9	7.8	3.1	3.5	3.3	3.4	2.9	3.2
	Low						4.94	5.78	6.59					3.1	3.2	2.7	3.0
Ratio of new car supply (%)	High						12.4	12.6	12.8								
	Medium	16.9	13.0	15.1	12.1	12.6	12.5	12.7	12.9								
	Low						12.6	12.8	13.2								

		Actual figures								Annual growth (%)							
		1965	1970	1975	1980	1985	1990	1995	2000	65~70	70~75	75~80	80~85	85~90	90~95	95~2000	85~2000
Number produced (million)	High						3.09	3.87	4.69								4.4
	Medium	1.12	1.14	1.82	2.01	2.01	3.00	3.66	4.35	0.4	3.2	2.0	4.2	3.9	4.1	3.5	3.8
	Low						2.90	3.47	4.13					3.3	3.7	3.5	3.6
GNP (US$ billion)	High						5,754	7,135	8,814					4.4	4.4	4.4	4.4
	Medium	2,069	2,279	3,324	4,458	4,641	5,592	6,738	8,125	1.9	7.8	6.0	0.8	3.8	3.8	3.8	3.8
	Low						5,432	6,359	7,455					3.2	3.2	3.2	3.2
Population (million)		2,750	3,115	3,442	3,804	4,139	4,525	4,947	5,414	2.5	2.0	2.0	1.7	1.8	1.8	1.8	1.8



Appendix Fig. 1 Changes in Replacement (REP) and Original Equipment (OE)

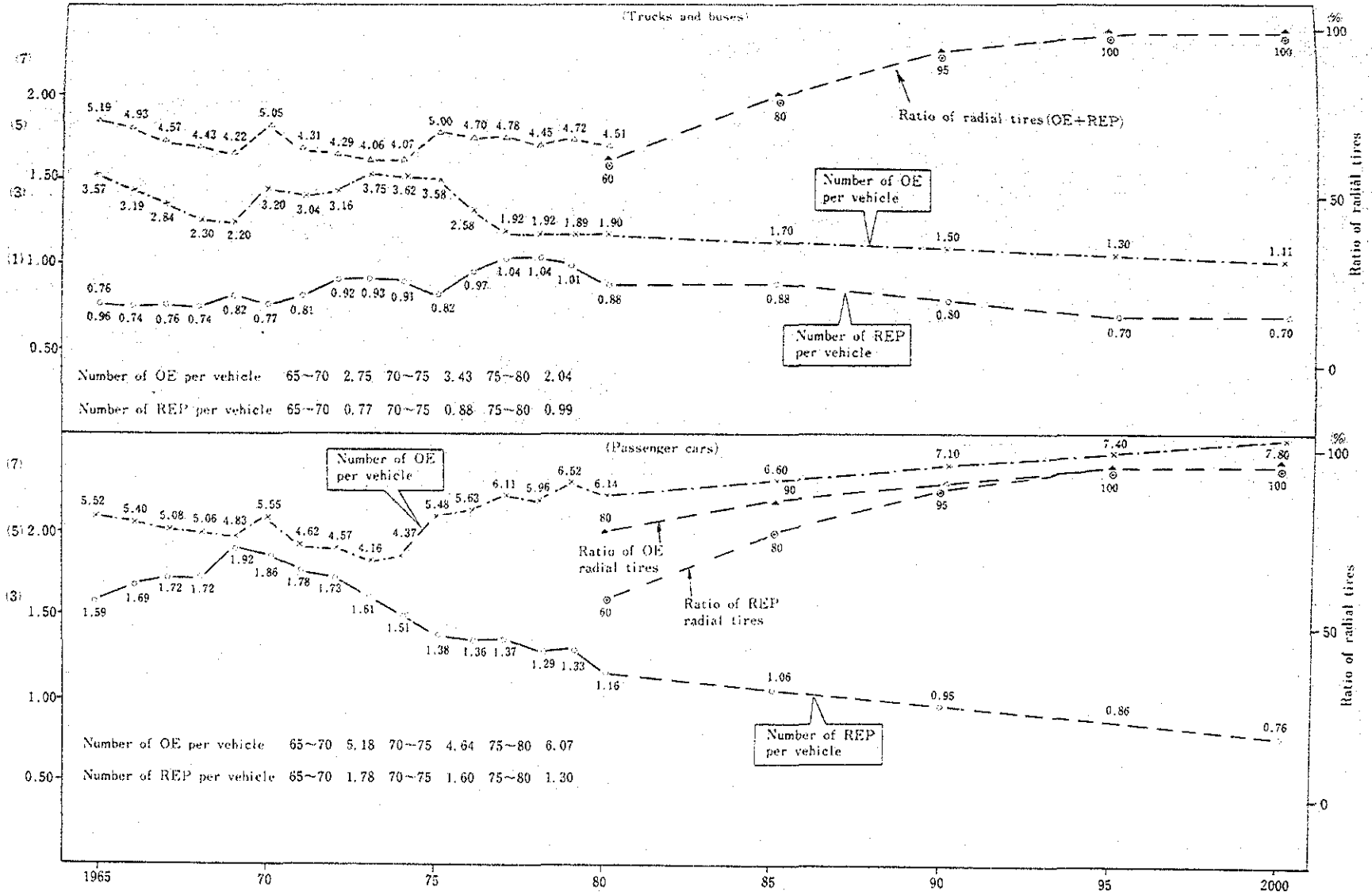
(1) USA



Source: The Study Team

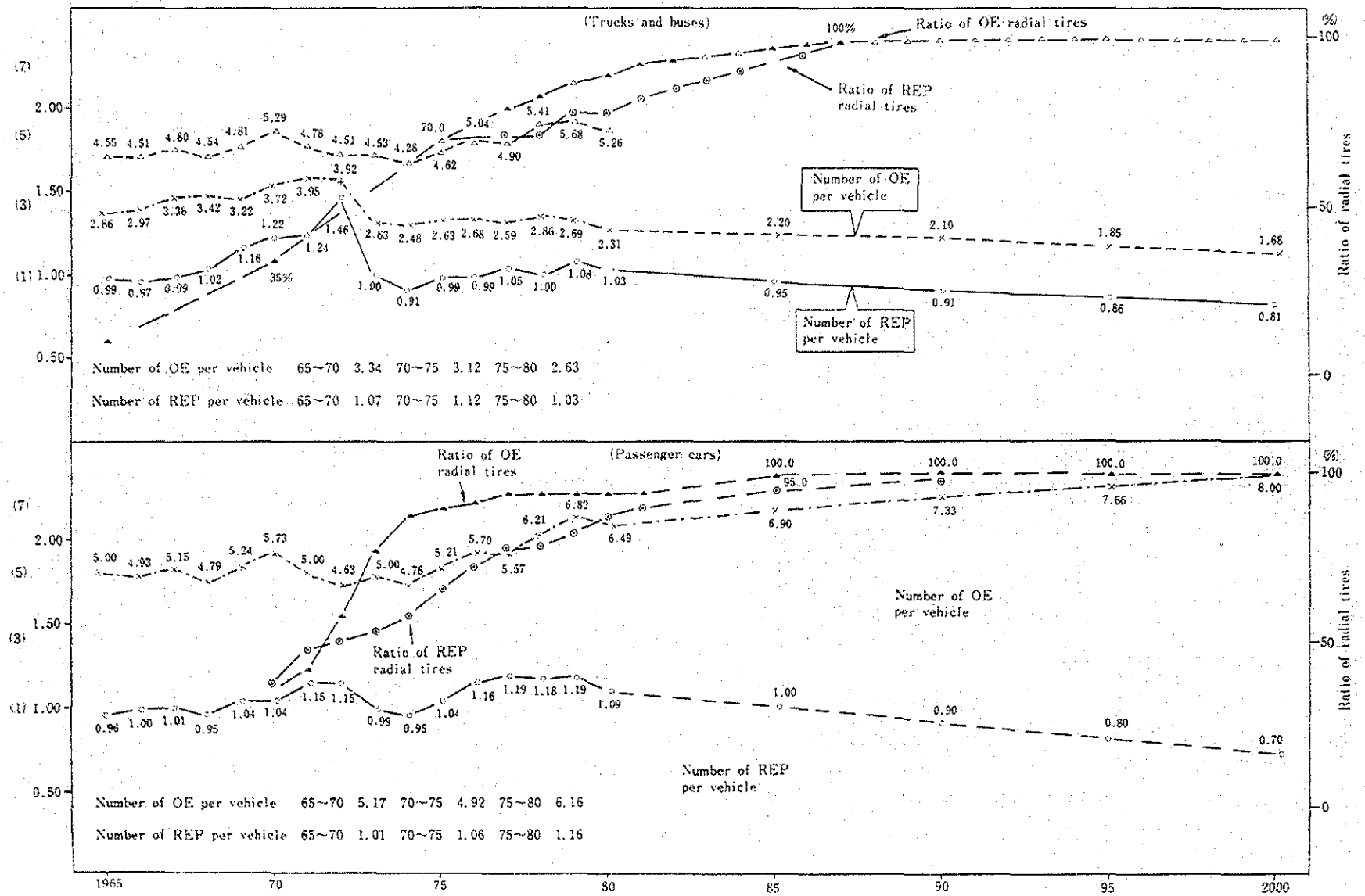
Appendix Fig. 1 (cont'd.)

(2) Canada

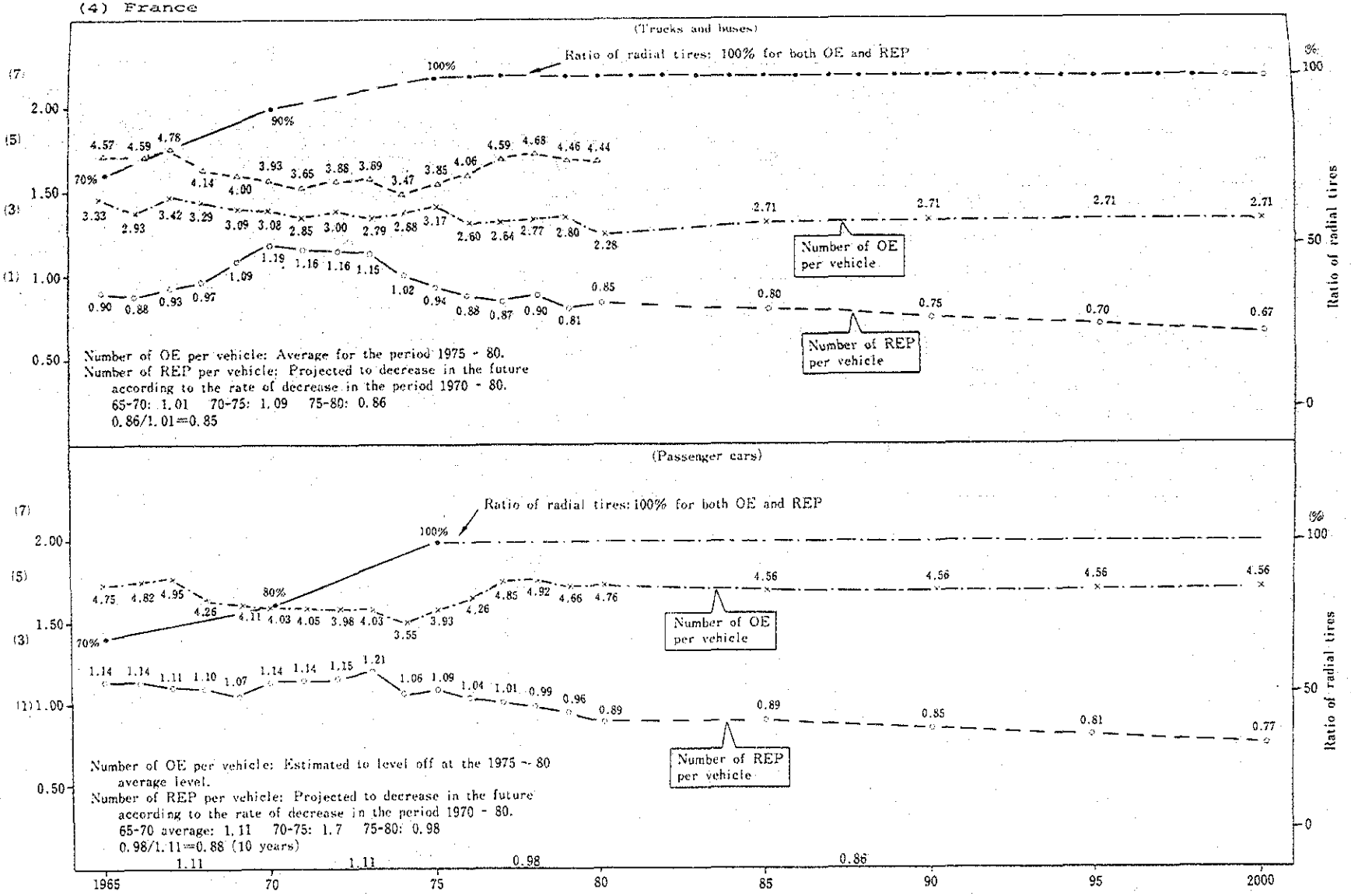


Appendix Fig. 1 (cont'd.)

(3) UK

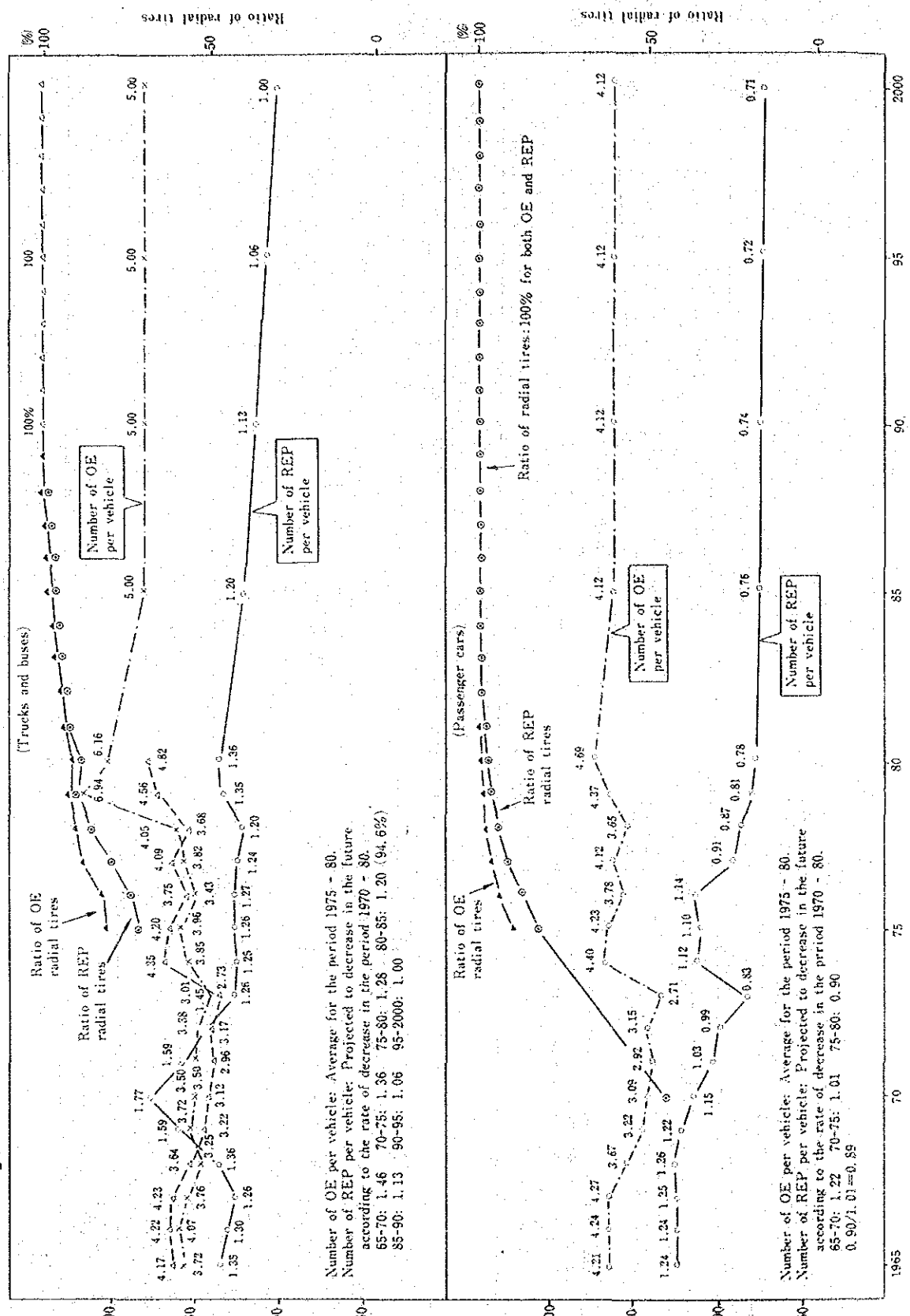


(4) France

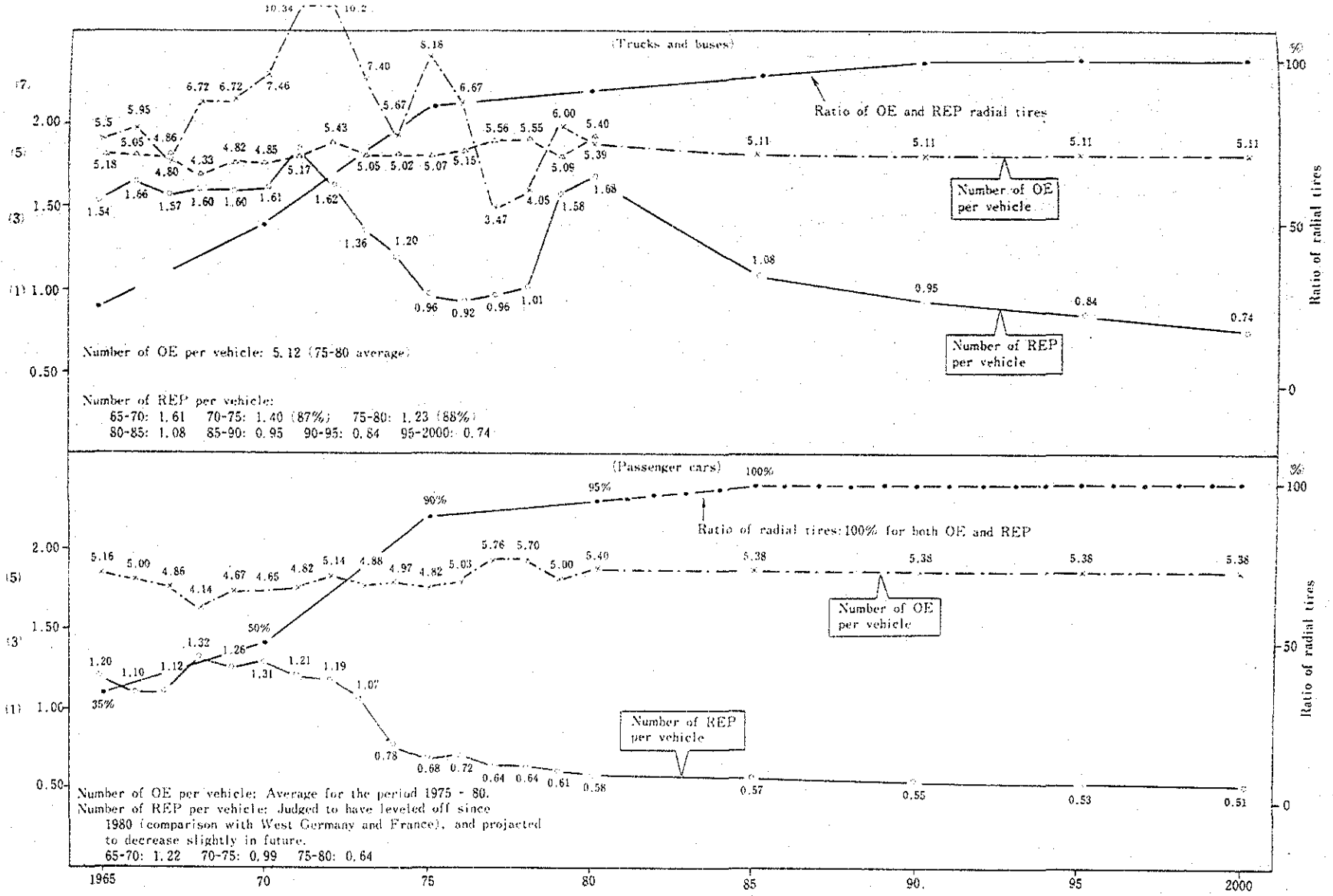

(Trucks and buses)
Ratio of radial tires: 100% for both OE and REP
Number of OE per vehicle
Number of REP per vehicle
Number of OE per vehicle: Average for the period 1975 - 80.
Number of REP per vehicle: Projected to decrease in the future according to the rate of decrease in the period 1970 - 80.
65-70: 1.01 70-75: 1.09 75-80: 0.86
0.86/1.01=0.85
(Passenger cars)
Ratio of radial tires: 100% for both OE and REP
Number of OE per vehicle
Number of REP per vehicle
Number of OE per vehicle: Estimated to level off at the 1975 ~ 80 average level.
Number of REP per vehicle: Projected to decrease in the future according to the rate of decrease in the period 1970 - 80.
65-70 average: 1.11 70-75: 1.7 75-80: 0.98
0.98/1.11=0.88 (10 years)
Ratio of radial tires
1965
70
75
80
85
90
95
2000

Appendix Fig. 1 (cont'd.)

(5) Germany, FR

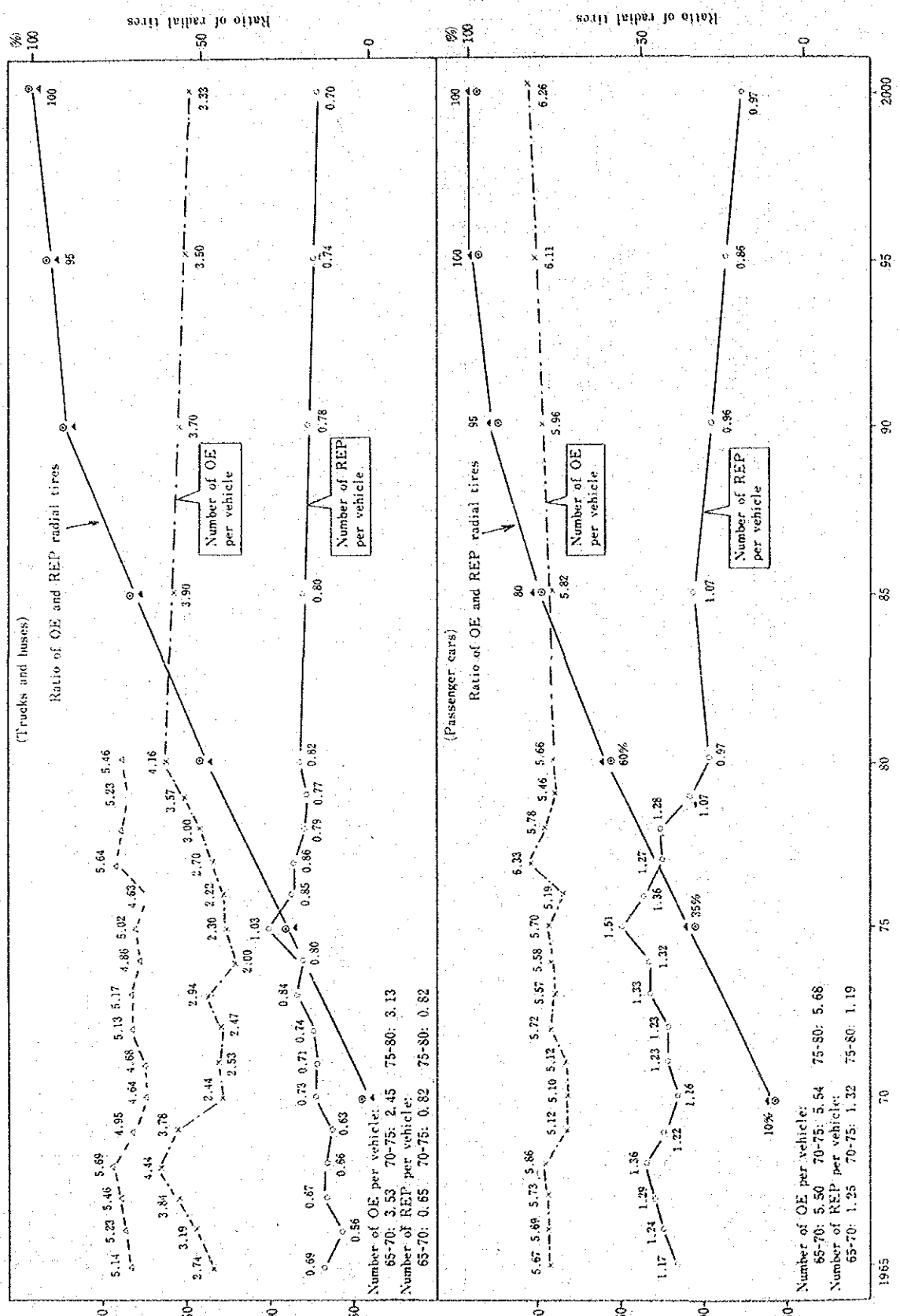


(6) Italy


(Trucks and buses)
Ratio of OE and REP radial tires
Number of OE per vehicle
Number of REP per vehicle
Number of OE per vehicle: 5.12 (75-80 average)
Number of REP per vehicle:
65-70: 1.61 70-75: 1.40 (87%); 75-80: 1.23 (88%)
80-85: 1.08 85-90: 0.95 90-95: 0.84 95-2000: 0.74
(Passenger cars)
Ratio of radial tires: 100% for both OE and REP
Number of OE per vehicle
Number of REP per vehicle
Number of OE per vehicle: Average for the period 1975 - 80.
Number of REP per vehicle: Judged to have leveled off since 1980 (comparison with West Germany and France), and projected to decrease slightly in future.
65-70: 1.22 70-75: 0.99 75-80: 0.64
Ratio of radial tires
%
1965
70
75
80
85
90
95
2000

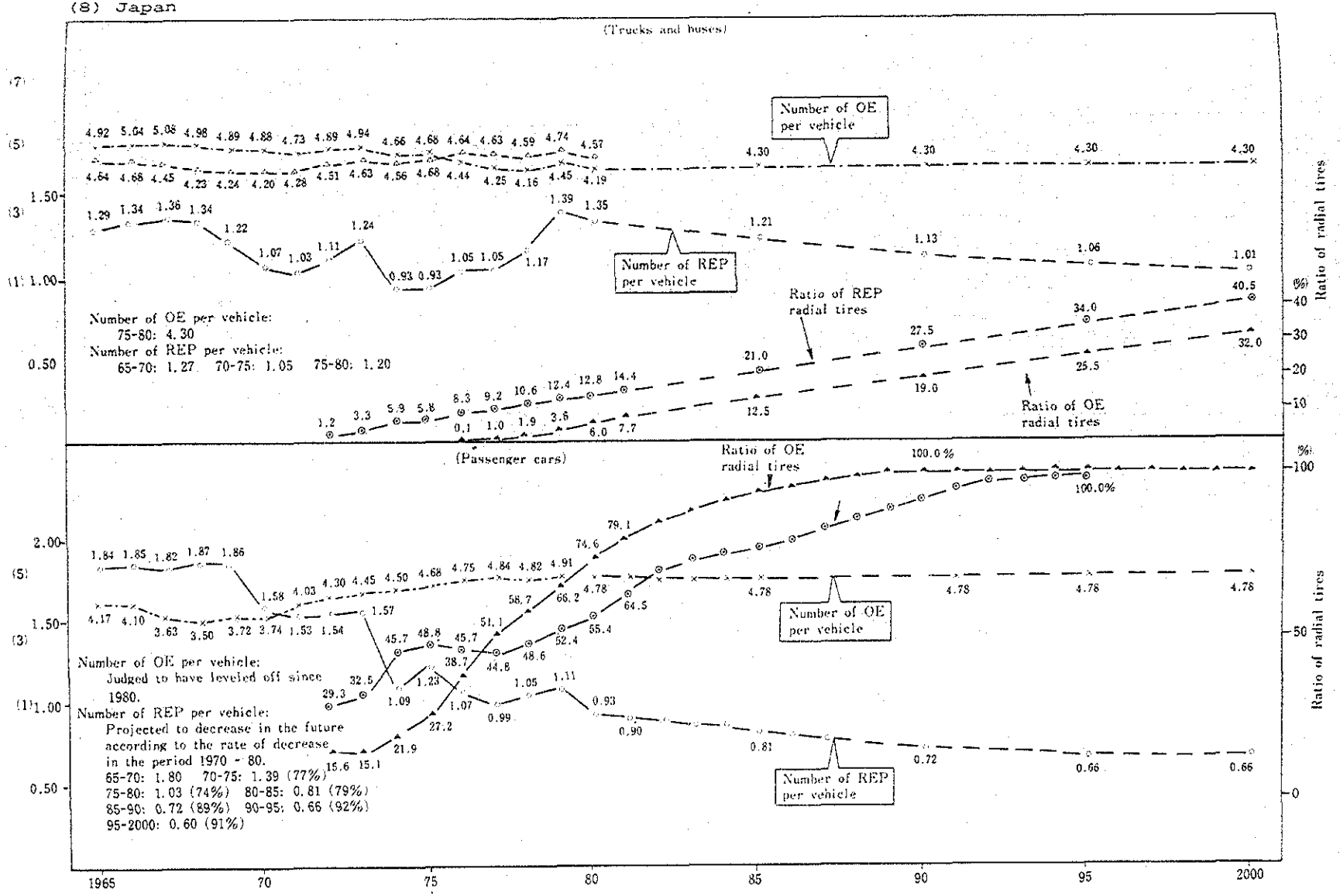
Appendix Fig. 1 (cont'd.)

(7) Australia



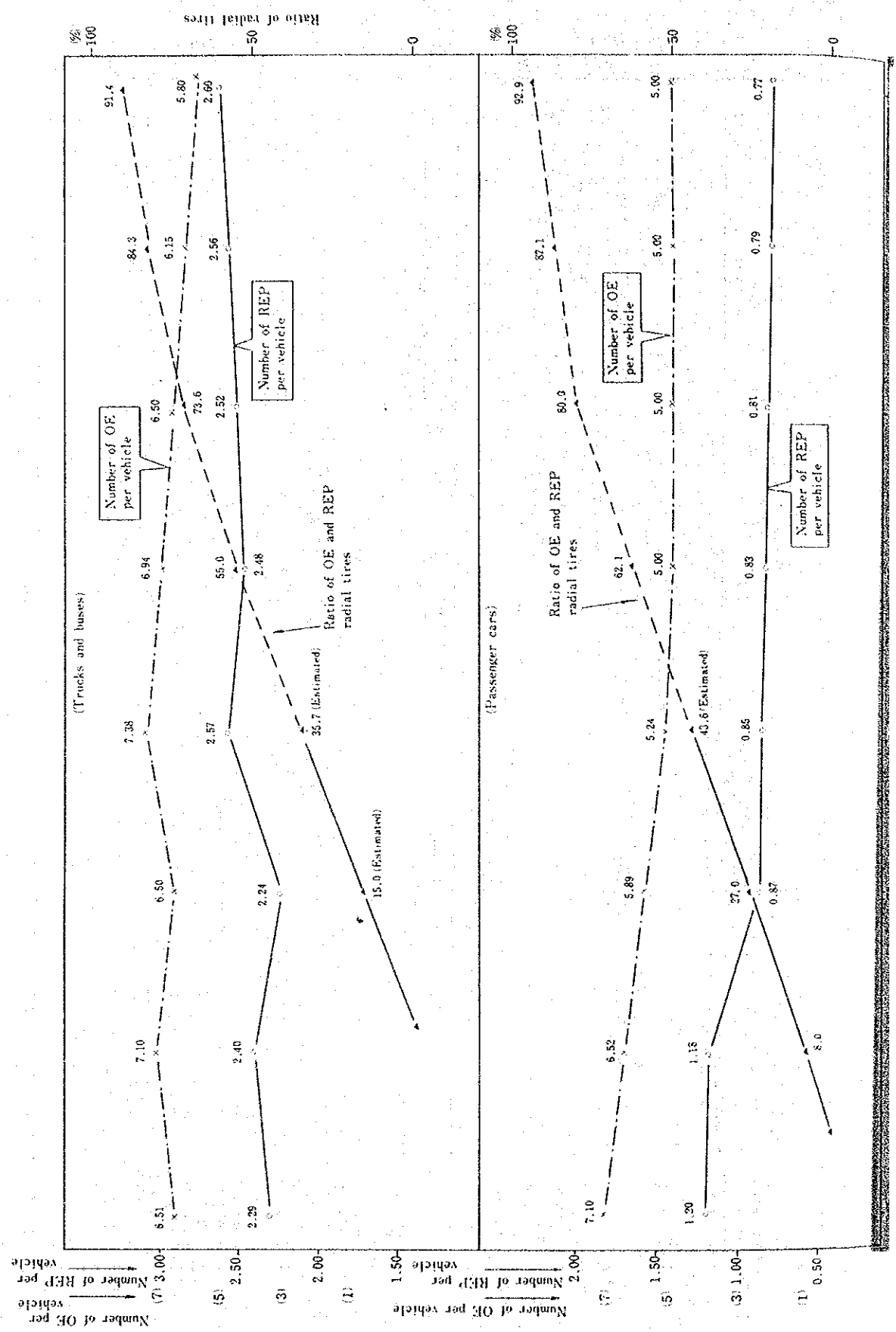
Appendix Fig. 1 (cont'd)

(8) Japan



Appendix Fig. 1 (cont'd.)

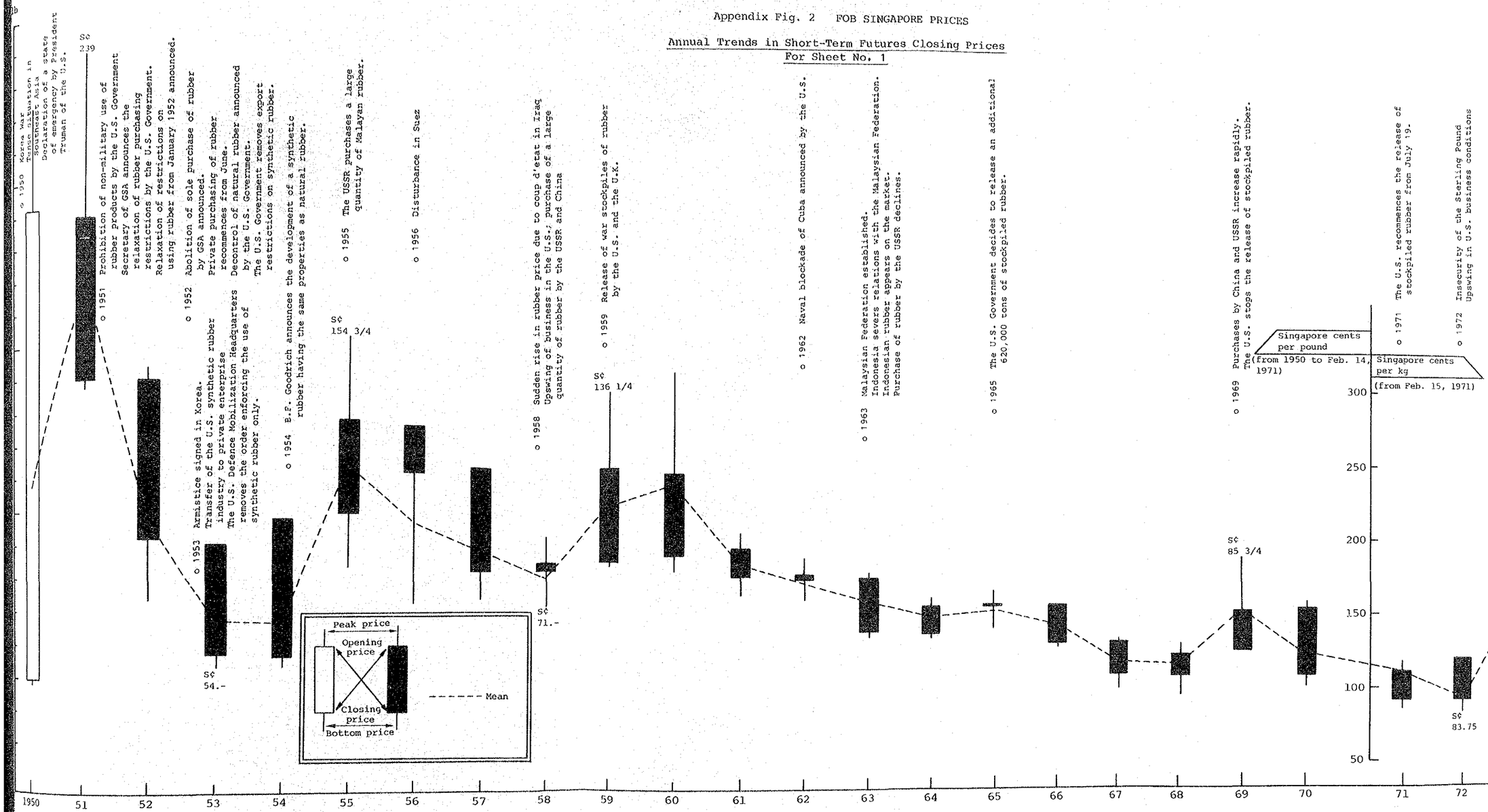
(9) Others



Appendix Fig. 2 FOB SINGAPORE PRICES

Annual Trends in Short-Term Futures Closing Prices

For Sheet No. 1

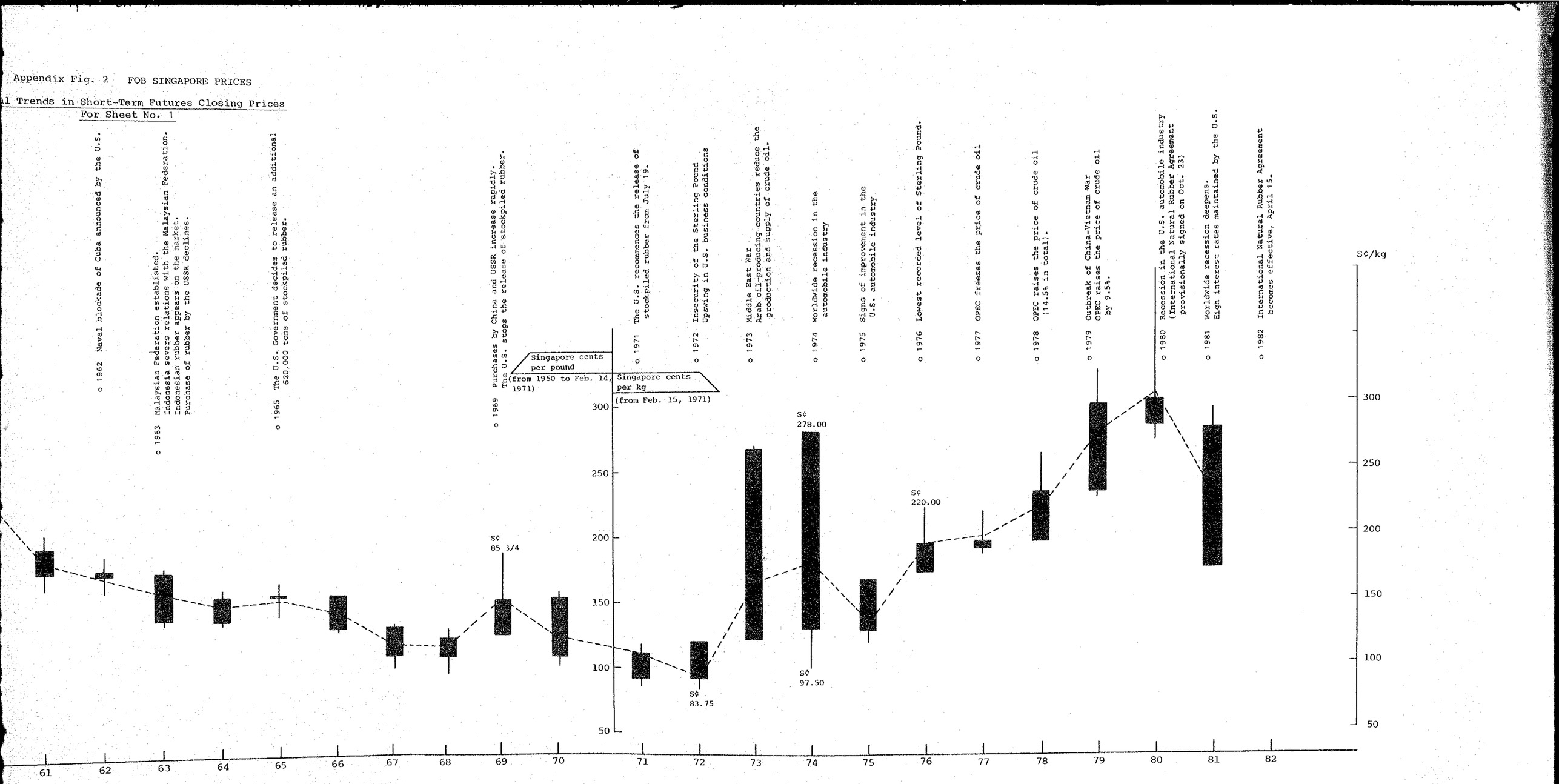


Source: The Rubber Trade Association of Japan
October 30, 1982.

Appendix Fig. 2 FOB SINGAPORE PRICES

l Trends in Short-Term Futures Closing Prices

For Sheet No. 1



[4-2] OTHER INDUSTRIAL CROPS

[4-2-1] PEPPER

A. INTRODUCTION

The pepper under discussion here is the product made by drying the berries of the plant having the scientific name "Piper nigrum", also called "Pimenta do Reino" in Portuguese. There are some other products also having the word "pepper" in their name. For instance, among the group of chillies produced from plants of the genus Capsicum, a group different from the genus Piper, there are spices called "red pepper", "sweet pepper", "cayenne pepper", and so on. In addition, allspice, obtained from the Pimenta officinalis plant, is sometimes called "Jamaica pepper" ("Pimenta de Jamaica" in Portuguese). However, these various groups of pepper products should not be confused with true pepper, obtained from Piper nigrum.[1)]

The berries of P. longum and P. retrofactum, both of which belong to the same genus as Piper nigrum, are called "long pepper" after the elongated shape of the spikes, and this product is handled in the same way as common pepper. It is said that during the time of ancient Rome long pepper was prized more highly than common pepper, and its price was several times higher than that of the later. Today, however, the long variety is less expensive than its common counterpart, and it is produced only in some areas of India and Indonesia in small quantities, and its percentage share of the world's pepper trade is negligible.

There are two types of pepper: black and white. Both are produced from the same plant, but the production process for each is different. While the former is made by drying the immature berries, the latter is produced by drying the fully matured berries after removing the mesocarp. World output of and transactions in black pepper are far greater than those of white pepper.

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1) The figures for Japan's imports of pepper in FAO Trade Yearbooks erroneously contain the imports of red pepper of the genus Capsicum (see Table D-1).

In addition to black and white pepper there is "green pepper", made by picking the raw immature berries in salt water or vinegar and bottling or canning them. Green pepper is sold for use in salads, etc. However, the level of production is small, merely several hundred tons per year, compared to over hundred thousand tons of black and white pepper which are produced every year.

Pepper originated in India, and was already being exported to Europe along the Silk Road before the Christian era, and thus is one of the oldest commodities of east-west trade. The exploratory voyages of Christopher Columbus and Vasco da Gama in the late fifteenth century were also attempts to find pepper and other spices grown in the tropics. The cultivation of pepper plants gradually spread to the tropical areas of Asia, and subsequently the major pepper producing regions changed in the course of its long history. Prior to World War II, Indonesia, which was then a Dutch territory, was by far the most important producer of pepper and accounted for 70% of world output.

However, during the war, Indonesia was isolated from other markets in the world, and almost all of her pepper farms were forced to be converted to food crops. In the post-war years, Indonesian pepper production was resumed, and there was also a sharp increase in pepper cultivation in Sarawak, Malaysia. The 1960s witnessed a surprising expansion in the output of this product in Brazil. At present, over 95% of the world's pepper production comes from the following four countries: India, Malaysia, Indonesia and Brazil.

Tropical zones with a high rainfall are the most suitable for growing pepper. Pepper is a vine, and when fully grown its height ranges from 5 to 10 m, with the diameter of its stalk reaching about 1.3 cm. In the cultivation of this plant, some form of stakes should be provided so it can entwine on them.

Cutting is the exclusive method used to propagate pepper plants. Raising the plant from the seeds is employed only for tests and plant breeding purposes.

Pepper produces berries in the second year after planting the cutting, and the most productive period is from four to seven years after cutting. Thereafter, the yield begins to decline, and no crop is obtainable after 15 years have passed. The timing of harvest varies from area to area; the Table below shows typical harvesting periods in the major producing countries.

India, which has the longest history of pepper cultivation, has many varieties of pepper. The country's most representative black pepper, Malabar Pepper (further described later), is produced from the variety "Balancotta". The next most important variety is Kulluvalli. While the former has large leaves and long spikes, the latter's leaves are small and its berries are large. The yield of Balancotta is high

Table A-1 Pepper Harvest Calendar

Spice	Origin	Months (January - December) 1 2 3 4 5 6 7 8 9 10 11 12
Pepper (black)	Brazil	
	India	——— ———
	Indonesia	
	Madagascar	———
	Malaysia	———
	Sri Lanka	———
		———
Pepper (white)	Brazil	
	Indonesia	———
	Malaysia	———
		———

Source: International Trade Center, UNCTAD/GATT: A Survey of the World Spice Market, 1977

and stable. In addition to these long-established varieties, there is Paniyur I, a high-yield variety developed recently (also discussed later).

Sarawak, in Malaysia, produces two species, Kuchin and Sarikei. While the leaves of the former are large in size, those of the latter are small. Kuchin has a high yield, but is susceptible to foot rot.

In Lampong, the southern area of Sumatra Island, which is Indonesia's principal pepper producing area, a variety called "Balantung" is grown. This plant grows rapidly and has some resistance to foot rot. On Bangka Island, in addition to Balantung, Muntok (also called "Bangka") is cultivated for the production of white pepper.

The variety grown in Brazil are almost all of the Kuchin variety, which was introduced in 1929 from Singapore. Recently, the high-yield variety Paniyur mentioned above is being cultivated on a trial basis in this country, but its commercial production has not yet been started.

In the Southeast Asian countries (Indonesia and Malaysia), foot rot or root rot is the most serious disease for pepper. These was a high incidence of this disease in Sumatra Island from 1925 to 1935 and in Sarawak during the 1950s. Various theories have existed as to the source of foot rot according to the affected areas and the researchers; some have said it is caused by Nematoda while others have blamed Fusacium orxysporum. Today's established theory is that the disease

arises from a fungus called Phytophthora palmivara. The authentic name of the disease in English is foot rot, but the term root rot is also used.

A disease similar to foot rot occurred in Brazil in the 1960s, and has caused chronic damage to the country's pepper farming. As no fundamental countermeasure has yet been found for the disease, Brazilian producers have no alternative but to change the location of their farms from place to place to avoid it.

The source of the Brazilian disease has been identified as Fuzarium solani. Recent studies show that there are two types of this fungus, known as type α and type β, and Professor Fukutomi of Kyoto University has identified that type β is responsible for the Brazilian form of this pepper disease.

The yield of pepper per hectare varies considerably from country to country, and the low productivity in India is particularly conspicuous.

There are differences in the form of cultivation among the producing countries. While farming by a very small farmers is overwhelmingly dominant in India, pepper cultivation is carried out as an enterprise in Malaysia. In Indonesia and Brazil, both of these methods coexist.

B. OUTLINE OF PEPPER PRODUCTION AND EXPORT

The statistics for world pepper production and its import and export are available from the FAO, the IPC (International Pepper Community, (described later) and the USDA (United States Department of Agriculture). In this chapter, we will mainly use the IPC and FAO figures, but there are considerable discrepancies between these two sets of statistics.[1] In addition, we will quote data from statistics prepared in the private sector, including those published in the Pepper News, a monthly publication issued by ASTA (American Spice Trade Association).

The area, yield, production and export of pepper for the world and in the major producing countries according to FAO data are shown in Appendix Tables 1-1 and 1-2. IPC statistics for these items (Appendix Tables 2-1 to 2-3) and the import-export matrix prepared by the USDA (Appendix Table 3) are also attached at the end of this chapter.

These figures indicate that pepper production is concentrated in four countries: India, Malaysia, Indonesia and Brazil. In particular, the expansion of the market share of Brazil in the 1970s is remarkable. FAO statistics show that Brazil's pepper output accounted for one third of the world's entire production in 1980 (See Table B-1 and Appendix Fig. 1). Other smaller producers include Madagascar, Sri Lanka, and Thailand.

Table B-1 Area, Production and Yield of Pepper in the World and Four Major Producing Countries, 1980

	Acreage (ha)	Production (MT)	Yield (kg/ha)	Share (%)
World	220,414	186,272	845	100
India	110,640	27,410	247	14.7
Malaysia	12,900	38,700	3,000	20.8
Indonesia	54,692	37,000	676	19.9
Brazil	22,899	62,458	2,727	33.5
Total, four major countries	201,131	165,568		88.9

Source: FAO statistics

1) There are considerable discrepancies between FAO and IPC statistics. These will be mentioned for each Table and Figure concerned.

As noted, the above Table is based on FAO statistics, which differ greatly from those of IPC. According to the latter figures, the output of Brazil remains at the world's second or third largest (Appendix Table 2-1).

On the other hand, the principal importers and consumers of pepper are the developed nations such as the United States, the West European countries, the USSR and Japan, although this product is exported to almost all countries in the world (FAO statistics list a total of 125 countries, including developed nations, as pepper importers).

The concentration of production areas in a few countries and the distribution of the product to a large number of countries are the salient features of pepper as an international commodity. Because of this, any changes in production occurring in a major producing country due to weather and other natural conditions or economic and political factors exert a great impact on world pepper supply and demand and its prices.

A comparison of the IPC figures for production and exports given in the Appendix Tables shows that all of the producers except India export their entire output, leaving nothing for domestic consumption, which is a strange fact. This is probably because the figures for pepper production are underestimated in these countries. As discussed in the section on pepper consumption (D. III) below, the average figures given in FAO's Food Balance Sheet, 1975-1977, indicate that per capita pepper consumption in these producing countries is greater than in the major consuming countries such as the Federal Republic of Germany, France and the United Kingdom. This means that a considerable amount of pepper consumption exists in the producing countries. The estimated pepper supply for 1982 published in IPC's Pepper News, July, 1982, gives the following figures for domestic consumption in the four main producing countries: 18,000 tons in India, 4,000 tons in Indonesia, 1,500 tons in Malaysia and 4,000 tons in Brazil.

C. PRODUCTION IN THE MAJOR PRODUCING COUNTRIES

I. India

India is the country in which pepper originated and her history of pepper cultivation is the longest in the world. During World War II this country was the only supplier of pepper to the European markets, accounting for 90% of the world's total output, since exports from Indonesia and other Southeast Asian countries ceased during that period.

Pepper production in India is concentrated in the State of Kerala, in the country's southwestern region. This State produces 95% of India's total pepper output.

The area, production and yield of pepper in India in the 1970s are shown in Appendix Tables 1-1 and 1-2 (FAO statistics) and 2-1 to 2-3. Table C-1 below summarizes the FAO statistics for India for the past three years.

Table C-1 Area, Production, Yield and Export of Pepper in India, 1979 - 1981

	Area (ha)	Production (MT)	Yield (kg/ha)	Exports (MT)
1979	110,720	27,700	250	20,545
1980	110,640	27,410	247	26,795
1981	110,000	29,000	263	18,636

Source: FAO statistics

India's pepper yield per ha is very low compared with that of other producing countries. The principal reason for this low level of productivity is probably that pepper cultivation is performed in this country by many small-scale farmers. Most pepper farmers own only 0.3 to 1.5 hectares of farm land, and are also growing other crops in many cases. These petty farmers are not very responsive to the price of their pepper; even if the price becomes higher, they make no efforts to increase their yield. Conversely, they tend to continue pepper cultivation even when the price is not very favorable. This is probably the reason for India's pepper output and export volume being relatively stable.

The most effective way to increase yield in areas where a large number of small farmers exist is the introduction of better species. In this regard, Panniyur I, which has been recently developed, is worthy of attention. According to a report by the FAO, this new species has a yield nearly double that of the plants formerly grown.

As in the case of Malaysia and Indonesia, India faces the threat of foot rot mentioned earlier (Phytophthora palmivara). However, since the scale of cultivation in India is smaller than that in Malaysia and other areas, the possibility of a wide occurrence of the disease is also less.

Almost all of the pepper produced in India is of the black type, and India's black pepper is traded under such names as Malabar Black and Tellicherry Black after the names of the major export ports.

In the past, the traditional destination for India's pepper was Europe, but during the 1970s there was a shift from the free markets of Europe to the USSR and other East European countries.

II. Malaysia

Malaysia also has a long history of pepper growing. After World War II, Sarawak's output showed a rapid increase, and at present 99% of the country's pepper is produced in this area.

Sarawak State produces both black and white pepper. Of the total output of about 30,000 tons in 1980, some 22,000 tons were black while the remaining 8,000 tons were white.

The major portion of Malaysia's pepper exports is sent to Singapore, from where the pepper is sold on the world market. The largest quantity directly exported from Malaysia is purchased by Japan.

Table C-2 Area, Production, Yield and Export of Pepper in Malaysia, 1979 - 1981

	Area (ha)	Production (MT)	Yield (kg/ha)	Exports (MT)
1979	12,160	35,200	2,894	40,310
1980	12,900	38,700	3,000	30,560
1981	13,300	40,000	3,007	28,478

Source: FAO statistics

Unlike in India where subsistent peasants account for most of the pepper output, pepper farming in Malaysia is mainly performed by profit-oriented owner farmers. The Government has adopted incentive measures including loans to pepper producers and a system of product grading, testing and Government purchase for price support, in an effort to raise the level of production of this crop. In 1975 the Export Standards System was inaugurated to maintain the high reputation of Malaysian pepper internationally.

However, it is said that the declining trend of the international price of pepper since 1978 is adversely affecting the motivation of producers, and that since around 1980 some pepper farmers have begun to neglect the management of their farms. Also important to the future of the country's pepper production will be the efficacy of preventing the diffusion of plant disease (Phytophthora palmivara).

III. Indonesia

Indonesia is another country which has a long history of pepper cultivation. During the 19th century, the country was producing half of the world's pepper output. Pepper production was temporarily halted during the World War years, but recovery began in the 1950s, followed by rapid growth in the 1960s.

In Indonesia two forms of pepper farming can be observed: estate farming and small-scale farming. The estates are further divided into those which are nationally-owned and private estates. In relation to prices, pepper has competition with, for example, cacao. Furthermore, there have been changes in output due to the occurrence of foot rot.

The main producing area is the State of Lampong at the southern tip of the island of Sumatra. This State produces Lampong Black pepper, the most important brand in the country's international trade. White pepper is produced chiefly on Bangka Island, and this product is known as Muntok White after the port from which it is shipped. In 1980, Indonesia exported about 29,000 tons of pepper, comprising 17,000 tons of black pepper and 12,000 tons of white pepper. More than half of the black pepper exported goes to the United States, whereas the major portion of the white pepper exported is sold to Western Europe. According to official statistics, Indonesia's exports of pepper via Singapore are not very substantial in quantity, unlike the case of Malaysia. However, it is said that a considerable quantity of informal sales to Singapore exists.

Table C-3 Area, Production, Yield and Export of Pepper in Indonesia, 1979 - 1981

	Area (ha)	Production (MT)	Yield (kg/ha)	Exports (MT)
1979	52,710	32,000	607	25,226
1980	54,692	37,000	676	29,680
1981	59,000	39,000	661	34,074

Source: FAO statistics

IV. Brazil

Pepper cultivation in Brazil dates back to the 17th century. However, commercial production of the plant was started in 1933 by Japanese immigrants, who settled in the Amazon Basin in 1929 and cultivated plants which they had introduced from Singapore. The variety they grew is thought to be the Kuching variety, the same variety as is grown now in Sarawak, Malaysia.

Until about 1970, almost all of the pepper farmers in Brazil were of Japanese descent, but during the 1970s pepper cultivation became widespread among native Brazilian farmers also, and the country's pepper production experienced a remarkable growth.

Table C-4 shows Brazil's pepper area, production and yield in the 1970s based on the IPC statistics. Since the figures given for 1975 onwards differ greatly from those of the FAO, FAO data for those years are also supplied in the Table. It is stated that FAO information is based on the official reports of the Brazilian Government.

The major producing area of pepper in Brazil is the State of Para located at the mouth of the Amazon. About 90% of the country's pepper output comes from this State.

Brazil produces both black and white pepper. The output of the former is greater in quantity, and almost all of the pepper exported to the United States, the country's greatest buyer, is black pepper.

Table C-5 shows Brazil's exports of the two types of pepper over the past three years.

Table C-4 Area, Production and Yield of Pepper in Brazil, 1968 - 1980

	Area (ha)		Production (MT)		Yield (kg/ha)
1968	5,567		14,094		253
1969	5,453		14,031		257
1970	5,473		14,267		260
1971	5,473		13,500		246
1972	5,500		14,500		263
1973	8,357		18,500		221
1974	8,357	*	18,500	*	221
1975	8,889	9,909	21,000	28,720	236
1976	10,127	11,173	23,000	30,380	227
1977	11,139	12,578	25,585	37,877	229
1978	12,253	15,786	30,000	47,015	244
1979	12,253	19,879	30,000	49,006	244
1980	12,253	22,899	30,000	62,458	244

Source: Compiled from IPC 1980 Report, except for figures in the columns marked * which are FAO data.

Table C-5 Pepper Exports from Brazil

(MT)

	Black pepper	White pepper	Total
1979	22,000	2,687	24,687
1980	26,172	4,621	30,793
1981	39,472	6,277	45,749

Source: Compiled from CACEX data

Pepper farming is performed mainly by investors who manage plantations, landed farmers, and petty farmers.

The rapid production increase in the 1970s was supported by Government promotional policies, principally loans for the planting of pepper. It is considered that 40% of the country's total pepper output is produced by petty farmers, who had once been the workers in

pepper plantations. These small-scale farmers are less experienced in pepper farming than those in India, where pepper cultivation has a longer history. Partly because of this, the quality of the pepper they are producing appears to be somewhat inferior.

Since 1980, Brazil along with the other producing countries has been faced with low international prices for pepper. Rising commodity prices since the second oil crisis and foreign exchange factors have also diminished the farmers' motivation.[1] In particular, the output of plantations and landed farmers, whose combined production is estimated at 60% of the country's total, may decline in the years to come.

As in the Southeast Asian producing countries, Brazil suffers from a disease which attacks pepper. It is believed that this disease is caused by the fungus Fusarium solani, type β, unlike the type found in Sarawak and Indonesia described before.

Since the source of the disease has recently been identified, preventive measures will be established in the near future. Therefore, the factors which will affect the future of pepper production in Brazil will be the economic trends of the country, especially the movements of commodity prices and foreign exchange, and the price relationship between pepper and competitive crops.

1) When the year 1971 is used as the base year, the combined commodity price index in May 1982 in the State of Para was 58 times greater, while the price of black pepper per kilogram was only 26 times higher. The minimum wage of farm workers rose to 83 times the previous level, resulting in pepper cultivation, which requires labor for management, harvesting and post harvest work, etc., facing a difficult situation.

D. CONSUMPTION AND IMPORT OF PEPPER

I. Uses and Patterns of Consumption

The consumption of pepper can be roughly divided into a. home cooking, b. consumption in the catering industry including restaurants, and c. consumption in the food processing industry, especially for processed meat such as sausages.

For home and restaurant use, both black and white pepper are used, although the consumption of the white is greater. Food processors mainly use black pepper, with the white type being applied to those foods which are light in color, such as mayonnaise.

The ratio of consumption in the three sectors mentioned above varies from country to country, and no precise data are available. However, in the Federal Republic of Germany, where the sausage industry flourishes, more than 50% of domestic pepper consumption is for meat processing, while the French consume more for cooking purposes and thus use white pepper in a greater quantity. In Japan, where the history of pepper use is relatively short, most of the pepper consumption is in the food processing industry, and home use has not yet been developed.

Food processors are recently using greater quantities of oleoresin, in addition to black pepper. Oleoresin is a substance extracted from black pepper by means of a solvent. It retains the flavor, aroma and pungency of pepper and can be considered an essence of pepper. This substance is produced in Europe, the United States and other pepper importing countries. Recently, however, factories have been established in India and some other producing countries to manufacture oleoresin, and these countries will be exporting oleoresin instead of black pepper only.

As stated above, pepper is consumed as an ingredient of foods, either directly or indirectly. Pepper oil produced by the steam distillation of pepper is used as an essential oil in the manufacture of perfumes and other cosmetics, but the consumption of pepper for this purpose is negligible in quantity.

II. Geographical Distribution of Consumption

Pepper cultivation is concentrated in the four main countries, which are filling the global demand for the product. Therefore, the

geographical distribution of pepper consuming areas can be understood by examining the situation of pepper imports by countries.

The import statistics by countries based on the FAO Trade Yearbook shown in Table D-1, and the matrix of pepper importing and exporting countries compiled from USDA data shown in Appendix Table 3, indicate that the largest importer is the United States. The combined imports of the major countries, including the United States, the USSR, the Federal Republic of Germany, France and Canada, occupy the major portion of world pepper imports. Major importers in other areas which can compare with the above nations are Japan, Saudi Arabia and Morocco.

In the import statistics and matrix, the fact should be noted that the pepper trade of Singapore, which is both a great importer and exporter of the product, is entrepot trade. Because of this, the figure for total world pepper imports is not the equivalent of total world pepper consumption. Hong Kong is also engaged in entrepot trade, although in far smaller quantities than Singapore. In addition, such large-scale importers as the United States, the Federal Republic of Germany and the United Kingdom are also re-exporting some of the pepper which they import.

Table D-1 Pepper Imports by Selected Countries, 1970 - 1981

(MT)

	USA	Germany, FR	German DR*	UK	France	USSR	Saudi Arabia	Japan	Singapore
1970	21,915	5,954	800	3,133	3,807	8,300	516	2,278	24,498
1971	28,165	7,137	820	2,931	4,572	6,900	729	2,951	25,839
1972	23,980	7,566	690	3,705	4,870	11,700	725	3,547	23,709
1973	25,217	7,736	860	4,680	5,575	9,300	928	4,050	21,215
1974	25,464	7,874	1,240	4,150	5,430	8,150	693	2,982	25,766
1975	24,968	8,167	2,473	3,155	5,713	8,317	757	3,115	29,364
1976	26,509	9,486	2,035	4,812	6,198	11,199	1,493	3,886**	33,747
1977	26,460	10,079	1,323	3,439	6,825	10,042	2,446	4,485**	31,301
1978	28,626	9,653	2,833	5,291	6,961	10,885	3,266	3,842**	36,880
1979	27,380	11,661	2,916	6,266	7,302	11,604	3,576	4,217**	33,872
1980	33,547	10,847	3,200	4,503	7,246	11,572	5,247	4,606**	24,277
1981	31,290	11,432	2,400	5,400f	8,670	14,126	3,931	5,152**	21,915

* Unofficial figures for German DR

** FAO statistics for Japan from 1976 onwards erroneously include the import of capsicum. Thus, the figures for Japan with asterisks have been corrected using the customs clearance statistics of the Japanese Government.

Source: FAO, Trade Yearbook

III. Consumption Levels

To obtain the level of pepper consumption in a country, the amount of pepper re-exported is deducted from the amount imported, and the balance is then divided by the number of population to obtain the figure for per capita consumption.

Table D-2 shows the annual per capita pepper consumption by selected countries on the basis of a report of UNCTAD/GATT's International Trade Center.[1] In general, per capita consumption is greater in the United States and European nations whose levels of pepper imports are larger. Especially noteworthy is the fact that the figures for Saudi Arabia and Kuwait, both petroleum producing countries, stand at a very high level. In addition, between 1975 and 1978 Yugoslavia and Hungary increased their per capita pepper consumption by four times and three times their previous levels respectively.

The higher level of income in the United States and Europe undoubtedly contributes to the higher level of pepper consumption in these countries. However, a more important factor is that these countries have a longer history of pepper consumption, and pepper has become firmly established in the daily diet of their population.

It is believed that the demand for such a commodity, whose use has been established among consumers and which has no substitute, is less responsive to price fluctuations. In other words, the theory goes that people will not reduce their consumption of such a commodity even if its price increases, nor will they increase its use even though its price becomes lower. Furthermore, increases or decreases in income will not greatly affect consumption for this type of product.

However, this theory is valid only in the case of those countries in which the use of pepper has continued and been established over several centuries, as in the Western countries, and the situation differs in other areas.

The original function of pepper was to remove the smell of stale meat in the years prior to the introduction of refrigeration. The use of pepper has therefore had a close relationship with meat diets, with people who consume more meat also consuming a greater quantity of pepper. In the developed countries in the West, the demand for meat has already reached saturation point, and the price and income elasticities for meat demand are low. On the other hand, the income elasticity for meat demand is considered to be substantially higher in low income countries. This indicates that when the income level in the

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1) A Survey of the World Market for Spices, International Trade Center, Geneva, 1977. This survey was conducted by the Center under a grant from the Netherlands Government.

Table D-2 Per Capita Consumption of Pepper, 1975 and 1978

(grams/year)

Country	Per capita consumption 1975	1978
I. North America		
Canada	100	108
USA	117	132
II. Western Europe		
1) EC countries		
Germany, FR	131	153
UK	51	61
Netherlands	94	98
France	107	125
Italy	58	52 e)
BLEU	90	118
Denmark	102	120
2) Other Western Europe		
Sweden	90	85
Norway	69	67 e)
Austria	97	119
Finland	32	26
Spain	36	37
Switzerland	121	119
III. Eastern Europe		
Czechoslovakia	84	84 c)
German DR	148	148 c)
Hungary	100	293 e)
Poland	62	62 c)
USSR	32 b)	42
Yugoslavia	32	124 e)
IV. Middle East		
Egypt	17	17 c)
Kuwait	138 b)	143 c)
Iran	26	24 e)
Saudi Arabia	129 a)	161 d)
Yemen, P.D.R.	33	29 d)
V. Asia & Pacific Region		
Australia	82	77
Hong Kong	n.a.	n.a.
Japan	28	33
New Zealand	47	50 e)

a) 1973, b) 1974, c) 1975, d) 1976, e) 1977

Source: UNCTAD/GATT, Spices: A Survey of the World Market, Vol. 1 & 2: Selected Markets in Western & Eastern Europe, the International Trade Center, 1978

developing countries is improved in the future and people consume more meat, new demand for pepper may emerge. In this case, pepper consumption will be affected not only by increased consumption of meat but also by changes in the cooking methods and forms of meat consumed, i.e., in processed or unprocessed form. The case of Japan in the 1960s and 1970s, when meat consumption increased, followed by increased use of pepper, provides a good example.

The above study presents the general situation of pepper consumption. In the following section we will discuss this subject further in respect of the major consuming countries.

E. MAJOR CONSUMING COUNTRIES

I. The United States

The United States is the largest importer of pepper in the world, but per capita consumption is less than in the Federal Republic of Germany and France (Table D-1 above). A little more than 90% of the pepper imported is black pepper, and imports of white pepper are less in quantity than in Europe. The reason for this is probably that home pepper consumption in this country is less than that in the European countries, while consumption in the food industry is greater.

In the United States, there are a number of world-famous food manufacturers such as Campbell and Heinz, and the catering industry is also active, represented by Kentucky Fried Chicken and McDonald's. These food manufacturers and caterers are large consumers of pepper. Recently there has been a tendency in the United States to return to home cooking rather than eating out or consuming pre-cooked foods. Thus, an increase in the household consumption of pepper can be expected.

The greatest exporters of black pepper to the United States are Indonesia (Lampong Black) and Brazil, while the majority of the country's white pepper imports come from Indonesia (Muntok White).

The United States' import of Lampong Black already has a history reaching back one hundred years, and this brand is the most popular among American consumers and users. Brazil began exporting pepper to the United States in the 1950s, and sales showed a remarkable increase during the 1970s.

II. The Federal Republic of Germany

The Federal Republic of Germany, together with the USSR, is the second-largest importer of pepper after the United States, and has imported over 10,000 tons per year over the past several years. Its major suppliers are Indonesia, Singapore and Brazil, with Indonesia supplying more than half of the total quantity of pepper imported. The Federal Republic of Germany is also the center of the pepper trade in Western Europe, and re-exports some of the quantity imported to neighboring countries, especially France. The total quantity of pepper re-exported from the Federal Republic of Germany in 1981 was 480 tons.

Table E-1 Imports of Black and White Peppers into the USA, by Country of Origin, 1980 and 1981

Commodity and Origin*	1980		1981	
	(MT)	(US$1,000)	(MT)	(US$1,000)
Pepper, black				
Afghanistan	-	-	30.0	41.2
Brazil	10,074.5	16,686.0	14,686.4	18,620.9
China, mainland	0.7	1.8	21.3	36.8
Colombia	6.2	14.0	-	-
Greece	-	-	10.2	20.2
Hong Kong	0.5	1.6	0.8	2.2
India	3,992.6	7,256.2	558.7	858.3
Indonesia	11,408.0	19,116.7	12,615.3	15,768.9
Macao	15.2	30.1	-	-
Malaysia	3,639.6	6,704.6	273.0	389.1
Mexico	-	-	31.4	49.4
Netherlands	1.6	3.4	0.2	0.9
Singapore	296.1	555.9	37.0	137.8
Spain	17.0	29.9	-	-
Sri Lanka	153.4	279.3	294.9	384.0
Surinam	15.0	27.8	-	-
Taiwan	**	0.9	1.3	1.0
Thailand	2.2	11.6	1.3	8.5
Others	21.3	58.3	1.6	8.7
Total	29,643.9	50,778.1	28,563.4	36,327.9
Pepper, white				
Brazil	508.7	1,141.7	763.0	1,311.5
Canada	0.2	0.7	-	-
China, mainland	35.1	83.6	0.5	2.5
France	**	0.5	0.5	4.3
Hong Kong	-	-	2.7	8.7
Indonesia	2,418.8	5,982.5	1,560.8	2,819.0
Japan	**	0.3	**	0.3
Malaysia	99.6	200.1	43.2	69.5
Netherlands	0.2	0.9	0.9	4.5
Singapore	130.8	277.8	75.0	127.5
Taiwan	-	-	54.9	99.7
Thailand	0.4	2.3	1.3	7.5
Total	3,193.8	7,690.4	2,503.1	4,455.0

* Unground unless otherwise specified.
** 50 kg or less

Source: USDA, Foreign Agriculture Circular, FTEA 1-82, April 1982

More than 50% of domestic consumption is by the food industry, with about 35% for home use and some 10% used by restaurants and other caterers, according to one estimate. The rate of personal consumption seems to be substantially higher than in the United States, and white pepper is preferred for home use. Most of the pepper consumed in the food industry is for the production of sausages.

III. The United Kingdom

British pepper imports show considerable fluctuations on a yearly basis. In the 1970s imports showed a rising trend, and until the mid-1970s the quantity of white pepper imported was greater than that of black pepper, but thereafter the situation has been changing. The major reason is the increasing consumption in the food industry.

A large quantity of food products containing pepper are exported from the United Kingdom, such as curry powders and mixed spices. However, the exact quantity of the pepper content, i.e., the quantity of pepper re-exported in the form of these food products, is unknown.

The United Kingdom has a close relationship with the Commonwealth countries and in the past its major suppliers were India, Malaysia and Singapore. Recently, however, imports from Brazil have been increasing, reaching 671 tons in 1980. There are also large fluctuations in the annual quantity of pepper imported from each of the supplying countires (Appendix Table 3).

IV. Japan and Others

Japan's consumption of pepper was very small in the past, but in the 1960s it began to rise rapidly. In 1982 Japan's imports of pepper reached 5,000 tons, a level equal to that of the United Kingdom, a traditional pepper importing country.

This sudden increase in pepper consumption in Japan was caused by both increase in meat consumption and change of the meat consumption pattern.

The traditional diet of the Japanese centered on rice and fish. The meat diet was introduced from the West in the second half of the 19th century, but soy sauce was the main seasoning used in cooking meat, as in the case of "sukiyaki". Red pepper, which was produced in a large quantity in Japan, was also widely used as a spice, and Japan was a major exporter of this product. After World War II, the high

rate of economic growth, accompanied by an increase in personal income, brought about a sharp increase in meat consumption among the Japanese. In addition, a greater consumption of ham, sausages and other processed meats and an expansion of the food industry supported by the development of such new food products as instant Chinese noodles and curry products have contributed to increased pepper consumption. Changed styles of diet in the home and the growth of the catering industry have also contributed to this trend, although these factors are far less important than the role the food industry has played.

The Republic of Korea, Japan's neighbor, has also experienced a rapid increase in imports of pepper,[1] and the case here appears to be the same as that of Japan. As with Japan, red pepper was the traditional spice popular with Koreans. However, with rising personal income resulting in a higher level of meat consumption, and the added factor of the development of the food processing industry, the country's pepper consumption has been expanding.

1) The Republic of Korea's pepper imports, which stood at 130 tons in 1970, reached 1,000 tons in 1980 (FAO, Trade Yearbook).

F. INTERNATIONAL AND DOMESTIC TRADE IN PEPPER

I. Marketing in Producing Countries and International Marketing

In the pepper producing areas, with the exception of commercial production at plantations, local traders purchase pepper from a number of producers. The pepper thus purchased is resold to exporters at shipping ports, either via wholesalers in local trade centers or directly, and the exporters have the function of the selection, grading, packaging, storage and shipment of the product.

Between these exporters in the producing country and the users in the importing country there are one or more intermediate stages, namely dealers or traders.

The majority of the pepper produced at plantations is sold directly to exporters without the intervention of local brokers. In Brazil, cooperatives of pepper farmers in some cases jointly ship their product, as in the case of the Tomeaçu Cooperative in the country's pepper producing area, for example, which handles 2,000 to 3,000 tons per year. The quantity handled by other cooperatives is small, however, and the total quantity shipped by cooperatives accounts for only a minor share of Brazil's total output.

International dealers and traders in pepper operating between the export and import stages move the product according to the world trends of production and the supply and demand situation, and play a key role linking supply and demand in the international markets. They are classified into traders and dealers located in the trade centers in large consuming countries and those in Singapore, most of the latter group being Chinese. Singapore mainly handles pepper from Indonesia and Malaysia.

The international trade system described above has existed for several hundred years. In the past forty to fifty years, however, this traditional system has been gradually changing. In the first instance, this has taken the form of an increasing number of cases in which the users purchase directly from the exporters in the producing countries.

Here, the term "users" means large consumers such as grinders, processors, food manufacturers and oleoresin producers. Another system is that in which these users own pepper farms in a producing country. For example, leading manufacturers of curry in Japan operate a pepper farm and produce pepper in Malaysia.

Still another recent change is a stronger intervention in pepper

production and export by the governments of producing countries. Measures such as price supports for the producers, loans to pepper farmers and a licensing system for exporters are among the major examples of such intervention. The Indonesian Pepper Board and the Malaysian Pepper Marketing Board were established in 1969 and 1971 respectively to enforce these policies. These government agencies have their offices in trade centers in the main consuming countries, and they provide services to importers, coordinate public relations and advertising campaigns and are themselves engaged in exporting the product. In 1972, Indonesia, India and Malaysia jointly set up the International Pepper Community (IPC), which Brazil and Madagascar have now also joined. The Community has its secretariat in Djakarta.

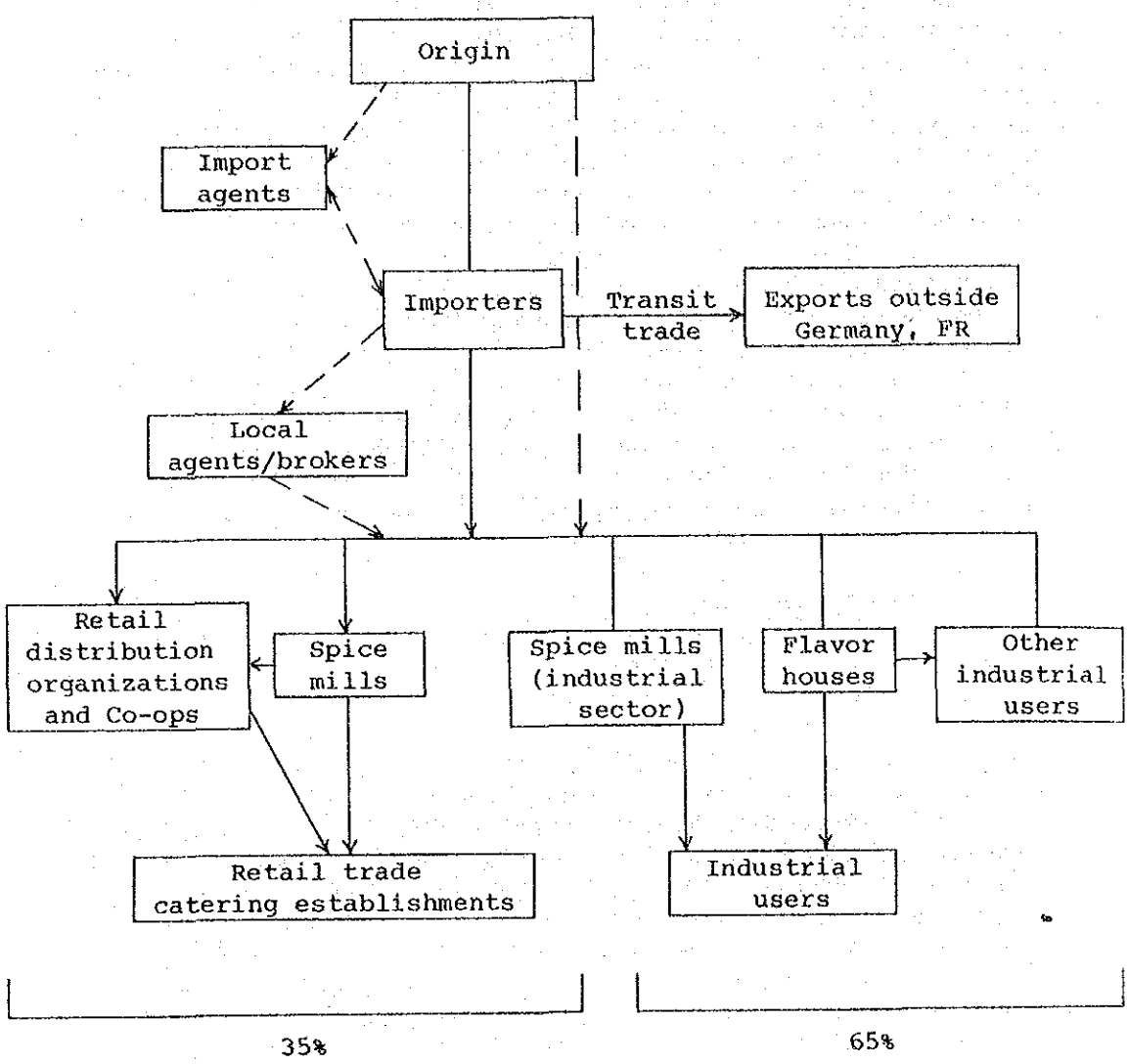
As a result of these changing circumstances, the number of international dealers has been decreasing. For instance, spice dealers in the United Kingdom and the Federal Republic of Germany, who mainly handle pepper declined by almost half in number from the 1960s to the 1970s. In the United States, those members of the American Spice Trade Association (ASTA) who are classified into the category of dealers and brokers also decreased in number to nearly half the previous level, while the number of those in the processor group increased.

II. Internal Distribution in Consuming Countries

In the consuming countries, pepper purchased by importers or dealers is resold to packers or "flavor houses" in its original form or after grinding by job grinders. The packers then package the pepper, which has been ground into a variety of grain sizes, in small containers with or without blending with other types of pepper, and sell it to retailers via wholesalers, or to restaurants and other commercial users. The packed pepper is sold with or without the packer's brand name. Flavor houses similarly separate or mix pepper according to the requirements of the users, and sell the product to food factories and other industrial users. Some business concerns operate both as a packer and a flavor house.

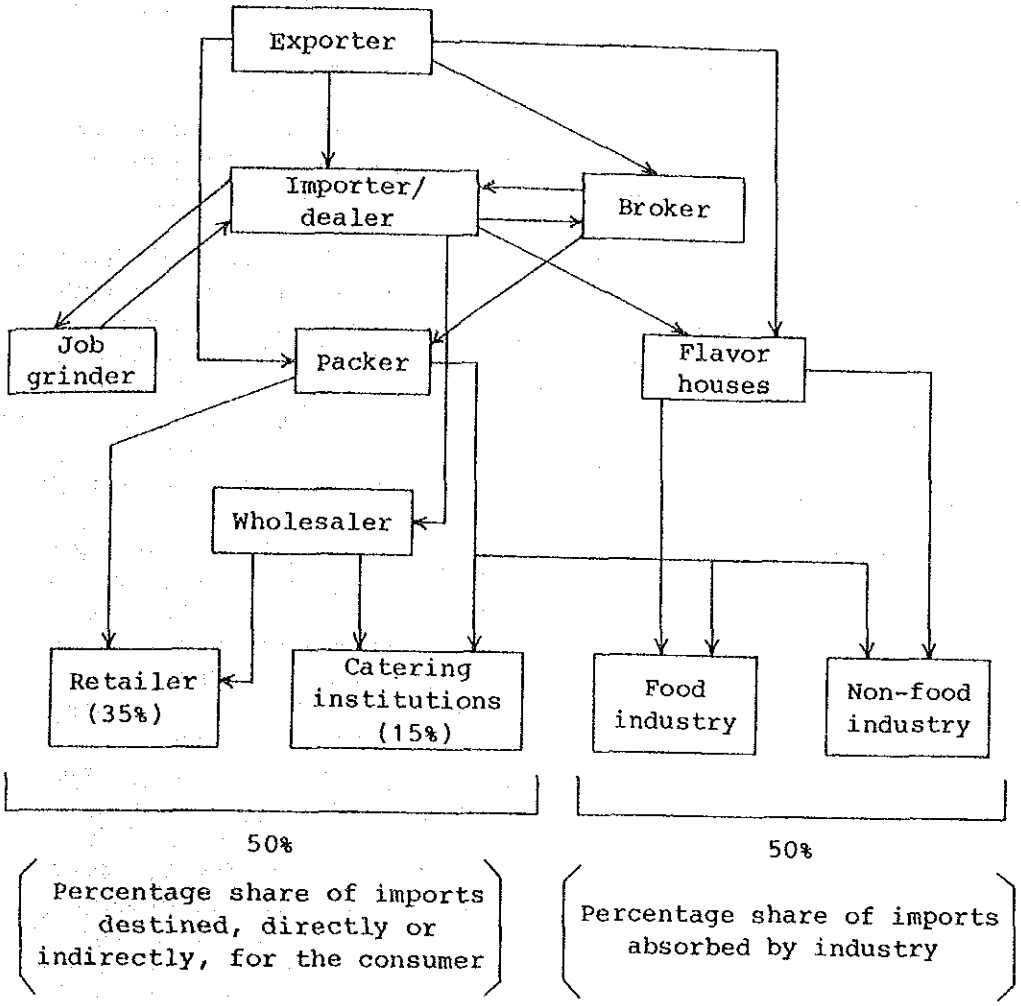
Figs. F-1 and F-2 below illustrate the internal distribution channels of spices in the Federal Republic of Germany and the United Kingdom. The distribution routes of pepper in these countries are roughly the same as those for spices, and the channels in the United States are similar to those to be found in the United Kingdom.

Fig. F-1 Distribution Channels of Spices in the Federal Republic of Germany



Source: UNCTAD/GATT, Spice: A Survey of the World Market, International Trade Center, Geneva, 1977

Fig. F-2 Distribution Channels of Spices in the United Kingdom



Source: Same as for Fig. F-1

G. INTERNATIONAL PRICES OF PEPPER

I. Standard Brands and their Price Differential

New York, London, Hamburg and Singapore are the centers of the international pepper trade. Among these, the prices on the New York market exert the greatest influence.

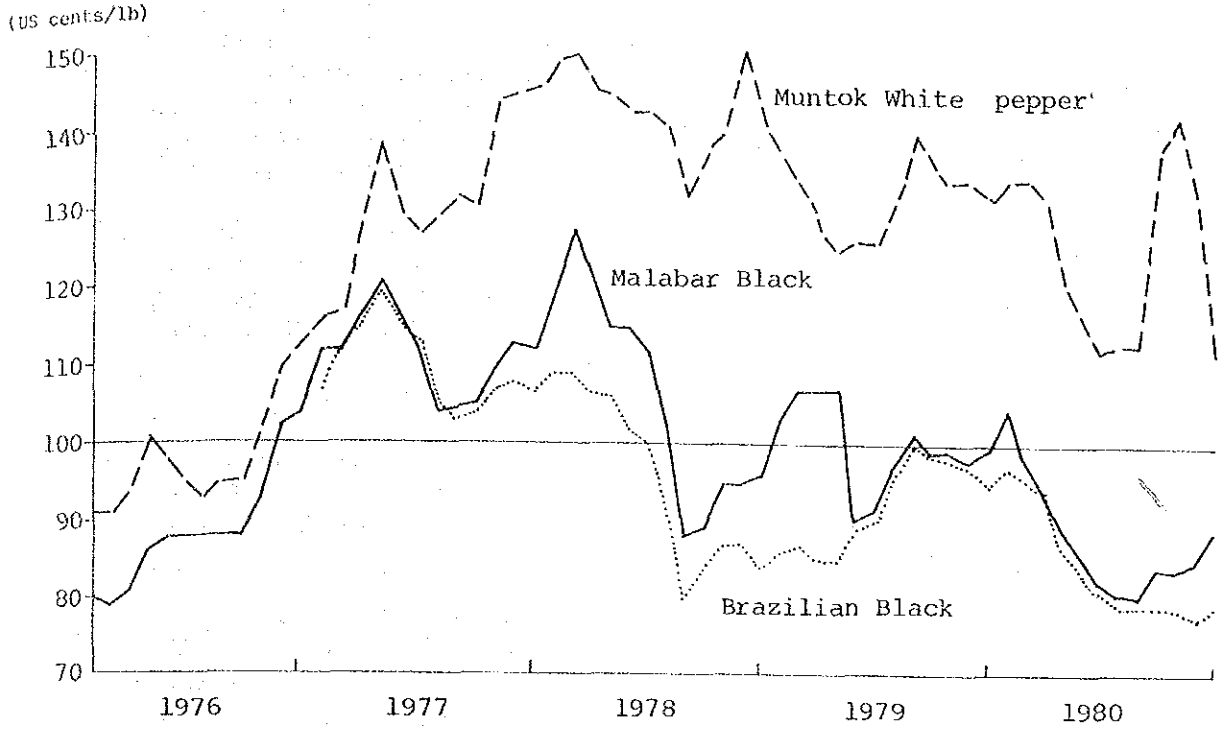
The brands of pepper handled in each of these markets are roughly identical, and they are named after their producing area or port of shipment. A large number of these brands exist, but the most representative ones used in the IPC statistics to show the movement of pepper prices include such black peppers as Malabar Black (India), Lampong Black (Indonesia), Sarawak Black (Malaysia), Brazilian Black and Tellicherry Extra Bold (India); and white peppers such as Sarawak White, Muntok White (Muntok Island, Indonesia) and Brazilian White.

The prices of white and black pepper move together, but the white variety is consistently more expensive than the black variety and a considerable differential exists between the prices of the two types. White pepper is produced by drying the fresh berries after the removal of their mesocarp, and its production cost is higher than that of black pepper. Moreover, the yield (percentage of pepper obtained from berry) of white pepper is smaller than that of black pepper, at around 27% and 33% respectively. Naturally, therefore the price of white pepper is higher than that of black pepper.

Of the two brands of white pepper, Muntok and Brazil, the price of the former is always higher than that of the latter. Among the five brands of black pepper, Tellichery is exceptional in that it has the highest price at all times. Of the remaining four, in general the price of Malabar is the highest while that of Brazil is the lowest.

Price differences among the various brands occur depending on the quality of the pepper. The quality of a pepper as well as of spices in general is made up of a delicate combination of aroma, flavor and pungency. Consuming countries have their own tastes, and this preference in taste is considerably reinforced by the fact that consumers have become accustomed to a particular brand after many years of use. Thus, behind the British preference for Malabar from India and the Scandinavian countries' strong liking for Muntok White lies their long history of use of the respective brands. A special case is Tellicherry from India, a brand which has an established position in Italy as a spice for salami sausages. Consequently, Tellichery Extra Bold maintains an exceptionally high price level among the black peppers.

Fig. G-1 Price Trends of Selected Varieties of Pepper, New York Spot (CIF), 1976 - 1980



Note: 1976 data for Brazilian Black are not available.
Source: IPC, Pepper News, Vol. V. No. 1, 1981

Lampong Black from Indonesia has maintained its important position for a century in the United States, the world's largest market for black pepper, although the share held by Brazilian Black has expanded rapidly during recent years. This is because Brazilian pepper is easier to obtain and is offered at lower prices.

II. Movements of International Prices for Pepper

Needless to say, the price of an international commodity is formed by the global supply and demand situation for the commodity. In the case of pepper, as described earlier, there are great fluctuations in supply, while fluctuations in demand are small. As a result, the supply situation of pepper is a factor greatly influencing its price level.

The supply of pepper is affected not only by such natural factors as weather and the incidence of disease but also by economic and political factors including competition with other crops in producing areas and government policies towards pepper cultivation. Pepper growing is concentrated to a few countries only, and consequently a change in pepper output in any one of these producing countries also exerts a substantial impact on the world's pepper supply. Moreover, price fluctuations caused by increased or decreased output in turn affect the motivation of pepper farmers, which then results in a rise or fall in production in the next crop year and thereafter.

Table G-1 shows the movements in pepper prices over the period of 92 years since 1890 by the annual average spot price of Lampong Black on the New York market. Fig. G-2 is a chart of the average monthly price fluctuations of this brand on the same market. This graph indicates that the monthly price fluctuations were smaller during the years before World War II than in the post-war period.

Appendix Fig. 2 shows both the changes in world annual average pepper prices and those in world pepper output (Note that prices in Fig. G-2 are in cents per pound, while those in Appendix Fig. 2 are in dollars per kilogram).

Appendix Fig. 2 clearly shows the correlation between pepper output and its price. The abnormally high price level in 1950 occurred when global pepper production registered an all-time low in the aftermath of World War II. In addition, an increase in pepper consumption following the shift from a war-time economy to normal economic conditions in the major consuming countries may have also been responsible for the high price level. Stimulated by these favorable price conditions, the rapid and large-scale new planting of pepper was started in Indonesia and Malaysia, and this fact is evident from the production curve. The pepper price temporarily rallied in 1960 after declining as pepper supply expanded, this price rebound being caused by poor harvests in both Indonesia and Malaysia simultaneously.

The sudden rises of price between 1973 and 1977 probably occurred more because of factors in the world economy as a whole, such as the low value of the U.S. dollar and worldwide increases in the price of farm products, than because of the supply conditions of pepper itself.

A long-term outlook has been given above on the international price of pepper, determined as it is by world supply and demand. In this subsection, the short-term, or everyday, formation of the international price is discussed.

Whereas exchanges exist for wheat and other internationally traded agricultural products, in such main international markets as Chicago, New York and London where quotations are formulated daily providing guides and standards for international trade, no such trading exchanges exist in the case of pepper.

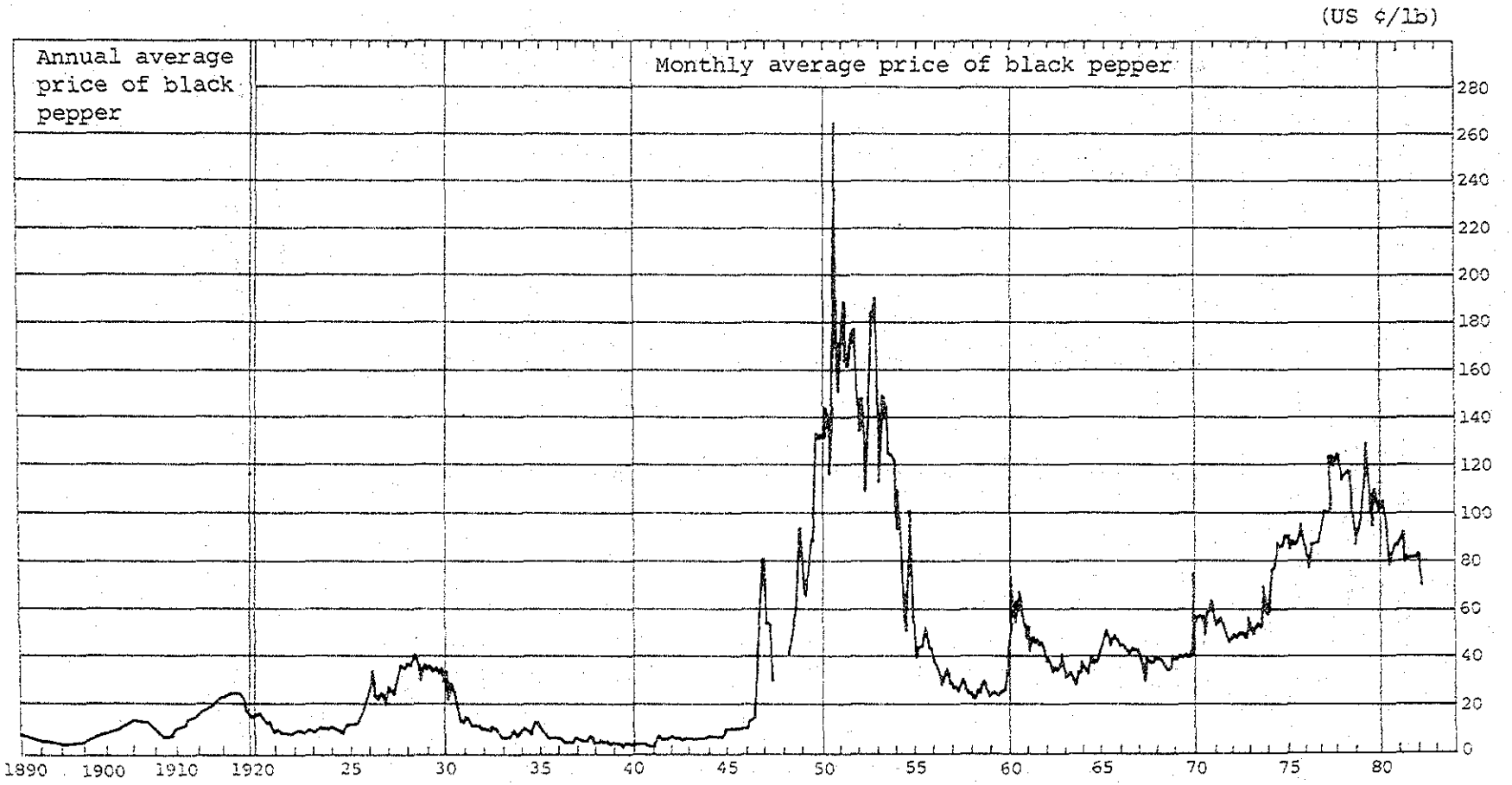
Table G-1 Annual Average Price of Pepper, 1980 - 1981; New York Spot Price for Black Pepper (Lampong Black)

Year	Price (¢)	Year	Price (¢)	Year	Price (¢)
1890	25.4	1921	20.1	1952	338.8
91	19.2	22	22.3	53	280.9
92	15.2	23	23.8	54	161.4
93	13.2	24	24.5	55	98.8
94	11.5	25	50.7	56	69.4
95	11.0	26	56.4	57	59.7
96	11.0	27	70.1	58	57.3
97	14.6	28	83.1	59	67.0
98	19.6	29	75.8	1960	128.3
99	24.7	1930	47.6	61	100.5
1900	28.4	31	27.3	62	80.7
01	28.4	32	22.0	63	73.9
02	27.9	33	18.3	64	85.3
03	28.4	34	24.3	65	103.4
04	27.1	35	17.0	66	95.0
05	26.9	36	12.1	67	72.1
06	25.1	37	13.4	68	72.8
07	21.8	38	11.9	69	92.8
08	15.9	39	8.8	1970	127.0
09	15.7	1940	9.0	71	109.8
1910	17.6	41	13.4	72	100.5
11	21.4	42	14.6	73	125.2
12	25.4	43	15.0	74	181.4
13	24.0	44	16.5	75	197.3
14	25.6	45	22.0	76	249.1
15	30.0	46	86.2	77	277.8
16	38.0	47	96.7	78	234.1
17	52.0	48	137.1	79	233.9
18	56.4	49	234.8	1980	196.9
19	44.5	1950	360.2	81	186.3
1920	31.3	51	373.2	82	165.0

Note : The price for 1982 is as of March 1982.

Source: U.S. Bureau of Labor Statistics

Fig. G-2 New York Cash Price for Pepper, 1890 - 1981



Source: Commodity Yearbooks

Although it may be said that the international price of pepper is formulated in the main markets in which trade is concentrated, the "formulated" price of each market is the representative price derived by the various contract prices among individual dealers and users and not as clear-cut as exchange quotations.

As already stated, dealers, brokers, exporters, importers, and user representatives, with offices in these markets, carry out negotiations and draw up contracts between themselves. They make business decisions based on information which they obtain from around the world, and speculative trade carried out on the basis of privately-acquired and undisseminated information has diminished because, i) the advance of communications such as the international telephone call and telex has facilitated the collation of information and, ii) information processing by computer allows decisions to be made more quickly than ever before. The increase in direct trade between suppliers and large users has also reduced speculative bargaining.

The influential markets in formulating the international price of pepper are New York, London and Singapore, and their features are described as follows:

a. New York Market

The New York market is one of the main markets handling the pepper imported by the United States and other countries in the Americas, and is the market handling exports from Brazil to the United States and other countries. Mitsui & Co., Ltd., a large trading firm for Brazilian exports, handles almost all of the trade in this market. The trade of Lampon Black from Indonesia, in which the U.S. is the biggest importer, is conducted through the New York Branch of the Central Indonesian Trading Company with dealers in the market. (It is said that the company does not sell pepper directly to users.)

Contracts which are concluded in the market are standardized according to the guidelines established by ASTA (American Spice Traders Association), and there are four types of contract: a. Import C.I.F. and F.O.B. contract; b. Import ex-dock contract; c. Spot contract; and d. Future delivery contract.

b. London Market

The United Kingdom is the world's largest pepper importer and re-exports to European countries. A large portion of the direct exports from producing countries to European countries are also handled in London Market. The pepper traded in this market comes mainly from Asian countries. However, as already mentioned, pepper from India is being increasingly exported directly to the USSR and East European block with the result that the volume traded in the London Market is now small.

Although well-established dealers (dealing in other spices as well as pepper) have been the dominant force, curry makers and other users also buy in the market, and some of the older major dealers, operating concurrently food and spice processing, also participate as buyers in recent years.

To facilitate trade in this market, the standard form of pepper contract, established by the London General Broker's Association is used.

c. Singapore Market

In addition to the pepper transited via this country, pepper directly exported by Indonesia and Malaysia is often traded in the Singapore Market. Although Malaysian government policy is to encourage Malaysian exporters to deal directly with overseas buyers, much of the trading is still conducted by dealers in Singapore. Almost all the merchants in the market are Chinese, although some dealers in London have set up business offices in Singapore.

It goes without saying that daily quotations in each of the above markets, made known to each other on the same day, influence one another. Besides the three major markets, there are markets, for example, in Hamburg and Hong Kong, although the volume of trade in these markets is less than the three major markets, thereby having a minor influence on the world distribution.

II. PROSPECTS AND OUTLOOK

I. Short-term Projection

Since 1978, pepper prices have suffered from a declining trend (See Table G-1 and Fig. G-2 and Appendix Fig. 2), and it has been reported that due to these falling prices there has been some conversion of pepper cultivation into the growing of more profitable crops, including cacao in Malaysia in 1981-1982, and that in Brazil the reduced use of fertilizers and reductions in the labor force have also led to a decrease in output. However, the level of exports from these two countries has not shown any decline, and thus their stock of pepper must have been reduced. In addition to this decrease in stock, observers believe that Brazil's pepper output in 1982-1983 will be smaller than usual, and that as a result the price will rally. In fact, information from trading firms indicates that the price of Brazilian pepper exported to Japan in January 1983 was higher by $200 per ton on a CIF basis. If the price rebounds, pepper output will increase, considering the past cycle of production. The FAO has also made a similar observation (FAO, Commodity Review and Outlook, 1981-1982).

The FAO further points out that the IPC countries are making joint efforts to control foot rot and that Brazil is at the stage of development of new clones which have a greater resistance to the fuzarium fungi. The Organization considers that if these efforts are strengthened, there will be a possibility for further increases in output. These observations are given in FAO's medium-term prospects for pepper production (for details of foot rot and fuzarium, see Section A, Introduction). In addition, the governments of IPC-affiliated countries have taken measures to cope with the recent decline in pepper prices, including price supports for the producers. At its general meeting in September 1982, the IPC agreed on the establishment of a minimum export price as its joint policy.[1] If this measure is actually taken, it will give added incentive to the farmers, or at least have the effect of preventing a further decline in output.

II. Long-term Projection

In this Study, we have conducted econometric model projections

1) IPC's recommended minimum prices are 70 cents/pound for Brazilian and Malaysian ASTA black pepper on an FOB basis, 72 cents for the Indonesian product and 73 cents for that from India.

both of vegetable oils as a whole and of the main vegetable oils, as a means of forecasting the long-term prospects (see the chapter on Oilseeds). In that connection, we have also made projections for pepper using the same method which has already been described in detail in the chapter on Oilseeds and need not be repeated here. In short, FAO data has been used to conduct a time series extrapolation. Table H-1 below summarizes the results for the world total, the developing countries in Asia (including India, Indonesia, Malaysia, Sri Lanka and Thailand), and Brazil.

Table H-1 World Pepper Production and Exports

Production

(ton)

	1970	1980	1990 (Estimated)	2000 (Estimated)
World total	105,642	186,272	237,340	295,200
Developing countries in Asia	86,491	117,261	128,350	137,990
Brazil	14,262	62,458	106,550	156,260

Exports

	1970	1980	1990 (Estimated)	2000 (Estimated)
World total	103,504	165,751	222,510	277,530
Developing countries in Asia	49,735	87,980	155,640	184,910
Brazil	9,018	31,966	51,940	82,970

The results of the above projections forecast that pepper production will continue to grow at a rate lower than in the 1970s, the base years for the projection; i.e., at an annual rate of about 2.5%. By regions, Brazil's growth will be far greater than that of the developing countries in Asia, and Brazil will be producing more than half of the world's total by the year 2000.

This projection uses the 1970s as the base period. As a result, the growth rate for Brazil, which has enjoyed a rapid growth in pepper production during this decade, has registered a high level. On the

contrary, Malaysia suffered from a low yield per acre in the 1970s, and the figure for the developing countries in Asia is consequently low.[1] The projection therefore indicates a reversal in the year 2000 of the respective shares held, when Brazil is expected to replace the Asian countries as the world's top producer. Precise data for the declining yield per acre in Malaysia in the 1970s are not available, but decreasing production will not continue there in years to come. Therefore, the extent of reduction in output in the country will not be as large as is indicated by this projection.

Our export projection indicates that Malaysian exports will level off in the future. Moreover, it may be reasonable to assume that the production share of the Asian producing countries and Brazil will undergo smaller changes than the projection suggests.

The results of our projection for imports indicate that the share of countries with planned economy will become greater.

The above-mentioned projection has produced some unrealistic results, as mentioned above, because of the short base period used. As stated earlier in the section on international prices, the demand in traditional importing countries such as Europe and the United States will show a slow growth in the long run. In these countries, per capita consumption has almost reached saturation point, and furthermore their rate of population increase is low.

In the other regions, some countries showed a conspicuous and rapid growth in pepper demand in the 1970s. While the growth in consumption in the traditional major importing countries during the decade was in the range of 20 to 80%, the rates of growth in the countries listed in Table H-2 were several times higher.

This Table contains data on these two groups of importers based on their average level of pepper imports in 1969/1971 and 1979/1981, and on increases in import levels during the 1970-1980 decade by indexes (based on data from FAO's Trade Yearbook).

In the new major importing countries shown in Table H-2, per capita pepper consumption is still less than half that in the traditional major importing countries, with the exception of Saudi Arabia. Table H-3 below shows the estimated per capita consumption in the two groups of countries, obtained by dividing their respective average level of imports in 1979/1981 (for China and Mexico, imports plus domestic output) by their population in 1980.

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1) In the projections contained herein, the figures of production projection are the products of the projected harvest area multiplied by yield per unit area.

Table H-2 Comparison of Increases in Imports by Traditional and New Importing Countries

(ton)

Traditional Major Importers	1969/71 average	1979/81 average	Index (1969/71 = 100)	New Major Importers	1969/71 average	1979/81 average	Index (1969/71 = 100)
Germany, FR	6,442	11,313	176	Japan	2,530	7,327	290
UK	3,209	5,390	168	Korea, Rep. of	130	867	667
France	4,233	7,739	183	China	1,157	3,100	268
USA	24,859	30,739	124	Saudi Arabia	556	4,250	764
USSR	8,733	12,434	142	Egypt	377	1,836	487
				Mexico	455	1,322	293

Table H-3 Estimated Per Capita Consumption in Traditional and New Importing Countries

Traditional Major Importers	Imports (1,000 tons)	Population (1,000)	Per capita consumption (g)	New Major Importers	Imports (1,000 tons)	Population (1,000)	Per capita consumption (g)
Germany, FR	11,313	61,561	183	Japan	7,327	116,782	62
UK	5,390	56,210	95	Korea, Rep. of	867	38,455	22
France	7,739	53,931	143	China*	4,400	994,913	4
USA	30,739	227,658	135	Saudi Arabia	4,250	8,960	474
USSR	12,434	265,540	47	Egypt	1,836	41,963	43
				Mexico*	3,322	69,752	91

* Figures in the column showing imports for China and Mexico indicate the total of pepper imports and domestic output for each country. The figure for China's per capita consumption is abnormally low probably because FAO statistics for China's pepper output have been underestimated.

The circumstances behind the expansion of pepper consumption in Japan have been discussed above. In other countries which have experienced a rapid increase in consumption, a similar trend can be observed: greater consumption of meat and processed foods. The demand for meat is also said to have a high income elasticity in developing countries (see [7] Beef, Section on Consumption). The Republic of Korea, Egypt and Mexico, three of the importing countries shown in Table H-3, saw a higher growth of income and more rapid industrial development than other developing nations in the mid-1960s and thereafter, and they are now classified in the group of newly-industrializing countries (NICs) by the United Nations. In this category of countries, increased consumption of meat and processed foods is considered to be brought about by higher incomes, industrialization and urbanization, accompanied by changes in people's lifestyles. At present, there are only nine NICs among the more than one hundred developing countries. The number of other developing nations which will experience economic growth and industrialization similar to that in the Republic of Korea, Egypt and Mexico will greatly affect future world demand for pepper.

III. Concluding Remarks

In view of the results of our projections and the prospects for growth in demand described above, world production of pepper will continue to increase and the share held by Brazil of world production will also grow. As discussed in the section on major producing countries, however, Brazil will have to deal with the incidence of disease if she is to expand her market share.

Brazilian pepper output recorded a rapid increase in the 1970s because the country succeeded in entering the world markets, and this is because the country's export price was always lower than that of other producing nations. If Brazil is to continue increasing her output of pepper in the future, she will have to maintain her price competitiveness. In addition, the country will be required to improve its system of standardization and inspection to offer products of higher quality.

Appendix Table 1-1 Harvested Area, Yield and Production in Major Producing Countries, 1970 - 1981

Country		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
India													
Area	ha	119,960	118,630	119,800	121,720	121,920	111,930	114,340	111,970	84,570	110,720	110,640	110,000F
Yield	kg/ha	218	220	218	235	231	228	276	228	254	250	247	263
Production	MT	26,160	26,160	26,190	28,700	28,180	25,570	31,620	25,620	21,500	27,700	27,410	29,000F
Malaysia													
Area	ha	6,950	7,407	7,376F	6,204	7,668	9,019	10,265	11,000	11,520	12,160	12,900	13,300F
Yield	kg/ha	4,103	4,230	4,190	4,489	4,463	3,993	3,312	3,136	2,777	2,894	3,000	3,007
Production	MT	28,516*	31,334*	30,909*	27,852*	34,224*	36,021*	34,000	34,500	32,000	35,200	38,700	40,000F
Indonesia													
Area	ha	36,000F	40,300F	37,000F	38,000F	39,000F	40,300	42,000	47,555	52,685	52,710	54,692	59,000
Yield	kg/ha	478	661	832	750	705	569	877	899	876	607	676	661
Production	MT	17,219	26,661	30,802	28,500	27,500	22,934	36,854	42,794	46,159	32,000	37,000	39,000
Madagascar													
Area	ha	7,000F	11,195	7,830	7,500F	5,800F	9,000F	7,215	6,200	5,315	5,480	5,205	5,500F
Yield	kg/ha	302	311	312	498	499	500	673	462	470	464	506	454
Production	MT	2,115	3,490	2,445	3,740*	2,898*	4,500*	4,860	2,865	2,500	2,545	2,635	2,500F
Brazil													
Area	ha	5,473	5,741	6,105	8,359	8,261	9,909	11,173	12,578	15,786	19,879	22,899	23,474
Yield	kg/ha	2,606	2,628	2,543	2,988	3,374	2,898	2,719	3,011	2,978	2,465	2,727	2,716
Production	MT	14,267	15,092	15,527	24,980	27,876	28,720	30,380	37,877	47,015	49,006	62,458	63,770
Sri Lanka													
Area	ha	6,429	5,508	5,884	5,942	5,970	6,445	6,535	7,128	7,443	7,830	9,080	9,000F
Yield	kg/ha	2,234	2,149	2,653	2,269	2,338	2,027	2,535	2,380	2,252	1,724	1,492	1,500
Production	MT	14,365	11,837	15,612	13,485	13,963	13,065	16,570	16,971	16,767	13,500	13,551	13,500F
World													
Area	ha	185,011	192,018	187,335	191,129	192,347	190,166	195,632	200,860	182,138	213,969	220,414	225,253
Yield	kg/ha	571	612	664	680	715	703	807	817	935	767	845	868
Production	MT	105,642	117,682	124,483	130,058	137,540	133,806	157,892	164,293	170,437	164,307	186,272	195,580

* Unofficial figure
F FAO estimates

Source: FAO Statistics Tape

Appendix Table 1-2 Exports and Export Value of Major Exporting Countries, 1970 - 1981

Country		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
India													
Q'ty	MT	19,691	16,973	21,043	27,697	28,856	24,541	17,933	24,882	18,999	20,545	26,795	18,636
Exp. U.V.	US$/MT	1,135	1,131	932	1,056	1,442	1,628	1,698	2,276	2,382	1,918	1,758	1,502
Exp. Amt.	US$1,000	22,342	19,189	19,604	29,243	41,598	39,946	30,456	56,627	45,247	39,400	47,100	28,000F
Indonesia													
Q'ty	MT	2,895	24,654	25,984	25,900	15,919	15,246	30,831	33,410	37,777	25,226	29,680	34,074
Exp. U.V.	US$/MT	1,099	1,007	827	1,118	1,528	1,500	1,525	1,993	1,832	1,856	1,688	1,385
Exp. Amt.	US$1,000	3,182	24,837	21,495	28,956	24,326	22,867	47,020	66,585	69,190	46,814	50,106	47,178
Malaysia													
Q'ty	MT	26,291	28,769	27,793	24,195	30,244	32,311	39,807	29,362	36,644	40,310	30,560	28,478
Exp. U.V.	US$/MT	736	753	779	1,174	1,458	1,373	1,352	1,985	1,823	1,711	1,557	1,234
Exp. Amt.	US$1,000	19,344	21,665	21,660	28,414	44,100	44,357	53,829	58,273	66,790	68,971	47,577	35,140
Brazil													
Q'ty	MT	9,018	17,325	14,297	13,761	15,490	17,944	20,240	17,710	29,985	25,205	31,966	46,972
Exp. U.V.	US$/MT	909	863	889	1,232	1,687	1,627	1,627	2,229	1,995	1,886	1,713	1,246
Exp. Amt.	US$1,000	8,193	14,943	12,707	16,955	26,125	29,198	32,939	39,476	59,810	47,545	54,748	58,507
Madagascar													
Q'ty	MT	2,227	1,434	4,187	3,740	2,898	4,095	3,943	3,748	2,153	2,570	3,096	2,000F
Exp. U.V.	US$/MT	872	1,100	938	1,236	1,503	1,554	1,616	1,983	2,208	1,793	1,721	1,500
Exp. Amt.	US$1,000	1,942	1,578	3,927	4,623	4,357	6,362	6,370	7,431	4,753	4,608	5,329	3,000F
Sri Lanka													
Q'ty	MT	858	45	105	2,052	338	96	85	913	1,205	876	945	2,223
Exp. U.V.	US$/MT	922	2,489	1,381	975	1,515	1,781	2,435	2,260	1,866	1,667	1,733	1,314
Exp. Amt.	US$1,000	791	112	145	2,000	512	171	207	2,063	2,249	1,460	1,638	2,921
World													
Q'ty	MT	103,504	125,084	130,642	124,240	126,866	130,440	154,524	145,126	176,678	162,345	165,751	173,444
Exp. U.V.	US$/MT	895	936	862	1,156	1,523	1,509	1,514	2,090	1,974	1,861	1,713	1,371
Exp. Amt.	US$1,000	92,648	117,036	112,549	143,616	193,232	196,843	233,924	303,275	348,797	302,052	283,975	237,856

Source: FAO Statistics Tape

Appendix Table 2-1 Area under Pepper Cultivation in Producing Countries, 1968 - 1980

(ha)

Country	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
India	121,000	120,000	120,270	119,960	118,630	119,800	121,720	121,920	111,930	114,340	111,970	84,910	85,000
Indonesia	42,954	40,093	45,063	50,965	45,831	46,286	48,903	54,074	53,877	58,500	57,100	58,370	61,373
Malaysia	5,101	5,547	5,992	6,475	6,994	7,464	8,203	9,132	9,930	10,569	11,500	12,555	15,922
Brazil	5,567	5,453	5,473	5,473	5,500	8,357	8,357	8,889	10,127	11,139	12,253	12,253	12,253
Total	174,622	171,093	176,798	183,873	176,955	181,907	187,183	191,015	185,864	194,548	192,823	168,088	174,548

Note : 1980: provisional figures
Brazil 1977-1980 estimated by IPC Secretariat.
Data from Madagascar, Sri Lanka and other countries are not available.

Source: Data compiled by IPC Secretariat

Appendix Table 2-2 World Production of Pepper, 1968 - 1980

(MT)

Country	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
India	26,000	26,000	25,000	26,000	26,090	26,190	28,700	28,180	28,530	31,830	34,400	21,900	30,000
Malaysia	23,777	30,362	25,859	28,418	27,300	23,800	29,689	31,367	37,888	28,893	31,576	37,430	31,544
Indonesia	46,665	17,070	17,219	26,656	30,801	28,510	27,492	22,934	26,875	30,700	36,600	25,600	31,500
Madagascar	2,960	2,700	2,115	4,400	5,800	4,800	4,900	5,000	4,900	5,100	4,000	4,000	4,000
Brazil	14,094	14,031	14,267	13,500	14,500	18,500	18,500	21,000	23,000	25,585	30,000	30,000	30,000
Sri Lanka	11,900	13,100	14,000	920	2,220	3,200	6,780	1,920	1,700	1,000	1,000	1,000	1,000
Other Asian countries	1,700	1,500	2,000	1,500	2,000	3,000	1,300	1,500	1,000	1,000	1,000	1,000	1,000
World production	127,096	104,763	100,460	101,394	108,711	108,000	117,361	111,901	123,893	124,108	138,576	120,930	129,044

Source: Data compiled by IPC Secretariat

Appendix Table 2-3 World Exports of Pepper, 1968 - 1980

(MT)

Country	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
India	25,060	18,950	22,300	17,970	19,250	28,080	28,880	24,610	17,939	25,250	18,745	21,429	27,932
Indonesia	24,600	17,200	2,655	22,874	24,900	25,625	16,017	15,223	24,223	30,854	37,038	24,955	29,345
Malaysia	23,777	30,362	25,858	28,418	27,300	23,800	29,689	31,367	37,888	28,893	31,576	37,430	31,544
Brazil	9,700	14,500	9,018	17,325	14,297	13,761	15,490	17,847	19,986	17,700	30,000	25,186	30,000
Madagascar	3,095	3,493	2,227	1,434	4,187	3,740	2,898	3,461	2,950	3,748	3,000	3,000	3,000
Sri Lanka	823	914	860	46	111	1,617	339	96	85	632	1,205	1,000	1,000
Other countries	1,700	1,800	1,700	100	100	1,700	400	200	300	600	600	600	600
Total	88,755	87,219	64,618	88,167	90,145	98,323	93,713	92,804	103,371	107,677	122,164	113,600	123,421

Notes : 1) 1980: provisional figures
2) Indian, Indonesian and Malaysian statistics are provided by Liaison Officers of member countries to the International Pepper Community.
3) Figures for Brazil (1968-77) are based on the report: An Examination of the Pepper Economy in Brazil and the Malagasy Republic, November 1977, by ESCAP.
4) Malagasy Republic figures (1968-77) are taken from FAO's Commodity Review and Outlook Yearbooks.
5) Sri Lanka and other Asian Countries' figures are based on FAO's Commodity Review and Outlook Yearbooks.

Source : Data compiled by IPC Secretariat from 1980 statistics

Appendix Table 3 Import/Export Matrix, 1979 - 1980

(MT)

Country of destination	India		Brazil		Malaysia *		Indonesia		Singapore **	
	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980
Western Europe										
Belgium	33	34	110	225	81	81	10	35	45	20
France	123	215	1,629	1,706	25	71	440	165	3,426	2,737
Germany, FR	132	411	1,960	2,778	1,364	948	5,270	7,486	3,898	2,867
Italy	1,090	1,429	134	143	82	339	-	75	1,839	1,675
Netherlands	83	38	163	288	53	30	3,365	2,568	253	166
Spain	32	43	3	14	-	23	-	-	1,318	1,339
UK	83	81	718	671	931	552	351	190	2,060	785
Yugoslavia	704	574	-	-	81	81	-	100	20	-
Others	32	23	21	85	90	77	85	150	1,016	1,233
Total	2,312	2,848	4,738	5,910	2,707	2,202	9,521	10,769	13,875	10,822
Eastern Europe and USSR										
Bulgaria	604	-	-	60	-	-	260	230	-	-
Czechoslovakia	1,063	768	-	-	-	-	-	-	-	-
German DR	1,026	804	1,890	2,183	-	-	-	-	-	-
Hungary	-	-	100	-	-	-	120	420	7	-
Poland	2,200	1,100	1,200	4,100	-	-	-	-	-	-
Romania	-	1,394	1,028	280	-	-	-	-	-	-
USSR	11,130	12,345	-	-	-	-	-	-	-	-
Total	16,023	16,411	4,218	6,623	-	-	380	650	7	-
Others										
Algeria	-	1,184	-	-	-	-	-	-	-	-
Argentina	-	-	1,160	1,961	-	-	-	-	10	-
Australia	81	75	-	-	-	-	295	270	645	823
Canada	609	965	85	90	179	225	25	60	940	583
Egypt	-	98	-	15	-	-	-	-	1,270	-

Appendix Table 3 (cont'd.)

(MT)

Country of destination	India		Brazil		Malaysia *		Indonesia		Singapore **	
	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980
(Others - cont'd.)										
Iran	-	-	-	-	-	-	-	-	570	1,228
Japan	192	190	20	30	2,405	3,272	190	338	1,450	1,156
Malaysia	-	-	-	-	3	179	-	-	3,118	285
Morocco	-	50	3,822	3,611	-	-	-	-	577	-
Pakistan	-	-	-	-	-	-	-	-	1,107	1,903
USA	771	3,729	9,079	11,276	587	1,107	9,535	12,703	6,797	3,044
Saudi Arabia	18	213	-	-	-	-	-	-	1,352	2,071
Singapore	-	-	-	-	29,942	23,236	4,920	4,170	-	-
Tunisia	-	-	-	-	-	-	-	-	800	1,400
Not specified	539	1,032	2,064	2,448	295	488	120	385	5,877	9,918
Grand total	20,545	26,795	25,186	31,964	36,118	30,709	24,986	29,345	38,395	33,233

* Sarawak only
** Re-exports

Source: USDA, Foreign Agriculture Circular FTEA 1-81, April 1981

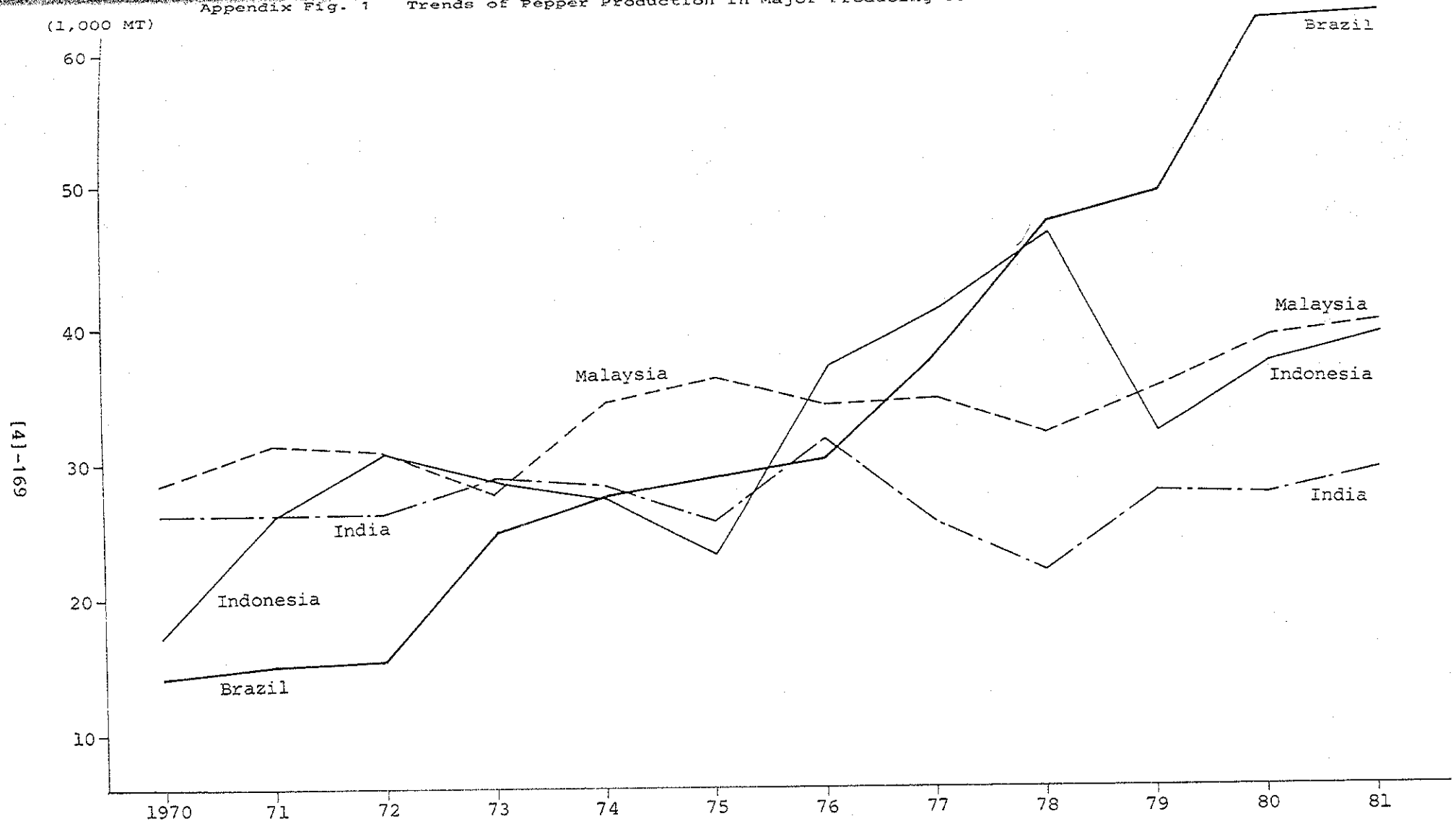
Appendix Table 4 Projection of Production, Exports and Imports of Pepper, 1980 - 2000

Category	A. Production (1,000 MT)					Production Share (%)				
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Developing countries in Asia	122.45	123.50	128.35	133.18	137.99	64.0	59.1	54.1	50.1	46.6
Latin America	66.15	83.92	108.32	132.23	157.14	34.6	40.2	45.6	49.8	53.1
Africa	2.69	1.56	0.67	0.25	0.08	1.4	0.7	0.3	0.1	0.0
World total	191.29	208.98	237.34	265.63	295.20					

Category	B. Exports (1,000 MT)					Export Share (%)				
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Developing countries in Asia	126.37	141.01	155.64	170.27	184.91	73.6	72.9	70.3	68.2	66.6
Latin America	42.36	49.63	63.17	76.72	90.26	24.7	25.6	28.5	30.7	32.5
Africa	3.03	2.86	2.70	2.53	2.36	1.8	1.5	1.2	1.0	0.9
World total	171.76	193.50	221.51	249.52	277.53					

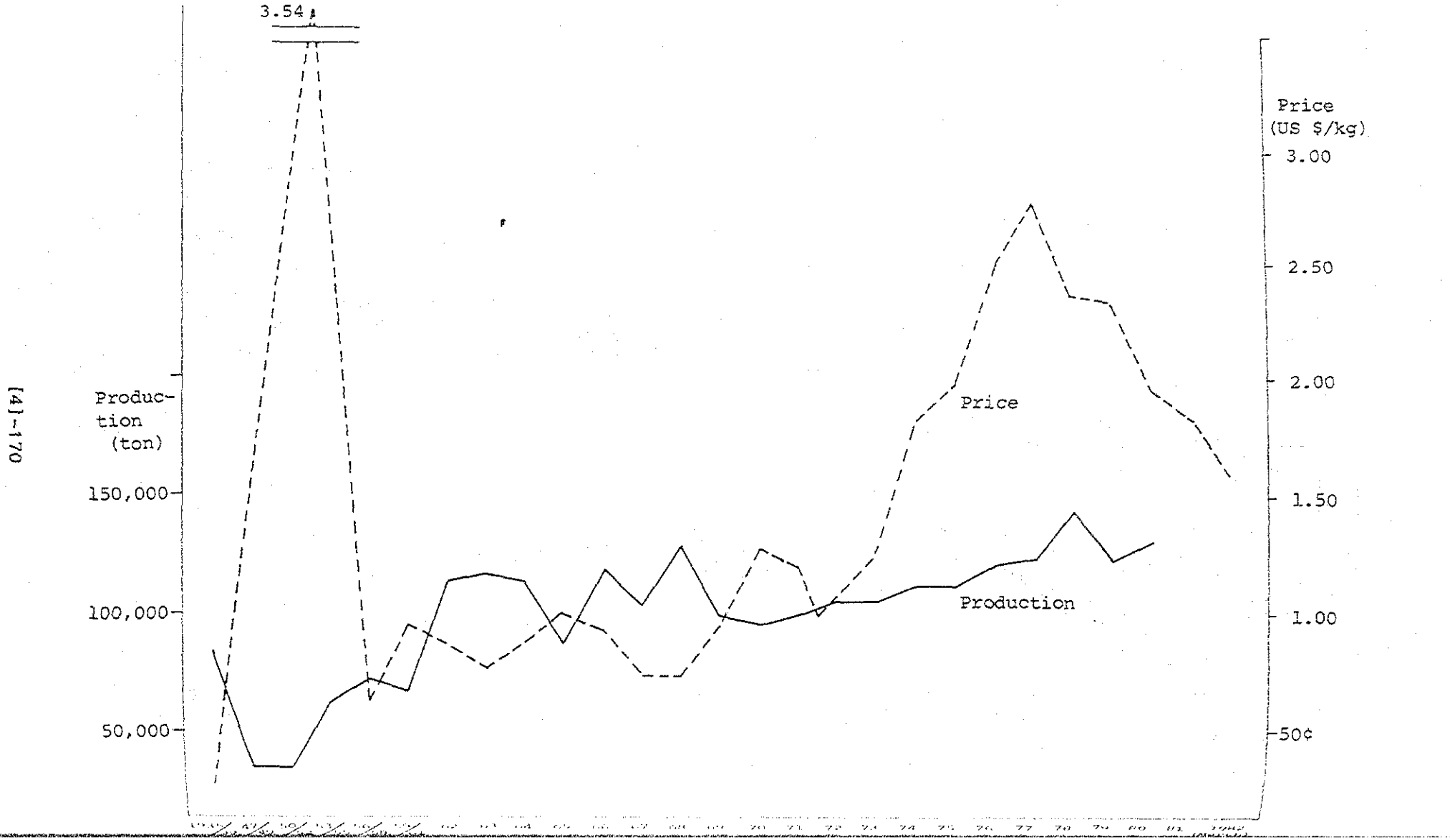
Category	C. Imports (1,000 MT)					Import share (%)				
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
North America	32.47	36.02	39.57	43.12	46.67	19.2	18.1	17.4	17.1	16.9
Western Europe	39.79	47.65	55.51	63.37	71.23	23.6	23.9	24.4	25.1	25.8
Other developed countries	9.23	12.29	15.36	18.43	21.49	5.5	6.2	6.8	7.3	7.8
Developed countries	82.82	97.35	111.89	126.43	140.96	49.0	48.8	49.2	50.1	51.1
Asia	32.95	33.03	33.04	33.04	33.04	19.5	16.6	14.5	13.1	12.0
Developing countries	60.81	71.02	78.47	83.40	86.48	36.0	35.6	34.5	33.0	31.3
Planned-economy countries	25.25	31.08	36.92	42.75	48.58	15.0	15.6	16.2	16.9	17.6
World	168.88	199.45	227.28	252.58	276.02					

Appendix Fig. 1 Trends of Pepper Production in Major Producing Countries, 1970 - 1981



Source: The same FAO statistics as used for Appendix Tables 1-1 and 1-2

Appendix Fig. 2 Long-term Trend in Pepper Production and Price, 1935 - 1981



[4-2-2] GUARANA AND BRAZIL NUTS

INTRODUCTION

Most or all of the world production of guarana and Brazil nuts takes place in Brazil, and the same applies to their exportation. Consequently, the source of most of the relevant data is Brazil, with a small amount of data also obtainable from other countries. Furthermore, since these products are relatively new as international commodities, there is little worldwide data available.

Before proceding, therefore, it should be noted that the trend analyses and outlook for the commercialization of guarana and Brazil nuts in this report are based on the limited materials available, and that this report has also been compiled in cooperation with Japanese enterprises dealing with these commodities.

[4-2-2-1] GUARANA

A. PRODUCTION AND EXPORT

I. Production

Brazil holds an overwhelming share compared to other producing countries in the production of guarana. The recent trends of guarana in Brazil indicate that the cultivated area and level of production have been expanding year by year, and guarana seems to have secured the status of a specialty product of Brazil (Table A-1).

Table A-1 Trends in Cultivated Area, Production and Yield per Unit Area of Guarana

	Cultivated area (ha)	Production (MT)	Yield (kg/ha)
1975	2,350	180	77
1976	2,900	290	100
1977	3,300	400	121
1978	3,411	440	129
1979	3,932	650	165
1980	3,932	650	165
1981	4,000	700	175

Source: Institute of Brazilian Geographical Statistics (IBGE)

It is said that it was only in 1816-1817, when guarana was first brought into France, that its existence and utility became known to foreign countries, in particular the European countries. However, it is possible that the native peoples of the Amazon region have been consuming guarana beans from early times, since the seeds have the

property of overcoming feelings of hunger. It is also said that guarana came to be known in Brazil through immigrant Portuguese settlers who made widespread claims its efficacy as a tonic. In Brazil today, guarana seeds are used as a material for syrups, tinctures, tablets and liquors, besides being used in cooling beverages and invigorating agents, utilizing the high content of caffeine ($C_8H_{10}O_2N_4$), theobromine ($C_7H_8O_2N_2$), saponin and fats contained in the seeds.

It is said that guarana is difficult to cultivate in locations other than its places of origin, which are limited to the upper reaches of the Amazon region in Brazil and some parts of Venezuela and Colombia.

II. Exports

Less than 10% of the total production of guarana in Brazil is exported even in years when the level of exports is high, while only about 1.5% of production is exported in the leaner years, and most of the product is domestically consumed. The ratio of exports to production during the past 10 years has remained within 10%, but the range of fluctuation has been very wide (Table A-2). This may mean that the consumption of guarana has not taken root in the main importing countries.

Table A-2 Annual Production and Exports of Guarana

(kg, %)

	Production	Exports	Ratio of exports
1975	180,000	13,222	7.3
1976	290,000	18,200	6.3
1977	400,000	18,820	4.7
1978	440,000	17,110	3.9
1979	650,000	59,424	9.1
1980	650,000	64,600	9.9
1981	700,000	10,824	1.5

Source: Bank of Brazil, Export/Import Deparment (CACEX)

The main importing countries of the guarana produced in Brazil are Japan, the United States and the Federal Republic of Germany. The combined volume of exports to these three countries has accounted for 90.7% of the total exports on an 10 year average from 1972-1982, while exports to other countries are extremely small in quantity (Table A-3).

Table A-3 Export Trends, by Importing Countries

(kg, %)

	Japan		USA		Germany, FR		3 countries share	Other countries		Total
	Exports	Share	Exports	Share	Exports	Share		Exports	Share	
1972	2,309	43.7	0	0	1,070	20.3	64.0	1,900	36.0	5,279
1973	4,150	26.3	3,000	8.3	6,750	42.9	77.5	1,900	22.5	15,750
1974	4,120	66.0	1,300	20.8	400	6.4	93.2	425	6.8	6,245
1975	4,550	34.4	2,722	20.6	5,500	41.6	96.6	450	3.4	13,222
1976	9,200	50.5	7,050	38.7	1,300	7.1	96.3	650	3.7	18,200
1977	10,720	57.0	5,000	26.6	2,000	10.6	94.2	1,100	5.8	18,820
1978	12,230	71.5	2,850	16.7	1,600	9.4	97.6	410	2.4	17,110
1979	16,100	27.1	38,574	64.9	4,500	7.6	99.6	250	0.4	59,424
1980	30,750	47.6	29,300	45.4	4,500	7.7	99.9	50	0.1	64,600
1981	9,530	88.0	0	0	0	0	88.0	1,294	12.0	10,824

Source: Bank of Brazil, Export/Import Department (CACEX)

As shown in Table A-3, of the three main export destinations, the fluctuations of imports in the United States and the Federal Republic of Germany are remarkable compared with the stable imports by Japan. This may indicate that use of guarana is limited in the former two countries and wide and stable demand has not yet been established there.

In recent years, fluctuations in the price have also greatly affected import and export of this product.

The United States and the Federal Republic of Germany increased their imports in 1979 and 1980, but in 1981 these levels fell steeply to the point where these countries were not importing any guarana at all, due to the price rising threefold of its level in the previous year (Table A-4). In the same year, Japan also registered a steep decrease in imports, although the decline was not as drastic as that for the two countries.

Table A-4 Export Price of Guarana (FOB)

(US$/kg)

1975	1976	1977	1978	1979	1980	1981	1982
12.0	10.3	10.0	9.6	8.5	8.8	27.8	17-18 (estimate)

Source: Bank of Brazil, Export/Import Department (CACEX)

It is reported that one factor contributing to the rise in price in 1981 was the large-scale purchasing of guarana by the Coca Cola Co. of Brazil, in addition to an increase in domestic consumption due to the popularity of guarana in Brazil.

As a result of this rise in price, exports of guarana from Brazil fell to a level below that prior to 1979. During this period, it seems that the major importing countries compensated for the shortage by using their own domestic stock of guarana which had been imported up to the previous year.

B. IMPORTS BY JAPAN

I. Import Trends

Most of the demand for guarana in Japan is for use as a beverage additive, i.e., as one of the materials of beverages. The level of imports in the 1970s showed a gradual increase, while that in 1980 showed an unprecedented large increase (Table A-3). This is probably due to the fact that a leading beverage manufacturer in Japan dealt in futures in expectation of future demand, while at the same time starting merchandize development of guarana products.

The steep decrease in imports in 1981 was mainly caused by Japan buying less guarana due to its rise in price, as in the case of the United States and the Federal Republic of Germany, and also because the leading beverage manufacturer mentioned above switched from using guarana as an additive in its products to a substitute material.

As seen in 1981, the drastic rise in price had a direct effect on the level of imports, although it can be noted that slight fluctuations in the import price are not a factor influencing the quantity of imports to any large extent. Furthermore, there is no tariff barrier, since the customs tariff in all of the importing countries is 0%.

II. Imports and Uses

To date, guarana has been imported in the form of the bean. A leading beverage manufacturer has recently imported it in the form of an extract, which may be regarded as an intermediate product, in a tie-up with an enterprise in Brazil, but that is a rare case. Importing guarana in the form of an extract is more costly than importing the bean itself, since extracts are treated as processed goods on which import tax is levied, and also because the level of extraction and refining technology in Japan is higher. Accordingly, importing the bean not only costs less but is also more stable in terms of both cost and quality under present conditions. While it is possible that imports of the product in the form of an extract as by the above Japanese manufacturer will expand, the current indications are that imports of the beans themselves will continue as before.

Ninety percent or more of the demand in Japan for guarana comprises its application as an additive for cooling beverages, especially aerated beverages. Another minor application is its use as an additive for health tonics and chewing gum.

Some guarana beverages in Japan contain guarana as their main ingredient, while in others it is a supplementary ingredient. However, the share held by guarana beverages is very small, at only 0.2% of aerated beverages as a whole in 1981. This situation may be due to the fact that guarana itself has no distinctive taste or flavor, and perhaps more importantly that the majority of the beverage manufacturers whose products contain guarana are small-scale enterprises, whose consumer demand is less due to their advertising power and sales networks being smaller.

Table B-1 Trends in Consumption of Beverages Containing Guarana

(kl, %)

	Consumption	Share of aerated beverages
1972	7,000	0.3
1973	7,300	0.2
1974	7,000	0.2
1975	6,000	0.2
1976	5,000	0.2
1977	4,500	0.1
1978	5,500	0.2
1979	6,000	0.2
1980	5,000	0.2
1981	4,000	0.2

Source: Japan Cooling Beverage Association

As a result of these circumstances in Japan, the consumption of beverages featuring guarana as an ingredient has been overwhelmed by other products of leading makers and currently shows a slightly declining trend.

The import of guarana into Japan involves the problem of classification by use, and it is normally necessary to follow the procedures provided by the Ministry of Health and Welfare under the Drugs, Cosmetics and Medical Instruments Act [1] or the Food Sanitation Act.[2]

C. CONCLUDING REMARKS ON CONSUMPTION IN JAPAN

In recent years, a greater interest than ever in the past for the maintenance and improvement of health has been observed in Japan, and consequently the consumption of various health drinks has expanded.

One such drink [3] containing guarana as one of its ingredients, perhaps one of best sellers, is being marketed by a chemical medicinal company, and this beverage is a typical product carrying the name "health drink". Sales of this drink have increased every year for the last 5 years, with an estimated 1.2 billion bottles (containing 120 ml each) being produced in 1982. Company sources predict continued growth in sales in the future.

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1) The Drugs, Cosmetics and Medical Instruments Act
Guarana is included in the item "materials used mainly as drugs", as per the decision made by the Ministry of Health and Welfare in 1971 categorizing the materials which fall under drugs, cosmetics and medical instruments. Guarana is not classified in these provisions in terms of its efficacy and effects as a drug, but rather as a processed product in such forms as pills, capsules and packages.

2) The Food Sanitation Act
This Act covers substances ingested orally other than drinks and drugs. Importers are required to register imports with the Food Monitoring Section, attached to the Ministry of Health and Welfare, located at main airports and ports throughout the country.

3) As a reference, the ingredients listed on the label of the drink are shown here. (cont'd. on next page)

A wide sales network for this beverage has been established, and it is sold in stores and in all railway station stalls throughout Japan, with active advertising being carried out in the mass media such as radio, television, newspapers and magazines.

A particularly interesting fact is that in 1980 several leading enterprises began to participate in the production of aerated guarana beverages and health drinks containing guarana. According to an enterprise which has developed an aerated beverage with guarana as its main ingredient, the motivation for the commercialization of this product is the expectation that guarana has consumer appeal due to its novelty and fresh image, since the existing aerated beverages appear to be somewhat declining in populality.

Furthermore, another enterprise which is participating in the field of health drinks has evaluated the properties of guarana as being useful in the maintenance and improvement of health.

As mentioned above, however, guarana is not commercialized as a product in itself but is always used as only one of the component ingredients constituting the whole, both in the case of refreshing and health drinks. Therefore, whether or not guarana is contained in any particular product is not a factor directly bearing on the trends of consumption of the commodity.

Consequently, in order to increase future demand for guarana as a beverage material in Japan, it is likely that the following conditions will be required.

Firstly, stability of the export price without large fluctuations. Secondly, the participation of well-known enterprises with large capital resources which are trusted by consumers. Here, both the high quality of the product developed by the enterprise and the method of advertisement to the consumers are important. These factors must be given serious consideration as a matter of course, in view of the characteristics of guarana.

(Note cont'd. from p. [4]-178)

Sugar (cane sugar, syrup of glucose and fructose), honey, guarana extract (natural caffein)*, essences, vitamin C, citric acid, nicotinamide, vitamin B_6, vitamin B_2, liquid vitamin P, L-phenylalanine, L-isoleucine, DL-threonine and L-glutamic acid

* underlined by the author of this report.

[4-2-2-2] BRAZIL NUTS

A. PRODUCTION AND EXPORT

I. Production

Brazil nuts are mainly produced (most of them naturally grown) in Brazil, their place of origin, with only a small quantity being produced in Peru, Bolivia, etc.

At present, the production of Brazil nuts is much smaller than the main nuts such as almond, cashew nut, hazelnut and walnut (Table A-1), and accordingly the demand for Brazil nuts remains at a low level.

Table A-1 Comparison of Production Trends among the Main Nuts and Brazil Nut

	Cashew nut (Raw seed basis)	Almond (Shelled basis)	Hazelnut (Unshelled basis)	Walnut (Unshelled basis)	Brazil nut (Unspecified)
1975	510,000	177,500	445,100	236,700	51,720
1976	380,000	235,000	329,200	225,300	61,044
1977	338,000	224,500	410,600	225,200	53,958
1978	335,000	184,300	426,200	217,200	40,449
1979	330,000	231,400	391,800	253,400	43,242
1980	330,000	239,500	401,000	237,800	-
1981	362,000	322,800	541,400	254,300	-

Notes: 1) Unit: Long tons for cashew nut; metric tons for other nuts
2) Almond: world total; Brazil nut: total only of Brazil; other nuts: the total of the specified countries
3) Cashew nut: by crop years; other nuts: by calendar years
4) Sources: CACEX for Brazil nut; Gill and Duffus, Edible Nut Statistics, June 1982, for other nuts
5) Data for 1980 and 1981 for Brazil nut not available.

In Europe, the importance of the Brazil nut has been recognized since the 1600s, and even today a large amount is imported by the United Kingdom.

II. Export

1. Export Trends

The major exporting countries of Brazil nuts are Brazil, Peru and Bolivia, with Brazil accounting for about 80% of the total amount exported, namely, 18,000 tons out of the world total of about 23,000 tons in 1981.

The main importing countries, which import only in-shell roasted and shelled dry nuts, are the United States, the United Kingdom and the Federal Republic of Germany, and about 90% of the total quantity exported from Brazil in 1981 was imported by these three countries (Appendix Tables 1 to 3).

2. Position of Brazil Nuts

Imports of almonds, cashew nuts, hazelnuts, walnuts and Brazil nuts by main consuming countries are shown in Fig. A-1. The percentage share of imports held by each country for each type of nut reflects the differences in preference for the various nuts.

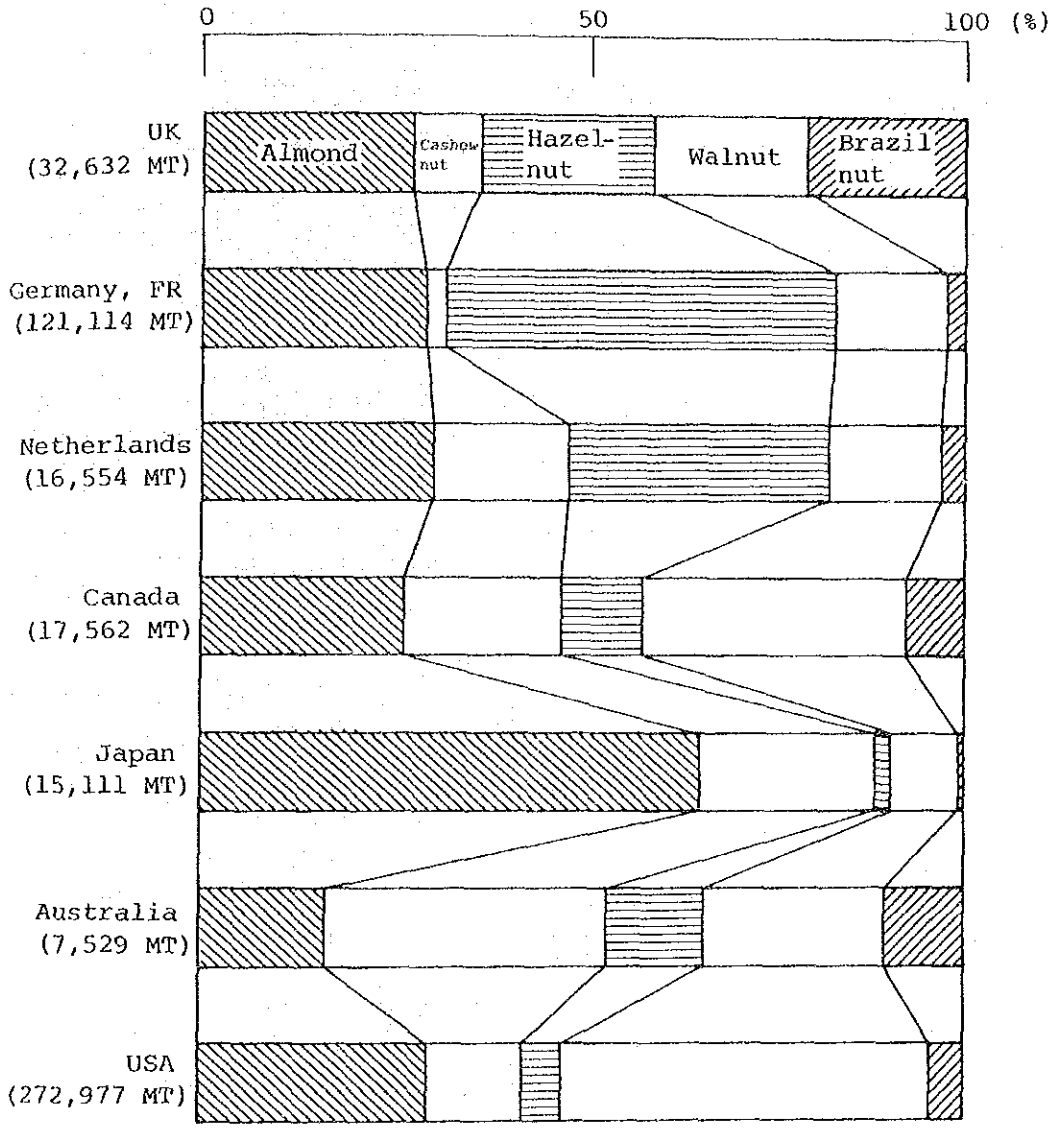
In the United Kingdom, the import share of Brazil nuts is about 21%, which is almost the same as the shares held by the other nuts. This probably indicates the deep-rooted demand for Brazil nuts in this country.

In each of the other countries, however, the import share held by Brazil nuts is 10% or less, and the consumption of Brazil nuts is not expanding as much as for the other nuts.

3. Export Price

Until 1976, the export price of Brazil nuts showed a fairly stable trend. However, in 1977 it registered a steep increase, and remained at that level until 1979, while in 1980 it again decreased. On the other hand, the volume of exports in each year showed

Fig. A-1 Comparison of Import Share of each Nut by Major Nut-importing Countries (5-year average, 1977 - 1981)



Notes: 1) UK: 5-year average, 1976 - 1980
2) Since the USA is a producing country of almonds, hazelnuts and walnuts, the share of domestic consumption is shown instead of import share for these three nuts.

Source: Gill and Duffus, Edible Nut Statistics, June 1982

Table A-2 Trends of Export Price of Brazil Nut by Countries, and Average Price

(US$/kg; FOB)

	In-shell, fresh				In-shell, roasted				Shelled, dry			
	USA	UK	Germany, FR	Average*	USA	UK	Germany, FR	Average*	USA	UK	Germany, FR	Average*
1972					0.34	0.39	0.28	0.35	0.99	1.06	0.96	1.01
1973					0.51	0.44	0.37	0.45	1.22	1.27	1.12	1.23
1974	0.59	0.61	0.56	0.61	0.66	0.66	0.74	0.66	1.52	1.69	1.61	1.59
1975	0.66	0.45	0.43	0.43	0.56	0.52	0.53	0.55	1.23	1.37	1.26	1.27
1976	1.63	0.70	0.57	0.56	0.65	0.69	0.71	0.67	1.40	1.47	1.38	1.44
1977		0.80		0.80	1.02	1.05	1.08	1.05	2.30	2.27	2.23	2.29
1978		0.82		0.82	1.16	1.21	1.19	1.18	2.65	2.72	2.23	2.68
1979				0.82	1.05	1.15	1.15	1.10	2.13	2.43	2.32	2.30
1980		0.79		0.78	0.87	0.95	0.86	0.87	1.74	2.04	1.93	1.89
1981				0.60	1.02	0.97	0.84	0.97	2.02	2.16	1.97	2.12

* Average export price for all importing countries

Note : Differences in the export price are caused by the different ports of shipment to the importing countries.

Source: Bank of Brazil, Export/Import Department (CACEX)

relatively large fluctuations, although the relationship between the volume of exports and the export price is not clear.

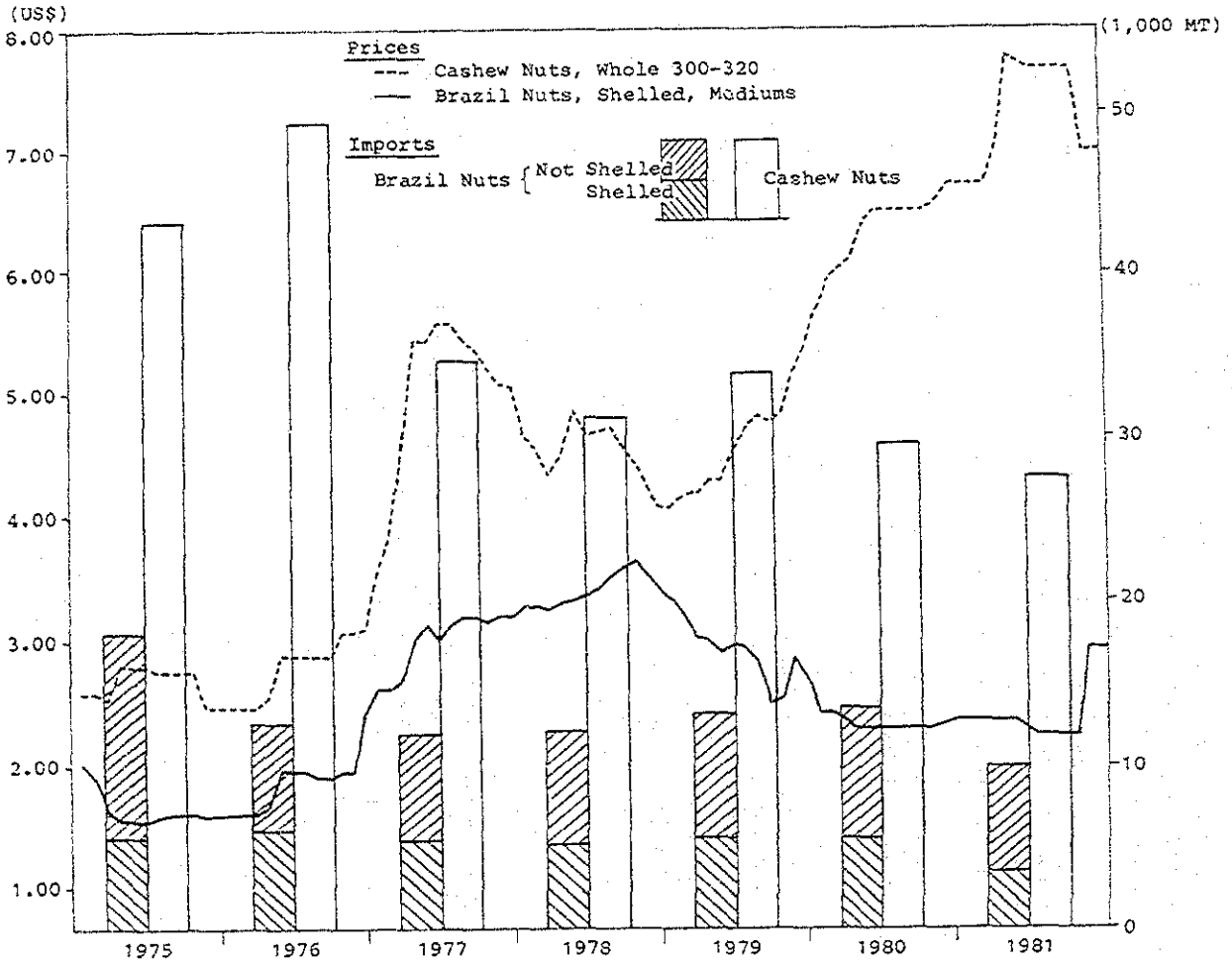
The reason behind the fluctuations in the export price is said to be an imbalance of supply and demand, caused by fluctuations in the yield due to the weather conditions; for example, storm damage causing blossoms to fall in the flowering period or the fruit to fall prematurely. The details, however, are not clear.

It is difficult to clearly delineate the relationship between the price of Brazil nuts and the price of other nuts because of the lack of suitable data on international prices on the same standard. As shown in Fig. A-2, as far as the relationship between the spot price of Brazil nuts (shelled, mediums) and that of cashew nuts (whole 300-320) in New York is concerned, the movement of both prices was relatively parallel until the middle of 1977, but thereafter their prices have moved in opposite directions. The price of cashew nuts, as reflected in the quantity of imports into the United States (a major consumer), seems to fluctuate according to the increases or decreases in the supply capacity of the market. Since Brazil nuts cannot easily be replaced by other nuts, their price seems to be determined mainly by the demand-supply situation existing between producing and consuming countries.

4. Customs Tariff Rates in Importing Countries

The customs tariff rates for Brazil nuts in each of the importing countries is 0% for the raw nuts, and consequently there is no problem in terms of customs barriers. With regard to processed goods, each country applies its own tariffs (Appendix Table 4).

Fig. A-2 Monthly Cashew and Brazil Nut Prices (Spot, New York) and Imports to the Unites States, 1975-1981



Source: USDA, Foreign Agriculture Circular

B. TRENDS OF CONSUMPTION AND USES

Brazil nuts are consumed as a food, and are roughly classified as follows.

a. Fried or roasted: After being fried or roasted, nuts are seasoned with salt, etc., and used alone or mixed with several kinds of nuts.

b. Confectionery products: After removing shells and peeling pericarp nuts are chopped finely, sliced or diced and then placed on or mixed into cakes, cookies and candies. Nuts are also used as a core in chocolate-coated confectioneries.

c. Raw: Both the in-shell type and shelled type of nuts are eaten raw. This form of consumption has to date accounted for the least amount of demand of all the forms of consumption, but the demand for raw nuts as a food may increase in future due to a recent propensity to natural foods.

In contrast to almonds and cashew nuts, Brazil nuts have few distinctive features in terms of "taste" and "flavor", although in the main importing countries, namely the United States, the United Kingdom and the Federal Republic of Germany, they are used in the following forms: a. in mixed nuts; b. as confectionary materials; and c. eaten raw.

Recently, an increase in the consumption of raw nuts is especially conspicuous. This trend seems to be caused by an orientation toward natural foods, in which consumers now avoid the excessive intake of fats, salt and sugar for the purpose of maintaining their health, and seek unprocessed natural foods.

The consumption of Brazil nuts in Japan shows a strong trend toward being used as a component of mixed nuts, and other uses are very rarely seen. Compared with the wide range of uses in the United States and the main importing countries in Europe, the use of Brazil nuts in Japan is limited in scope.

One major nut processor who handled about 90% of Japan's imports of Brazil nuts from Brazil and Peru in 1982 (67 tons) reportedly used more than 99% of them in mixed nuts (oil-roasted), selling the remainder as a single commodity. This processor who holds a 30-35% share in the market of all roasted nuts also sells other nuts to confectionery manufacturers as ingredients in bread, cookies and chocolate, but according to him Brazil nuts are at present not used for such purposes in Japan. Smaller food companies, which annually use 2-3 tons of Brazil nuts also use them just as roasted nuts, mainly in mixed nuts.

Brazil nuts are eaten as roasted nuts in Japan. On the other hand, they are consumed in a variety of forms, not only as roasted nuts, but also as ingredients in confectionery in the main European importing countries as well as in the United States. Japan's relatively narrow utilization of Brazil nuts is partly due to the fact that they are not well-known in the Japanese market. According to the market analysis undertaken by the above nut processor (having at least twenty-five years experience in handling Brazil nuts), the taste of Brazil nuts appears not to agree with the Japanese palate so far. For this reason, although the market cannot be expected to rapidly expand, he feels that the rarity of Brazil nuts in Japan provides these dealers with a sales point in promoting their use in mixed nuts. Further, according to another nut processor, despite the disadvantage of the Brazil nuts of having high fat content, it is possible to establish them in the Japanese market by making efforts to improve the processing method by such techniques as dry roasting, or even to develop new uses.

The first requirement for expanding the market may be, however, the stability of supply as described in detail later. Though there were a considerable number of nut processors who used Brazil nuts mainly as mixed nuts a few years ago, today there are only a few companies because of the difficulty in the stable acquisition of good-quality nuts. A supply shortage is a serious problem for nut processors. If any nut appearing on a label of mixed nuts is not actually included, nut processors are prohibited to sell them by the Law of Labelling. The instability of supply is due not only to the system of production but also to the distance from the producing countries. Moreover, from the point of view of quality, long-distance transportation is not conducive to highly fatty products like Brazil nuts.

The proportion of Brazil nuts in mixed nuts is almost constant regardless of the price, because it is considered that they cannot easily be replaced by other nuts in Japan because of their taste. Since almond, cashew and hazel nuts can be substituted for one another, and there are sharp fluctuations in the price quotations for each, price stabilization of the end product is attempted by adjusting the proportion of each nut in each batch of mixed nuts. On the other hand, there is little fluctuation in the proportion of Brazil nuts, namely about one piece in a 100-200 gram batch, and about three pieces per 500-700 gram batch.