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13 Trends and Patterns of Singapore's Trade in Manufactures

Chung Ming Wong

In recent years Singapore has achieved a satisfactory record of economic growth together with relative price stability (table 13.1). Because Singapore is a small and very open economy,[1] the growth of Singapore's exports of manufactured goods and services is expected to have a significant influence on its overall rate of economic growth. This paper examines the trends and changes in composition of Singapore's trade in manufactures in the last two decades and attempts to relate them to the nation's industrial development and shifts in government policies.[2] Also included is a discussion of how Singapore's comparative advantage—and therefore the pattern of trade—may be expected to change in the future. Finally, the paper examines the problems that need to be overcome in view of current world economic conditions if Singapore's export-led growth is to continue.

13.1 Singapore's Industrial Development, 1959–82

Because of its favorable location, Singapore developed initially as an entrepôt, serving as a center for the collection and distribution of goods to the neighboring countries. The industries at that time produced simple types of consumer manufactures and intermediate inputs. The goods produced were based on easy access to raw materials (e.g., processing of rubber and coconut and vegetable oils), or enjoyed natural protection because of high transport costs (e.g., beverages, clay products, and furniture).

When Singapore became a self-governing state in 1959, entrepôt trade was showing signs of stagnation. The neighboring countries were in-

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Table 13.1 **Singapore: Selected Economic Indicators**

Year	Unemployment Rate (%)	Gross Domestic Product: At Current Factor Cost, Value[a]	Gross Domestic Product: At Current Factor Cost, Annual Change[b]	Gross Domestic Product: At 1968 Factor Cost, Value[a]	Gross Domestic Product: At 1968 Factor Cost, Annual Change[b]	(M^1) at End Period, Value[a]	(M^1) at End Period, Annual Change[b]	(annual change in %), CPI[c]	(annual change in %), GDP Defl.[d]	(million U.S. $), Current Acct. Bal.	(million U.S. $), Overall Balance	Official Foreign Reserves at End of Year (million U.S. $)	Year
1960	—	1,985.3	—	2,122.3	—	—	—	—	—	−79.9	45.7	—	1960
1961	—	2,153.3	8.5	2,305.5	8.6	—	—	0.4	0.0	−91.0	22.7	—	1961
1962	—	2,327.5	8.1	2,466.2	7.0	783.6	—	0.4	0.9	−65.0	43.3	—	1962
1963	—	2,594.0	11.5	2,724.3	10.5	832.8	6.3	2.3	1.0	−108.5	32.1	377.1	1963
1964	—	2,504.3	−3.5	2,607.0	−4.3	842.3	1.1	1.4	0.7	−54.2	−3.9	371.8	1964
1965	—	2,707.1	8.1	2,780.3	6.6	890.5	5.7	0.3	1.4	−49.0	−4.6	349.1	1965
1966	8.9	3,037.4	12.2	3,074.6	10.6	996.6	11.9	2.1	1.3	1.1	49.9	394.4	1966
1967	8.1	3,444.6	13.4	3,475.2	13.0	972.7	−2.4	3.2	0.6	−68.4	99.4	495.6	1967
1968	7.3	3,970.8	15.3	3,970.8	14.3	1,172.3	20.5	0.7	1.1	−133.3	216.7	712.4	1968
1969	6.7	4,609.5	16.1	4,501.8	13.4	1,341.7	14.5	−0.2	2.3	−191.2	95.5	826.6	1969
1970	6.0	5,319.9	15.4	5,107.0	13.4	1,574.3	17.3	0.3	1.7	−571.9	184.5	1,012.0	1970
1971	4.8	6,279.4	18.0	5,747.4	12.5	1,759.9	11.8	2.0	4.5	−723.6	319.8	1,343.5	1971
1972	4.7	7,523.9	19.8	6,514.1	13.3	2,384.8	35.5	2.1	5.4	−495.7	336.4	1,754.9	1972
1973	4.5	9,437.8	25.4	7,247.2	11.1	2,632.7	10.4	19.5	12.1	−521.8	411.4	2,373.6	1973
1974	3.9	11,738.2	24.4	7,737.1	6.8	2,858.8	8.6	22.4	15.6	−1,021.6	294.8	2,668.5	1974
1975	4.6	12,507.2	6.6	8,043.5	4.0	3,472.2	21.5	2.6	2.4	−584.2	407.5	3,156.9	1975
1976	4.5	13,586.2	8.6	8,621.2	7.2	4,000.0	15.2	−1.9	1.4	−567.3	298.4	3,343.7	1976
1977	3.9	14,846.7	9.3	9,290.3	7.8	4,412.1	10.3	3.2	1.6	−295.1	312.9	3,698.8	1977
1978	3.6	16,474.9	11.0	10,088.6	8.6	4,925.9	11.6	4.8	2.3	−452.5	664.7	5,045.6	1978
1979	3.4	18,904.9	14.7	11,030.9	9.3	5,706.1	15.8	4.0	5.3	−735.8	523.0	5,776.9	1979
1980	3.5	22,381.7	18.4	12,160.5	10.2	6,134.6	7.5	8.5	7.3	−1,564.2	669.6	6,425.2	1980
1981	2.9	26,196.3	17.0	13,369.3	9.9	7,241.1	18.1	8.2	6.6	−1,382.3	917.5	7,332.4	1981
1982	2.6	28,906.7	10.3	14,217.9	6.3	8,156.8	12.6	3.9	3.9	−1,279.1	1,176.4	8,372.9	1982

Sources: Singapore, Department of Statistics, *Economic and Social Statistics: Singapore 1960–1982*; Singapore, Ministry of Finance, *Economic Survey of Singapore, 1975*.

[a]In millions of Singapore dollars.

[b]In percentages.

[c]Calculation is based on consumer price index (June 1977–May 1978 = 100).

[d]Calculated from GDP deflator based on 1968 = 100.

creasingly trading directly with countries who needed their materials and had begun developing their manufacturing industries. Moreover, population growth had been rapid, and in 1960 the unemployment rate was 13.5%. To solve the unemployment problem, Singapore embarked on an industrialization strategy. In that year, the Economic Development Board (EDB) was set up as the government agency to foster industrial development. But achievements during 1960–65 were modest because of political uncertainty and labor unrest.

The separation of Singapore from Malaysia in 1965 meant the loss of a well-protected market. To protect the domestic market, protective duties were imposed. But as Tan and Ow (1982) have pointed out, nominal and effective rates of protection were low compared with those of other developing countries.[3] Although import-competing activities were generally favored during that period, discrimination against exports was low and was finally eliminated after 1967, when imports were liberalized and additional export incentives were provided. Moreover, since the import substitution phase (1965–67) was short, interest groups did not develop. Thus when Singapore later shifted to an export-oriented strategy, the transition was eased by the absence of entrenched interests.

Singapore's export-oriented industrialization was remarkably successful, and with it came significant transformation of the economy. In terms of gross domestic product at constant prices the share of the manufacturing sector has increased significantly in the last two decades (table 13.2). In 1960 the trade sector accounted for one-third of GDP, and it is still the largest sector despite the decline in importance of entrepôt trade. The manufacturing sector is now the second-largest sector in terms of share in GDP and the largest sector in terms of

Table 13.2 **Singapore's GDP by Industry at 1968 Factor Cost for Selected Years** (percentages)

Industry	1960	1970	1980	1982
Agriculture and fishing	4.1	2.5	1.3	1.0
Quarrying	0.4	0.4	0.4	0.5
Manufacturing	13.2	19.7	23.9	21.2
Utilities	2.5	2.8	2.9	2.8
Construction	3.7	6.7	5.0	6.9
Trade	33.6	30.1	25.8	24.4
Transport and communication	14.0	11.6	19.2	20.7
Financial and business services	11.7	14.0	17.8	20.8
Other services	18.5	14.2	11.0	10.9
Less imputed bank charges	1.7	2.1	7.3	9.2
Total	100.0	100.0	100.0	100.0

Sources: Singapore, Ministry of Trade and Industry, *Economic Survey of Singapore, 1982;* Singapore, Department of Statistics, *Monthly Digest of Statistics, March 1983.*

employment. At the same time Singapore has also emerged as the region's financial center, as evidenced by the increase in the share in GDP of financial and business services. The construction sector has grown since 1960 (mainly the result of public housing and other projects), and so have transport and communication.

The recent experience of Singapore provides a classical example of export-led growth. Since the turn toward export-oriented industrialization, not only the growth of exports but the growth of manufacturing output and value added in general have become tied to world conditions. The growth rates of output, value added, and direct export of the manufacturing sector are closely related (table 13.3). In 1960–68 and especially during the import substitution phase (1965–68), the growth rate of direct export lagged behind those of manufacturing output and value added. In 1968–74, with the turn to export-oriented industrialization, the growth rate of direct export was almost twice those of value added and output. During this period there were significant increases in the degree of export orientation of most industries. Singapore, like many other developing countries, was hit by the 1974–75 recession, and despite its recovery since 1976, growth rates in 1974–81 were significantly lower than in the earlier period.

Singapore is essentially a free enterprise economy, and the government has relied mainly on private enterprise and initiative while employing fiscal incentives and other measures to attract investors. Fiscal incentives were first used in 1959 with the granting of relief from the prevailing 40% company profit tax to designated pioneer companies. Under the Economic Expansion Incentives (Relief from Income Tax) Act of 1967, the existing incentives were consolidated and new ones were added.

Table 13.3 **Compound Growth Rates of Singapore's Manufacturing Sector at Constant Prices**[a] (percentage per year)

		Subperiod			
	1960–81	1960–65	1965–68	1968–74	1974–81
Output[b]	17.06	15.56	24.35	24.92	8.89
Value added[b]	16.26	16.70	19.02	23.65	8.88
Direct export[b]	20.14	13.42	18.06	41.68	9.49

Source: Singapore, Department of Statistics, *Report on the Census of Industrial Production*, various issues.

[a]Computed using GDP deflator for manufacturing (1968 = 100) in all cases.

[b]Data on output, value added, and direct exports obtained from the *Report on the Census of Industrial Production* include only firms with ten or more workers. (The share in output of firms with less than ten workers is, however, very small.) Figures on direct exports are underestimates of domestically produced exports since goods sold in Singapore may subsequently be exported. All figures are for total manufacturing excluding rubber processing.

The rapid growth of export-oriented industries since 1967 was accompanied by increasing participation by foreign enterprises. In general, no limits were placed on foreign participation: local participation, though encouraged, was not required. Foreign firms could freely repatriate profits and were allowed to import workers with skills not available in Singapore. The major sources of capital at present are the United States, Western Europe, and Japan. Compared with local firms, foreign establishments are characterized by larger size, higher value added and output per worker, and higher degree of export orientation. In 1981 wholly foreign firms accounted for 16.7% of the total number of manufacturing establishments but 42.8% of total employment, 55.9% of output, 54.3% of value added, and 67.0% of direct export. The ratio of direct export to total sales was 73.5% for wholly foreign firms and 26.0% for wholly local firms.[4] Recent figures indicate that foreign investments are concentrated in highly capital-intensive industries like petroleum refineries or rapidly growing export-oriented industries like electronic and electrical machinery and appliances.

Although Singapore has relied mainly on private enterprise, the government has tried to influence resource allocation in various ways—such as providing incentives to industries regarded as desirable for the country. In fact, Pang and Tan (1981, 151) single out the government as the most important factor behind Singapore's economic success. Government intervention was perhaps especially significant in the labor market. The Employment Act and Industrial Relations (Amendment) Act of 1968 limited the negotiating power of unions by making matters such as promotion, internal transfer, and dismissal nonnegotiable and cut down labor costs by limiting bonuses and annual paid leave and by increasing the number of hours in the work week. While some may regard such stringent labor laws as unnecessary infringements of workers' rights, they were seen at the time to be necessary to correct the image of an undisciplined work force, and they paid off very well by attracting foreign capital to Singapore.

The policy of wage restraint by the government was an important factor responsible for the success of Singapore's labor-intensive export-oriented industrialization strategy. By 1970 unemployment was largely overcome (table 13.1), and Singapore became instead a labor-short economy. Immigration laws were relaxed to allow firms short of labor to bring in foreign workers. The tripartite National Wage Council (NWC) was formed in 1972 to recommend orderly wage changes. The wage guidelines, though not mandatory, were to a great extent adopted by the unionized sectors and the public sector. In 1972–74 the NWC recommended high wages to offset inflation, but from 1976 to 1979 it recommended only moderate wage increases in order to maintain Singapore's competitiveness in the world market. As a result labor-intensive firms were encouraged and employment opportunities increased. In

1979, however, the NWC shifted to a high-wage policy in view of widespread labor shortages to encourage firms to upgrade and use labor more efficiently. The high-wage policy was in fact part of a long-term strategy to restructure the economy in recognition of the fact that Singapore's future comparative advantage might not lie in labor-intensive industries, and thus Singapore would need to move upstream toward more skill-intensive, capital-intensive, and higher-technology industries.

At present the "pioneer" status (entitling tax relief for five to ten years from the 40% tax on profits) and the investment allowance incentive (with tax deduction equal to up to 50% of new fixed investment in plant, machinery, and factory buildings) are the main incentives used in investment promotion. Pioneer certificates are now mainly awarded to projects manufacturing new and high-technology products, while the investment allowance incentive is increasingly being used to promote the upgrading and mechanization of existing operations. Tax incentives are also given to encourage manufacturers to undertake research and development activities. Projects believed to be of strategic importance to Singapore's industrial development can obtain long-term fixed-rate loans at favorable interest rates under the Capital Assistance Scheme (CAS) administered by the Economic Development Board. Lastly, on realization that the restructuring of the Singapore economy with emphasis on high-technology industries and higher productivity through automation would create demand for new skills, the Skills Development Fund (SDF) was established in 1979 to provide financial assistance to employers for the training of employees in skills needed for Singapore's economic restructuring effort.[5]

13.2 Commodity Composition of Singapore's Trade and Relation to Domestic Development

The examination of Singapore's trade structure is complicated by the presence of entrepôt trade. To give some idea of the importance of entrepôt trade, in 1960 the value of reexports was ten times that of domestic exports, and the value of reexports of manufactured goods (SITC 5–8) was about five times that of domestically manufactured exports. The value of entrepôt trade has shown a rising trend, although its relative importance has declined. It was not until 1972 that the value of domestically manufactured exports exceeded that of manufactured reexports for the first time, and only in 1974 did total domestic exports exceed reexports.

Table 13.4 shows the changing composition of Singapore's trade (imports and exports), and table 13.5 shows the change in composition of its domestically produced exports.[6] In 1960 food, beverages, crude materials, and animal and vegetable oils and fats (SITC 0, 1, 2, and 4)

Table 13.4 **Commodity Composition of Singapore's Imports and Exports for Selected Years, 1960–80** (in millions of U.S. Dollars)

SITC Rev. 1	Commodity	1960		1965		1970		1975		1980	
		Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
0	*Food and live animals*	**220.93**	**150.78**	**242.82**	**142.35**	**307.31**	**178.21**	**694.07**	**383.24**	**1,362.93**	**938.66**
		(16.59)	(13.27)	(19.52)	(14.51)	(12.49)	(11.47)	(8.53)	(7.13)	(5.68)	(4.84)
1	*Beverages and tobacco*	**23.24**	**23.01**	**22.98**	**15.11**	**41.78**	**23.38**	**55.02**	**17.25**	**129.02**	**73.46**
		(1.74)	(2.03)	(1.85)	(1.54)	(1.70)	(1.50)	(0.68)	(0.32)	(0.54)	(0.38)
2	*Crude materials except fuels*	**496.83**	**509.08**	**229.59**	**267.68**	**283.75**	**468.55**	**523.25**	**716.81**	**1,599.13**	**2,200.11**
		(37.30)	(44.82)	(18.46)	(27.28)	(11.53)	(30.16)	(6.43)	(13.33)	(6.66)	(11.36)
231	Crude rubber (incl. synthetic and reclaimed)	444.33	467.73	181.69	221.14	184.92	383.29	316.39	556.64	1,101.41	1,539.69
24	Wood, lumber, cork	—	—	15.94	—	39.66	36.21	71.51	64.80	198.04	273.43
3	*Mineral fuels*	**193.17**	**128.09**	**166.04**	**140.83**	**331.52**	**360.07**	**1,998.49**	**1,808.73**	**6,882.14**	**4,882.18**
		(14.50)	(11.28)	(13.35)	(14.35)	(13.47)	(23.18)	(24.57)	(33.64)	(28.67)	(25.20)
331	Petroleum, crude and partly refined	5.75	4.10	34.29	0.00	142.71	—	1,518.46	21.87	5,681.56	—
332	Petroleum products	187.24	123.88	131.25	140.37	188.16	358.60	478.50	1,768.53	1,196.05	4,809.40
4	*Animal and veg. oils and fats*	**12.79**	**16.42**	**18.73**	**19.59**	**41.15**	**45.80**	**102.16**	**103.45**	**467.96**	**512.07**
		(0.96)	(1.45)	(1.51)	(2.00)	(1.67)	(2.95)	(1.26)	(1.92)	(1.95)	(2.64)
4222	Palm oil			12.28	11.70	29.64	28.32	66.61	73.18	52.86	304.17
5	*Chemicals*	**44.41**	**28.18**	**62.06**	**36.45**	**126.87**	**42.36**	**472.63**	**200.49**	**1,341.28**	**1,374.84**
		(3.33)	(2.48)	(4.99)	(3.71)	(5.16)	(2.73)	(5.81)	(3.73)	(5.59)	(7.10)
51	Chem. elements and compounds	8.37	6.37	9.99	5.92	23.06	6.03	86.25	30.40	337.49	132.09
541	Medicinal products	8.58	—	11.97	5.95	20.21	7.23	63.42	73.31	96.68	151.13
581	Plastic materials	—	—	6.20	2.34	19.71	4.38	69.43	54.94	306.05	103.72
6	*Basic manufactures*	**153.25**	**102.74**	**204.48**	**116.56**	**539.31**	**138.24**	**1,481.87**	**457.94**	**3,367.61**	**1,601.58**
		(11.50)	(9.05)	(16.44)	(11.88)	(21.91)	(8.90)	(18.22)	(8.52)	(14.03)	(8.2727)
63	Wood and cork manuf. n.e.s.	—	—	2.85	3.31	9.73	18.32	30.24	84.61	119.30	256.69
64	Paper, board, and manuf.	12.75	—	17.60	6.22	36.07	7.24	72.08	18.75	235.11	60.85
65	Textile yarn, fabrics, etc.	72.75	46.18	87.71	45.89	264.63	53.71	374.40	130.20	846.92	366.65
66	Nonmetallic mineral manuf. n.e.s.	9.63	7.43	19.05	13.55	37.28	14.43	149.67	38.55	422.69	133.98

(*continued*)

Table 13.4 (continued)

SITC Rev. 1	Commodity	1960		1965		1970		1975		1980	
		Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
67	Iron and steel	22.52	13.11	38.16	16.70	102.03	12.79	542.01	86.82	866.97	212.33
68	Nonferrous metals	4.79	2.87	8.98	4.83	22.22	3.76	61.87	16.89	258.26	316.62
69	Metal manuf. n.e.s.	14.63	14.11	21.67	18.48	52.46	20.77	210.01	66.74	491.96	204.48
7	*Machinery and transport equip.*	**93.94**	**76.63**	**179.71**	**102.88**	**561.34**	**170.15**	**2,130.28**	**1,220.00**	**7,053.09**	**5,105.49**
		(7.05)	(6.75)	(14.45)	(10.48)	(22.81)	(10.95)	(26.19)	(22.69)	(29.38)	(26.35)
71	Machinery other than elec.	39.01	34.28	62.01	35.17	275.46	61.93	990.35	375.01	2,511.16	1,157.67
714	Office mach.	0	0	—	—	10.86	13.25	55.40	87.55	212.00	153.35
715	Metalworking mach.	0	0	—	—	11.76	—	46.05	—	109.44	—
717	Textile and leather mach.	0	0	3.85	—	15.11	—	22.38	—	74.69	—
718	Mach. for special industries	0	0	11.39	9.79	96.83	19.65	278.30	96.38	544.99	295.13
719	Mach. and appliances (other than elec.) and mach. parts n.e.s.	0	0	—	—	102.39	15.96	416.11	113.22	1,207.86	485.02
72	Elec. mach., apparatus, appliances	17.36	10.73	50.88	16.69	160.33	62.10	793.29	620.36	2,894.55	3,120.61
722	Elec. power mach. and switchgear	0	0	14.04	2.38	26.85	5.29	152.94	54.14	476.23	286.29
723	Equip. for distributing elec.	0	0	7.09	—	18.82	—	56.68	—	120.03	—
724	Telecommunications apparatus	0	0	14.16	3.91	35.66	11.69	164.79	168.82	645.77	1,259.15
725	Domestic elec. equip.	0	0	6.02	—	8.38	1.94	18.62	14.68	78.30	113.45
729	Other elec. mach. and apparatus	0	0	—	—	70.35	42.29	398.20	374.80	1,567.72	1,428.65
73	Transport equip.	37.53	31.07	66.73	50.21	125.55	46.12	346.64	224.64	1,647.38	827.21
732	Road motor vehicles	29.97	26.42	60.45	46.93	90.41	39.52	140.56	80.44	559.80	211.24
734	Aircraft	0	0	—	—	9.41	0.85	65.77	10.70	529.34	158.48
735	Ships and boats	0	0	—	—	20.15	5.13	125.98	130.21	521.08	435.20
8	*Misc. manufactures*	**70.08**	**32.46**	**91.26**	**49.33**	**175.49**	**80.69**	**562.00**	**371.07**	**1,487.50**	**1,283.10**
		(5.26)	(2.86)	(7.34)	(5.03)	(7.13)	(5.19)	(6.91)	(6.90)	(6.20)	(6.62)
84	Clothing	15.58	8.44	20.21	16.47	23.16	30.94	60.62	117.07	146.67	426.26
86	Instruments, watches, clocks	21.17	—	26.72	6.19	62.56	10.12	207.60	124.52	553.29	257.88
9	*Unclassified*	**26.40**	**68.44**	**26.01**	**90.54**	**52.53**	**46.10**	**115.21**	**98.09**	**311.99**	**1,403.99**
		(1.98)	(6.03)	(2.09)	(9.23)	(2.13)	(2.97)	(1.42)	(1.82)	(1.30)	(7.25)
Total	*All commodities*	**1,332.05**	**1,135.84**	**1,243.68**	**981.34**	**2,461.06**	**1,553.55**	**8,134.98**	**5,377.08**	**24,002.67**	**19,375.48**

Source: United Nations, *Yearbook of International Trade Statistics*, various issues.

Note: Percentage shares of SITC one-digit sections shown in parentheses; . . . = not available or negligible.

Table 13.5 **Composition of Singapore's Domestic Exports in Selected Years, 1960–82** (percentages)

		Share of Domestic Exports of Commodity							
		1960		1969		1975		1982	
SITC	Commodity	Total	SITC 5–8	Total	SITC 5–8	Total	SITC 5–8	Total	SITC 5–8
0	*Food and live animals*	**22.29**		**5.34**		**3.69**		**1.54**	
1	*Beverages and tobacco*	**9.63**		**0.73**		**0.34**		**0.46**	
2	*Crude materials except fuels*[a]	**4.15**		**2.09**		**0.60**		**0.43**	
3	*Mineral fuels*[b]	—		**53.74**		**42.88**		**47.49**	
4	*Animal and vegetable oils and fats*	**9.35**		**1.75**		**0.74**		**1.66**	
5	*Chemicals*	**12.30**	**22.53**	**2.60**	**11.63**	**2.76**	**6.83**	**2.37**	**6.41**
	Medicinal products			0.58	2.59	1.80	4.45	0.89	2.42
	Plastic materials			0.18	0.80	0.31	0.77	0.37	1.01
6	*Manufactured goods classified by materials*	**22.31**	**42.70**	**8.39**	**37.50**	**6.45**	**15.95**	**4.16**	**11.27**
	Wood, simply shaped	n.a.	n.a.	1.99	8.91	1.92	4.75	0.99	2.69
	Textiles, yarn, thread	n.a.	n.a.	—	—	0.58	1.44	0.26	0.71
	Cotton fabrics, woven	n.a.	n.a.	0.81	3.63	0.58	1.43	0.25	0.67

(*continued*)

Table 13.5 (continued)

SITC	Commodity	Share of Domestic Exports of Commodity							
		1960		1969		1975		1982	
		Total	SITC 5–8	Total	SITC 5–8	Total	SITC 5–8	Total	SITC 5–8
7	*Machinery and transport*	**7.65**	**14.01**	**4.87**	**21.77**	**22.37**	**55.31**	**23.87**	**64.61**
	Office machines	n.a.	n.a.	0.01	0.05	2.32	5.75	1.31	3.55
	Other nonelectric machines	n.a.	n.a.	0.38	1.71	1.15	2.84	1.49	4.03
	Electric generators	n.a.	n.a.	0.04	0.19	1.16	2.87	2.10	5.67
	Telecommunications apparatus	n.a.	n.a.	0.22	0.99	4.62	11.42	5.91	16.00
	Other electric machinery	n.a.	n.a.	3.15	14.06	7.85	19.42	7.75	20.99
	Ships and boats and oil rigs	n.a.	n.a.	0.50	2.24	2.38	5.88	2.62	7.10
8	*Miscellaneous manufactured articles*	**11.33**	**20.76**	**6.51**	**29.10**	**8.86**	**21.92**	**6.54**	**17.70**
	Clothing	n.a.	n.a.	3.41	15.26	3.13	7.75	2.58	6.99
	Scientific instruments	n.a.	n.a.	0.03	0.13	1.75	4.32	0.56	1.52
	Watches and clocks	n.a.	n.a.	0.02	0.11	1.12	2.77	0.51	1.39
	Printed matter	n.a.	n.a.	0.56	2.51	0.56	1.38	0.38	1.03
	Toys and sporting goods	n.a.	n.a.	0.13	0.56	0.31	0.78	0.52	1.41
9	*Miscellaneous transactions n.e.s.*	—		**13.98**		**11.32**		**11.48**	
	Oil bunkers			13.51		11.14		11.37	
5–8	*Total manufactures*	**54.58**	**100.00**	**22.38**	**100.00**	**40.44**	**100.00**	**36.95**	**100.00**

Sources: Singapore, Department of Statistics, *Economic and Social Statistics: Singapore 1960–1982;* Singapore, Ministry of Trade and Industry, *Economic Survey of Singapore, 1982.*

Note: — = nil or negligible; n.a. = not available.

[a]Excludes processed rubber and sawn timber.

[b]Figures from 1975 include petroleum naphtha, which was previously included under chemicals.

made up about 60% of total trade, but their share declined to less than 20% in 1980. In the early 1960s, trade consisted mainly of transshipments of primary commodities such as rubber, tin, coconut and palm oil, and timber to industrial countries, and reexports of manufactures from the rest of the world to neighboring countries. In recent years crude materials like rubber are still important in entrepôt trade, but since the relative importance of rubber has declined in general, the share of SITC 0, 1, 2, and 4 has fallen. On the other hand, the shares of manufactures (SITC 5–8) and mineral fuels (SITC 3) have significantly increased. This reflects the changing nature of entrepôt trade as well as Singapore's successful export-oriented industrialization. While reexports of raw materials from Southeast Asian countries (and also petroleum from West Asian countries) to industrialized countries are still important, entrepôt trade is increasingly dominated by manufactures—e.g., the reexport of machinery and capital equipment from industrialized countries to the Asian region. At the same time (as will be seen) Singapore's domestic exports of manufactures have increased significantly as a result of successful industrialization. Domestic exports consist not only of labor-intensive manufactures like clothing but also increasingly of capital goods like machinery (especially electrical machinery and appliances) and transport equipment (including ships and boats, oil rigs, and aircraft). With industrialization, Singapore in turn requires increasing imports of raw materials, intermediate inputs, and machinery and capital goods. The effect of Singapore's industrialization on the trade pattern is once again clearly seen in the case of mineral fuels. In 1960 export of crude petroleum and petroleum products was mainly entrepôt trade. With the development of domestic refinery facilities, in the last decade exports of crude petroleum became insignificant, while exports of petroleum products (mostly to Japan) greatly exceeded imports (table 13.4). It can be seen from table 13.5 that domestic exports of mineral fuels were negligible in 1960 but accounted for more than half of domestically produced exports by 1969.

The shares of food, beverages, tobacco, crude materials, and animal and vegetable oils and fats in domestically produced exports have declined (table 12.5). The share of manufactures (SITC 5–8) in domestically produced exports declined from 1960 to 1969, but this was mainly due to the rapid expansion of domestically produced exports of petroleum products; more recently the share in the total has increased. Within manufacturing itself the share of machinery and transport increased tremendously—from 14% in 1960 to 65% in 1982—at the expense of other major categories. Increases in shares were especially spectacular for telecommunications apparatus and other electrical machinery.

The change in composition of Singapore's direct exports during industrial development and its relation to changes in composition of

output and value added can be seen in table 13.6. In 1960 most industries with large shares of output and value added were those which enjoyed considerable degrees of natural protection (food and beverages, printing and publishing) or were based on materials from nearby countries (rubber and wood products). In 1960 these industries together with tobacco accounted for 54% of output, 58% of value added, and 48% of direct export. The shares of the same industries have, however, declined consistently so that by 1981 their respective shares in output, value added, and direct export were 10%, 12%, and 7%. Since the shift to an export-oriented industrialization strategy, the shares of chemical and petroleum products, electrical machinery, and transport equipment have increased tremendously so that by 1981 they accounted for almost 80% of direct export. The shares of textiles, clothing, and footwear increased until the early 1970s and then declined—apparently a result of the move to the higher-skill, higher-technology phase of export-oriented industrialization.

Also presented in table 13.6 are annual growth rates for the manufacturing sector and the Schiavo-Campo (1978) measure of structural change calculated at three-year intervals.[7] It can be seen that in terms of output and value added structural changes are the greatest in 1960–63 and the two subperiods between 1966 and 1972. Growth rates of the manufacturing sector are also the highest in the same periods. As for direct export, both structural changes and growth rates are the highest in the years between 1966 and 1975, when there was a significant turn toward export-oriented industrialization.[8] As can be seen from the last row of the table, while the ratio of direct export to total sales fell from 36% in 1960 to 31% in 1966, it increased sharply to almost 60% in 1975.

Not only had there been increasing trade in manufactures relative to primary commodities, but trade in the former had become increasingly concentrated in capital goods at the expense of intermediate goods. This can be seen clearly in table 13.7, which shows the change in composition of Singapore's trade in manufactures according to broad categories of goods. Only goods under SITC 5–8 are included; thus food and beverages and petroleum products, etc., do not enter the calculation. Figures on reexports are not generally available before 1975 and those for retained imports have to be estimated; thus they may be subject to considerable inaccuracy.[9] The figures nevertheless show a clear tendency for the shares of capital goods in both exports and imports to increase and the shares of intermediate goods to decline. These trends are especially evident when one looks at domestic exports and retained imports, where the shares of capital goods have increased from about one-fourth in 1960 to over two-thirds in 1982. The shares of consumer goods in export, reexport, and domestic export fluctuated, showing some tendency to increase up to the early 1970s and then

Table 13.6 **Composition of Singapore's Manufacturing Output, Value Added, and Direct Exports** (percentages)

SIC	Industry[a]	1960	1963	1966	1969	1972	1975	1978	1981
	A. *Output*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	Food	16.18	13.80	13.62	12.48	9.65	6.69	6.25	4.60
21	Beverages	8.45	5.04	4.27	1.85	1.28	1.04	1.04	0.89
22	Tobacco	8.36	7.09	6.23	2.82	1.79	1.15	0.87	0.53
23+24+29	Textiles, clothing, footwear, leather products	3.27	2.51	4.51	5.10	7.73	4.74	5.45	3.95
25	Wood and cork products	7.67	5.91	6.35	4.99	4.56	2.47	2.78	1.74
26	Furniture and fixtures	0.83	1.05	1.05	0.89	0.51	0.39	0.59	0.75
27	Paper and paper products	1.11	0.74	1.08	1.01	1.06	0.77	0.81	0.82
28	Printing and publishing	9.17	6.32	4.94	2.44	2.50	1.79	1.91	1.83
30	Rubber products	3.90	1.76	2.11	1.46	0.98	0.59	0.44	0.28
31+32	Chemicals, chemical products, petroleum	13.67	26.44	26.91	40.12	32.25	41.01	41.07	42.08
33	Nonmetallic mineral products	3.72	7.30	4.61	2.41	2.33	2.77	2.08	2.38
34	Basic metal products	1.06	1.31	3.41	2.24	1.65	1.48	1.24	1.29
35	Metal products	6.53	6.62	7.07	4.95	4.29	3.88	3.74	4.06
36	Nonelectrical machinery	3.61	1.87	1.94	1.55	2.24	5.17	4.26	3.83
37	Electrical machinery	3.67	2.49	2.52	3.82	12.95	11.79	15.82	17.45
38	Transport equipment	6.81	5.86	5.99	8.08	9.67	10.60	7.79	9.95
39	Misc. manufacturing industries	2.02	3.89	3.40	3.79	4.56	3.70	3.86	3.57
	Structural change[b]	18.80	6.38	17.59	14.92	13.05	5.65	5.64	
	Growth rate at constant prices (% per yr.)	19.22	13.22	32.86	15.59	14.51	13.26	12.04	

(*continued*)

Table 13.6 (continued)

SIC	Industry[a]	1960	1963	1966	1969	1972	1975	1978	1981
	C. *Direct exports*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	Food	14.21	14.93	14.04	11.54	6.00	4.41	4.79	3.92
21	Beverages	10.99	5.21	3.65	1.01	0.55	0.43	0.33	0.43
22	Tobacco	0.19	1.52	1.04	0.27	0.13	0.03	0.04	0.10
23+24+29	Textile, clothing, footwear, leather products	2.49	2.48	9.61	7.26	10.93	5.06	5.48	3.99
25	Wood and cork products	10.48	9.22	9.37	5.75	5.25	2.72	2.72	1.45
26	Furniture and fixtures	0.76	1.26	0.61	0.25	0.10	0.18	0.35	0.62
27	Paper and paper products	0.84	0.59	0.91	0.50	0.44	0.15	0.17	0.16
28	Printing and publishing	4.38	4.78	2.49	0.67	0.89	0.63	0.53	0.51
30	Rubber products	7.82	3.32	2.79	1.64	0.94	0.46	0.29	0.22
31+32	Chemicals, chemical products, petroleum	17.70	19.46	29.16	50.17	32.53	45.63	48.14	45.41
33	Nonmetallic mineral products	9.10	9.10	1.82	1.31	0.55	1.10	0.70	0.73
34	Basic metal products	1.81	2.52	3.15	1.47	0.31	0.47	0.64	0.60
35	Metal products	7.88	8.18	6.20	3.21	1.93	2.07	1.49	1.83
36	Nonelectrical machinery	2.44	1.86	1.42	0.47	2.40	6.63	4.25	3.94
37	Electrical machinery	8.31	5.68	4.40	6.69	23.79	17.43	20.68	24.00
38	Transport equipment	0.42	6.82	8.62	5.76	8.57	9.32	6.57	9.46
39	Misc. manufacturing industries	0.20	0.33	0.73	2.03	4.68	3.26	2.83	2.63
	Structural change[b]	13.63	18.76	24.61	28.39	19.02	6.92	7.01	
	Growth rate at constant prices (% per yr.)	8.39	18.66	44.60	21.90	22.92	17.79	10.02	

	C. *Direct exports*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	Food	14.21	14.93	14.04	11.54	6.00	4.41	4.79	3.92
21	Beverages	10.99	5.21	3.65	1.01	0.55	0.43	0.33	0.43
22	Tobacco	0.19	1.52	1.04	0.27	0.13	0.03	0.04	0.10
23+24+29	Textile, clothing, footwear, leather products	2.49	2.48	9.61	7.26	10.93	5.06	5.48	3.99
25	Wood and cork products	10.48	9.22	9.37	5.75	5.25	2.72	2.72	1.45
26	Furniture and fixtures	0.76	1.26	0.61	0.25	0.10	0.18	0.35	0.62
27	Paper and paper products	0.84	0.59	0.91	0.50	0.44	0.15	0.17	0.16
28	Printing and publishing	4.38	4.78	2.49	0.67	0.89	0.63	0.53	0.51
30	Rubber products	7.82	3.32	2.79	1.64	0.94	0.46	0.29	0.22
31+32	Chemicals, chemical products, petroleum	17.70	19.46	29.16	50.17	32.53	45.63	48.14	45.41
33	Nonmetallic mineral products	9.10	9.10	1.82	1.31	0.55	1.10	0.70	0.73
34	Basic metal products	1.81	2.52	3.15	1.47	0.31	0.47	0.64	0.60
35	Metal products	7.88	8.18	6.20	3.21	1.93	2.07	1.49	1.83
36	Nonelectrical machinery	2.44	1.86	1.42	0.47	2.40	6.63	4.25	3.94
37	Electrical machinery	8.31	5.68	4.40	6.69	23.79	17.43	20.68	24.00
38	Transport equipment	0.42	6.82	8.62	5.76	8.57	9.32	6.57	9.46
39	Misc. manufacturing industries	0.20	0.33	0.73	2.03	4.68	3.26	2.83	2.63
	Structural change[b]	13.63	18.76	24.61	28.39	19.02	6.92	7.01	
	Growth rate at constant prices (% per yr.)	8.39	18.66	44.60	21.90	22.92	17.79	10.02	
	Ratio of direct export to total sales (%)	35.95	26.75	30.82	38.87	46.51	58.07	64.60	61.23

Source: Singapore, Department of Statistics, *Report on the Census of Industrial Production,* various issues.

[a]See Appendix table 13.A.1.

[b]The Schiavo-Campo (1978) measurement of structural change. Over the entire period 1960–81, the indices for output, value added, and direct exports are respectively 48.03%, 40.56%, and 57.88%.

Table 13.7 **Singapore's Trade in Manufactures Divided into Consumer Goods (C), Intermediate Goods (I), and Capital Goods (K)**

		Value (in thousands of U.S. dollars)					Trade in C, I, and K as Percentage of Total				
Year	Type of Good	Total Exports	Total Imports	Domestic Exports[a]	Reexports[b]	Retained Imports[c]	Total Exports	Total Imports	Domestic Exports[a]	Reexports[b]	Retained Imports[c]
1960	*Total*	*240,023*	*358,685*	*38,710*	*201,313*	*157,372*					
	C	32,465	70,085	8,036	24,429	45,655	13.53	19.54	20.76	12.13	29.01
	I	100,846	152,721	20,050	80,796	71,925	42.02	42.58	51.80	40.13	45.70
	K	106,711	135,879	10,624	96,087	39,791	44.46	37.88	27.44	47.73	25.28
1966	*Total*	*317,015*	*558,614*	*80,423*	*236,592*	*322,021*					
	C	53,152	98,060	14,050	39,103	58,958	16.77	17.55	17.47	16.53	18.31
	I	115,426	212,744	34,905	80,521	132,223	36.41	38.08	43.40	34.03	41.06
	K	148,437	247,810	31,468	116,969	130,841	46.82	44.36	39.13	49.44	40.63
1970	*Total*	*431,438*	*1,403,018*	*226,404*	*205,034*	*1,197,984*					
	C	80,979	175,986	26,487	54,492	121,494	18.77	12.54	11.70	26.58	10.14
	I	143,025	488,989	71,066	71,959	417,030	33.15	34.85	31.39	35.10	34.81
	K	207,434	738,044	128,851	78,583	659,461	48.08	52.60	56.91	38.33	55.05
1975	*Total*	*2,250,781*	*4,641,930*	*1,292,092*	*958,690*	*3,683,240*					
	C	321,276	561,409	282,399	88,877	472,532	16.50	12.09	21.86	9.27	12.83
	I	488,269	1,139,426	240,633	247,636	891,790	21.69	24.55	18.62	25.83	24.21
	K	1,391,236	2,941,096	769,060	622,177	2,318,919	61.81	63.36	59.52	64.90	62.96
1980	*Total*	*8,650,274*	*13,160,265*	*4,937,966*	*3,712,309*	*9,447,957*					
	C	1,201,386	1,378,224	883,391	317,995	1,060,229	13.89	10.47	17.89	8.57	11.22
	I	1,534,032	3,014,647	712,873	821,160	2,193,487	17.73	22.91	14.44	22.12	23.22
	K	5,914,856	8,767,394	3,341,702	2,573,154	6,194,241	68.38	66.62	67.67	69.31	65.56
1982	*Total*	*9,317,202*	*15,079,255*	*5,186,249*	*4,130,953*	*10,948,301*					
	C	1,323,146	1,800,131	893,886	429,260	1,370,871	14.20	11.94	17.24	10.39	12.52
	I	1,685,540	3,179,457	695,329	990,211	2,189,246	18.09	21.08	13.41	23.97	20.00
	K	6,308,516	10,099,667	3,597,034	2,711,482	7,388,185	67.71	66.98	69.36	65.54	67.48

Sources: Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports,* various issues; idem, *Report on the Census of Industrial Production,* various issues.

Note: Manufacturers are defined as SITC 5 to 8 and are subdivided as follows: consumer goods (SITC 8), intermediate goods (SITC 5 + 6, excluding 67 + 68 + 69), and capital goods (SITC 67 + 68 + 69 + 7) . See Appendix tables 13.A.1 and 13.A.2 for correspondence with Singapore industrial codes. Industrial codes 311 to 314 and 353 to 355 do not belong to SITC 5 to 8 and are not included in the calculation.

[a]Estimates for 1960, 1966, and 1970 are based on direct exports.

[b]Estimated by total exports minus direct exports for 1960, 1966, and 1970.

[c]Estimated by total imports minus reexports.

decline. For reexport, capital goods always had the largest share. Their share has increased further in recent years, while the share of intermediate goods has declined. Table 13.7 also shows the changing importance of entrepôt trade in manufactures. In 1960 the value of reexports was five times that of domestic exports, but by 1970 domestic manufactured exports exceeded reexports. The share of reexports in total exports fell from 84% in 1960 to 43% in 1975 but then increased slightly, reaching 44% in 1982. Retained imports as a fraction of total imports increased from 44% in 1960 to 85% in 1970 but fell gradually to 73% in 1982. This may reflect in part the change in nature of entrepôt trade, which has come to consist increasingly of reexport of capital goods to neighboring countries. The pattern of change also differs according to the type of good. For instance, even in 1982, reexport of intermediate goods continued to exceed domestic export.

The changes in export orientation and the growth and export performance of Singapore's major industry groups are shown in table 13.8. Between 1970 and 1981, the export orientation of Singapore's manufacturing sector increased from 40% to over 61%. Most industries have become more export oriented, although there are exceptions (e.g., leather, paper, plastic, and nonmetallic mineral products). Several industries which are highly export oriented (e.g., petroleum products, radios, televisions, and electrical machinery) or have significantly increased their export orientation (e.g., transport equipment, oil rigs, professional and scientific equipment, calculators, and industrial machinery) have experienced high rates of growth and their shares of direct exports have increased. On the other hand, some industries that have increased their export orientation have experienced declines in shares (e.g., food and beverages).

Singapore's manufacturing industries are characterized by high degrees of import content. In 1973 direct and total (direct and indirect) import requirements per unit of commodity output were 58% and 65% respectively.[10] In 1978 the corresponding figures were 64% and 73%.[11] This characteristic of Singapore's industries is apparent from the ratio of value added to output for the manufacturing sector (excluding rubber processing), which in 1978 was 26% (table 13.9). Owing to high import requirements, the ratio for petroleum refineries and petroleum products is among the lowest, even though this industry group has the highest value added per employee. However, ratios of value added to output are considerably higher for most other industries.

13.3 Factor Intensity of Singapore's Trade in Manufactures

Until the late 1960s, Singapore was abundant in unskilled labor; her comparative advantage was in low-technology, unskilled, labor-intensive

Table 13.8 **Export Orientation and Growth and Export Performance of Singapore's Major Industry Groups**

SSIC, 1969	Industry	Compound Annual Growth Rate at Current Prices, 1970–81 (% per yr.)			Ratio of Direct Exports to Total Sales (%)		Share in Direct Exports (%)	
		Output	Value Added	Direct Exports	1970	1981	1970	1981
311 + 312	Food	10.73	14.60	15.17	33.22	50.25	12.19	3.92
313	Beverages	15.60	13.46	19.85	19.78	29.21	0.86	0.43
314	Cigarettes, other tobacco prod.	6.43	9.64	16.71	4.20	11.58	0.27	0.10
321	Textiles, textile manuf.	15.76	17.20	15.52	50.02	47.51	2.68	0.89
322	Wearing apparel except footwear	24.09	26.22	25.13	64.71	71.16	3.64	2.92
323	Leather and leather prod.	11.70	16.37	9.20	54.40	41.14	0.55	0.10
324	Footwear	10.71	10.47	15.08	22.30	34.63	0.27	0.09
331	Sawn timber, other wood prod., except furniture	11.88	10.17	12.96	46.27	51.14	5.57	1.45
332	Furniture and fixtures except primarily of metal	24.89	22.82	44.20	10.24	50.71	0.16	0.62
341	Paper, paper prod.	20.81	21.24	17.74	15.51	11.76	0.39	0.16
342	Printing and publishing	19.13	18.87	21.64	13.78	17.06	0.87	0.51
351	Industrial chemicals and gases	23.75	20.03	36.89	15.03	45.80	0.34	0.73
352	Paints, pharmaceuticals, other chem. prod.	21.52	23.47	29.61	28.41	58.11	1.45	1.72
353 + 354	Petroleum refineries and petroleum prod.	25.18	20.97	29.08	47.74	66.88	38.09	42.96

355	Processing of jelutong and gum dammar	6.17	7.73	4.80	72.90	61.92	0.71	0.08
357	Plastic prod.	6.16	5.53	7.14	36.68	42.06	0.98	0.14
361 + 362	Pottery, china, earthenware, glass prod.	15.88	12.72	16.76	48.40	56.24	0.55	0.21
363	Bricks, tiles, other structural clay prod.	13.79	12.05	19.96	1.55	2.49	0.01	0.00
364 + 365	Cements, cement additives, structural cement, concrete prod.	26.24	27.22	44.55	3.08	13.85	0.10	0.38
369	Asbestos, stone, other non-metallic mineral prod.	21.33	23.05	6.36	64.42	21.68	1.00	0.13
371	Iron and steel	19.03	20.93	36.13	3.64	14.74	0.12	0.24
372	Zinc and other nonferrous metals	16.21	15.78	17.23	57.48	63.80	0.93	0.36
381	Metal grills, cans, pipes, other fabricated prod.	19.11	20.07	20.86	24.15	27.37	3.35	1.83
382	Calculators, refrigerators, air conditioners, indust. mach.	30.61	32.66	43.23	24.60	63.14	1.11	3.94
383	Radios, TVs, semiconductors, other elec. mach.	32.81	27.56	34.15	77.27	82.90	13.92	24.00
384	Transport equip. and oil rigs	24.46	24.97	32.15	31.32	61.80	6.47	9.46
385	Professional and sci. equip., photog. and optical goods	33.14	36.86	40.97	48.04	90.15	0.39	1.15
390	Other manuf. industries (jewelry, toys, umbrellas, etc.)	14.05	15.63	17.47	31.94	42.90	2.38	0.95
	Total manufacturing (excl. rubber processing)	22.66	21.97	27.67	39.60	61.23	100.00	100.00

Source: Singapore, Department of Statistics, *Report on the Census of Industrial Production,* various issues.

Table 13.9 **The Ratio of Value Added to Output and the Capital and Skill Intensities of Singapore's Major Industry Groups**

SSIC, 1969	Industry	Ratio of Value Added to Output, 1978 (%)	Net Value of Fixed Assets per Employee (thousands of S $)		Value Added per Employee (thousands of S $)		Skill Index[a]	
			1970	1978	1970	1978	1970	1980
311 + 312	Food	16.8	10.98	22.25	9.14	22.21	0.0639	0.1378
313	Beverages	39.6	18.20	18.09	14.95	31.38	0.0439	0.1199
314	Cigarettes, other tobacco prod.	24.0	13.28	12.91	23.76	32.53	0.0715	0.1006
321	Textiles, textile manuf.	32.7	9.35	19.72	3.35	11.81	0.0547	0.0736
322	Wearing apparel except footwear	32.6	1.34	3.28	2.45	7.21	0.0091	0.0403
323	Leather and leather prod.	26.3	2.68	4.69	3.81	10.23	0.0470	0.1079
324	Footwear	36.3	2.38	6.64	3.27	8.48	0.0251	0.0662
331	Sawn timber, other wood prod. except furniture	32.8	5.80	13.33	6.74	18.24	0.0335	0.0662
332	Furniture and fixtures except primarily of metal	37.5	2.57	4.71	6.12	9.40	0.0197	0.0603
341	Paper, paper prod.	34.2	3.82	12.93	5.03	14.52	0.0569	0.1122
342	Printing and publishing	50.8	5.55	9.44	7.53	17.62	0.1978	0.2773
351	Industrial chemicals and gases	36.7	34.35	50.62	19.67	40.66	0.2104	0.3955
352	Paints, pharmaceuticals, other chem. prod.	54.9	7.53	26.52	11.09	60.40	0.1643	0.3982
353 + 354	Petroleum refineries and petroleum prod.	10.5	130.45	610.11	95.63	255.35	0.4125	0.7573
355	Processing of jelutong and gum dammar	9.2	2.72	21.51	6.81	13.13	0.0277	0.0585
356	Rubber prod. except footwear	42.1	11.57	15.51	11.78	18.13	0.0718	0.1360

357	Plastic prod.	34.1	6.17	12.75	5.43	12.82	0.0757	0.1204
361 + 362	Pottery, china, earthenware, glass prod.	50.4	6.63	12.91	5.54	32.25	0.0566	0.1061
363	Bricks, tiles, other structural clay prod.	66.3	10.79	32.15	5.09	19.75	0.0534	0.0764
364	Cements, cement additives	20.8	13.28	42.73	11.04	36.16	0.1134	0.1352
365	Structural cement, concrete prod.	39.7						
369	Asbestos, stone, other non-metallic mineral prod.	44.5	11.38	14.45	7.57	28.42	0.0686	0.1537
371	Iron and steel	47.7	18.85	53.86	16.22	63.29	0.0684	0.1464
372	Zinc and other nonferrous metals	24.0	6.33	13.99	12.20	21.82	0.0655	0.2602
381	Metal grills, cans, pipes, other fabricated prod.	35.1	6.78	16.34	8.41	18.20	0.0716	0.1296
383	Radios, TVs, semiconductors, other elec. mach.	31.9	2.40	6.84	9.40	16.70	0.0946	0.1166
382	Calculators, refrigerators, air conditioners, indust. mach.	47.3	3.14	17.84	7.64	21.12	0.1266	0.1495
384	Transport equip. and oil rigs	47.7	10.80	29.75	9.88	25.88	0.0815	
385	Professional and sci. equip., photog. and optical goods	52.1	4.75	13.20	3.99	15.15	0.1444	0.1090
390	Other manuf. industries (jewelry, toys, umbrellas, etc.)	29.8	1.32	7.68	3.64	13.77	0.0334	0.0784
	Total manufacturing (excl. rubber processing)	26.3	9.05	21.64	9.24	21.38	0.0731	0.1254

Sources: Singapore, Department of Statistics, *Report on the Census of Industrial Production,* various issues; idem, *Report on the Census of Population, 1970,* vol. 2; idem, *Census of Population 1980: Singapore* (Release no. 4).

[a]A modification of the Keesing (1965) skill ratio made by Nyaw (1979):

$$\text{index} = \frac{\text{(professional, technical, and related workers + administrative and managerial workers)}}{\text{production and related workers}}.$$

manufactures.[12] Since 1970 Singapore has moved into a skill-intensive, higher-technology, and possibly more capital-intensive phase of industrial development, and it is interesting to see how this shift is reflected in her trade in manufactures. Three different measures of factor intensity calculated for the years 1970 and 1978 are presented in table 13.9.[13] The net value of fixed assets per employee is used as an indicator of (physical) capital intensity. Its main disadvantage is that it does not allow for differences in skill. Skill differences can be taken into account in two main ways: redefining capital to include both physical and human capital or introducing skill as a separate factor. Lary (1968) used the value added per employee as an index of total (physical plus human) capital intensity. Lary (1968, 19) argued that this measure provides an "integrated treatment of the flows of services rendered by capital and labor," whereas previous measures of capital intensity neglect skill differences and tend to treat capital as a stock rather than as a flow of services. Keesing (1965, 1968), on the other hand, preferred to treat skill as a factor separate from unskilled labor and physical capital. He argued that, since capital is fairly mobile internationally, it is the ratio of skilled to unskilled labor that determines comparative advantage in trade in manufactures. The skill index presented in table 13.9 is a modification of Keesing's skill ratio made by Nyaw (1979).[14]

It can be seen from table 13.9 that the rankings of various industry groups according to the three indices do not change very much in the course of eight to ten years. Moreover, there is a fairly close relationship between the indices. The petroleum refinery and products industry is the most capital-intensive and also has the highest skill ratio and value added per employee. Several other capital-intensive industries (e.g., industrial chemicals and gases, iron and steel, and transport equipment) also rank high in terms of skill intensity and value added per employee. At the lower end, industries such as clothing, footwear, and leather are characterized by low value added, low skill intensity, and low capital intensity. The relationship is of course not perfect, as can be seen from the Spearman rank correlation coefficients in table 13.10. Value added per employee reflecting total (physical plus human) capital intensity is strongly correlated with physical capital intensity and skill intensity. But, as might be expected, the relationship between skill intensity and physical capital intensity is weaker. The same table shows the relationship between factor intensity and growth and export performance as measured by growth rates and changes in shares between 1970 and 1981. As shown in row 3, industries with high skill intensities tend to have high growth rates of output, value added, and direct exports and have experienced increases in shares in the total. The relationship between value added

Table 13.10 **Spearman Rank Correlation Coefficients between Indices of Factor Intensity and Indicators of Growth and Export Performance of Singapore's Major Industry Groups**

Net Value of Fixed Assets per Empl., 1975 (1)	Value Added per Employee, 1975 (2)	Skill Index, 1970 (3)	Dir. Exp./ Tot. Sales Ratio, 1975 (4)	Change in Dir. Exp./ Tot. Sales Ratio, 1970–81 (5)	Compound Annual Growth Rate 1970–81			Change in Share over 1970–81 in:		
					Output (6)	Value Added (7)	Direct Export (8)	Output (9)	Value Added (10)	Direct Export (11)
(1) 1.0000	0.6429[a]	0.4167[b]	−0.0345	0.2256	0.0606	−0.0315	0.1828	0.0734	−0.1409	0.1764
(2)	1.0000	0.6882[a]	−0.1330	0.3754[b]	0.2187	0.1355	0.3236[c]	0.1404	−0.0611	0.3754[b]
(3)		1.0000	0.0616	0.2852	0.5409[a]	0.4709[d]	0.4857[d]	0.4054[b]	0.1847	0.5296[a]
(4)			1.0000	0.1271	0.2714	0.2897	−0.0340	0.3483[c]	0.3729[b]	0.0764
(5)				1.0000	0.3744[b]	0.2882	0.6409[a]	0.2507	0.1069	0.5498[a]
(6)					1.0000	0.9443[a]	0.8251[a]	0.8207[a]	0.6936[a]	0.6704[a]
(7)						1.0000	0.7458[a]	0.7522[a]	0.7837[a]	0.5571[a]
(8)							1.0000	0.6236[a]	0.5281[a]	0.7631[a]
(9)								1.0000	0.7818[a]	0.7828[a]
(10)									1.0000	0.5562[a]
(11)										1.0000

[a]Significant at 1% level.
[b]Significant at 5% level.
[c]Significant at 10% level.
[d]Significant at 2% level.

per employee and growth and export performance is much weaker, while no significant relationship is observed for physical capital intensity. It can be seen that the growth rates of output, value added, and direct exports of various industries (and changes in their shares) are highly correlated. Moreover, row 5 of table 13.10 indicates that industries that have significantly increased their export orientation during the period tend to have higher growth rates of exports (and, to a lesser extent, of value added and output) and experience increases in shares. This reinforces the notion of export-led growth. Moreover, as we have seen, in the most recent decade, skill-intensive industries have performed better than the average. It can be seen from table 13.9 that skill intensities for the manufacturing sector as a whole, and for all industry groups other than professional and scientific equipment, have increased over the period. All these reflect the shift to the skill-intensive phase of industrial development. (Similar conclusions cannot be drawn for the other two indices for want of an adequate deflator.)

To provide estimates of the comparative advantage of Singapore's trade in manufactures in the most recent decade, we have computed in table 13.11 the weighted averages of factor intensities of Singapore's exports and imports.[15] To allow for differences between trade with industrialized countries and trade with other countries, for the year 1978 weighted-average factor intensities are also calculated separately for trade with the two country groups. One serious problem encountered in examining Singapore's comparative advantage as revealed by the factor intensity of its trade in manufactures is that export and import figures include, respectively, reexports and entrepôt imports. The volume and direction of entrepôt trade are determined by an entirely different set of factors, and there is no reason why its commodity structure should reflect Singapore's comparative advantage in production. Thus in table 13.11 calculations have also been made for domestically produced exports and retained imports. As noted earlier, we have only rough estimates for retained imports, and, hence, our results are subject to some inaccuracy.[16]

It is to be noted that the factor intensity figures used in the calculation refer only to direct requirements of capital, labor, and skill. Moreover, the use of factor requirements of Singapore's industries to study factor requirements of exports and imports assumes that there are broad similarities between Singapore's structure of production and that of other countries in general.[17] These facts, together with the fact that only twenty-nine major industry groups are distinguished, imply that our figures should be regarded as only rough estimates.

In table 13.12 the ratios of factor intensities of Singapore's exports of manufactures to those of manufactured imports are presented.

Table 13.11 Factor Intensity of Singapore's Imports and Exports of Manufactures (SITC 5–8), 1970 and 1978

Singapore's Trading Partners	Net Value of Fixed Assets per Employee[a]	Value Added per Employee[a]	Skill Index[b]
		1970	
All countries			
Total exports	6.9054	7.7557	0.0868
Total imports	7.7440	7.9836	0.0923
Domestic exports[c]	5.8262	7.9979	0.0767
Retained imports	7.6539	8.0659	0.0911
		1978	
All countries			
Total exports	15.5818	21.1113	0.1354
Total imports	19.8279	23.5969	0.1425
Domestic exports	13.0134	19.9082	0.1263
Retained imports	20.0134	23.8612	0.1404
Industrialized countries[d]			
Total exports	11.3223	18.2068	0.1234
Total imports	20.8314	24.9168	0.1488
Domestic exports	10.3274	17.7141	0.1188
Retained imports	21.1204	25.1771	0.1485
Other countries			
Total exports	19.7379	23.9432	0.1471
Total imports	16.3529	19.0127	0.1208
Domestic exports	18.9164	24.7255	0.1428
Retained imports	15.3545	14.3432	0.0863

Sources: Table 13.9; Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports*, various issues.

Note: The figures shown are weighted averages, with the shares of major industry groups in total exports, total imports, domestic exports, and retained imports as weights. See Appendix table 13.A.2. Industrial codes 311 to 314 and 353 to 355 do not belong to SITC 5 to 8 and are not included in the calculations.

[a]In thousands of Singapore dollars.

[b]Calculations for 1978 are based on the skill index of 1980.

[c]Direct exports.

[d]Following the United Nations classification, countries in this group are United States, Canada, Japan, Australia and New Zealand, EC (Belgium and Luxembourg, Denmark, France, Federal Republic of Germany, Ireland, Italy, Netherlands, United Kingdom), European Free Trade Association (Austria, Finland, Iceland, Norway, Portugal, Sweden, Switzerland), Greece, Malta, Spain, and Yugoslavia.

When trade with all countries is considered, the ratios are all less than unity for both 1970 and 1978. Thus, in general, Singapore's manufactured exports have lower (physical and total) capital and skill intensities than its imports. The exceptional case is that of value added per employee in 1970, where the ratios are very close to one.

Table 13.12 Ratios of Factor Intensities of Singapore's Manufactured Exports to Manufactured Imports, 1970 and 1978

Singapore's Trading Partners	Net Value of Fixed Assets per Employee	Value Added per Employee	Skill Index
		1970	
All countries			
Total exports/total imports	0.8917	0.9715	0.9404
Domestic exports[a]/retained imports	0.7612	0.9916	0.8419
		1978	
All countries			
Total exports/total imports	0.7859	0.8947	0.9502
Domestic exports/retained imports	0.6502	0.8343	0.8996
Industrialized countries			
Total exports/total imports	0.5435	0.7307	0.8293
Domestic exports/retained imports	0.4890	0.7036	0.8000
Other countries			
Total exports/total imports	1.2070	1.2593	1.2177
Domestic exports/retained imports	1.2320	1.7238	1.6547

Source: Table 13.11.

[a]Direct export.

In general the ratios fall so that the contrast is greater when one relates factor intensities of domestically produced exports to those of retained imports. From 1970 to 1978, the ratios have risen for skill intensity but fallen for physical and total capital intensities. The latter result may be partly explained by the fact that in 1978 a higher proportion of Singapore's exports went to developed countries. On the whole, despite the fact that recently Singapore has shifted its attention to skill-intensive and high-value-added industries, its exports are still relatively labor-intensive (less capital- and skill-intensive) compared with its imports. When Singapore's trading partners are divided into industrialized countries and other countries, the ratios are significantly less than one for industrialized countries and greater than one for other countries. When one looks at factor intensities of domestic exports compared with retained imports, the ratios become still lower for trade with industrialized countries and still higher for trade with other countries. Thus, as might be expected from comparative advantage, in its trade with industrialized countries Singapore's exports are labor-intensive compared with imports, while in its trade with other countries its exports are capital- and skill-intensive compared with imports.[18]

13.4 Geographic Patterns of Trade in Manufactures

There have been significant changes in the geographic pattern of Singapore's trade in manufactures (table 13.13). In general, trade in manufactures with developed countries has grown greatly in importance compared with trade with developing countries. There are, however, differences among countries. The shares of the United Kingdom have declined greatly, because of the loss of colonial ties and the gradual phasing out of Commonwealth preferences with Britain's entry into the Common Market. On the other hand, the importance of the United States, Japan, and West Germany as trading partners has increased.

For manufactured imports into Singapore the relative shares of developed countries and developing countries have not changed much in the last two decades, with the greater part (about 80%) continuing to come from the former group of countries. There have been significant changes, however, in the shares of individual countries. The share of the United Kingdom fell from 23% in 1960 to only 5% in 1980, while those of the United States and Japan increased.

For manufactured exports the change in trade pattern has been remarkable. In 1960 less than 4% of Singapore's exports went to developed countries, but by 1980 the latter's share reached 45%. (It should be noted that the share of developed countries in Singapore's domestic exports is higher than their share in total exports because a higher percentage of exports of manufactures to developed countries consists of domestic exports.) The share of developing countries fell correspondingly from 94% in 1960 to 52% in 1980. This was partly due to the decline in entrepôt trade. Moreover, since the 1960s, neighboring developing countries have begun their industrialization based on import substitution, leading to reduced imports of labor-intensive types of manufactures (textiles, clothing, footwear, etc.) from Singapore. Malaysia is the clearest example of this trend, and as can be seen from table 13.13, its share of total manufactured exports from Singapore fell from almost 60% in 1960 to 20% in 1980. Among developed countries, increases in shares have been particularly great for the United States and West Germany. The shares of manufactured exports going to Asian newly industrializing countries (NIC) and centrally planned economies have also increased somewhat.

For all commodities together, the shares of developed countries and developing countries in Singapore's exports remained relatively stable, while for imports the share of developing countries increased. In 1960 manufactured exports made up 21% of exports to all countries and less than 2% of exports to developed countries; in 1980 the corresponding percentages were 45% and 49%. In 1960 Singapore's trade was dominated by trade in primary commodities (a large part of which was

Table 13.13 **Composition of Singapore's Trade in Manufactures: By SITC One-Digit Codes and by Countries and Regions** (in thousands of U.S. dollars)

		1960			
		Imports		Exports	
SITC	Trading Partner[a]	Value	%	Value	%
5	*Chemicals*	41,414	100.00	28,185	100.00
	Developed economies	**31,374**	**75.76**	**2,005**	**7.11**
	United States	4,909	11.85	143	0.51
	Japan	2,847	6.87	50	0.18
	Western Europe	21,977	53.07	1,498	5.31
	EC (9)	21,135	51.03	1,493	5.30
	France	811	1.96	76	0.27
	Fed. Rep. of Germany	3,929	9.49	21	0.07
	Italy	372	0.90	6	0.02
	United Kingdom	13,533	32.68	1,110	3.94
	Australia	719	1.74	276	0.98
	Developing economies	**7,578**	**18.30**	**25,463**	**90.34**
	ASEAN[b]	3,071	7.42	18,053	64.05
	Malaysia	2,927	7.07	16,847	59.77
	Philippines	1	0.00	240	0.85
	Thailand	143	0.35	966	3.43
	Asian NICs[c]	2,941	7.10	801	2.84
	Centrally planned economies	**2,238**	**5.40**	—	—
6	*Basic manufactures*	152,343	100.00	102,127	100.00
	Developed economies	**109,982**	**72.19**	**5,322**	**5.21**
	United States	7,252	4.76	590	0.58
	Japan	58,337	38.29	158	0.15
	Western Europe	41,753	27.41	3,489	3.42
	EC (9)	37,296	24.48	2,938	2.88
	France	1,805	1.18	—	—
	Fed. Rep. of Germany	4,905	3.22	282	0.28
	Italy	1,777	1.17	—	—
	United Kingdom	23,545	15.46	2,484	2.43
	Australia	1,696	1.11	354	0.35
	Developing economies	**22,834**	**14.99**	**94,198**	**92.24**
	ASEAN[b]	7,587	4.98	63,508	62.19
	Malaysia	6,566	4.31	57,927	56.72
	Philippines	559	0.37	133	0.13
	Thailand	462	0.30	5,448	5.33
	Asian NICs[c]	6,211	4.08	2,946	2.88
	Centrally planned economies	**19,091**	**12.53**	—	...
7	*Machinery and transport equipment*	96,016	100.00	77,575	100.00
	Developed economies	**86,649**	**90.24**	**1,454**	**1.87**
	United States	16,307	16.98	7	0.01
	Japan	8,890	9.26	11	0.01
	Western Europe	56,387	58.73	762	0.98
	EC (9)	55,402	57.70	758	0.98
	France	1,629	1.70	—	—
	Fed. Rep. of Germany	9,711	10.11	8	0.01

1971				1980			
Imports		Exports		Imports		Exports	
Value	%	Value	%	Value	%	Value	%
143,366	100.00	60,619	100.00	1,255,973	100.00	663,029	100.00
117,407	**81.89**	**6,342**	**10.46**	**1,039,059**	**82.73**	**106,907**	**16.12**
26,904	18.77	324	0.53	316,774	25.22	4,180	0.63
26,883	18.75	659	1.09	207,062	16.49	74,145	11.18
52,720	36.77	603	0.99	449,400	35.78	19,474	2.94
47,528	33.15	348	0.57	398,930	31.76	15,998	2.41
4,452	3.11	113	0.19	57,234	4.56	1,421	0.21
10,462	7.30	143	0.24	118,904	9.47	1,482	0.22
2,232	1.56	—	—	13,627	1.08	302	0.05
22,204	15.49	—	—	144,917	11.54	4,451	0.67
4,354	3.04	4,076	6.72	28,676	2.28	8,207	1.24
18,809	**13.12**	**54,270**	**89.53**	**143,920**	**11.46**	**538,775**	**81.26**
10,163	7.09	41,415	68.32	53,011	4.22	327,499	49.39
9,500	6.63	37,505	61.87	44,656	3.56	262,638	39.61
414	0.29	894	1.47	3,361	0.27	19,115	2.88
249	0.17	3,016	4.98	4,994	0.40	45,746	6.90
4,316	3.01	4,395	7.25	37,846	3.01	37,332	5.63
7,150	**4.99**	—	—	**72,994**	**5.81**	**17,348**	**2.62**
603,975	100.00	174,673	100.00	3,383,255	100.00	1,608,697	100.00
423,867	**70.18**	**34,184**	**19.57**	**2,161,503**	**63.89**	**444,076**	**27.60**
30,813	5.10	10,282	5.89	268,168	7.93	177,523	11.04
287,913	47.67	2,174	1.24	1,191,414	35.22	33,417	2.08
83,580	13.84	14,383	8.23	501,322	14.82	164,417	10.22
70,240	11.63	13,685	7.83	404,008	11.94	147,842	9.19
3,596	0.60	372	0.21	44,087	1.30	8,246	0.51
16,552	2.74	877	0.50	105,140	3.11	28,363	1.76
6,268	1.04	304	0.17	68,298	2.02	11,123	0.69
35,137	5.82	10,289	5.89	117,803	3.48	50,677	3.15
15,868	2.63	3,209	1.84	109,408	3.23	47,831	2.97
111,884	**18.52**	**140,076**	**80.19**	**1,000,051**	**29.56**	**1,091,388**	**67.84**
35,515	5.88	89,598	51.29	323,634	9.57	476,447	29.62
29,341	4.86	86,450	49.49	262,881	7.77	424,110	26.36
2,779	0.46	471	0.27	10,578	0.31	25,251	1.57
3,395	0.56	2,677	1.53	50,175	1.48	27,086	1.68
30,522	5.05	8,721	4.99	328,604	9.71	104,657	6.51
68,223	11.30	**413**	0.24	**221,701**	**6.55**	**73,233**	**4.55**
721,641	100.00	241,889	100.00	7,154,221	100.00	5,183,407	100.00
670,758	**92.95**	**88,164**	**36.45**	**6,180,842**	**86.39**	**2,637,632**	**50.89**
233,054	32.30	65,632	27.13	2,234,466	31.23	1,522,022	29.36
159,266	22.07	2,621	1.08	2,358,905	32.97	132,946	2.56
256,255	35.51	14,335	5.93	1,517,704	21.21	844,046	16.28
233,902	32.41	13,938	5.76	1,221,450	17.07	749,424	14.46
8,912	1.23	1,089	0.45	117,467	1.64	160,773	3.10
64,976	9.00	1,341	0.55	457,837	6.40	293,562	5.66

(*continued*)

Table 13.13 (continued)

SITC	Trading Partner[a]	1960 Imports Value	Imports %	Exports Value	Exports %
	Italy	2,381	2.48	9	0.01
	United Kingdom	37,888	39.46	728	0.94
	Australia	2,939	3.06	385	0.50
	Developing economies	**8,375**	**8.72**	**75,497**	**97.32**
	ASEAN[b]	7,309	7.61	50,874	65.58
	Malaysia	7,274	7.58	49,177	63.39
	Philippines	26	0.03	61	0.08
	Thailand	9	0.01	1,636	2.11
	Asian NICs[c]	827	0.86	740	0.95
	Centrally planned economies	**892**	**0.93**	**9**	**0.01**
8	*Miscellaneous manufactured goods*	68,900	100.00	32,128	100.00
	Developed economies	**44,537**	**64.64**	**420**	**1.31**
	United States	5,534	8.03	53	0.16
	Japan	11,143	16.17	14	0.04
	Western Europe	27,412	39.79	179	0.56
	EC (9)	13,555	19.67	171	0.53
	France	138	0.20	—	—
	Fed. Rep. of Germany	4,090	5.94	17	0.05
	Italy	519	0.75	84	0.26
	United Kingdom	7,984	11.59	61	0.19
	Australia	279	0.40	31	0.10
	Developing economies	**19,806**	**28.75**	**30,507**	**94.95**
	ASEAN[b]	3,933	5.71	18,137	56.45
	Malaysia	3,752	5.45	17,680	55.03
	Philippines	—	—	104	0.32
	Thailand	181	0.26	353	1.10
	Asian NICs[c]	12,862	18.67	986	3.07
	Centrally planned economies	**4,448**	**6.46**	**2**	**0.01**
5–8	*Total manufactures*	358,673	100.00	240,015	100.00
	Developed economies	**272,542**	**75.99**	**9,201**	**3.83**
	United States	34,002	9.48	793	0.33
	Japan	81,217	22.64	233	0.10
	Western Europe	147,529	41.13	5,928	2.47
	EC (9)	127,388	35.52	5,360	2.23
	France	4,383	1.22	76	0.03
	Fed. Rep. of Germany	22,635	6.31	328	0.14
	Italy	5,049	1.41	99	0.04
	United Kingdom	82,950	23.13	4,383	1.83
	Australia	5,633	1.57	1,046	0.44
	Developing economies	**58,593**	**16.34**	**225,665**	**94.02**
	ASEAN[b]	21,900	6.11	150,572	62.73
	Malaysia	20,519	5.72	141,631	59.01
	Philippines	586	0.16	538	0.22
	Thailand	795	0.22	8,403	3.50
	Asian NICs[c]	22,841	6.37	5,473	2.28
	Centrally planned economies	**26,669**	**7.44**	**11**	**0.00**

1971				1980			
Imports		Exports		Imports		Exports	
Value	%	Value	%	Value	%	Value	%
23,940	3.32	3,256	1.35	104,463	1.46	82,663	1.59
107,604	14.91	7,204	2.98	372,413	5.21	135,051	12.61
14,949	2.07	3,386	1.40	45,338	0.63	81,627	1.57
40,666	**5.64**	**153,310**	**63.38**	**913,681**	**12.77**	**2,415,207**	**46.59**
19,631	2.72	101,095	41.79	517,722	7.24	1,251,218	24.14
18,794	2.60	88,854	36.73	365,565	5.11	938,897	18.11
372	0.05	6,513	2.69	32,408	0.45	103,044	1.99
465	0.06	5,728	2.37	119,749	1.67	209,277	4.04
8,853	1.23	20,512	8.48	165,445	2.31	220,100	4.25
10,216	**1.42**	**415**	**0.17**	**59,698**	**0.83**	**130,567**	**2.52**
210,018	100.00	111,844	100.00	1,379,559	100.00	1,202,379	100.00
143,791	**68.47**	**51,808**	**46.32**	**947,792**	**68.70**	**725,655**	**60.35**
25,924	12.34	22,234	19.88	201,147	14.58	254,869	21.20
52,383	24.94	4,314	3.86	362,223	26.26	35,764	2.97
60,088	28.61	19,770	17.68	351,115	25.45	368,473	30.65
43,421	20.67	16,737	14.96	229,402	16.63	309,021	25.70
3,132	1.49	3,442	3.08	42,777	3.10	63,250	5.26
14,921	7.10	5,486	4.91	62,555	4.53	111,130	9.24
1,818	0.87	216	0.19	28,135	2.04	12,486	1.04
16,427	7.82	4,491	4.02	78,464	5.69	70,077	5.83
4,802	2.29	3,149	2.82	29,321	2.13	44,869	3.73
46,589	**22.18**	**57,709**	**51.60**	**374,284**	**27.13**	**469,237**	**39.03**
13,868	6.60	32,507	29.06	112,451	8.15	150,011	12.48
13,371	6.37	31,284	27.97	89,488	6.49	127,263	10.58
185	0.09	387	0.35	9,703	0.70	9,791	0.81
312	0.15	836	0.75	13,260	0.96	12,957	1.08
23,291	11.09	9,693	8.67	169,010	12.25	79,020	6.57
19,638	**9.35**	**2,326**	**2.08**	**57,483**	**4.17**	**7,487**	**0.62**
1,679,000	100.00	589,025	100.00	13,173,008	100.00	8,657,512	100.00
1,355,823	**80.75**	**180,498**	**30.64**	**10,329,196**	**78.41**	**3,914,270**	**45.21**
316,695	18.86	98,472	16.72	3,020,555	22.93	1,958,594	22.62
526,445	31.35	9,768	1.66	4,119,604	31.24	276,272	3.19
452,643	26.96	49,091	8.33	2,819,541	21.40	1,396,410	16.13
395,091	23.53	44,708	7.59	2,253,790	17.11	1,222,285	14.12
20,092	1.20	5,016	0.85	261,565	1.99	233,690	2.70
106,911	6.37	7,847	1.33	744,436	5.65	434,537	5.02
34,258	2.04	3,776	0.64	214,523	1.63	106,574	1.23
181,372	10.80	21,984	3.73	713,597	5.42	260,256	3.01
39,973	2.38	13,820	2.35	212,743	1.63	182,534	2.11
217,948	**12.98**	**405,365**	**68.82**	**2,431,936**	**18.46**	**4,514,607**	**52.15**
79,177	4.72	264,615	44.92	1,006,818	7.64	2,205,175	25.47
71,006	4.23	244,093	41.44	762,590	5.79	1,752,908	20.25
3,750	0.22	8,265	1.40	56,050	0.43	157,201	1.82
4,421	0.26	12,257	2.08	188,178	1.43	295,066	3.41
66,982	3.99	43,321	7.35	700,905	5.32	441,109	5.10
105,227	**6.27**	**3,154**	**0.54**	**411,876**	**3.13**	**228,635**	**2.64**

(*continued*)

Table 13.13 (continued)

SITC	Trading Partner[a]	1960 Imports Value	Imports %	Exports Value	Exports %
0–9	*All commodities*	1,332,058	100.00	1,135,849	100.00
	Developed economies	**404,584**	**30.37**	**470,487**	**41.42**
	United States	50,964	3.83	79,101	6.96
	Japan	97,326	7.31	51,173	4.51
	Western Europe	210,403	15.80	248,871	21.91
	EC (9)	187,164	14.05	205,852	18.12
	France	9,454	0.71	29,861	2.63
	Fed. Rep. of Germany	24,172	1.81	25,685	2.26
	Italy	5,649	0.42	26,896	2.37
	United Kingdom	118,543	8.90	93,665	8.25
	Australia	34,594	2.60	44,218	3.89
	Developing economies	**874,770**	**65.67**	**574,593**	**50.59**
	ASEAN[b]	326,157	24.49	321,688	28.32
	Malaysia	277,884	20.86	267,798	23.58
	Philippines	663	0.05	18,878	1.66
	Thailand	47,610	3.57	35,012	3.08
	Asian NICs[c]	29,213	2.19	19,569	1.72
	Centrally planned economies	**51,087**	**3.84**	**82,099**	**7.23**

Source: United Nations, *Commodity Trade Statistics*, Statistical Papers, series D, various issues.

[a]Classification of countries into developed, developing, and centrally planned follows the source cited.

[b]Excluding Indonesia.

[c]Hong Kong and Republic of Korea (Taiwan is not included).

entrepôt trade); since then, trade in manufactures has grown tremendously in importance. This reflects partly the change in nature and importance of entrepôt trade and partly Singapore's successful industrialization: there has been increasing demand by industrialized countries for Singapore's labor-intensive (and, at a later stage, more skill- and capital-intensive) types of manufactures.

The composition of Singapore's trade in manufactures differs significantly across countries, as can be seen from tables 13.13–13.17. For chemicals and basic manufactures (SITC 5 and 6) the great majority of Singapore's exports continued to go to developing countries. By 1980, however, over half of Singapore's exports of machinery and transport equipment (SITC 7) and 60% of exports of miscellaneous manufactures (SITC 8) were to developed countries. Manufactured imports from developing countries continued to be dominated by basic manufactures, over half of which consisted of textile yarns and fabrics in recent years. The share of machinery and transport equipment in

1971				1980			
Imports		Exports		Imports		Exports	
Value	%	Value	%	Value	%	Value	%
2,827,286	100.00	1,754,610	100.00	24,002,667	100.00	19,375,478	100.00
1,591,853	**56.30**	**721,120**	**41.10**	**11,677,760**	**48.65**	**8,058,148**	**41.59**
360,087	12.74	207,370	11.82	3,383,235	14.10	2,464,185	12.72
555,202	19.64	124,077	7.07	4,283,232	17.84	1,560,357	8.05
520,140	18.40	270,778	15.43	3,199,597	13.33	2,738,738	14.14
457,858	16.19	229,933	13.10	2,589,238	10.79	2,259,540	11.66
30,712	1.09	28,260	1.61	326,778	1.36	423,528	2.19
111,018	3.93	37,132	2.12	783,999	3.27	582,968	3.01
36,788	1.30	20,799	1.19	226,333	0.94	249,118	1.29
206,878	7.32	108,995	6.21	827,980	3.45	499,743	2.58
120,129	4.25	84,035	4.79	543,333	2.26	780,938	4.03
1,078,686	**38.15**	**955,365**	**54.45**	**11,594,624**	**48.31**	**10,583,838**	**54.62**
543,875	19.24	465,789	26.55	3,877,654	16.16	4,026,036	20.78
471,595	16.68	401,298	22.87	3,326,420	13.86	2,906,380	15.00
15,296	0.54	12,370	0.70	74,871	0.31	273,955	1.41
56,984	2.02	52,121	2.97	476,363	1.98	845,701	4.36
76,657	2.71	109,622	6.25	766,585	3.19	1,784,484	9.21
156,746	**5.54**	**78,125**	**4.45**	**730,284**	**3.04**	**733,491**	**3.79**

Source: United Nations, *Commodity Trade Statistics*, Statistical Papers, series D, various issues.

[a]Classification of countries into developed, developing, and centrally planned follows the source cited.

[b]Excluding Indonesia.

[c]Hong Kong and Rupublic of Korea (Taiwan is not included).

imports increased, while that of miscellaneous manufactures fell. Machinery and transport equipment have the largest share in exports to developing countries and also dominate trade in manufactures with developed countries. About 60% of machinery and transport equipment exports (SITC 7) are domestically produced exports, reflecting Singapore's industrialization.

Japan was Singapore's largest trading partner (in terms of exports plus imports) in 1981 and second-largest after Malaysia in 1982. For trade in manufactures (SITC 5–8) it was Singapore's second-largest trading partner after the United States. In recent years, Singapore's exports and domestically produced exports to Japan have been dominated by mineral fuels. In 1982 about one-quarter of Singapore's domestic exports of mineral fuels (mostly petroleum products) went to Japan and accounted for 75% of domestic exports to Japan. Imports from Japan have been dominated by machinery and transport equipment in recent years, followed by basic manufactures. It can be seen

Table 13.14 **Commodity Composition of Singapore's Trade in Manufactures with Individual Countries and Regions in Selected Years** (percentages)

Destination of Export/ Origin of Import	1960		1971		1980	
	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.
All countries						
SITC 5	11.55	11.74	8.54	10.29	9.53	7.66
SITC 6	42.47	42.55	35.97	29.65	25.68	18.58
SITC 7	26.77	32.32	42.98	41.07	54.31	59.87
SITC 8	19.21	13.39	12.51	18.99	10.47	13.89
Developed economies						
SITC 5	11.51	21.79	8.66	3.51	10.06	2.73
SITC 6	40.35	57.84	31.26	18.94	20.93	11.35
SITC 7	31.79	15.80	49.47	48.84	59.84	67.39
SITC 8	16.34	4.56	10.61	28.70	9.18	18.54
United States						
SITC 5	14.44	18.03	8.50	0.33	10.49	0.21
SITC 6	21.33	74.40	9.73	10.44	8.88	9.06
SITC 7	47.96	0.88	73.59	66.65	73.98	77.71
SITC 8	16.28	6.68	8.19	22.58	6.66	13.01
Japan						
SITC 5	3.51	21.46	5.11	6.75	5.03	26.84
SITC 6	71.83	67.81	54.69	22.26	28.92	12.10
SITC 7	10.95	4.72	30.25	26.83	57.26	48.12
SITC 8	13.72	6.01	9.95	44.16	8.79	12.95
Western Europe						
SITC 5	14.90	25.27	11.65	1.23	15.94	1.39
SITC 6	28.30	58.86	18.46	29.30	17.78	11.77
SITC 7	38.22	12.85	56.61	29.30	53.83	60.44
SITC 8	18.58	3.02	13.27	40.27	12.45	26.39
Developing economies						
SITC 5	12.93	11.28	8.63	13.39	5.92	11.93
SITC 6	38.97	41.74	51.34	34.56	41.12	24.17
SITC 7	14.29	33.46	18.66	37.82	37.57	53.50
SITC 8	33.80	13.52	21.38	14.24	15.39	10.39

Source: Table 13.13.

from table 13.13 that while Japan accounted for almost one-third of Singapore's manufactured imports in 1980, exports of manufactures to Japan accounted for only 3% of Singapore's total manufactured exports. Table 13.14 indicates that basic manufactures accounted for a higher percentage of manufactured imports from Japan than from the United States and Western Europe; in fact they accounted for over half of manufactured imports from Japan in 1971. In 1982, 64% of Singapore's imports of iron and steel originated from Japan. In addition, Singapore has been Japan's main customer of textile manufactures (SITC 65) in the Asian region. On the export side, chemical products

Table 13.15 **Singapore's Trade Balance in Manufactures with Country Groups in Selected Years** (in thousands of U.S. dollars)

	1960	1971	1980
	Manufactures (SITC 5–8)		
All countries	**−118,658**	**−1,089,975**	**−4,515,496**
SITC 5	−13,229	−82,747	−592,944
SITC 6	−50,216	−429,302	−1,774,558
SITC 7	−18,441	−479,752	−1,970,814
SITC 8	−36,772	−98,174	−177,180
Developed economies	**−263,341**	**−1,175,325**	**−6,414,926**
SITC 5	−29,369	−111,065	−932,152
SITC 6	−104,660	−389,683	−1,717,427
SITC 7	−85,195	−582,594	−3,543,210
SITC 8	−44,117	−91,983	−222,137
Developing economies	**167,072**	**187,417**	**2,082,671**
SITC 5	17,885	35,461	394,855
SITC 6	71,364	28,192	91,337
SITC 7	67,122	112,644	1,501,526
SITC 8	10,701	11,120	94,953
Centrally planned economies	**−26,658**	**−102,073**	**−183,241**
SITC 5	−2,238	−7,150	−55,646
SITC 6	−19,091	−67,810	−148,468
SITC 7	−883	−9,801	70,869
SITC 8	−4,446	−17,312	−49,996
	All Commodities (SITC 0–9)		
All countries	**−196,209**	**−1,072,676**	**−4,627,189**
Developed economies	65,903	−870,733	−3,619,612
Developing economies	−300,177	−123,321	−1,010,786
Centrally planned economies	31,012	−78,621	3,207

Source: Table 13.13.

accounted for a much higher percentage of exports of manufactures to Japan than to the United States and Western Europe. In recent years, domestic export of medicinal products to Japan has grown greatly in importance. As shown in table 13.14, the share of chemicals in exports to Japan grew tremendously from 1971 to 1980. In 1980, 70% of Singapore's exports of chemicals to developed countries went to Japan.

Machinery and transport equipment have recently dominated Singapore's manufactured exports to and imports from developed countries. The United States has recently become Singapore's largest trading partner in manufactures. In 1982, 80% of Singapore's manufactured exports and 83% of manufactured domestic exports to the United States were in this category. Although ASEAN (Association of South East Asian Nations) exports to the United States under the Generalized System of Preferences (GSP) were rather small, because of its export

Table 13.16 **Singapore's Trade Balance with Selected Countries in Manufactures Divided into Consumer (C), Intermediate (I), and Capital (K) Goods** (in thousands of U.S. dollars)

	1975	1978	1982
	Manufactures (SITC 5–8)		
All countries	**−2,391,149**	**−2,758,573**	**−5,762,052**
C	−190,132	−152,341	−476,985
I	−651,158	−863,947	−1,493,916
K	−1,549,859	−1,742,285	−3,791,151
EC (9)	**−552,696**	**−712,266**	**−1,408,269**
C	16,663	30,521	−42,463
I	−167,202	−250,600	−485,606
K	−402,157	−492,187	−880,200
United States	**−741,793**	**−377,388**	**−984,363**
C	12,284	99,726	10,523
I	−129,873	−168,901	−403,922
K	−624,204	−308,213	−590,964
Japan	**−1,215,617**	**−2,202,467**	**−4,456,353**
C	−131,393	−238,052	−464,805
I	−222,771	−318,989	−608,263
K	−861,453	−1,645,426	−3,383,285
	All Commodities (SITC 0–9)		
All countries	**−2,746,363**	**−2,909,326**	**−7,369,996**
EC (9)	−333,905	−304,259	−1,043,641
United States	−526,577	−38,377	−1,019,640
Japan	−903,035	−1,513,704	−2,779,011

Source: Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports*, various issues.

Note: Consumer goods are defined as SITC 8; intermediate goods as SITC 5 + 6, excluding 67 + 68 + 69; and capital goods as SITC 67 + 68 + 69 + 7.

orientation Singapore was probably the chief beneficiary among ASEAN countries. Since the early 1970s, Singapore's exports of electrical and electronic products and transport equipment to the United States have grown quickly partly as a result of inflow of American investment into these industries. In the last recession, resentment against the NICs and (especially) Japan gave rise to new protective measures. Although they were aimed mainly against products of technologically advanced countries, Singapore was also affected to some extent. Machinery and transport equipment have also dominated trade in manufactures with Western Europe and Japan in recent years, though to smaller extents.

For miscellaneous manufactures (SITC 8), which are mainly labor-intensive types of manufactures, Singapore had a trade surplus with the United States, Western Europe, and the developing countries as a group but a large deficit with Japan. Some of the main imports from

Japan in this category are scientific instruments, photographic apparatus, watches, and clocks. Singapore is also a net importer of clothing from Japan (and from Asian NICs and developing countries as a group). In the mid-1960s, almost all of Singapore's clothing exports to developed countries were to the United Kingdom. Recently clothing exports have gone mainly to the United States and West Germany (table 13.17). In 1982 almost 80% of Singapore's domestic exports of clothing went to the United States and the European Community (EC), but only 13% of imports of clothing came from these countries. Table 13.14 shows that the percentage share of miscellaneous manufactures tends to be higher in exports of manufactures to Western Europe than to other developed countries.

In the last two decades Singapore consistently has had negative trade balances in manufactures with developed countries and positive balances with developing countries; this has been true for all major SITC categories (table 13.15). Most of the deficits with the former group of countries can be accounted for by the net imports of machinery and transport equipment, followed by basic manufactures and chemicals. The overall trade deficits with developed countries have been less than those for manufactures because of exports (mostly reexports) of primary commodities and fuels to these countries. The trade surpluses in manufactures with developing countries have been more than offset by net imports of primary commodities and fuels, so that Singapore also has trade deficits with this group of countries. Singapore's trade surpluses in manufactures with developing countries were mainly due to the machinery and transport equipment category. All this shows the role played by Singapore in distributing primary commodities and fuels from developing countries to developed countries, and in distributing machinery and transport equipment from the latter to the former group of countries. It may be noted, for example, that in 1982, 80% of Singapore's exports of SITC 7 manufactures to Southeast Asia (mainly Malaysia) were reexports.

In table 13.16, Singapore's balance in manufactures has been broken down into consumer, intermediate, and capital goods for major developed-country trading partners. It can be seen that for consumer goods Singapore's trade balances with the United States (and with the EC until 1982) have been positive.[19] For Japan, trade balances in all three categories have been negative, with capital goods contributing most to the deficit. What is remarkable is the size of the deficit with Japan in manufactures. In 1982 this deficit was equal to 60% of Singapore's trade deficit, 77% of Singapore's trade deficit in manufactures, and 160% of Singapore's trade deficit with Japan.

Tables 13.17–13.20 may be examined together. Tables 13.17 and 13.18 present detailed analyses of exports and imports of manufactures in

Table 13.17 **Singapore's Trade in Manufactures by Commodity Groups and Selected Countries** (in thousands of U.S. dollars)

		1975				1982			
SITC	Trading Partner	Exports	Domestic Exports	Reexports	Imports	Exports	Domestic Exports	Reexports	Imports
5	*Chemicals*	200,606	88,138	112,469	472,139	804,851	327,317	477,534	1,304,053
	EC (9)	2,578	1,867	711	144,897	29,494	25,041	4,453	390,579
	France	178	54	124	15,661	1,331	899	432	56,020
	Fed. Rep. of Germany	479	103	376	24,835	9,651	8,518	1,113	98,662
	Italy	20	13	6	4,166	2,737	2,689	49	13,294
	Netherlands	143	50	93	32,947	1,197	263	934	38,781
	United Kingdom	491	380	110	56,421	6,714	5,525	1,189	148,579
	United States	1,096	1,028	67	109,758	5,448	3,657	1,792	333,258
	Japan	37,508	36,876	632	74,805	87,678	79,243	8,436	204,943
6	*Basic manufactures*	458,204	207,315	250,889	1,480,325	1,793,786	597,828	1,195,958	3,928,671
	EC (9)	60,928	45,101	15,828	169,653	146,749	91,558	55,191	488,103
	France	4,029	2,995	1,033	26,445	10,907	10,431	475	59,712
	Fed. Rep. of Germany	7,903	5,246	2,657	37,390	21,831	18,800	3,031	121,631
	Italy	1,203	1,057	146	21,339	5,475	3,979	1,496	82,641
	Netherlands	6,262	3,959	2,302	6,514	49,445	18,857	30,588	33,032
	United Kingdom	34,086	24,866	9,220	61,683	44,972	32,755	12,217	132,580
	United States	20,480	12,587	7,893	159,817	145,888	38,684	107,204	306,827
	Japan	9,219	7,301	1,918	633,072	114,565	19,255	95,310	1,523,671
67	Iron and steel	86,865	15,296	71,569	541,444	330,585	63,911	266,674	1,213,083
	EC (9)	533	—	533	43,181	13,241	7,972	5,268	131,533
	France	7	—	7	12,791	7,117	7,117	—	17,352
	Fed. Rep. of Germany	217	—	217	13,986	411	261	150	32,798
	Italy	—	—	—	3,622	6	—	6	7,591
	Netherlands	10	—	10	1,627	3,165	529	2,637	12,413
	United Kingdom	299	—	299	9,551	918	66	852	34,811
	United States	1,227	164	1,063	73,975	10,801	4,186	6,615	60,443
	Japan	1,459	1,168	291	371,759	6,086	3,093	2,993	776,421

68	Nonferrous metals	16,903	5,842	11,061	61,803	340,985	46,022	294,963	212,050
	EC (9)	3,158	560	2,598	7,789	37,277	12,328	24,949	29,612
	France	—	—	—	162	203	203	—	2,736
	Fed. Rep. of Germany	122	116	6	2,225	97	97	—	12,136
	Italy	54	54	—	364	161	161	—	1,784
	Netherlands	1,595	1	1,594	224	36,586	11,765	24,821	917
	United Kingdom	1,319	322	997	3,832	215	102	113	9,260
	United States	1,040	996	43	6,008	89,793	1,039	88,754	12,664
	Japan	643	568	74	16,748	87,463	425	87,037	60,452
69	Metal manufactures	66,774	33,682	33,092	209,791	241,526	119,883	121,643	628,134
	EC (9)	3,616	3,250	366	40,178	21,875	20,029	1,845	128,079
	France	381	378	3	3,573	1,321	1,169	152	10,990
	Fed. rep. of Germany	600	475	125	8,601	13,182	12,270	912	39,243
	Italy	12	1	11	4,845	1,477	1,457	20	19,958
	Netherlands	374	369	5	2,305	1,994	1,733	261	13,874
	United Kingdom	2,105	1,885	219	19,403	3,386	3,117	269	38,809
	United States	5,218	4,253	965	45,628	11,685	8,656	3,029	123,997
	Japan	1,121	907	214	53,095	6,396	3,992	2,404	181,178
7	*Machinery and transport equip.*	1,220,695	714,240	506,456	2,128,058	5,395,420	3,367,218	2,028,201	8,046,400
	EC (9)	197,073	180,678	16,395	515,389	769,675	716,312	53,363	1,433,043
	France	27,628	26,089	1,539	43,341	159,586	151,346	8,240	291,317
	Fed. Rep. of Germany	80,986	75,084	5,902	165,007	241,016	230,795	10,221	541,935
	Italy	13,089	12,001	1,088	44,309	95,857	91,403	4,455	121,812
	Netherlands	20,495	18,111	2,384	38,377	112,923	107,936	4,987	79,477
	United Kingdom	51,283	46,206	5,077	209,246	131,713	109,535	22,179	353,511
	United States	317,902	297,246	20,656	823,979	1,718,807	1,530,695	188,113	2,224,945
	Japan	38,718	27,712	11,006	461,791	191,900	142,806	49,095	2,657,078

(*continued*)

Table 13.17 (continued)

SITC	Trading Partner	1975 Exports	1975 Domestic Exports	1975 Reexports	1975 Imports	1982 Exports	1982 Domestic Exports	1982 Reexports	1982 Imports
8	*Misc. manufactures*	371,276	282,399	88,877	561,409	1,323,146	893,886	429,260	1,800,131
	EC (9)	109,200	99,935	9,265	92,537	234,883	196,948	37,936	277,346
	France	16,163	12,986	3,177	9,249	57,707	47,525	10,183	53,582
	Fed. Rep. of Germany	60,043	57,486	2,557	30,062	69,660	58,379	11,281	77,841
	Italy	3,142	3,035	107	7,456	6,656	4,913	1,743	51,458
	Netherlands	10,054	9,189	865	9,682	19,344	15,021	4,323	9,811
	United Kingdom	15,006	12,861	2,145	32,825	64,190	55,105	9,085	75,139
	United States	80,854	78,744	2,110	68,570	299,385	267,812	31,573	288,862
	Japan	10,287	7,357	2,930	141,680	36,037	27,780	8,257	500,842
84	Clothing	117,140	99,610	17,530	60,558	457,797	351,789	106,008	253,797
	EC (9)	37,735	31,127	6,608	4,334	131,406	104,144	27,262	26,348
	France	7,634	5,003	2,631	2,031	33,083	25,245	7,838	7,495
	Fed. Rep. of Germany	13,739	11,650	2,089	166	45,012	36,400	8,612	2,136
	Italy	819	749	70	603	1,706	776	929	12,848
	Netherlands	7,176	6,636	540	40	13,893	10,335	3,558	115
	United Kingdom	4,963	3,990	973	1,468	28,152	23,010	5,143	3,699
	United States	45,168	44,783	385	3,234	183,429	166,631	16,798	7,747
	Japan	663	450	213	4,210	2,558	1,269	1,290	26,847
0–9	*All commodities*	5,380,132	3,334,263	2,045,869	8,126,496	20,781,677	13,927,743	6,853,934	28,151,672
	EC (9)	720,771	518,337	202,434	1,054,677	1,849,282	1,375,921	473,362	2,892,923
	France	94,751	71,957	22,794	112,532	313,625	239,642	73,983	525,513
	Fed. Rep. of Germany	203,048	160,611	42,437	268,276	455,444	348,983	106,461	893,643
	Italy	52,022	31,250	20,772	89,267	168,965	123,656	45,309	275,470
	Netherlands	102,421	75,446	26,976	118,279	354,767	257,344	97,423	211,240
	United Kingdom	227,649	150,150	77,498	403,159	422,757	314,495	108,262	798,297
	United States	748,688	503,903	244,786	1,275,265	2,613,714	2,055,022	558,692	3,633,353
	Japan	469,329	387,866	81,463	1,372,364	2,263,500	1,998,538	264,961	5,042,511

Source: Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports*, various issues.

Table 13.18 **Shares of the United States, Japan, and the European Community in Singapore's Trade in Manufactures** (percentages)

	1975			1982		
	Imp.	Exp.	Dom. Exp.	Imp.	Exp.	Dom. Exp.
SITC 5–8						
United States	25.04	18.67	30.15	20.92	23.29	35.49
EC (9)	19.87	16.43	25.35	17.17	12.67	19.86
Japan	28.25	4.25	6.13	32.41	4.62	5.19
Total	73.16	39.35	61.63	70.50	40.58	60.54
SITC 5						
United States	23.25	0.55	1.17	25.56	0.68	1.12
EC (9)	30.69	1.29	2.12	29.95	3.66	7.65
Japan	15.84	18.70	41.84	15.72	10.89	24.21
Total	69.78	20.54	45.13	71.23	15.23	32.98
SITC 6						
United States	10.80	4.47	6.07	7.81	8.13	6.47
EC (9)	11.46	13.30	21.75	12.42	8.18	15.32
Japan	42.77	2.01	3.52	38.78	6.39	3.22
Total	65.03	19.78	31.34	59.01	22.70	25.01
SITC 7						
United States	38.72	26.04	41.62	27.65	31.86	45.46
EC (9)	24.22	16.14	25.30	17.81	14.27	21.27
Japan	21.70	3.17	3.88	33.02	3.56	4.24
Total	84.64	45.35	70.80	78.48	49.69	70.97
SITC 8						
United States	12.21	21.78	27.88	16.05	22.63	29.96
EC (9)	16.48	29.41	35.39	15.41	17.75	22.03
Japan	25.24	2.77	2.61	27.82	2.72	3.11
Total	53.93	53.96	65.88	59.28	43.10	55.10

Source: Table 13.17.

1975 and 1982 showing the importance of commodity subgroups and trading partners, with domestic exports and reexports distinguished. Table 13.19 gives some idea about the shares of manufactures and primary products and their major subgroups in Singapore's exports and domestic exports to and imports from the world and selected countries. Finally, table 13.20 provides a finer breakdown of Singapore's domestic manufactured exports in 1982, with the major markets for individual commodities indicated.

It can be seen from table 13.17 that while for chemicals and manufactured goods classified by material reexports had been more important than domestically produced exports, much higher proportions of manufactured exports to advanced countries (EC, United States, and Japan) consisted of domestic exports. Thus, for chemicals, domestic

Table 13.19 **Composition of Singapore's Imports, Exports, and Domestic Exports, 1982** (percentages)

	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4	SITC 5	SITC 6	SITC 7	SITC 8	SITC 9	All Commodities
Imports (total)	*5.98*	*0.56*	*3.83*	*33.99*	*1.11*	*4.63*	*13.96*	*28.58*	*6.39*	*0.96*	*100.00*
United States	4.81	1.28	1.20	4.86	0.09	9.17	8.44	61.24	7.95	0.96	100.00
EC[a]	3.41	2.71	0.47	1.57	0.16	13.48	16.85	49.47	9.60	2.28	100.00
Japan	1.28	0.03	0.47	0.10	0.06	4.06	30.22	52.69	9.93	1.15	100.00
Exports (total)	*5.37*	*0.49*	*6.25*	*32.87*	*1.75*	*3.87*	*8.63*	*25.96*	*6.37*	*8.43*	*100.00*
United States	4.76	0.04	4.59	4.71	0.00	0.21	5.58	65.76	11.45	2.90	100.00
EC[a]	4.03	0.04	13.97	2.33	0.11	1.52	7.65	39.83	12.13	18.39	100.00
Japan	2.97	0.33	2.45	66.13	0.06	3.87	5.06	8.48	1.59	9.05	100.00
Domestic exports (total)	*1.65*	*0.45*	*1.31*	*46.46*	*1.63*	*2.35*	*4.29*	*24.18*	*6.42*	*11.27*	*100.00*
United States	1.26	0.04	0.78	5.98	0.00	0.18	1.88	74.49	13.03	2.36	100.00
EC[a]	1.21	0.02	2.16	3.10	0.10	1.72	6.31	49.32	13.54	22.52	100.00
Japan	1.25	0.32	0.90	74.89	0.01	3.97	0.96	7.15	1.39	9.18	100.00

Source: Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports, December 1982.*

[a]Figures include Greece.

exports to these countries greatly exceeded reexports. For manufactured goods classified by material, although domestic exports to these countries were smaller than reexports, they nevertheless represented a higher proportion of total exports to these countries than of exports to other countries. In fact, for iron and steel and metal manufactures, domestic exports to these countries were more important than reexports in 1982. Exports of machinery and transport equipment and miscellaneous manufactures were mostly domestically produced.

Table 17.18 shows that manufactured imports from the United States, Japan, and the EC together accounted for more than 70% of the total in 1982 and over 59% for all individual SITC one-digit categories. The countries' shares differed, however: imports of basic manufactures and miscellaneous manufactures were mostly from Japan, imports of chemicals were mostly from the EC and the United States, and imports of machinery and transport equipment were mainly from Japan and the United States. The share of these countries in manufactured domestic exports was about 60% in 1982. Their shares in domestically produced exports from Singapore were in general higher than those in total exports, reflecting the fact that much higher percentages of exports of manufactures to these countries were domestically produced exports. Their shares were higher for machinery and transport equipment, followed by miscellaneous manufactures. For chemicals and manufactured goods classified by material their shares were less than half since most of Singapore's exports were to developing countries. Again, there are differences among countries. Domestic exports of chemicals were mostly to Japan, and those of manufactured goods by material mainly to the EC. Over 45% of domestic exports of machinery and transport equipment and 30% of domestic exports of miscellaneous manufactures were to the United States, with the EC taking over another 20% in each case. The shares of Japan in these two categories were less than 4%.

Table 13.19 shows the importance of manufactures in Singapore's trade with all countries and with individual countries. In 1982 manufactured imports made up 54% of Singapore's imports. They made up 97% of total imports from Japan and close to 90% of imports from the United States and the EC. Machinery and transport equipment alone made up 50%–60% of total imports from these countries. Manufactures accounted for 90% of domestic exports to the United States and 71% of domestic exports to the EC. Machinery and transport equipment account for three-quarters of domestic exports to the United States and half of domestic exports to the EC, with miscellaneous manufactured articles contributing another 14% in both cases. Mineral fuels—especially petroleum products—accounted for three-quarters of domestic exports to Japan, with manufactures contributing only about 13%.

Table 13.20 **Commodity Composition and Geographic Distribution of Singapore's Domestic Exports and Domestic Manufactured Exports, 1982**

SITC Rev. 2	Commodity	Share (%) of Dom. Exp. in: Total	Share (%) of Dom. Exp. in: SITC 5–8	Destinations[a] (%) U.S.	EC[b]	Japan	Malaysian Peninsula	Others
0	*Food*	*1.65*		*11.33* (2)	*7.70*	*10.86* (3)	*9.88*	Hong Kong *13.60* (1)
1	*Beverages and tobacco*	*0.45*		*1.17*	*0.42*	*10.06*	*2.93*	Hong Kong *23.06* (1), Brunei *20.98* (2), Democratic Kampuchea *19.49* (3)
2	*Crude materials*	*1.31*		*8.77* (3)	*17.23* (1)	*9.82* (2)	*7.55*	
3	*Mineral fuels*	*46.46*		*1.90*	*0.70*	*23.13* (1)	*16.25* (2)	Hong Kong *14.15* (3)
4	*Animal & veg. oils & fats*	*1.63*		*0.01*	*0.65*	*0.12*	*2.75*	Saudi Arabia *32.05* (1), Nigeria *15.70* (2), Bangladesh *8.34* (3)
5	*Chemicals*	**2.35**	**6.31**	**1.12**	**7.65** (3)	**24.21** (1)	**13.89** (2)	
51	Organic chem.		0.82					
52	Inorganic chem.		0.22					
53	Dyes and colors		0.41					
54	Medicinal prod.		2.35	0.38	2.53	54.13 (1)	3.60	Hong Kong 4.30 (2), Saudi Arabia 3.91 (3)
55	Perfumed toilet preps.		0.69					
56	Fertilizers mfd.		0.00					
57	Explosives		0.00					
58	Plastic materials		0.98	1.22	0.93	0.47	21.34 (1)	Australia 10.64 (2), United Arab Emirates 6.75 (3)
59	Chemical prod. n.e.s.		0.85					
6	*Basic manufactures*	**4.29**	**11.53**	**6.47**	**15.38** (2)	**3.22**	**17.02** (1)	Hong Kong **7.28** (3)
61	Leather prod. n.e.s.		0.02					
62	Rubber manuf. n.e.s.		0.39					
63	Wood and cork manuf.		2.61	2.32	28.65 (1)	2.66	5.61	Saudi Arabia 9.87 (2), Hong Kong 6.89 (3)
64	Paper manuf.		0.63					
65	Textile manuf.		1.87	18.99 (1)	6.26	5.00	9.50	Hong Kong 14.90 (2), Australia 9.63 (3)
66	Nonmetal mineral manuf.		1.58	1.43	0.32	2.36	33.42 (1)	China 14.23 (2), Hong Kong 8.06 (3)
67	Iron and steel		1.23	6.55	12.47 (2)	4.84	26.58 (1)	Brunei 11.11 (3)
68	Nonferrous metals		0.89					
69	Metal manuf.		2.31	7.22 (3)	16.71 (2)	3.33	18.43 (1)	

7	*Machinery and transport*	**24.18**	**64.93**	**45.46** (1)	**21.32** (2)	**4.24**	**4.72**	Hong Kong **5.29** (3)
71	Power-generating mach.		1.65	69.09 (1)	7.01 (3)	8.50 (2)	3.31	
72	Industrial mach.		1.46	16.81 (1)	7.97	7.38	9.97	Australia 11.97 (2), Brunei 11.44 (3)
73	Metalworking mach.		0.48					
74	General indust. mach.		3.89	28.92 (1)	11.46 (3)	16.79 (2)	9.17	
75	Office and data mach.		4.43	58.60 (1)	27.31 (2)	1.14	1.73	Canada 2.61 (3)
76	Telecommunications apparatus		16.75	37.74 (1)	33.62 (2)	1.98	3.35 (3)	
761	Television receivers		4.47	12.49 (2)	51.93 (1)	0.55	4.27	Australia 4.83 (3)
762	Radio-broadcast receivers		7.13	36.34 (2)	38.67 (1)	3.02 (3)	0.80	
763	Gramophones		1.22	61.37 (1)	18.98 (2)	3.56	0.59	Taiwan 5.01 (3)
764	Telecomm. equip.		3.93	61.63 (1)	8.16 (2)	1.24	7.77 (3)	
77	Elec. mach. n.e.s.		28.98	47.07 (1)	17.44 (2)	4.25	5.76	Hong Kong 9.91 (3)
771	Elec. power mach.		0.56					
772	Elec. circuit apparatus		4.95	65.10 (1)	15.19 (2)	3.60	4.30 (3)	
773	Electricity-distributing equip.		0.28					
774	Elec. medical apparatus		0.00					
775	Household goods		2.25	51.77 (1)	13.70 (2)	0.98	1.09	Saudi Arabia 5.31 (3)
776	Electronic valves		18.18	48.64 (1)	17.96 (2)	4.73	5.59	Hong Kong 13.08 (3)
778	Elec. mach. n.e.s.		2.75	8.89 (3)	23.52 (1)	3.61	5.63	Hong Kong 10.54 (2)
78	Road vehicles		0.24					
79	Transport equip.		7.04	60.09 (1)	17.56 (2)	0.03	1.83 (3)	
8	*Misc. manufactured articles*	**6.42**	**17.24**	**29.96** (1)	**22.06** (2)	**3.11**	**3.10**	Saudi Arabia **7.97** (3)
81	Sanitary lighting manuf.		0.12					
82	Furniture		1.27	41.80 (1)	10.80 (2)	5.31	1.50	Saudi Arabia 10.20 (3)
83	Travel goods		0.20					
84	Clothing		6.78	47.37 (1)	29.60 (2)	0.36	0.58	Sweden 3.60 (3)
85	Footwear		0.38					
87	Scientific instruments		1.06	40.64 (1)	10.52 (3)	11.16 (2)	3.51	
88	Photographic apparatus		1.83	14.89 (2)	9.79 (3)	7.37	4.27	Hong Kong 47.00 (1)
89	Misc. manuf. articles n.e.s.		5.59	12.32 (3)	23.16 (1)	3.36	5.66	Saudi Arabia 17.91 (2)
9	*Misc. transactions n.e.s.*	**11.27**		**3.09**	**20.88** (1)	**11.68**	**2.30**	Liberia **15.39** (2), Panama **14.58** (3)
5–8	*Total manufactures*	**37.24**	**100.00**	**35.49** (1)	**19.90** (2)	**5.19**	**6.44** (3)	
0–9	*All commodities*	**100.00**		**14.75** (1)	**10.45**	**14.35** (2)	**10.53** (3)	

Source: Singapore, Department of Statistics, *Singapore Trade Statistics: Imports and Exports, December 1982.*

[a]Ranks of the three most important markets are shown in parentheses. Geographic distributions are shown for all SITC one-digit categories and for individual manufactured goods whose shares in domestic exports of manufactures (SITC 5–8) exceed 1%.

[b]Figures include Greece.

Table 13.20 gives a detailed classification of Singapore's domestic exports of manufactures in 1982 and lists the major country destinations for individual commodities. The largest markets for Singapore's domestically produced exports of manufactures and their shares in the total are as follows: United States, 35.5%; EC, 19.9%; Malaysian Peninsula, 6.4%; Hong Kong, 5.8%; and Japan, 5.2%. For domestically produced exports of all commodities from Singapore, however, Japan's share (14.4%) ranks just behind the U.S. share (14.8%) owing to the importance of petroleum products. In 1982 Singapore's domestic exports of manufactures were dominated by machinery and transport equipment, which accounted for 65% of the total, followed by miscellaneous manufactured articles (17%), manufactured goods classified by material (12%), and chemicals (6%). Within machinery and transport equipment (SITC 7), electrical machinery not elsewhere specified (n.e.s.) (SITC 77) and telecommunications apparatus (SITC 76) together accounted for 46% of total domestically manufactured exports, while transport equipment (SITC 79) contributed another 7%. The single most important SITC three-digit group was SITC 776, electronic valves (mostly integrated circuits), which alone accounted for 18% of domestically manufactured exports. For SITC 7, the United States was by far the largest market for Singapore, with a share of 45%, followed by the EC (21%) and Hong Kong (5%). For miscellaneous manufactured articles (SITC 8, with clothing being the most important), the United States was also the largest buyer. For manufactured goods by material (SITC 6), the Malaysian Peninsula provided the largest market; for chemicals (SITC 5), especially medicinal products, Japan was the most important.

13.5 Prospects for Singapore's Exports of Manufactures

In the last two decades the Singapore economy has grown at a high and sustained rate as a result of its successful export-oriented industrialization. During that period, emphasis has shifted from entrepôt trade to domestic exports of manufactures, and export orientation has increased in most industries. The same period has witnessed significant changes in the commodity composition and geographic pattern of Singapore's trade. While twenty years ago trade was mainly concentrated in primary commodities, manufactures and fuels now make up the greater part of Singapore's trade. Within trade in manufactures, there have been declines in the shares of consumer and intermediate goods and increases in the share of capital goods. All these reflect the changing nature of entrepôt trade as well as Singapore's industrial development. In 1960 practically all manufactured exports (mainly reexports) were to developing countries; by 1982 over 60% of domestic exports of manufactures went to developed countries. Recently, there has also been increasing emphasis on high-value-added, skill-intensive, and

capital-intensive industries. At present, however, Singapore's manufactured exports are still labor-intensive relative to its imports.

In recent years Singapore has run balance-of-trade deficits, partly as a result of its industrialization drive necessitating imports of intermediate inputs and capital goods. However, the trade deficits have been more than offset by foreign capital inflows, especially through the nonmonetary private sector in the form of foreign direct investment, giving rise to overall balance-of-payments surpluses (table 13.1). There is little doubt that Singapore's liberal policy with respect to foreign investment has been an important factor contributing to its success in developing the manufacturing sector. At the same time, it may be noted that a large supply of national savings is available, partly through contributions to the Central Provident Fund (CPF), a compulsory savings scheme for workers' retirement. The funds are mainly used to buy government securities and finance government expenditures on infrastructure such as public housing. Since a large part of Singapore's own capital is invested abroad, one might question why Singapore has not relied more on domestic capital in financing industrial development, thereby reducing "dependence" on foreign investment.[20] Tan and Ow (1982) pointed out that in addition to bringing in capital, foreign investment brings in new technology, entrepreneurship, and technical skills. Others have, however, noted that this might have an inhibiting effect on the development of local entrepreneurship in industry, and whether this has been more or less important than beneficial spillover effects is perhaps debatable (see, for example, Chia 1980). Nevertheless, from a macroeconomic point of view foreign investment provided the capital inflow necessary to offset the trade deficits that accompanied rapid industrialization.

Although Singapore's outward-looking strategy has been remarkably successful, difficulties have to be faced in the future. One is that of protectionism on the part of developed countries. The deepening of recession in 1982 and increasing unemployment led to increased pressured from domestic industries in advanced countries to curb imports, and the use of nontariff barriers (e.g., quotas and voluntary export restraints) became more widespread. Although attempts were made to halt rising protectionism (for example, at the General Agreement on Tariffs and Trade [GATT] meeting in Geneva in November 1982), there is not much hope for freer trade in the near future. This would be so even if there is a world economic recovery, since the fundamental issue is whether advanced countries are willing to restructure their economies and phase out certain (mainly low-technology and labor-intensive) declining industries.

Singapore has been a beneficiary under the U.S., EC, and Japanese Generalized System of Preferences. But protectionism is likely to affect GSP exports as well because of safeguard provisions if domestic in-

dustries are adversely affected by imports. Moreover there is the possibility that Singapore and other newly industrializing countries may soon lose their developing-country status and thus be excluded from preferential tariff treatment in developed countries. Closer economic cooperation among developing countries may be thought to be the solution, but the creation of a preferential regional market inevitably results in a loss of gains from specialization at the global level, which must be weighed against the possible benefits.

During a recession, labor-intensive manufactures like textiles are especially vulnerable to protectionist measures.[21] This provided further impetus for Singapore to move upstream toward higher-technology and higher-value-added industries. Another reason is the growing labor shortage.

Until the late 1960s, Singapore's high rates of industrial growth had been accomplished by rapid absorption of labor into labor-intensive industries. This "easy" phase of industrialization has come to an end. In the coming years it is labor shortage and not labor surplus that presents the problem. In the case of Singapore, it can be solved only by technological upgrading, since the import of foreign labor has obvious social and other costs and can hardly be regarded as a long-term solution. In a labor-shortage situation, improvements in productivity are essential for a high and sustainable rate of GNP growth. Unfortunately, productivity performance in manufacturing in the 1970s was less than satisfactory. Pang and Tan (1981) found that labor force expansion from 1975 to 1979—not growth of the capital stock or productivity improvement—was the dominant factor explaining output growth. They suggested that importation of foreign labor, together with the National Wage Council policy of emphasizing small wage increases during that period, might have delayed the needed structural adjustment in manufacturing of decreasing the number of industries and processes whose viability depends on an abundance of unskilled labor. In fact, as pointed out earlier, a high-wage policy was resumed in 1979 to encourage substitution of capital for unskilled labor. Singapore is now following a deliberate policy of phasing out unskilled-labor-intensive industries and restructuring the economy through the provision of fiscal and other incentives to move into high-technology and skill-intensive activities.

In its further industrialization, Singapore faces what has appropriately been described as a "sandwich problem" (Tan and Ow 1982, 308). Singapore is destined to lose its comparative advantage to other developing countries in the low-value-added, low-technology types of manufactures (e.g., textiles and plastic products). On the other hand, it may be some time before it can compete successfully with developed countries in those requiring high technology (e.g., precision and en-

gineering products). The attraction of foreign investment into these high-technology and skill-intensive industries will also prove to be more difficult than attracting investment in labor-intensive operations through low wages. In addition to fiscal incentives, the development of a highly skilled local work force and trained professional and engineering manpower, among other things, will be crucial.

The restructuring of the manufacturing sector is likely to be a slow and expensive process. Because of Singapore's size there may be limits to its further industrialization. This leads some to suggest that areas other than manufacturing—such as modern traded services, e.g., banking and finance, professional and management services—may merit attention (see Tan and Ow 1982; Chia 1980). In the past they have developed rapidly without direct government support, and they may be the activities in which Singapore's future comparative advantage lies. Regardless of whether the future emphasis is on high-technology manufacturing or on high-value-added services, economic restructuring as a dynamic response to external conditions and internal development, the upgrading of the work force, and the improvement of productivity present the main challenges to Singapore in the coming years.

Appendix

Singapore's Industrial Classification and Relation to International Trade Data

Many of the analyses in this paper are based on time series comparisons of compositions of output, value added, and direct export. Many of the analyses also require relating production to trade data. Since published census data on industrial production in various years are sometimes based on different classification systems, an attempt has been made to make them comparable. Table 13.A.1 shows the relations between the three industrial classification systems on which the data in the study have been based. Table 13.A.2 shows the relation between Singapore's industrial classification and the United Nations' standard international trade classification (SITC), revision 1. The conversions given in the two tables should of course be regarded as approximate rather than exact.

Table 13.A.1 Singapore's Industrial Classifications

Industry	SIC[a]	SSIC, 1969[b]	SSIC, 1978[c]
Food	20	311+312	311+312
Beverages	21	313	313

(*continued*)

Table 13.20 (continued)

Industry	SIC[a]	SSIC, 1969[b]	SSIC, 1978[c]
Tobacco	22	314	314
Textiles	23	321	321
Footwear, wearing apparel, made-up textile goods	24	322 + 324	322 + 324
Wood and cork prod.	25	331	331
Furniture and fixtures	26	332	332
Paper and paper prod.	27	341	341
Printing, publishing, allied prod.	28	342	342
Leather, leather prod.	29	323	323
Rubber prod. (incl. footwear but excl. rubber proc.)	30	355 + 356	355 + 356
Chemicals and chem. prod.	31	351 + 352	351 + 352
Petroleum refineries, petroleum and coal prod.	32	353 + 354	353 + 354
Nonmetallic mineral prod.	33	361 + 362 + 363 + 364 + 365 + 369	361 + 362 + 363 + 364 + 365 + 369
Basic metal prod.	34	371 + 372	371 + 372
Metal prod. (except mach. and transport equip.)	35	381	381
Nonelect. mach.	36	382	382 + 38411 + 38412 − 38231 + 38239
Elect. mach.	37	383	383 + 38421 − 38429 + 3843 − 3849 + 38413
Transport equip.	38	384	385 + 38231 + 38239
Misc. manuf. industries	39	385	386
		390	390
Plastic products	3995	357	357

Sources: Nyaw 1979; Singapore, National Statistical Commission, *Singapore Standard Industrial Classification, 1973;* Singapore, Department of Statistics, *Singapore Standard Industrial Classification, 1978.*

[a]Singapore Industrial Classification, two-digit.

[b]Singapore Standard Industrial Classification of all economic activities, revised 1969.

[c]Singapore Standard Industrial Classification, 1978.

Table 13.A.2 **Relation between Singapore Standard Industrial Classification (Revised 1969) and United Nations' Standard International Trade Classification (Revised)**

Industry	Type[a]	SSIC, 1969	SITC (Rev. 1)
Food	C	311 + 312	013 + 022 + 032 + 046 + 048 + 053 + 0612 + 081
Beverages	C	313	111 + 112
Cigarettes, other tobacco prod.	C	314	122
Textiles, textile manuf.	I	321	65
Wearing apparel except footwear	C	322	84
Leather, leather prod.	I	323	61 + 83

Table 13.20 (continued)

Industry	Type[a]	SSIC, 1969	SITC (Rev. 1)
Footwear	C	324	851
Sawn timber, other wood prod. except furniture	I	331	63
Furniture and fixtures except primarily of metal	C	332	821
Paper and paper prod.	I	341	64
Printing and publishing	C	342	892
Industrial chemicals and gases	I	351	51 + 52+ 531 + 532 + 571
Paints, pharmaceuticals, other chem. prod.	I	352	541 + 533 + 55
Petroleum refineries, petroleum prod.	I	353 + 354	332
Processing of jelutong and gum dammar	I	355	231 + 232 + 233
Rubber prod. except footwear	I	356	62
Plastic products	I	357	893 + 581
Pottery, china, earthenware, glass prod.	I	361 + 362	666 + 664 + 665
Bricks, tiles, other structural clay prod.	I	363	662
Cements, cement additives	I	364	661
Structural cement and concrete prod.	I	365	
Asbestos, stone, other nonmetallic mineral prod.	I	369	663
Iron and steel	K	371	67
Zinc, other nonferrous metals	K	372	68
Metal grills, cans, pipes and other fabricated prod.	K	381	69
Calculators, refrigerators, air conditioners and indust. mach.	K	382	71
Radios, TVs, semiconductors, other elect. mach.	K	383	72
Transport equip. and oil rigs	K	384	73
Professional and sci. equip., photog. and optical goods	C	385	86
Other manuf. industries (jewelry, toys, umbrellas, etc.)	—	390	—

Source: Nyaw 1979, with modifications.

[a]C = consumer goods, I = intermediate goods, K = capital goods.

Notes

1. In 1982 total merchandise trade (sum of exports and imports) was 362% of gross domestic product. The calculation is based on figures from Singapore, Ministry of Trade and Industry, *Economic Survey of Singapore, 1982*.

2. A good description of Singapore's industrial development and its relation to trade can be found in Tan and Ow 1982, Pang 1981, and Pang and Tan 1981.

3. The average nominal and effective rates of protection to the whole manufacturing sector in 1967 were estimated to be 3% and 6% respectively. In addition, Tan and Ow (1982) calculated "effective subsidy rates" that also quantify the additional incentives provided by differential corporation tax rates and preferential loans. The average rate of effective subsidy for the whole manufacturing sector was 6%. The figures for predominantly export-oriented industries and predominantly import-competing industries were 7% and 15% respectively.

4. Singapore, Department of Statistics, *Report on the Census of Industrial Production, 1981*.

5. The SDF is financed through a levy on employers amounting to 4% of the payroll of all employees earning less than S $750 per month. See Singapore, Economic Development Board, *Annual Report 1982/83*, for details of the various schemes described in this paragraph.

6. Tables 13.4 and 13.5 have not been constructed on a comparable basis, since before 1975 official published data on domestic exports are available only for selected commodities—and only for certain years.

7. The Schiavo-Campo (1978) index of structural change (SC) between years t and $t + k$ is $SC = 50 \Sigma|s_i(t + k) - s_i(t)|$, where s_i is the share of subgroup i in the total.

8. Schiavo-Campo (1978) also suggested the following "index of consistency" of structural change (C) for years 1 through n: $C = SC(1,n)/\Sigma SC(i,j)$, $0 \leq C \leq 1$, where $i = (1, k, 2k, \ldots, n - k)$ and $j = (k, 2k, 3k, \ldots, n)$ so that each subperiod has k years and the number of subperiods is n/k. The indices of consistency for output, value added, and direct export are respectively 0.59, 0.51, and 0.49, indicating that compositions do fluctuate considerably and the changes often reverse themselves.

9. Total exports (X) consist of domestically produced exports (X_d) and reexports (X_r), while total imports (M) consist of retained imports (M_r) and entrepôt imports (M_e). Thus we have $X = X_d + X_r$ and $M = M_r + M_e$. Since reexport figures are unavailable before 1975, they are estimated by subtracting direct export (see note to table 13.3) from total export. If one can further assume that $X_r = M_e$, then retained import can be estimated by $M_r = M - M_e = M - X_r$. However, M_e may differ considerably from X_r for two reasons. First, the two are not the same because of differences in valuation (Singapore's exports are valued f.o.b. and imports are valued c.i.f.) and because of the margin on entrepôt trade. Second, there is the timing problem: entrepôt imports may not be reflected in reexports of the same year.

10. Singapore, Department of Statistics, *Singapore Input-Output Tables 1973*, pp. 17–18.

11. Singapore, Department of Statistics, *Singapore Input-Output Tables 1978*, pp. 21–22.

12. See, for example the Rahman (1973) study, which suggests that developing countries are in the strongest competitive position if they concentrate their manufactured exports in labor-intensive products.

13. The skill index is computed for 1970 and 1980 since it requires population census data.

14. See also Chow 1975, in which Keesing's procedures are employed to study the skill intensity of Singapore's trade in manufactures.

15. The weighted-average factor intensity (physical capital, total capital, or skill intensity) F is given by

$$F = \sum_{i=1}^{n} w_i f_i ,$$

where f_i is the factor intensity in the production of commodity i and w_i is the share of commodity i in total exports or total imports.

16. See n. 9. Because of the timing problem (and possibly other reasons), the estimate of retained imports for a commodity group can be negative. When Singapore's trading partners are divided into industrialized and other countries, the estimate of retained imports for a commodity can also be negative because of the pattern of entrepôt trade: the commodity may be imported from, say, developed countries and then reexported to developing countries. In the few cases where estimates of retained imports are negative, they are assumed to be zero, and the commodities are therefore given zero weights in the computation of average factor intensities.

17. Chow (1975) in studying the skill intensity of Singapore's trade argued that, since Singapore is in between the advanced and less advanced industrialized countries, the skill requirements of Singapore's industries may reflect the "average" skill requirement in world trade. Moreover, although Singapore is a small country, it is not so specialized as to make its skill requirements inappropriate as a measurement yardstick.

18. It should be noted that "other countries" in tables 13.11 and 13.12 include both developing countries and centrally planned economies. If calculations are made for developing countries alone, the contrast would probably be even more marked.

19. In 1982 exports of clothing to the EC were more than offset by net imports of scientific instruments and other miscellaneous manufactured articles.

20. Forced savings in the form of contributions to CPF are also believed to help siphon off excessive purchasing power and to exert a deflationary influence on the economy. See Wong 1981 for a related discussion. It may be noted that during the 1974–75 inflation following the oil crisis, Singapore, unlike some other developing countries, chose to accept a lower rate of growth by deflationary domestic policies for the sake of limiting indebtedness and lowering the rate of inflation. External financing continued to take the form of direct foreign investment. Balassa (1981) noted that Singapore's gross debt service ratio declined from 9% in 1973 to 7% in 1978; and while the ratio of gross external debt to GNP rose from 13% to 15%, net reserves continued to exceed its gross external debt by almost three times.

21. See Singapore, Ministry of Trade and Industry, *Economic Survey of Singapore, 1982,* for a discussion of protectionist measures introduced in that year. In the case of textiles, more restrictions were introduced in the new Multi-Fiber Arrangement and in the Singapore EC Textile Agreement concluded in November 1982.

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