THE RELATIONSHIP BETWEEN MATERIALS, ECONOMIC STRUCTURE AND PERFORMANCE

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TABLE 1.1

Standard Industrial Classification of materials industries

MLH	Crude Materials
102, 103, 109	Stone, slate, chalk, clay, sand, gravel extraction.
	Other non-energy material mining and quarrying.
	Processed Materials
276	Synthetic Resins
311, 312, 313	Iron & Steel
321	Aluminium & Alloys
322, 323	Other Non-ferrous metals
464	Cement
461, 469	Bricks, fireclay, refractory goods and other building materials
471	Timber
491	Rubber

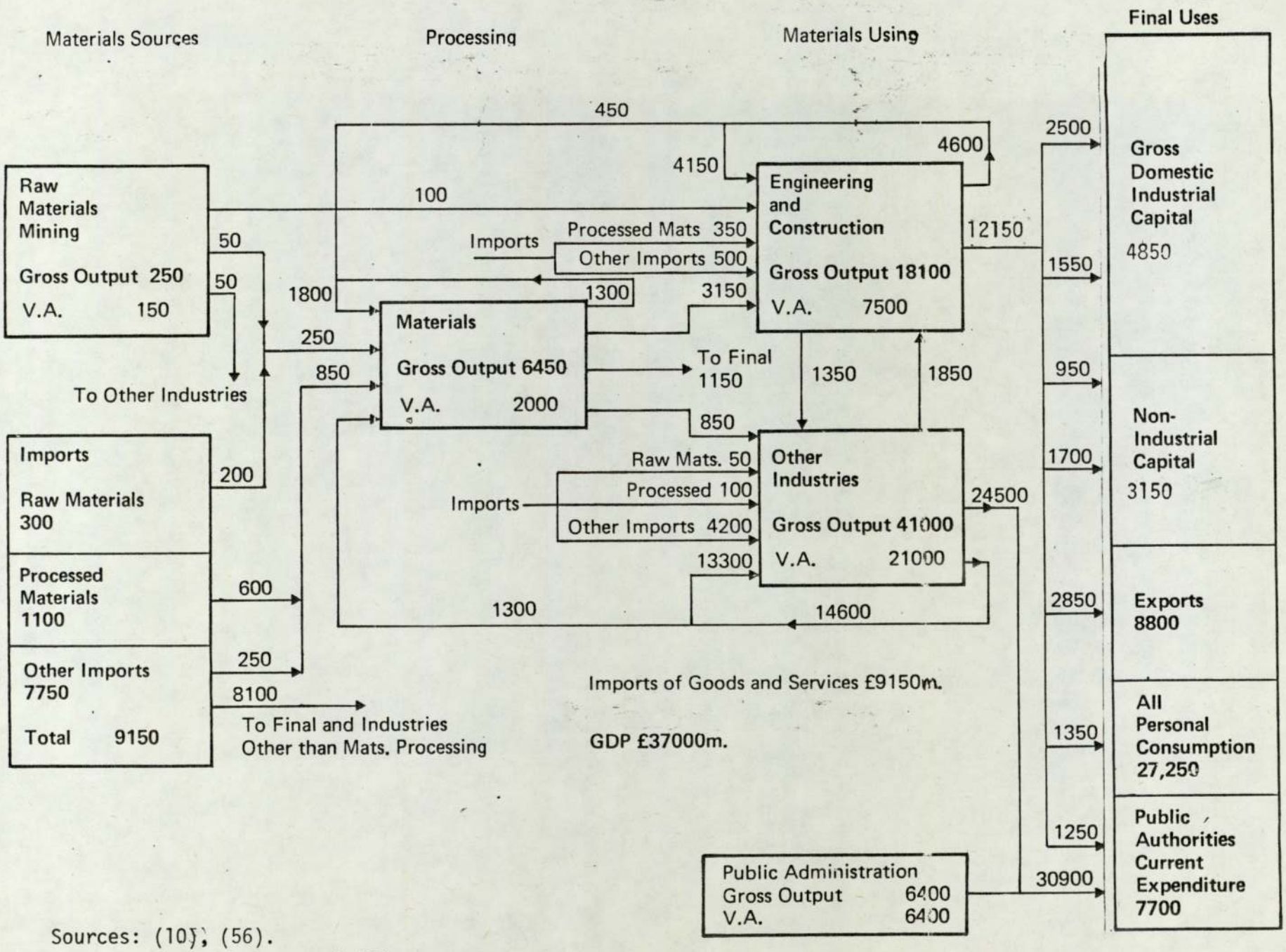


FIGURE 1.1
Input-Output Flow Diagram: UK 1968

Sources: (10), (56).
Figures rounded to nearest £50m

TABLE 1.2

Output & Employment of Materials Industries Compared with Other Manufacturing Industries in the UK 1968

	Net Output £ million	%	No. Employed £ million	%
MATERIALS TOTAL	2282	16.1	1112	15.3
Iron & Steel	789	5.6	414	5.7
Non-ferrous metals	280	2.0	131	1.8
Plastics Materials	197	1.4	57	0.8
Bricks, Refractory Products etc.	104	0.7	58	0.8
Glass	139	1.0	73	1.0
Cement	49	0.3	14	0.2
Miscellaneous Building Materials	196	1.4	86	1.2
Timber	269	1.9	155	2.1
Rubber	259	1.8	124	1.7
ENGINEERING	6411	45.2	3413	47.1
OTHER MANUFACTURING	5497	38.7	2724	37.6
TOTAL MANUFACTURING	14190	100	7249	100

Source: Census of Production 1968 (11)

TABLE 1.3

Capital Stock at 1970 replacement cost (end-year)
1968

	£ million	% of total manufacturing
TOTAL MATERIALS	7574	20.9
Iron and Steel	4001	11.1
Non-ferrous Metals	756	2.1
Synthetic Resins	627	1.7
Bricks & Miscellaneous Building Materials	721	2.0
Cement	272	0.8
Glass	307	0.8
Timber	344	1.0
Rubber	546	1.5
TOTAL ENGINEERING AND TRANSPORT EQUIPMENT	11311	31.3
TOTAL MANUFACTURING	36157	100.0

Source : (12)

TABLE 1.4

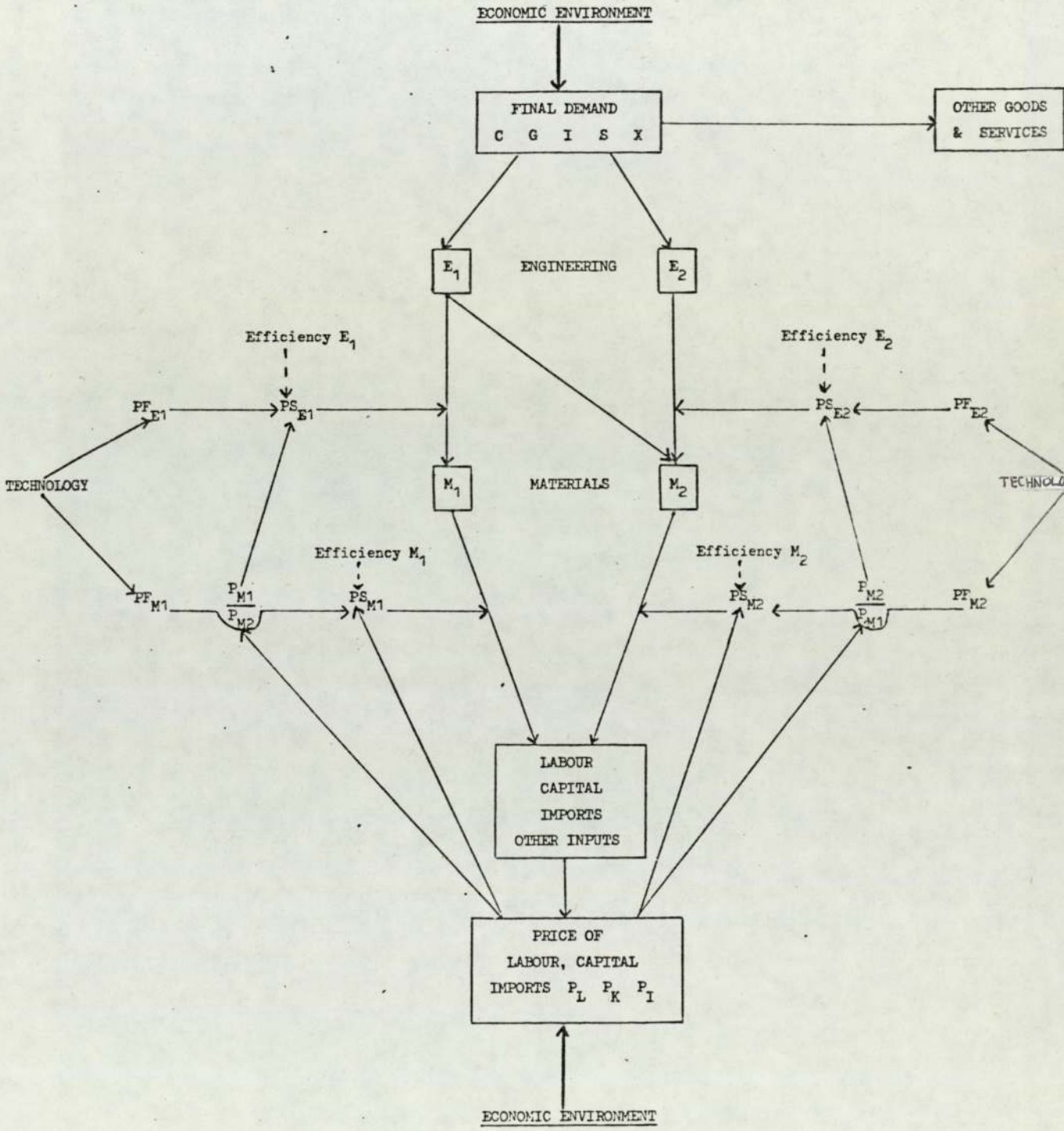
Energy Consumption by Manufacturing Industry, 1968

	Million Therms	%
TOTAL MATERIALS	11236	50.6
Iron and Steel	5841	26.3
Non-ferrous Metals	496	2.2
Synthetic Resins	519	2.3
Building Materials	2765	12.5
Cement	1044	4.7
Timber	118	0.5
Rubber	453	2.0
TOTAL ENGINEERING & TRANSPORT EQUIPMENT	3713	16.7
OTHER MANUFACTURING	7253	32.7
TOTAL MANUFACTURING	22202	100

Source: (59), (7) and own estimates based upon (59), (7) and (10).

FIGURE 2.1

SCHEMATIC REPRESENTATION OF FACTORS AFFECTING MATERIALS CONSUMPTION



Key
C - Private Consumption
G - Public Authorities Current Expenditure
I - Gross Domestic Fixed Capital Formation
S - Change in Stocks
X - Exports
PF - Production Function
PS - Production Structure
P - Price
E - Engineering industry
M - Materials industry

FIGURE 2.2

INDEX OF COINCIDENT BUSINESS CYCLE INDICATORS

Source: 1958-74 Reproduced from (117)
1953-58 Estimated from Index of real GDP in (117)

TABLE 2.1

Deviation from trend in Gross Domestic Product

	GDP (Output Measure) 1975 = 100	5 Year Moving Average	% Deviation
1953	58.10	58.58	- 0.82
1954	60.70	60.04	1.10
1955	62.40	61.72	1.10
1956	63.20	62.90	0.48
1957	64.20	64.10	0.16
1958	64.00	65.68	- 2.56
1959	66.70	67.46	- 1.13
1960	70.30	69.22	1.56
1961	72.10	71.56	0.75
1962	73.00	74.20	- 1.62
1963	75.70	76.60	- 1.17
1964	79.90	78.94	1.22
1965	82.30	81.44	1.06
1966	83.80	84.12	- 0.38
1967	85.50	86.40	- 1.04
1968	89.10	88.54	0.63
1969	91.30	90.66	0.71
1970	93.00	92.90	0.11
1971	94.40	95.76	- 1.42
1972	96.70	97.78	- 1.10
1973	103.40	99.18	4.25

Source: Estimated from information in (117).

TABLE 2.2

Percentage of Firms Reporting Below Capacity Working

	February	June	October
1960	45	40	41
1961	45	45	51
1962	60	63	67
1963	68	65	57
1964	50	42	40
1965	38	43	47
1966	47	48	54
1967	65	66	68
1968	61	55	49
1969	42	46	46
1970	51	51	49
1971	n/a	63	67

	January	April	July	October
1972	71	67	63	59
1973	52	47	39	44
1974	71	50	54	56
1975	61	71	75	73

This information is collected on a sample basis and allowance for seasonality is made by respondents.

Source: CBI Industrial Trends Survey (118).

FIGURE 3.1

Index of Growth of Industrial Production & Consumption of Four Materials, 1954-74, 1954 = 100

Sources: (15), (17), (68)

(Index derived from volume figures)

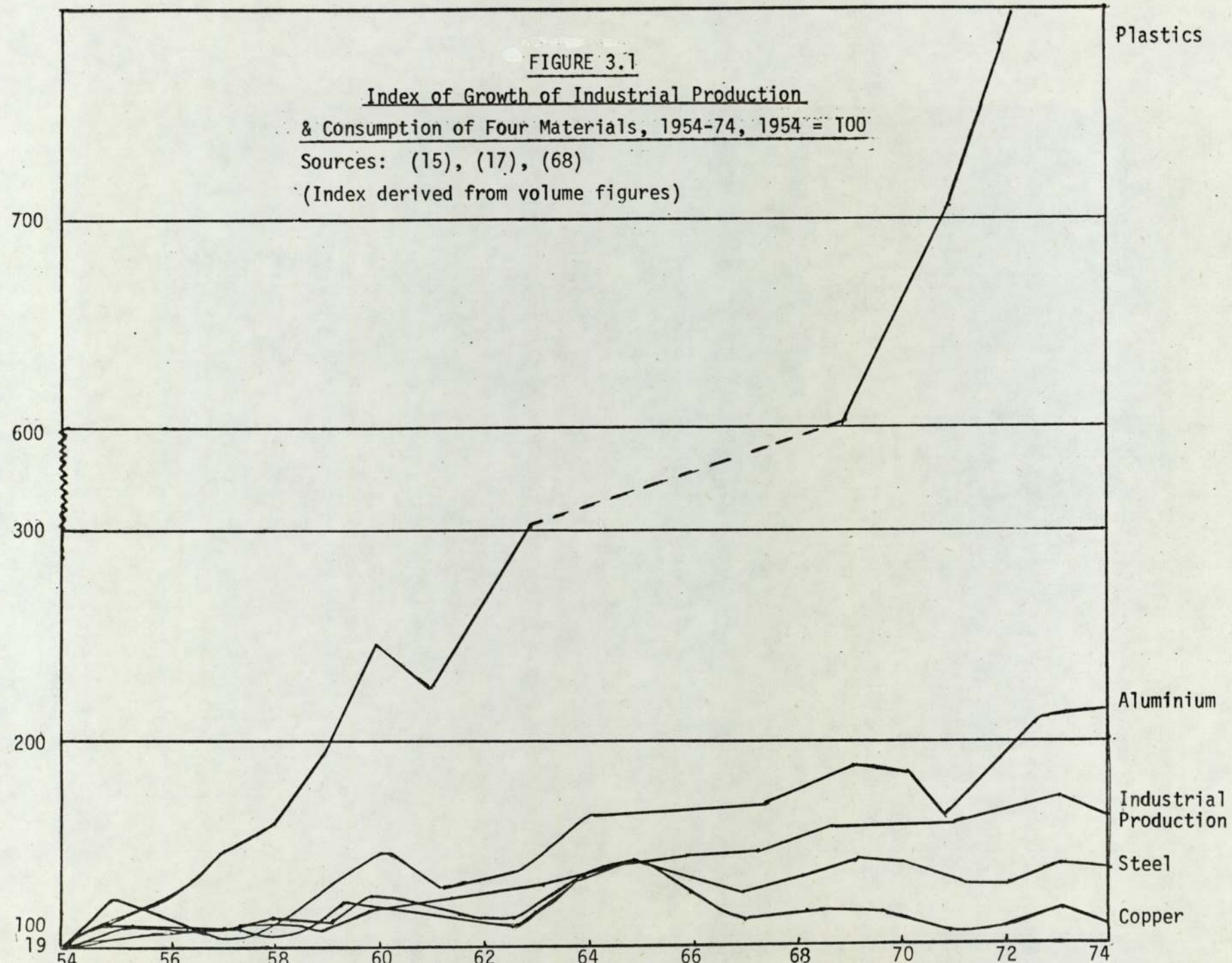
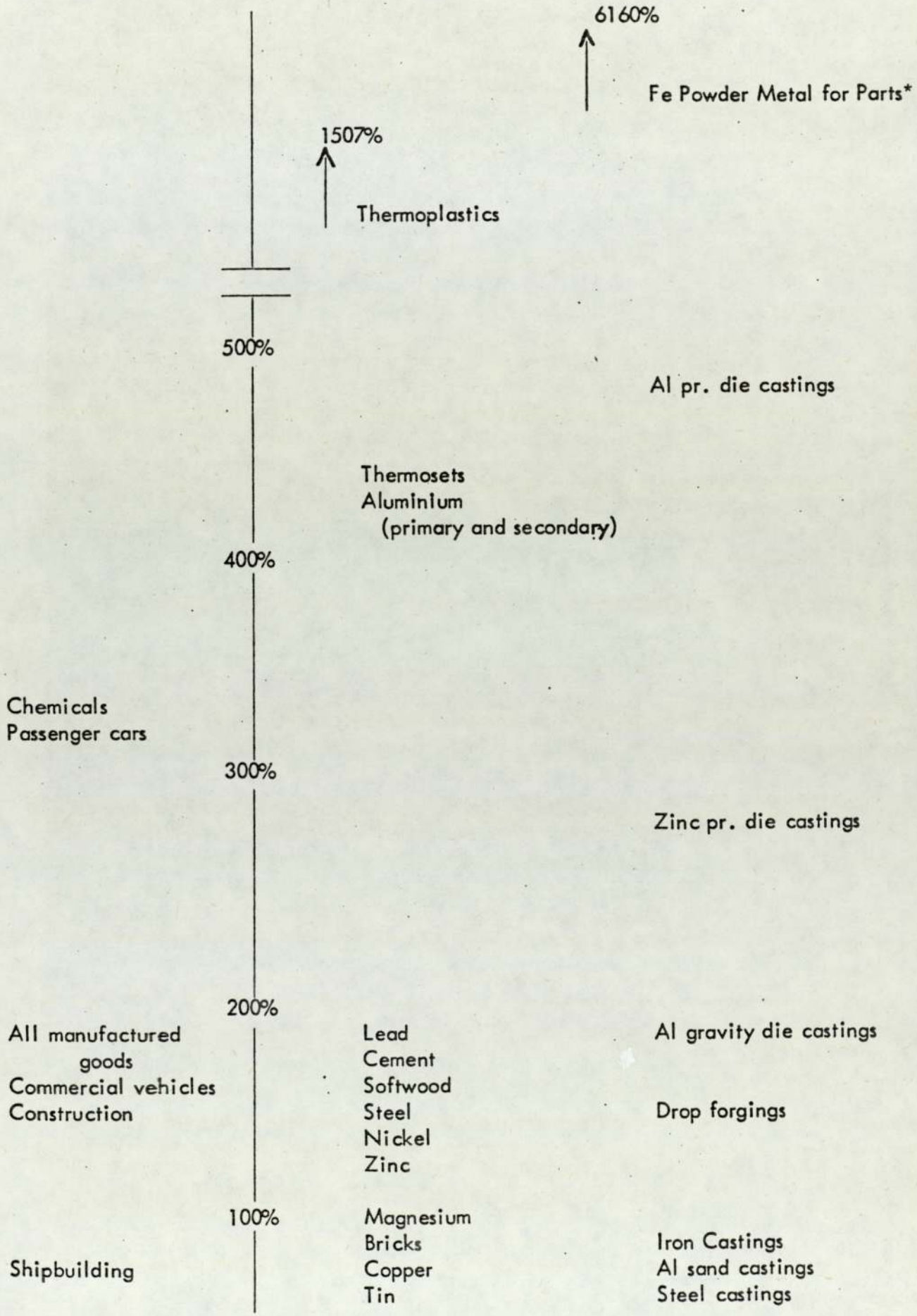


FIGURE 3.2:

UK Ratio of Production in 1973 to 1953



* Estimate based on 1956 data.

Source: Annual Abstract of Statistics.

TABLE 3.1

Specific Consumption of Four Materials in Manufacturing and Construction, UK

Units: tonnes/£'000 at 1963 prices.

	1954	1963	1968	1972
Crude Steel (ingot equilavent)	1.703	1.604	1.513	1.365
Aluminium (primary and secondary)	0.032	0.037	0.037	0.036
Copper (primary and secondary)	0.059	0.055	0.044	0.040
Synthetic Resins	0.020	0.049	0.072	0.095

Sources: C.S.O. Annual Abstract of Statistics (15)
Metallgesellschaft (18)
Rubber and Plastics Research Association (Private Communication) (68)
Iron and Steel Annual Statistics (17)
Report on the Census of Production 1968 (11)

TABLE 3.2

Growth of End-Use Industries 1954-74

Percent (volume terms)

TOTAL MANUFACTURING & CONSTRUCTION	71%
Mechanical Engineering	78%
Electrical Engineering	203%
Transport Equipment	54%
of which Motor Vehicles	125%
Aircraft & Other Vehicles	3%
Shipbuilding	-22%
Other Metal Goods	37%
Construction	48%

Sources: Department of Applied Economic, Cambridge - A Programme of Growth No. 12 (53)
CSO: Annual Abstract of Statistics (15)

Notes: The percentages were calculated using net output indices from (53) and linking with indices from (15) for post 1968 figures. Engineering sectors disaggregated using (15). The index uses an amalgam of 1963 and 1970 weights.

TABLE 3.3

Consumption and Specific Consumption of Finished Steel in End-Uses

Units: Consumption - '000 tonnes
Specific Consumption - tonnes/£'000 output 1963 prices

	1954			1963		
	Consumption	% of total	Specific Consumption	Consumption	% of total	Specific Consumption
Transport Equipment	2933	23.5	3.50	3090	21.4	2.61
of which						
Motor Vehicles	1569	(12.5)	3.91	2250	(15.6)	2.93
Other	1364	(10.9)	3.11	840	(5.8)	2.02
Mechanical Engineering	2315	18.5	2.32	3426	23.8	2.72
Electrical Engineering	403	3.2	0.70	739	5.1	0.77
Other Metal Goods	2208	17.7	3.80	4118	28.6	6.17
Construction)	n/a)	37.0	n/a	937	6.5	0.51
Other)	4631)		n/a	2105	14.6	n/a
TOTAL	12490	-	-	14415	-	-

	1968			1972		
Transport Equipment	3057	18.1	2.37	3096	18.5	2.29
of which						
Motor Vehicles	2242	(13.3)	2.53	2212	(13.2)	2.29
Other	815	(4.8)	2.02	884	(5.3)	2.31
Mechanical Engineering	3931	23.3	2.49	3442	20.5	2.11
Electrical Engineering	783	4.6	0.60	763	4.6	0.48
Other Metal Goods	4877	28.9	6.45	4976	29.7	6.89
Construction	1007	6.0	0.45	1499	8.9	0.66
Other	3217	19.1	n/a	2974	17.8	n/a
TOTAL	16872	-	-	16750	-	-

Sources: (15), (17), (53), (55).

FIGURE 3.3

Prices of Materials 1953 = 100

(Source: (15))

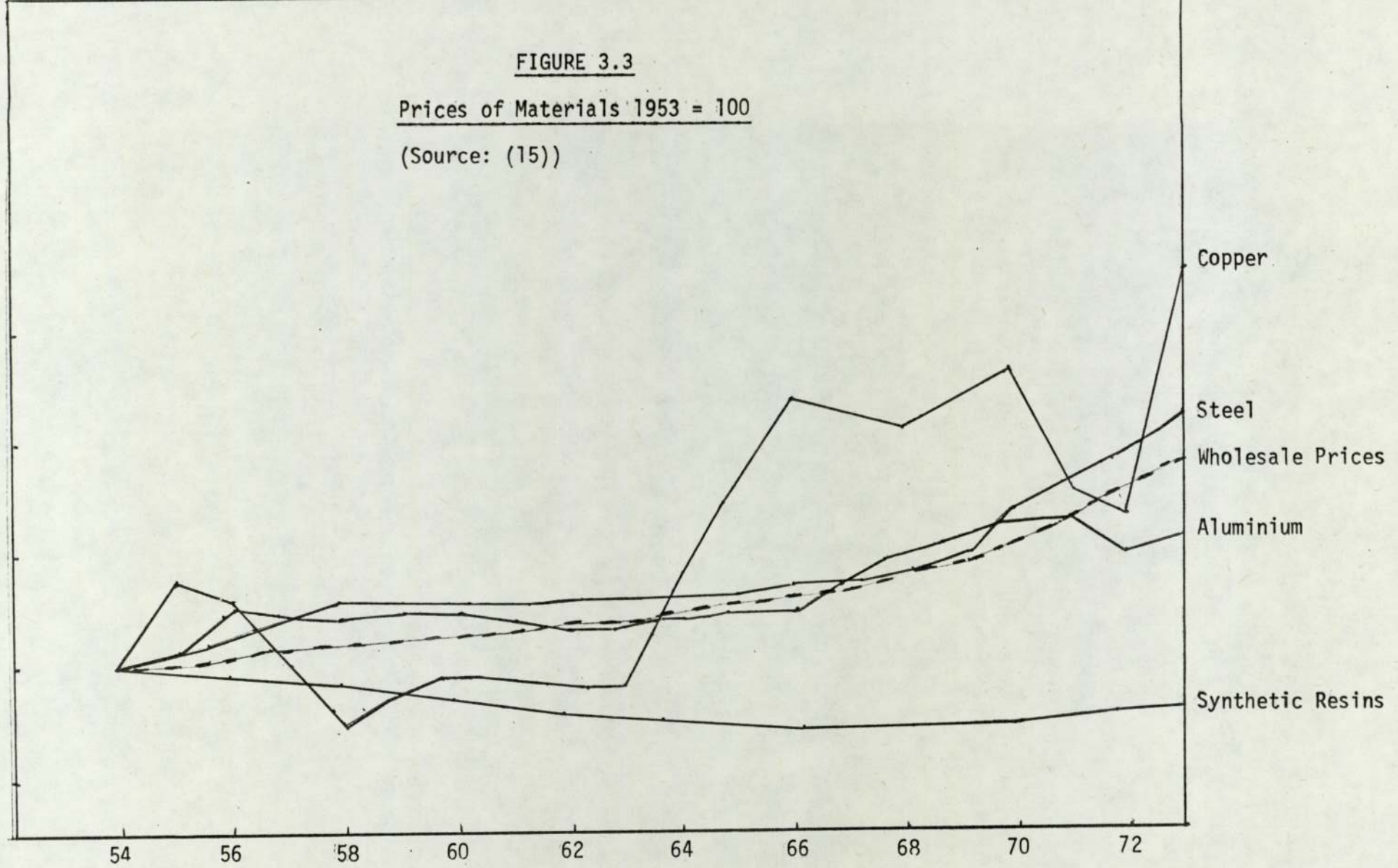


TABLE 3.4

Consumption & Specific Consumption of Primary & Secondary Aluminum in End-Uses

Units: Consumption - '000 tonnes
Specific Consumption - tonnes/£'000 output 1963 prices

	1958			1963		
	Consumption	%	Specific Consumption	Consumption	%	Specific Consumption
Transport Equipment	87.5	32.8	0.088	112.6	32.2	0.095
of which						
Motor Vehicles	33.3	(12.5)	0.067	67.2	(19.2)	0.087
Other	54.2	(20.3)	0.109	45.4	(13.0)	0.109
Mechanical Engineering	19.4	7.3	0.019	23.6	6.8	0.019
Electrical Engineering	26.1	9.8	0.037	43.1	12.3	0.045
Other Metal Goods	32.3	12.1	0.052	52.3	15.0	0.078
Construction	20.4	7.6	0.013	29.2	8.4	0.016
Packaging	25.2	9.4	n/a	27.2	7.8	n/a
Other	56.0	21.0	n/a	61.5	17.6	n/a
TOTAL	266.9			349.5		
	1968			1972		
Transport Equipment	135.3	28.0	0.105	131.8	27.0	0.089
of which						
Motor Vehicles	98.7	(20.4)	0.111	90.6	(18.6)	0.094
Other	36.6	(7.6)	0.091	40.8	(8.4)	0.107
Mechanical Engineering	27.4	5.7	0.017	25.0	5.1	0.015
Electrical Engineering	64.2	13.3	0.049	56.0	11.5	0.035
Other Metal Goods	55.8	11.5	0.074	54.0	11.1	0.075
Construction	36.3	7.5	0.016	42.2	8.6	0.019
Packaging	36.7	7.6	n/a	38.3	7.8	n/a
Other	127.6	26.4	n/a	141.1	28.9	n/a
TOTAL	483.3			488.4		

Note: The 1958 allocation of transport equipment consumption of aluminium between motor vehicles and other was done on the basis of the expanded 1954 input-output tables, (55) since 1958 census does not contain sufficiently detailed information.

Sources: (15) (18) (53) (55)

TABLE 3.5

Consumption & Specific Consumption of Refined Copper in End-Uses 1968

Unit: Consumption - 000 tonnes
Specific consumption tonnes/£'000 output 1963 prices

	Consumption	% of total	Specific Consumption
Transport Equipment	45	7.8	0.035
of which			
Motor Vehicles	24	(4.1)	0.027
Other	21	(3.7)	0.052
Mechanical Engineering	44	7.6	0.028
Electrical Engineering	269	46.5	0.205
Other Metal Goods	52	9.0	0.068
Construction	56	9.6	0.025
Other	113	19.5	n/a
TOTAL	578.7		

Sources: Chapman (28) (Percentage breakdown)
Metallgesellschaft (18) (total consumption excluding direct use of scrap)

Note: Figures for other years not available.

TABLE 3.6

Consumption & Specific Consumption of Plastics 1968

Units: Consumption - '000 tonnes
Specific consumption - tonnes/£'000 net output at 1963 prices

	Consumption	% of total	Specific Consumption
Transport Equipment	56	5	0.043
of which			
Motor Vehicles	45	(4)	0.051
Other	11	(1)	0.027
Mechanical Engineering	38	3.5	0.024
Electrical Engineering	191	17	0.146
Other Metal Goods	n/a		
Construction	266	24	0.118
Packaging	248	22	n/a
Other	326	29	n/a
TOTAL	1125		

Sources: RAPRA (Private Communication) (68)
- These figures estimated by author from data provided. Figures for other years not available.

TABLE 3.7

Output per Employee in Materials Industries

Units: tonnes/employee/year

	1954	1963	1968	1972
Crude Steel	28.1	32.8	40.1	39.7
Aluminium	2.6	3.1	3.9	7.0
Copper	6.4	4.0	4.1	3.9
Plastics	8.7	17.8	21.4	35.7

Source: Iron & Steel Annual Statistics (17)
Metallgesellschaft (18)
RAPRA (Private Communication) (68)
Report on Census of Production 1954, 1968 (11)
Business Monitor Census of Production 1972 (11)

TABLE 3.8

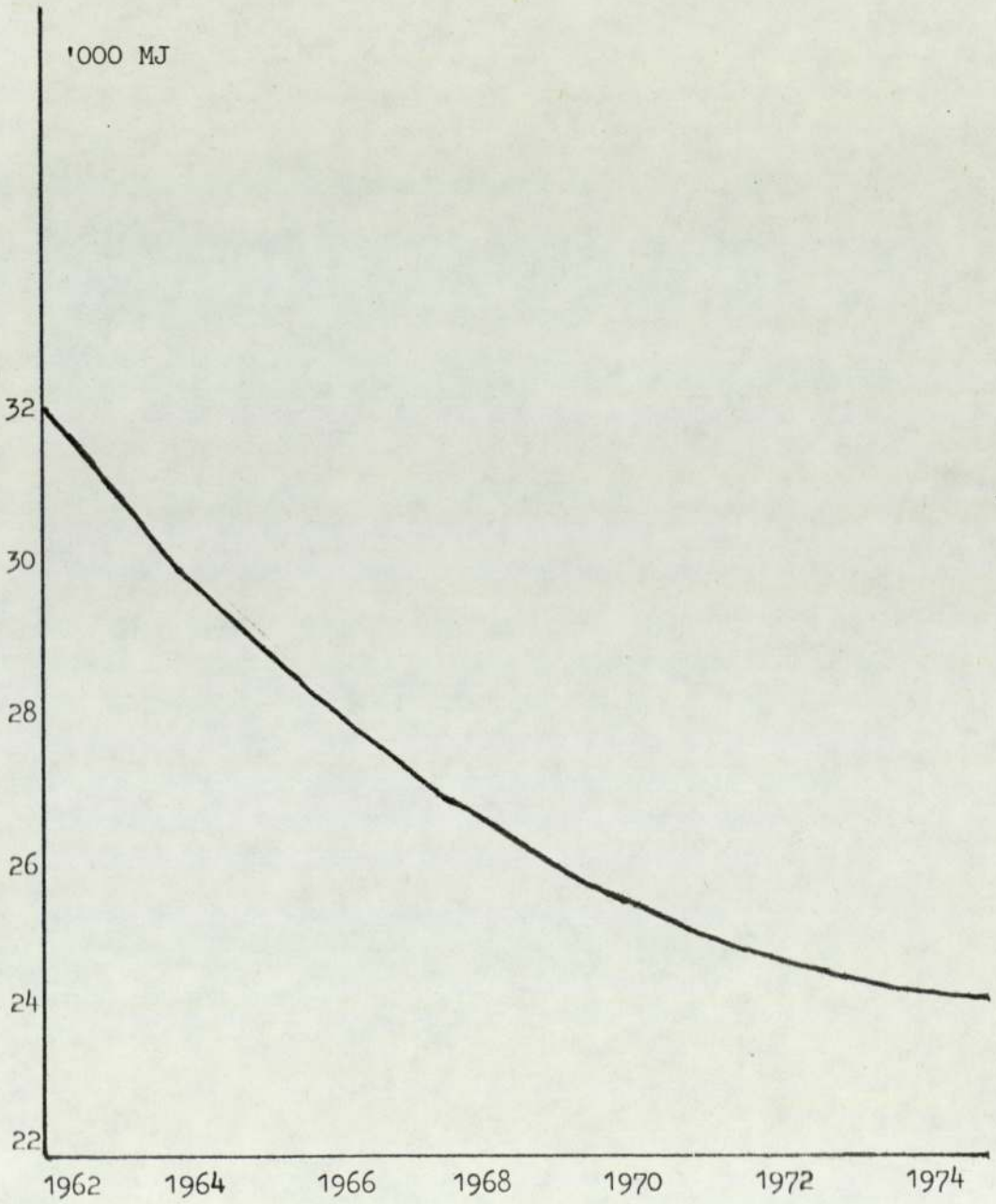
Energy Requirements for Materials Production

	KWh/ton
Finished Steel	13200
Aluminium	90000
Copper	20000
Ainc	14700
Lead	12900
Cement	2361
Glass	7200
Synthetic Rubber	19600
PVC	19270

Source: Chapman (22)

FIGURE 3.4

Energy Consumption per Tonne of Crude Steel Output in the UK



Source: (25).

TABLE 3.9

Input Costs in Aluminium Conversion, 1963

Process	Product (Price)	Cost of inputs per ton of output (dollars)	
Mining	Bauxite ($8/ton)	Mining, including explorations etc.	1.0-3.0
		Beneficiation	Nil-1.0
		Drying	0.8-1.5
		Shipping	3.0-4.5
		Local taxes, mining and shipping company profits	Balance
		Total	$8.0
Ore Refining	Alumina ($75/ton)	Bauxite	16.8
		Caustic Soda	5.1
		Steam	3.3
		Electric Power	1.0
		Fuel for calcination	2.6
		Labour, operating, maintenance and indirect costs	12.5
		Maintenance (materials and equipment)	3.0
		Capital cost:	
		Depreciation on fixed capital	11.8
		Interest on fixed capital	10.3
		Miscellaneous supplies and general expenses	9.5
		Total	$75.0
Aluminium Smelting and Refining	Primary Aluminium Ingot ($450/ton)	Alumina	150.0
		Fluorides	25.0
		Carbon	25.0
		Operating and maintenance supplies	18.0
		Power	61.0
		Labour	42.0
		Miscellaneous and general expenses	38.0
		Capital charges:	
		Depreciation	53.0
		Interest on fixed capital	38.0
		Total	$450.0
Aluminium Rolling and Drawing	Wrought Semis ($1100/ton)	Primary Aluminium	580.0
		Other non-ferrous metals	60.0
		Other Materials	110.0
		Fuel	12.0
		Wages	148.0
		Salaries	51.0
		Depreciation	90.0
		Heating, lighting and other services	28.0
		Maintenance expenditure	9.0
		Rates and insurance	12.0
		Total	$1100.0

Source: U.S. Census of Manufactures, 1963. Reproduced from (1)

TABLE 4.1

Price Indices for 1968 by Commodity Row Total

1.	Agriculture	1.073
2.	Forestry and Fishing	1.174
3.	Coal Mining	1.138
4.	Other Mining	1.079
5.	Grain Milling	1.175
6.	Other Cereals	1.156
7.	Sugar	0.959
8.	Cocoa etc.	1.176
9.	Other Food	1.142
10.	Drink	1.092
11.	Tobacco	1.221
12.	Coke Ovens	1.111
13.	Mineral Oil Refining	1.046
14.	Pharmaceuticals	1.061
15.	Paint	1.037
16.	Soaps	1.149
17.	Synthetic Resins	0.979
18.	Other Chemicals	1.054
19.	Iron and Steel	1.089
20.	Aluminium	1.256
21.	Other Non-ferrous Metals	1.807
22.	Agricultural Machinery	1.125
23.	Machine Tools	1.174
24.	Industrial Engines	1.175
25.	Textile Machinery	1.125
26.	Construction Equipment	1.182
27.	Office Machinery	1.135
28.	Other Non-Electrical Machinery	1.098
29.	Industrial Plant and Steelwork	1.241
30.	Other Mechanical Engineering	1.180
31.	Instrument Engineering	1.133
32.	Electrical Machinery	1.134
33.	Insulated Wires and Cables	1.151
34.	Electronics	1.533
35.	Other Electrical	1.200

(continued)

TABLE 4.1 - contd...

36.	Shipbuilding	1.120
37.	Motor Vehicles	1.051
38.	Aerospace	1.187
39.	Other Vehicles	1.090
40.	Engineers' Small Tools	1.111
41.	Cans and Metal Boxes	1.529
42.	Other Metal Goods	1.139
43.	Man-Made Fibres	0.880
44.	Cotton	1.169
45.	Woollen	0.960
46.	Textile Finishing	1.095
47.	Other Textiles	1.068
48.	Leather	1.160
49.	Clothing	1.162
50.	Footwear	1.127
51.	Pottery and Glass	1.085
52.	Cement	1.137
53.	Other Building Materials	1.107
54.	Furniture	1.178
55.	Timber	1.191
56.	Paper and Board	1.110
57.	Paper and Board Products	1.123
58.	Printing and Publishing	1.214
59.	Rubber	1.080
60.	Other Manufacturing	1.108
61.	Construction	1.343
62.	Gas	1.041
63.	Electricity	1.268
64.	Water Supply	1.297
65.	Rail, Road Transport	1.189
66.	Other Transport	1.221
67.	Communications	1.144
68.	Distributive Trades	1.184
69.	Miscellaneous Services	1.187

Source: Estimates derived from (10) and (51)

TABLE 4.2

Final Demand Vectors for 1963 and 1968 at 1968 Prices

	£mn. 1963	1968
1. Coal Mining	261.1	186.9
2. Other Mining and Quarrying	32.9	39.8
3. Coke Ovens	38.1	70.5
4. Mineral Oil Refining	229.6	339.1
5. Chemicals	827.4	1019.9
6. Paint	44.0	58.2
7. Synthetic Resins	68.9	122.7
8. Iron and Steel	207.2	269.1
9. Aluminium	16.5	31.9
10. Non-ferrous Metals	116.5	186.9
11. Agricultural Machinery	58.6	65.7
12. Machine Tools	157.1	190.7
13. Inudstrial Engines	78.0	72.9
14. Textile Machinery	107.1	136.2
15. Construction Equipment	290.6	400.3
16. Office Equipment	62.9	68.1
17. Other Non-Electrical Machinery	603.7	647.4
18. Industrial Plant & Steelwork	335.0	466.0
19. Other Mechanical Engineering	199.5	198.4
20. Instrument Engineering	173.2	336.1
21. Electrical Machinery	249.7	338.3
22. Insulated Wires and Cables	115.2	89.6
23. Electronics	592.0	720.9
24. Other Electrical Engineering	270.1	294.8
25. Shipbuilding	327.9	418.2

(continued)

TABLE 4.2 - contd...

		1963	1968
26.	Motor Vehicles	1522.2	1732.8
27.	Aerospace	704.4	567.1
28.	Other Vehicles	103.2	84.2
29.	Engineers' Small Tools	30.2	25.7
30.	Cans and Metal Boxes	6.4	5.0
31.	Other Metal Goods	428.0	470.8
32.	Pottery and Glass	67.9	118.1
33.	Cement	8.3	6.1
34.	Building Materials	37.9	71.7
35.	Furniture	251.7	274.4
36.	Timber	64.9	128.6
37.	Paper and Board	54.3	64.7
38.	Paper Products	79.4	115.2
39.	Rubber	85.7	139.9
40.	Other Manufacturing	208.8	304.5
41.	Construction	3874.5	4811.5
42.	Man-made Fibres	24.6	78.5
43.	Other Textiles etc.	1837.6	2009.0
44.	Gas, Electricity, Water	886.1	1185.8
45.	Road and Rail Transport	751.7	838.3
46.	Other Transport	1129.3	1543.4
47.	Distribution	4879.1	5258.4
48.	Services, Agriculture, Food etc.	9386.1	11456.3

Source: (10) and estimates derived from (51)

TABLE 4.3

Final Demand Vectors for 1954 & 1972 at 1968 Prices

£ million

	1954 Domestic and Imported	1972 Domestic
1. Energy	950	1981
2. Other Mining	11	44
3. Chemicals	521	1369
4. Textiles	1722	1806
5. Synthetic Resins	20	174
6. Iron and Steel	139	221
7. Aluminium	21	23
8. Other Non-ferrous Metals	89	143
9. Mechanical Engineering	1610	2281
10. Instrument Engineering	145	412
11. Electrical Engineering	761	1602
12. Shipbuilding	438	434
13. Motor Vehicles	753	1969
14. Aerospace	592	605
15. Other Vehicles	193	91
16. Metal Goods n.e.s.	375	489
17. Building Materials	117	240
18. Timber	51	106
19. Paper and Paper Products	169	193
20. Rubber	79	142
21. Other Manufacturing	457	639
22. Construction	2635	5211
23. Other	14465	23473

Sources: See Appendix 4.8

TABLE 4.4

Vectors of Imports 1954 & 1972 at 1968 Prices

£ million

	1954 Total Minus Complementary Intermediate Imports	1972 Total Competitive Imports
1. Energy	120	223
2. Other Mining	12	44
3. Chemicals	176	441
4. Textiles	317	415
5. Synthetic Resins	9	163
6. Iron and Steel	26	173
7. Aluminium	44	74
8. Other Non-ferrous Metals	210	244
9. Mechanical Engineering	110	176
10. Instrument Engineering	18	44
11. Electrical Engineering	25	232
12. Shipbuilding	5	14
13. Motor Vehicles	15	64
14. Aerospace	51	45
15. Other Vehicles	4	5
16. Metal Goods n.e.s.	39	601
17. Building Materials	14	58
18. Timber	21	0
19. Paper	18	22
20. Rubber	3	31
21. Other Manufacturing	14	517
22. Construction	0	0
23. Other	2972	1087

Sources: See Appendix 4.8

TABLE 4.5a

Direct and Total Requirements of Labour and Capital

Units: Man-years per £ output at 1963 prices
Capital stock employed at 1970 prices per £ output at 1963 prices

(Rank ordering in brackets)

	DIRECT				DIRECT PLUS INDIRECT					
	1963		1968		1963		1968		1972	
	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital
Synthetic Resins	0.17 (8)	1.57 (3)	0.12 (8)	1.30 (4)	0.60 (7)	4.36 (4)	0.41 (8)	3.78 (6)	0.33 (8)	3.40 (7)
Iron & Steel	0.33 (5)	2.76 (1)	0.27 (4)	2.57 (2)	0.72 (6)	5.85 (2)	0.60 (6)	6.38 (2)	0.61 (4)	6.25 (2)
Aluminium	0.34 (4)	0.84 (7)	0.30 (3)	1.03 (7)	0.76 (4)	3.07 (7)	0.77 (2)	4.32 (5)	0.62 (3)	4.13 (3)
Non-ferrous Metals	0.19 (6)	1.15 (6)	0.17 (6)	1.31 (3)	0.75 (5)	4.84 (3)	0.73 (3)	6.08 (3)	0.80 (1)	6.31 (1)
Cement	0.18 (7)	2.51 (2)	0.15 (7)	2.96 (1)	0.58 (8)	5.86 (1)	0.51 (7)	6.89 (1)	0.59 (5/6)	4.06 (4/5)
Building Materials	0.38 (1)	1.16 (5)	0.26 (5)	1.26 (6)	0.76 (3)	4.21 (5)	0.61 (5)	4.86 (4)		
Timber	0.37 (2)	0.71 (8)	0.32 (1)	0.73 (8)	0.90 (1)	2.72 (8)	0.82 (1)	2.95 (8)	0.66 (2)	2.39 (8)
Rubber	0.35 (3)	1.23 (4)	0.29 (2)	1.29 (5)	0.84 (2)	3.53 (6)	0.62 (4)	3.41 (7)	0.55 (7)	3.57 (6)

Source: Estimates derived from constructed input-output tables for 1963, 1968 and 1972 at 1963 prices.

TABLE 4.5b

Total Capital/Labour Ratios, Changes in Labour and Capital Intensiveness and Comparison with changes in Output and Price Ratios

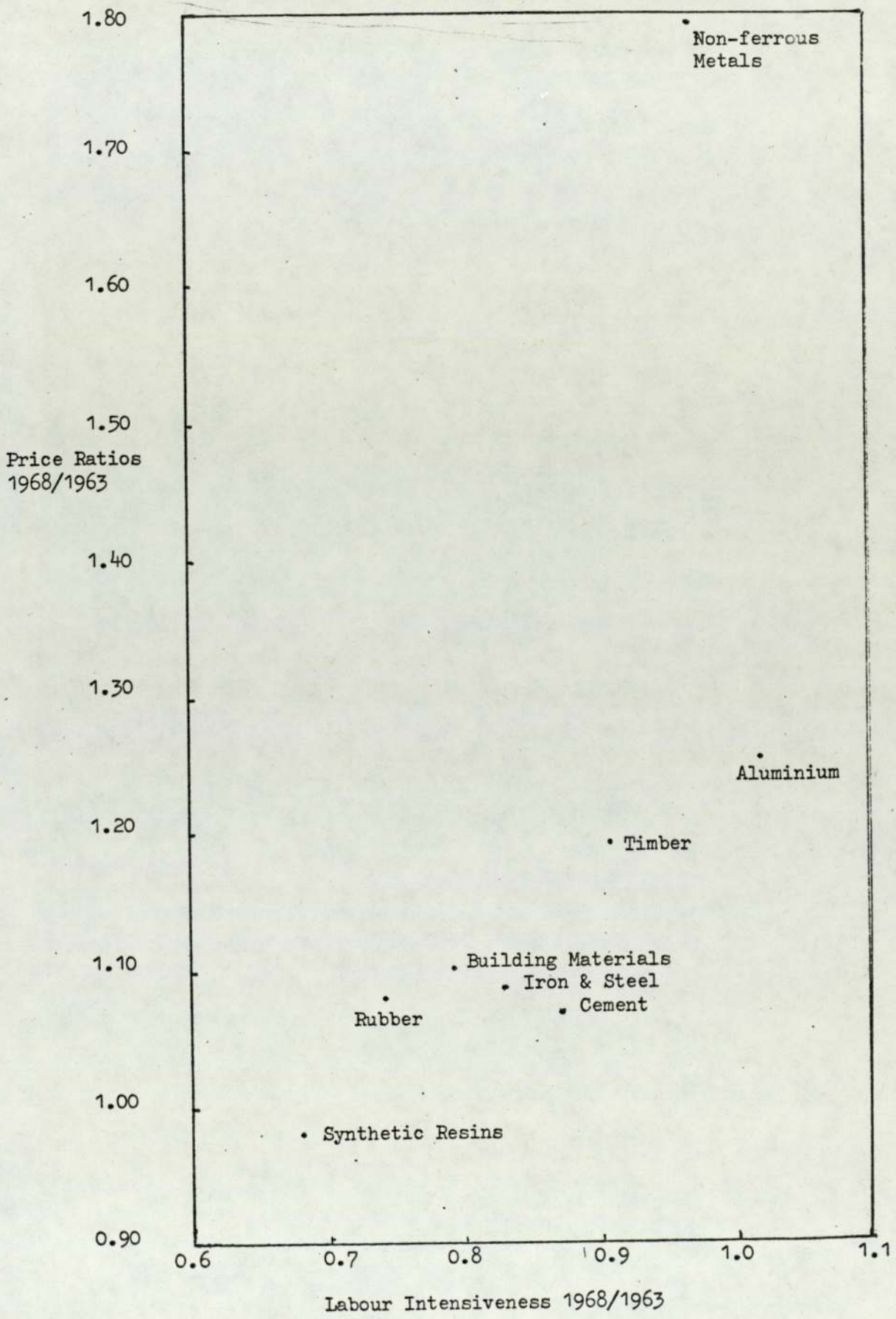
(Rank ordering in Brackets)

	Capital /Labour 1963	Capital /Labour 1968	Capital /Labour 1968/63	Labour Intensiveness 1968/63	Capital Intensiveness 1968/63	Gross Output Ratio 1968/63	Net Output Ratio 1968/63	Output Price Ratio 1968/63
	1	2	3	4	5	6	7	8
Synthetic Resins	7.23 (3)	9.22 (3)	1.28 (7)	0.68 (8)	0.87 (8)	1.98 (1)	2.23 (1)	0.979 (8)
Iron & Steel	8.07 (2)	10.63 (2)	1.32 (4)	0.84 (5)	1.09 (5)	1.13 (7)	1.06 (5)	1.089 (5)
Aluminium	4.05 (7)	5.61 (6)	1.39 (2)	1.02 (1)	1.41 (1)	1.18 (5)	0.85 (7)	1.256 (2)
Other non-ferrous Metals	6.44 (4)	8.33 (4)	1.29 (6)	0.97 (2)	1.26 (2)	1.02 (8)	0.80 (8)	1.807 (1)
Cement	10.04 (1)	13.50 (1)	1.35 (3)	0.87 (4)	1.18 (3)	1.14 (6)	1.04 (6)	1.083 (6)
Other Building Materials	5.50 (5)	8.08 (5)	1.46 (1)	0.79 (6)	1.15 (4)	1.40 (2)	1.23 (3)	1.107 (4)
Timber	3.01 (8)	3.60 (8)	1.20 (8)	0.91 (8)	1.08 (6)	1.33 (3)	1.12 (4)	1.191 (3)
Rubber	4.21 (6)	5.46 (7)	1.30 (5)	0.74 (7)	0.97 (7)	1.28 (4)	1.39 (2)	1.080 (7)

Sources: Column 1, derived from Table 4.5a
Column 3 = Column 2/Column 1
Column 6 and 7 (51)
Column 8, Table 4.1

FIGURE 4.1

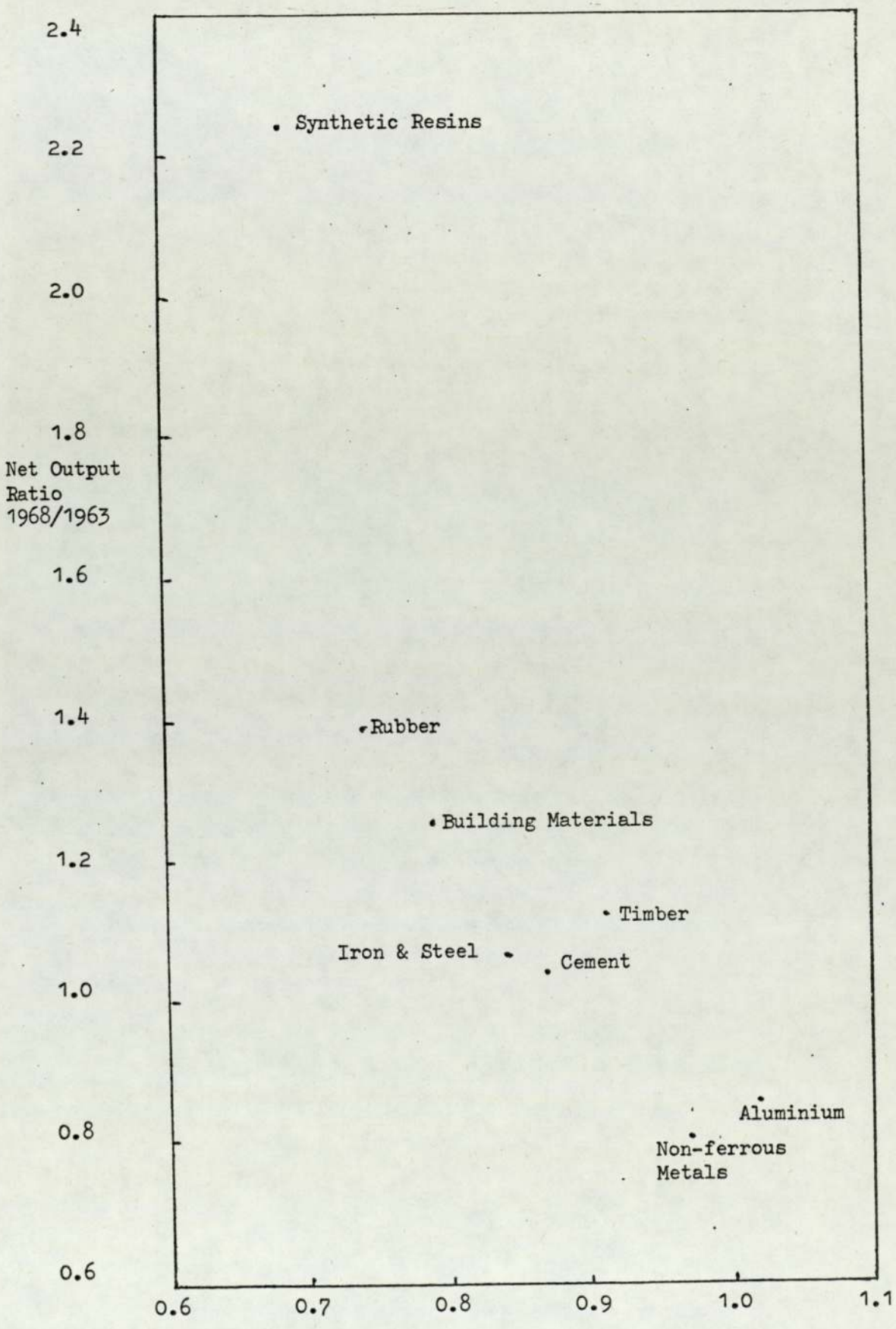
Labour Intensiveness and Price Ratios for Materials 1968/1963



Source: Table 4.5b

FIGURE 4.2

Labour Intensiveness and Net Output Ratios of Materials 1968/1963



Source: Table 4.5b

TABLE 4.6

Energy Intensiveness of Materials

Rank ordering in brackets

	Wright KWh/£	NEDO £(coal & oil)/£ Output	Estimates of Current Work £ Total Energy/£ Output		
	1963	1968	1963	1968	1972
Synthetic Resins	115.1 (4)	0.084 (4)	0.147 (4)	0.141 (4)	0.126 (6)
Iron and Steel	124.5 (3)	0.087 (3)	0.234 (2)	0.236 (2)	0.268 (1)
Aluminium	51.5 (6)	0.028 (6)	0.134 (5)	0.123 (5)	0.141 (5)
Non-ferrous Metals	50.8 (7)	0.023 (7)	0.107 (6)	0.094 (6)	0.174 (2)
Cement	146.9 (2)	0.211 (1)	0.375 (1)	0.376 (1)	0.171 (3/4)
Building Materials	317.2 (1)	0.093 (2)	0.226 (3)	0.216 (3)	
Timber	39.6 (8)	0.016 (8)	0.068 (8)	0.062 (8)	0.058 (8)
Rubber	68.5 (5)	0.042 (5)	0.090 (7)	0.086 (7)	0.079 (7)

Sources: (57), (58) and estimates from input-output tables derived.

TABLE 4.7a

Price Ratios for Raw and Processed Materials

1968/1963

(Rank Ordering in Brackets)

Material		Natural Resource	
Synthetic Resins	0.98 (7)	Crude Petroleum	1.10 (5)
Iron and Steel	1.09 (5)	Iron Ore	1.02 (6)
Aluminium	1.26 (2)	Bauxite	1.27 (3)
Non-ferrous Metals	1.81 (1)	Non-ferrous ores	1.80 (1)
Building Materials and Cement	1.11 (4)	Stone, Slate, Sand etc.	1.40 (2)
Timber	1.19 (3)	Softwood	1.25 (4)
Rubber	1.08 (6)	Natural Rubber	0.87 (7)

Sources: (53), (36), (15), and estimates based upon (51).

Note: Only the direct raw material was used, though the price of coke for steel and carbon for aluminium etc. may be thought to be equally, if not more important. In Table 4.7b all non-energy crude materials are included in the intensiveness estimate.

TABLE 4.7b

Raw Materials, Energy and Wages Coefficients of Materials, 1963

£/£ Output (direct and indirect, domestic and imported)

(Rank ordering in brackets)

	Raw Materials	Energy	Wages
Synthetic Resins	0.034 (8)	0.147 (4)	0.522 (8)
Iron and Steel	0.076 (5)	0.234 (2)	0.623 (5)
Aluminium	0.037 (7)	0.134 (5)	0.648 (3)
Other Non-ferrous metals	0.137 (2)	0.107 (6)	0.621 (6)
Cement	0.042 (6)	0.375 (1)	0.526 (7)
Building Materials	0.088 (4)	0.226 (3)	0.635 (4)
Timber	0.476 (1)	0.068 (8)	0.689 (1)
Rubber	0.092 (3)	0.090 (7)	0.653 (2)

TABLE 4.8a

Origin of Output Change - 1963 Commodity Based Estimates

£ million

MATERIAL	CHANGE IMPLIED BY — Mechanical Engineering	Electrical Engineering	Transport Equipment	Other Metal Goods	Construction	Other Engineering & Construction	Total Engineering & Construction	TOTAL PS. (Direct Coefficient) ep	INDIRECT COEFFICIENT CHANGE	FINAL DEMAND	TOTAL
Synthetic Resins	0.5	7	0.5	0	0	-6.5	1.5	66	11.5	64	141
Iron and Steel	-18.5	5	13	22.5	33.5	0	55.5	21	36	199	256
Aluminium	-0.5	2	4	0.5	-8	0	-4	-21	-11	46	14
Non-ferrous Metals	-16	-20	-15	-41.5	-8.5	-3.5	-104.5	-116	-51	102	-65
Cement	0	0	0	0	-4.5	0	-4.5	-5	0	20	15
Building Materials	-4	1	3.5	0	24.5	0.5	25.5	19.5	13	104	136.5
Timber	-4.5	-3	-7.5	0	-9	-2.5	-26.5	-40.5	-5	73.5	28
Rubber	5	1	8	0	0	3.5	17.5	5	5.5	42	52.5

TABLE 4.8b

Origin of Output Change - 1968 Commodity Based Estimates

£ million

MATERIAL — CHANGE IMPLIED BY —	Mechanical Engineering	Electrical Engineering	Transport Equipment	Other Metal Goods	Construction	Other Engineering & Construction	Total Engineering & Construction	TOTAL PS (Direct ^{ep} Coefficient)	INDIRECT COEFFICIENT CHANGE	FINAL DEMAND	TOTAL
Synthetic Resins	0	7	0	0	0	-6	1	69	19.5	53	141
Iron and Steel	-31.5	5.5	12	26.5	41	1.5	55	26	35	195.5	256.5
Aluminium	0	-0.5	4.5	0	-10	0	-6.5	-26	-12.5	53	14.5
Non-ferrous Metals	-19.5	-27.5	-18.5	-48	-10	-4	-127.5	-130	-49	113	-66
Cement	0	0	0	0	-4.5	-0.5	-5	-6	1	20	15
Building Materials	-3	2	3	0	31	1.5	34.5	24	17	95.5	136.5
Timber	-6	-1.5	-8.5	0	-10	-4.5	-30.5	-42	-20	90	28
Rubber	2	1.5	8	0	0	5.5	17	6	5	41	52

TABLE 4.8c

Origin of Output Change - 1963 Industry Based

£ million 1963 prices

	Direct Coefficients				
	Total Engineering & Construction	Total PS_{ep}	Indirect Coefficient Change	Final Demand	Total
Synthetic Resins	3	47	36	82	165
Iron and Steel	50.5	22	32	193.5	247.5
Aluminium	0.5	-15	-5	33	12
Other Non-ferrous Metals	-58	-72.5	-33	91.5	-14
Cement	-4	-4.5	1	16.5	13
Building Materials	27	37.5	5	93	135.5
Timber	-17.5	-22.5	-13.5	54.5	18
Rubber	12.5	5	8	40	53

TABLE 4.8d

Origin of Output Change - 1968 Industry Based

£ million 1968 prices

	Total Engineering and construction	Total PS_{ep}	Indirect Coefficient Change	Final Demand	Total
Synthetic Resins	2	66	34	65.5	165
Iron and Steel	50	24	33.5	190	247.5
Aluminium	-0.5	-16.5	-12.5	41	12
Other Non-ferrous Metals	-73	-84.5	-41.5	112	-14
Cement	-5.5	-5.0	0	18	13
Building Materials	34.5	42	9.5	84	135.5
Timber	-20.5	-36	-23	77	18
Rubber	13.5	9.5	9.5	34	53

Direct Materials Commodity Coefficients 1963 & 1968

£ Direct requirements/£1000 of output at 1968 prices

PURCHASING INDUSTRY	Synthetic Resins			Iron and Steel			Aluminium			Other Non-ferrous Metals		
	1963	1968	% Change	1963	1968	% Change	1963	1968	% Change	1963	1968	% Change
1. Coal Mining	0	0	-	43	44	2.3	0	0	-	0	0	-
2. Other Mining and Quarrying	0	0	-	0	0	-	0	0	-	0	0	-
3. Coke Ovens	0	0	-	0	0	-	0	0	-	0	0	-
4. Mineral Oil Refining	0	0	-	0	0	-	0	0	-	0	0	-
5. Chemicals	5	13	160.0	3	1	-	5	6	-	19	20	5.3
6. Paint	75	82	9.3	0	0	-	0	0	-	0	0	-
7. Synthetic Resins	64	160	150.0	4	0	-	0	1	-	9	4	-
8. Iron and Steel	1	1	-	19	17	10.5	2	1	-	64	45	-29.7
9. Aluminium	0	1	-	0	7	-	393	322	-18.1	47	64	36.2
10. Non-ferrous Metals	0	2	-	4	1	-	15	21	40.0	272	295	8.5
11. Agricultural Machinery	0	0	-	130	152	16.9	0	0	-	0	0	-
12. Machine Tools	0	0	-	125	105	-16.0	0	0	-	18	16	-11.1
13. Industrial Engines	0	0	-	114	112	-1.8	10	13	30.0	51	42	-17.7
14. Textile Machinery	0	0	-	76	85	11.8	9	10	11.1	8	7	-
15. Construction Equipment	0	0	-	127	122	-3.9	5	4	-	5	7	-
16. Office Equipment	0	0	-	43	29	-32.6	0	0	-	0	0	-
17. Other Non-Electrical Machinery	2	2	-	102	107	4.9	10	14	40.0	39	30	-23.1
18. Industrial Plant and Steelwork	0	0	-	177	132	-25.5	9	7	-	17	13	-23.5
19. Other Mechanical Engineering	0	0	-	108	109	0.9	21	15	-28.6	68	55	-19.1
20. Instrument Engineering	22	6	-72.7	20	26	30.0	12	12	0	27	22	-18.5
21. Electrical Machinery	8	6	-	90	97	7.8	10	9	-10.0	75	42	-44.0
22. Insulated Wires and Cables	28	42	50.0	7	6	-	19	27	42.1	407	409	0.5
23. Electronics	11	10	-9.1	13	15	15.3	9	10	11.1	28	26	-7.1
24. Other Electrical Engineering	9	18	100.0	51	53	3.9	23	20	-13.0	75	59	-21.3
25. Shipbuilding	0	0	-	104	90	-13.5	7	4	-	29	18	-37.9
26. Motor Vehicles	1	1	-	143	149	4.2	19	23	21.1	25	16	-36.0
27. Aerospace	0	0	-	30	39	30.0	26	22	-15.4	7	13	85.7
28. Other Vehicles	0	0	-	108	123	13.9	12	13	8.3	17	19	11.8
29. Engineers' Small Tools	0	0	-	89	117	31.5	0	5	-	36	27	-25.0
30. Cans and Metal Boxes	0	0	-	531	497	-6.4	13	19	46.2	27	11	-59.3
31. Other Metal Goods	3	3	-	164	181	10.4	27	26	-3.7	113	83	-26.5
32. Pottery and Glass	6	4	-	0	0	-	0	0	-	0	0	-
33. Cement	0	0	-	0	0	-	0	0	-	0	1	-
34. Building Materials	4	4	-	10	12	20.0	6	18	200.0	4	4	-
35. Furniture	15	9	-40.0	5	4	-	8	4	-	0	0	-
36. Timber	9	13	44.4	6	8	-	4	4	-	4	1	-
37. Paper and Board	3	9	-	0	0	-	0	0	-	0	0	-
38. Paper Products	19	22	15.8	3	2	-	0	0	-	0	0	-
39. Rubber	90	180	100.0	0	6	-	0	2	-	0	8	-
40. Other Manufacturing	125	180	44.0	14	6	-57.1	0	0	-	11	8	-27.3
41. Construction	0	0	0	28	36	28.6	2	0	-	9	7	-
42. Man-made Fibres	174	144	-17.2	0	0	-	0	0	-	0	0	-
43. Other Textiles etc.	5	11	120.0	1	1	0	0	0	-	0	0	-
44. Gas, Electricity, Water	0	0	-	16	10	-37.5	0	0	-	1	1	-
45. Road and Rail Transport	0	0	-	8	6	-	0	0	-	0	0	-
46. Other Transport	0	0	-	0	0	-	0	0	-	0	0	-
47. Distribution	1	0	-	0	0	-	0	0	-	0	0	-
48. Services, Agriculture, Food etc.	1	2	-	1	1	-	2	2	-	1	1	-

* for coefficients of less than 1 per 100 in both 1963 and 1968, the percentage change is not shown.

Direct Materials Industry Coefficient, 1963 & 1968

£ Direct requirements/£1000 of output at 1963 prices

PURCHASING INDUSTRY	Synthetic Resins			Iron and Steel			Aluminium			Non-ferrous Metals		
	1963	1968	% Change*	1963	1968	% Change*	1963	1968	% Change*	1963	1968	% Change*
1. Coal Mining	0	0	-	46	44	-4.3	0	0	-	0	0	-
2. Other Mining	0	0	-	2	0	-	0	0	-	0	0	-
3. Coke Ovens	0	0	-	5	0	-	0	0	-	0	0	-
4. Mineral Oil Refining	0	1	-	1	0	-	0	0	-	0	0	-
5. Chemicals	4	13	225.0	2	2	-	5	4	-	12	7	-41.6
6. Paint	71	68	-4.2	0	2	-	1	1	-	5	2	-
7. Synthetic Resins	72	84	16.7	4	0	-	0	0	-	8	3	-
8. Iron and Steel	1	2	-	20	19	-5.0	1	2	-	38	24	-36.1
9. Aluminium	0	1	-	6	7	-	288	242	-16.0	41	35	-14.6
10. Non-ferrous Metals	0	0	-	9	8	-	185	184	-0.5	309	360	16.5
11. Agricultural Machinery	0	0	-	129	158	22.5	0	0	-	0	0	-
12. Machine Tools	0	0	-	120	101	-15.2	0	0	-	10	9	-10.0
13. Industrial Engines	0	0	-	117	116	-0.9	8	11	37.5	30	27	-10.0
14. Textile Machinery	0	2	-	75	88	17.3	7	9	-	5	5	-
15. Construction Equipment	0	0	-	131	127	-3.1	4	2	-	5	3	-
16. Office Equipment	0	0	-	41	27	-34.1	0	0	-	0	0	-
17. Other Non-Electrical Machinery	1	1	-	105	107	1.9	9	12	33.3	26	18	-30.8
18. Industrial Plant and Steelwork	0	0	-	198	147	-25.8	11	5	-54.5	11	7	-37.4
19. Other Mechanical Engineering	0	3	-	115	107	-7.0	20	14	-30.0	46	37	-19.6
20. Instrument Engineering	23	14	-39.1	16	21	31.3	9	9	-	16	14	-12.5
21. Electrical Machinery	9	5	-	94	99	5.3	8	7	-	38	30	-21.1
22. Insulated Wires and Cables	34	47	38.2	14	13	-7.1	19	29	52.6	286	316	10.5
23. Electronics	11	9	-18.2	14	14	0	8	8	-	20	17	-15.0
24. Other Electrical Engineering	10	15	50.0	50	53	6.0	17	16	5.9	51	37	-27.5
25. Shipbuilding	0	1	-	94	91	-3.2	5	3	-	16	11	-31.2
26. Motor Vehicles	1	1	-	140	148	5.7	17	19	11.8	18	9	-50.0
27. Aerospace	0	2	-	42	52	23.8	30	24	-20.0	8	15	87.5
28. Other Vehicles	0	0	-	115	125	8.7	9	12	33.3	9	10	11.1
29. Engineers' Small Tools	0	0	-	108	126	16.7	1	3	-	27	18	-33.3
30. Cans and Metal Boxes	0	6	-	528	488	-7.6	11	14	27.3	16	12	-25.0
31. Other Metal Goods	4	3	-	182	202	11.0	23	24	4.3	76	54	-29.1
32. Pottery and Glass	7	5	-	1	1	-	0	0	-	0	1	-
33. Cement	0	0	-	0	0	-	0	0	-	0	0	-
34. Building Materials	4	4	-	9	11	22.2	5	12	140.0	2	2	-
35. Furniture	15	9	-40.0	6	5	-	0	3	-	0	0	-
36. Timber	9	11	22.2	8	11	37.5	3	3	-	3	0	-
37. Paper and Board	3	10	233.3	0	0	-	3	2	-	0	0	-
38. Paper Products	20	22	10.0	3	2	-	0	1	-	1	2	-
39. Rubber	106	94	-11.3	0	1	-	0	0	-	0	0	-
40. Other Manufacturing	109	173	58.7	14	6	-7.1	0	0	-	6	4	-
41. Construction	0	0	-	34	44	29.4	3	3	-	7	6	-
42. Man-made Fibres	128	118	-7.8	0	0	-	0	0	-	0	0	-
43. Other Textiles etc.	5	8	-	1	1	-	0	0	-	0	0	-
44. Gas, Electricity, Water	0	0	-	17	10	-41.2	0	0	-	1	1	-
45. Road and Rail Transport	0	0	-	9	8	-	0	0	-	0	0	-
46. Other Transport	0	0	-	0	0	-	0	0	-	0	0	-
47. Distribution	1	0	-	0	0	-	0	0	-	0	0	-
48. Services, Agriculture, Food etc.	2	2	-	1	0	-	2	2	-	1	1	-

* for coefficients of less than 1 per 100 in both 1963 and 1968, the percentage change is not shown.

TABLE 4.11

Weighted Average Direct Commodity Coefficient Change for Materials 1963-68

All purchasing commodities (excluding materials)

	No. of non-zero cells in 1963*	Weighted average change	Number Conforming to Sign	Number not Conforming to Sign	Little Change+
Synthetic Resins	19	32.2%	8	6	5
Iron & Steel	31	10.2%	8	11	12
Aluminium	21	-3.6%	9	8	4
Non-ferrous Metals	24	-18.2%	16	3	5
Building Materials	18	5.8%	7	10	1
Timber	29	-27.0%	22	2	5
Rubber	18	10.2%	6	6	6
	Engineering and Construction				
Synthetic Resins	8	5.3%	2	2	4
Iron & Steel	22	12.9%	8	5	9
Aluminium	18	-4.6%	8	7	3
Non-ferrous Metals	20	-20.2%	15	3	2
Building Materials	12	7.5%	6	5	1
Timber	17	-27.0%	12	1	4
Rubber	9	7.0%	3	2	4

* Cells for which transaction exceeded £0.5 million.
\+ Coefficients for which change was less than 10%.

TABLE 4.12

Weighted Average Direct Industry Coefficient Change for Materials, 1963-1968

All Purchasing Industries (excluding materials)

	No. of non-zero cells in 1963*	Weighted Average Change	Number Conforming to Sign	Number not Conforming to Sign	Little Change+
Synthetic Resins	19	34.8%	9	5	5
Iron & Steel	31	10.3%	6	9	16
Aluminium	21	-2.5%	9	7	5
Non-ferrous Metals	24	-22.3%	19	3	2
Building Materials	18	7.1%	6	6	6
Timber	29	-24.8%	20	4	5
Rubber	18	9.8%	5	6	7
Engineering & Construction					
Synthetic Resins	8	3.4%	2	3	3
Iron & Steel	22	13.1%	6	3	13
Aluminium	18	-3.9%	7	7	4
Non-ferrous Metals	20	-25.0%	18	2	0
Building Materials	12	7.6%	5	4	3
Timber	17	-22.1%	10	2	5
Rubber	9	8.1%	3	0	6

* Cells for which transaction exceeded £0.5 million.

+ Coefficients for which change was less than 10%.

TABLE 4.13

Changes in Intermediate Demand for Competitive Commodities, 1954-1963

Input Commodity	Percentage change in direct coefficients*	Cells with non-zero entries	
	Weighted average	Total number in row	Number conforming to sign of weighted average
1.1 Raw Meat	-20.0	2	2
1.2 Cereals	6.1	6	5
1.3 Agricultural products n.e.s.	-17.0	8	6
2. Coal	-28.6	37	37
3.4 Mining products n.e.s.	-3.2	7	3
4. Cereal products	4.7	7	3
5.1. Meat and fish products	5.0	1	1
5.4 Processed foods n.e.s.	16.3	4	2
6. Drink	-13.0	1	1
7.2 Tobacco manufactures	-31.0	1	1
8. Coke	-11.2	24	20
9. Refined mineral oil	52.4	35	31
10. Chemicals n.e.s.	11.5	38	25
11. Iron and steel	-6.9	17	11
12. Non-ferrous metals	-1.5	16	9
13. Engineering products	21.5	38	23
14. Ships etc.	-18.2	2	2
15. Motor vehicles	17.5	16	7
16. Aircraft	87.0	1	1
17. Vehicles n.e.s.	-42.0	1	1
18. Metal goods n.e.s.	-9.9	37	21
19. Textile fibres	21.0	1	1
20. Textiles n.e.s.	-20.0	27	23
21. Leather, clothing, footwear	-23.9	6	5
22. Building materials	-0.3	20	11
23. Pottery and glass	29.1	14	10
24. Timber, furniture etc.	-13.2	29	23
25.2 Paper and board	9.8	19	15
26. Paper n.e.s., printing etc.	20.9	31	19
27. Rubber products	1.6	25	8
28. Manufactures n.e.s.	54.2	24	15
29. Construction	-31.1	37	33
30. Gas	-17.0	19	15
31. Electricity	37.5	37	37
32. Water	-15.4	12	6
33. Transport and communications	1.9	38	19
34. Distribution	-4.6	38	26
35. Services n.e.s.	8.4	38	10

* Coefficients less than 1 per 1000 are excluded.

Reproduced from Table III.4 of (53)

TABLE 4.14

Substitution Indicators

Engineering Industry	Average Percentage Change*			
	Plastics+	Iron & Steel	Aluminium	Non-ferrous metals
Other Non-electrical machinery			+37%	-26%
Instrument Engineering	-56%	+32%		-15%
Electronics	+30%			-11%
Other Electrical Engineering	+19%			-24%
Motor Vehicles	+280%		+17%	-44%
Aerospace		+27%	-14%	
Engineers' Small Tools		+24%		-29%
Cans & Metal Boxes			+37%	-42%
Other Metal Goods		+11%		-28%
Construction		+29%		-19%

* Average of percentage change implied by commodity and industry table.

+ For the purposes of this table, the coefficients for the 'other manufacturing' category were added to those for 'synthetic resins' to form the 'plastics' category, since the decline in synthetic resins coefficients was often offset by an increase in 'other manufacturing' coefficients, the major proportion of which category, represents the output of plastics products.

TABLE 4.15a

Change in Intermediate Output, 1954-63

1968 Prices

	Total Change in output		Change Implied by coefficients		Change Implied by final demand	
	£	%	£	%	£	%
Synthetic Resins	185	325%	131	230%	54	95%
Iron & Steel	214	20%	-81	-8%	295	28%
Aluminium	147	94%	63	40%	84	54%
Non-ferrous Metals	122	15%	-129	-16%	251	32%
Building Materials (incl. Cement)	219	45%	31	6%	188	39%
Timber	-5	1%	-85	-21%	60	15%
Rubber	68	35%	3	2%	65	33%

TABLE 4.15b

Change in Intermediate Output, 1963-68

1968 Prices

	Total Change in output		Change Implied by coefficients		Change Implied by final demand	
	£	%	£	%	£	%
Synthetic Resins	141	58%	77	32%	64	26%
Iron & Steel	256	20%	57	5%	199	16%
Aluminium	14	5%	-32	-11%	46	15%
Non-ferrous Metals	-65	-7%	-167	-18%	102	11%
Building Materials (incl. Cement and Pottery and Glass)	188	22%	5	1%	153	22%
Timber	28	7%	-45	-11%	73	18%
Rubber	52	20%	10	4%	42	16%

TABLE 4.15c

Change in Intermediate Output, 1968-72

1968 Prices

	Total Change in output		Change Implied by coefficients		Change Implied by final demand	
	£	%	£	%	£	%
Synthetic Resins	62	16%	21	6%	41	11%
Iron & Steel	-17	-1%	-77	-5%	60	4%
Aluminium	2	1%	-30	-9%	32	10%
Non-ferrous Metals	26	3%	-39	-5%	65	8%
Building Materials (incl. Cement)	116	12%	51	6%	65	7%
Timber	29	7%	-3	-1%	32	7%
Rubber	-4	-1%	-50	-16%	46	15%

TABLE 4.16

Changes in Gross Commodity Outputs, 1954-1963

(percentages)

Commodity	Change implied by changes in final demand	Change implied by changes in intermediate	Actual change
1.1 Raw meat	57	-9	48
1.2 Cereals	26	2	28
1.3 Agricultural products n.e.s.	37	-3	34
2. Coal	11	-22	-11
3.4 Mining products n.e.s.	39	-6	33
4. Cereal products	27	-6	21
5.1 Meat and fish products	37	0	37
5.4 Processed foods n.e.s.	19	5	24
6. Drink	46	2	48
7.2 Tobacco manufactures	9	0	9
8. Coke	10	-15	-5
9. Refined mineral oil	53	43	96
10. Chemicals n.e.s.	37	12	49
11. Iron and steel	28	-15	13
12. Non-ferrous metals	25	0	25
13. Engineering products	35	9	44
14. Ships etc.	-14	-5	-19
15. Motor vehicles	89	0	89
16. Aircraft	17	1	18
17. Vehicles n.e.s.	-18	-13	-31
18. Metal goods n.e.s.	24	-8	16
19. Textile fibres	50	-10	40
20. Textiles n.e.s.	6	-20	-14
21. Leather, clothing, footwear	22	-6	16
22. Building materials	33	-1	32
23. Pottery and glass	24	10	34
24. Timber, furniture etc.	23	-18	5
25.2 Paper and goard	9	27	36
26. Paper n.e.s. printing etc.	23	15	38
27. Rubber products	28	1	29
28. Manufactures n.e.s.	20	29	49
29. Construction	44	-1	43
30. Gas	17	-10	7
31. Electricity	82	20	102
32. Water	49	-4	45
33. Transport & communications	20	0	20
34. Distribution	24	-1	23
35. Services n.e.s.	32	2	34

Reproduced from Table III.5 of (53)

TABLE 4.17

Ranking of Materials in terms of percentage Final Demand and Coefficient Impact upon Consumption

	1954-63		1963-68	
	Coefficients	Final Demand	Coefficients	Final Demand
Synthetic Resins	1	1	1	1
Iron and Steel	5	6	2	5
Aluminium	2	2	5	6
Non-Ferrous Metals	6	5	7	7
Building Materials (incl. cement)	3	3	4	2
Timber	7	7	6	3
Rubber	4	4	3	4

	1968-72		1954-72	
	Coefficients	Final Demand	Coefficients	Final Demand
Synthetic Resins	2	2	1	1
Iron and Steel	5	7	4	5
Aluminium	6	3	3	2
Non-Ferrous Metals	4	4	7	6
Building Materials (incl. cement)	1	5	2	4
Timber	3	6	6	7
Rubber	7	1	5	3

Source: From Tables 4.15 a, b and c.

TABLE 4.18

Relationship between Production Structural Change, Labour Intensiveness & Relative Price Change, 1963-1968

	Output Change due to[1] Production Structure		Labour Intensiveness[2]		Price Change[2]	
	%	Rank	%	Rank*	%	Rank*
Synthetic Resins	28%	1	-32%	1	-2%	1
Iron & Steel	2%	4	-16%	4	9%	3
Aluminium	-8%	5	+2%	7	26%	6
Non-ferrous Metals	-13%	7	-3%	6	81%	7
Building Materials (incl. Cement)	4%	2	-18%	3	10%	4
Timber	-10%	6	-9%	5	19%	5
Rubber	2%	3	-26%	2	8%	2

1 From Table 4.8a

2 From Table 4.5b

* For price ratios, materials are ranked in inverse order of increase to facilitate comparison with the structural change indicators.

TABLE 4.19a

Relationship between Coefficient Induced Change in Output and Price Changes

	1954-1963			1963-1968			1968-1972		
	Coefficient Change[1] (Rank)	Price Change[2]	Rank*	Coefficient Change[3] (Rank)	Price Change[4]	Rank*	Coefficient Change[5] (Rank)	Price Change[2]	Rank*
Synthetic Resins	1	-21%	1	1	-2%	1	2	8%	2
Iron & Steel	5	29%	7	2	9%	3	5	39%	7
Aluminium	2	16%	4	5	26%	6	6	1%	1
Non-ferrous Metals	6	6%	2	7	81%	7	4	10%	3
Building Materials (incl. Cement)	3	15%	3	4	10%	4	1	35%	6
Timber	7	27%	6	6	19%	5	3	23%	4
Rubber	4	21%	5	3	8%	2	7	33%	5

1 From Table 4.15a

2 Estimated from (53), (15), (51) & other CSO data

3 From Table 4.15b

4 From (51)

5 From Table 4.15c

* For price ratios, materials are ranked in inverse order of increase to facilitate comparison with the structural change indicators.

TABLE 4.19b

Relationship between Coefficient Induced Change in Output & Price Changes estimated by Moving Average Method

	1954-1963			1963-1968			1968-1972		
	Coefficient Change[1] (Rank)	Price Change[2] %	Rank	Coefficient Change[3] (Rank)	Price Change[2] %	Rank	Coefficient Change[4] (Rank)	Price Change[2] %	Rank
Synthetic Resins	1	-22%	1	1	-4%	1	2	17%	1
Iron & Steel	5	26%	6	2	12%	4	5	46%	6
Aluminium	2	10%	3	5	21%	6	6	18%	2
Non-ferrous Metals	6	17%	5	7	65%	7	4	33%	3
Building Materials (incl. Cement)	3	16%	4	4	11%	3	1	37%	4
Timber	7	33%	7	6	20%	5	3	54%	7
Rubber	4	6%	2	3	10%	2	7	42%	5

1 From Table 4.15a
2 Estimated from (53), (15), (51) and other CSO information.
3 From Table 4.15b
4 From Table 4.15c

* For price ratios, materials are ranked in inverse order of increase to facilitate comparison with the structural change indicators.

TABLE 4.20

Relationship between the Relative Price of Raw Materials & Processed Materials

	Raw Material Price 1954-68		Processed Material Price 1954-68	
	% Change	Rank*	% Change	Rank*
Synthetic Resins	-5%	3	-29%	1
Iron and Steel	-21%	1	39%	4
Aluminium	-4%	4	50%	5
Non-ferrous Metals	113%	7	69%	6
Building Materials (incl. Cement)	26%	6	38%	3
Timber	29%	5	52%	7
Rubber	-8%	2	26%	2

Estimated from figures given in (15), (51), (53), (110)

*Ranking in inverse order for consistency with Tables 4.18 and 4.19.

TABLE 5.1

Commodity Structure of UK Imports 1953-76 at Current Prices

Per Cent

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS TOTAL	18	16	15	18	14	14	15	13
Iron and Steel *	4	3	3	3	3	3	4	4
Non-Ferrous Metals *	7	6	6	9	6	6	6	5
Plastics	-	-	1	1	1	1	2	1
Crude Rubber	2	2	1	1	-	-	-	-
Wood, Lumber, Cork	5	4	3	3	2	3	3	2
Building Materials & Miscellaneous Minerals	1	1	1	1	1	1	1	1
OTHER MATERIALS TOTAL	19	13	11	7	5	5	5	5
Textile Fibres	12	6	5	3	2	2	1	1
Paper Pulp etc.	2	3	2	2	2	1	1	1
Others	5	4	3	2	2	2	2	2
CHEMICALS (excluding Plastics)	2	3	3	4	5	4	5	5
FUELS	9	12	11	11	11	11	20	18
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	5	5	8	15	20	21	17	20
Non-Electrical Machinery	3	3	5	8	9	10	8	10
Electrical Machinery and Appliances	-	1	2	3	5	5	4	4
Transport Equipment	2	1	1	4	6	6	4	6
OTHER MANUFACTURED COMMODITIES TOTAL	7	11	15	18	22	23	20	21
Manufactures of Leather	1	1	1	-	-	-	-	-
Manufactures of Rubber	-	-	-	-	-	-	-	-
Manufactures of Wood and Cork	1	1	1	1	1	2	1	1
Manufactures of Paper and Board	1	2	2	2	3	3	3	3
Textile, Fabrics and Articles	1	2	3	3	3	3	3	3
Non-Metallic Mineral Manufactures n.e.s.+	2	2	3	4	5	5	4	4
Manufactures of Metal n.e.s.	-	-	1	1	1	1	1	1
Other	1	2	5	6	8	8	7	8
FOOD AND BEVERAGES	39	39	34	24	21	20	16	16
OTHER	2	2	2	2	2	2	2	2
	100	100	100	100	100	100	100	100
TOTAL IMPORTS (c.i.f.) VALUE (£ Million)	3378	3832	4982	7899	11143	15852	23234	31169

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112).

TABLE 5.2

Commodity Structure of UK Imports 1953-76 At Constant Prices

(per cent)

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS TOTAL	23	20	19	18	16	16	16	16
Iron and Steel*	4	3	3	3	3	4	4	5
Non-Ferrous Metals *	12	12	10	10	7	7	7	6
Plastics	-	-	1	1	2	2	2	2
Crude Rubber	1	1	1	1	1	1	-	1
Wood, Lumber, Cork	5	3	3	3	2	2	2	2
Building Materials & Miscellaneous Minerals	1	1	1	1	1	1	1	1
OTHER MATERIALS TOTAL	13	10	9	7	5	5	5	5
Textile Fibres	7	5	4	3	2	1	1	1
Paper Pulp etc.	2	2	2	2	2	1	1	1
Others	4	3	3	2	2	2	2	2
CHEMICALS (excluding Plastics)	2	2	3	4	5	5	5	5
FUELS	6	7	9	10	10	9	8	7
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	6	7	9	16	21	23	23	24
Non-Electrical Machinery	4	4	5	8	10	11	12	12
Electrical Machinery	1	1	2	3	5	7	7	7
Transport Equipment	2	1	2	4	5	5	5	6
OTHER MANUFACTURED GOODS TOTAL	9	12	17	18	22	23	24	24
Manufactures of Leather	1	1	1	-	-	-	-	-
Manufactures of Rubber	-	-	-	-	-	-	-	-
Manufactures of Wood and Cork	1	1	1	1	1	1	1	1
Manufactures of Paper and Board	1	2	3	2	3	3	3	3
Textile Yarn and Manufactures	1	2	3	3	3	4	4	4
Non-Metallic Mineral Manufactures n.e.s.+	2	3	3	4	5	5	5	5
Manufactures of Metal n.e.s.	1	1	1	1	1	1	2	2
Other	1	2	5	6	8	9	9	9
FOOD AND BEVERAGES	40	40	32	25	20	17	17	17
OTHER	1	2	1	2	2	2	2	3
TOTAL VALUE (£ million) (1970 prices)	4251	4967	6241	8496	10488	12007	12075	12066

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112), (53), (77).

TABLE 5.3

Commodity Structure of U.K. Exports 1953-76 At Current Prices

(per cent)

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS								
TOTAL	10	11	11	12	11	11	12	10
Iron and Steel*	5	6	5	4	4	4	3	3
Non-Ferrous Metals *	3	3	3	5	4	4	5	3
Plastics	1	1	1	2	2	2	2	2
Crude Rubber	-	-	-	-	-	-	-	-
Wood, Lumber, Cork	-	-	-	-	-	-	-	-
Building Materials & Miscellaneous Minerals	1	1	1	1	1	1	1	1
OTHER MATERIALS								
TOTAL	3	3	4	2	2	2	2	2
Textile Fibres	3	2	2	1	1	1	1	1
Paper Pulp etc.	-	-	-	-	-	-	-	-
Others	-	1	1	1	1	1	1	1
CHEMICALS (excluding Plastics)	6	7	7	8	8	8	11	10
FUELS	6	4	4	3	2	3	5	5
MACHINERY AND TRANSPORT EQUIPMENT								
TOTAL	36	41	42	41	41	38	37	39
Non-Electrical Machinery	15	17	20	20	21	19	19	20
Electrical Machinery and Appliances	7	7	7	7	7	6	7	8
Transport Equipment	14	17	15	14	13	12	11	12
OTHER MANUFACTURED COMMODITES								
TOTAL	30	25	23	24	26	27	25	25
Manufactures of Leather	1	1	1	1	1	1	1	1
Manufactures of Rubber	1	1	1	1	1	1	1	1
Manufactures of Wood and Cork	-	-	-	-	-	-	-	-
Manufactures of Paper and Board	1	1	1	1	1	1	1	1
Textile Yarn, Fabrics & Articles	12	8	6	5	5	5	5	4
Non-Metallic Mineral Manufactures n.e.s. +	3	4	4	5	6	7	6	6
Manufactures of Metal n.e.s.	6	5	3	3	3	3	3	3
Other	6	6	7	8	10	9	9	9
FOOD AND BEVERAGES	6	6	6	7	7	7	6	7
UN-ALLOCATED	3	3	3	3	3	3	3	3
TOTAL EXPORTS VALUE (£ million)	2601	3251	4365	6434	9759	12505	16600	25909

* Including ores and scrap.

+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112).

TABLE 5.4

Commodity Structure of UK Exports 1953-76 At Constant Prices

(per cent)

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING AND CONSTRUCTION MATERIALS TOTAL	11	13	12	12	13	12	11	10
Iron and Steel*	4	5	5	5	4	4	3	3
Non-Ferrous Metals*	5	7	5	5	5	5	5	3
Plastics	-	1	1	2	2	2	2	2
Crude Rubber	-	-	-	-	-	-	-	-
Wood, Lumber, Cork	-	-	-	-	-	-	-	-
Building Materials and Miscellaneous Minerals	1	1	1	1	1	1	1	1
OTHER MATERIALS TOTAL	1	1	1	2	2	2	2	2
Textile Fibres	1	1	1	1	1	1	1	1
Paper Pulp, etc.	-	-	-	-	-	-	-	-
Others	-	-	-	1	1	1	1	1
CHEMICALS (excluding Plastics)	4	5	7	8	8	9	10	10
FUELS	3	2	2	2	2	2	2	2
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	40	43	43	41	39	38	38	39
Non-Electrical Machinery	21	20	21	20	20	19	20	19
Electrical Machinery	6	6	6	6	7	7	7	8
Transport Equipment	13	17	16	14	13	12	12	12
OTHER MANUFACTURED GOODS TOTAL	31	26	25	25	26	27	26	27
Manufactures of Leather	1	1	1	1	1	1	1	1
Manufactures of Rubber	1	1	1	1	1	1	1	1
Manufactures of Wood and Cork	-	-	-	-	-	-	-	-
Manufactures of Paper and Board	1	2	1	1	1	1	1	1
Textile Yarn and Manufactures	11	7	5	5	5	5	5	4
Non-Metallic Mineral Manufactures n.e.s.+	4	4	5	5	5	6	5	6
Manufactures of Metals n.e.s.	6	4	4	3	3	3	3	3
Other Manufactures	8	8	8	9	10	10	10	11
FOOD AND BEVERAGES	5	5	6	7	6	7	7	7
OTHER	4	4	3	3	3	3	4	3
TOTAL VALUE (£ million) (1970 prices)	4075	4701	5629	7099	8991	10215	10728	11260

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112), (53), (77).

TABLE 5.5

UK Trade in Materials and Other Commodities, 1976

(£ million)

	Imports	Exports	Balance
ENGINEERING AND CONSTRUCTION MATERIALS TOTAL	4102	2508	-1594
Iron and Steel*	1252	850	-402
Non-Ferrous Metals *	1432	793	-639
Plastics	463	531	+68
Crude Rubber	140	61	-79
Wood, Lumber, Cork	585	9	-576
Building Materials and Miscellaneous Minerals	230	264	+34
OTHER MATERIALS TOTAL	1468	468	-1000
Textile Fibres	438	260	-178
Paper Pulp, etc.	463	9	-454
Others	567	199	-368
CHEMICALS (excluding Plastics)	1536	2514	+978
FUELS	5645	1254	-4391
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	6386	10125	+3739
Non-Electrical Machinery	3255	5056	+1801
Electrical Machinery & Appliances	1382	2004	+622
Transport Equipment	1749	3065	+1316
OTHER MANUFACTURED GOODS TOTAL	6422	6463	+41
Manufactures of Leather	107	148	+41
Manufactures of Rubber	130	300	+170
Manufactures of Wood and Cork	290	53	-237
Manufactures of Paper & Board	826	278	-548
Textile Yarn and Manufactures	911	933	+22
Non-Metallic Mineral Manufactures n.e.s. +	1276	1572	+296
Manufactures of Metal n.e.s.	415	800	+385
Other Manufactures	2467	2379	-88
FOOD, BEVERAGES AND TOBACCO	4983	1692	-3291
OTHER	627	885	+258
TOTAL	31169	25909	-5260

* Including ores and scrap.

+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112).

TABLE 5.6a

Comparison of Engineering Materials and Products Imports and Exports, 1962

IMPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	111	1	119	1	172	1
24	Wood, Lumber, Cork	123	2	320	3	439	3
28	Metal Ores and Scrap	134	2	489	4	389	3
58	Plastic Materials	64	1	81	1	89	1
67	Iron and Steel	447	6	644	5	150	1
68	Non-Ferrous-Metals	299	4	565	5	675	5
	TOTAL	1178	16	2218	18	1915	15
7	Machinery and Transport Equipment	1417	19	1499	12	1105	9
8	Other Manufactures	336	4	590	5	577	5
	TOTAL FINISHED GOODS	1752	23	2089	17	1683	13

EXPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	13	-	17	-	23	-
24	Wood, Lumber, Cork	83	1	21	-	3	-
28	Metal Ores and Scrap	171	2	66	1	55	1
58	Plastic Materials	74	1	284	2	151	1
67	Iron and Steel	769	10	1245	9	562	5
68	Non-Ferrous-Metals	128	2	262	2	369	3
	TOTAL	1238	17	1895	14	1162	11
7	Machinery and Transport Equipment	1975	27	6127	46	4653	44
8	Other Manufactures	640	9	1076	8	703	7
	TOTAL FINISHED GOODS	2615	36	7204	54	5356	50

[1] Percentage of total exports of goods.

Source: OECD Commodity Trade Statistics, Series C.

TABLE 5.6b

Comparison of Engineering Materials and Products Imports and Exports, 1972

IMPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	135	1	158	-	119	-
24	Wood, Lumber, Cork	318	1	528	1	635	2
28	Metal Ores and Scrap	393	1	1026	3	712	3
58	Plastic Materials	515	2	639	2	359	1
67	Iron and Steel	1632	6	2136	5	631	2
68	Non-Ferrous-Metals	965	4	1541	4	1118	4
	TOTAL	3958	15	6029	15	3573	13
7	Machinery and Transport Equipment	6927	26	7653	19	5593	20
8	Other Manufactures	2365	9	4555	12	2230	8
	TOTAL FINISHED GOODS	9292	35	12207	31	7824	28

EXPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	109	-	75	-	71	-
24	Wood, Lumber, Cork	125	-	59	-	6	-
28	Metal Ores and Scrap	283	1	167	-	72	-
58	Plastic Materials	434	2	1347	3	441	2
67	Iron and Steel	1777	7	3005	7	942	4
68	Non-Ferrous-Metals	422	2	817	2	867	4
	TOTAL	3151	12	5471	12	2399	10
7	Machinery and Transport Equipment	8545	33	22309	48	10039	41
8	Other Manufactures	2486	10	4274	10	2316	10
	TOTAL FINISHED GOODS	11031	43	26583	57	12354	51

[1] See Table 5.6a.

Source: As Table 5.6a.

TABLE 5.6c

Comparison of Engineering Materials and Products Imports and Exports, 1976

IMPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	277	-	342	-	252	-
24	Wood, Lumber, Cork	665	1	847	1	1049	2
28	Metal Ores and Scrap	925	1	2256	3	1230	2
58	Plastic Materials	1276	2	1667	2	830	1
67	Iron and Steel	3242	5	3888	4	1732	3
68	Non-Ferrous-Metals	1899	3	2660	3	1864	3
	TOTAL	8283	13	11661	13	6957	12
7	Machinery and Transport Equipment	14951	23	15840	18	11459	20
8	Other Manufactures	5554	9	9774	11	4431	8
	TOTAL FINISHED GOODS	20505	32	25614	29	18890	28

EXPORTS

SITC Code		France Million $	France % of Total[1]	West Germany Million $	West Germany % of Total[1]	U.K. Million $	U.K. % of Total[1]
23	Crude Rubber	248	-	172	-	110	-
24	Wood, Lumber, Cork	229	-	301	-	16	-
28	Metal Ores and Scrap	618	1	498	-	177	-
58	Plastic Materials	1770	3	3227	3	953	2
67	Iron and Steel	3765	7	6655	7	1480	3
68	Non-Ferrous-Metals	816	1	1902	2	1296	3
	TOTAL	5852	11	12755	12		9
7	Machinery and Transport Equipment	20925	37	48527	48	18175	39
8	Other Manufactures	4643	8	8946	9	4275	9
	TOTAL FINISHED GOODS	25568	46	57473	56	22450	48

[1] As in Table 5.6a

Source: As Table 5.6a.

TABLE 5.7a

Trade Balance in Unwrought & Worked Iron and Steel for Major Producing Countries

Unwrought

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1962	- 280	701	-415	-1186	n/a	-1456
1968	- 295	1446	-502	-1852	n/a	-3384
1972	- 487	735	-919	-3532	n/a	n/a
1976	-1188	- 317	-681	-2769	n/a	5148

Worked

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1963	2730	2800	2333	-1735	-2548	4921
1968	2392	3741	2396	410	-14157	n/a
1972	2045	2196	1372	1216	-12974	19049
1976	297	3951	757	2501	-9777	n/a

Sources (76), (114), (115)

TABLE 5.7b

Trade Balance in Unwrought & Worked Aluminium Products for Major Producing Countries

Unwrought

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1962	-245	-110	+52	-90	-142	-12
1968	-335	-269	+89	-61	-458	-168
1972	-182	-262	-29	-161	-490	-316
1976	-56	-124	-102	-187	-379	-360

Worked

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1958	33	23	9	3	-13	7
1963	29	35	21	-8	22	17
1968	2	49	11	20	57	32
1972	-51	26	n/a	22	65	n/a
1976	-57	73	-11	34	n/a	n/a

Sources (76), (114), (115)

TABLE 5.7c

Trade Balance in Unwrought & Worked Copper for Main Producing Countries

Unwrought

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1962	-360	-316	-193	-259	+20	-35
1968	-350	-378	-251	-218	-375	-279
1972	-385	-461	-375	-312	-145	-278
1976	-401	-480	-354	-310	-285	-204

Worked

Th. Tonnes

	U.K.	W. Germany	France	Italy	U.S.	Japan
1958	150	73	9	8	-48	10
1963	52	46	8	-3	n/a	17
1968	63	37	5	12	-78	30
1972	73	21	17	20	-80	n/a
1976	68	87	55	17	n/a	132

Sources (76), (114), (115)

TABLE 5.8a

Imports and Exports of Metals, U.K. and W. Germany, 1962

Th. Tonnes

	U.K.		W. Germany	
	Imports	Exports	Imports	Exports
IRON AND STEEL				
Ore, Scrap	12897	1102	30444	282
Unwrought	608	318	1613	2315
Worked	494	3076		
COPPER				
Ore, Scrap	2	8	1261	15
Unwrought	536	158	431	115
Worked	4	63	20	63
NICKEL				
Ore, Scrap	56	2	4	-
Unwrought	8	20	19	1
Worked	4	6	1	5
ALUMINIUM				
Ore, Scrap	439	20	1445	95
Unwrought	255	60	118	6
Worked	22	59	12	46
LEAD				
Ore, Scrap	29	-	144	5
Unwrought	180	36	98	22
Worked	-	2	1	3
ZINC				
Ore, Scrap	188	12	133	15
Unwrought	142	7	127	25
Worked	1	7	12	7
TIN				
Ore, Scrap	50	-	8	-
Unwrought	8	10	12	2
Worked	-	1	-	-

Sources: (32), (112), (115)

TABLE 5.8b

Imports and Exports of Metals, U.K. and W. Germany, 1972

(Bilateral Trade in Brackets)

Th. Tonnes

	U.K.		W. Germany	
	Imports	Exports	Imports	Exports
IRON AND STEEL				
Ore, Scrap	17752 (3)	1091 (42)	43072 (-)	2174 (6)
Unwrought	991 (23)	504 (16)	2710 (16)	3445 (23)
Worked	2203 (269)	4249 (108)	9262 (108)	11456 (269)
COPPER				
Ore, Scrap	18 (-)	4 (0.7)	489 (0.7)	37 (-)
Unwrought	449 (24.0)	64 (16.0)	569 (16.0)	108 (24.0)
Worked	24 (3.3)	97 (2.3)	100 (2.3)	122 (3.3)
NICKEL				
Ore, Scrap	63 (0.3)	5 (0.8)	9 (0.8)	2 (0.3)
Unwrought	18 (0.4)	33 (6.8)	35 (6.8)	3 (0.4)
Worked	3 (0.8)	12 (0.9)	2 (0.9)	11 (0.8)
ALUMINIUM				
Ore, Scrap	333 (-)	3 (0.9)	2416 (0.9)	23 (-)
Unwrought	267 (2.5)	85 (13.7)	347 (13.7)	85 (2.5)
Worked	86 (5.5)	35 (2.2)	144 (2.2)	169 (5.5)
LEAD				
Ore, Scrap	32 (-)	6 (-)	218 (-)	17 (-)
Unwrought	207 (0.7)	147 (32.6)	122 (32.6)	67 (0.7)
Worked	1 (-)	2 (-)	3 (-)	7 (-)
ZINC				
Ore, Scrap	113 (1.3)	7 (-)	514 (-)	54 (1.3)
Unwrought	231 (4.8)	16 (-)	144 (4.8)	105 (4.8)
Worked	1 (0.2)	7 (0.5)	19 (0.2)	11 (0.2)
TIN				
Ore, Scrap	61 (0.3)	- (-)	7 (-)	- (-)
Unwrought	6 (-)	16 (1.6)	16 (1.6)	1 (-)
Worked	- (-)	1 (-)	- (-)	1 (-)

Sources: (36),(76),(114)

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TABLE 5.8c

Imports and Exports of Metals, United Kingdom and West Germany, 1976
(Bilateral Trade in Brackets)

	U.K.		W. Germany	
	Imports	Exports	Imports	Exports
IRON AND STEEL				
Ore, Scrap	19497 (61)	598 (120)	49226 (120)	2704 (61)
Unwrought	1551 (265)	363 (58)	2887 (58)	3204 (265)
Worked	3210 (613)	3507 (243)	9156 (243)	13107 (613)
COPPER				
Ore, Scrap	15 (0.3)	39 (16.0)	731 (16.0)	40 (0.3)
Unwrought	434 (26.0)	33 (17.0)	582 (17.0)	102 (26.0)
Worked	34 (8.0)	102 (2.8)	144 (2.8)	231 (8.0)
NICKEL				
Ore, Scrap	59 (1.0)	5 (2.2)	21 (2.2)	6 (1.0)
Unwrought	20 (0.2)	30 (8.6)	43 (8.6)	1 (0.2)
Worked	4 (1.6)	10 (1.2)	5 (1.2)	15 (1.6)
ALUMINIUM				
Ore, Scrap	18 (1.3)	7 (3.1)	4189 (3.1)	54 (1.3)
Unwrought	218 (5.1)	162 (19.1)	405 (19.1)	281 (5.1)
Worked	119 (15.0)	62 (5.9)	206 (5.9)	279 (15.0)
LEAD				
Ore, Scrap	14 (-)	21 (0.8)	214 (0.8)	29 (-)
Unwrought	252 (0.2)	104 (22.0)	110 (22.0)	72 (0.2)
Worked	1 (0.1)	2 (-)	2 (-)	9 (0.1)
ZINC				
Ore, Scrap	125 (0.8)	13 (1.6)	621 (1.6)	90 (0.8)
Unwrought	203 (7.3)	131 (0.7)	134 (0.7)	105 (7.3)
Worked	4 (2.4)	4 (-)	20 (-)	13 (2.4)
TIN				
Ore, Scrap	43 (0.9)	- (-)	10 (-)	1 (0.9)
Unwrought	8 (0.3)	10 (0.7)	16 (0.7)	2 (0.3)
Worked	- (-)	1 (0.4)	1 (0.4)	1 (-)

Source: As Table 5.8b

TABLE 5.9a

Implied Price of Metals Imports and Exports, United Kingdom, 1962, 1972, 1976

$/tonne

	1962		1972		1976	
	Imports	Exports	Imports	Exports	Imports	Exports
IRON AND STEEL						
Unwrought	126	84	152	152	304	364
Worked	148	173	218	204	393	384
COPPER						
Unwrought	665	620	1065	945	1355	1260
Worked	980	940	1750	1480	2210	1965
NICKEL						
Unwrought	305	190	300	300	435	480
Worked	-	285	-	370	610	570
ALUMINIUM						
Unwrought	510	-	565	540	890	860
Worked	910	855	1055	1215	1595	1660

Source: (76),(115)

TABLE 5.9b

Implied Price of Metals Imports and Exports, West Germany
1962, 1972 and 1976

$/tonne

	1962		1972		1976	
	Imports	Exports	Imports	Exports	Imports	Exports
IRON AND STEEL						
Unwrought	95	77	146	119	302	251
Worked	132	191	188	226	329	446
COPPER						
Unwrought	640	665	1020	1090	1325	1505
Worked	935	1045	1350	1705	1870	2220
NICKEL						
Unwrought	280	-	300	-	485	-
Worked	-	240	-	385	605	645
ALUMINIUM						
Unwrought	515	-	513	555	864	910
Worked	990	1030	960	1215	1590	1750

- Implies quantity is insufficient to estimate a price.

Source: As Table 5.9a

TABLE 5.10a

Direct and Indirect Output Requirements for Exports, United Kingdom and West Germany 1972

£ Million

	U.K.			W. Germany		
	Direct	Indirect	D/I	Direct	Indirect	D/I
Synthetic Resins	181	140	1.29	553	303	1.83
Iron and Steel	346	723	0.48	1088	1597	0.68
Aluminium	34	149	0.23	97	306	0.32
Other Non-Ferrous Metals	193	418	0.46	150	840	0.18
Building Materials	171	137	1.25	362	316	1.15
Timber	16	74	0.22	86	168	0.51
Rubber	109	95	1.15	176	210	0.84
TOTAL MATERIALS	1050	(1736)[1]	0.60	2512	(3740)[1]	0.67
Mechanical Engineering	1459	404	3.61	3845	916	4.20
Instrument Engineering	232	42	5.52	456	89	5.12
Electrical Engineering	662	347	1.91	1723	688	2.50
Shipbuilding	185	14	13.20	444	31	14.32
Motor Vehicles	1049	65	16.14	2578	145	17.78
Aerospace	314	19	16.53	53	12	4.42
Other Engineering	438	665	0.66	468	1274	0.37
Construction	0	93	0	0	209	0
TOTAL ENGINEERING AND CONSTRUCTION	4154	(1635)[1]	2.54	9567	(3364)[1]	2.84

[1] This column is not strictly additive, but the summation is made to indicate relative magnitudes.

Source: (10),(76)

TABLE 5.10b

Direct and Indirect Output Requirements for Exports, United Kingdom - West Germany Bilateral Trade, 1972

£ Million

	U.K.			W. Germany		
	Direct	Indirect	D/I[2]	Direct	Indirect	D/I[2]
Synthetic Resins	6	9	0.71	31	12	2.58
Iron and Steel	10	38	0.28	22	84	0.26
Aluminium	4	9	0.40	4	15	0.27
Other Non-Ferrous Metals	25	28	0.90	10	42	0.24
Building Materials	10	8	1.34	12	15	0.80
Timber	2	4	0.38	5	7	0.71
Rubber	6	5	1.12	6	10	0.60
TOTAL MATERIALS	63	101	0.62	90	185	0.49
Mechanical Engineering	97	24	4.02	200	50	4.00
Instrument Engineering	12	3	4.65	26	5	5.20
Electrical Engineering	50	22	2.28	119	39	3.05
Shipbuilding	11	1	11.00	123	4	29.75
Motor Vehicles	43	3	12.30	114	8	14.28
Aerospace	26	1	18.30	10	1	9.24
Other Vehicles	11	38	0.30	15	65	0.23
Construction	0	6	0	0	10	0
TOTAL ENGINEERING AND CONSTRUCTION	250	98	2.55	607	182	3.34

[1] See footnote to Table 5.10a.

[2] The figures in this column may not exactly equal the ratio of the figures in the first two columns, because of rounding.

Source: As Table 5.10a

TABLE 5.11a

Imported Commodities Absorbed Directly by Final Demand, 1972

(£ Million)

	Private Consumption	Public Authorities Current Expenditure	Gross Fixed Capital Formation	Stocks	Total
ENGINEERING AND CONSTRUCTION MATERIALS TOTAL	43	0	-	0	43
Iron and Steel	-	0	-	0	0
Aluminium	-	0	-	-	0
Other Non-Ferrous Metals	-	0	-	0	0
Synthetic Resins, etc.	-	-	-	-	-
Rubber and Rubber Products	6	-	-	-	6
Timber & Misc Wood Manufactures	22	-	-	0	22
Building Materials	15	-	-	0	15
Mining and Quarrying Products	-	-	-	-	-
ENGINEERING AND CONSTRUCTION TOTAL	552	32	947	-73	1458
Mechanical Engineering	11	4	455	0	470
Instrument Engineering	54	12	61	-	127
Electrical Engineering	169	2	169	0	340
Shipbuilding	-	-	68	0	68
Motor Vehicles	261	0	110	0	371
Aerospace	-	14	69	-	83
Other Vehicles	15	-	1	-	16
Metal Goods n.e.s.	42	-	9	-73	-22
Construction	-	-	-	-	-
OTHER COMMODITIES TOTAL	1922	114	-	-10	2026
Energy	51	9	-	-13	47
Textiles, etc.	107	-	-	0	107
Paper and Board, Packaging	33	-	-	3	36
Other	1731	105	-	0	1836
ALL COMMODITIES TOTAL	2517	146	947	-83	3527

- Zero

0 Transactions less than £0.5 and thus rounded to zero.

TABLE 5.11b

Analysis of Actual and Implicit Final Destination of All imported Commodities (final and intermediate), 1972

(per cent)

	Private Consumption	Public Authorities Current Expenditure	Gross Fixed Capital Formation	Stocks	Exports
ENGINEERING AND CONSTRUCTION MATERIALS TOTAL	30	8	31	- 1	32
Iron and Steel	22	8	35	0	35
Aluminium	26	10	25	- 1	40
Other Non-Ferrous Metals	21	10	27	- 2	44
Synthetic Resins, etc.	44	8	14	0	34
Rubber and Rubber Products	50	7	18	0	25
Timber[1]	39	6	46	0	10
Building Materials	40	7	34	1	18
Mining and Quarrying Products	24	8	26	- 2	43
ENGINEERING AND CONSTRUCTION TOTAL	38	6	44	- 2	13
Mechanical Engineering	9	3	80	0	8
Instrument Engineering	34	12	42	0	12
Electrical Engineering	40	7	40	0	13
Shipbuilding	1	8	84	0	7
Motor Vehicles	64	1	29	0	6
Aerospace	11	25	50	1	13
Other Vehicles	77	0	9	0	14
Metal Goods n.e.s.[2]	61	8	17	-11	25
Construction	-	-	-	-	-
OTHER COMMODITIES TOTAL	70	8	6	0	16
Energy	59	10	11	- 1	20
Textiles, etc.	68	4	4	- 1	25
Paper and Board, Packaging	58	10	9	1	22
Other	75	7	5	0	13
ALL COMMODITIES TOTAL	55	7	20	- 1	18

TABLE 5.11c

Analysis of Implicit Final Destination of Intermediate Imports, 1972

(£ Million)

	Private Consumption	Public Authorities Current Expenditure	Gross Fixed Capital Formation	Stocks	Exports	Total
ENGINEERING AND CONSTRUCTION MATERIALS TOTAL	446	131	517	-15	520	1599
Iron and Steel	46	17	73	0	73	209
Aluminium	25	10	24	- 1	39	97
Other Non-Ferrous Metals	79	35	98	- 9	162	365
Synthetic Resins, etc.	65	12	21	0	51	149
Rubber	16	3	8	0	11	38
Timber	124	24	186	- 1	41	374
Building Materials	18	6	28	1	15	68
Mining and Quarrying Products	73	24	79	- 5	128	299
ENGINEERING AND CONSTRUCTION TOTAL	542	152	291	4	378	1367
Mechanical Engineering	50	16	73	- 1	56	194
Instrument Engineering	8	11	16	0	22	57
Electrical Engineering	67	38	68	1	75	249
Shipbuilding	1	7	4	0	6	18
Motor Vehicles	28	4	2	1	28	83
Aerospace	15	21	2	1	18	57
Other Vehicles	2	0	1	0	3	6
Metal Goods n.e.s.	371	55	105	22	170	703
Construction	-	-	-	-	-	-
OTHER COMMODITIES TOTAL	2362	356	397	5	1016	4139
Energy	685	117	138	- 1	252	1191
Textiles, etc.	277	20	20	- 4	143	456
Paper and Board, Packaging	261	52	47	3	110	473
Other	1139	167	192	7	511	2016
ALL COMMODITIES TOTAL	3350	639	1205	- 6	1914	7102

Figures rounded to nearest £1m

TABLE 5.12

Net Trade Effects of Domestic Substitution for Imported Materials

Materials Saved £ Million

	Synthetic Resins	Iron and Steel	Aluminium
Synthetic Resins	+149.8	- 0.2	- 0.2
Iron and Steel	- 0.2	+208.8	- 0.3
Aluminium	- 0.1	- 0.3	+97.1
Other-Non-Ferrous Metals	- 0.6	- 5.1	- 3.9
Rubber	- 3.8	- 0.5	- 0.7
Ores and Scrap	- 0.8	- 12.0	- 2.0
Chemicals n.e.s.	- 18.3	- 1.4	- 0.7
Energy	- 4.6	- 10.8	- 2.3
Other	- 6.2	- 6.1	- 3.6
NET TRADE EFFECT	115.2	172.4	83.4

FIGURE 6.1

Technical Efficiency and Price Efficiency

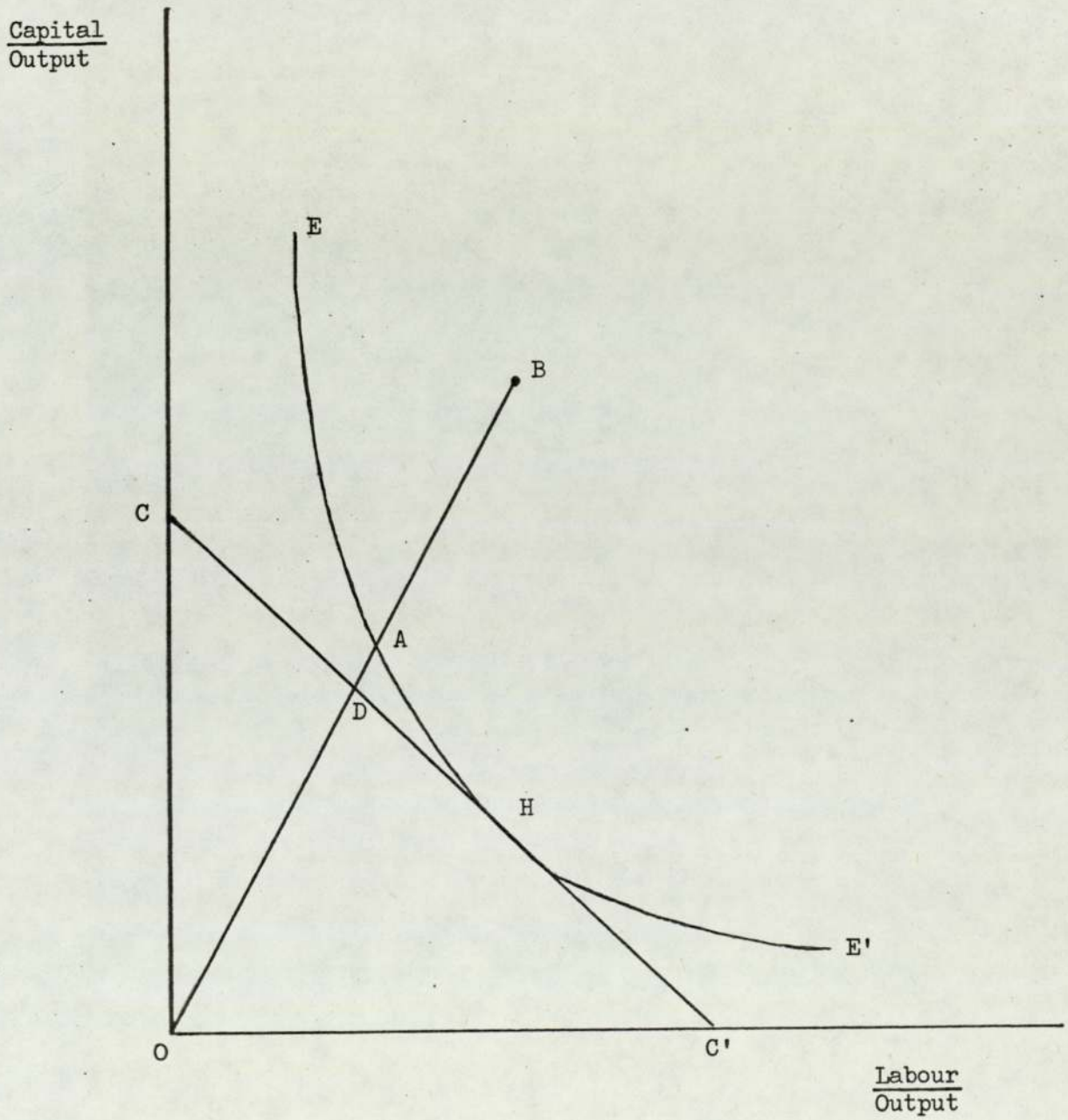

TABLE 6.1

Productivity - Example 1

Input-Output Tables

Period 0

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	5	0	0	0	5
Ind. 3	5	0	0	0	5
Net Output	10	5	5	20	
(Labour Input)	(10)	(5)	(5)		
Gross Input	20	5	5		

Period 1

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	7.5	0	0	0	7.5
Ind. 3	5	0	0	0	5
Net Output	7.5	7.5	5	20	
(Labour Input)	(7.5)	(7.5)	(5)		
Gross Input	20	7.5	5		

All output figures in period 0 prices

TABLE 6.2

Productivity - Example 2
Input-Output Tables

Period 0

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	5	0	0	0	5
Ind. 3	5	0	0	0	5
Net Output	10	5	5	20	
(Labour Input)	(10)	(5)	(5)	(20)	
Gross Input	20	5	5		

Period 1

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	7.5	0	0	0	7.5
Ind. 3	2.5	0	0	0	2.5
Net Output	10	7.5	2.5	20	
(Labour Input)	(10)	(5)	(2.5)	(17.5)	
Gross Input	20	7.5	2.5		

All output figures in period 0 prices

TABLE 6.3

Productivity - Example 3

Input-Output Tables

Period 0

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	5	0	0	0	5
Ind. 3	5	0	0	0	5
Net Output	10	5	5	20	
(Labour Input)	(10)	(5)	(5)	(20)	
Gross Input	20	5	5		

Period 1

	Ind. 1	Ind. 2	Ind. 3	Final Demand	Gross Output
Ind. 1	0	0	0	20	20
Ind. 2	5	0	0	0	5
Ind. 3	2.5	0	0	0	2.5
Net Output	12.5	5	2.5	20	
(Labour Input)	(10)	(5)	(2.5)	(17.5)	
Gross Input	20	5	2.5		

Period 1 values erroneously believed to be at period 0 prices. If accurate deflation had taken place, the period 1 situation would be as in Table 6.2.

TABLE 6.4

Employment by Industry 1963 and 1968

Man-Years

	Operatives		Administrative, Technical Clerical	
	1963	1968	1963	1968
1. Coal Mining	547.9	355.4	45.3	35.2
2. Other Mining and Quarrying	44.4	40.4	9.7	9.1
3. Coke Ovens	15.4	14.5	12.2	2.9
4. Mineral Oil Refining	19.3	15.7	17.4	8.4
5. Chemicals	212.7	193.8	125.9	123.2
6. Paint	19.2	16.3	18.9	15.9
7. Synthetic Resins	26.0	34.5	16.0	22.2
8. Iron and Steel	351.9	323.0	85.5	90.4
9. Aluminium	44.9	44.9	12.4	13.1
10. Non-ferrous Metals	59.9	53.3	19.0	19.4
11. Agricultural Machinery	15.6	15.1	5.5	6.1
12. Machine Tools	53.3	48.9	20.6	22.7
13. Industrial Engines	24.4	22.0	13.1	11.4
14. Textile Machinery	40.8	37.3	10.0	11.4
15. Construction Equipment	64.8	67.1	30.2	34.4
16. Office Equipment	21.3	19.9	8.8	10.8
17. Other Non-Electrical Machinery	187.7	200.6	87.3	107.2
18. Industrial Plant and Steelwork	85.9	97.9	45.3	55.5
19. Other Mechanical Engineering	148.7	146.3	46.5	51.5
20. Instrument Engineering	99.4	108.6	44.1	60.7
21. Electrical Machinery	144.6	106.0	74.9	61.1
22. Insulated Wires and Cables	37.3	37.3	15.6	16.6
23. Electronics	205.6	212.4	104.7	122.5
24. Other Electrical Engineering	131.7	142.6	48.5	52.3
25. Shipbuilding	170.1	148.1	32.5	38.2
26. Motor Vehicles	362.6	373.6	95.3	108.3
27. Aerospace	146.6	129.6	107.9	106.9
28. Other Vehicles	83.7	56.1	16.0	12.0
29. Engineers' Small Tools	42.4	48.6	13.0	15.5
30. Cans and Metal Boxes	24.9	24.3	5.3	4.9
31. Other Metal Goods	354.8	335.8	91.2	96.2
32. Pottery and Glass	108.0	102.4	23.5	24.9
33. Cement	10.9	10.7	3.3	3.2
34. Building Materials	126.3	118.7	29.2	30.7
35. Furniture	90.0	80.9	20.0	18.5
36. Timber	115.4	119.9	26.6	29.4
37. Paper and Board	73.3	61.7	15.0	14.3
38. Paper Products	107.3	124.4	29.1	34.2
39. Rubber	87.7	90.2	29.1	33.3
40. Other Manufacturing	136.3	157.4	35.8	43.6
41. Construction	1338.9	1231.9	237.1	256.7
42. Man-made Fibres	28.3	30.8	8.9	9.6
43. Other Textiles etc.	1088.8	943.6	161.4	161.9
44. Gas, Electricity, Water	273.0	255.0	133.1	154.0
45. Road and Rail Transport	600.0	476.0	243.0	286.0
46. Other Transport	310.0	256.0	126.0	154.0
47. Distribution	2027.0	1700.0	900.0	1132.0
48. Services, Agriculture, Food etc.	5731.0	5720.0	1428.0	1875.0

Source: (11), (53), (109).

TABLE 6.5

Gross Capital Stock by Industry 1963 and 1968

Value of Capital Stock at end of year at 1970 replacement cost

	Capital Stock	
	1963	1968
1. Coal Mining	1800.0	1800.0
2. Other Mining and Quarrying	300.0	500.0
3. Coke Ovens	566.3	588.0
4. Mineral Oil Refining	752.5	1110.3
5. Chemicals	3185.9	4063.2
6. Paint	209.5	246.1
7. Synthetic Resins	387.8	627.3
8. Iron and Steel	3624.8	4001.4
9. Aluminium	140.5	201.2
10. Non-ferrous Metals	473.5	554.7
11. Agricultural Machinery	75.2	80.7
12. Machine Tools	253.2	254.7
13. Industrial Engines	73.6	79.6
14. Textile Machinery	207.6	226.0
15. Construction Equipment	165.0	213.9
16. Office Equipment	56.2	78.3
17. Other Non-Electrical Machinery	774.6	894.7
18. Industrial Plant and Steelwork	443.1	605.3
19. Other Mechanical Engineering	645.6	729.4
20. Instrument Engineering	237.8	315.9
21. Electrical Machinery	373.7	431.7
22. Insulated Wires and Cables	227.2	236.5
23. Electronics	461.1	745.4
24. Other Electrical Engineering	246.7	333.8
25. Shipbuilding	601.0	599.0
26. Motor Vehicles	1781.9	2156.9
27. Aerospace	733.0	833.0
28. Other Vehicles	370.9	364.6
29. Engineers' Small Tools	133.3	196.1
30. Cans and Metal Boxes	127.2	187.2
31. Other Metal Goods	1329.2	1489.6
32. Pottery and Glass	282.9	388.6
33. Cement	205.6	272.2
34. Building Materials	472.9	721.3
35. Furniture	168.5	194.5
36. Timber	272.5	343.5
37. Paper and Board	429.3	448.0
38. Paper Products	701.5	1019.4
39. Rubber	410.0	546.0
40. Other Manufacturing	349.0	560.8
41. Construction	1300.0	2000.0
42. Man-made Fibres	279.6	507.5
43. Other Textiles etc.	3171.5	3440.9
44. Gas, Electricity, Water	12200.0	16600.0
45. Road and Rail Transport	9500.0	9700.0
46. Other Transport	5300.0	5600.0
47. Distribution	6500.0	9000.0
48. Services, Agriculture, Food etc.	15900.0	21200.0

Source: (12), (56).

TABLE 6.6

Gross Output by Industry 1963 and 1968 (Excluding Duplication)

£ million 1963 prices

	Gross Output	
	1963	1968
1. Coal Mining	910.3	724.0
2. Other Mining and Quarrying	184.8	219.9
3. Coke Ovens	190.1	206.3
4. Mineral Oil Refining	564.5	859.2
5. Chemicals	1617.9	2137.1
6. Paint	153.3	169.2
7. Synthetic Resins	247.3	488.7
8. Iron and Steel	1804.0	2045.6
9. Aluminium	203.1	240.4
10. Non-ferrous Metals	505.8	514.8
11. Agricultural Machinery	63.3	74.5
12. Machine Tools	168.6	198.1
13. Industrial Engines	133.9	109.2
14. Textile Machinery	118.7	143.4
15. Construction Equipment	288.0	413.6
16. Office Equipment	63.4	93.7
17. Other Non-Electrical Machinery	699.9	950.8
18. Industrial Plant and Steelwork	392.2	609.4
19. Other Mechanical Engineering	397.0	506.3
20. Instrument Engineering	268.6	434.1
21. Electrical Machinery	413.4	493.9
22. Insulated Wires and Cables	220.2	245.3
23. Electronics	657.9	925.1
24. Other Electrical Engineering	454.4	610.0
25. Shipbuilding	426.3	457.6
26. Motor Vehicles	2009.3	2420.4
27. Aerospace	572.1	549.3
28. Other Vehicles	187.3	149.5
29. Engineers' Small Tools	105.1	137.5
30. Cans and Metal Boxes	102.8	133.3
31. Other Metal Goods	1211.4	1364.3
32. Pottery and Glass	240.8	297.3
33. Cement	83.0	94.3
34. Building Materials	424.2	593.3
35. Furniture	259.4	314.5
36. Timber	408.2	541.4
37. Paper and Board	378.8	400.7
38. Paper Products	393.2	575.4
39. Rubber	344.6	439.7
40. Other Manufacturing	399.5	646.9
41. Construction	3930.5	4741.6
42. Man-made Fibres	205.8	393.0
43. Other Textiles etc.	2878.5	3222.4
44. Gas, Electricity, Water	1634.2	2068.7
45. Road and Rail Transport	1498.6	1512.6
46. Other Transport	1539.0	1957.0
47. Distribution	4688.9	4930.5
48. Services, Agriculture, Food etc.	13009.3	15608.3

Source: (51) & derived input-output tables.

TABLE 6.7

Index of Net Output, Primary Inputs and Productivity 1968

1963 = 100

Rank	ENGINEERING	OUTPUT	OPS	ADMIN TECH	CAPITAL	TOTAL PRIMARY	PROD	PARTIAL $A_1 = A_0$	PARTIAL $F_1 = F_0$
13	AGRICULTURAL MACHINERY	1.13	0.95	1.11	1.07	1.02	1.11	1.15	0.96
18	MACHINE TOOLS	1.00	0.90	1.10	0.99	0.97	1.03	1.21	0.85
20	INDUSTRIAL ENGINES	0.79	0.89	0.87	1.05	0.91	0.86	0.89	0.97
8	TEXTILE MACHINERY	1.23	0.89	1.14	1.10	0.99	1.25	1.22	1.02
4	CONSTRUCTION EQUIPMENT	1.51	1.03	1.14	1.26	1.13	1.33	1.27	1.05
6	OFFICE MACHINERY	1.42	0.94	1.23	1.33	1.11	1.28	1.33	0.96
11	OTHER NON-ELECTRICAL MACHINERY	1.29	1.00	1.23	1.16	1.13	1.14	1.20	0.95
2	INDUSTRIAL PLANS AND STEELWORK	1.86	1.12	1.22	1.40	1.21	1.54	1.29	1.20
10	OTHER MECHANICAL ENGINEERING	1.22	0.96	1.11	1.13	1.04	1.17	1.23	0.95
9	INSTRUMENT ENGINEERING	1.46	1.07	1.38	1.36	1.23	1.19	1.31	0.91
1	ELECTRICAL MACHINERY	1.30	0.71	0.82	1.20	0.84	1.56	1.43	1.09
15	INSULATED WIRES AND CABLES	1.11	0.96	1.06	1.07	1.02	1.08	1.09	0.99
16	ELECTRONICS AND TELECOMMUNICATIONS	1.33	1.00	1.17	1.65	1.24	1.08	1.14	0.95
3	DOMESTIC AND OTHER ELECTRONICAL GOODS	1.53	1.06	1.08	1.35	1.15	1.34	1.17	1.14
7	SHIPBUILDING	1.18	0.86	1.17	0.99	0.93	1.27	1.16	1.10
17	MOTOR VEHICLES	1.15	0.99	1.14	1.22	1.08	1.06	1.11	0.95
21	AEROSPACE	0.64	0.86	0.99	1.10	0.94	0.69	1.02	0.66
14	OTHER VEHICLES	0.76	0.66	0.75	0.99	0.69	1.10	1.15	0.95
12	ENGINEERS' SMALL TOOLS	1.40	1.14	1.19	1.48	1.24	1.13	1.06	1.07
5	CANS AND METAL BOXES	1.42	0.97	0.92	1.48	1.11	1.29	1.17	1.10
19	OTHER METAL GOODS	1.02	0.91	1.05	1.12	1.00	1.02	1.12	0.91
	TOTAL ENGINEERING	1.20	0.94	1.10	1.19	1.06	1.13	1.16	0.97

TABLE 6.7 (Continued)

Rank		NET OUTPUT	OPS	ADMIN TECH	CAPITAL	TOTAL PRIMARY	PROD	PARTIAL $A_1 = A_2$	$F_1 = F_2$
	MATERIALS								
1	Synthetic Resins	2.23	1.29	1.39	1.62	1.48	1.50	1.33	1.28
4	Iron and Steel	1.06	0.91	1.06	1.10	0.99	1.07	1.15	0.93
8	Aluminium	0.85	0.97	1.06	1.38	1.10	0.77	1.07	0.72
7	Other Non-Ferrous Metals	0.80	0.87	1.02	1.16	0.99	0.81	1.03	0.79
3	Building Materials n.e.s	1.23	0.92	1.05	1.52	1.12	1.10	1.25	0.88
6	Cement	1.04	0.88	0.97	1.35	1.14	0.91	0.99	0.92
5	Timber	1.12	1.02	1.10	1.26	1.10	1.02	1.20	0.85
2	Rubber	1.39	1.00	1.14	1.31	1.12	1.23	1.13	1.09
	TOTAL MATERIALS	1.14	0.96	1.09	1.21	1.07	1.06	1.15	0.93
	OTHER INDUSTRIES								
	Construction	1.12	0.89	1.08	1.54	1.07	1.05	1.13	0.93
	Mineral Oil Regining	1.48	0.79	0.93	1.46	1.06	1.40	1.43	0.98
	Chemicals n.e.s	1.24	0.89	0.98	1.26	1.09	1.14	1.21	0.94
	Paper	1.12	0.82	0.95	1.05	0.92	1.22	1.15	1.06
	Textiles	1.12	0.85	1.00	1.09	0.93	1.24	1.21	1.00
	Other Manufacturing	1.77	1.14	1.22	1.61	1.30	1.36	1.25	1.09
	Road and Rail Transport	1.03	0.80	1.18	1.02	0.95	1.08	1.06	1.02
	Distribution	1.13	0.82	1.26	1.38	1.15	0.99	0.92	1.08
	TOTAL ALL INDUSTRIES	1.18	0.91	1.19	1.24	1.08	1.09	1.11	0.98

TABLE 6.8

Index of Gross Output, Direct Plus Indirect Primary Inputs, and 'Total' Productivity

Rank		NET OUTPUT	OPS	ADMIN TECH	CAPITAL	TOTAL PRIMARY	PROD	PARTIAL $A_i = A_o$	$F_i = F_o$
14	AGRICULTURAL MACHINERY	1.14	0.93	1.12	1.15	1.04	1.09	1.14	0.96
18	MACHINE TOOLS	1.15	0.98	1.21	1.18	1.09	1.06	1.20	0.88
20	INDUSTRIAL ENGINES	0.80	0.78	0.86	0.95	0.84	0.96	1.00	0.96
7	TEXTILE MACHINERY	1.19	0.90	1.14	1.15	1.01	1.18	1.18	0.99
4	CONSTRUCTION EQUIPMENT	1.41	1.03	1.21	1.34	1.17	1.20	1.19	1.01
6	OFFICE MACHINERY	1.69	1.20	1.49	1.75	1.41	1.19	1.29	0.94
11	OTHER NON-ELECTRICAL MACHINERY	1.26	1.01	1.22	1.24	1.13	1.12	1.14	0.98
2	INDUSTRIAL PLANT & STEELWORK	1.60	1.11	1.27	1.45	1.24	1.30	1.20	1.07
10	OTHER MECHANICAL ENG.	1.25	0.98	1.19	1.26	1.10	1.14	1.20	0.95
8	INSTRUMENT ENGINEERING	1.50	1.11	1.43	1.47	1.30	1.15	1.21	0.96
1	ELECTRICAL MACHINERY	1.20	0.76	0.87	1.17	0.89	1.35	1.28	1.04
17	INSULATED WIRES & CABLES	1.07	0.89	1.06	1.11	1.00	1.07	1.09	0.97
15	ELECTRONICS & TELECOMMUNICATION	1.20	0.91	1.10	1.39	1.10	1.09	1.06	1.02
3	OTHER ELECTRICAL GOODS	1.31	0.96	1.08	1.26	1.08	1.22	1.13	1.07
4	SHIPBUILDING	1.10	0.83	1.09	1.00	0.91	1.20	1.16	1.03
16	MOTOR VEHICLE	1.11	0.92	1.08	1.18	1.03	1.08	1.09	0.99
21	AEROSPACE	0.77	0.86	1.01	1.19	0.97	0.79	0.93	0.84
13	OTHER VEHICLES	0.77	0.65	0.74	0.86	0.70	1.10	1.11	0.98
12	ENGINEERS' SMALL TOOLS	1.32	1.07	1.17	1.38	1.18	1.12	1.06	1.05
9	CANS & METAL BOXES	1.25	0.93	1.09	1.34	1.09	1.15	1.14	1.00
19	OTHER METAL GOODS	1.06	0.90	1.08	1.56	1.01	1.04	1.11	0.94
	TOTAL ENGINEERING	1.17	0.92	1.10	1.23	1.05	1.11	1.13	0.98

TABLE 6.8 (Continued)

Rank		NET OUTPUT	OPS	ATC	CAPITAL	TOTAL PRIMARY	PROD	PARTIAL $A_i = A_o$	$F_i = F_o$
	MATERIALS								
1	Synthetic Resins	1.89	1.20	1.42	1.63	1.44	1.31	1.18	1.09
4	Iron & Steel	1.12	0.90	1.14	1.22	1.04	1.08	1.15	0.94
8	Aluminium	1.01	0.99	1.18	1.43	1.16	0.88	1.06	0.82
7	Non-Ferrous Metals	0.96	0.85	1.11	1.19	1.01	0.94	1.06	0.90
6	Cement	1.14	0.92	1.14	1.33	1.13	1.01	1.04	0.97
3	Building Materials n.e.s.	1.35	1.01	1.32	1.56	1.24	1.09	1.16	0.94
5	Timber	1.12	0.97	1.12	1.23	1.08	1.04	1.11	0.94
2	Rubber	1.24	0.90	1.07	1.20	1.03	1.19	1.12	1.06
	TOTAL MATERIALS	1.22	0.94	1.14	1.30	1.09	1.12	1.12	0.99
	OTHER INDUSTRIES								
	Construction	1.18	0.92	1.15	1.46	1.10	1.07	1.13	0.95
	Mineral Oil Refining	1.73	1.18	1.55	1.77	1.47	1.17	1.23	0.96
	Chemicals	1.19	0.86	1.04	1.25	1.06	1.12	1.12	0.99
	Paper	1.00	0.74	0.92	0.99	0.86	1.16	1.11	1.03
	Textiles	1.10	0.82	0.99	1.12	0.94	1.18	1.15	1.02
	Other Manufacturing	1.61	1.07	1.25	1.55	1.27	1.27	1.18	1.06
	Road and Rail Transport	0.96	0.74	1.09	0.97	0.88	1.09	1.06	1.02
	Distribution	1.08	0.78	1.19	1.30	1.07	1.01	0.96	1.06
	TOTAL ALL INDUSTRIES	1.16	0.89	1.16	1.28	1.07	1.08	1.12	0.99

TABLE 6.9

Comparison of S.N.A. & Gross Output 'Intensiveness' Index

	1 'Intensiveness' Index	(Rank)	2 S.N.A.	(Rank)
Agricultural Machinery	1.09	14	1.02	11
Machine Tools	1.06	18	1.00	13
Industrial Engines	0.96	20	0.92	21
Textile Machinery	1.18	7	1.09	7
Construction Equipment	1.20	5	1.11	5
Office Machinery	1.19	6	1.28	1
Other Non-electrical Machines	1.12	11	0.99	14
Industrial Plant & Steelwork	1.30	2	1.24	3
Other Mechanical Engineering	1.14	10	1.06	9
Instrument Engineering	1.15	8	1.01	12
Electrical Machinery	1.35	1	1.24	2
Insulated Wires & Cables	1.07	17	0.99	15
Electronics	1.09	15	0.88	20
Other Electrical Engineering	1.22	3	1.11	6
Shipbuilding	1.20	4	1.14	4
Motor Vehicles	1.08	16	0.94	18
Aerospace	0.79	21	0.69	21
Other Vehicles	1.10	13	0.98	16
Engineers' Small Tools	1.12	12	1.09	8
Cans & Metal Boxes	1.15	9	1.03	10
Other Metal Goods	1.04	19	0.95	17

Sources: Column 1 from Table 6.8
Column 2 is the first column of Table 6.8 divided by an index of inputs, combining intermediate inputs with primary inputs using base year weights.

TABLE 6.10

Dependence of SNA Index upon intermediate input proportion of gross input

	'Intensiveness' Productivity Index / SNA Productivity Index	Intermediate proportion of gross input 1968/1963
Agricultural Machinery	1.07	1.05
Machine Tools	1.06	1.19
Industrial Engines	1.04	1.03
Textile Machinery	1.08	1.00
Construction Equipment	1.08	0.98
Office Machinery	0.93	0.93
Other Non-Electrical Machinery	1.13	1.13
Industrial Plant & Steelwork	1.05	0.84
Other Mechanical Engineering	1.07	1.08
Instrument Engineering	1.13	1.20
Electrical Machinery	1.08	0.91
Insulated Wires & Cables	1.09	1.04
Electronics	1.24	1.23
Other Electrical Engineering	1.10	0.92
Shipbuilding	1.05	0.91
Motor Vehicles	1.15	1.10
Aerospace	1.15	1.69
Other Vehicles	1.11	1.12
Engineers' Small Tools	1.03	0.90
Cans & Metal Boxes	1.12	1.00
Other Metal Goods	1.09	1.12

Note: Simple correlation coefficient: 0.56

Source: Tables 6.8, 6.9 and derived input-output tables.

TABLE 6.11

Contribution of Materials Industries to Gross Output of Engineering Industries, 1963

1963 Gross Output = 100

	Synthetic Resins	Iron & Steel	Aluminium	Non-ferrous Metals	Building Materials (inc. cement)	Timber	Rubber	Principal Industry
Agricultural Machinery	0.2	8.4	0.4	0.6	0.4	0.4	0.9	49.7
Machine Tools	0.1	7.1	0.3	0.6	0.3	0.3	0.2	65.9
Industrial Engines	0.2	7.7	0.6	1.3	2.2	0.4	0.3	53.9
Textile Machinery	0.2	5.6	0.6	0.6	0.3	0.7	0.3	54.9
Construction Equipment	0.2	8.7	0.4	0.7	0.4	0.3	1.0	50.8
Office Machinery	0.3	3.5	0.7	0.4	0.2	0.4	0.2	68.0
Other Non-Electrical Machinery	0.2	6.6	0.6	1.1	0.4	0.4	0.4	58.4
Industrial Plant & Steelwork	0.2	10.9	0.7	0.7	1.2	0.5	0.3	47.6
Other Mechanical Engineering	0.2	6.4	1.0	1.5	0.7	0.2	0.5	66.2
Instrument Engineering	0.8	1.4	0.5	0.6	0.2	0.5	0.4	70.3
Electrical Machinery	0.6	5.8	0.6	1.2	0.7	0.3	0.2	59.9
Insulated Wires & Cables	2.1	3.0	1.5	5.5	0.7	0.5	0.8	43.3
Electronics	0.7	1.7	0.5	0.8	0.4	0.4	0.2	59.5
Other Electrical Engieering	0.7	3.8	1.1	1.4	0.5	0.4	0.7	49.1
Shipbuilding	0.2	6.3	0.5	0.9	0.4	0.7	0.2	58.6
Motor Vehicles	0.4	8.7	1.0	1.0	0.4	0.5	2.1	49.2
Aerospace	0.2	3.3	1.6	0.6	0.2	0.2	0.3	69.1
Other Vehicles	0.2	7.7	0.7	0.7	0.5	0.5	0.9	55.1
Engineers' Small Tools	0.1	5.9	0.2	1.0	0.4	0.2	0.2	69.1
Cans and Metal Boxes	0.2	27.8	0.7	1.1	0.8	0.2	0.4	33.3
Other Metal Goods	0.3	10.1	1.2	2.3	0.4	0.2	0.2	55.8

TABLE 6.12a

Contribution of Materials Industries to Gross Output of Engineering Industries, 1968

1963 Gross Output = 100

	Synthetic Resins	Iron & Steel	Aluminium	Non-ferrous Metals	Building Materials (inc. cement)	Timber	Rubber	Principal Industry
Agricultural Machinery	0.5	10.0	0.3	0.5	0.5	0.3	1.1	56.4
Machine Tools	0.2	7.2	0.3	0.6	0.3	0.2	0.5	65.9
Industrial Engines	0.2	5.5	0.5	0.7	0.6	0.3	0.3	42.3
Textile Machinery	0.4	6.8	0.6	0.5	0.5	0.6	0.6	67.7
Construction Equipment	0.3	10.3	0.4	0.4	0.4	0.3	1.3	76.7
Office Machinery	0.7	5.6	0.8	0.7	0.5	0.5	0.5	96.5
Other Non-Electrical Machinery	0.4	7.7	0.8	0.8	0.5	0.4	0.9	75.2
Industrial Plant & Steelwork	0.3	11.5	0.5	0.5	2.1	0.6	0.5	89.0
Other Mechanical Engineering	0.4	7.0	0.7	1.2	0.6	0.2	0.5	80.7
Instrument Engineering	0.7	2.4	0.6	0.6	0.3	0.1	0.7	107.9
Electrical Machinery	0.6	6.4	0.5	0.8	0.7	0.2	0.4	78.1
Insulated Wires & Cables	3.6	3.0	1.7	5.1	0.7	0.4	0.9	48.0
Electronics	1.1	2.0	0.5	0.6	0.4	0.4	0.4	79.2
Other Electrical Engineering	1.6	4.6	0.9	1.0	08	0.4	1.2	74.9
Shipbuilding	0.3	5.7	0.2	0.5	0.3	0.4	0.3	69.2
Motor Vehicles	0.8	9.0	0.9	0.6	0.4	0.4	2.8	56.4
Aerospace	0.4	2.7	0.8	0.5	0.3	0.2	0.5	43.9
Other Vehicles	0.3	5.6	0.5	0.4	0.3	0.4	0.8	41.9
Engineers' Small Tools	0.1	7.5	0.3	0.4	0.5	0.1	0.3	97.3
Cans and Metal Boxes	0.7	28.9	0.7	0.6	0.9	0.1	0.5	47.5
Other Metal Goods	0.5	10.7	1.1	1.4	0.4	0.3	0.6	57.6

TABLE 6.12b

Contribution of Materials Industries to Gross Input of Engineering Industries, 1968

1963 Gross Output = 100

	Synthetic Resins	Iron & Steel	Aluminium	Non-ferrous Metals	Building Materials (inc. cement)	Timber	Rubber	Principal Industry
Agricultural Machinery	0.3	9.4	0.4	0.5	0.4	0.4	0.9	50.9
Machine Tools	0.2	6.8	0.4	0.7	0.3	0.2	0.2	63.9
Industrial Engines	0.1	5.2	0.7	0.9	0.3	0.3	0.2	49.1
Textile Machinery	0.3	6.3	0.7	0.6	0.6	0.6	0.4	54.0
Construction Equipment	0.2	9.6	0.5	0.6	0.5	0.3	1.1	57.0
Office Machinery	0.4	5.2	1.1	0.8	0.4	0.6	0.4	75.2
Other Non-Electrical Machinery	0.2	7.2	0.9	1.0	0.4	0.3	0.7	66.0
Industrial Plant & Steelwork	0.2	10.8	0.6	0.6	1.9	0.6	0.4	57.8
Other Mechanical Engineering	0.3	6.6	1.0	1.5	0.6	0.2	0.4	68.6
Instrument Engineering	0.5	2.2	0.8	0.8	0.3	0.1	0.6	86.8
Electrical Machinery	0.4	6.0	0.6	1.1	0.6	0.3	0.3	50.1
Insulated Wires & Cables	2.4	2.8	2.2	6.4	0.7	0.4	0.7	44.3
Electronics	0.7	2.0	0.7	0.7	0.3	0.3	0.3	73.3
Other Electrical Engineering	1.1	4.3	1.3	1.3	0.8	0.3	1.0	56.4
Shipbuilding	0.2	5.4	0.4	0.6	0.3	0.5	0.3	54.1
Motor Vehicles	0.5	8.4	1.2	0.6	0.4	0.4	2.3	53.2
Aerospace	0.3	2.5	1.1	0.6	0.3	0.2	0.5	66.9
Other Vehicles	0.2	5.2	0.6	0.5	0.4	0.6	0.9	38.1
Engineers' Small Tools	0.1	7.1	0.2	0.5	0.5	0.1	0.2	85.7
Cans and Metal Boxes	0.5	27.1	1.0	0.8	1.0	0.2	0.4	37.0
Other Metal Goods	0.3	10.0	1.4	1.7	0.4	0.3	0.5	56.1

TABLE 6.13

Index of Materials' Contribution to Industry Productivity 1963-68

1963 = 100

Industry	Index	Rank
Agricultural Machinery	100.9	4
Machine Tools	100.4	10
Industrial Engines	100.2	14
Textile Machinery	100.7	6
Construction Equipment	100.6	7
Office Machinery	100.4	13
Other Non-Electrical Machinery	100.8	5
Industrial Plant & Steelwork	100.9	3
Other Mechanical Engineering	100.0	16
Instrument Engineering	100.2	15
Electrical Machinery	100.0	17
Insulated Wires & Cables	99.8	21
Electronics	100.4	11
Other Electrical Engineering	100.4	12
Shipbuilding	100.0	18
Motor Vehicles	101.1	2
Aerospace	99.9	19
Other Vehicles	99.9	20
Engineers' Small Tools	100.5	8
Cans and Metal Boxes	101.4	1
Other Metal Goods	100.4	9

Glossary of Terms

Adaptive Structural Change - The process whereby industries alter their input mix as a result of changing relative efficiency in the production of those inputs, usually reflected in changing relative prices.

Comparative Advantage - Where a nation has a cost advantage in one product relative to another with respect to its trade with another country. It is possible for one country to have an absolute advantage in both product A and product B, but the other country must, by definition have a comparative advantage in one or the other.

Competitive and Complementary Imports - Competitive imports are those which compete with domestic products. For complementary imports there is no (or very small) domestic counterpart.

Complementary Inputs - Those which are jointly required in a production process, e.g. Labour and capital, iron and coke, etc.

Deflator - Price relative used to revalue the output of a product to the prices of a different year.

Elasticity - The price elasticity of demand is the percentage change in consumption resulting from a one percent change in price (ceteris paribus).

Externality - Where the social cost of an activity exceeds its economic cost e.g. A production process which pollutes the atmosphere.

Factors of Production - The inputs to the economic system which share the returns of economic activity - usually labour and capital.

Final Demand - Consumption of goods by domestic or foreign consumers, government or firms' capital account. In social accounting terms, goods which go to final demand are those which are not further processed within the domestic economy.

Inertia Factor - The rationale for the simultaneous existence of different technologies using different input mix to produce the same end-product. In a perfect market, 'best-practice' technology would be adopted everywhere instantaneously.

Intensiveness	- The 'intensiveness' of energy in steel is the direct plus indirect requirements of energy (measured in £'s or thermal units), per unit of output of steel. Indirect requirements for energy are those which are not for energy inputs to the production process of steel, but those required to produce all the other inputs required for steel production.
Intermediate Output	- That which goes to other industries on current account (bought-in materials).
Marginal Cost	- The additional cost of an incremental unit of input.
Oligopoly	- An industry where the number of sellers is small enough for their price and output decisions to be interdependent. (The case for most producers of primary materials).
Primary Inputs	- The 'original' inputs to the input-output system - Not part of interindustry transactions. Depends upon definition - Imports may or may not be primary. Capital is a primary input in a static input-output system, but becomes endogenous over time.
Principal Industry	- In productivity measurement this distinguishes the industry being studied from those from which it purchases inputs.
Production Function	- The maximum output attainable from a set of inputs for a given state of technical knowledge. This is determined by purely technical (not economic) factors.
Production or Input Structure	- The combination of inputs which are actually used in the production of a good. Depends upon the production function, relative prices and efficiency.
Quality Adjusted Price	- In order to compare the output of an industry at two different points in time, it is not sufficient to simply compare quantities or weights, especially for sophisticated products. It is necessary to adjust for quality change. Published price deflators are sometimes inadequate for this task.
Resources	- The 'fundamentals' of the economic system. The system is endowed with resources, it does not make them.

Returns to Scale	- The ratio of output to input may be dependent upon the scale of the activity. If output more than doubles when all inputs are doubled, the activity is said to exhibit 'increasing returns to scale'.
Specific Consumption	- Consumption of a material per unit value of output of an industry or economy. An indicator of how intensively the material is used in an industry or economy.

List of Abbreviations

Cet.par.	- Ceteris paribus (everything else constant)
CSO	- Central Statistical Office
D_{ep}	- Demand for the end-product using a material.
MLH	- Minimum List Heading: The classification system for industries (see SIC below).
NEDO	- National Economic Development Office
P_{α}	- Price of input α to the production of the material.
P_M	- Price of the material.
PF_M	- Production function of the material.
PS_{ep}	- Production structure of the end-product using the material.
PS_M	- Production structure of the material (Also PS_e etc. - production structure of engineering industry 1).
SIC	- Standard Industrial Classification:- The method of classifying domestic industries and commodities for census purposes (see (116)
SITC	- Standard Industrial Trade Classification - The method of classifying internationally traded commodities.
SNA	- 'A System of National Accounts' (see (47)).
(W/U)	- Worked to unwrought metals ratio in external trade.
VA/direct factor	- Index of productivity using value added (net output) as numerator and primary inputs as denominator.

NOMENCLATURE

The following notation was used throughout except in certain cases where an author's original notation was used. These are shown at the end of this section.

A	=	Commodity x commodity (or industry x industry) coefficient matrix
A_H, A_M	=	Domestic and imports commodity x commodity coefficient matrices
B	=	Commodity x industry (absorption) coefficient matrix
C	=	Product mix matrix - showing the proportion of the output of each industry represented by each commodity.
D	=	Market share matrix - showing the proportion of each commodity produced in each industry.
F_o	=	Vector of primary input (volumes) in year zero.
H	=	Industry x industry flow matrix
I	=	Identity matrix
K	=	Capital Stock input (in production function)
L	=	Labour input (in production function)
M	=	Make matrix - showing the commodities made by industries
M_1, M_2	=	That part of make matrix to be treated on commodity technology and industry technology basis respectively
P, P^*	=	Matrices of price deflators
R	=	Matrix for transforming commodity x industry tables into commodity x commodity tables
S	=	Relative level of subsidies for worked and unwrought metals
T	=	Relative average tariff levels for worked and unwrought metals
W	=	Commodity x commodity flow matrix
W_{63}^{68}	=	Commodity flow matrix for 1963 at 1968 prices
(W/U)	=	Ratio of worked to unwrought metals in external trade
X	=	Absorption Matrix - showing commodities purchased by industries
Y	=	Total output of industry or economy (in production function)

a_{ij} = Element of A etc

f = Vector of total final demand by commodity

f_I = Vector of final demand classified by industry

g = Vector of gross industry output

h = Vector of domestic final demand

k = Vector of capital input

l = Vector of labour input

m = Vector of imports

p = Vector of price deflators

p_f = Price of competing foreign products

p_x = Price of Exports

q = Vector of gross commodity output

$\hat{q}$ = Diagonal matrix with the vector q as the leading diagonal

r = Vector of price indices of primary inputs (sometimes specifically rate of return on capital

t_o = Vector of total non-factor primary inputs in year zero

v = Matrix of primary input coefficients

w = Wage rate

x = Vector of exports

x_I = Vector of exports classified by industry

x_{ij} = Element of inverse matrix $(I-A)^{-1}$

Exceptions to above notation

Chapter 5

g_i = Demand for primary input i by all industries

$v_{i,m}$ = Change in coefficient of primary input i in industry m

t_m = Gross output of industry m

ε_m = Change in direct coefficient of material p in industry m

$\sigma_{p,}$ = $\sum_m \varepsilon_m \delta_{m,p}$

where:

$\delta_{m,p}$ = direct and indirect coefficient of industry m in material p

$\gamma_{i,p}$ = direct and indirect requirement of primary input i per unit of output of material p

θ_j = primary input coefficient to commodity j

M_l = Matrix of complementary imports purchased by industry groups

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$\frac{\dot{A}}{A}$ = Index of residual growth in industry or economy

$\frac{\dot{X}}{X}$ = Index of non-intermediate inputs

R_l = Materials input to industry l

d_{ij} = input from industry i to industry j in flow form

u_{ij} = share of industry i gross output directly required for the output of industry j

p_{ij} = share of industry i gross output required directly and indirectly for the output of industry j

= Proportion of industry l output indirectly required to support the output of industry l itself

mi_{63} = Materials industries' contribution to gross input 1963

mo_{68} = Materials industries' contribution to gross output 1968

α = Marginal product of labour

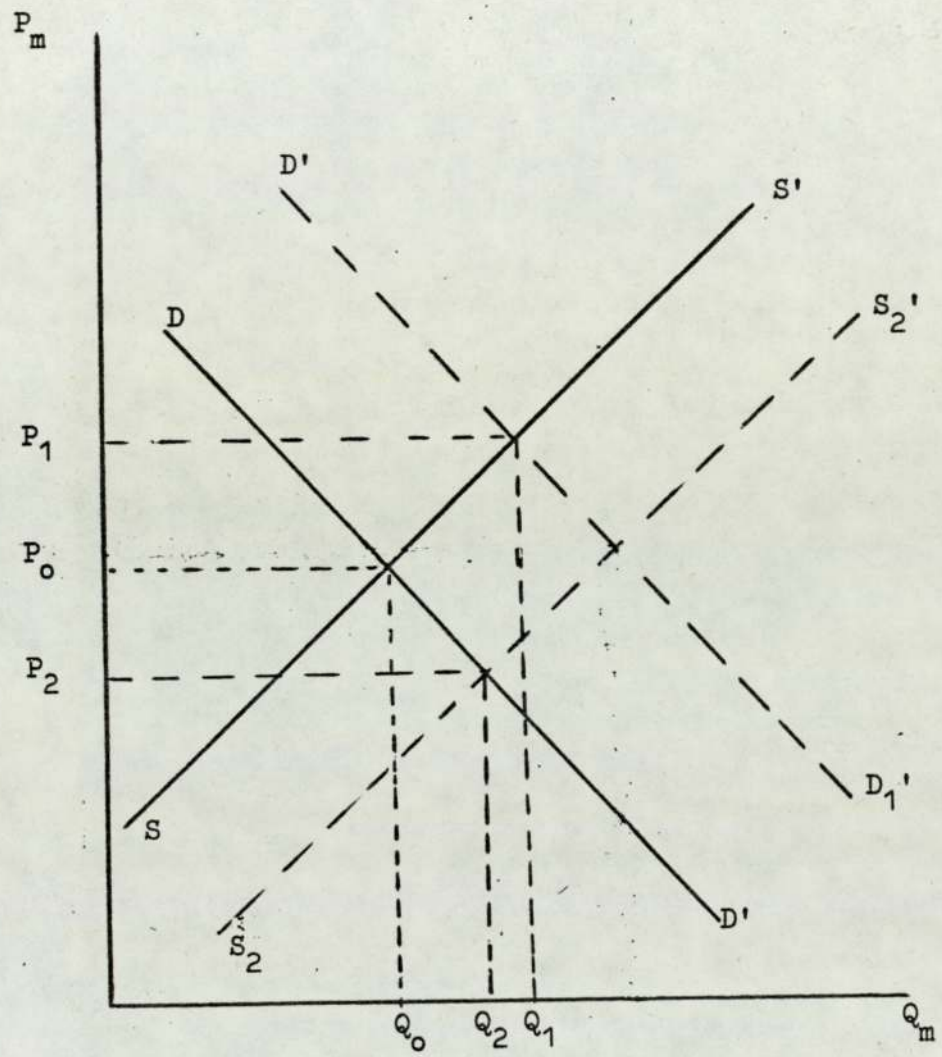
β = Marginal product of capital

γ = Marginal product of materials

APPENDICES

APPENDIX 2.1

The Effect of Supply & Demand Parameters upon Price & Output



The above figure shows the familiar diagrammatic supply and demand schedules. The line DD' represents the relationship between the demand for the material m and its price, if all other factors such as the prices of substitute materials are constant. Similarly, SS' represents the relationship between price and the forthcoming supply of the material if all other parameters are constant.

The intersection of SS' and DD' would give the market clearing price P_o of the material and the quantity consumed, Q_o.

A change in any of the parameters of Section 2.2 would shift either the demand or the supply curve, and a different price/quantity combination would result.

A rise in the price of a substitute for material m, P_s, would shift the demand curve to D_1D_1', thus increasing both the price of the material to P_1 and the quantity consumed to Q_1. An increase in the demand for the end-product using the material D_{ep}, or a change in the production structure PS_{ep}, such that the material became more intensively used, would have the same effect.

The reverse applies in each case.

A decrease in the price of P_α of one of the inputs to the production of the material would shift the supply curve to S_2S_2', thus reducing price to P_2 and increasing the quantity consumed to Q_2. A similar effect would arise from a change in technology leading to a change in the production structure of the material such that the requirement for one or more inputs was less,whilst the requirement for other inputs was not increased (or increased only to an extent where, at prevailing relative prices, total input cost would be reduced).

A complete theoretical approach would need to deal with the problems of different types of competition amongst suppliers, the difference between short and long-run price elasticities and non-instantaneous adjustment to changes in supply and demand parameters. Nevertheless, this diagrammatic approach demonstrates the way in which each parameter influences the price/quantity combination and may help to clarify the role of these various parameters in the determination of the consumption of materials.

APPENDIX 4.1

Input-Output Tables and Analysis

A number of general accounts of this technique exist (eg. Armstrong (32), Miernyk (33), Yan (34)), and thus only a brief description of the methods andassumptions involved will be presented here, together with an account of the particular applications of the techniques adopted in Chapters 4, 5 and 6.

The Input-Output Concept

An economic system should correctly be perceived as an infinitely divisible process of creating value, but, as noted in Chapter 1, a system of industrial (or commodity) classification is necessary for the observation of economic structural change.

Such an industrial classification permits the recording of the flows of value between one process and another over a given period of time. The matrix W of which the element w_{ij} represents the flow from process i to process j, is an input-output matrix. It would be desirable to obtain a matrix recording flows between highly disaggregated engineering processes in order to obtain insight into the changing intensity and efficiency of use of various materials at the micro level. Unfortunately, the effort required for the collection and manipulation of data renders it necessary to aggregate processes or activities into larger groups which may be identified as commodities or industries.

Industries and commodities are defined in the following way: An industry is the aggregation of a group of production establishments, the major part of sales from all of which is that range of goods and services which are regarded as characteristic of the industry's output and are called its 'principal product'. Most industries also sell, as a subsidiary activity, certain products which are principal to other industries. It is possible that an industry's principal product may be divided into more than one commodity such that there are more commodities than industries, but usual practice is to assume that each industry has one principal product and thus that the number of commodities equals the number of industries.

The Basic Tables

In the U.K. the basic information for the tables is collected in the form of a Census of Production, in which the purchases of the reporting establishments are analysed in such a way that an estimate may be made of the value of purchases of each commodity by each industry in a given year. In order to provide uniform valuation of a commodity across a row, producers' prices are used rather than purchasers' prices, and thus taxes, transport and distribution margins are separated out and allocated to separate rows.

The census covers only manufacturing, mining, construction, gas, electricity and water. Information on other industries, such as agriculture, transport, communication etc., is collected from government departments and the nationalised industries, but for distribution and miscellaneous services, less information is available and relatively approximate methods must be used.

The Census information is translated into three basic tables: The make matrix, the absorption matrix and the imports matrix. The make matrix, M, shows the production of each commodity by each industry. Each row and column is dominated by the diagonal element which represents the principal production within the industry, whilst the off-diagonal elements record the extent of subsidiary production.

The absorption matrix, X, records the purchases of each commodity by each industry.

Since the number of types of commodity purchased by all industries reported in the Census exceeds the number of industries classified, commodities must be grouped into an identical classification to that for industries for the make matrix to be square. This was the practice in the construction of the 1963 and 1968 input-output Tables for the U.K. (10), although certain writers, for example Gigantes (35) have discussed the possibility of using rectangular make and absorption matrices.

Finally, the imports matrix X_m represents the purchases of imported commodities by domestic industries. The information for total imports of commodities is obtained from the "Trade & Navigation Accounts of the United Kingdom" (36), although allocation of the purchases of particular industries between domestic and imported commodities must often be undertaken on a pro rata basis in the absence of the relevant information on source.

The tables also typically show the commodity analysis of final demand (i.e. demand for those products which are not required for further domestic processing), and an industrial analysis of primary inputs. The

latter are the inputs which are not a part of the current output of domestic industries and, in the case of the U.K. tables for 1968, include total value added and indirect taxes. There is also a row referred to as "sales to final buyers" which encompasses sundry transactions such as sale of second-hand goods etc.

The accounting framework for these tables is shown in Figure 1. of this appendix. (Page 126)

Conversion of the Basic Tables into Pure Industry or Commodity Tables

Since the basic data are collected as a set of purchases of commodities by industries, it is necessary, for the study of economic structure, to convert the basic tables, (the make matrix and the absorption matrix,) into matrices of commodity purchases by commodity production processes or of industrial output by industries.

Having constructed a "pure" table it is then possible to obtain a column of coefficients representing the purchases from each industry or commodity required per unit of output of the industry or commodity to which the column refers. These are obtained by dividing each element in the column by the column total or gross input.

Thus if the commodity x commodity transactions matrix was represented by K, then the commodity coefficient matrix would be given by

$$A = K \hat{q}^{-1} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad 1$$

where q is the vector of commodity output totals. (The hat notation above a vector is used to represent a matrix which has the vector as leading diagonal and zeros elsewhere).

If the matrix A was disaggregated to the level of the process, each column would be a good representation of the technology of production of that commodity.

In fact, because of the unavoidably high level of aggregation, a change in input structure may not necessarily be due to changes in the technology of production. The latter is only one factor in structural change. Others may be changes in the product mix of the commodity or industry group engendered by aggregation, and changes in the process mix, in that several processes may be in use simultaneously in the production of the same commodity.

As Carter (9) notes: "Steels, which are identical from the user's point of view may be produced by the basic oxygen process, characterised by one input structure; or by the open hearth process characterised by another; or by the electric furnace process, with still a third input structure. Even when a single process seems to enjoy a unique advantage for producing a given product at a particular time, several processes may be used simultaneously for historical reasons".

Carter also indicates the difficulty when interpreting changes in input coefficients, in differentiating between pure technological change on the one hand, (i.e. a change in the production function), and substitution, (changes in the input mix within the context of a given production function) on the other.

Nevertheless, changes in input coefficients whether through product mix, substitution or pure technological change, give an indication of technological developments within the economy, and are thus of interest.

Since a large proportion of the work reported in Chapter 4 involved the conversion of make and absorption matrices to "pure" commodity

or industry matrices, it is necessary to provide some detail here of the methods of obtaining these pure matrices.

Since the total commodity output of the economy is given by the vector of row sums of the commodity transactions matrix K plus the vector of final demand for commodities,

$$q = Ki + f \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad 2$$

where i is the unit vector, having the effect of summing the rows of K and f is the matrix of final demand for commodities.

Substituting for K from 1 into 2

$$q = Aq + f \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad 3$$

In order to obtain this matrix A, certain assumptions must be made concerning the input structures of commodities produced in various industries.

Commodity and Industry Technology Assumptions

The basic task involved in obtaining a commodity x commodity matrix from the absorption matrix, is to adjust the columns of the latter such that the total commodity output remains the same but the destination is delineated by commodity or process rather than by industry. Similarly, industry x industry tables are obtained by maintaining column totals constant, but adjusting rows such that the non-principal production of commodities is allocated to the row representing the industry where that production took place. Since there is typically no information concerning the allocation of inputs between the various outputs of an establishment or industry, assumptions must be made concerning the allocation of these inputs.

In general, two extreme assumptions may be made in order to allocate each commodity output to a particular process or commodity destination, or industry output to a particular industry destination. These two extremes are the industry technology assumption, which implies that the same input structure is relevant to all commodities produced by a given industry, and the commodity technology assumption, which implies that a commodity is produced using the same input structure, irrespective of the industry of origin.

An example of where the commodity technology assumption is appropriate is for the production of chemicals by engineering industries, since the input structure for this non-principal production would obviously differ from that of the principal product. An example of where the industry technology assumption is appropriate is the non-principal production of mechanical engineering goods by a mechanical engineering industry.

Commodity Technology Assumptions

In the notes to the 1968 Input-Output Tables for the United Kingdom (10), the commodity technology assumption is associated with a "product mix" matrix, the columns of which show the proportions in which a particular industry produces commodities. This is obtained by dividing the columns of the transposed make matrix (i.e. the columns showing production of each commodity by each industry), by the gross outputs of industries

$$\text{i.e. } C = M' \hat{g}^{-1} \qquad \ldots\ldots\ldots\ldots \quad 4$$

Where g is the vector of gross outputs of industries.
Thus C is the matrix of coefficients of production of commodities per unit of output of each industry.

(The prime notation indicates the transpose of a matrix).

If B is the matrix of coefficients of commodity requirements per unit of industry output, then:

$$B = X \hat{g}^{-1} \quad \text{.....}$$

Thus $$Bg = Aq = Xi = Ki \quad \text{.....} \quad 5$$

Now since the vector of the row sums of the transposed make matrix is the vector of total commodity outputs,

$$M'i = q$$

and thus from 4

$$g = C^{-1} q \quad \text{.....} \quad 6$$

Substituting for g from 6 in 5

$$BC^{-1}q = Aq$$

Thus $$BC^{-1} = A \quad \text{.....} \quad 7$$

A is thus the commodity x commodity coefficient matrix obtained via the commodity technology assumption.

7 may also be expressed in the form:

$$B = AC$$

Cressy (37) obtained this result in another way by first expressing the requirements of a commodity i for an industry k, to be the weighted average of the input coefficients of commodities absorbing i within industry k.

Thus $b_{ik} = \sum_j a_{ijk} m_{jk} / \sum_j m_{jk}$ (Notation altered from (37) but identical algebra)

where m_{jk} is the "make" of commodity j in industry k, b_{ik} is an element of B and a_{ijk} is the input of the ith commodity per unit of the jth commodity, produced in the kth industry.

Hence: $b_{ik} = \sum_j a_{ijk} c_{jk}$ 8

where c_{jk} is an element of C and is the proportion of commodity j in the output of the kth industry.

8 is valid irrespective of technology assumptions.

The commodity technology assumption implies the additional constraint:

$a_{ij} = a_{ijk}$ for all k 9

substituting 9 into 8 gives:

$b_{ik} = \sum_j a_{ij} c_{jk}$ 10

or B = AC

In the notes to the UK Input-Output Tables for 1968 (10), a matrix E is obtained by substituting for Aq from 5 into 3 to obtain

$q = Bg + f$ 11

Substituting for q from 5 in the above:

$g = C^{-1} (Bg + f) = C^{-1} Bg + C^{-1} Bg + C^{-1} f$ 12

However, since C^{-1} gives the industrial composition of final demand,

$g = Eg + C^{-1} f$ 13

where E is the industry x industry coefficient matrix.

One solution to 12 and 13 is:

$E = C^{-1} B$ 14

This is not a unique solution following inevitably from the commodity technology assumption, since it implies the further assumption that each interindustry transaction consists of all the commodities produced by the selling industry in proportion to the output of that industry. This is the proportional output purchase assumption of Becker (7).

What this means may be demonstrated by premultiplying 14 by C to obtain CE = B

then $b_{ij} = \sum_k c_{ik} e_{kj}$

The interpretation of this equation is that the purchase of commodity i by industry j as a proportion of total industry j purchases = the proportion of commodity i in the output of industry k x the requirement of the output of the industry k for the production of the output of industry j.

This is clearly correct, provided the proportions of commodity i in the output of industry k are constant for each sale of industry k output. This must hold for all industries k.

Industry Technology Assumptions

The industry technology assumption states that every commodity produced by a given industry has the same input mix, and thus the input structure of a commodity depends upon the industry in which it was produced. This assumption was associated in (10) and (38) with the "market shares" matrix D which shows the proportions in which industries contribute to the total production of each commodity.

D is obtained by dividing the columns of the (non-transposed) make matrix by the commodity totals.

Thus: $D = M\hat{q}^{-1}$ 15

The reasoning presented by the C.S.O. in the notes to the 1968 UK Input-Output Tables (10) was as follows:

From 15, $M = D\hat{q}$

and thus $Mi = D\hat{q}i$

since Mi = g, we have:

$g = BDq$ 16

Substituting for g in 11 gives:

$q = BDq + f$

which gives $A = BD$ 17

as a solution to the system, giving a commodity x commodity table.

Cressy disputes that the industry technology assumption is sufficient for a solution such as 17, since the former has no implications for the form of the industry to commodity transformation matrix.

He demonstrates this by expressing the industry technology assumption as:

$b_{ik} = a_{ijk}$ for all j 18

(notation as before).

18 may then be substituted into 8 to obtain:

$b_{ik} = \sum_j b_{ik} c_{jk} = b_{ik}$, since $\sum_j c_{jk} = 1$

This is a trivial result.

However, a counterpart to 8 is another basic result, that the commodity x commodity coefficient a_{ij} is a weighted average of the individual a_{ij}'s for each industry. The weights are the proportions of commodity j's output produced in the kth industry (industry k's share in the market for commodity j), and the result, like 8, is valid irrespective of technology assumptions.

Thus: $a_{ij} = \sum_k a_{ijk} d_{kj}$ 19

where d_{kj} is the proportion of the output of commodity j produced in the

kth industry or $m_{jk} / \sum_k m_{jk}$, where m_{jk} is the "make" of commodity j in industry k.

Using the industry technology assumption, 18 may be substituted in 19 to obtain:

$$a_{ij} = \sum_k b_{ik} d_{kj} \quad \ldots\ldots\ldots\ldots\ldots 20$$

Thus the solution A = BD follows inevitably from the industry technology assumption.

Substitution of the commodity technology condition 9 in 19 also gives a trivial result:

$$a_{ij} = \sum_k a_{ij} d_{kj} = a_{ij} \sum_k d_{kj} = a_{ij}$$

Thus using the basic result 19, it is possible to associate the market shares matrix with an industry technology assumption, for the construction of a commodity x commodity matrix, contrary to Cressy (37).

The industry x industry table derived from an industry technology assumption, as for that derived from the commodity technology assumption, requires an industry purchasing assumption. This time it is the "proportional market purchase assumption" (7), which states that "each commodity is purchased from every producer of that commodity in proportion to each industry's market share of that commodity". Using this assumption, it is possible to obtain the solution:

$$E = DB \quad \ldots\ldots\ldots\ldots 21$$

Thus, in summary, Cressy is correct in stating that the industry technology assumption leaves the output structure of industries indeterminate. However, this does not mean that a unique commodity x

commodity matrix cannot be obtained using the industry technology assumption throughout.

Industry x industry matrices require purchasing rather than input technology assumptions.

It is thus argued that continued use of the method followed by the C.S.O. in constructing the 1968 Input-Output Tables involving the use of an industry technology assumption, is valid.

Hybrid Technology Assumptions

As Armstrong (39) suggests, whilst it is reasonable to assume that commodity technology is more appropriate in general, an industry technology assumption may be more suitable for subsidiary production which is a by-product of an industrial process.

It is not necessary exclusively to employ either extreme assumption and the usual procedure is to use a mixture or "hybrid" of the two assumptions.

Various approaches to hybridisation are possible, but that used for the construction of the 1968 input-output tables was set out by Armstrong (39).

The methodology requires the separation of the elements of the make matrix into those for which a commodity technology assumption is deemed appropriate and those for which an industry technology assumption should be used. The former are grouped into a matrx M_1 and the latter into M_2

such that $M = M_1 + M_2$.

Armstrong derives: $C_1 = M_1' \hat{g}_1^{-1}$

$M_2 = D_2 \hat{q}$

and $g_2 = M_2 i = D_2 q$

where q_1 and q_2 are the totals of commodity output produced respectively under the commodity and industry technology assumptions. Similarly for g_1 and g_2.

A column j of C_1 gives the share of each commodity produced on a commodity technology basis in the total of the output industry j produced under the commodity technology assumption.

A column j of D_2 gives the shares of each industry's by-products in the total output of commodity j.

There is no need here for a reiteration of this procedure. It appears in (39) pp. 73 and 74 and (10) pp. 25 and 26.

It results in the expression for a commodity x commodity matrix:

$$A = B\,(C_1^{-1}\,(I - \widehat{D_2'\,i}) + D_2) \qquad \ldots \quad \underline{22}$$

If $R = C_1^{-1}\,(I - \widehat{D_2'\,i}) + D_2$

then the industry x industry table under a hybrid technology assumption may be obtained via the expression:

$$E = RB \qquad \ldots \quad \underline{23}$$

although once again, as indicated above, purchasing assumptions are required for solution 23.

Armstrong (39) obtained an alternative formulation for a commodity x commodity table under the assumption that the output of by-products in M_2 is linked to the outputs of producing industries rather than to industries' market share in that commodity. In the context of the current study, it was considered that the choice between different hybrid technology assumptions was of relatively minor importance in comparison with the problems of, for example, deflation.

As a result, the method used by the C.S.O. and reported in (10) was used in the construction of the tables. The allocation of cells of the make matrix to the commodity or industry technology assumption was undertaken on a similar basis to that of the C.S.O., and described in Chapter 4, section 4.2.3.

The Imports Matrix

Since the basic imports matrix has the dimensions commodity x industry, the same multiplier may be applied to obtain a commodity x commodity imports matrix.

i.e. $A_m = B_m R$ ... 24

where $R = C_1^{-1} (I - (\hat{D_2'} i)) + D_2$

Negative Entries

The hybrid technology solution 22 tends to produce some negative entries. A description of why these occur and how they were removed is given in Chapter 4, section 4.2.3.

The Inverse Matrix

Since the gross output of each industry or commodity is equal to total consumption by final and intermediate users, the rows of the coefficient matrix may be considered to be a set of n simultaneous equations, where n is the number of commodities.

From 3

$q = Aq + f$

which may be solved for q to obtain:

$q = (I-A)^{-1} f$ ... 25

An element x_{ij} of $(I-A)^{-1}$ (the Leontief inverse), represents the value of commodity i required per unit output of commodity j, both directly, and indirectly via other commodities.

Thus 25 may be used to calculate the change in gross output requirements q, consequent upon a change in final demand f. In order to do this, the critical assumptions must be made that the elements of the A matrix (the technical coefficients) remain constant, whatever the level of output, and that the output classified to a given commodity is homogeneous across consuming commodities. The implication of the first assumption is that each commodity has a linear homogeneous production function.

Thus, the use of these assumptions implies that such phenomena as economies of scale and product mix differences within a given commodity classification are ignored, which is a serious limitation in the use of these tables for forecasting and hypothesis testing, and this must be

emphasised in the interpretation of results obtained from input-output analysis.

Theoretically, these assumptions could be circumvented by the more realistic specification of input-output relationships but the cost in terms of both data and complexity is sufficiently large to place a severe constraint upon such non-linear extensions. These were regarded as being beyond the scope of the current work and the latter relies exclusively upon the linear model.

Primary input requirements for a given demand may also be estimated since these are assumed to be proportional to the gross output of each commodity. Thus the expression:

$$v' (I-A)^{-1} f \qquad \ldots \quad 26$$

where v is the vector of requirements of a given primary input per unit of gross output of each commodity, gives the total use of that primary input for a given final demand f. 26 may be used to estimate changes in physical labour and capital requirements, or values of net output and imports, consequent upon a change in final demand.

Applications of Input-Output Analysis

The most obvious application is the estimation of the direct plus indirect requirements for the production of each commodity to produce a given final demand. If final demand changes and the intermediate coefficient matrix A is unaltered, then the change in commodity requirements resulting from that change in final demand may be estimated, and potential supply constraints identified.

This indicates the usefulness of the tables in planning and forecasting, though the long lead time required for the production of the tables means that they are a few years out of date on publication. As a result, it must either be assumed that coefficients are stable, or that they may be updated using mechanical techniques such as the RAS method, together with extraneous information. See for example Stone (41), Barker (42).

The effect of changes in coefficients, through substitution between intermediate inputs may be estimated using techniques such as those of Becker (7).

Another application is the study of intertemporal structural change in the economy, undertaken by measuring the changes in direct and indirect coefficients and the total requirements of commodities to produce the same final demand with the technical coefficients of different years.

In addition, the primary input component of the price of each commodity may be estimated, and thus the impact upon final prices of "autonomous" changes in primary input prices,(such as wages, imported oil prices etc.), may be measured.

Other applications are in development and regional economics, and various modifications may be made for the study of particular inputs and outputs, such as energy or pollutants.

In this current work, the techniques were applied in a relatively straightforward way.

The tables are used in the study of economic structure and structural change in Chapter 4.

In Chapter 5, input-output analysis is used in order to estimate import requirements under different assumptions concerning the production of engineering materials.

This type of analysis may also be used for the estimation of net output and productivity indices, as shown in Chapter 6.

Finally, if estimates of coefficients of various types of capital per unit of output can be calculated, a dynamic system may be set up, using a simple accelerator model and assumptions concerning replacement. See for example Leontief (79).

Only static systems were employed throughout the current work.

Problems in the Comparison of Input-Output Tables

(i) Industrial and Commodity Classification

The initial problem in the intertemporal or international comparison of economic structure using input-output tables is that of industrial classification. Different countries, in addition to having different accounting procedures, also have different systems for classifying the output of individual establishments to particular commodity groups. The lack of standardised international tables containing the degree of detail required, precluded the use of tables other than those for the UK in the present study.

(ii) Aggregation

The second major problem in the use of input-output tables for the comparison of economic structure is that of aggregation.

Since each commodity classification contains several products, each growing in use at a different rate, the growth rate of the sector will be the weighted average of the growth rates of all the subcommodities contained in that sector. For example, if the aluminium sector was aggregated with other non-ferrous metals over the post-war period, the resultant coefficients would show an aggregated sector with a growth rate higher than that of the old non-ferrous metals category, but much slower than that of the aluminium sector alone.

There is also the problem of completely new products which grow so fast that they eventually require a category of their own, whilst for a time they remain subsumed in another category. In short, product mix problems increase with aggregation.

Aggregation bias may affect the predicted output of sectors which have not been aggregated. i.e. Assume a sector A and sector B are aggregated, and sector A requires a large input from sector C, whilst sector B requires none. Any sector which purchases the output of sector B will appear to have an indirect requirement for C even if it had no such requirement before the aggregation of A and B.

Thus even if there is little interest, for the purposes of a given study, in a range of sectors, the aggregation of these sectors may be injudicious because of this potential bias.

The implications of aggregating two sectors A and B are most serious for a sector X when there is a substantial difference between A and B in their direct or indirect consumption of the output of X.

Hence, a simple criterion for the appropriateness of sectors to be aggregated is their similarity of input structure.

More complex criteria have been derived by Balderston and Whitin (44) and Fisher (45).

In the current study, it was decided to adopt a judgemental rather than a statistical approach to aggregation, and, in general, to aggregate sectors producing commodities of similar type. (E.g. commodities of different 3-digit SIC minimum list headings belonging to the same 2-digit MLH.) This was firstly for the reason that commodities from similar SIC groups tend to have similar input structures, secondly since constraints upon computer storage resources provided an incentive to aggregate sectors of the economy with which the current study is not concerned.

Tests were undertaken throughout the course of the empirical work, in order to ascertain whether the results obtained in Chapters 4,5 and 6 were sensitive to the aggregation of these large sectors.

The specific pattern of aggregation employed is described in Chapter 4, together with the construction of the constant price commodity and industry tables for 1963 and 1968.

(iii) Relative Prices

Since input-output tables are, of necessity, in value terms, a change in the relative prices over a period of time will influence the relative size of entries in the intermediate coefficient matrix, and of the components of final demand. The change in an input coefficient a_{ij} will be a combination of the change in the physical usage of commodity i by commodity j, and the change in the price of i relative to j.

Thus in order to disentangle the changes in volumes and prices, deflators must be used to obtain each intermediate table and vector of final demand, in the prices of the base year. Ideally, each cell of the intermediate matrix should be deflated separately, and exports should have a different deflator from that of the remainder of final demand. In practice, it is necessary to apply general row deflators to many cells of the matrix, whilst selecting particular cells for special treatment, these being the ones where the heterogeneity of the classification demands separate deflation for each commodity within the sector.

Fortunately, for the purposes of the current study, most of the deflation necessary had already been carried out by the C.S.O. Details are given in Chapter 4 of the price deflation undertaken as part of the current work.

In fact, as Carter (9) indicates, for the purposes of determining output requirements, the inaccurate deflation for a particular commodity will simply affect the observed output requirements for that commodity. For other commodities, the error in their coefficient of input to the production of the wrongly deflated commodity is exactly offset by the under or overstatement of the requirements of that commodity.

(iv) The Treatment of Imports

Since the basic UK input-output tables include a table of imports of commodities by industries, it is possible to treat imports as distinct commodities and provided an industry to commodity conversion is applied, calculate their requirements from a variant of 26

$$A_m (I-A_H)^{-1} f \qquad \ldots 27$$

where A_m is the matrix of coefficients of imports requirements by domestic commodities and A_H is the domestic coefficient matrix. This gives the requirements of each imported commodity for a given vector of final demand.

However, it could be argued that whether goods are purchased from a domestic or imported source is irrelevant for the purpose of the comparison of economic structure. This would militate for the summing of the domestic and imports intermediate matrix, such that the change in commodity requirements, regardless of source, could be estimated. Certain imports do not have a domestic counterpart, and may thus be considered "complementary", and treated as in 27. The majority could be considered "competitive" and may be aggregated with the domestic matrix to obtain a more accurate representation of economic structure.

The principal problems arising from this approach are:

(a) The normal practice for input-output tables is to value imports on a c.i.f. basis, i.e. including insurance and freight charges up to the domestic port of entry. This is in order to make them as comparable as possible with their domestic equivalent. However, if the objective is to approximate an input structure in physical terms, insurance and freight charges may overstate the "value" of the input relative to the domestic

product. It is not easy however to improve upon this system.

(b) If the intermediate matrix includes imports, the Leontief inverse derived from that matrix will reflect the output necessary to produce those imported goods, as well as that for domestic production. The resultant gross outputs from an actual final demand vector will exceed the gross outputs of the domestic economy. The only means of avoiding this is to deduct the total value of the competitive imports of each commodity, from the corresponding final demand row.

For the purpose of comparing input structures for different years, undertaken in Chapter 4, the matrix of competitive imports was aggregated with the domestic matrix.

FIGURE 1

Simple Input-Output Accounting Framework

	Commodity	Industry	Home final demand	Exports	Totals
Flow Commodity Coeff.	W $A = W\hat{q}^{-1}$	X $B = X\hat{g}^{-1}$	f	x	q
Flow Industry Coeff.	M	H	f_I	x_I	g
Incomes		V			
Imports	W_m	X_m			
Totals	q	g			

Adapted from (32)

APPENDIX 4.2

The 1968 Absorption Matrix at 1963 Prices

The construction of the 1968 absorption matrix and imports matrix at 1963 prices was explained fully in (51). Some of the important points are reiterated here:

(i) The appropriate price deflators for the larger entries in the table were obtained by breaking them down into finer commodity detail and then applying the appropriate deflator for each commodity. For the small entries, a simple price relative was applied. At the time of calculation, only 1963 purchases were available for weighting the deflators for certain cells, but it is thought that this was of little significance.

Thus the process was not simply a matter of applying uniform row deflators.

(ii) Price deflation for commodities purchased by final buyers was based totally upon a 1963 weighting pattern for the disaggregation of the cells.

(iii) Double deflated estimates of value added are obtained by subtracting all the deflated estimates of intermediate inputs to each industry from the gross industry input, calculated by applying Laspeyre volume indices to 1963 gross outputs at 1963 prices.

(iv) Specific import deflators were used where these were available, but a large proportion of imports had to be deflated by the corresponding domestic deflator.

(v) Price data for non-manufacturing industries is particularly difficult to acquire and the reports of the nationalised industries were used to approximate the deflators for certain of these industries.

For distribution and services, a rule-of-thumb approach was used, assuming the price of the output of these sectors to be proportional to the weighted average of the cost of their inputs.

(vi) Aluminium and synthetic resins were among the industries with the largest discrepancies between input and output volume indices, and thus double deflation is particularly appropriate to these industries.

APPENDIX 4.3

Specification of the Technologies of Production

The specification was as similar as possible to that indicated by the C.S.O. in (10).

Those cells of the matrix representing subsidiary production treated on a commodity technology basis were as follows:

(Classification as in Table 4.1)

Row	Columns
1	None
2	None
3	None
4	19, 21, 52
5	None
6	None
7	None
8	None
9	None
10	None
11	None
12	30
13	30
14	31, 44
15	53, 60
16	None
17	33, 46, 55, 61
18	23-35, 40, 41, 45, 46, 50, 51, 53, 61
19	59, 61
20	56-58
21	20, 60
22	None
23	18, 19, 22, 34, 60
24	53
25	20, 53, 60
26	19, 34, 36, 61
27	34, 57
28	17-21, 34, 36, 38, 51, 53, 56, 57, 58, 61
29	12, 17-20, 36, 38, 53, 61
30	18-21, 36, 38, 53, 60, 61

31	20, 36, 38, 51, 53, 56, 57, 60
32	18, 19, 21, 36, 51, 61
33	None
34	18, 36, 38, 51, 53, 56
35	18, 19, 20, 38, 53, 59-61
36	21, 61
37	17, 19, 21, 36, 38, 51, 53, 60
38	17, 18, 36, 51, 53
39	17, 19, 20, 36, 60
40	19, 20, 21, 34, 60
41	55
42	18-21, 36, 38, 49, 57-61
43	None
44	51, 53, 56, 57, 59, 60
45	44, 53, 59
46	33, 37, 42, 59, 60
47	59
48	39, 57, 58, 60
49	42, 55, 56
50	55, 56
51	19, 29, 31, 34, 35, 36, 37, 42, 60, 61, 66
52	None
53	4, 19, 21, 28, 31, 33-37, 41, 42, 58, 59
54	28, 34, 35, 37, 42, 60, 61
55	10, 19, 22, 25-37, 53, 60, 61
56	20, 53
57	20, 21, 27, 28, 33, 42, 53
58	20, 21, 37, 38, 39
59	25, 33, 34, 37, 38, 44, 46, 55
60	18, 20, 25-30, 33-39, 41, 42, 44-46, 53, 55, 61
61	All
62	51
63	25, 27, 37
64	None
65	None
66	None
67	None
68	All
69	All

APPENDIX 4.4.

Details of Adjustments to Commodity x Commodity Tables

In transforming the matrix, the primary objective was to make as few adjustments as possible, whilst acknowledging the necessity of eliminating anomalous coefficients and obtaining a good representation of input structures.

The transformation exercise was necessary since no commodity x commodity table on a 1968 SIC basis was available. The C.S.O has, however, published a commodity x commodity table (Table I in the 'Purple Book' (10)) which was used as a benchmark for this exercise. Coefficients for which the SIC change had not engendered any change of definition of the selling and purchasing industries should have been almost identical between the published tables and the results obtained from the 1968 SIC data.

In fact there were a number of differences, especially in the large distribution and services rows. Where there was a considerable discrepancy, not attributable to SIC changes, the figure was adjusted to within 5% of the figure in the published tables.

Having obtained the transformed matrix, it was necessary to correct approximately one hundred negative coefficients. Those of less than 1 per 1000 or representing flows of less than £0.5 million could be rounded to zero without the need for compensating adjustments.

The largest errors occurred in the cells representing the input of construction to water supply (-0.026) and to electricity (-0.016)

and the majority of negative coefficients were in the columns representing utilities or services and resulted from the construction activity of these sectors.

There were several small errors in the requirements of coal and other mining products by engineering industries. The industrial plant and metal goods industries were most apparent in this, and the anomaly probably arises via the production of chemicals by these industries, and some non-existent inputs of mining products are transferred away as a result. This is a case where neither an industry nor a commodity technology assumption is appropriate.

There were also several substantial negative coefficients in the textiles rows and services column.

The errors were corrected by firstly adjusting the rows by determining the cell of the make matrix in which the error originated, and then adjusting the columns via a row representing a commodity which had a large input into both affected columns. The services row was mainly used for this process, since it was peripheral to the work of this study.

APPENDIX 4.5

Industrial Classification of 48-order Matrix, according to MLH

1.	Coal Mining	101
2.	Other Mining	102, 103, 104, 109
3.	Coke Ovens	261
4.	Mineral Oil Refining	262, 263
5.	Chemicals	271-273, 275, 277-279
6.	Paint	274
7.	Synthetic Resins	276
8.	Iron and Steel	311-313
9.	Aluminium	321
10.	Other Non-ferrous Metals	322, 323
11.	Agricultural Machinery	331
12.	Machine Tools	332
13.	Industrial Engines	334
14.	Textile Machinery	335
15.	Construction Equipment	336, 337
16.	Office Machinery	338
17.	Other Non-electrical Machinery	333, 339
18.	Industrial Plant & Steelwork	341
19.	Other Mechanical Engineering	342, 349
20.	Instrument Engineering	351-354
21.	Electrical Machinery	361
22.	Insulated Wires & Cables	362
23.	Electronics and Telecommunication	363-367
24.	Other Electrical Goods	368
25.	Shipbuilding	370
26.	Motor Vehicles (inc. Tractors)	380, 381
27.	Aerospace	383
28.	Other Vehicles	382, 384, 385
29.	Engineers' Small Tools	390
30.	Cans and Metal Boxes	395
31.	Other Metal Goods	391-394, 396, 399
32.	Pottery and Glass	462, 463
33.	Cement	464
34.	Other Building Materials	469
35.	Furniture	472, 473
36.	Timber	471, 474, 475, 479
37.	Paper	481
38.	Paper and Board Products	482-484
39.	Rubber	491
40.	Other Manufacturing	492-495, 499
41.	Construction	500
42.	Man-made Fibres	411
43.	Other Textiles	412-419, 421-423, 431-433, 441-446, 449, 450
44.	Gas, Electricity, Water	601-603
45.	Road and Rail Transport	701-704
46.	Other Transport	705-707, 709
47.	Distributive Trades	810-812, 820, 821, 831, 832
48.	Other	All other except Public Administration

Complementary Imports

Crude Mineral Oil	104,
Other Mining	102, 103, 109
Timber	471, 474, 475, 479
Paper & Board	481
Rubber	Part of 001
Tobacco	Part of 001

APPENDIX 4.6

Derived Input-Output Tables

The following are some of the Tables derived for the purpose of the analysis.

The tables shown are:

(i) The domestic commodity x commodity matrix for 1963 at 1968 prices (pp.137 - 146)

(ii) The domestic commodity x commodity matrix for 1968 at current prices (pp.147 - 154)

(iii) The matrix of commodity imports for 1963 at 1968 prices (pp.155 - 164)

The 48-order classification system is as shown in Appendix 4.5

Domestic Commodity Matrix 1963

at 1968 Prices

	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
1	0.0	2.1	135.4	0.0	35.2
2	0.0	0.0	0.0	2.4	13.2
3	0.0	.1	0.0	.2	21.4
4	3.2	9.7	.4	0.0	23.5
5	6.7	5.9	4.2	20.8	0.0
6	1.1	0.0	0.0	0.0	0.0
7	0.0	.1	0.0	0.0	5.6
8	42.2	.6	.8	.6	2.3
9	0.0	0.0	0.0	0.0	6.9
10	0.0	0.0	0.0	0.0	26.5
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	.1	.1
13	.6	.3	0.0	.1	.4
14	0.0	0.0	0.0	0.0	0.0
15	1.1	4.3	0.0	0.0	.3
16	0.0	0.0	0.0	0.0	0.0
17	16.8	.7	.2	.5	2.3
18	.2	.5	.8	2.2	2.7
19	7.6	.4	.8	1.0	5.2
20	0.0	.1	0.0	.1	.6
21	1.1	.5	.3	.3	2.2
22	14.8	0.0	0.0	0.0	0.0
23	.2	.1	.1	0.0	.6
24	2.1	.8	.2	0.0	4.5
25	0.0	0.0	0.0	0.0	0.0
26	1.3	.6	.1	0.0	1.2
27	0.0	0.0	0.0	0.0	0.0
28	1.1	.1	.1	0.0	1.3
29	6.4	3.4	.6	.9	6.0
30	0.0	0.0	0.0	2.9	11.5
31	5.8	.7	.2	3.5	13.6
32	0.0	0.0	0.0	0.0	11.2
33	0.0	.8	0.0	0.0	.6
34	5.1	.4	.1	0.0	3.6
35	0.0	0.0	0.0	0.0	0.0
36	15.3	.5	0.0	0.0	5.3
37	1.7	0.0	0.0	0.0	6.0
38	0.0	3.1	.3	.8	36.0
39	6.6	.8	.1	0.0	1.7
40	10.5	.2	0.0	.6	14.7
41	23.1	4.2	.6	.3	21.2
42	0.0	0.0	0.0	0.0	2.7
43	15.0	.4	0.0	0.0	9.7
44	38.9	7.2	7.0	8.4	48.2
45	10.3	31.9	18.9	1.9	29.4
46	1.2	.6	.7	76.4	19.0
47	16.2	4.8	.6	3.4	34.9
48	3.6	10.1	5.1	15.2	199.7

	COLUMN 6		COLUMN 7		COLUMN 8		COLUMN 9		COLUMN 10
1	0.0	1	1.8	1	14.2	1	.5	1	1.8
2	.9	2	.2	2	11.2	2	1.1	2	17.3
3	0.0	3	.6	3	111.4	3	.2	3	1.2
4	4.8	4	6.8	4	19.6	4	1.9	4	2.0
5	35.4	5	73.9	5	24.0	5	3.2	5	2.9
6	0.0	6	.1	6	2.1	6	.3	6	.5
7	11.9	7	0.0	7	1.6	7	0.0	7	.2
8	0.0	8	.9	8	0.0	8	.8	8	3.2
9	.1	9	.1	9	2.1	9	0.0	9	10.6
10	.5	10	2.4	10	78.5	10	10.1	10	0.0
11	0.0	11	0.0	11	.1	11	0.0	11	0.0
12	0.0	12	0.0	12	8.4	12	.3	12	.9
13	0.0	13	0.0	13	1.3	13	0.0	13	.7
14	0.0	14	0.0	14	0.0	14	0.0	14	.1
15	0.0	15	0.0	15	2.4	15	0.0	15	.6
16	0.0	16	0.0	16	0.0	16	0.0	16	.1
17	.1	17	.5	17	7.9	17	.5	17	1.1
18	.1	18	.4	18	6.2	18	.2	18	.3
19	.4	19	1.0	19	22.4	19	.8	19	4.0
20	0.0	20	0.0	20	1.3	20	.3	20	.5
21	0.0	21	.4	21	4.8	21	.3	21	3.0
22	0.0	22	.2	22	0.0	22	.3	22	12.1
23	0.0	23	.2	23	.6	23	.2	23	1.1
24	.1	24	.5	24	4.0	24	.2	24	2.5
25	0.0	25	0.0	25	2.4	25	0.0	25	.7
26	0.0	26	.4	26	11.7	26	.4	26	3.7
27	0.0	27	0.0	27	0.0	27	1.1	27	0.0
28	0.0	28	0.0	28	8.1	28	0.0	28	3.0
29	.1	29	1.2	29	6.3	29	1.0	29	1.8
30	8.3	30	.4	30	0.0	30	0.0	30	0.0
31	1.0	31	3.4	31	14.9	31	1.2	31	25.4
32	.1	32	.6	32	0.0	32	0.0	32	0.0
33	0.0	33	0.0	33	0.0	33	0.0	33	0.0
34	.5	34	.9	34	33.8	34	.2	34	.4
35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
36	.5	36	1.2	36	1.8	36	0.0	36	.4
37	0.0	37	4.3	37	0.0	37	3.7	37	0.0
38	1.4	38	4.4	38	4.4	38	.8	38	.6
39	.2	39	1.2	39	5.1	39	.2	39	.5
40	1.6	40	1.6	40	3.0	40	.2	40	.4
41	.2	41	1.1	41	3.6	41	.4	41	.7
42	0.0	42	0.0	42	0.0	42	0.0	42	0.0
43	0.0	43	1.7	43	.2	43	0.0	43	0.0
44	1.7	44	10.3	44	96.9	44	7.4	44	10.8
45	2.2	45	4.3	45	82.5	45	2.4	45	6.2
46	1.0	46	4.2	46	27.4	46	2.5	46	17.3
47	3.2	47	6.2	47	57.2	47	6.1	47	27.0
48	28.2	48	21.6	48	25.9	48	4.7	48	15.1

	COLUMN 11		COLUMN 12		COLUMN 13		COLUMN 14		COLUMN 15
1	+ .1	1	+ .4	1	+ .2	1	+ .4	1	+ .3
2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0
3	+ 0.0	3	+ .1	3	+ .1	3	+ .1	3	+ .3
4	+ .2	4	+ .7	4	+ .5	4	+ .6	4	+ 1.3
5	+ .3	5	+ .5	5	+ 1.2	5	+ .3	5	+ 1.0
6	+ .3	6	+ .3	6	+ .2	6	+ .3	6	+ 1.1
7	+ 0.0	7	+ 0.0	7	+ .2	7	+ .1	7	+ .1
8	+ 8.1	8	+ 22.7	8	+ 14.9	8	+ 9.5	8	+ 39.9
9	+ .3	9	+ .7	9	+ 1.3	9	+ 1.1	9	+ 1.7
10	+ .4	10	+ 3.4	10	+ 6.7	10	+ 1.0	10	+ 2.9
11	+ 0.0	11	+ .2	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ .6	12	+ .2	12	+ .6
13	+ 2.4	13	+ .8	13	+ 0.0	13	+ 0.0	13	+ 12.9
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ .7	17	+ 1.8	17	+ 1.8	17	+ .5	17	+ 3.1
18	+ 1.3	18	+ .7	18	+ .3	18	+ 0.0	18	+ 1.9
19	+ 4.1	19	+ 8.9	19	+ 6.3	19	+ 10.1	19	+ 18.7
20	+ .1	20	+ .9	20	+ .9	20	+ .9	20	+ 1.5
21	+ .6	21	+ 2.9	21	+ 1.6	21	+ 1.6	21	+ 5.7
22	+ 0.0	22	+ .6	22	+ .9	22	+ 0.0	22	+ 1.4
23	+ 0.0	23	+ .5	23	+ .2	23	+ .5	23	+ .2
24	+ .1	24	+ .3	24	+ .5	24	+ .6	24	+ 1.0
25	+ 0.0	25	+ 0.0	25	+ .8	25	+ 0.0	25	+ 0.0
26	+ 0.0	26	+ .2	26	+ 3.1	26	+ .1	26	+ 6.4
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ .2	29	+ .4	29	+ .8	29	+ .6	29	+ 1.2
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 5.9	31	+ 9.0	31	+ 11.1	31	+ 12.5	31	+ 26.9
32	+ .1	32	+ .1	32	+ .2	32	+ 0.0	32	+ .2
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.0	34	+ .3	34	+ 3.9	34	+ .3	34	+ .3
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ .1
36	+ .4	36	+ 1.0	36	+ .9	36	+ 1.5	36	+ 1.4
37	+ 0.0	37	+ 0.0	37	+ 0.0	37	+ 0.0	37	+ 0.0
38	+ .3	38	+ .6	38	+ .5	38	+ .4	38	+ .7
39	+ .9	39	+ .3	39	+ .7	39	+ .5	39	+ 4.2
40	+ .4	40	+ .6	40	+ .8	40	+ .6	40	+ 2.8
41	+ .1	41	+ .5	41	+ .3	41	+ .5	41	+ .7
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 0.0	43	+ 0.0	43	+ .1	43	+ .7	43	+ .4
44	+ .9	44	+ 2.8	44	+ 2.0	44	+ 1.8	44	+ 3.5
45	+ .5	45	+ .9	45	+ 1.1	45	+ .6	45	+ 2.8
46	+ .2	46	+ .7	46	+ .8	46	+ 1.1	46	+ 2.0
47	+ 2.2	47	+ 5.6	47	+ 4.7	47	+ 3.6	47	+ 12.6
48	+ 4.1	48	+ 5.5	48	+ 6.4	48	+ 11.9	48	+ 13.7

	COLUMN 16		COLUMN 17		COLUMN 18		COLUMN 19		COLUMN 20
1	+ .1	1	+ 1.6	1	+ .8	1	+ 1.9	1	+ .2
2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ .1	2	+ 0.0
3	+ 0.0	3	+ .8	3	+ .2	3	+ .3	3	+ 0.0
4	+ .2	4	+ 3.2	4	+ 1.6	4	+ 3.3	4	+ .9
5	+ .2	5	+ 2.6	5	+ 3.1	5	+ 3.6	5	+ 5.5
6	+ .1	6	+ 2.1	6	+ .9	6	+ .2	6	+ 0.0
7	+ .3	7	+ 1.6	7	+ .3	7	+ .9	7	+ 5.2
8	+ 2.8	8	+ 78.7	8	+ 76.4	8	+ 56.0	8	+ 5.0
9	+ .5	9	+ 8.2	9	+ 4.2	9	+ 10.4	9	+ 3.1
10	+ .7	10	+ 30.1	10	+ 7.3	10	+ 34.8	10	+ 6.8
11	+ 0.0	11	+ 0.0	11	+ 1.8	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 2.3	12	+ .6	12	+ 2.7	12	+ .2
13	+ 0.0	13	+ 4.3	13	+ .8	13	+ 1.0	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ .5	15	+ 1.6	15	+ .8	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ .1	16	+ 0.0
17	+ .3	17	+ 0.0	17	+ 14.6	17	+ 4.9	17	+ .2
18	+ 0.0	18	+ 3.5	18	+ 0.0	18	+ .8	18	+ .2
19	+ 7.0	19	+ 60.7	19	+ 4.5	19	+ 0.0	19	+ 4.6
20	+ .1	20	+ 5.3	20	+ 4.5	20	+ .6	20	+ 0.0
21	+ .9	21	+ 14.6	21	+ 3.6	21	+ .8	21	+ 3.0
22	+ .3	22	+ 2.3	22	+ .6	22	+ .5	22	+ .7
23	+ 0.0	23	+ .5	23	+ .5	23	+ .4	23	+ 10.2
24	+ .1	24	+ 1.4	24	+ .4	24	+ .2	24	+ 6.9
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 0.0	26	+ .4	26	+ .5	26	+ 1.0	26	+ .2
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ .5	28	+ 0.0
29	+ .8	29	+ 3.4	29	+ 1.7	29	+ 4.6	29	+ .9
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 1.5	31	+ 27.7	31	+ 13.6	31	+ 12.7	31	+ 5.9
32	+ 0.0	32	+ 1.4	32	+ .4	32	+ .3	32	+ 1.9
33	+ 0.0	33	+ 0.0	33	+ .2	33	+ 0.0	33	+ 0.0
34	+ 0.0	34	+ 2.5	34	+ 3.5	34	+ 4.8	34	+ .5
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ .5	36	+ 4.8	36	+ 1.2	36	+ .9	36	+ 2.5
37	+ 0.0	37	+ .7	37	+ .1	37	+ 3.4	37	+ 5.3
38	+ .4	38	+ 4.8	38	+ .9	38	+ 2.1	38	+ 3.2
39	+ .1	39	+ 4.0	39	+ .7	39	+ 4.1	39	+ 1.3
40	+ .9	40	+ 6.8	40	+ 2.4	40	+ 2.1	40	+ 2.5
41	+ .2	41	+ 2.0	41	+ 36.3	41	+ 1.7	41	+ .4
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ .1
43	+ 0.0	43	+ .8	43	+ .9	43	+ 2.4	43	+ 2.7
44	+ 1.2	44	+ 9.5	44	+ 5.3	44	+ 10.8	44	+ 2.7
45	+ .2	45	+ 5.9	45	+ 4.1	45	+ 2.9	45	+ 1.2
46	+ .8	46	+ 4.8	46	+ 1.0	46	+ 1.3	46	+ 1.6
47	+ .8	47	+ 20.3	47	+ 18.8	47	+ 14.1	47	+ 6.2
48	+ 1.7	48	+ 38.4	48	+ 37.3	48	+ 24.9	48	+ 13.8

	COLUMN 21		COLUMN 22		COLUMN 23		COLUMN 24		COLUMN 25
1	+ 1.3	1	+ .7	1	+ .8	1	+ .6	1	+ .5
2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0
3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ 2.1	4	+ .3	4	+ 2.3	4	+ 1.8	4	+ 1.3
5	+ 1.7	5	+ 2.5	5	+ 6.1	5	+ 9.8	5	+ 1.6
6	+ 1.1	6	+ .4	6	+ .8	6	+ 2.8	6	+ 1.8
7	+ 3.1	7	+ 8.0	7	+ 7.0	7	+ 4.5	7	+ .6
8	+ 34.6	8	+ 2.1	8	+ 7.8	8	+ 25.9	8	+ 39.1
9	+ 3.8	9	+ 5.1	9	+ 5.6	9	+ 11.5	9	+ 2.7
10	+ 21.3	10	+ 65.8	10	+ 14.6	10	+ 27.8	10	+ 10.5
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 1.1	12	+ 0.0	12	+ .4	12	+ 1.1	12	+ 1.7
13	+ 8.5	13	+ 0.0	13	+ 1.0	13	+ .3	13	+ .3
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ .2	15	+ 0.0	15	+ .1	15	+ .2	15	+ .2
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ .9	17	+ .5	17	+ .2	17	+ 3.4	17	+ 5.4
18	+ 3.4	18	+ 0.0	18	+ 0.0	18	+ .3	18	+ .2
19	+ 13.9	19	+ 1.6	19	+ 26.1	19	+ 25.2	19	+ 4.9
20	+ 8.0	20	+ 0.0	20	+ 18.5	20	+ 6.2	20	+ 1.7
21	+ 0.0	21	+ .3	21	+ 7.5	21	+ 8.8	21	+ 6.7
22	+ 15.4	22	+ 0.0	22	+ 9.8	22	+ 12.9	22	+ 1.7
23	+ 5.2	23	+ .3	23	+ 0.0	23	+ 5.7	23	+ .9
24	+ 1.6	24	+ 0.0	24	+ 2.6	24	+ 0.0	24	+ .3
25	+ .2	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ .2	26	+ 0.0	26	+ 0.0	26	+ .8	26	+ .7
27	+ 1.4	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ .2	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ 2.1	29	+ .6	29	+ 2.3	29	+ 2.7	29	+ .8
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 14.6	31	+ 46.6	31	+ 27.8	31	+ 22.3	31	+ 42.1
32	+ 4.5	32	+ .4	32	+ 7.6	32	+ 10.3	32	+ 1.3
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ .3
34	+ 4.6	34	+ 2.1	34	+ 2.2	34	+ 3.1	34	+ 1.3
35	+ 0.0	35	+ 0.0	35	+ 12.9	35	+ 0.0	35	+ .7
36	+ 1.7	36	+ 1.2	36	+ 2.2	36	+ 2.1	36	+ 4.7
37	+ .8	37	+ 1.9	37	+ .7	37	+ .9	37	+ 0.0
38	+ 4.6	38	+ 2.4	38	+ 6.1	38	+ 8.0	38	+ .4
39	+ .5	39	+ 2.5	39	+ .7	39	+ 5.2	39	+ .4
40	+ 3.3	40	+ .3	40	+ 10.6	40	+ 11.6	40	+ 1.1
41	+ 1.1	41	+ 0.0	41	+ 1.2	41	+ 1.0	41	+ 2.8
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ .2
43	+ .7	43	+ 4.0	43	+ .6	43	+ 5.7	43	+ 1.4
44	+ 6.4	44	+ 2.9	44	+ 8.0	44	+ 6.4	44	+ 7.0
45	+ 2.8	45	+ 3.3	45	+ 2.4	45	+ 4.1	45	+ 1.1
46	+ 2.1	46	+ 2.3	46	+ 3.6	46	+ 2.2	46	+ 1.0
47	+ 12.1	47	+ 4.8	47	+ 25.1	47	+ 14.4	47	+ 14.8
48	+ 14.8	48	+ 17.9	48	+ 68.5	48	+ 45.7	48	+ 21.3

	COLUMN 26			COLUMN 27			COLUMN 28			COLUMN 29			COLUMN 30	
1	+	4.5	1	+	1.3	1	+	1.5	1	+	0.0	1	+	.1
2	+	0.0	2	+	0.0	2	+	0.0	2	+	0.0	2	+	0.0
3	+	.1	3	+	0.0	3	+	.2	3	+	0.0	3	+	0.0
4	+	9.8	4	+	4.2	4	+	1.1	4	+	.5	4	+	.4
5	+	6.8	5	+	.3	5	+	2.2	5	+	.2	5	+	.7
6	+	11.0	6	+	.7	6	+	.8	6	+	.1	6	+	1.9
7	+	1.4	7	+	.4	7	+	.1	7	+	0.0	7	+	0.0
8	+	226.9	8	+	20.5	8	+	22.4	8	+	12.9	8	+	49.3
9	+	30.2	9	+	17.7	9	+	2.5	9	+	.3	9	+	1.3
10	+	40.2	10	+	5.1	10	+	3.6	10	+	5.4	10	+	2.6
11	+	0.0	11	+	0.0	11	+	0.0	11	+	0.0	11	+	0.0
12	+	3.1	12	+	2.7	12	+	.5	12	+	.6	12	+	.1
13	+	.4	13	+	.1	13	+	16.5	13	+	.1	13	+	0.0
14	+	0.0	14	+	0.0	14	+	0.0	14	+	0.0	14	+	0.0
15	+	1.2	15	+	.2	15	+	0.0	15	+	0.0	15	+	0.0
16	+	0.0	16	+	.1	16	+	0.0	16	+	0.0	16	+	0.0
17	+	1.7	17	+	4.7	17	+	.4	17	+	.6	17	+	.2
18	+	0.0	18	+	.2	18	+	.3	18	+	.1	18	+	0.0
19	+	30.4	19	+	3.5	19	+	10.8	19	+	2.8	19	+	.3
20	+	2.5	20	+	15.3	20	+	.1	20	+	.3	20	+	0.0
21	+	7.2	21	+	2.1	21	+	3.0	21	+	.6	21	+	0.0
22	+	6.3	22	+	2.6	22	+	.9	22	+	0.0	22	+	0.0
23	+	1.3	23	+	10.6	23	+	.4	23	+	.3	23	+	0.0
24	+	69.3	24	+	2.8	24	+	2.8	24	+	.3	24	+	.1
25	+	0.0	25	+	0.0	25	+	0.0	25	+	0.0	25	+	0.0
26	+	0.0	26	+	1.0	26	+	3.6	26	+	.3	26	+	.1
27	+	0.0	27	+	0.0	27	+	0.0	27	+	0.0	27	+	0.0
28	+	2.4	28	+	.4	28	+	0.0	28	+	0.0	28	+	0.0
29	+	9.3	29	+	2.7	29	+	1.2	29	+	0.0	29	+	.7
30	+	0.0	30	+	0.0	30	+	0.0	30	+	0.0	30	+	0.0
31	+	140.9	31	+	42.3	31	+	6.0	31	+	4.4	31	+	.3
32	+	10.6	32	+	0.0	32	+	.4	32	+	0.0	32	+	0.0
33	+	0.0	33	+	0.0	33	+	0.0	33	+	0.0	33	+	0.0
34	+	1.1	34	+	.6	34	+	.5	34	+	.6	34	+	0.0
35	+	20.5	35	+	0.0	35	+	0.0	35	+	0.0	35	+	0.0
36	+	12.9	36	+	1.1	36	+	1.8	36	+	.3	36	+	0.0
37	+	2.9	37	+	.1	37	+	.1	37	+	0.0	37	+	.1
38	+	5.1	38	+	1.3	38	+	1.0	38	+	.8	38	+	.7
39	+	66.5	39	+	2.7	39	+	2.9	39	+	.2	39	+	.1
40	+	14.5	40	+	.9	40	+	1.3	40	+	.3	40	+	.1
41	+	4.0	41	+	2.7	41	+	.2	41	+	.4	41	+	.1
42	+	0.0	42	+	0.0	42	+	0.0	42	+	0.0	42	+	0.0
43	+	18.0	43	+	1.7	43	+	.5	43	+	.1	43	+	.1
44	+	25.0	44	+	7.9	44	+	3.6	44	+	2.9	44	+	1.6
45	+	9.3	45	+	1.0	45	+	.9	45	+	.6	45	+	2.5
46	+	10.5	46	+	2.2	46	+	.7	46	+	.5	46	+	0.0
47	+	69.4	47	+	16.7	47	+	6.7	47	+	3.2	47	+	3.7
48	+	74.8	48	+	19.8	48	+	2.0	48	+	8.6	48	+	1.7

	COLUMN 31		COLUMN 32		COLUMN 33		COLUMN 34		COLUMN 35
1	+ 2.4	1	+ 3.8	1	+ 10.6	1	+ 15.4	1	+ .4
2	+ 0.0	2	+ 7.5	2	+ 2.2	2	+ 23.9	2	+ 0.0
3	+ .2	3	+ 0.0	3	+ .1	3	+ 2.5	3	+ 0.0
4	+ 6.1	4	+ 6.5	4	+ 5.3	4	+ 12.6	4	+ 1.0
5	+ 11.5	5	+ 13.7	5	+ 1.7	5	+ 8.8	5	+ 2.6
6	+ 6.5	6	+ .2	6	+ 0.0	6	+ .2	6	+ 4.0
7	+ 4.3	7	+ 1.5	7	+ 0.0	7	+ 1.7	7	+ 1.9
8	+ 205.0	8	+ .2	8	+ 0.0	8	+ 4.3	8	+ 1.3
9	+ 32.7	9	+ .7	9	+ 0.0	9	+ 2.3	9	+ 2.2
10	+ 128.4	10	+ 0.0	10	+ 0.0	10	+ 2.0	10	+ 0.0
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 2.2	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ .1	13	+ .1	13	+ 0.0	13	+ .3	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 1.8	15	+ .1	15	+ 0.0	15	+ .2	15	+ 0.0
16	+ .1	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ 3.2	17	+ 1.1	17	+ .5	17	+ 1.5	17	+ .6
18	+ .5	18	+ .1	18	+ .6	18	+ .2	18	+ 0.0
19	+ 2.1	19	+ 1.4	19	+ .4	19	+ 3.5	19	+ .7
20	+ 1.2	20	+ .1	20	+ 0.0	20	+ 0.0	20	+ 0.0
21	+ 1.6	21	+ .3	21	+ .1	21	+ 1.3	21	+ .2
22	+ 1.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0
23	+ .5	23	+ .1	23	+ 0.0	23	+ 0.0	23	+ 0.0
24	+ 2.6	24	+ .7	24	+ .1	24	+ 1.7	24	+ 0.0
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 1.5	26	+ .5	26	+ .1	26	+ 1.6	26	+ 0.0
27	+ .5	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 1.0	28	+ .2	28	+ 0.0	28	+ .5	28	+ 0.0
29	+ 9.4	29	+ 2.4	29	+ .7	29	+ 4.1	29	+ .4
30	+ 1.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 0.0	31	+ 5.0	31	+ .5	31	+ 8.2	31	+ 17.3
32	+ 1.0	32	+ 0.0	32	+ 0.0	32	+ .9	32	+ 1.5
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 21.8	33	+ 0.0
34	+ 2.0	34	+ 3.7	34	+ 1.3	34	+ 0.0	34	+ .8
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 3.5	36	+ 2.2	36	+ 0.0	36	+ 3.8	36	+ 29.3
37	+ 1.2	37	+ .2	37	+ .4	37	+ 5.4	37	+ .7
38	+ 9.5	38	+ 6.4	38	+ 4.0	38	+ 5.3	38	+ 1.5
39	+ 1.3	39	+ .5	39	+ .1	39	+ 1.2	39	+ 2.7
40	+ 6.1	40	+ 2.2	40	+ .1	40	+ .8	40	+ 4.5
41	+ 2.4	41	+ .1	41	+ .1	41	+ 1.2	41	+ .5
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ .5	42	+ .2
43	+ 5.2	43	+ .8	43	+ 0.0	43	+ 2.4	43	+ 28.5
44	+ 27.5	44	+ 16.1	44	+ 7.3	44	+ 13.9	44	+ 2.2
45	+ 13.6	45	+ 7.6	45	+ 4.1	45	+ 31.8	45	+ 3.6
46	+ 8.9	46	+ 1.0	46	+ .4	46	+ 9.4	46	+ 4.1
47	+ 58.9	47	+ 7.3	47	+ 4.9	47	+ 19.8	47	+ 5.1
48	+ 69.1	48	+ 13.7	48	+ 5.9	48	+ 24.6	48	+ 24.1

	COLUMN 36		COLUMN 37		COLUMN 38		COLUMN 39		COLUMN 40
1	+ 1.2	1	+ 17.9	1	+ 1.5	1	+ 3.3	1	+ 2.4
2	+ .2	2	+ 4.9	2	+ .2	2	+ 0.0	2	+ .1
3	+ 0.0	3	+ .4	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ 1.9	4	+ 3.6	4	+ 1.6	4	+ 1.2	4	+ 2.8
5	+ 2.7	5	+ 19.3	5	+ 11.9	5	+ 16.5	5	+ 22.2
6	+ 2.1	6	+ .4	6	+ .8	6	+ .2	6	+ 1.8
7	+ 4.4	7	+ 1.2	7	+ 7.6	7	+ 19.2	7	+ 40.3
8	+ 2.9	8	+ 0.0	8	+ 1.6	8	+ 0.0	8	+ 5.9
9	+ 1.8	9	+ 0.0	9	+ .6	9	+ 0.0	9	+ .9
10	+ 2.0	10	+ 0.0	10	+ .8	10	+ 0.0	10	+ 4.6
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ .1	13	+ .1
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ .1	15	+ .1	15	+ .1	15	+ .2
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ .4
17	+ .7	17	+ 5.4	17	+ 2.5	17	+ .9	17	+ 1.2
18	+ .1	18	+ .1	18	+ .1	18	+ .1	18	+ 0.0
19	+ 1.0	19	+ 2.1	19	+ 1.0	19	+ 1.3	19	+ 2.8
20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ .2	20	+ .2
21	+ .3	21	+ .3	21	+ .2	21	+ .4	21	+ .3
22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ .1
23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ .2	23	+ .4
24	+ 2.0	24	+ 0.0	24	+ 0.0	24	+ .2	24	+ .5
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ .1	26	+ 0.0	26	+ 0.0	26	+ .3	26	+ .2
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ .3	28	+ .2	28	+ .4	28	+ .4
29	+ .6	29	+ 0.0	29	+ .3	29	+ 1.2	29	+ 1.4
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ .4
31	+ 10.2	31	+ 2.4	31	+ 1.6	31	+ 11.9	31	+ 8.2
32	+ 2.5	32	+ .3	32	+ 0.0	32	+ .1	32	+ 1.8
33	+ .6	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 2.9	34	+ .3	34	+ 0.0	34	+ 1.3	34	+ .3
35	+ 1.4	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 0.0	36	+ 4.0	36	+ .8	36	+ 1.1	36	+ 7.2
37	+ 8.9	37	+ 0.0	37	+ 110.8	37	+ 1.1	37	+ 14.6
38	+ 2.2	38	+ 4.6	38	+ 0.0	38	+ 3.9	38	+ 10.0
39	+ .5	39	+ .5	39	+ .1	39	+ 0.0	39	+ 4.1
40	+ 2.0	40	+ 1.8	40	+ 1.8	40	+ 0.0	40	+ 0.0
41	+ .9	41	+ .8	41	+ .8	41	+ .6	41	+ 1.0
42	+ 0.0	42	+ .4	42	+ .2	42	+ 3.2	42	+ 0.0
43	+ 2.9	43	+ 6.9	43	+ 7.0	43	+ 29.5	43	+ 24.5
44	+ 4.6	44	+ 10.1	44	+ 4.5	44	+ 8.3	44	+ 6.4
45	+ 6.1	45	+ 6.1	45	+ 8.0	45	+ 4.3	45	+ 5.0
46	+ 9.4	46	+ 13.6	46	+ 6.3	46	+ 8.3	46	+ 2.8
47	+ 5.9	47	+ 32.5	47	+ 18.5	47	+ 9.1	47	+ 10.5
48	+ 37.0	48	+ 24.2	48	+ 29.5	48	+ 29.7	48	+ 38.5

	COLUMN 41		COLUMN 42		COLUMN 43		COLUMN 44		COLUMN 45
1	+ 2.4	1	+ 5.0	1	+ 16.8	1	+ 366.9	1	+ 36.6
2	+ 69.7	2	+ 0.0	2	+ 0.0	2	+ 1.2	2	+ 0.0
3	+ .2	3	+ .1	3	+ .5	3	+ 2.7	3	+ .1
4	+ 25.4	4	+ .6	4	+ 6.0	4	+ 42.1	4	+ 42.5
5	+ .8	5	+ 24.1	5	+ 30.2	5	+ 3.9	5	+ 8.2
6	+ 53.9	6	+ 0.0	6	+ .2	6	+ 1.5	6	+ 4.0
7	+ 0.0	7	+ 24.5	7	+ 11.0	7	+ .1	7	+ .1
8	+ 113.0	8	+ 0.0	8	+ 1.3	8	+ 26.8	8	+ 13.9
9	+ 9.0	9	+ 0.0	9	+ .1	9	+ 0.0	9	+ 0.0
10	+ 39.4	10	+ 0.0	10	+ .1	10	+ 2.1	10	+ .1
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ .1	12	+ .1	12	+ .1
13	+ 1.3	13	+ 0.0	13	+ .1	13	+ .4	13	+ .3
14	+ 0.0	14	+ 3.1	14	+ 17.1	14	+ 0.0	14	+ 0.0
15	+ 14.4	15	+ 0.0	15	+ .2	15	+ .6	15	+ .6
16	+ .1	16	+ 0.0	16	+ .3	16	+ .2	16	+ 0.0
17	+ 66.3	17	+ .2	17	+ 3.8	17	+ 1.9	17	+ .6
18	+ 77.1	18	+ .1	18	+ .4	18	+ 1.8	18	+ .1
19	+ 1.4	19	+ .3	19	+ 4.0	19	+ 7.5	19	+ .2
20	+ 1.1	20	+ 0.0	20	+ .4	20	+ 4.3	20	+ .7
21	+ 2.6	21	+ .1	21	+ 1.6	21	+ 22.9	21	+ 3.7
22	+ 45.7	22	+ 0.0	22	+ .3	22	+ 34.5	22	+ .1
23	+ .5	23	+ .1	23	+ 1.1	23	+ 2.1	23	+ 1.3
24	+ 28.9	24	+ .2	24	+ 1.6	24	+ 7.0	24	+ 23.6
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ .1
26	+ 5.1	26	+ .2	26	+ .9	26	+ 1.2	26	+ 24.7
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 1.2	28	+ .1	28	+ 1.2	28	+ 1.8	28	+ 76.7
29	+ 16.4	29	+ .8	29	+ 2.2	29	+ 3.8	29	+ .8
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ .1
31	+ 71.6	31	+ .3	31	+ 24.4	31	+ 5.5	31	+ 26.0
32	+ 80.9	32	+ 0.0	32	+ .7	32	+ 3.5	32	+ .3
33	+ 54.5	33	+ 0.0	33	+ 0.0	33	+ .4	33	+ 0.0
34	+ 310.3	34	+ .1	34	+ 1.2	34	+ 5.7	34	+ .5
35	+ 0.0	35	+ 0.0	35	+ .3	35	+ 0.0	35	+ .1
36	+ 225.4	36	+ 0.0	36	+ 1.8	36	+ 3.7	36	+ 2.7
37	+ 5.5	37	+ .1	37	+ 8.1	37	+ 1.1	37	+ .1
38	+ 2.1	38	+ 3.1	38	+ 18.4	38	+ 2.4	38	+ 3.7
39	+ 7.2	39	+ .2	39	+ 12.3	39	+ .9	39	+ 45.6
40	+ 34.9	40	+ .3	40	+ 12.8	40	+ 1.6	40	+ 4.5
41	+ 0.0	41	+ .4	41	+ 7.3	41	+ 4.0	41	+ 15.4
42	+ 0.0	42	+ 0.0	42	+ 137.3	42	+ 0.0	42	+ 0.0
43	+ 7.1	43	+ 5.9	43	+ 0.0	43	+ 1.4	43	+ 3.3
44	+ 19.6	44	+ 3.7	44	+ 32.5	44	+ 0.0	44	+ 20.6
45	+ 25.5	45	+ 1.6	45	+ 21.6	45	+ 41.2	45	+ 0.0
46	+ 17.4	46	+ 2.5	46	+ 61.7	46	+ 24.9	46	+ 1.5
47	+ 73.2	47	+ 4.0	47	+ 71.5	47	+ 19.7	47	+ 30.7
48	+ 154.3	48	+ 16.0	48	+ 148.7	48	+ 103.5	48	+ 54.5

	COLUMN 46		COLUMN 47		COLUMN 48
1	.6	1	2.2	1	26.8
2	0.0	2	0.0	2	8.8
3	0.0	3	.3	3	.8
4	17.9	4	25.3	4	54.6
5	2.3	5	3.7	5	208.2
6	2.7	6	.1	6	3.2
7	0.0	7	5.8	7	10.2
8	0.0	8	.1	8	11.1
9	0.0	9	0.0	9	21.2
10	0.0	10	0.0	10	16.9
11	0.0	11	0.0	11	5.1
12	.1	12	0.0	12	.1
13	.8	13	.1	13	.4
14	0.0	14	.1	14	.1
15	.5	15	.1	15	.5
16	.2	16	.5	16	2.1
17	.3	17	2.7	17	15.2
18	.1	18	3.7	18	1.4
19	.1	19	.1	19	14.3
20	.7	20	3.3	20	7.0
21	1.9	21	3.5	21	20.1
22	0.0	22	.1	22	1.9
23	.3	23	.6	23	12.1
24	.1	24	9.5	24	62.2
25	58.6	25	0.0	25	6.8
26	.7	26	4.8	26	41.2
27	10.7	27	0.0	27	0.0
28	2.7	28	0.0	28	3.4
29	.9	29	0.0	29	9.0
30	0.0	30	10.5	30	55.8
31	2.3	31	30.1	31	114.3
32	.3	32	0.0	32	40.2
33	0.0	33	0.0	33	1.6
34	.3	34	0.0	34	6.2
35	0.0	35	0.0	35	1.1
36	1.3	36	21.6	36	22.4
37	.1	37	1.2	37	141.8
38	1.8	38	54.9	38	151.2
39	2.1	39	24.0	39	34.5
40	2.3	40	2.9	40	32.1
41	5.2	41	74.0	41	94.3
42	0.0	42	.1	42	0.0
43	.5	43	90.8	43	54.3
44	2.7	44	104.5	44	194.6
45	18.6	45	433.6	45	204.2
46	0.0	46	5.0	46	130.1
47	8.2	47	0.0	47	196.6
48	56.9	48	437.6	48	0.0

Domestic Commodity Matrix 1968 at Current Prices

MATRIX F 1968 FOR P   48 ROWS   48 COLUMNS

Row	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
1	0.0	1.1	121.0	0.0	32.4	0.0
2	0.0	0.0	0.1	1.1	8.1	0.5
3	0.1	0.1	0.0	6.7	7.4	0.0
4	2.6	11.1	1.9	0.0	76.6	2.9
5	4.7	8.3	3.1	13.7	0.0	25.9
6	0.0	0.0	0.0	0.0	0.6	0.0
7	0.0	0.7	0.0	0.1	14.6	11.0
8	33.0	2.0	0.2	0.0	1.7	0.3
9	0.0	0.0	0.0	0.0	9.3	0.1
10	0.0	0.0	0.0	0.3	20.7	0.4
11	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.2	0.0	0.0
13	1.2	0.4	0.3	0.3	1.2	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0
15	5.8	1.4	0.0	0.0	0.2	0.0
16	0.1	0.0	0.0	0.0	0.2	0.0
17	8.5	2.6	0.2	6.5	5.9	0.2
18	0.0	0.0	1.7	2.0	3.0	0.1
19	17.0	3.7	2.0	3.7	19.0	0.6
20	0.0	0.0	0.0	1.5	0.3	0.0
21	6.8	0.0	0.0	1.9	0.0	0.0
22	5.7	0.0	0.0	0.5	0.8	0.0
23	0.0	0.0	0.0	0.0	0.1	0.0
24	0.0	0.2	0.0	0.6	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.7	0.0	0.1	0.3	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0
29	10.5	3.2	0.3	0.8	4.8	0.1
30	0.0	0.1	0.0	2.5	11.7	7.9
31	11.9	3.9	0.8	5.1	25.5	2.5
32	0.0	0.0	0.0	0.0	12.6	0.1
33	0.2	0.8	0.0	0.0	0.0	0.0
34	2.0	0.0	0.6	0.4	3.0	1.5
35	0.0	0.0	0.0	0.0	0.0	0.0
36	0.3	0.2	0.0	0.1	3.2	0.3
37	0.0	0.0	0.0	0.0	13.1	0.1
38	0.9	2.4	0.1	0.8	43.8	1.8
39	5.0	0.6	0.3	0.4	3.8	0.6
40	0.2	0.2	0.2	0.7	34.7	0.8
41	25.8	7.5	0.4	0.5	3.5	0.3
42	0.0	0.0	0.0	0.0	162.4	0.0
43	4.1	0.2	0.0	0.0	10.0	0.1
44	32.6	8.2	8.6	9.3	64.8	1.2
45	16.7	1.7	23.6	6.2	68.5	2.7
46	0.0	1.0	0.2	162.6	20.6	1.1
47	4.6	3.1	0.2	2.4	28.7	2.1
48	2.9	15.1	6.2	28.9	238.9	20.0

	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12
1	0.9	6.9	0.1	1.2	0.1	0.1
2	0.1	26.2	0.1	2.6	0.0	0.1
3	0.0	98.7	0.4	1.6	0.1	0.1
4	13.0	42.8	3.1	3.9	0.5	0.9
5	7.4	23.5	2.8	4.3	0.1	0.8
6	0.1	2.7	0.8	0.1	0.5	0.4
7	0.0	1.6	0.2	1.1	0.1	0.1
8	0.1	0.0	1.8	0.8	11.8	22.7
9	0.3	1.9	0.0	10.0	0.4	1.1
10	1.5	41.3	10.7	0.0	0.5	3.1
11	0.0	0.2	0.0	0.0	0.0	0.0
12	0.0	2.3	0.0	0.3	0.2	0.0
13	0.3	0.3	0.1	0.3	1.8	0.4
14	0.2	0.2	0.0	0.1	0.0	0.0
15	0.1	3.4	0.2	0.4	0.1	0.1
16	0.1	0.2	0.0	0.1	0.0	0.1
17	1.4	7.9	0.1	3.9	3.3	8.9
18	0.8	4.3	0.2	0.7	0.0	0.0
19	3.6	38.4	1.7	8.2	3.4	9.2
20	0.0	2.8	0.0	0.0	0.4	2.2
21	0.0	0.9	0.1	2.2	0.9	4.4
22	0.0	0.1	0.2	14.6	0.1	0.6
23	0.0	0.2	0.0	2.1	0.0	1.9
24	0.0	0.6	0.0	3.2	0.1	0.0
25	0.0	0.7	0.0	1.2	0.0	0.0
26	0.0	9.9	0.4	3.8	1.3	1.9
27	0.0	0.5	0.7	0.0	0.0	0.0
28	0.0	1.4	0.0	0.6	0.0	0.0
29	1.0	11.4	1.4	1.3	0.4	1.6
30	0.4	0.9	0.0	0.2	0.0	0.0
31	4.5	64.4	7.4	24.2	7.0	17.2
32	2.2	0.3	0.0	0.1	0.2	0.0
33	0.0	0.0	0.0	0.0	0.0	0.0
34	1.0	37.3	0.2	0.7	0.2	0.4
35	0.0	0.0	0.0	0.0	0.0	0.0
36	1.6	1.8	1.2	0.7	0.5	0.7
37	4.8	0.0	2.4	0.9	0.0	0.1
38	4.7	4.0	0.8	0.9	0.3	1.2
39	0.9	7.1	0.5	0.7	1.1	0.5
40	1.6	7.0	1.7	0.9	0.3	0.6
41	0.8	1.9	0.6	0.7	0.2	0.7
42	0.0	0.0	0.0	0.0	0.0	0.0
43	1.3	0.3	0.4	0.2	0.2	0.0
44	13.8	118.4	8.6	11.1	0.8	2.6
45	9.0	80.6	4.0	12.8	1.2	1.1
46	3.3	19.7	2.2	13.5	0.3	0.9
47	4.8	71.9	10.3	51.0	2.8	4.9
48	31.8	74.6	7.2	17.8	4.8	13.1

	COLUMN 13	COLUMN 14	COLUMN 15	COLUMN 16	COLUMN 17	COLUMN 18
1	0.1	0.2	0.2	0.0	0.8	0.2
2	0.4	0.0	0.0	0.0	0.2	0.1
3	0.1	0.3	0.2	0.0	1.1	0.3
4	0.6	0.3	2.0	0.2	3.9	1.9
5	0.2	0.2	0.5	0.1	2.1	1.9
6	0.3	0.2	1.1	0.2	2.0	0.9

	COLUMN 13		COLUMN 14		COLUMN 15		COLUMN 16		COLUMN 17		COLUMN 18
7	+ 0.0	7	+ 0.1	7	+ 0 2	7	+ 0.2	7	+ 1.5	7	+ 0.3
8	+ 13.1	8	+ 12.4	8	+ 53.3	8	+ 2.1	8	+ 97.9	8	+ 85.6
9	+ 1.5	9	+ 1.4	9	+ 1.6	9	+ 0.8	9	+ 12.7	9	+ 4.5
10	+ 4.5	10	+ 1.1	10	+ 2.9	10	+ 0.4	10	+ 26.7	10	+ 7.0
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.4	12	+ 0.6	12	+ 1.1	12	+ 0.2	12	+ 3.2	12	+ 2.4
13	+ 0.0	13	+ 0.1	13	+ 11.2	13	+ 0.0	13	+ 5.3	13	+ 0.6
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.1	14	+ 0.0
15	+ 0.1	15	+ 0.1	15	+ 0.0	15	+ 0.0	15	+ 0.7	15	+ 0.2
16	+ 0.0	16	+ 0.0	16	+ 0.1	16	+ 0.0	16	+ 0.2	16	+ 0.1
17	+ 4.0	17	+ 6.3	17	+ 19.8	17	+ 0.0	17	+ 0.0	17	+ 20.3
18	+ 0.0	18	+ 0.1	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ 5.0	19	+ 9.2	19	+ 14.9	19	+ 11.8	19	+ 35.0	19	+ 11.3
20	+ 0.5	20	+ 1.9	20	+ 3.9	20	+ 0.3	20	+ 11.1	20	+ 7.8
21	+ 0.7	21	+ 1.7	21	+ 6.2	21	+ 1.1	21	+ 17.4	21	+ 5.5
22	+ 0.2	22	+ 0.2	22	+ 1.5	22	+ 0.6	22	+ 2.7	22	+ 1.7
23	+ 0.1	23	+ 0.0	23	+ 0.2	23	+ 0.7	23	+ 1.1	23	+ 0.3
24	+ 2.4	24	+ 0.0	24	+ 1.4	24	+ 0.0	24	+ 1.7	24	+ 0.0
25	+ 0.3	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.2	25	+ 0.0
26	+ 5.9	26	+ 0.0	26	+ 6.5	26	+ 0.2	26	+ 8.5	26	+ 0.7
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.1
29	+ 1.0	29	+ 1.0	29	+ 1.8	29	+ 0.5	29	+ 5.3	29	+ 1.7
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 9.2	31	+ 13.6	31	+ 35.0	31	+ 10.5	31	+ 65.5	31	+ 25.6
32	+ 0.1	32	+ 0.1	32	+ 0.4	32	+ 0.0	32	+ 1.0	32	+ 0.2
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.4	34	+ 0.3	34	+ 0.6	34	+ 0.1	34	+ 3.1	34	+ 6.2
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 0.7	36	+ 1.4	36	+ 1.0	36	+ 0.5	36	+ 3.5	36	+ 0.8
37	+ 0.0	37	+ 0.4	37	+ 0.0	37	+ 0.0	37	+ 0.7	37	+ 0.1
38	+ 0.5	38	+ 0.8	38	+ 1.3	38	+ 0.3	38	+ 5.7	38	+ 1.6
39	+ 1.0	39	+ 0.7	39	+ 5.1	39	+ 0.2	39	+ 7.1	39	+ 1.0
40	+ 0.5	40	+ 0.8	40	+ 1.2	40	+ 1.1	40	+ 4.8	40	+ 1.0
41	+ 0.3	41	+ 0.4	41	+ 1.7	41	+ 0.3	41	+ 4.0	41	+ 63.4
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 0.2	43	+ 0.5	43	+ 0.4	43	+ 0.0	43	+ 1.5	43	+ 1.5
44	+ 1.4	44	+ 1.6	44	+ 3.7	44	+ 0.7	44	+ 11.0	44	+ 5.9
45	+ 1.5	45	+ 0.9	45	+ 4.0	45	+ 0.4	45	+ 9.0	45	+ 6.8
46	+ 0.7	46	+ 0.8	46	+ 1.8	46	+ 0.2	46	+ 3.8	46	+ 1.0
47	+ 2.9	47	+ 3.4	47	+ 12.9	47	+ 2.1	47	+ 22.9	47	+ 13.6
48	+ 5.7	48	+ 8.3	48	+ 29.8	48	+ 3.9	48	+ 54.6	48	+ 47.0

	COLUMN 19		COLUMN 20		COLUMN 21		COLUMN 22		COLUMN 23		COLUMN 24
1	+ 1.0	1	+ 0.2	1	+ 0.8	1	+ 0.4	1	+ 0.3	1	+ 0.3
2	+ 0.3	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0
3	+ 0.4	3	+ 0.0	3	+ 0.2	3	+ 0.0	3	+ 0.1	3	+ 0.1
4	+ 3.6	4	+ 1.3	4	+ 1 9	4	+ 0.5	4	+ 2.4	4	+ 2.5
5	+ 13.0	5	+ 1.5	5	+ 2.4	5	+ 0.3	5	+ 5.0	5	+ 4.2
6	+ 0.7	6	+ 0.6	6	+ 1.1	6	+ 0.3	6	+ 1.3	6	+ 2.1
7	+ 1.1	7	+ 2.0	7	+ 2.5	7	+ 8.7	7	+ 7.2	7	+ 8.6
8	+ 68.6	8	+ 10.4	8	+ 44 0	8	+ 1.5	8	+ 12.4	8	+ 29.8
9	+ 9.6	9	+ 4.7	9	+ 4.3	9	+ 6.6	9	+ 7.9	9	+ 11.3
10	+ 32.7	10	+ 6.9	10	+ 15.9	10	+ 55.8	10	+ 17.8	10	+ 25.7
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 3.5	12	+ 0.9	12	+ 0.7	12	+ 0.4	12	+ 1.8	12	+ 1.4

	COLUMN 19		COLUMN 20		COLUMN 21		COLUMN 22		COLUMN 23		COLUMN 24
13	+ 1.4	13	+ 0.2	13	+ 2.8	13	+ 0.0	13	+ 0.2	13	+ 0.2
14	+ 0.1	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 1.0	15	+ 0.0	15	+ 0.3	15	+ 0.0	15	+ 0.3	15	+ 0.3
16	+ 0.1	16	+ 0.1	16	+ 0.1	16	+ 0.1	16	+ 0.1	16	+ 0.2
17	+ 12.8	17	+ 0.3	17	+ 0.8	17	+ 0.0	17	+ 0.7	17	+ 1.2
18	+ 0.5	18	+ 0.0	18	+ 1.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ 0.0	19	+ 4.4	19	+ 16.5	19	+ 5.5	19	+ 38.2	19	+ 21.3
20	+ 3.1	20	+ 0.0	20	+ 4.5	20	+ 0.0	20	+ 5.4	20	+ 4.9
21	+ 5.7	21	+ 4.9	21	+ 0.0	21	+ 0.0	21	+ 15.6	21	+ 13.2
22	+ 1.0	22	+ 1.5	22	+ 14.3	22	+ 0.0	22	+ 10.4	22	+ 11.4
23	+ 0.7	23	+ 36.4	23	+ 13.4	23	+ 0.6	23	+ 0.0	23	+ 15.8
24	+ 0.5	24	+ 0.2	24	+ 1.1	24	+ 0.0	24	+ 2.4	24	+ 0.0
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 3.3	26	+ 0.4	26	+ 0.1	26	+ 0.0	26	+ 0.0	26	+ 0.2
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.2	28	+ 0.0	28	+ 1.7	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ 5.7	29	+ 2.0	29	+ 1.5	29	+ 0.7	29	+ 3.6	29	+ 2.6
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 24.4	31	+ 10.5	31	+ 23.8	31	+ 44.0	31	+ 48.9	31	+ 37.9
32	+ 0.3	32	+ 3.7	32	+ 3.1	32	+ 0.0	32	+ 10.2	32	+ 13.2
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 4.0	34	+ 0.6	34	+ 4.3	34	+ 0.8	34	+ 3.9	34	+ 5.7
35	+ 0.0	35	+ 0.2	35	+ 0.1	35	+ 0.0	35	+ 14.8	35	+ 0.1
36	+ 1.4	36	+ 0.3	36	+ 1.4	36	+ 0.0	36	+ 1.7	36	+ 2.2
37	+ 1.2	37	+ 0.4	37	+ 0.1	37	+ 1.2	37	+ 2.4	37	+ 1.4
38	+ 3.5	38	+ 4.3	38	+ 2.5	38	+ 2.1	38	+ 6.8	38	+ 8.6
39	+ 3.5	39	+ 2.8	39	+ 1.0	39	+ 1.4	39	+ 1.6	39	+ 7.7
40	+ 2.0	40	+ 4.3	40	+ 2.5	40	+ 0.3	40	+ 20.3	40	+ 10.6
41	+ 5.0	41	+ 1.0	41	+ 1.0	41	+ 0.0	41	+ 2.0	41	+ 1.9
42	+ 0.0	42	+ 0.5	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 2.4	43	+ 3.0	43	+ 0.7	43	+ 1.8	43	+ 0.6	43	+ 1.9
44	+ 12.6	44	+ 5.3	44	+ 5.3	44	+ 3.3	44	+ 7.7	44	+ 8.0
45	+ 4.6	45	+ 2.1	45	+ 4.1	45	+ 2.9	45	+ 3.4	45	+ 4.1
46	+ 1.8	46	+ 1.9	46	+ 1.2	46	+ 1.3	46	+ 3.6	46	+ 1.5
47	+ 13.5	47	+ 6.0	47	+ 10.3	47	+ 1.1	47	+ 21.9	47	+ 11.7
48	+ 41.3	48	+ 26.2	48	+ 23.6	48	+ 6.8	48	+ 47.8	48	+ 43.1

	COLUMN 25		COLUMN 26		COLUMN 27		COLUMN 28		COLUMN 29		COLUMN 30
1	+ 0.2	1	+ 1.6	1	+ 0.8	1	+ 0.5	1	+ 0.0	1	+ 0.1
2	+ 0.1	2	+ 0.0	2	+ 0.0	2	+ 0.3	2	+ 0.0	2	+ 0.0
3	+ 0.3	3	+ 0.5	3	+ 0.2	3	+ 0.1	3	+ 0.0	3	+ 0.0
4	+ 1.7	4	+ 12.4	4	+ 4.0	4	+ 0.9	4	+ 0.5	4	+ 0.2
5	+ 1.6	5	+ 10.8	5	+ 0.6	5	+ 0.9	5	+ 0.2	5	+ 1.1
6	+ 1.7	6	+ 11.9	6	+ 0.8	6	+ 0.7	6	+ 0.2	6	+ 2.4
7	+ 0.4	7	+ 1.7	7	+ 0.7	7	+ 0.1	7	+ 0.0	7	+ 0.6
8	+ 38.4	8	+ 209.1	8	+ 21.4	8	+ 19.1	8	+ 18.7	8	+ 56.2
9	+ 1.7	9	+ 41.6	9	+ 12.1	9	+ 2.0	9	+ 0.8	9	+ 2.2
10	+ 7.9	10	+ 26.2	10	+ 6.5	10	+ 2.6	10	+ 4.6	10	+ 1.4
11	+ 0.0	11	+ 0.5	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 1.3	12	+ 5.3	12	+ 2.0	12	+ 0.2	12	+ 0.5	12	+ 0.2
13	+ 0.6	13	+ 1.4	13	+ 0.2	13	+ 5.6	13	+ 0.1	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 7.1	15	+ 3.0	15	+ 0.8	15	+ 0.0	15	+ 0.1	15	+ 0.1
16	+ 0.1	16	+ 0.0	16	+ 0.1	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ 19.5	17	+ 4.0	17	+ 8.9	17	+ 0.2	17	+ 0.7	17	+ 0.0
18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0

	COLUMN 25		COLUMN 26		COLUMN 27		COLUMN 28		COLUMN 29		COLUMN 30
19	+ 0.1	19	+ 31.1	19	+ 4.0	19	+ 15.1	19	+ 2.5	19	+ 0.3
20	+ 4.9	20	+ 7.8	20	+ 7.5	20	+ 0.3	20	+ 0.5	20	+ 0.0
21	+ 4.9	21	+ 11.6	21	+ 4.2	21	+ 3.0	21	+ 0.4	21	+ 0.0
22	+ 3.7	22	+ 4.8	22	+ 1.4	22	+ 0.6	22	+ 0.1	22	+ 0.0
23	+ 2.0	23	+ 0.2	23	+ 36.1	23	+ 0.2	23	+ 0.2	23	+ 0.0
24	+ 3.5	24	+ 31.2	24	+ 16.8	24	+ 5.0	24	+ 0.3	24	+ 0.0
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 1.4	26	+ 0.0	26	+ 0.7	26	+ 0.4	26	+ 1.8	26	+ 0.1
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 1.2	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ 2.7	29	+ 22.1	29	+ 7.1	29	+ 1.2	29	+ 0.0	29	+ 0.7
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 7.5	31	+ 145.4	31	+ 4.0	31	+ 7.0	31	+ 4.6	31	+ 0.2
32	+ 1.2	32	+ 18.4	32	+ 0.0	32	+ 0.4	32	+ 0.2	32	+ 0.0
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.6	34	+ 4.3	34	+ 1.3	34	+ 0.3	34	+ 0.6	34	+ 0.2
35	+ 3.6	35	+ 0.2	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 3.0	36	+ 11.8	36	+ 1.1	36	+ 1.6	36	+ 0.3	36	+ 0.1
37	+ 0.0	37	+ 2.2	37	+ 0.2	37	+ 0.1	37	+ 0.0	37	+ 0.3
38	+ 0.9	38	+ 5.4	38	+ 2.4	38	+ 0.3	38	+ 1.1	38	+ 0.9
39	+ 0.9	39	+ 72.9	39	+ 3.6	39	+ 2.2	39	+ 0.5	39	+ 0.2
40	+ 1.1	40	+ 49.9	40	+ 5.0	40	+ 0.7	40	+ 0.6	40	+ 0.3
41	+ 3.3	41	+ 5.6	41	+ 4.0	41	+ 0.5	41	+ 0.5	41	+ 0.1
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 2.3	43	+ 25.2	43	+ 1.9	43	+ 0.7	43	+ 0.1	43	+ 0.1
44	+ 6.1	44	+ 26.4	44	+ 7.7	44	+ 2.6	44	+ 2.8	44	+ 1.5
45	+ 2.6	45	+ 19.2	45	+ 1.5	45	+ 1.3	45	+ 0.9	45	+ 3.7
46	+ 1.6	46	+ 8.9	46	+ 2.7	46	+ 0.6	46	+ 0.5	46	+ 0.1
47	+ 7.1	47	+ 49.9	47	+ 6.7	47	+ 3.7	47	+ 2.5	47	+ 5.8
48	+ 20.0	48	+ 72.1	48	+ 21.1	48	+ 1.9	48	+ 10.0	48	+ 3.8

	COLUMN 31		COLUMN 32		COLUMN 33		COLUMN 34		COLUMN 35		COLUMN 36
1	+ 1.2	1	+ 1.5	1	+ 12.1	1	+ 9.3	1	+ 0.2	1	+ 0.4
2	+ 0.3	2	+ 5.2	2	+ 2.2	2	+ 29.3	2	+ 0.0	2	+ 0.0
3	+ 0.7	3	+ 0.2	3	+ 0.1	3	+ 4.1	3	+ 0.1	3	+ 0.1
4	+ 7.6	4	+ 9.5	4	+ 4.7	4	+ 21.0	4	+ 1.6	4	+ 2.2
5	+ 10.1	5	+ 14.5	5	+ 1.6	5	+ 9.2	5	+ 1.4	5	+ 2.4
6	+ 5.8	6	+ 0.4	6	+ 0.0	6	+ 0.8	6	+ 3.9	6	+ 2.6
7	+ 3.2	7	+ 1.0	7	+ 0.0	7	+ 1.9	7	+ 2.5	7	+ 6.0
8	+ 250.0	8	+ 0.1	8	+ 0.0	8	+ 6.8	8	+ 1.2	8	+ 4.2
9	+ 37.2	9	+ 0.3	9	+ 0.0	9	+ 1.0	9	+ 0.9	9	+ 1.5
10	+ 102.0	10	+ 0.1	10	+ 0.0	10	+ 2.2	10	+ 0.0	10	+ 0.3
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 4.5	12	+ 0.0	12	+ 0.0	12	+ 0.1	12	+ 0.0	12	+ 0.0
13	+ 0.7	13	+ 0.4	13	+ 0.4	13	+ 0.9	13	+ 0.1	13	+ 0.2
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.6	15	+ 0.2	15	+ 0.2	15	+ 0.7	15	+ 0.0	15	+ 0.1
16	+ 0.3	16	+ 0.1	16	+ 0.1	16	+ 0.2	16	+ 0.0	16	+ 0.0
17	+ 0.7	17	+ 0.8	17	+ 0.8	17	+ 2.2	17	+ 0.2	17	+ 0.7
18	+ 0.0	18	+ 0.1	18	+ 0.3	18	+ 0.8	18	+ 0.0	18	+ 0.0
19	+ 24.2	19	+ 3.1	19	+ 0.3	19	+ 6.2	19	+ 1.3	19	+ 2.2
20	+ 0.7	20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0
21	+ 0.7	21	+ 0.1	21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ 0.1
22	+ 0.5	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0
23	+ 1.6	23	+ 0.7	23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0
24	+ 0.3	24	+ 0.9	24	+ 0.0	24	+ 0.2	24	+ 0.1	24	+ 0.8

	COLUMN 31		COLUMN 32		COLUMN 33		COLUMN 34		COLUMN 35		COLUMN 36	
25	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
26	+	3.7	+	0.1	+	0.1	+	0.7	+	0.1	+	0.2
27	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
28	+	0.1	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
29	+	12.4	+	1.9	+	1.1	+	2.7	+	0.1	+	0.2
30	+	0.8	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
31	+	0.0	+	8.4	+	3.4	+	18.3	+	15.3	+	12.5
32	+	2.9	+	0.0	+	0.0	+	2.4	+	2.4	+	3.3
33	+	0.1	+	0.0	+	0.0	+	30.7	+	0.0	+	0.9
34	+	3.2	+	2.2	+	0.7	+	0.0	+	0.6	+	3.3
35	+	0.9	+	0.0	+	0.0	+	0.0	+	0.0	+	2.8
36	+	4.8	+	1.6	+	0.1	+	3.9	+	37.5	+	0.0
37	+	2.0	+	0.6	+	0.0	+	7.9	+	0.9	+	1.7
38	+	13.5	+	7.5	+	3.1	+	4.1	+	1.9	+	1.5
39	+	7.5	+	0.6	+	0.7	+	2.4	+	2.4	+	0.4
40	+	12.5	+	1.0	+	0.5	+	2.2	+	12.5	+	2.8
41	+	3.1	+	0.4	+	0.1	+	1.9	+	0.9	+	0.4
42	+	0.0	+	0.0	+	0.0	+	0.0	+	0.1	+	0.0
43	+	6.6	+	0.5	+	0.0	+	3.4	+	31.1	+	2.1
44	+	29.6	+	13.8	+	8.7	+	16.7	+	2.8	+	5.0
45	+	21.9	+	14.8	+	10.3	+	93.5	+	5.2	+	10.7
46	+	5.6	+	1.6	+	0.3	+	3.5	+	1.7	+	10.3
47	+	42.9	+	3.1	+	1.0	+	5.9	+	7.9	+	13.3
48	+	76.0	+	24.6	+	8.1	+	41.9	+	26.5	+	35.0

	COLUMN 37		COLUMN 38		COLUMN 39		COLUMN 40		COLUMN 41		COLUMN 42	
1	+	11.3	+	1.0	+	2.1	+	1.2	+	1.2	+	2.0
2	+	2.4	+	0.0	+	0.4	+	0.0	+	94.4	+	0.0
3	+	0.4	+	0.0	+	0.0	+	0.1	+	0.6	+	0.3
4	+	9.0	+	3.0	+	2.8	+	4.3	+	29.8	+	3.1
5	+	14.9	+	18.7	+	23.4	+	23.7	+	4.3	+	31.8
6	+	0.4	+	0.6	+	0.0	+	1.4	+	51.2	+	0.0
7	+	4.5	+	14.1	+	27.4	+	93.4	+	0.0	+	32.4
8	+	0.0	+	1.5	+	0.0	+	3.5	+	160.2	+	0.0
9	+	0.5	+	2.0	+	0.0	+	1.4	+	0.0	+	0.0
10	+	0.0	+	2.3	+	0.0	+	4.1	+	37.2	+	0.0
11	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
12	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
13	+	0.1	+	0.1	+	0.4	+	0.4	+	4.9	+	0.0
14	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	4.2
15	+	0.3	+	0.3	+	0.2	+	0.2	+	30.5	+	0.0
16	+	0.1	+	0.2	+	0.1	+	0.6	+	0.6	+	0.1
17	+	3.1	+	2.6	+	0.7	+	0.5	+	118.8	+	0.0
18	+	0.3	+	0.2	+	0.2	+	0.2	+	198.6	+	0.0
19	+	4.6	+	3.4	+	3.1	+	4.6	+	18.9	+	1.7
20	+	0.0	+	0.0	+	0.1	+	0.2	+	0.0	+	0.0
21	+	0.0	+	0.0	+	0.0	+	0.3	+	0.0	+	0.0
22	+	0.0	+	0.0	+	0.0	+	0.2	+	23.8	+	0.0
23	+	0.0	+	0.0	+	0.0	+	0.4	+	0.0	+	0.0
24	+	0.0	+	0.0	+	0.0	+	0.0	+	37.8	+	0.0
25	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
26	+	0.0	+	0.0	+	0.1	+	0.1	+	7.3	+	0.0
27	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
28	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0	+	0.0
29	+	0.5	+	0.6	+	1.6	+	2.8	+	10.4	+	0.1
30	+	0.0	+	0.0	+	0.0	+	0.6	+	0.0	+	0.0

	COLUMN 37	COLUMN 38	COLUMN 39	COLUMN 40	COLUMN 41	COLUMN 42
31	5.0	2.7	16.2	19.3	74.9	0.2
32	0.0	0.0	0.0	2.3	43.2	0.0
33	0.0	0.0	0.0	0.0	60.3	0.0
34	0.3	0.1	0.6	1.5	413.0	0.0
35	0.0	0.0	0.0	0.0	0.0	0.0
36	3.1	1.4	0.5	4.6	266.8	0.1
37	0.0	129.0	1.7	11.4	0.0	0.5
38	1.3	0.0	3.1	14.2	15.7	3.4
39	0.8	0.6	0.0	3.3	7.3	0.3
40	0.8	2.1	0.9	0.0	40.8	0.8
41	0.8	1.4	0.7	1.3	0.0	0.4
42	0.1	6.1	4.8	0.3	0.0	0.0
43	5.1	1.4	20.1	13.3	4.9	9.1
44	10.7	5.5	9.3	10.7	15.8	6.0
45	25.5	14.6	8.6	11.7	99.9	3.5
46	6.1	3.4	4.0	3.1	6.1	1.8
47	17.3	25.1	5.4	9.8	84.0	1.6
48	32.7	40.8	26.9	47.3	178.5	23.9

	COLUMN 43	COLUMN 44	COLUMN 45	COLUMN 46	COLUMN 47	COLUMN 48
1	8.5	370.3	0.7	0.0	0.0	19.7
2	0.0	14.2	0.6	0.0	0.0	5.7
3	0.3	11.9	0.0	0.0	0.0	0.5
4	14.3	87.3	41.0	28.1	19.6	88.4
5	40.6	7.8	8.5	1.6	23.4	294.9
6	0.0	0.0	4.2	0.0	0.0	2.3
7	22.2	0.0	0.0	0.0	0.0	23.8
8	1.8	21.2	12.1	0.7	0.0	6.4
9	0.2	0.0	0.0	0.0	0.0	25.2
10	0.1	2.5	0.0	0.0	0.0	9.0
11	0.0	0.0	0.0	0.0	0.0	15.6
12	0.0	0.2	0.0	0.0	0.0	0.0
13	0.0	0.3	0.8	0.0	0.0	1.4
14	12.2	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	3.2	0.0	0.7
16	0.3	0.3	0.5	0.0	1.3	5.6
17	1.0	4.3	0.1	0.0	12.0	20.2
18	0.0	6.8	0.0	0.9	0.0	1.6
19	18.5	3.6	0.0	0.0	0.0	24.7
20	0.1	1.7	0.0	0.0	0.0	9.0
21	0.0	17.0	4.0	1.6	0.0	2.4
22	0.0	27.7	2.0	0.0	0.0	33.4
23	0.4	0.0	0.0	0.0	0.6	20.4
24	0.0	16.1	22.8	3.7	57.6	83.1
25	0.0	0.0	0.0	28.3	0.0	7.3
26	0.9	0.9	26.4	0.2	5.7	60.1
27	0.0	0.0	0.0	16.2	0.0	0.0
28	0.1	0.0	73.0	0.0	0.0	2.8
29	0.0	5.2	0.0	0.0	0.0	5.6
30	0.0	0.0	0.0	0.0	22.1	69.2
31	27.3	10.4	10.5	0.0	10.8	85.7
32	0.8	0.0	0.7	0.0	0.0	54.9
33	0.1	0.2	0.4	0.2	0.0	1.3
34	0.2	2.9	4.3	1.4	0.0	22.8
35	0.1	0.2	0.0	0.0	0.6	42.2
36			1.6	0.0	15.8	28.6

	COLUMN 43		COLUMN 44		COLUMN 45		COLUMN 46		COLUMN 47		COLUMN 48
37	+ 8.4	37	+ 0.1	37	+ 0.0	37	+ 0.0	37	+ 13.9	37	+ 160.5
38	+ 23.9	38	+ 3.0	38	+ 7.0	38	+ 3.0	38	+ 97.4	38	+ 194.8
39	+ 19.9	39	+ 1.0	39	+ 36.0	39	+ 1.8	39	+ 7.0	39	+ 65.1
40	+ 19.7	40	+ 2.0	40	+ 3.2	40	+ 1.6	40	+ 29.1	40	+ 42.2
41	+ 8.0	41	+ 28.2	41	+ 1.2	41	+ 3.4	41	+ 34.8	41	+ 72.5
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 23.2
43	+ 0.0	43	+ 1.9	43	+ 8.0	43	+ 4.3	43	+ 84.2	43	+ 105.6
44	+ 36.1	44	+ 0.0	44	+ 26.4	44	+ 18.3	44	+ 160.1	44	+ 216.5
45	+ 30.0	45	+ 51.5	45	+ 0.0	45	+ 0.0	45	+ 452.5	45	+ 186.0
46	+ 20.5	46	+ 9.6	46	+ 3.5	46	+ 0.0	46	+ 1.9	46	+ 102.9
47	+ 77.0	47	+ 6.7	47	+ 13.8	47	+ 5.9	47	+ 0.0	47	+ 366.2
48	+ 162.0	48	+ 126.6	48	+ 74.5	48	+ 94.4	48	+ 382.8	48	+ 0.0

NUMBER OF PAGES 9

Imports Matrix 1963 at 1968 Prices

Row	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
1	0.0	0.0	0.0	0.0	0.0
2	0.0	.3	0.0	499.4	24.0
3	0.0	0.0	0.0	0.0	0.0
4	.5	1.0	.3	45.6	15.4
5	.4	.2	.1	2.8	88.6
6	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	1.6
8	.3	0.0	0.0	0.0	1.0
9	0.0	0.0	0.0	0.0	.8
10	0.0	0.0	0.0	0.0	5.9
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	.1
15	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0
17	1.2	0.0	0.0	0.0	0.0
18	.5	0.0	0.0	0.0	0.0
19	.1	0.0	0.0	0.0	.1
20	0.0	0.0	0.0	0.0	.6
21	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0
24	.1	.1	0.0	0.0	.1
25	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0
29	.6	.2	0.0	0.0	.5
30	0.0	0.0	0.0	0.0	0.0
31	.2	0.0	0.0	.2	.3
32	0.0	0.0	0.0	0.0	.1
33	0.0	0.0	0.0	0.0	0.0
34	.1	0.0	0.0	0.0	.1
35	0.0	0.0	0.0	0.0	0.0
36	4.6	0.0	0.0	0.0	.9
37	0.0	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0	0.0
39	.1	0.0	0.0	0.0	0.0
40	.1	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	.3
43	.1	0.0	0.0	0.0	1.6
44	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0
46	0.0	0.0	0.0	0.0	0.0
47	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	.1	0.0	17.4

	COLUMN 6		COLUMN 7		COLUMN 8		COLUMN 9		COLUMN 10
1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
2	.3	2	.4	2	85.5	2	2.0	2	42.3
3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
4	2.4	4	1.9	4	9.5	4	.9	4	.9
5	4.7	5	4.7	5	1.7	5	0.0	5	.4
6	0.0	6	0.0	6	0.0	6	0.0	6	0.0
7	0.0	7	17.1	7	0.0	7	0.0	7	0.0
8	0.0	8	0.0	8	26.6	8	0.0	8	0.0
9	0.0	9	0.0	9	.5	9	86.5	9	.5
10	0.0	10	0.0	10	10.9	10	.3	10	194.5
11	0.0	11	0.0	11	0.0	11	0.0	11	0.0
12	0.0	12	0.0	12	.2	12	0.0	12	0.0
13	0.0	13	0.0	13	0.0	13	0.0	13	0.0
14	0.0	14	0.0	14	0.0	14	0.0	14	0.0
15	0.0	15	0.0	15	0.0	15	0.0	15	0.0
16	0.0	16	0.0	16	0.0	16	0.0	16	0.0
17	0.0	17	0.0	17	.3	17	0.0	17	.1
18	0.0	18	0.0	18	0.0	18	0.0	18	0.0
19	0.0	19	0.0	19	.4	19	0.0	19	.1
20	0.0	20	0.0	20	.1	20	0.0	20	0.0
21	0.0	21	0.0	21	.1	21	0.0	21	0.0
22	0.0	22	0.0	22	0.0	22	0.0	22	0.0
23	0.0	23	0.0	23	0.0	23	0.0	23	0.0
24	0.0	24	0.0	24	.4	24	0.0	24	.1
25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
26	0.0	26	0.0	26	0.0	26	0.0	26	0.0
27	0.0	27	0.0	27	0.0	27	0.0	27	0.0
28	0.0	28	0.0	28	0.0	28	0.0	28	0.0
29	0.0	29	.1	29	1.9	29	.1	29	.2
30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
31	0.0	31	0.0	31	.2	31	0.0	31	.5
32	0.0	32	.4	32	0.0	32	0.0	32	0.0
33	0.0	33	0.0	33	0.0	33	0.0	33	0.0
34	0.0	34	0.0	34	1.1	34	0.0	34	0.0
35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
36	0.0	36	0.0	36	.3	36	0.0	36	0.0
37	0.0	37	.2	37	0.0	37	1.0	37	0.0
38	0.0	38	0.0	38	0.0	38	0.0	38	0.0
39	0.0	39	0.0	39	.1	39	0.0	39	0.0
40	0.0	40	0.0	40	0.0	40	0.0	40	0.0
41	0.0	41	0.0	41	0.0	41	0.0	41	0.0
42	0.0	42	0.0	42	0.0	42	0.0	42	0.0
43	0.0	43	.2	43	0.0	43	0.0	43	0.0
44	0.0	44	0.0	44	0.0	44	0.0	44	0.0
45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
46	0.0	46	0.0	46	0.0	46	0.0	46	0.0
47	0.0	47	0.0	47	0.0	47	0.0	47	0.0
48	.1	48	.5	48	0.0	48	0.0	48	0.0

	COLUMN 11		COLUMN 12		COLUMN 13		COLUMN 14		COLUMN 15	
1	+	0.0	1 +	0.0	1 +	0.0	1 +	0.0	1 +	0.0
2	+	.1	2 +	.1	2 +	0.0	2 +	0.0	2 +	0.0
3	+	0.0	3 +	0.0	3 +	0.0	3 +	0.0	3 +	0.0
4	+	0.0	4 +	.1	4 +	.1	4 +	0.0	4 +	.3
5	+	0.0	5 +	0.0	5 +	0.0	5 +	0.0	5 +	.2
6	+	0.0	6 +	0.0	6 +	0.0	6 +	0.0	6 +	0.0
7	+	0.0	7 +	0.0	7 +	0.0	7 +	0.0	7 +	0.0
8	+	.3	8 +	.3	8 +	.4	8 +	.2	8 +	1.2
9	+	0.0	9 +	0.0	9 +	0.0	9 +	0.0	9 +	0.0
10	+	0.0	10 +	0.0	10 +	.3	10 +	0.0	10 +	.3
11	+	0.0	11 +	0.0	11 +	0.0	11 +	0.0	11 +	0.0
12	+	0.0	12 +	.2	12 +	0.0	12 +	0.0	12 +	0.0
13	+	.1	13 +	0.0	13 +	.2	13 +	0.0	13 +	.8
14	+	0.0	14 +	0.0	14 +	0.0	14 +	0.0	14 +	0.0
15	+	0.0	15 +	0.0	15 +	0.0	15 +	0.0	15 +	.8
16	+	0.0	16 +	0.0	16 +	0.0	16 +	0.0	16 +	0.0
17	+	0.0	17 +	.1	17 +	.1	17 +	0.0	17 +	.3
18	+	0.0	18 +	0.0	18 +	0.0	18 +	0.0	18 +	0.0
19	+	.1	19 +	.2	19 +	.2	19 +	.3	19 +	.6
20	+	0.0	20 +	.1	20 +	.2	20 +	0.0	20 +	.2
21	+	0.0	21 +	.1	21 +	.1	21 +	0.0	21 +	.1
22	+	0.0	22 +	0.0	22 +	0.0	22 +	0.0	22 +	0.0
23	+	0.0	23 +	0.0	23 +	0.0	23 +	0.0	23 +	0.0
24	+	0.0	24 +	0.0	24 +	0.0	24 +	0.0	24 +	0.0
25	+	0.0	25 +	0.0	25 +	.1	25 +	0.0	25 +	0.0
26	+	0.0	26 +	0.0	26 +	0.0	26 +	0.0	26 +	0.0
27	+	0.0	27 +	0.0	27 +	0.0	27 +	0.0	27 +	0.0
28	+	0.0	28 +	0.0	28 +	0.0	28 +	0.0	28 +	0.0
29	+	0.0	29 +	0.0	29 +	.1	29 +	.1	29 +	.1
30	+	0.0	30 +	0.0	30 +	0.0	30 +	0.0	30 +	0.0
31	+	.2	31 +	.2	31 +	.3	31 +	.3	31 +	.5
32	+	0.0	32 +	0.0	32 +	0.0	32 +	0.0	32 +	0.0
33	+	0.0	33 +	0.0	33 +	0.0	33 +	0.0	33 +	0.0
34	+	0.0	34 +	0.0	34 +	0.0	34 +	0.0	34 +	0.0
35	+	0.0	35 +	0.0	35 +	0.0	35 +	0.0	35 +	0.0
36	+	.2	36 +	.1	36 +	.2	36 +	.2	36 +	.1
37	+	0.0	37 +	0.0	37 +	0.0	37 +	0.0	37 +	0.0
38	+	0.0	38 +	0.0	38 +	0.0	38 +	0.0	38 +	0.0
39	+	0.0	39 +	0.0	39 +	0.0	39 +	0.0	39 +	0.0
40	+	0.0	40 +	0.0	40 +	0.0	40 +	0.0	40 +	0.0
41	+	0.0	41 +	0.0	41 +	0.0	41 +	0.0	41 +	0.0
42	+	0.0	42 +	0.0	42 +	0.0	42 +	0.0	42 +	0.0
43	+	0.0	43 +	0.0	43 +	0.0	43 +	0.0	43 +	0.0
44	+	0.0	44 +	0.0	44 +	0.0	44 +	0.0	44 +	0.0
45	+	0.0	45 +	0.0	45 +	0.0	45 +	0.0	45 +	0.0
46	+	0.0	46 +	0.0	46 +	0.0	46 +	0.0	46 +	0.0
47	+	0.0	47 +	0.0	47 +	0.0	47 +	0.0	47 +	0.0
48	+	0.0	48 +	0.0	48 +	0.0	48 +	0.0	48 +	0.0

	COLUMN 16		COLUMN 17		COLUMN 18		COLUMN 19		COLUMN 20
1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
2	0.0	2	.1	2	.1	2	.1	2	0.0
3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
4	0.0	4	.9	4	.4	4	1.0	4	.1
5	0.0	5	0.0	5	0.0	5	.2	5	1.5
6	0.0	6	0.0	6	0.0	6	0.0	6	0.0
7	0.0	7	0.0	7	0.0	7	0.0	7	1.1
8	.1	8	1.7	8	2.6	8	1.2	8	.2
9	0.0	9	.4	9	.2	9	.5	9	.2
10	.2	10	1.4	10	.8	10	1.4	10	.6
11	0.0	11	0.0	11	0.0	11	0.0	11	0.0
12	0.0	12	0.0	12	0.0	12	.2	12	0.0
13	0.0	13	.2	13	0.0	13	.1	13	0.0
14	0.0	14	0.0	14	0.0	14	0.0	14	0.0
15	0.0	15	0.0	15	0.0	15	0.0	15	0.0
16	12.3	16	0.0	16	0.0	16	.3	16	0.0
17	0.0	17	4.2	17	1.0	17	.3	17	.1
18	0.0	18	0.0	18	0.0	18	0.0	18	0.0
19	.1	19	1.2	19	.5	19	.4	19	.1
20	0.0	20	.5	20	.6	20	.1	20	1.0
21	0.0	21	.3	21	.1	21	0.0	21	0.0
22	0.0	22	0.0	22	0.0	22	0.0	22	0.0
23	.2	23	0.0	23	0.0	23	0.0	23	.9
24	0.0	24	.1	24	0.0	24	.1	24	.6
25	0.0	25	0.0	25	0.0	25	0.0	25	0.0
26	0.0	26	0.0	26	0.0	26	.1	26	0.0
27	0.0	27	0.0	27	0.0	27	0.0	27	0.0
28	0.0	28	0.0	28	0.0	28	0.0	28	0.0
29	.1	29	.2	29	.2	29	.3	29	.1
30	0.0	30	0.0	30	0.0	30	0.0	30	0.0
31	0.0	31	.6	31	.3	31	.5	31	.2
32	0.0	32	0.0	32	0.0	32	0.0	32	.1
33	0.0	33	0.0	33	0.0	33	0.0	33	0.0
34	0.0	34	0.0	34	0.0	34	0.0	34	0.0
35	0.0	35	0.0	35	0.0	35	0.0	35	0.0
36	0.0	36	0.0	36	.1	36	.1	36	0.0
37	0.0	37	0.0	37	0.0	37	0.0	37	0.0
38	0.0	38	0.0	38	0.0	38	0.0	38	0.0
39	0.0	39	0.0	39	0.0	39	.1	39	0.0
40	0.0	40	0.0	40	0.0	40	0.0	40	0.0
41	0.0	41	0.0	41	0.0	41	0.0	41	0.0
42	0.0	42	0.0	42	0.0	42	0.0	42	0.0
43	0.0	43	0.0	43	0.0	43	.1	43	0.0
44	0.0	44	0.0	44	0.0	44	0.0	44	0.0
45	0.0	45	0.0	45	0.0	45	0.0	45	0.0
46	0.0	46	0.0	46	0.0	46	0.0	46	0.0
47	0.0	47	0.0	47	0.0	47	0.0	47	0.0
48	0.0	48	0.0	48	0.0	48	.1	48	0.0

	COLUMN 21		COLUMN 22		COLUMN 23		COLUMN 24		COLUMN 25
1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0
2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0
3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ .6	4	+ .1	4	+ .6	4	+ .4	4	+ .4
5	+ .3	5	+ 0.0	5	+ .4	5	+ .4	5	+ 0.0
6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0
7	+ 0.0	7	+ 0.0	7	+ 0.0	7	+ 0.0	7	+ 0.0
8	+ 1.0	8	+ .1	8	+ .3	8	+ .8	8	+ 2.1
9	+ .2	9	+ .4	9	+ .4	9	+ .5	9	+ .2
10	+ 8.1	10	+ 71.8	10	+ 6.0	10	+ 18.6	10	+ .3
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ .4	13	+ 0.0	13	+ .1	13	+ 0.0	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ 0.0	17	+ .1	17	+ 0.0	17	+ .1	17	+ .4
18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ .4	19	+ .1	19	+ .6	19	+ .5	19	+ 2.2
20	+ .5	20	+ 0.0	20	+ .4	20	+ .5	20	+ .1
21	+ 1.7	21	+ 0.0	21	+ .2	21	+ .2	21	+ .1
22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0
23	+ .1	23	+ .3	23	+ 11.6	23	+ .3	23	+ 0.0
24	+ .1	24	+ 0.0	24	+ .8	24	+ 1.7	24	+ 0.0
25	+ 0.0	25	+ .1	25	+ 0.0	25	+ 0.0	25	+ 3.6
26	+ 0.0	26	+ 0.0	26	+ 0.0	26	+ .1	26	+ 0.0
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ .2	29	+ .1	29	+ .2	29	+ .2	29	+ .1
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ .3	31	+ .6	31	+ .6	31	+ .5	31	+ 1.6
32	+ .1	32	+ 0.0	32	+ .8	32	+ .1	32	+ 0.0
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 0.0
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ .2	36	+ 0.0	36	+ .2	36	+ .1	36	+ 0.0
37	+ 0.0	37	+ .2	37	+ 0.0	37	+ 0.0	37	+ 0.0
38	+ .5	38	+ 0.0	38	+ 0.0	38	+ .3	38	+ 0.0
39	+ .2	39	+ 0.0	39	+ 0.0	39	+ .2	39	+ 0.0
40	+ .2	40	+ 0.0	40	+ 0.0	40	+ .2	40	+ 0.0
41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 0.0	43	+ 0.0	43	+ 0.0	43	+ 0.0	43	+ 0.0
44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0
45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0
46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0
47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0
48	+ 0.0	48	+ 0.0	48	+ 0.0	48	+ 0.0	48	+ 0.0

	COLUMN 26			COLUMN 27			COLUMN 28			COLUMN 29			COLUMN 30	
1	+	0.0	1	+	0.0	1	+	0.0	1	+	0.0	1	+	0.0
2	+	0.0	2	+	0.0	2	+	0.0	2	+	2.9	2	+	0.0
3	+	0.0	3	+	0.0	3	+	0.0	3	+	0.0	3	+	0.0
4	+	2.8	4	+	1.3	4	+	.3	4	+	.1	4	+	.1
5	+	.1	5	+	0.0	5	+	0.0	5	+	0.0	5	+	0.0
6	+	0.0	6	+	0.0	6	+	0.0	6	+	0.0	6	+	0.0
7	+	0.0	7	+	0.0	7	+	0.0	7	+	0.0	7	+	0.0
8	+	7.0	8	+	.3	8	+	.4	8	+	.5	8	+	2.0
9	+	2.3	9	+	1.1	9	+	.2	9	+	0.0	9	+	0.0
10	+	2.5	10	+	0.0	10	+	.3	10	+	0.0	10	+	0.0
11	+	0.0	11	+	0.0	11	+	0.0	11	+	0.0	11	+	0.0
12	+	.2	12	+	.2	12	+	0.0	12	+	0.0	12	+	0.0
13	+	0.0	13	+	0.0	13	+	.1	13	+	0.0	13	+	0.0
14	+	0.0	14	+	0.0	14	+	0.0	14	+	0.0	14	+	0.0
15	+	0.0	15	+	0.0	15	+	0.0	15	+	0.0	15	+	0.0
16	+	0.0	16	+	0.0	16	+	0.0	16	+	0.0	16	+	0.0
17	+	.1	17	+	0.0	17	+	0.0	17	+	0.0	17	+	0.0
18	+	0.0	18	+	0.0	18	+	0.0	18	+	0.0	18	+	0.0
19	+	3.6	19	+	2.0	19	+	2.0	19	+	.1	19	+	0.0
20	+	.3	20	+	.9	20	+	0.0	20	+	0.0	20	+	0.0
21	+	.1	21	+	0.0	21	+	0.0	21	+	0.0	21	+	0.0
22	+	0.0	22	+	0.0	22	+	0.0	22	+	0.0	22	+	0.0
23	+	.1	23	+	0.0	23	+	.1	23	+	0.0	23	+	0.0
24	+	7.3	24	+	.1	24	+	.1	24	+	0.0	24	+	0.0
25	+	0.0	25	+	0.0	25	+	0.0	25	+	0.0	25	+	0.0
26	+	7.6	26	+	0.0	26	+	0.0	26	+	0.0	26	+	0.0
27	+	0.0	27	+	5.6	27	+	0.0	27	+	0.0	27	+	0.0
28	+	0.0	28	+	0.0	28	+	1.4	28	+	0.0	28	+	0.0
29	+	.6	29	+	.2	29	+	.1	29	+	.1	29	+	0.0
30	+	0.0	30	+	0.0	30	+	0.0	30	+	0.0	30	+	0.0
31	+	4.9	31	+	1.0	31	+	.2	31	+	.3	31	+	0.0
32	+	.1	32	+	0.0	32	+	0.0	32	+	0.0	32	+	0.0
33	+	0.0	33	+	0.0	33	+	0.0	33	+	0.0	33	+	0.0
34	+	0.0	34	+	0.0	34	+	0.0	34	+	0.0	34	+	0.0
35	+	0.0	35	+	0.0	35	+	0.0	35	+	0.0	35	+	0.0
36	+	1.6	36	+	.3	36	+	.1	36	+	0.0	36	+	0.0
37	+	.3	37	+	0.0	37	+	0.0	37	+	0.0	37	+	0.0
38	+	0.0	38	+	0.0	38	+	0.0	38	+	0.0	38	+	0.0
39	+	.5	39	+	0.0	39	+	0.0	39	+	0.0	39	+	0.0
40	+	.1	40	+	0.0	40	+	0.0	40	+	0.0	40	+	0.0
41	+	0.0	41	+	0.0	41	+	0.0	41	+	0.0	41	+	0.0
42	+	0.0	42	+	0.0	42	+	0.0	42	+	0.0	42	+	0.0
43	+	.1	43	+	0.0	43	+	0.0	43	+	0.0	43	+	0.0
44	+	0.0	44	+	0.0	44	+	0.0	44	+	0.0	44	+	0.0
45	+	0.0	45	+	0.0	45	+	0.0	45	+	0.0	45	+	0.0
46	+	0.0	46	+	0.0	46	+	0.0	46	+	0.0	46	+	0.0
47	+	0.0	47	+	0.0	47	+	0.0	47	+	0.0	47	+	0.0
48	+	0.0	48	+	0.0	48	+	0.0	48	+	0.0	48	+	0.0

	COLUMN 31		COLUMN 32		COLUMN 33		COLUMN 34		COLUMN 35
1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0
2	+ 23.4	2	+ 0.0	2	+ 0.0	2	+ 23.6	2	+ 0.0
3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ 1.9	4	+ 2.1	4	+ 2.1	4	+ 3.1	4	+ .3
5	+ 0.0	5	+ .5	5	+ .1	5	+ 2.2	5	+ .4
6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0
7	+ 0.0	7	+ 0.0	7	+ 0.0	7	+ 0.0	7	+ 2.4
8	+ 9.4	8	+ 0.0	8	+ 0.0	8	+ .1	8	+ 0.0
9	+ 3.0	9	+ 0.0	9	+ 0.0	9	+ .2	9	+ .2
10	+ 22.2	10	+ 0.0	10	+ 0.0	10	+ 0.0	10	+ 0.0
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ .3	17	+ .1	17	+ 0.0	17	+ .1	17	+ 0.0
18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ .2	19	+ 0.0	19	+ 0.0	19	+ 0.0	19	+ 0.0
20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0
21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ 0.0
22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0
23	+ .1	23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0
24	+ .1	24	+ 0.0	24	+ 0.0	24	+ 0.0	24	+ 0.0
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 0.0	26	+ 0.0	26	+ 0.0	26	+ 0.0	26	+ 0.0
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ .6	29	+ .2	29	+ .1	29	+ .3	29	+ 0.0
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 21.1	31	+ 0.0	31	+ 0.0	31	+ .2	31	+ .3
32	+ 0.0	32	+ 1.1	32	+ 0.0	32	+ 0.0	32	+ 0.0
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 1.0	34	+ 0.0
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 0.0	36	+ .7	36	+ 0.0	36	+ 0.0	36	+ 12.0
37	+ 0.0	37	+ 0.0	37	+ 0.0	37	+ .1	37	+ 0.0
38	+ 0.0	38	+ 0.0	38	+ 0.0	38	+ 0.0	38	+ 0.0
39	+ 0.0	39	+ 0.0	39	+ 0.0	39	+ 0.0	39	+ .1
40	+ 0.0	40	+ 0.0	40	+ 0.0	40	+ 0.0	40	+ 0.0
41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ 0.0	43	+ 0.0	43	+ 0.0	43	+ .9	43	+ 7.7
44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0
45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0
46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0
47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0
48	+ 0.0	48	+ 0.0	48	+ 0.0	48	+ 0.0	48	+ 1.3

	COLUMN 36		COLUMN 37		COLUMN 38		COLUMN 39		COLUMN 40
1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0
2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ 0.0	2	+ .1
3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ .6	4	+ 1.3	4	+ .6	4	+ .6	4	+ 1.0
5	+ 0.0	5	+ .8	5	+ .1	5	+ 0.0	5	+ .4
6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0
7	+ 0.0	7	+ 0.0	7	+ 1.3	7	+ 11.8	7	+ 12.4
8	+ 0.0	8	+ 0.0	8	+ 0.0	8	+ 0.0	8	+ .2
9	+ .2	9	+ 0.0	9	+ 0.0	9	+ 0.0	9	+ 0.0
10	+ 0.0	10	+ 0.0	10	+ 0.0	10	+ 0.0	10	+ .3
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0
14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0	14	+ 0.0
15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ 0.0	17	+ .4	17	+ .1	17	+ .1	17	+ .1
18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ 0.0	19	+ 0.0	19	+ 0.0	19	+ 0.0	19	+ .1
20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0
21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ 0.0
22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 0.0
23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0
24	+ .1	24	+ 0.0	24	+ 0.0	24	+ 0.0	24	+ 0.0
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 0.0	26	+ 0.0	26	+ 0.0	26	+ 0.0	26	+ 0.0
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ 0.0	29	+ 0.0	29	+ 0.0	29	+ .1	29	+ .1
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ .2	31	+ 0.0	31	+ 0.0	31	+ .3	31	+ .3
32	+ 0.0	32	+ 0.0	32	+ 0.0	32	+ .1	32	+ 1.1
33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 0.0
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 144.7	36	+ .2	36	+ .1	36	+ 0.0	36	+ .1
37	+ 0.0	37	+ 108.0	37	+ 64.4	37	+ .1	37	+ 1.5
38	+ 0.0	38	+ 0.0	38	+ 2.9	38	+ 0.0	38	+ 0.0
39	+ 0.0	39	+ 0.0	39	+ 0.0	39	+ 3.1	39	+ .1
40	+ 0.0	40	+ 0.0	40	+ 0.0	40	+ 0.0	40	+ .1
41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0
42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0	42	+ 0.0
43	+ .1	43	+ 3.4	43	+ .1	43	+ 4.3	43	+ 2.7
44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ 0.0
45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0
46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0
47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0
48	+ 7.7	48	+ 4.5	48	+ .2	48	+ 29.6	48	+ 2.9

	COLUMN 41		COLUMN 42		COLUMN 43		COLUMN 44		COLUMN 45
1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0	1	+ 0.0
2	+ .9	2	+ 0.0	2	+ 5.2	2	+ .5	2	+ 0.0
3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0	3	+ 0.0
4	+ 1.9	4	+ .5	4	+ 2.8	4	+ 22.2	4	+ 8.3
5	+ 0.0	5	+ .3	5	+ 10.6	5	+ 1.2	5	+ 0.0
6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0	6	+ 0.0
7	+ 0.0	7	+ 5.0	7	+ .4	7	+ 0.0	7	+ 0.0
8	+ 6.0	8	+ 0.0	8	+ 0.0	8	+ .5	8	+ 0.0
9	+ 1.1	9	+ 0.0	9	+ 0.0	9	+ 0.0	9	+ 0.0
10	+ 1.7	10	+ 0.0	10	+ 0.0	10	+ 0.0	10	+ 0.0
11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0	11	+ 0.0
12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0	12	+ 0.0
13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0	13	+ 0.0
14	+ 0.0	14	+ .3	14	+ 3.8	14	+ 0.0	14	+ 0.0
15	+ 3.3	15	+ 0.0	15	+ 0.0	15	+ 0.0	15	+ 0.0
16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0	16	+ 0.0
17	+ 3.5	17	+ 0.0	17	+ .3	17	+ .1	17	+ 0.0
18	+ 2.4	18	+ 0.0	18	+ 0.0	18	+ 0.0	18	+ 0.0
19	+ 0.0	19	+ 0.0	19	+ 0.0	19	+ .2	19	+ 0.0
20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ 0.0	20	+ .1
21	+ 0.0	21	+ 0.0	21	+ 0.0	21	+ .5	21	+ 0.0
22	+ 0.0	22	+ 0.0	22	+ 0.0	22	+ 1.0	22	+ 0.0
23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0	23	+ 0.0
24	+ 4.2	24	+ 0.0	24	+ 0.0	24	+ .4	24	+ 2.2
25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0	25	+ 0.0
26	+ 0.0	26	+ 0.0	26	+ .2	26	+ 0.0	26	+ 0.0
27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0	27	+ 0.0
28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0	28	+ 0.0
29	+ 1.4	29	+ .1	29	+ .3	29	+ .2	29	+ .1
30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0	30	+ 0.0
31	+ 8.0	31	+ 0.0	31	+ 1.9	31	+ .2	31	+ 1.0
32	+ 5.9	32	+ 0.0	32	+ .6	32	+ 0.0	32	+ 0.0
33	+ 1.7	33	+ 0.0	33	+ 0.0	33	+ 0.0	33	+ 0.0
34	+ 8.7	34	+ 0.0	34	+ 0.0	34	+ 0.0	34	+ 0.0
35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0	35	+ 0.0
36	+ 67.7	36	+ 0.0	36	+ .7	36	+ 0.0	36	+ 1.6
37	+ 12.0	37	+ 13.0	37	+ 2.7	37	+ 0.0	37	+ 0.0
38	+ 0.0	38	+ 0.0	38	+ .6	38	+ .2	38	+ 0.0
39	+ .6	39	+ 0.0	39	+ 1.9	39	+ .1	39	+ .5
40	+ .2	40	+ 0.0	40	+ 0.0	40	+ 0.0	40	+ 0.0
41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0	41	+ 0.0
42	+ 0.0	42	+ 0.0	42	+ 12.5	42	+ 0.0	42	+ 0.0
43	+ 0.0	43	+ 0.0	43	+ 230.7	43	+ 0.0	43	+ 0.0
44	+ 0.0	44	+ 0.0	44	+ 0.0	44	+ .4	44	+ 0.0
45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0	45	+ 0.0
46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0	46	+ 0.0
47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0	47	+ 0.0
48	+ .1	48	+ 0.0	48	+ 188.7	48	+ 0.0	48	+ 0.0

	COLUMN 46		COLUMN 47		COLUMN 48
1	0.0	1	0.0	1	0.0
2	0.0	2	0.0	2	12.8
3	0.0	3	0.0	3	0.0
4	5.0	4	9.1	4	24.2
5	0.0	5	0.0	5	36.0
6	0.0	6	0.0	6	0.0
7	0.0	7	0.0	7	.6
8	0.0	8	0.0	8	0.0
9	0.0	9	0.0	9	1.2
10	0.0	10	0.0	10	.2
11	0.0	11	0.0	11	0.0
12	0.0	12	0.0	12	0.0
13	0.0	13	0.0	13	0.0
14	0.0	14	0.0	14	0.0
15	0.0	15	0.0	15	0.0
16	0.0	16	0.0	16	0.0
17	.1	17	.3	17	.8
18	0.0	18	0.0	18	0.0
19	0.0	19	0.0	19	.1
20	.2	20	1.4	20	3.0
21	0.0	21	.1	21	.4
22	0.0	22	0.0	22	0.0
23	0.0	23	0.0	23	0.0
24	0.0	24	.6	24	5.6
25	0.0	25	0.0	25	0.0
26	0.0	26	0.0	26	2.8
27	12.4	27	0.0	27	0.0
28	0.0	28	0.0	28	0.0
29	.1	29	0.0	29	.6
30	0.0	30	0.0	30	.4
31	0.0	31	.8	31	4.3
32	0.0	32	0.0	32	.5
33	0.0	33	0.0	33	0.0
34	0.0	34	0.0	34	0.0
35	0.0	35	0.0	35	0.0
36	0.0	36	0.0	36	6.1
37	0.0	37	8.3	37	46.0
38	0.0	38	2.3	38	.2
39	0.0	39	.2	39	.3
40	.1	40	.1	40	.1
41	0.0	41	0.0	41	0.0
42	0.0	42	0.0	42	0.0
43	0.0	43	0.0	43	3.6
44	0.0	44	0.0	44	0.0
45	0.0	45	0.0	45	0.0
46	0.0	46	0.0	46	0.0
47	0.0	47	0.0	47	0.0
48	.1	48	2.7	48	958.1

APPENDIX 4.7

Industrial Classification for 23-order Matrix by 1968 MLH

1.	Energy	101, 104, 261, 262, 263, 601, 602
2.	Mining and Quarrying n.e.s.	102, 103, 109
3.	Chemicals	271-275, 277-279
4.	Textiles	ORDERS XIII - XV
5.	Synthetic Resins	276
6.	Iron & Steel	311, 312, 313
7.	Aluminium	321
8.	Non-ferrous Metals	322, 323
9.	Mechanical Engineering	ORDER VII
10.	Instrument Engineering	ORDER VIII
11.	Electrical Engineering	ORDER IX
12.	Shipbuilding	ORDER X
13.	Motor Vehicles	380, 381
14.	Aerospace	383
15.	Other Vehicles	382, 384, 385
16.	Other Metal Goods	ORDER XII
17.	Building Materials	ORDER XVI
18.	Timber	471, 474, 475, 479
19.	Paper & Paper Products	481-484
20.	Rubber	491
21.	Other Manufacturing	472, 473, 492-499
22.	Construction	ORDER XX
23.	Other	All other except Public Administration

APPENDIX 4.8

Revaluation of the 1954 & 1972 final demand, import & gross output vectors to 1968 prices

1. The Vectors for 1954

For the purposes of Chapter 4, it is necessary to obtain vectors of final demand and imports for 1954 at 1968 prices on the 23-order classification basis shown in Appendix 4.7. In addition, 1954 intermediate output, including competitive imports must be estimated for the purposes of comparison.

For consistency with the estimates for 1963 and 1968, all 1954 vectors were first revalued to 1963 prices and then revalued to the prices of 1968, using the same deflators as were used to revalue the 1963 matrix to 1968 prices. This implies the use of intra-commodity weights for different years and a mixture of the 1958 and 1968 SIC, but this was considered to be a minor problem relative to the general problem of revaluation with inadequate data.

The 1954 absorption matrix on a 1958 SIC basis constructed by Woodward (55), was used as the basis of the estimation. Though Woodward urges caution in the interpretation of his figures (55), this table has the advantage of identifying all the products required for the current study, except aluminium, which is subsumed in the non-ferrous metals category.

Woodward attempted to construct the 1954 table on the same basis as the C.S.O.'s Input-Output Tables for 1963, which is more similar to the basis used in the current work (the C.S.O. 1968 input-output system), than, for example, that of the 'Programme for Growth No. 12' (53). Whilst the latter was of enormous use in the revaluation process, it is more aggregative and differs in its treatment of transport and distributive margins, invisible imports and protective duties. For example, the allocation of transport margins to the category 'Transport and Communication' in (53) leads to a large negative entry for imports into that category, whereas in the C.S.O. system, there are no imports allocated to that category. Woodward allocates these margins to the services category. The C.S.O. only allocates foreign freight incurred in importing to the imported services row, and the domestic cost to the transport row of the domestic absorption matrix.

Since these categories are peripheral to the current study, it was considered that this difference in treatment would not substantially affect the results.

Protective duties and invisible imports were allocated across products in both (55), and (53), but not in the C.S.O.'s framework. This again, is a relatively minor problem in the study of the materials industries.

Woodward's table does not distinguish between imports and domestic output. It does, however, provide a list of imports by commodity group in a subsidiary publication (55).

For comparison with 1963 and 1968 intermediate output, vectors are required of final demand for domestic output (minus intermediate competitive imports) and of (domestic intermediate output plus intermediate competitive imports).

Since (55) provides vectors of final demand including imports and of total imports, the required vectors may be obtained in the following way:

From (51)

$f + m_1^* + m_2^*$ ..... (1) = vector of final demand including imports

and $m_1 + m_2 + m_1^* + m_2^*$ ..... (2) = vector of total imports

where f is final demand for domestic output

m_1 is the vector of intermediate competitive imports

m_2 is the vector of intermediate complementary imports

m_1^* is the vector of competitive imports purchased directly by final demand

m_2^* is the vector of complementary imports purchased directly by final demand

(1) - (2) gives $f - m_1 - m_2$ ..... (3)

The vector required is $f - m_1$ and so the vector of intermediate complementary imports, m_2, should be added to (3).

To obtain the vector of intermediate domestic output and competitive imports, the resultant vector $f - m_1$ should be subtracted from the vector of domestic gross outputs, also obtainable from (51).

The first step was to aggregate f from (55) to the categories in (53). In addition, certain other categories which are not isolated in (53) but are required for this work were identified. Altogether, there were 40 categories shown in Table 1 of this Appendix.

Deflators to revalue most categories to 1963 prices were then obtained by dividing the 1954 final demand at 1963 prices given in Table 8 of (53) by that at current prices given in Table 7 of (53). Although it would be possible to use the figures of Table 8 directly, this was not considered appropriate, since the current price figures did not always agree with those in (55) which had been deemed to be the basis.

For the categories not identified in (53) - 10, 13, 14, 15, 16, 17, 27, 28 and 31 in Table 1, revaluation was effected in different ways:

For engineering, timber, furniture and printing and publishing, deflation was carried out in the same way as for the majority of categories, i.e., using implicit deflators from (53). However, since these all constituted only parts of categories in (53), the aggregate category in (53) was used as a proxy.

For synthetic resins, the wholesale price deflator in (15) was used.

Final demand for aluminium and non-ferrous metals had first to be separated. Since almost all final demand for these products was in the form of exports, the proportion of aluminium in the total value of non-ferrous metals exported was obtained from the Trade & Navigation Accounts of the U.K. (36) and final demand allocated in these proportions. (Fortunately total exports of non-ferrous metals in (36) agreed with those in (55)).

Deflation was then effected, for aluminium, by using the index in (15) for castings, since this was thought to be more appropriate to final output than an index for primary metal. Prices of rolled products would be a better indicator, but at the time the research was carried out, no such indiex was available. A later comparison with information from industry sources and the Department of Industry suggested that the price index for castings moved in line with that for rolled products and the implied volume index would be appropriate.

For non-ferrous metals, L.M.E prices were used, as quoted in (15). An index for copper, lead, zinc, nickel and tin was extracted from (15) and these were weighted together on the basis of the proportion of each in exports. A 3-year moving average was used for each metal to compensate for excess volatility in the L.M.E. price.

Having revalued the 40 categories to 1963 prices, the revaluation to 1968 prices was carried out using implicit final demand deflators from the Input-Output Tables for 1968 at 1968 and 1963 prices respectively.

Exports were not revalued separately because the return in terms of increased accuracy would be small relative to the large potential error in the data.

Final demand (including imports) for 1954 at 1954 and 1968 prices, together with the deflators used, is given in Table 2 of this Appendix.

For 1954 imports at 1968 prices, the same classification procedure is followed, except that crude mineral oil, natural rubber and tobacco were deflated as separate categories.

Where the estimate of imports for a particular category in (55) was equal to that in (53), the estimates in Table 8 of the latter were used directly. For other categories, Tables 7 and 8 of (53) were once again used to provide implicit deflators for revaluation to 1963 prices.

This accounted for all but aluminium, non-ferrous metals, synthetic resins and the complementary imports.

For synthetic resins, the domestic price index from (15) was used, whilst for aluminium, the price index of imported primary aluminium from (15) was used. (A 3-year moving average was again used because of the volatility of this series).

For non-ferrous metals, the L.M.E prices for metals were again used, this time with import rather than export weights. (This produces a substantially different index to the export weighted index). There is a problem that total imports of non-ferrous metals reported in the Trade&Navigation Accounts (£168 million excluding re-exports) differs from that estimated by Woodward (£183 million), and this is not accounted for by coverage and valuation adjustments or protective duties. Since the total output (domestic plus imported) shown in Woodward's Table includes £183 million of imports, it was thought appropriate to use this figure and so the value of non-ferrous metals, excluding aluminium was increased pro rata.

Imports were then revalued to 1968 prices using implicit deflators from the 1968 'Table C' at 1968 and 1963 prices. In the case of aluminium, this was not used, because it differed so greatly from the domestic index

for the same period and from the index for imported primary aluminium given in (15). As a result, the latter was substituted.

The values of imports for 1954 at 1954 and 1968 prices are shown in Table 3. of this Appendix.

Complementary imports were estimated in the following way: For Crude mineral oil, natural rubber and tobacco, these appear as single cells in the 1954 absorption matrix and are revalued using indices from (53). For timber, paper and mining products, the proportion of intermediate outputs in total imports was assumed to be the same as in 1963, (only a small proportion goes directly to final demand), and the revaluation effected using deflators from (15) or (53).

Finally, in order to obtain an estimate of 1954 intermediate output plus intermediate competitive imports, it is firstly necessary to revalue domestic gross output to 1968 prices. This is done by subtracting total imports from the total output vector given in the 1954 absorption matrix and then using Tables 7 and 8 of (53) or wholesale price indices in (15), to revalue to 1963 and implicit gross output deflators from the C.S.O. Input-Output Tables for 1968 at 1968 and 1963 prices respectively.

For aluminium and non-ferrous metals, gross output had to be estimated from the Report on the Census of Production for 1954.

Having estimated gross output at 1968 prices, the values of final demand minus competitive intermediate imports for the materials categories were subtracted.

There was still the problem of intra-commodity output which in the calculations using the 1963 and 1968 matrices, was netted out and thus, for comparison the same was done for 1954.

The ratio of intra-industry output on a commodity-commodity basis to that on a commodity-industry basis was assumed to be the same in 1954 as in 1963 and the domestic component of the intra-commodity value registered for 1954 was estimated by obtaining the domestic component of intra-commodity output in 1963 and multiplying this by the ratio of the share of imports in the total output of the commodity in 1954 compared with 1963.

The results of these calculations are shown in Table 4.

2. The Vectors for 1972

Deflating the vectors for 1972 was somewhat easier than the re-valuation of the 1954 vectors, since imports going direct to final demand are separated from domestic final demand and from other imports in the Business Monitor Input-Output Tables for 1972.

Deflators for most manufacturing MLH were supplied by the C.S.O. The proportion of each MLH in the output of each of the manufacturing categories of the 1972 Tables was also supplied by the C.S.O and it was possible to weight together the deflators on this basis for most of the final demand categories identified in the Tables.

For the missing categories, a proxy was used from the Department of Industry indices published in (15).

Some crude estimates for non-manufactured goods were also supplied by the C.S.O; but for certain categories, such as 'distributive trades' and 'miscellaneous services', an index of average earnings had to be used, since no deflators were available.

For aluminium, an index of wrought aluminium prices was used to deflate final demand (including exports), whilst for other non-ferrous metals, a weighted average of export price indices was used (weighted by export values in 1972).

For products which had a substantial non-export final demand, exports were deflated separately using C.S.O supplied indices for SITC categories and wholesale price indices given in (15) (see Appendix 5.2).

For competitive imports, deflators for SITC categories were available from 1970 onwards. For the period 1968-70, the methods described in Appendix 5.2 were used.

TABLE 1

Commodity Classification for revaluation of 1954 vectors to 1968 prices

	Category	Equivalent in (55)
1.	Agriculture	1, 2
2.	Coal Mining	3
3.	Other Mining (including oil)	4
4.	Cereals	5, 6
5.	Food	7, 8, 9
6.	Drink	10
7.	Tobacco	11
8.	Coke	14
9.	Mineral Oil	12
10.	Synthetic Resins	17
11.	Chemicals n.e.s.	13, 15, 16, 18
12.	Iron & Steel	19
13.	Aluminium	20)
14.	Non-ferrous Metals	21)
15.	Mechanical Engineering	22, 23, 25-31
16.	Instrument Engineering	32
17.	Electrical Engineering	33-36
18.	Shipbuilding	39
19.	Motor Vehicles	40
20.	Aircraft	41
21.	Vehicles n.e.s.	42
22.	Metal Goods	24, 37, 38
23.	Textiles	43-48
24.	Leather, Clothing, Footwear	49-51
25.	Building Materials	52-53
26.	Pottery & Glass	54
27.	Timber	56
28.	Furniture	55
29.	Paper & Board	57
30.	Paper Products	58
31.	Printing & Publishing	59
32.	Rubber	60
33.	Other Manufacturing	61
34.	Construction	62
35.	Gas	63
36.	Electricity	64
37.	Water	65
38.	Transport & Communication	66, 67, 68
39.	Distribution	69
40.	Services	70

TABLE 2

1954 Final Demand-Revaluation to 1968 Prices

	Category	Final Demand 1954 prices £ million	1954-63 Deflator	1963-68 Deflator	Final Demand 1968 prices £ million
1.	Agriculture	1116	1.092	1.181	1438
2.	Coal	190	1.507	1.127	322
3.	Other Mining	8	1.286	1.031	11
4.	Cereals	396	1.323	1.210	634
5.	Food	1260	1.062	1.128	1508
6.	Drink	235	1.210	1.101	312
7.	Tobacco	157	1.441	1.183	267
8.	Coke	12	1.689	1.137	24
9.	Mineral Oil	130	0.822	1.112	118
10.	Synthetic Resins	17	0.813	0.968	20
11.	Chemical n.e.s.	428	1.130	1.074	521
12.	Iron & Steel	132	0.969	1.086	139
13.	Aluminium	12	1.325	1.256	21
14.	Non-ferrous Metals	48	1.132	1.658	89
15.	Mechanical Engineering	1097	1.260	1.165	1610
16.	Instrument Engineering	103	1.260	1.115	145
17.	Electrical Engineering	547	1.260	1.105	761
18.	Shipbuilding	327	1.221	1.103	438
19.	Motor Vehicles	602	1.128	1.107	753
20.	Aircraft	309	1.250	1.535	592
21.	Vehicles n.e.s.	139	1.238	1.119	193
22.	Metal Goods	230	1.351	1.207	375
23.	Textiles	783	1.090	1.037	885
24.	Leather, etc.	740	1.029	1.096	837
25.	Building Materials	39	1.211	1.108	53
26.	Pottery & Glass	47	1.191	1.142	64
27.	Timber	34	1.245	1.187	51
28.	Furniture	168	1.245	1.175	245
29.	Paper & Board	39	1.270	1.131	56
30.	Paper Products	81	1.219	1.141	113
31.	Printing & Publishing	194	1.464	1.343	380
32.	Rubber	66	1.120	1.073	79
33.	Other Manufacturing	145	1.311	1.109	211
34.	Construction	1682	1.297	1.208	2635
35.	Gas	152	1.359	0.991	205
36.	Electricity	162	1.161	1.248	235
37.	Water	34	1.112	1.288	49
38.	Transport & Communication	1168	1.285	1.198	1798
39.	Distribution	2560	1.416	1.180	4278
40.	Services n.e.s.	2182	1.469	1.202	3852

TABLE 3

Imports 1954 at 1954 & 1968 prices

£ million

	Category	1954 imports 1954 prices	1954 imports 1968 prices
1.	Agriculture	919	1097
2.	Coal	17	27
3.	Other Mining	see Complementary Imports	
4.	Cereals	32	43
5.	Food	642	658
6.	Drink	25	33
7.	Tobacco (manufactures)	1	1
8.	Coke	0	0
9.	Mineral Oil	84	93
10.	Synthetic Resins	9	8
11.	Chemical n.e.s.	160	176
12.	Iron & Steel	25	26
13.	Aluminium	31	44
14.	Non-ferrous Metals	153	233
15.	Mechanical Engineering	72	110
16.	Instrument Engineering	11	18
17.	Electrical Engineering	17	25
18.	Shipbuilding	4	5
19.	Motor Vehicles	9	15
20.	Aircraft	20	51
21.	Vehicles n.e.s.	2	4
22.	Metal Goods	20	39
23.	Textiles	237	249
24.	Leather, etc.	40	68
25.	Building Materials	5	6
26.	Pottery & Glass	6	8
27.	Timber	see Complementary Imports	
28.	Furniture	1	1
29.	Paper & Board	see Complementary Imports	
30.	Paper Products	2	2
31.	Printing & Publishing	5	8
32.	Rubber	5	3
33.	Other Manufacturing	10	13
34.	Construction	0	0
35.	Gas	0	0
36.	Electricity	0	0
37.	Water	0	0
38.	Transport & Communication	0	0
39.	Distribution	1	3
40.	Services n.e.s.	843	1253

TABLE 3 (Cont)

Complementary Imports	1954 imports 1954 prices	1954 imports 1968 prices	Of which intermediate
Crude Mineral Oil	193	212	212
Iron Ore	54	55	55
Non-ferrous Ores	77	138	138
Mining Products	31	40	28
Timber	187	242	223
Paper & Board	146	163	147
Tobacco	67	89	89
Natural Rubber	40	35	35

TABLE 4

Estimation of intermediate output plus competitive imports

	Gross Output + Imports 1954	Imports	Gross Output 1954	Deflator* 1954-63	Deflator* 1963-68	Gross Output 1954 at 1968 Prices	Final Demand Minus Competitive Imports	Intermediate Output Plus Competitive Imports	Adjustment For Diagonal Element	Intermediate Output 1954 Including Competitive Imports
Synthetic Resins	97.5	9.3	88.2	0.809	0.965	69	11	58	-1	57
Iron and Steel	1272.5	25.2	1247.3	1.258	1.079	1696	113	1583	-531	1052
Aluminium	148.2	31.0	117.2	1.15	1.258	168	-23	191	-35	156
Non-ferrous Metals	542.3	153.0	389.0	1.13	1.732	761	-144	905	-114	791
Building Materials (incl. Pottey & Glass)	493.6	12.2	481.4	1.16, 1.16 1.17	1.09, 1.108 1.13	623	103	520	-35	485
Timber	445.3	183.0	262.3	1.39	1.23	448	29	419	-15	404
Rubber	219.5	4.8	214.7	1.201	1.068	276	76	200	-4	196

*Deflators for building materials are for building materials, Cement and Pottery and Glass respectively

APPENDIX 5.1

S.I.T.C. Codes for headings in Tables 5.1-5.5

S.I.T.C. code	Heading
Engineering Materials:	
281, 282, 67	Iron and Steel
283, 284, 285, 68	Non-ferrous Metals
58	Plastics
23	Crude Rubber
24	Wood, Lumber, Cork
661, 662, 663, 273-276	Building Materials & Miscellaneous Minerals
Other Materials:	
21	Hides, Skins, Furs
22	Oil seeds, nuts and kernels
25	Pulp and waste paper
26	Textile Fibres, not manufactured and waste
271	Crude Fertilizers
29	Crude Animal and Vegetable Materials
Chemicals:	
51-57, 59	Chemicals (excluding Plastics)
Fuels:	
3	Mineral Fuels, Lubricants etc.
Machinery and Transport Equipment:	
71	Non-Electrical Machinery
72	Electrical Machinery and Appliances
73	Transport Equipment
Other Manufactured Commodities:	
61	Manufactures of leather and furs
62	Manufactures of rubber
63	Manufactures of wood and cork (excluding furniture)
64	Manufactures of Paper and paperboard
65	Textile yarn, fabrics and articles
664-667	Non-Metallic Mineral Manufactures n.e.s.
69	Manufactures of Metal n.e.s.
8	Other
Food and Beverages:	
0, 1	Food, Beverages and Tobacco
Unallocated:	
4, 9	

APPENDIX 5.2

Imports & Exports at Constant Prices

The purpose of obtaining constant price estimates of imports and exports by commodity group was to present a more authentic representation of trends in the commodity composition of trade than those available using undeflated data. This was necessary because of the substantial changes in relative price structure over the period. In particular, the share of fuels in imports rose dramatically in 1974 in current price terms, but this was solely attributable to price changes.

Since the estimates are not used in any further analysis, the approximate method of deflation used was thought to be adequate.

The methodology was as follows:

1 For all years post-1970, deflators were constructed for each two-digit SITC category by the CSO. These were obtained via Mr J.Wailing of the CSO. Thus the 1972, 1973, 1974 and 1976 figures could be reestimated at 1970 prices.

2 For years preceding 1970, the import and export volume index for the larger commodity groups, given in the Annual Abstract of Statistics (15) were used as control totals.

3 For the commodity sub-groups, all categories were converted to 1968 prices using figures presented in (53), (Tables 48-59). The categories given in these Tables did not correspond to the categories used in Tables 5.1 to 5.4. As a result, a proxy was used in certain cases. For example, the chemicals category in Tables 5.1 to 5.4 excludes synthetic resins, whereas the chemicals

category in (53) includes this group of products. Since synthetic resins only constitute a small proportion of the chemicals category, this discrepancy was ignored in the deflation of 'chemicals n.e.s.'.

In some cases, where the corresponding category in (53) was too aggregated, a proxy from the Annual Abstract of Statistics was used. (Wholesale price index table, derived from figures published by the Department of Industry).

4 The figures for years pre-1970 were converted from 1968 to 1970 prices, in the case of exports, using figures for exports by MLH again provided by the CSO. Once again, Annual Abstract wholesale price proxies were used where SIC categories did not coincide with the SITC categories or where there were gaps in the data. For imports, the conversion from 1968 to 1970 prices was made on the basis of wholesale price index numbers given in (15), except for a few commodities for which specific import price index numbers are available, either from (15) or implied from figures in the Annual Statement of Trade (36).

This is probably the weakest link in the process, but since it only covers a period of two years, it is hoped that this would not seriously affect the general indicators of trends provided by the constant price figures.

The import and export volume figures for the larger categories were once again used as control totals and adjustments were made to commodities for which deflators were suspect, such that the sub-groups summed to the commodity group totals where these were applicable.

The figures upon which Tables 5.1 - 5.4 are based, are given in the following tables:

BASE DATA FOR TABLE 5.1

Imports

£ million

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS TOTAL	608	627	759	1418	1509	2266	3447	4102
Iron and Steel *	130	120	140	240	362	535	893	1252
Non-Ferrous Metals *	230	242	312	748	621	888	1358	1432
Plastics	5	16	43	82	143	205	361	463
Crude Rubber	56	76	53	48	47	75	100	140
Wood, Lumber, Cork	159	140	170	231	253	458	590	585
Miscellaneous Building Materials and Minerals	28	33	41	69	82	105	145	230
OTHER MATERIALS TOTAL	629	480	549	541	600	847	1050	1468
Textile Fibres	391	247	268	219	213	322	310	438
Paper Pulp etc.	68	98	115	155	172	201	330	463
Other	170	135	166	167	215	324	410	567
CHEMICALS (excluding Plastics)	70	104	162	333	508	692	1218	1536
FUELS	313	439	558	901	1242	1724	4626	5645
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	159	210	407	1189	2238	3293	3903	6386
Non-Electrical Machinery	97	131	254	633	1040	1526	1959	3255
Electrical Machinery	10	32	93	237	528	847	1009	1382
Transport Equipment	52	47	60	319	670	919	935	1749
OTHER MANUFACTURED GOODS TOTAL	225	421	769	1429	2471	3645	4641	6422
Manufactures of Leather	21	20	27	34	47	67	61	107
Manufactures of Rubber	1	3	8	28	42	57	88	130
Manufactures of Wood and Cork	24	38	53	96	142	244	232	290
Manufactures of Paper and Board	33	78	114	185	311	402	725	826
Manufactures of Textiles	48	85	145	231	370	515	688	911
Non-Metallic Mineral Manufactures n.e.s.+	53	88	146	320	531	816	914	1276
Manufactures of Metal n.e.s.	11	16	31	71	136	205	286	415
Other Manufactures	34	93	245	464	892	1339	1647	2467
FOOD, BEVERAGES AND TOBACCO TOTAL	1303	1491	1676	1900	2356	3094	3762	4983
NON-ALLOCATED IMPORTS	71	60	102	187	219	292	588	627
TOTAL	3378	3832	4982	7899	11143	15852	23234	31169

* Including ores and scrap.
\+ Including Pottery , Glass and Precious Stones.

Sources: (15), (36), (112).

BASE DATA FOR TABLE 5.2

Imports

£ million 1970 Prices

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIAL TOTAL	979	1009	1193	1551	1626	1920	1932	1889
Iron and Steel *	170	130	193	290	365	447	504	555
Non-Ferrous Metals *	530	595	640	803	730	817	845	750
Plastics	8	13	43	85	160	198	217	223
Crude Rubber	43	62	48	51	56	64	53	62
Wood, Lumber, Cork	194	171	214	247	239	297	235	206
Building Materials & Miscellaneous Minerals	34	38	55	75	76	97	78	93
OTHER MATERIALS TOTAL	551	513	578	573	544	556	570	563
Textile Fibres	290	253	246	230	190	173	170	167
Paper Pulp etc.	81	110	143	179	169	168	170	156
Other	180	150	189	164	185	215	230	240
CHEMICALS (n.e.s.)	85	119	198	337	485	557	570	590
FUELS	272	361	575	817	1048	1062	1005	822
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	253	330	555	1337	2175	2767	2816	2955
Non-Electrical Machinery	160	198	335	722	1079	1303	1392	1417
Electrical Machinery	23	60	125	263	548	811	850	818
Transport Equipment	70	72	95	352	548	653	574	720
OTHER MANUFACTURED GOODS TOTAL	371	612	1043	1558	2322	2812	2895	2870
Manufactures of Leather	30	28	32	37	40	38	32	39
Manufactures of Rubber	3	4	10	31	37	47	58	55
Manufactures of Wood and Cork	55	60	78	108	131	171	135	119
Manufactures of Paper and Board	58	107	168	211	282	313	362	306
Manufactures of Textiles	62	119	190	245	355	433	442	484
Non-Metallic Mineral Manufactures n.e.s.+	98	156	214	348	501	600	622	578
Manufactures of Metal n.e.s.	25	38	41	81	132	162	188	189
Other Manufactures	40	100	310	497	844	1048	1056	1100
FOOD AND BEVERAGES	1690	1948	2019	2120	2088	2094	2026	2072
OTHER	50	75	80	203	201	239	260	305
TOTAL	4251	4967	6241	8496	10488	12007	12075	12066

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (56), (53), (77).

BASE DATA FOR TABLE 5.3

Exports

£ million

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS TOTAL	258	359	490	786	1076	1419	1931	2508
Iron and Steel *	135	191	218	279	393	448	563	850
Non-Ferrous Metals *	66	98	140	302	360	560	750	793
Plastics	25	36	64	111	176	225	366	531
Crude Rubber	-	-	19	17	28	38	54	61
Wood, Lumber, Cork	-	-	-	1	2	3	6	9
Miscellaneous Building Materials and Minerals	32	34	49	76	117	145	192	264
OTHER MATERIALS TOTAL	82	95	156	153	202	278	334	468
Textile Fibres	71	75	108	93	108	172	202	260
Paper Pulp etc.	-	-	1	2	2	4	12	9
Other	11	20	48	58	92	102	120	199
CHEMICALS (excluding Plastics)	153	227	308	496	785	1047	1778	2514
FUELS	146	131	167	168	239	370	767	1254
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	937	1347	1838	2657	4014	4774	6059	10125
Non-Electrical Machinery	398	566	878	1310	2054	2413	3083	5056
Electrical Machinery	172	222	326	423	662	807	1132	2004
Transport Equipment	367	559	634	924	1298	1554	1844	3065
OTHER MANUFACTURED GOODS TOTAL	789	819	986	1546	2489	3353	4127	6463
Manufactures of Leather	17	20	31	46	67	84	94	148
Manufactures of Rubber	29	37	49	62	96	121	167	300
Manufactures of Wood and Cork	2	3	5	7	11	15	25	53
Manufactures of Paper and Board	29	38	47	66	102	129	199	278
Manufactures of Textiles	325	254	260	309	445	590	745	933
Non-Metallic Mineral Manufactures n.e.s. +	86	115	169	333	552	925	948	1572
Manufactures of Metal n.e.s.	146	151	134	185	290	339	470	800
Other Manufactures	155	201	291	538	926	1150	1479	2379
FOOD, BEVERAGES AND TOBACCO TOTAL	146	188	280	430	660	876	1063	1692
NON-ALLOCATED IMPORTS	90	85	140	198	294	388	541	885
TOTAL	2601	3251	4365	6434	9759	12505	16600	25909

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112).

BASE DATA FOR TABLE 5.4

Exports

£ million 1970 Prices

	1953	1958	1963	1968	1972	1973	1974	1976
ENGINEERING MATERIALS TOTAL	458	633	695	868	1141	1261	1148	1159
Iron and Steel*	172	220	283	333	393	390	301	339
Non-Ferrous Metals*	215	330	278	336	436	531	490	395
Plastics	15	30	62	115	186	204	212	250
Crude Rubber	-	1	6	18	26	31	33	24
Wood, Lumber, Cork	-	-	-	1	1	2	3	4
Building Materials and Miscellaneous Minerals	56	52	66	85	99	103	109	147
OTHER MATERIALS TOTAL	50	55	79	164	189	191	199	212
Textile Fibres	45	45	66	98	106	118	117	124
Paper Pulp etc.	-	-	-	-	-	-	-	3
Other	5	10	13	66	83	73	82	85
CHEMICALS (excluding Plastics)	170	254	390	559	750	918	1105	1080
FUELS	130	110	140	168	218	221	210	223
MACHINERY AND TRANSPORT EQUIPMENT TOTAL	1636	2020	2420	2900	3496	3876	4105	4386
Non-Electrical Machinery	853	956	1180	1424	1775	1973	2096	2133
Electrical Machinery	238	280	359	450	587	669	709	853
Transport Equipment	545	784	881	1026	1134	1234	1300	1400
OTHER MANUFACTURED GOODS TOTAL	1279	1219	1385	1742	2366	2777	2830	3028
Manufactures of Leather	32	27	35	51	55	56	61	59
Manufactures of Rubber	45	48	63	70	85	102	106	118
Manufactures of Wood and Cork	4	5	7	8	8	11	15	21
Manufactures of Paper and Board	60	75	65	76	91	109	128	123
Manufactures of Textiles	430	312	305	324	441	504	494	489
Non-Metallic Mineral Manufactures n.e.s.+	162	202	265	362	488	657	584	669
Manufactures of Metal n.e.s.	236	190	200	215	262	288	317	329
Other Manufactures	310	360	445	636	936	1050	1125	1220
FOOD, BEVERAGES AND TOBACCO TOTAL	192	230	330	468	581	696	730	802
NON-ALLOCATED	160	180	190	210	250	274	401	370
TOTAL	4075	4701	5629	7099	8991	10215	10728	11260

* Including ores and scrap.

\+ Including Pottery, Glass and Precious Stones.

Sources: (15), (36), (112), (53), (77).

APPENDIX 5.3

Interpretation of Wrought/Unwrought Ratios for Trade in Metals

This section is based on the assumption that a relatively high ratio of worked to unwrought $(\frac{W}{U})$ metal in exports and a low $(\frac{W}{U})$ ratio in imports is typical of an industrial country which specialises in processing metals rather than producing the primary metal principally for export.

To assist the interpretation of the text:

High $(\frac{W}{U})_x$ and Low $(\frac{W}{U})_m$	———	comparative advantage in processing
Low $(\frac{W}{U})_x$ and High $(\frac{W}{U})_m$	———	comparative advantage in unwrought metal

Inference may be made both from the 'static' $\frac{W}{U}$ ratios and the relative growth in these ratios over time.

The bilateral comparisons with West Germany are used since this is the most appropriate way to test for international specialisation. They also allow the comparison of ratios in the UK's total trade to those in trade with an advanced industrial competitor.

It should be possible to infer, by this method, in which products the UK had a comparative advantage, under conditions of relatively few tariff distortions.

The effect of tariffs and subsidies is discussed in Section 5.1.3.

APPENDIX 5.4

SIC Codes of 24-order matrix used in Chapter 5

1.	Energy	101, 104, 261, 262, 263, 601, 602
2.	Mining and Quarrying n.e.s.	102, 103, 109
3.	Chemicals	271-275, 277-279
4.	Textiles	ORDERS XIII - XV
5.	Synthetic Resins	276
6.	Iron and Steel	311, 312, 313
7.	Aluminium	321
8.	Non-ferrous Metals	322, 323
9.	Mechanical Engineering	ORDER VII
10.	Instrument Engineering	ORDER VIII
11.	Electrical Engineering	ORDER IX
12.	Shipbuilding	ORDER X
13.	Motor Vehicles	380, 381
14.	Aerospace	383
15.	Other Vehicles	382, 384, 385
16.	Other Metal Goods	ORDER XII
17.	Building Materials	ORDER XVI
18.	Timber	471, 474, 475, 479
19.	Paper & Paper Products	ORDER XVIII
20.	Rubber	491
21.	Other Manufacturing	472, 473, 492-499
22.	Construction	ORDER XX
23.	Transport	701-707
24.	Other	Remainder excluding Public Administratio

APPENDIX 5.4 (CONTINUED)

SITC Codes of 24 commodity headings

1.	Energy	3
2.	Mining and Quarrying n.e.s.	27, 28
3.	Chemicals	51-57, 59
4.	Textiles	61, 65, 84, 85
5.	Synthetic Resins	58
6.	Iron and Steel	67
7.	Aluminium	684
8.	Non-ferrous Metals	68 (ex. 684)
9.	Mechanical Engineering	71 n.e.s. 812.1
10.	Instrument Engineering	86
11.	Electrical Engineering	714.2B, 714.3B, 719.1(5), 72, 812.4, 891.1, 891.2
12.	Shipbuilding	711.1B, 711.3A, 711.5A, 711.6B, 735
13.	Motor Vehicles	711.5B, 712.5, 732
14.	Aerospace	711.4, 734
15.	Other Vehicles	711.1C, 731, 733
16.	Other Metal Goods	667, 69, 812.3, 896, 897
17.	Building Materials	661-666
18.	Timber	243, 63
19.	Paper and Paper Products	25, 64, 892
20.	Rubber	62
21.	Other Manufacturing	719.9(3)C, 81 n.e.s. 82, 83, 891 n.e.s. 893, 894, 895, 899
22.	Construction	-
23.	Transport	-
24.	Other	All other categories.

APPENDIX 6.1

Condition for Dovring Productivity Index to be unbiased

Dovring estimates total indirect labour requirements for industry 1 by multiplying the total intermediate input to industry 1 by the share of wages in the output of the rest of the economy. This figure is assumed to be the total wage component of the intermediate input to industry 1 and division by the average wage rate for the rest of the economy provides an estimate of the volume of labour required to produce this input.

Thus, assuming there are 3 industries in the economy and using the notation of Section 6.4.2, the total wage component of the intermediate input industry 1 is estimated by:

$$(d_{21} + d_{31}) \times \frac{(w_2 l_2 + w_3 l_3)}{(Y_2 + Y_3)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where Y_2 and Y_3 are the total net output of industries 2 and 3 respectively.

The labour requirement for this input is estimated by dividing (1) by $\frac{w_2 l_2 + w_3 l_3}{l_2 + l_3}$, the average wage rate in the economy, excluding industry 1.

This gives the expression:

$$\frac{(d_{21} + d_{31})(l_2 + l_3)}{Y_2 + Y_3} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Now the "correct" labour requirement for this input is obtained by the separate estimation of labour requirements of each industry involved:

$$\frac{d_{21} \times \frac{w_2 l_2}{Y_2}}{w_2} + \frac{d_{31} \times \frac{w_3 l_3}{Y_3}}{w_3}$$

$$= \frac{d_{21} l_2}{Y_2} + \frac{d_{31} l_3}{Y_3} \quad \ldots\ldots\ldots\ldots\ldots (3)$$

assuming the wage rate is homogeneous within industries (Dovring assumes it is homogeneous across all industries).

Thus for Dovring's estimate of total labour requirements to be correct, it is necessary for (2) to equal (3) and thus for the condition

$$\frac{d_{21}}{d_{31}} = \frac{(l_2 + l_3) Y_2 Y_3 - l_3 Y_2 (Y_2 + Y_3)}{(l_2 Y_3 (Y_2 + Y_3) - (l_2 + l_3) Y_2 Y_3} \quad \ldots\ldots (4)$$

to hold.

Multiplying out brackets, cancelling and dividing through $Y_2 Y_3$, (4) becomes

$$\frac{d_{21}}{d_{31}} = \frac{l_2 - l_3 \frac{Y_2}{Y_3}}{l_2 \frac{Y_3}{Y_2} - l_3} = \frac{\frac{l_2 Y_3 - l_3 Y_2}{Y_3}}{\frac{l_2 Y_3 - l_3 Y_2}{Y_2}} = \frac{Y_2}{Y_3}$$

Thus industry 1 must purchase the outputs of industries 2 and 3 in proportion to the total outputs of those industries.

If labour's share of income is constant across industries, then this condition becomes $\frac{d_{21}}{d_{31}} = \frac{w_2 l_2}{w_3 l_3}$ and thus industry 1 would have to purchase the output of industries 1 and 2 in proportion to the wage component of the output of each industry.

This condition will hold if there is no interdependence between industries 2 and 3 or if wage rates are uniform throughout the economy,

When generalised to n inputs, it is very unlikely that there will not be interdependence between the non-principal inputs and so this system has a high probability of bias, the magnitude of which depending upon the variance in wage rates across industries.

APPENDIX 6.2

Explanation of Notation in Equation 6.11

In order to deflate a coefficient a_{ij}, it should be considered as the ratio of the flow d_{ij} to the gross output of j, q_j.

The flow d_{ij} should be multiplied by the deflator relevant to the industry i. q_j should be multiplied by the price ratio relevant to industry j.

Thus the coefficient a_{ij} should be multiplied by the deflator for i and divided by the deflator for the industry j.

Assuming for the amount that deflators are uniform across commodity rows the algebraic expression for this operation would be:

$p_i\, a_{ij} / p_j$ or in matrix form $\hat{p}_o\, A_1\, \hat{p}_o^{-1}$.

Though the deflators actually used were not uniform across rows, it was thought that this was an adequate algebraic expression of the process involved.

APPENDIX 6.3

Why the "intensiveness" index is insensitive to deflation errors in non-principal industries

If the deflator for industry K is incorrectly estimated, making the assumption that both the correct and erroneous deflators are uniform across all purchasers of the output of industry k, then only row and column k of the inverse matrix will be affected by this error. The other cells will be as if all industries had been correctly deflated.

The numerator of the productivity index for all industries except k will be unaffected, since the gross output of each industry is deflated independently of the deflation of the output of other industries.

Under certain circumstances, the denominator will be unaffected as well:

If the ratio of the correct price multiplier to the incorrect one is $\mathcal{E}$, then each element of row k of the inverse matrix would be estimated as $x_{kj}.\mathcal{E}$ where x_{kj} is the correct element for the k_{th} row and j_{th} column. Since one element in each column is thus incorrect, this may still be the source of error when columns of the matrix are used to estimate the primary input intensiveness of an industry. However, if the gross output of commodity k has also been estimated as $q_k.\mathcal{E}$ instead of q_k, then the estimate of the ratio of primary input to gross output for industry k will be $\frac{1}{\mathcal{E}}$ times as great as it should be. When this primary input coefficient for the k_{th} industry is multiplied by an element in the k_{th} row of the inverse matrix, the errors cancel out, and since all other elements are correct, the accurate primary input estimates are obtained for all industries except k.

Of course this does not reduce the need to correctly deflate the output of industry k if it is wished to estimate the productivity change in that industry, but under these conditions, such an error will not affect the estimates for other industries.

This is not true of the VA/direct factor index, since the double deflated estimates of real output depend upon the deflation of the output of all industries.

APPENDIX 6.4

Capital Stock Estimates

The estimates of capital stock in manufacturing industry were constructed by Mr. A. Armstrong of the University of Bristol from figures supplied by Mr. T. Griffin of the C.S.O. Some of the information was obtained via Mr. I. Elliot of NEDO.

The estimates are at 1970 replacement cost and refer to the end of the year concerned.

For non-manufacturing industries, there was some very aggregated information in the C.S.O.'s National Income & Expenditure , and in (53). Where no figures were given in sufficiently disaggregated form in the Blue Book, disaggregation was performed by using the estimate of capital stock at 1963 replacement cost in (53) as weights. Since this approximation only applied to industries which were peripheral to the current study, it was not considered to be a serious flaw.

The manufacturing capital stock figures were estimated by the perpetual inventory method which measures end-year stock by adding gross capital formation during the year and subtracting scrapped plant and equipment from the beginning of year figure. The average life of plant was assumed to be 16 years and scrapping was assumed to take place over a range of years distributed about a mean of 16 years after the original investment. The average life of commercial vehicles was assumed to be 7 years.

No allowance is made for embodied technological change and this was considered an advantage for reasons given in the text. This implies that there is no necessity to obtain data on the different vintages of capital stock employed in each industry, since the figures provided are adequate for estimating the average productivity of capital or average capital-output ratio, to which the current work is limited. The estimation of marginal productivity or incremental capital output ratio was beyond the scope of the current work.

APPENDIX 6.5

Factors affecting engineering industry productivity

1. Capacity Utilisation

(i) The inventory measure of capacity utilisation was obtained by subtracting the change in inventories for each industry over the year 1963 from that for 1968 (in 1963 prices) and dividing by the gross output for 1963.

The rationale was that firms tend to accumulate inventories at times of above average demand (which tend to coincide with times of strong expected demand) and to run-down inventories when demand is low. As explained in the text, these assumptions are not very satisfactory and this probably explains the poor performance of the measure in the statistical analysis.

(ii) The unemployment indicator was obtained from the figures relating to unemployment and to total employment by industry in the Department of Employment Gazette (109).

The indicator was:

$$\frac{U_{68}}{U_{68} + E_{68}} \Big/ \frac{U_{63}}{U_{63} + E_{63}}$$

where U_{68} is unemployment by industry in 1968, E_{68} is employment by industry in 1968.

Similarly for U_{63}.

(iii) The output-capital ratio was obtained by the division of the first column of Table 6.8 by the fourth column of Table 6.7. The figures for all three indicators are given in Table 1 below.

2. Scale

The figures for average number of employees per establishment in 1968 relative to 1963 were obtained from the Report on the Census of Production 1968, Summary Table 42A (11), and are shown in Table 1 below.

3. Factor Ratios

The ratio of capital to labour was obtained by dividing the fourth column by the second column of Table 6.7.

4. Materials

The plastics coefficient ratios were obtained by summing the coefficients for synthetic resins and other manufacturing (the latter category consisting largely of plastics products), and dividing the 1968 coefficients (at 1963 prices) by the 1963 coefficients.

Similarly for the other materials. The change in the ratio of one material to another was obtained by dividing the above ratio for one material by that for another.

The ratios for each material (1968/1963) are shown in Table 1 (below).

TABLE 1

Variables used in productivity regressions - Ratio 1968 to 1963

Industry	Capacity Utilisation: Inventory (x1000)	Capacity Utilisation: Unemployment	Output / Capital	Average Establishment Size	Capital / Labour	Operatives / Administrative etc.	Plastics Ratio	Iron & Steel Ratio	Aluminium Ratio	Non-ferrous Metals Ratio
Agricultural Machinery	-3	1.05	1.06	0.88	1.13	0.86	0.83	1.17	1.00	1.17
Machine Tools	31	1.40	1.16	0.80	1.10	0.82	1.00	0.84	1.25	0.83
Industrial Engines	44	0.92	0.76	1.38	1.18	1.02	0.57	0.98	1.30	0.82
Textile Machinery	18	1.49	1.08	1.03	1.24	0.78	1.00	1.12	1.11	0.87
Construction Equipment	55	0.22	1.11	0.87	1.22	0.90	0.33	0.96	0.80	1.40
Office Machinery	80	1.23	1.27	0.76	1.41	0.76	1.19	0.67	1.57	0.64
Other Non-Electrical Machinery	-14	0.10	1.09	0.84	1.16	0.81	0.64	1.05	1.40	0.77
Industrial Plant & Steelwork	-52	2.05	1.14	0.83	1.25	0.92	0.33	0.75	0.78	0.76
Other Mechanical Engineering	-2	1.01	1.11	0.73	1.18	0.86	0.83	1.01	0.71	0.81
Instrument Engineering	-25	3.06	1.10	1.00	1.27	0.78	0.44	1.30	1.00	0.81
Electrical Machinery	-79	1.48	1.00	0.78	1.69	0.87	0.65	1.08	0.90	0.56
Insulated Wires & Cables	-49	1.75	1.00	1.09	1.11	0.91	1.48	0.86	1.42	1.00
Electronics	-52	1.00	0.73	0.69	1.65	0.85	1.30	1.15	1.11	0.93
Other Electrical Engineering	-1	1.09	0.97	0.96	1.27	0.98	1.19	1.04	0.87	0.79
Shipbuilding	3	0.64	1.11	0.93	1.15	0.74	0.80	0.87	0.57	0.62
Motor Vehicles	-18	2.11	0.91	0.88	1.23	0.87	2.90	1.04	1.21	0.64
Aerospace	-137	1.45	0.54	0.85	1.28	0.87	5.00	1.30	0.85	1.86
Other Vehicles	-8	1.15	0.78	1.05	1.50	0.88	0.83	1.14	1.08	1.12
Engineers' Small Tools	-12	0.90	0.89	1.01	1.30	0.96	4.00	1.31	2.50	0.75
Cans and Metal Boxes	-6	0.96	0.84	0.78	1.53	1.05	8.00	0.94	1.46	0.41
Other Metal Goods	-6	1.11	0.95	0.99	1.23	0.87	1.50	1.10	0.96	0.73

APPENDIX 6.6

Intermediate output change of industries implied by coefficients & final demand

£ million

	Change implied by Coefficients			Change implied by Final Demand		
	1963 based*	1968 based	Average	1963 based	1968 based	Average
Agricultural Machinery	3.4	4.2	3.8	2.7	1.9	2.3
Machine Tools	3.3	3.5	3.4	4.7	4.5	4.6
Industrial Engines	-8.6	-10.7	-9.6	6.0	8.1	7.0
Textile Machinery	0.2	-0.1	0.1	3.8	4.1	3.9
Construction Equipment	32.0	40.0	36.0	13.3	5.3	9.3
Office Machinery	12.1	14.2	13.1	5.6	3.5	4.6
Other Non-Electrical Machinery	90.1	104.7	97.4	48.1	33.5	40.8
Industrial Plant & Steelwork	58.1	72.5	65.3	34.8	20.4	27.6
Other Mechanical Engineering	84.3	91.6	87.9	49.1	41.8	45.5
Instrument Engineering	-2.8	-1.7	-2.2	18.7	17.6	18.1
Electrical Machinery	-16.9	-22.9	-19.9	20.8	26.8	23.8
Insulated Wires & Cables	-7.1	-9.1	-8.1	26.7	28.7	27.7
Electronics	104.9	113.2	109.1	23.0	14.7	18.8
Other Electrical Goods	64.7	66.6	65.6	41.6	39.7	40.7
Shipbuilding	-37.9	-48.8	-43.3	9.6	20.5	15.0
Motor Vehicles	22.1	27.2	24.6	28.4	23.3	25.9
Aerospace	13.6	14.0	13.8	-1.4	-1.8	-1.6
Other Vehicles	-25.1	-28.8	-26.9	3.0	6.7	4.8
Engineers' Small Tools	21.1	20.2	20.6	14.7	15.6	15.2
Cans & Metal Boxes	8.7	10.8	9.7	19.3	17.2	18.3
Other Metal Goods	1.3	4.2	2.7	133.1	130.1	13.6

* 1963 based implies 1963 final demand based.

NOTES TO TEXT

NOTES TO CHAPTER 1

1. The Standard Industrial Classificaction (SIC) is a system of classification of establishments according to industry, facilitating the comparability between statistics relating to industries.

   The SIC gives a set of 3-digit Minimum List Headings relating to industry groups, which are aggregated into larger groups or 'orders'.

   Slight revisions to the SIC are made from time to time and the classification used for the work of this thesis was that of 1968. (116).

2. The apparent discrepancies between Figure 1.1 and Table 1.2 in the estimate of the net output in materials and engineering industries occurred because the former was constructed using aggregated figures from Tables B and C of the 1968 Input-Output Tables (10), whilst the latter used the Report on the Census of Production (11).

   All the input and output flows shown in Figure 1.1 sum to the gross output for each industry provided adjustments are made to inputs for indirect taxation. In the case of final demand, adjustment must be made for imports, indirect taxes and sales by final buyers.

NOTES TO CHAPTER 2

Please note these abbreviations since they occur frequently in the text. A list of abbreviations is given on Page 97

A list of definitions of terms is given on Page 94

However, it could be argued that primary aluminium producers, for example, are frequently affected by capacity shortages or surplus since there are few producers in the market and a long-lead time is required for investment.

The magnitude and indivisibility of the commitment is also a problem.

However, these are essentially short-term problems and the long run, price of inputs and output has been the overriding factor in determining the trend in consumption.

The fact that short-term capacity inflexibility is excluded from the price-output determination system should not lead to the conclusion that the problem of the large energy requirement for smelting is not accounted for. Any change in the price of energy inputs would be one of the supply determinants listed: P_{α} where α = electricity.

References are occasionally made to dates outside this time period for the purpose of illustrating long-term trends.

The materials considered in this study are those which have a large number of applications across the economy. The production and consumption of these materials therefore affects, and is affected by, a wide range of economic factors.

The minor materials (or those whose total consumption in volume terms is relatively low), whilst sometimes crucial to specific processes and of geo-political importance, tend to be more specific in application and do not have the same degree of complexity of interdependence with the rest of the economy as do the "bulk" materials.

Methods do exist for the mathematical interpolation of production structures between census years, but they are of little value in the present exercise.

A general description of input-output techniques is provided in Appendix 4.1.

NOTES TO CHAPTER 3

1. The period covered is broadly that between 1954 and 1974, although owing to differences in the availability of data, some information may refer to years outside this range, and similarly some tables may cover less than the whole period.

2. Specific consumption is only an approximate measure and is subject to distortion via stock fluctuations and other factors. Over a long period, it is an indicator of the trend in intensiveness of use of a material.

3. The consumption figures in Table 3.3 refer to finished steel only - They ignore the non-steel output of the steel industry, mainly in the form of iron castings consumed by the transport equipment sector. This is a relatively small and declining portion of iron and steel output. (Production fell 15% between 1955 and 1975)

4. For the purpose of obtaining a weighted average index of end-use growth for a material, all end-use categories not listed in Table 3.2 were assumed to have grown at the same rate as manufacturing and construction in general. This probably produces a bias against those materials which are very intensively used in packaging since this sector has undoubtedly experienced above average growth. However, there are no figures covering the period concerned for aggregate packaging output, though there are figures for the output of certain types of packaging.

   Having consulted 'Packaging Review' and P.I.R.A. it was decided that no meaningful figure for the 'packaging industry' could be obtained for the period in question.

5. Roberts (23) also produced a set of energy intensiveness figures based on process analysis and obtained substantially different results for aluminium, copper, zinc and lead. This is due to the allowance made by Roberts for scrap recycling which is a less energy intensive process than the production of the material from primary sources.

6. Old scrap is that which is collected at the end of the life of the finished good. New scrap is that occurring in processing and available for immediate recycling.

NOTES TO CHAPTER 4.

1. Constructed by V.H. Woodward and obtained from Marjorie Osborn of the C.S.O. Described in reference (55).

2. Subscripts represent the year described by the matrix. Superscripts represent the year at whose process the matrix is valued.

3. Supplied by J. Wailing of the C.S.O.
The absorption matrix for 1968 at 1963 prices was estimated by P. Wilding of the C.S.O. Some details of the calculations underlying this table are given in Appendix 4.2

4. There are alternatives to this approach. For example, Armstrong (39) suggests the occasional replacement of small negative entries with small positive ones where there is evidence of a significant value of transaction for that call.

5. These deflators by MLH categories were supplied by Mr J. Wailing of the C.S.O.

6. The ratio of the volume of rolled aluminium sales in 1954 relative to 1963 was later obtained from industry sources. It did not conflict substantially with the original estimates of relative gross output for the two years.

7. As explained in Appendix 4.1 industry tables are more appropriate to the study of primary input intensiveness, since the original information on the purchase of primary inputs is collected on an industrial basis.

8. See Appendix 6.4.

9. Rank correlation is a way of measuring the relation between two variables when their probability distribution is not known. It is especially useful when there are few observations for each variable. It is measured by ascribing each observation of both variables a rank according to its place in the ordering of the variables when they are arranged in increasing (or decreasing) order of magnitude.
The degree of correspondence between the ranking of the two variables is an indication of the correlation between them.
Spearman's rank correlation coefficient is given by:

$$r_s = 1 - \frac{6\Sigma d^2}{n(n^2-1)}$$

where d is the difference between the rank of each observation of the two variables and n is the number of observations. The significance of r_s may be tested according to some Tables constructed for the purpose. When there are 8 observations as is the case in most of this Chapter, r_s must be at least about 65% to be significantly different to zero and thus to accept the hypothesis that there is some dependence between the 2 variables. r_s must be at least 70% if there are only 7 observations.

10 Intra-energy industry duplication was removed by subtracting from the total of each type of energy purchased indirectly, that proportion of energy which is consumed in conversion by the energy industries themselves.

11 Other important studies in this field were undertaken by Strout (113) and Reardon (61). The latter used a similar method to Carter.

12 See Appendix 4.1 for explanation of this equation.

13 The allocation of output change between final demand and coefficient change differs substantially between estimates for the two base years because of the interaction between final demand and intermediate coefficients. Some authors have attempted to overcome this problem by averaging the two estimates. Fromm(65) points out that the index number problem engendered is such that the average has no economic meaning, even though the two components exactly exhaust the change in output. This is an important theoretical point, but not one which has a great significance for a study such as the current one.

14 This is partly, but not wholly accounted for by the difference in price base. The discrepancy is possibly a result of the difference in non-principal production patterns between the two years. Non-principal production by the non-ferrous metals industry appeared to be relatively greater in 1968 than in 1963, thus making the ratio of outputs for 1968 over 1963 greater for the industrial comparison than for the commodity comparison.

15 Cement was omitted, since the only coefficient change of note was in the construction industry.

16 There may be technical factors concerning the use of the input-output tables which have tended to reduce observed aluminium consumption over time. A substitution of imported ingot by domestically smelted metal increases the value of domestic intra-industry transactions and thus more value is netted out from gross output. This will tend to reduce intermediate requirements for any given level of final demand.

NOTES TO CHAPTER 5

1. This refers to the gross output of all industries necessary to produce the set of goods which are exported. The set of exports as conventionally measured, referred to as 'direct exports', is only one component of export-related output.

2. These being categories 4 and 5 of the 1968 Input-Output Tables MLH 102, 103 and 109. That proportion of category 5, which was MLH 104 (crude petroleum), was included in 'other imports' in Figure 1.1.

3. The materials categories in Table 5.1-5.5 differ slightly from those used elsewhere, principally because SITC rather than SIC categories were used. The SITC categories corresponding to the headings in these tables are given in Appendix 5.1.

   The method of deflation used to obtain the figures in Tables 5.2 and 5.4 is given in Appendix 5.2.

4. The proportion of non-chemical manufactures (SITC categories 6,7 and 8) in the total value of imports by the countries currently constituting the OECD increased from 41% to 48% in the period 1960 to 1976, in spite of a strong increase in the relative price of primary products.

   Such growth is not sufficient to explain the rapid increase in the share of manufactures in UK imports over the period.

5. The figures for West German exports were obtained by firstly extracting the dollar values of exports according to SITC categories from (76) and then allocating them to the SIC categories represented in the 24-commodity breakdown used for the empirical work. These figures were then compared with the dollar values of UK exports according to the same categories and estimates of the sterling value of German exports obtained by multiplying the UK exports vector by the ratio of German to UK dollar export values.

   The 24-commodity headings used for this exercise and their SIC and SITC equivalents are given in Appendix 5.4.

6. The nomenclature is the same as in (7) and therefore differs slightly from that in the remainder of this thesis.

7. The fact that a domestic substitute exists makes it inappropriate to treat these commodities on a fixed volume/flexible price basis.

8. The category 'timber and miscellaneous wood products' contains some products which are decidedly competitive. However, the imports of this category are more intensive of timber and basic wood products than the domestic counterpart.

9. The NEDO methodology is algebraically represented in a slightly different way (58) but the actual calculations are analogous to those described here.

10. The alternative would be to use the more complex computations described by Becker (7) to take account of the interaction effect when changes in the coefficient of more than one commodity are postulated. This refinement was not thought necessary here, given the approximate nature of the exercise.

NOTES TO CHAPTER 6

1. This is a very strong assumption since natural resources are undoubtedly a primary factor. In a period of abundance of raw materials, the assumption that labour and capital are the only scarce resources is incorrect but of little practical significance, since the total value of the output of this stage of production is so low relative to the total product of a developed economy (See Figure 1.1, Chapter 1). The rent component of raw materials is subsumed in the return to the factors of production responsible for the mining or otherwise obtaining of that material.

   However there are signs that we are moving into an age of raw material shortage (106) (107) and thus the traditional emphasis upon labour and to a lesser extent capital saving, may have to be reviewed in the light of ever increasing natural resource rents. In this situation, the traditional labour and capital productivity comparisons would underweight the economic value of raw material saving.

2. Discussed in Section 6.3.

3. The inconsistencies and empirical errors engendered in ascribing a "productivity" to materials are discussed in Section 6.4. It may be, as suggested in Section 6.4 that improvements in the processing properties of materials leads to factor productivity gains in the user industries, but if this additional value is not reflected in the cost to the user industry or the return to the materials producer, it represents an allocative inefficiency, not a basis for a concept of "materials productivity".

4. The environment here refers to the exogenous constraints acting upon the industry as opposed to those variables within the control of management and the workforce (Hall et al (108)).

5. In addition, some movements towards one axis which do involve a movement away from the other, may be consistent with an improvement in productivity, dependent upon relative factor prices.

6. The term "principal industry" is used to denote that industry of which the productivity is being measured. "Non-principal industries" are those which have a direct or indirect input to the principal industry, but are separate entities.

7. Assuming the marginal rate of substitution between the two inputs to be such that, within a given range, if the resource intensiveness of the intermediate input equals the direct resources displaced, output is unchanged.

8. It will be remembered that the objective here is to construct an index of industry productivity and not an aggregate one for the economy. Thus additivity is not essential. However, use of the Thomson index leads to bias at both industry and national level.

9. The appropriateness of this algebraic representation will be discussed in Section 6.5.

10. The nomenclature has been changed to accord with that of the rest of this Chapter.

11. A similar method has nevertheless been used to estimate capital stock employed: West (98) used the "Giffen" method which derives an estimate of capital stock in each industry by multiplying the total income of capital by the reciprocal of the rate of return to capital by industry.

12. The algebra does not, of course, reflect the fact that some cells were deflated individually and uniform row deflators were not comprehensively applied.

13. Imports are included in the interindustry matrix.

14. See Appendix 6.6 for change implied by coefficients and by final demand for engineering industries.

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