Structural Changes in Manufacturing Industries 1981 - 1991

This article describes structural changes in the major manufacturing industries over the decade 1981 to 1991. Analysis is made with reference to data collected in the Annual Survey of Industrial Production conducted by the Census and Statistics Department.

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1. Introduction

1.1 In the early stage of industrialization in the fifties to seventies, manufacturers in Hong Kong were mainly engaged in labour intensive assembling and processing of consumer products. Most of these products were produced for export. In the eighties, local manufacturers were increasingly subject to the pressure of tight labour market, rising production costs and keen competition from other newly industrialized economies (including in particular Singapore, South Korea and Taiwan) in overseas markets. On the other hand, the adoption of an open door policy by Mainland China since 1978 had opened up opportunities. Increasingly local manufacturers relocated part or the whole of the manufacturing process across the border to take advantage of lower labour and land costs. Another step taken by manufacturers to contain production costs and improve export competitiveness was to raise productivity by means of investment in physical capital. Between 1981 and 1991, retained imports of industrial machinery for manufacturing use recorded an average annual growth rate of 7.8% in real terms. Consequently, structural changes took place in the manufacturing industries.

1.2 This article describes the performance and structural changes in 16 major manufacturing industries [1] in Hong Kong over the last decade between 1981 and 1991. Analysis is made with reference to data collected in the Annual Survey of Industrial Production [2] by the Census and Statistics Department.

2. Performance of major manufacturing industries/industry groups

2.1 The wearing apparel and textiles industries remain the two largest industries in Hong Kong in terms of value of output and employment. However, the wearing apparel industry lost some of its relative importance over the past decade. In terms of value added [3], its share decreased from 25% of the total for the manufacturing sector in 1981 to 20% in 1991. The textiles industry was able to sustain its position. Its share increased from 13% in 1981 to 15% in 1991.

2.2 Between 1981 and 1991, industries with the fastest growth in terms of value added included the tobacco manufactures industry (increased by 12.4 times); paper and paper products industry group (increased by 4.6 times); machinery industry (increased by 3.8 times); food manufactures industry (increased by 3.7 times); and printing and publishing industry (increased by 3 times).

2.3 Industries/industry groups which experienced less impressive growth in value added during the eighties included the watches and clocks, photographic and optical goods, scientific equipment industry group (+96%); plastic products industry (+83%); electrical appliances and electronic toys industry group (+68%); and radio, television, and communication equipment industry group (+5%). [4]

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[1] *The 16 major industries covered in this review accounted for 92% of total value added, 90% of total gross output and 92% of total employment of the manufacturing sector in 1991.*

[2] *Starting from the reference year of 1973, the Annual Survey of Industrial Production was conducted by the Census and Statistics Department to collect information on the operating characteristics, cost structure and performance of the manufacturing industries in Hong Kong. With the exception of 1974 and 1975 which covered only the wearing apparel and textiles industries, the annual surveys for other reference years covered all the manufacturing industries in Hong Kong. The latest available survey results were in respect of 1991.*

[3] *Value added or net output is obtained by deducting intermediary inputs (such as cost of bought-in raw materials and components, payments for industrial services and other operating expenses) from gross output. It thus measures the value which manufacturing establishments have "added" to these bought-in materials and components. Conceptually, it covers the values of input of labour and input of capital and entrepreneurship.*

[4] *These industries are also known to be extensively involved in outward processing activities in China. See footnote 5 and paragraph 2.4. In the situation where an establishment relocates all its production processes to China and is engaged only in supporting services such as sourcing of materials, product design, transportation and trading of goods produced in China etc., it will then be classified as an import/export establishment and thus not included in the statistics for the manufacturing industries. Caution should thus be taken in interpreting the declining trend in these outward processing oriented industries by making reference to the industrial production statistics alone.*

Table 1: Value added and gross output of selected manufacturing industries/industry groups

	Value added ($ million)			Gross output ($ million)		
	1981	1991	% change 1991/1981	1981	1991	% change 1991/1981
All manufacturing industries	36,049	92,693	+ 157	130,816	324,218	+ 148
Selected manufacturing industries/industry groups						
Wearing apparel	8,876 (24.6)	18,424 (19.9)	+ 107	28,322 (21.7)	63,510 (19.6)	+ 124
Textiles	4,596 (12.7)	14,009 (15.1)	+ 204	20,093 (15.4)	53,738 (16.6)	+ 167
Printing & publishing	1,774 (4.9)	7,049 (7.6)	+ 297	4,580 (3.5)	17,130 (5.3)	+ 274
Machinery	1,330 (3.7)	6,374 (6.9)	+ 379	4,198 (3.2)	20,606 (6.4)	+ 391
Fabricated metal products	2,777 (7.7)	5,922 (6.4)	+ 113	8,554 (6.5)	20,054 (6.2)	+ 134
Plastic products	2,862 (7.9)	5,238 (5.7)	+ 83	9,094 (7.0)	16,318 (5.0)	+ 79
Office & computing equipment	1,494 (4.1)	4,465 (4.8)	+ 199	6,407 (4.9)	22,330 (6.9)	+ 249
Watches & clocks, photographic & optical goods, scientific equipment	1,964 (5.4)	3,841 (4.1)	+ 96	11,205 (8.6)	21,471 (6.6)	+ 92
Electronic parts & components	1,189 (3.3)	3,645 (3.9)	+ 207	3,855 (2.9)	10,907 (3.4)	+ 183
Food manufactures	738 (2.0)	3,473 (3.7)	+ 371	3,094 (2.4)	10,163 (3.1)	+ 228
Transport equipment	977 (2.7)	2,717 (2.9)	+ 178	1,921 (1.5)	4,447 (1.4)	+ 131
Paper & paper products	428 (1.2)	2,409 (2.6)	+ 462	1,802 (1.4)	8,290 (2.6)	+ 360
Tobacco manufactures	170 (0.5)	2,265 (2.4)	+1236	458 (0.3)	5,036 (1.6)	+1001
Chemicals & chemical products	544 (1.5)	2,028 (2.2)	+ 273	2,170 (1.7)	6,524 (2.0)	+ 201
Electrical appliances & electronic toys	1,095 (3.0)	1,839 (2.0)	+ 68	3,777 (2.9)	6,375 (2.0)	+ 69
Radio, television & communication equipment	1,441 (4.0)	1,515 (1.6)	+ 5	7,124 (5.4)	6,313 (1.9)	- 11
Sub-total	32,254 (89.5)	85,214 (91.9)	+ 164	116,655 (89.2)	293,213 (90.4)	+ 151

Notes : Figures in brackets refer to the percentage shares of gross output/value added of the individual industries/industry groups.

2.4 In recent years, more and more local manufacturers have engaged themselves in outward processing activities [5] in China. Production for some product lines has been relocated to China and the goods produced are shipped back to the same Hong Kong manufacturers. Sales of such goods, which have been produced through outward processing arrangements, are currently recorded as "resale of goods in the same condition as purchased" in the statistics. Thus a comparison of resales as a percentage of total sales between 1981 and 1991 may provide an indication of the changes in the extent to which individual industries are involved in outward processing. Results of such a comparison (see Table 2) show that the electrical appliances and electronic toys industry group; plastic products industry; radio, television and communication equipment industry group; and watches and clocks, photographic and optical goods, scientific equipment industry group were involved rather extensively in outward processing activities.

Table 2: Resales as a percentage of total sales in selected manufacturing industries/industry groups

	Resales as a percentage of total sales * (%)		Increase in percentage points between 1981 and 1991
	1981	1991	
All manufacturing industries	6	20	14
Selected manufacturing industries/industry groups			
Wearing apparel	6	16	10
Textiles	8	14	6
Printing & publishing	2	3	1
Machinery	12	23	11
Fabricated metal products	5	15	10
Plastic products	3	35	32
Office & computing equipment	6	12	6
Watches & clocks, photographic & optical goods, scientific equipment	5	23	18
Electronic parts & components	15	31	16
Food manufactures	10	22	12
Transport equipment	3	14	11
Paper & paper products	2	8	6
Tobacco manufactures	44	52	8
Chemicals & chemical products	10	35	25
Electrical appliances & electronic toys	8	38	30
Radio, television & communication equipment	5	41	36

* Total sales include sales of goods produced, machinery produced for own use and resales of goods in the same condition as purchased.

[5] *Activities of outward processing in China involve basically sub-contracting of the local manufacturing processes to China. In many situations, the local manufacturers concerned are involved in exporting or re-exporting raw materials to China for processing, and with a contractual arrangement, in subsequent re-importation of the processed goods into Hong Kong, either for further processing (in the case of semi-manufactures) or resale (in the case of finished goods). It is not uncommon that the local manufacturer concerned has also a business interest in the sub-contracting firm in China, which is run in a different business capacity from his local firm, and in some cases, as a joint venture with other partners. As such, the sub-contracting firm in China is therefore not simply a pure extension of the local manufacturing firm but acts as a close business associate of it.*

2.5 Compared with the past, most of the manufacturing industries in Hong Kong produced higher value added products, especially towards the end of the eighties and the early nineties, as reflected by an increase in the percentage of value added of gross output. The trend of product upgrading was very obvious in the food manufactures industry; transport equipment industry; paper and paper products industry group; tobacco manufactures industry; and chemicals and chemical products industry group. This was the result of greater investment in physical capital, application of more advanced production technology and development of new products with a higher degree of sophistication.

Table 3: Value added content for selected manufacturing industries/industry groups

	Value added as a percentage of gross output (%)				
	1981	1988	1989	1990	1991
All manufacturing industries	28	26	28	29	29
Selected manufacturing industries/industry groups					
Wearing apparel	31	30	31	30	29
Textiles	23	27	26	27	26
Printing & publishing	39	40	43	42	41
Machinery	32	30	32	35	31
Fabricated metal products	32	28	28	31	30
Plastic products	31	26	28	31	32
Office & computing equipment	23	20	21	23	20
Watches & clocks, photographic & optical goods, scientific equipment	18	18	19	19	18
Electronic parts & components	31	28	32	29	33
Food manufactures	24	31	30	32	34
Transport equipment	51	55	58	62	61
Paper & paper products	24	22	27	25	29
Tobacco manufactures	37	43	44	46	45
Chemicals & chemical products	25	24	26	24	31
Electrical appliances & electronic toys	29	22	23	22	29
Radio, television & communication equipment	20	15	16	17	24

2.6 Relocation of the production processes to China was also a contributing factor. For an industry as a whole, the value added content of gross output changes differently at different stages of the relocation of the production processes. In the initial stage when the relocation of the production processes starts on a partial scale, i.e. part of the production processes moved to China, the value added content of gross output drops as that part of the output is no more contributed by local manufacturers. As the whole of the production processes of products which are labour intensive and have low value added is relocated to China, products of the industry which are still manufactured in Hong Kong are mostly those having a greater skill content and thus higher value added. As a result, the value added content of gross output of the industry picks up again. For this reason, the value added content of gross output of the radio, television and communication equipment industry group dropped from 20% in 1981 to 15% in 1988, but then rose again gradually to 24% in 1991. Similar trends were observed in the electrical appliances and electronic toys industry group and plastic products industry.

3. Employment and productivity

3.1 Downsizing in employment was a common trend experienced by most manufacturing establishments over the past decade. For the manufacturing sector as a whole, average employment size per establishment decreased from 21 in 1981 to 15 in 1991. Relocation of the relatively more labour intensive production processes to China was the major contributing factor of this trend.

Table 4 : No. of establishments, no. of persons engaged and average employment size per establishment in selected manufacturing industries/industry groups

	No. of establishments			No. of persons engaged			Average employment size per establishment	
	1981	1991	% change 1991/1981	1981	1991	% change 1991/1981	1981	1991
All manufacturing industries	48 324	43 893	-9	996 121	651 404	-35	21	15
Selected manufacturing industries/industry groups								
Wearing apparel	8 789	7 443	-15	289 339	187 496	-35	33	25
Textiles	5 691	4 684	-18	127 491	99 234	-22	22	21
Printing & publishing	3 164	4 978	+57	34 623	41 221	+19	11	8
Machinery	4 272	5 885	+38	36 210	41 161	+14	8	7
Fabricated metal products	6 827	5 855	-14	84 675	46 366	-45	12	8
Plastic products	4 808	3 795	-21	88 944	38 725	-56	18	10
Office & computing equipment	213	198	- 7	29 430	18 660	-37	138	94
Watches & clocks, photographic & optical goods, scientific equipment	1 774	1 369	-23	60 045	27 157	-55	34	20
Electronic parts & components	515	313	-39	26 383	22 638	-14	51	72
Food manufactures	919	838	- 9	16 316	21 310	+31	18	25
Transport equipment	416	567	+36	18 287	13 634	-25	44	24
Paper & paper products	1 382	1 517	+10	13 260	14 804	+12	10	10
Tobacco manufactures	3	4	+33	874	1 353	+55	291	338
Chemicals & chemical products	629	686	+ 9	8 836	7 758	-12	14	11
Electrical appliances & electronic toys	454	249	-45	27 850	10 489	-62	61	42
Radio, television & communication equipment	354	170	-52	35 972	9 401	-74	102	55

3.2 The largest percentage decreases in the number of persons engaged were also recorded in those industries/industry groups which were extensively involved in outward processing: radio, television and communication equipment (-74%); electrical appliances and electronic toys (-62%); plastic products (-56%); and the watches and clocks, photographic and optical goods, scientific equipment (-55%).

3.3 On the other hand, some industries nevertheless recorded a positive growth in the number of persons engaged. These included tobacco manufactures industry (+55%); food manufactures industry (+31%); printing and publishing industry (+19%); and machinery industry (+14%); paper and paper products industry group (+12%). With an exception of the food manufactures industry, the increases in the number of persons engaged were accompanied by increases in the number of establishments in these industries.

Table 5 : Composition of employment between operatives and non-operative employees in selected manufacturing industries/industry groups

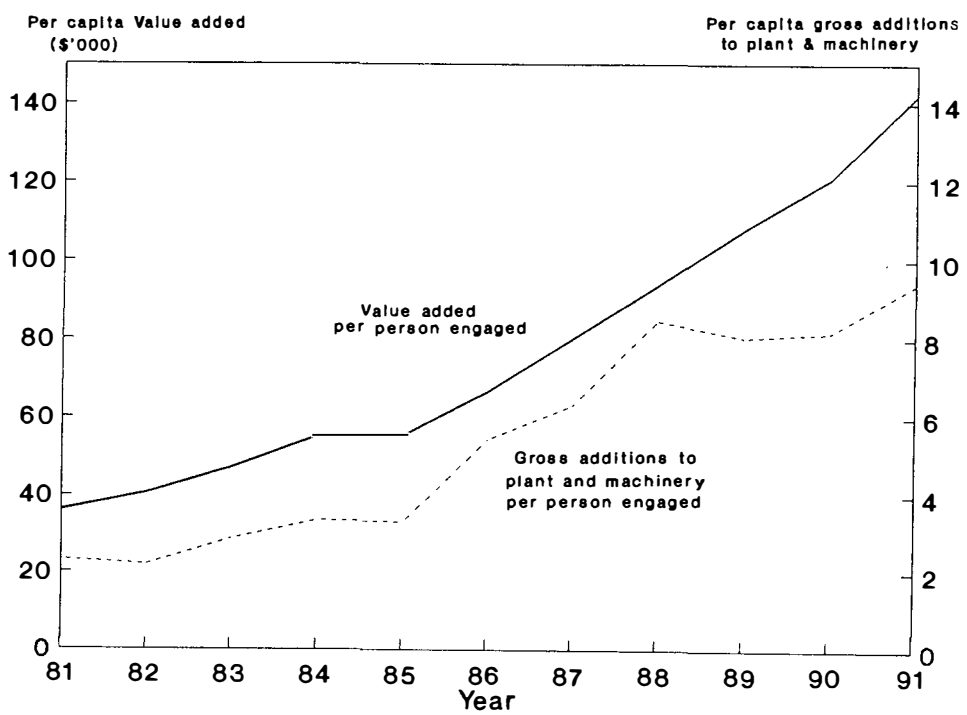
	No. of operatives			No. of non-operative employees			Non-operative employees as percentage of total employees*	
	1981	1991	% change 1991/1981	1981	1991	% change 1991/1981	1981	1991
All manufacturing industries	839 154	476 687	-43	114 443	127 225	+11	12.0	21.1
Selected manufacturing industries/industry groups								
Wearing apparel	256 898	153 497	-40	25 080	26 431	+5	8.9	14.7
Textiles	107 864	76 766	-29	14 236	17 555	+23	11.7	18.6
Printing & publishing	25 186	26 026	+3	6 246	9 790	+57	19.9	27.3
Machinery	28 492	26 436	-7	4 142	8 094	+95	12.7	23.4
Fabricated metal products	69 800	32 846	-53	8 504	6 425	-24	10.9	16.4
Plastic products	74 932	26 514	-65	9 873	7 679	-22	11.6	22.5
Office & computing equipment	25 238	12 453	-51	3 779	6 065	+60	13.0	32.8
Watches & clocks, photographic & optical goods, scientific equipment	51 729	19 138	-63	7 317	6 694	-9	12.4	25.9
Electronic parts & components	21 877	15 961	-27	4 095	6 552	+60	15.8	29.1
Food manufactures	12 154	14 513	+19	3 414	5 934	+74	21.9	29.0
Transport equipment	15 351	11 052	-28	2 679	1 900	-29	14.9	14.7
Paper & paper products	10 108	10 192	+1	1 633	3 140	+92	13.9	23.6
Tobacco manufactures	567	803	+42	307	551	+79	35.1	40.7
Chemicals & chemical products	6 087	4 466	-27	2 298	2 656	+16	27.4	37.3
Electrical appliances & electronic toys	24 252	7 114	-71	3 414	3 226	-6	12.3	31.2
Radio, television & communication equipment	31 524	6 229	-80	4 412	3 063	-31	12.3	33.0

* Total employees do not include working proprietors, active partners and unpaid family workers.

3.4 It is interesting to note that despite a cut in the number of operatives, most industries employed more non-operative employees than 10 years ago. Significant portions of them are engaged in supporting services such as sourcing of raw materials, product design, production management and engineering, marketing and so on. The largest rates of increase of non-operative employees were recorded in the machinery industry (+95%); paper and paper products industry group (+92%); and tobacco manufactures industry (+79%). These are generally technology and skill intensive industries. The change in employment mix reflects a change in the skill requirement of labour along with the mechanization of production processes and the introduction of new production technologies. For industries where outward processing activities are prominent, this also reflects the increasing role of local industries of providing technical support to the production processes relocated to China.

3.5 The ratio of value added to number of persons engaged provides a crude indication of labour productivity in an industry. For the manufacturing sector as a whole, this ratio was on an uptrend in practically all the years throughout the eighties. The improvement in productivity was partly attributable to increased investment in machinery and equipment. Furthermore, with the relocation of labour intensive production processes across the border, local manufacturers concentrate on more capital intensive and skill intensive (hence high value added) activities, which are conducive to enhancing the productivity of the manufacturing sector. Prior to 1988, productivity generally moved in line with investment in physical capital as measured by gross additions to plant and machinery per person engaged. However, with more and more factories relocated to China, investment in plant and machinery in local manufacturing industries became stagnant after 1988. Productivity, on the other hand, continued to improve [6] (Chart 1). The factor of physical capital has thus stopped contributing to the improvement of productivity in the manufacturing sector. Instead, the prevalence of outward processing activities has increased entrepreneurial profits and in turn further raised the productivity of the manufacturing sector.

Chart 1 Value added per person engaged and gross additions to plant and machinery per person engaged



[6] *While the output of the manufacturing sector as a whole had not increased significantly in real terms during the period of 1988 to 1991, the continued decline in the number of persons engaged resulted in an increase in the ratio of value added to number of persons engaged.*

3.6 Industries which recorded higher productivity growth during the eighties included the tobacco manufactures industry (the ratio of value added to number of persons engaged increased by an average annual growth rate of 24% between 1981 and 1991); paper and paper products industry group (+18% per annum); and office and computing equipment industry (+17% per annum). Higher productivity growth was also recorded in the chemicals and chemical products industry group; watches and clocks, photographic and optical goods, scientific equipment industry group; and electrical appliances and electronic toys industry group - all with an average annual growth rate of about 16%. The increase in productivity in most of these industries was due to a combination of increased investment and relocation of labour intensive production processes to China during the period under review.

Table 6 : Investment in plant and machinery and labour productivity in selected manufacturing industries/industry groups

	Average annual growth rate of gross additions to plant & machinery per person engaged (%)			Average annual growth rate of value added per person engaged (%)		
	1981-88	1988-91	1981-91	1981-88	1988-91	1981-91
All manufacturing industries	20	4	15	15	15	15
Selected manufacturing industries/industry groups						
Wearing apparel	14	-8	7	13	12	12
Textiles	18	7	14	16	11	15
Printing & publishing	15	-5	9	13	13	13
Machinery	27	1	19	15	17	15
Fabricated metal products	17	-2	11	15	13	15
Plastic products	22	-4	13	16	15	15
Office & computing equipment	27	6	20	15	22	17
Watches & clocks, photographic & optical goods, scientific equipment	11	20	14	17	12	16
Electronic parts & components	34	5	24	13	14	14
Food manufactures	15	3	11	15	10	14
Transport equipment	18	-22	4	14	15	14
Paper & paper products	37	-10	21	17	19	18
Tobacco manufactures	6	33	14	22	30	24
Chemicals & chemical products	11	-1	8	14	19	16
Electrical appliances & electronic toys	30	27	29	13	25	16
Radio, television & communication equipment	27	-12	14	13	21	15

4. Cost structure and profitability

4.1 The shares of various cost components (consumption of materials, employee compensation, and other operating expenses) and gross surplus in gross output provide an indication of the cost structure and profitability of an industry.

4.2 The largest input content of the manufacturing industries is accounted for by the consumption of raw materials and supplies for production and business operation. In 1981, for each $100 gross output generated in the manufacturing sector, $65 were paid for the costs of materials and supplies. Between 1981 and 1991, the share of the costs of raw materials and supplies consumed decreased in most of the manufacturing industries under study. Industries being more capable of reducing raw material costs through sourcing of cheaper raw materials/supplies, productivity improvement and adoption of raw materials/supplies conserving production technology will have a better chance to improve the profitability of their business. (see paragraph 4.4)

Table 7 : Cost structure of selected manufacturing industries/industry groups (percentage share of gross output)

	Consumption of materials, supplies & industrial work/services		Compensation of employees		Other expenses		Gross surplus	
	1981	1991	1981	1991	1981	1991	1981	1991
All manufacturing industries	65	63	18	16	9	10	8	11
Selected manufacturing industries/industry groups								
Wearing apparel	62	63	23	21	9	11	5	6
Textiles	71	66	16	16	9	11	4	8
Printing & publishing	53	47	21	22	11	13	16	18
Machinery	59	59	19	16	12	10	10	14
Fabricated metal products	59	62	23	16	10	9	9	12
Plastic products	60	58	22	18	10	12	9	13
Office & computing equipment	71	75	10	7	6	6	13	11
Watches & clocks, photographic & optical goods, scientific equipment	78	76	12	10	6	6	4	8
Electronic parts & components	59	55	16	19	11	13	14	13
Food manufactures	68	54	14	19	9	13	9	14
Transport equipment	37	31	37	45	16	8	11	16
Paper & paper products	67	62	17	15	11	10	5	12
Tobacco manufactures	36	43	8	5	24	12	33	40
Chemicals & chemical products	65	59	11	12	11	13	13	15
Electrical appliances & electronic toys	64	60	16	13	9	13	11	14
Radio, television & communication equipment	74	70	10	13	8	10	9	8

4.3 Despite rising production costs, most manufacturing industries were able to improve their profit margins during the eighties. The share of gross surplus in gross output [7] provides an indication of the profitability of the industry.

4.4 Industries that were more successful in improving their profit margins included the tobacco manufactures industry; food manufactures industry; transport equipment industry; and paper and paper products industry group. Improvement in the profit margins of these industries was achieved by investment in machinery to raise productivity. They were also more successful in reducing non-labour costs as reflected by a significant decrease in the percentage component of raw materials and other expenses between 1981 and 1991.

4.5 Moderate increases in profit margins were recorded in the textiles industry; machinery industry; fabricated metal products industry; plastic products industry; watches and clocks, photographic and optical goods, scientific equipment industry group; and electrical appliances and electronic toys industry group. This was largely the result of improvement in productivity as reflected by an increase in value added per person engaged during the period under review. Furthermore, for those outward processing oriented industries, the component percentage of employee compensation was lower than 10 years ago. This coupled with some reduction in raw material costs also contributed to improving profit margins.

4.6 In the printing and publishing industry and chemicals and chemical products industry group, the increase in labour costs was largely offset by the reduction in raw material costs. As a result, their profit margins increased marginally between 1981 and 1991.

[7] *The share of gross surplus as a percentage of gross output may be used to represent the gross profit margin of the industry.*