

SIZE AND PRODUCTIVITY IN NEW ZEALAND

MANUFACTURING : A FIRST LOOK

Paper for presentation to New Zealand Geography Conference, Wellington

August 1981.

Geoff Bertram and Janya McCalman
(Victoria University of Wellington)

Most studies of New Zealand manufacturing remark on the importance of small and medium-scale enterprises. The most recent available census data, for the 1976-77 year, show that firms employing less than 100 people account for 94% of all manufacturing enterprises, and 48% of total manufacturing employment. Firms employing less than 50 accounted for 87% of firms and 33% of employment. During the past three decades the small and medium sized firms have held their own in numerical terms, although their relative importance has been slowly eroded as a limited number of very large firms have emerged at the top of the industrial pyramid. (See Appendix I for the available data on the size structure of manufacturing).

The persistence of firms of relatively small size raises a number of questions. One of the most interesting is the relative economic performance of smaller as compared with larger firms in the New Zealand context. The old "Industrial Production Statistics", which terminated in 1973-74, provided data on average labour productivity by size of firm, and on average wages and salaries paid to employees of firms of different size. These data (see figure 6) indicated a general tendency for labour productivity to be positively related to size of firm, and for average earnings to display a similar correlation. In the absence of data on capital investment, however, it was impossible to say very much about the actual competitive strength of smaller firms from the point of view of profitability, or efficiency of total factor use.

The new system of manufacturing census, started in 1975-76, provides information on depreciation and capital outlays, in addition to figures on employment, value added, and wages and salaries. This enables us to derive estimates of net factor productivity¹ (that is, the ratio of value added to the cost of total inputs of labour and capital services). These estimates, furthermore, can be calculated separately for each industrial sector, in order to show the detailed patterns which underlie the broad aggregates. In this paper we set out the results of such an analysis, based upon the 1975-76 census results. Net factor productivity estimates are derived, and then related to capital-labour ratios and average earnings. We then add some comments on

¹ For this concept see Campbell, C., Trends in Productivity of New Zealand's Manufacturing Industries 1951/52 - 1972/73 (P.E.P. Occasional Paper No.36. V.U.W. October 1978) pp. 5-6.

trends in labour productivity through time.

Table 1 shows net factor productivity by size of firm for manufacturing as a whole, for the three census years from 1974/75 to 1976/77. The "net productivity" figure shows the number of dollars of value added² for each dollar spent on labour and capital services. It shows, in other words, the amount of net surplus generated, to be allocated among profit and interest, economic rent, and taxes. Thus a net productivity figure of 1.76 means that 76 cents of net surplus was obtained for every \$1 spent on labour and capital inputs³. The data are graphed in Figure I. In constructing these charts we have first expressed each size category's net productivity as a percentage of the average for all firms, and then weighted each category by its percentage share of total salaries, wages and depreciation. (In geometric terms this means that the areas enclosed above and below the 100% line are equal).

A very clear and consistent pattern emerges. Firms employing less than 10 persons display net factor productivity over 10% greater than average. Firms employing between 20 and 99 fall slightly below the average, and firms employing over 100 are more or less average, with some suggestion of a downward trend at the very top end of the size distribution. (In reading overall trends it is important not to be distracted by the sharp divergence from the mean of a couple of numerically-insignificant categories, in which a very few individual firms have excessive weight).

There is, in other words, no evidence to suggest that larger firms are more efficient at generating surplus than smaller firms; and some evidence to suggest that very small firms (less than 10 employees) have the highest net return on factor outlays. Whether this means that the smallest firms have the highest rate of reinvestible surplus is a moot point, since capitalist consumption by working proprietors would obviously account for a higher fraction of net surplus at this end of the scale than towards the top.

The data in Table I, of course, are broad aggregates covering all manufacturing, and it is of some interest to know whether the aggregate pattern is reproduced in individual industrial sectors. We therefore used the 1975/76 census to calculate net productivity figures for all available size categories in each of the 123 industrial sectors covered by the census; the results appear in Appendix II. By visual inspection of the data we grouped sectors into six types as follows:

² Value added in the New Zealand census statistics is measured at market prices - in other words it includes indirect taxes.

³ It need hardly be said, of course, that depreciation allowances are a very imperfect measure of capital services used; see Campbell op.cit., p.12. In the context of the present study, however, we are interested in the relative performance of firms of different size; we are assuming that depreciation allowances do at least provide a measure of the relative volume of capital services used by firms of different size.

TABLE 1

Net Factor Productivity in New Zealand Manufacturing by Size of Firm, 1974/75 - 1976/77

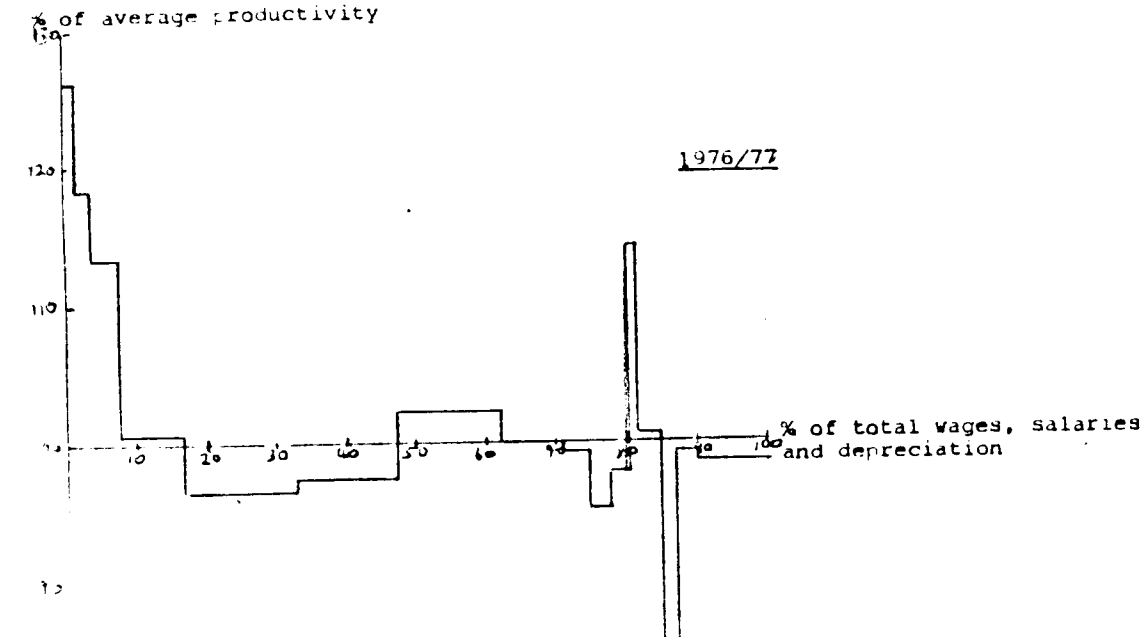
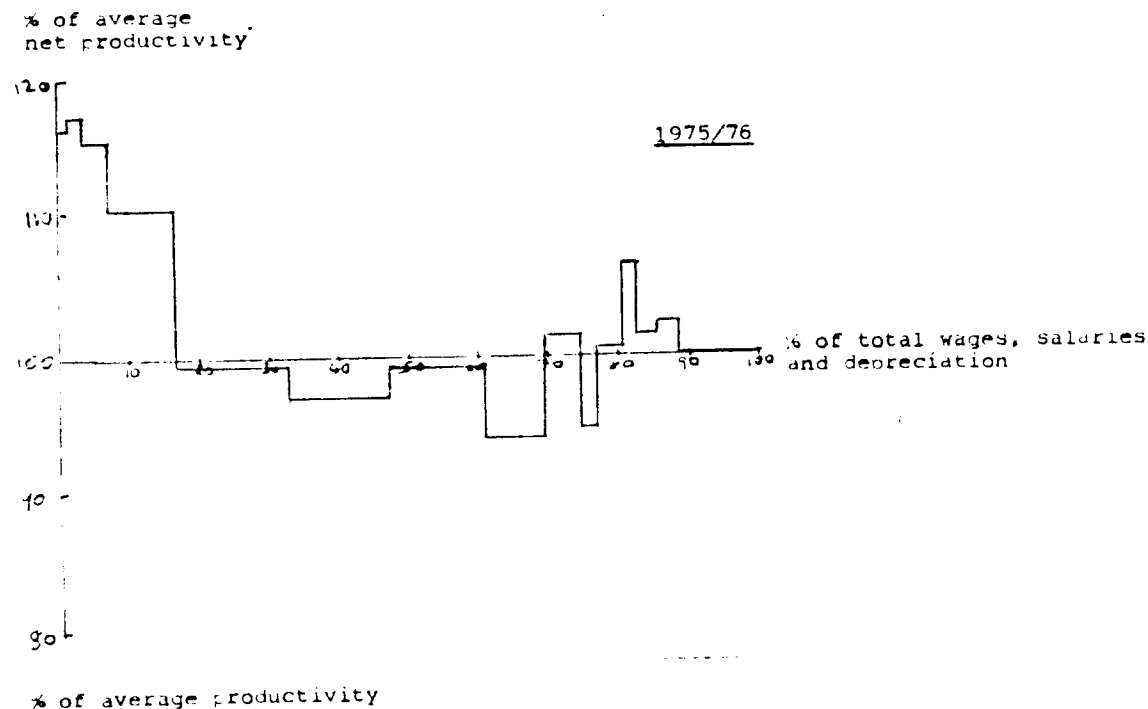
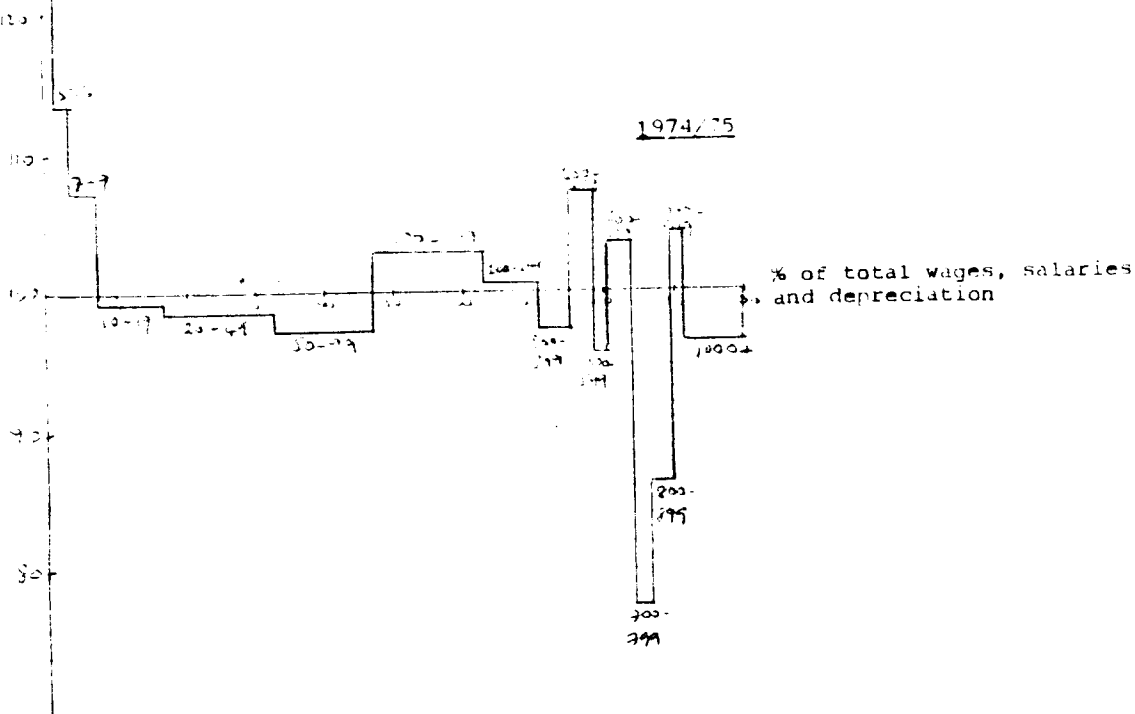
Firm size (number employed)	1974/75.....			1975/76.....			1976/77.....		
	Net productivity \$	% of average productivity	% of total salaries wages and depreciation	Net productivity \$	% of average productivity	% of total salaries wages and depreciation	Net productivity \$	% of average productivity	% of total salaries wages and depreciation
Under 5	1.76	127.5	1.4	1.56	116.4	1.5	1.79	126.1	1.6
5- 6	1.57	113.8	1.6	1.57	117.2	1.5	1.68	118.3	1.5
7- 9	1.48	107.2	3.1	1.55	115.7	3.0	1.61	113.4	3.1
10-19	1.37	99.3	8.1	1.35	100.7	7.8	1.43	100.7	7.7
20-49	1.36	98.6	15.6	1.33	99.3	15.0	1.37	96.5	15.2
50-99	1.34	97.1	14.0	1.30	97.0	13.8	1.38	97.2	14.4
100-199	1.42	102.9	15.5	1.33	99.3	14.8	1.45	102.1	15.1
200-299	1.39	100.7	8.5	1.26	94.0	9.3	1.42	100.0	9.0
300-399	1.34	97.1	5.4	1.36	101.5	5.0	1.41	99.3	4.7
400-499	1.48	107.2	3.6	1.27	94.8	2.8	1.35	95.1	3.3
500-599	1.32	103.6	1.7	1.35	100.7	3.4	1.39	97.9	2.6
600-699	1.43	103.6	3.9	1.43	106.7	2.6	1.62	114.1	1.8
700-799	1.07	77.5	2.3				1.43	100.7	3.5
800-899	1.19	86.2	3.4	1.36	101.5	3.8	1.23	86.6	2.2
900-999	1.44	104.3	2.4	1.37	102.2	3.0	1.41	99.3	2.9
1000+	1.33	96.4	9.3	1.34	100.0	12.4	1.40	98.6	11.6
Average	1.38	100.0		1.34	100.0		1.42	100.0	
Totals*			100.0			100.0			100.0

* May not add exactly due to rounding of decimals.

Source: Derived from Census of Manufacturing 1976-77 (Department of Statistics, Wellington. Cat.No.11.101) pp.58-59.

FIGURE 1, Relative Net Factor Productivity, by Size of Firm

NOTE: Each bar represents a size category of industrial establishments. The height of the bar shows the relative performance of the category compared to the average for all firms, and the width of the bar shows the weight of each category in the total.



- Type I Clear declining trend in net productivity as size of firm increases.
- Type II Some evidence of a tendency for net productivity to decline with increasing size of firm
- Type III No clear relationship between firm size and net productivity
- Type IV Some evidence of tendency for net productivity to increase with size of firm
- Type V Clear rising trend in net productivity as size of firm increases
- Type VI Insufficient data to judge (mainly sectors for which only an overall figure is available due to confidentiality requirements).

The results are summarised in Table 2. It can be seen that in 63% of the sectors, accounting for 64% of employment and 60% of total value added, there was evidence of a tendency for smaller firms to out-perform larger ones in terms of our net productivity measure. A further 12% of sectors, with 23% of employment and 22% of value added, showed no discernable trend; while 13% of sectors, with 8% of employment and 9% of value added, displayed a tendency for net productivity to correlate positively with size of firm.

TABLE 2

Results of 123-Sector Analysis of Net Productivity by Size of Firm

Relationship between net productivity and firm size	Number of sectors	Percent of sectors	Percent of employment	Percent of value added	Average number of employees per firm
Type I	44	35.8	28.6	27.1	25.5
Type II	34	27.6	35.1	33.2	37.7
Type III	15	12.2	23.2	22.3	72.1
Type IV	11	8.9	5.7	6.0	43.1
Type V	5	4.1	2.6	2.8	59.0
Type VI	14	11.4	4.8	8.5	112.6
Totals	123	100.0	100.0	100.0	34.1

Source: Appendix II

- Type I: Clear inverse relationship
 Type II: Some inverse relationship
 Type III: No relationship
 Type IV: Some direct relationship
 Type V: Clear direct relationship
 Type VI: Inadequate data.

It is immediately obvious that sectors of Types IV, V and VI (that is, those showing larger firms as more productive, plus those so dominated by a few large firms that disaggregated data was not available), are characterised by relatively high labour productivity in the aggregate (since the percentage of value-added accounted for by these sectors exceeds their share of total employment). There is also some tendency for average size of firm to increase as we move from Type I to Type V, which indicates (as neo-classical intuition would suggest) that large firms are more common in sectors where net productivity rises rather than falls with size of firm.

Probably the most important point to emerge from Table 2, though, is the heterogeneity of experience revealed by the more detailed data. Only a small minority of manufacturing sectors displayed the same pattern as our aggregate graphs in Figure 1. Most sectors showed either increasing or decreasing relationships between net productivity and firm size, and a majority of sectors displayed a tendency for smaller firms to have higher net productivity.

The measure of net productivity which we have used - value added at market prices divided by total salaries, wages and depreciation - is itself made up of several component parts, and differences in net productivity could arise from several possible sources. One possibility is differences in labour productivity, which we can measure as value add per person employed. A second possibility is different average labour costs in firms of different size (so that a given amount of salaries and wages paid may not represent equal amounts of labour services in different size categories). A third possibility is differences in capital-output ratios, some proxy for which we can obtain by relating depreciation to value added. A fourth possibility is difference in capital-labour ratios, which we can approximate by relating depreciation to number of employees.

We explore these four issues in Tables 3 - 10 and Figures 2 - 5. In each case the same approach is adopted: first we show the overall pattern for manufacturing as a whole, for the three census years 1974/75 - 1976/77; secondly we reproduce this data in graph form; and thirdly we show the result of a "head count" of our 123 individual sectors to illustrate the degree to which the aggregate pattern is typical of individual sectors.

At the aggregate level, we find clear and strong trends. Labour productivity (value added per worker) is positively related to firm size (Table 3 and Figure 2). Average labour costs show the same pattern (not surprisingly - we would expect average wages and salaries to be related to labour productivity) (Table 4 and Figure 3). Output-capital ratios (Table 5 and Figure 4) are negatively related to size of firm (that is, larger firms obtain less output per unit of capital) although there is rather extreme variability in the ratio for the larger size categories, due presumably to the small number of firms and the peculiarities of accounting practice in measuring depreciation. Finally, the ratio of capital to labour (Table 6 and Figure 5) rises with size of firm - that is, larger firms tend to be more capital-intensive than smaller firms.

All of these results suggest a very straightforward picture for manufacturing as a whole. Smaller firms are more labour-intensive in their choice of technique. Their labour productivity and wages and salaries are correspondingly lower, while capital productivity is higher (which presumably shows up in higher returns to capital invested). With results such as these, it would be easy to imagine a set of general policy prescriptions for the sector. One might

TABLE 3

Labour Productivity Related to Size of Firm, 1974/75 - 1976/77

Size category (number employed)	1974/75			1975/76			1976/77		
	Value added per employee \$	Labour productivity as % of average	% of total employment	Value added per employee \$	Labour productiv- ity as % of average	% of total employ- ment	Value added per employee \$	Labour product- ivity as % of average	% of total employment
Under 5	7,585	101.5	1.8	7,991	101.5	1.7	10,253	109.6	1.3
5-6	6,855	94.6	2.0	6,813	86.6	2.0	7,908	84.5	2.1
7-9	6,937	95.8	3.5	7,387	93.9	3.7	8,534	91.2	3.8
10-19	6,565	90.6	8.9	7,083	90.0	8.7	8,302	88.7	8.6
20-49	6,774	93.5	16.6	7,157	90.9	16.3	8,267	88.3	16.5
40-99	6,765	93.4	14.6	7,407	94.1	14.5	8,811	94.2	14.8
100-199	7,587	104.7	15.3	8,076	102.6	14.3	9,883	105.6	14.5
200-299	7,670	105.9	8.1	8,000	101.7	8.6	10,917	116.7	8.3
300-399	8,015	110.7	4.8	8,749	111.2	4.5	9,752	104.2	4.4
400-499	8,157	112.6	3.4	8,382	106.5	2.5	10,258	109.6	2.9
500-599	6,970	96.2	1.7	8,060	102.4	3.3	9,653	103.2	2.4
600-699	8,861	122.3	3.3	10,930	138.9	2.0	10,875	116.2	1.8
700-799	6,084	84.0	2.1	6,220	79.0	1.0	11,031	117.9	2.8
800-899	6,198	85.6	3.4	7,933	100.8	2.6	7,805	83.4	2.3
900-999	9,128	126.0	2.0	8,239	104.7	2.9	9,252	98.9	2.9
1,000+	7,685	106.1	8.5	8,832	112.2	11.1	10,646	113.8	10.0
Average	7,243	100.0		7,870	100.0		9,358	100.0	
Total*			100.0			100.0			100.0

* May not add exactly due to rounding of decimals.

Source: As for Table 1.

FIGURE 2: Relative Labour Productivity by Size of Firm

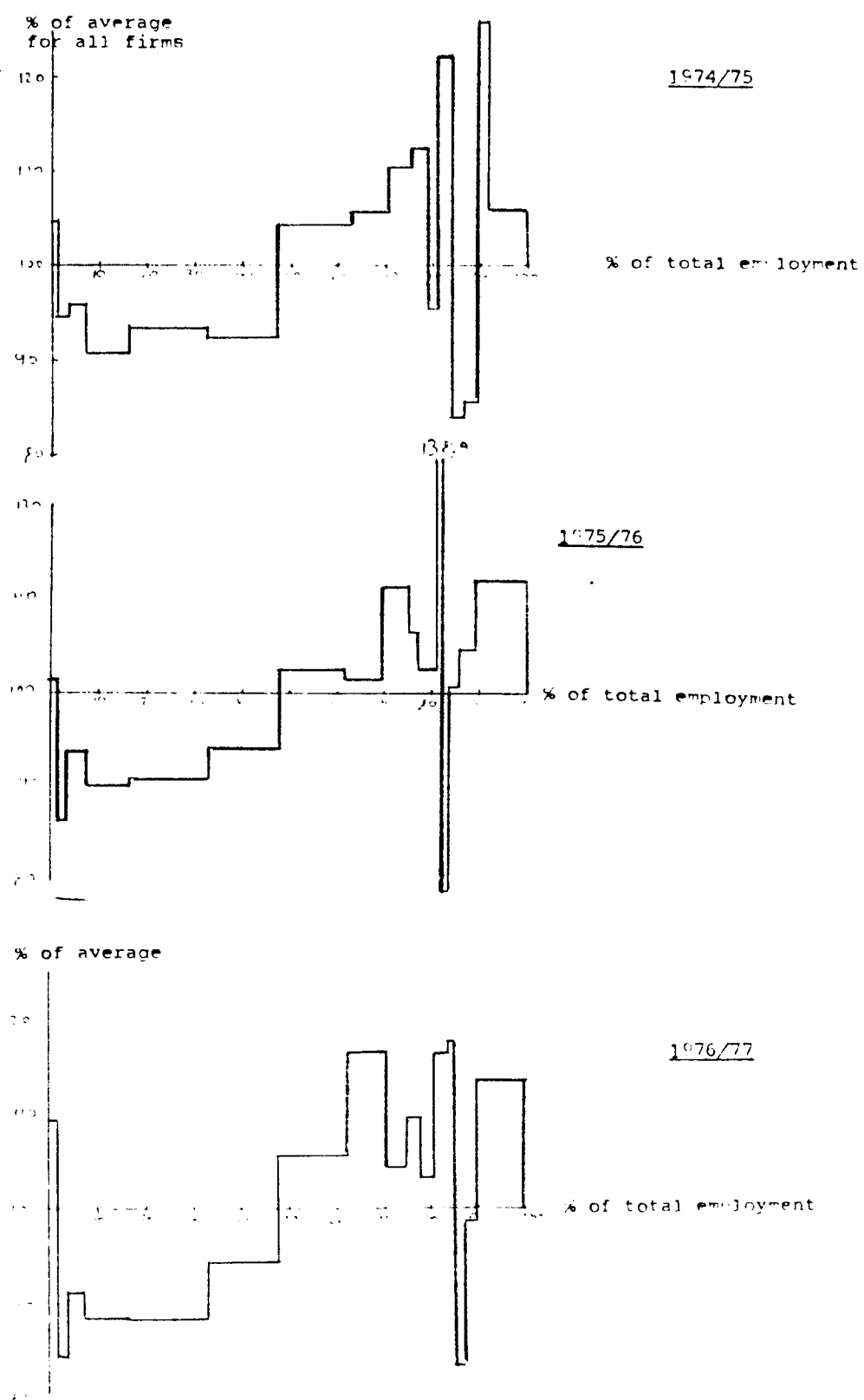


TABLE 4

Average Labour Cost Related to Size of Firm, 1974/75-1976/77

Firm size (Number employed)	1974/75			1975/76			1976/77		
	Labour cost per employee \$	% of average labour cost	% of total employ- ment	Labour cost per employee \$	% of average labour cost	% of total employ- ment	Labour cost per employee \$	% of average labour cost	% of total employ- ment
Under 5	3,336	81.2	1.8	4,389	83.2	1.7	5,006	85.1	1.8
5-6	3,243	83.7	2.0	3,827	72.5	2.0	4,202	71.4	2.1
7-9	4,268	90.6	3.5	4,234	80.2	3.7	4,748	80.7	3.9
10-19	4,338	92.1	8.9	4,687	88.8	8.7	5,253	89.3	8.6
20-49	4,438	95.3	16.6	4,855	92.0	16.3	5,450	92.6	16.5
50-99	4,563	95.9	14.6	5,104	96.7	14.5	5,696	96.8	14.8
100-199	4,742	100.7	15.3	5,341	101.2	14.3	5,981	101.6	14.5
200-299	5,014	106.5	8.1	5,700	108.0	8.6	6,402	108.8	8.3
300-399	5,042	107.0	4.8	5,688	107.8	4.5	6,081	103.3	4.4
400-499	5,050	107.2	3.4	5,669	107.4	2.5	6,519	110.8	2.9
500-599	4,874	103.5	1.7	5,527	104.7	3.3	6,380	103.4	2.4
600-699	4,866	103.3	3.3	6,658	126.2	2.0	6,112	103.9	1.8
700-799	5,168	109.7	2.1	5,481	103.9	3.6	6,790	115.4	2.8
800-899	4,824	102.4	3.4				5,850	99.4	2.3
900-999	5,202	110.4	2.0	5,604	106.2	2.9	6,063	103.0	2.9
1,000+	5,056	107.6	8.5	5,626	106.6	11.1	6,412	109.0	10.0
Average	4,710	100.0		5,277	100.0		5,885	100.0	
Totals*			100.0			100.0			100.0

*May not add exactly due to rounding

Source: As for Table 1.

FIGURE 3: Relative Average Labor Cost by Size of Firm

10.

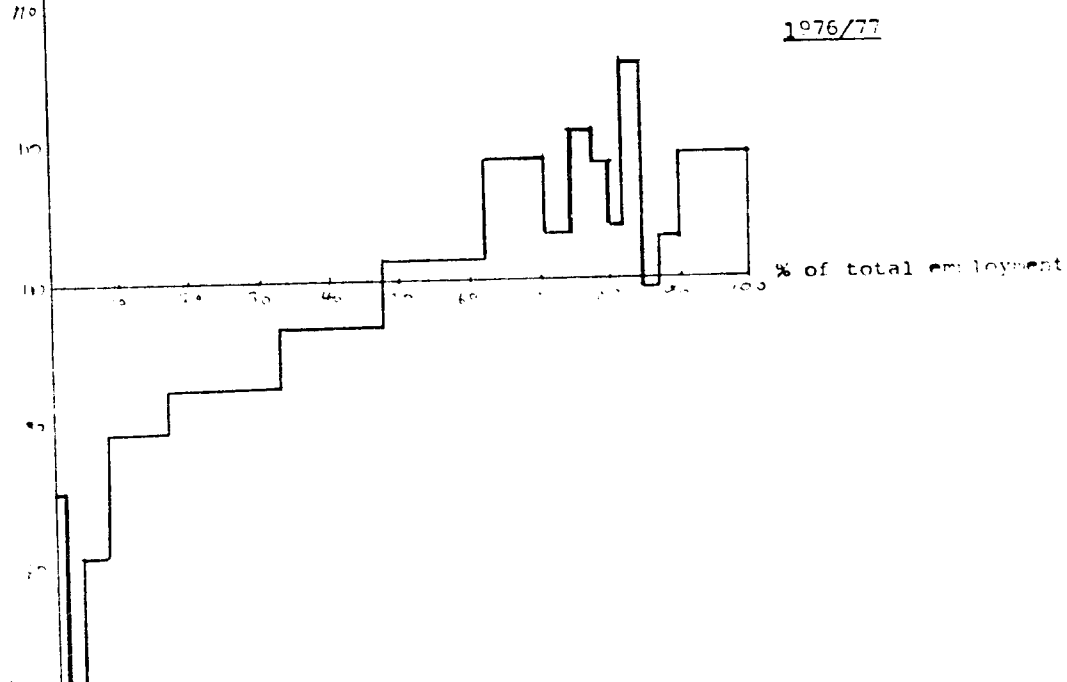
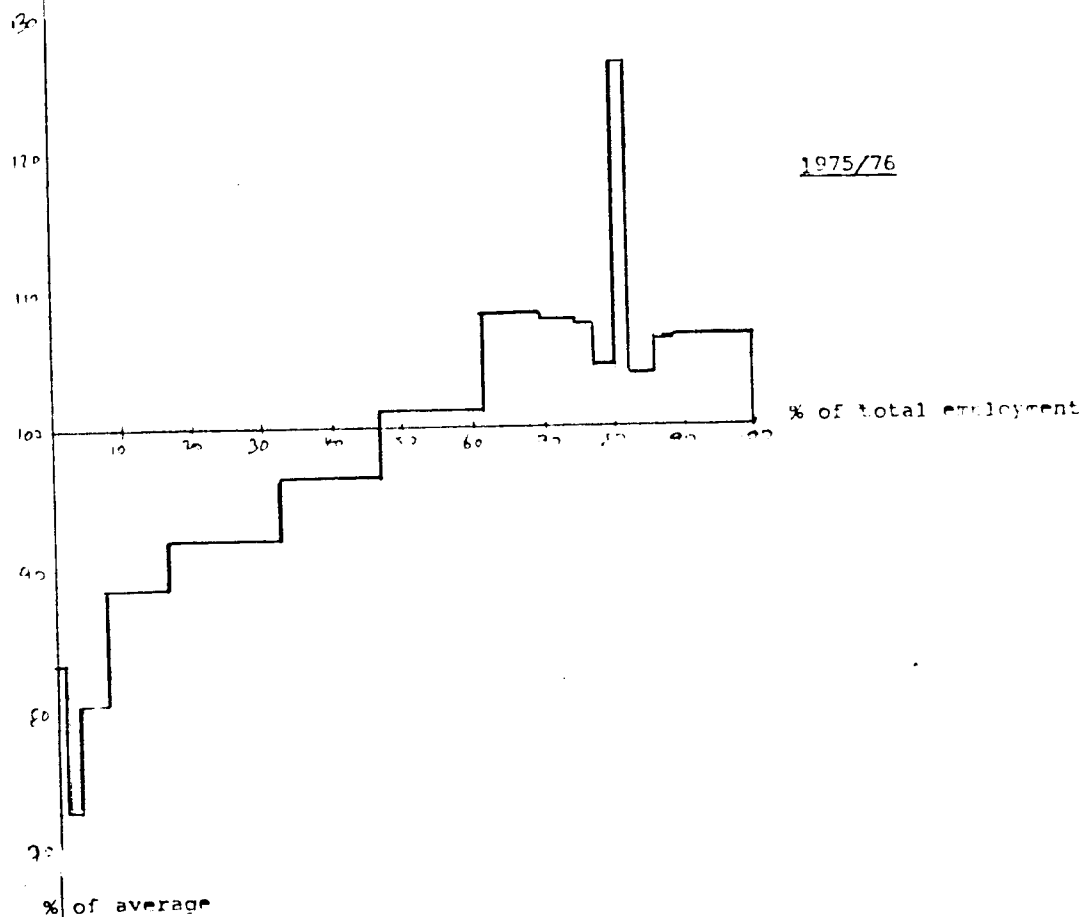
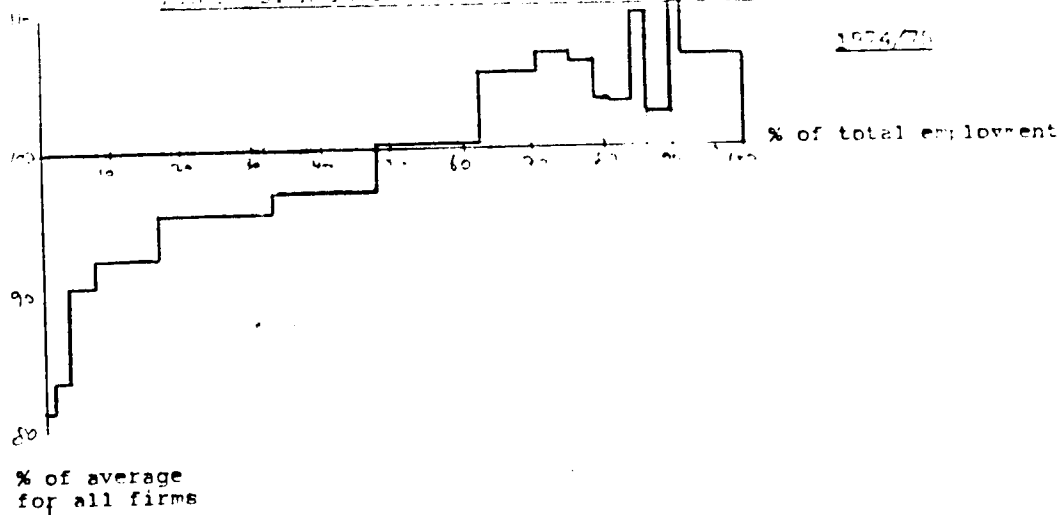


TABLE 5

Capital Productivity Related to Size of Firm, 1974/75-1976/77

Size of firm (Number employed)	1974/75-----			-----1975/76-----			----- 1976/77 -----		
	Value added/ depreciation ratio	% of average ratio	% of total depreciation	Value added/ depreciation ratio	% of average ratio	% of total depreciation	Value added/ depreciation ratio	% of average ratio	% of total depreciation
Under 5	16.09	123.5	1.5	11.13	91.9	1.9	14.13	110.1	1.8
5-6	15.73	120.7	1.5	13.40	110.8	1.6	15.58	121.4	1.5
7-9	16.07	123.3	2.7	14.20	117.3	3.0	15.74	122.7	2.9
10-19	14.86	114.0	7.1	12.95	107.0	7.4	15.07	117.4	6.6
20-49	14.19	108.9	14.2	13.11	108.4	13.7	14.30	111.4	13.2
50-99	13.83	106.1	12.8	12.92	106.8	12.8	13.22	103.0	13.6
100-199	12.80	98.2	16.3	11.11	91.8	16.0	11.79	91.8	16.7
200-299	15.13	116.1	7.4	12.64	104.5	8.4	14.96	116.5	7.7
300-399	8.54	65.5	8.1	11.71	96.8	5.2	11.78	91.8	5.0
400-499	17.59	135.0	2.8	9.23	76.3	3.5	9.43	73.5	4.3
500-599	16.52	126.8	1.3	17.64	145.8	2.3	17.44	135.9	1.9
600-699	11.43	87.7	4.6	11.31	93.4	3.0	18.60	144.9	1.4
700-799	11.19	85.9	2.1	12.46	103.0	0.8	11.77	91.7	3.6
800-899	15.56	119.4	2.4	14.04	116.0	2.3	15.35	119.6	1.6
900-999	8.13	62.4	4.1	20.19	166.8	1.9	18.48	144.0	2.0
1,000+	10.78	82.8	10.9	9.38	77.5	16.1	9.03	70.8	16.2
Average	13.03	100.0		12.10	100.0		12.83	100.0	
Totals*			100.0			100.0			100.0

*May not add exactly due to rounding

Source: As for Table 1.

FIGURE 4: Relative output/capital ratios by Size of Firm

% of average
for all firms

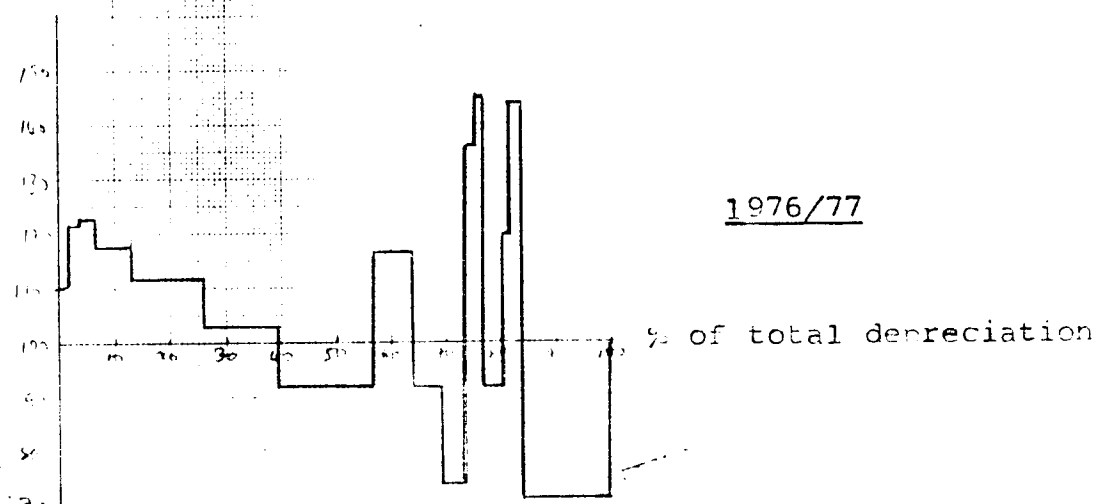
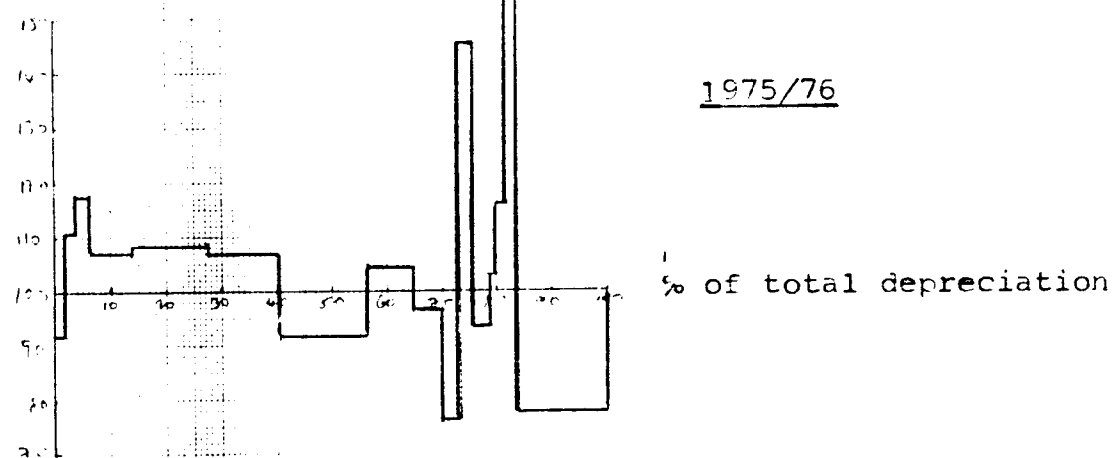
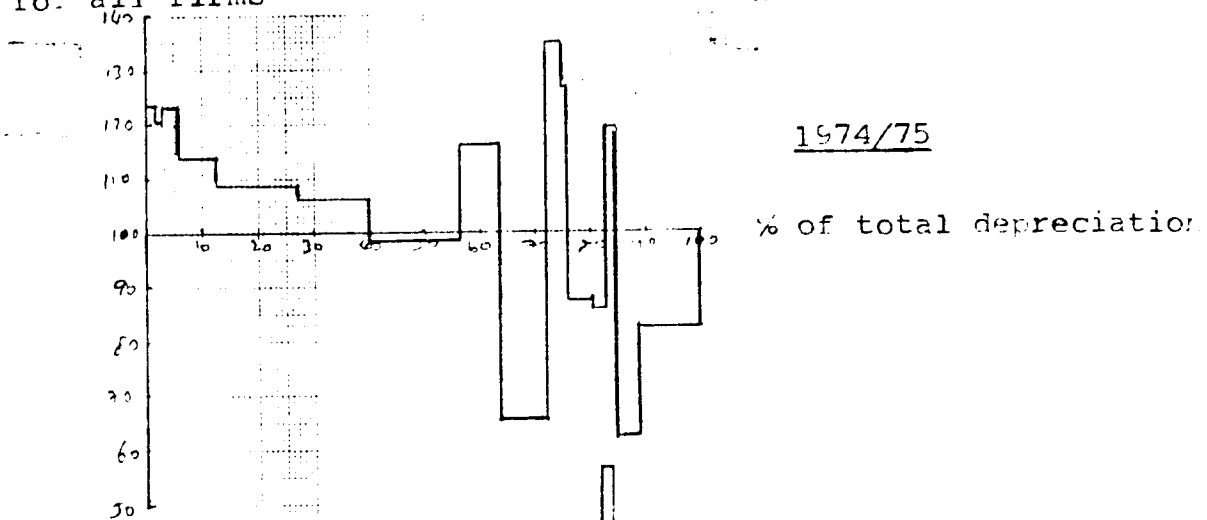


TABLE 6

Capital/Labour Ratio (Depreciation/employment) and Size of Firm, 1974/75-1976/77

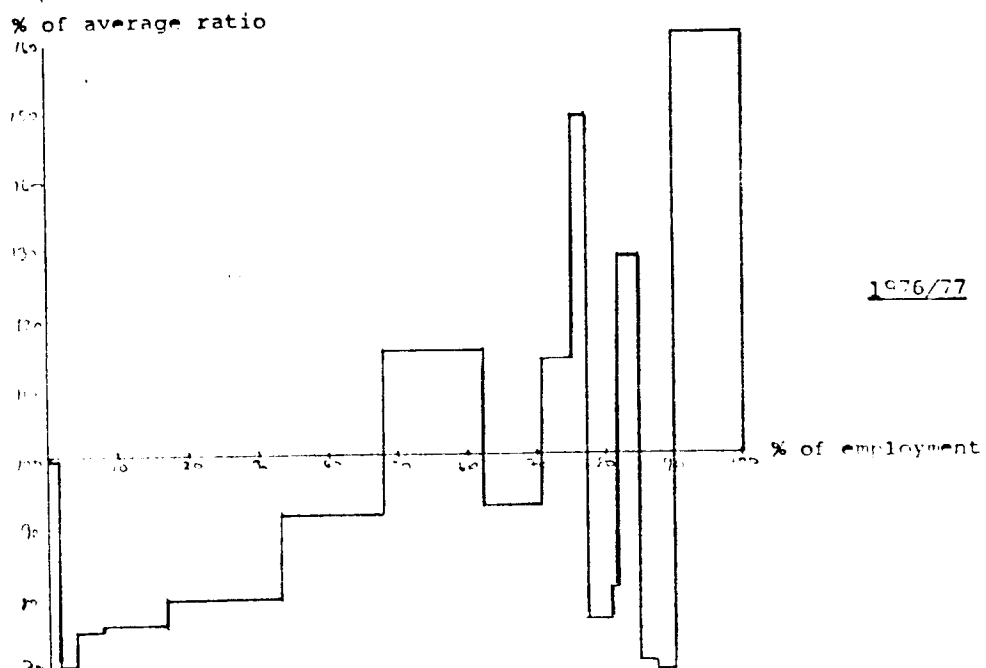
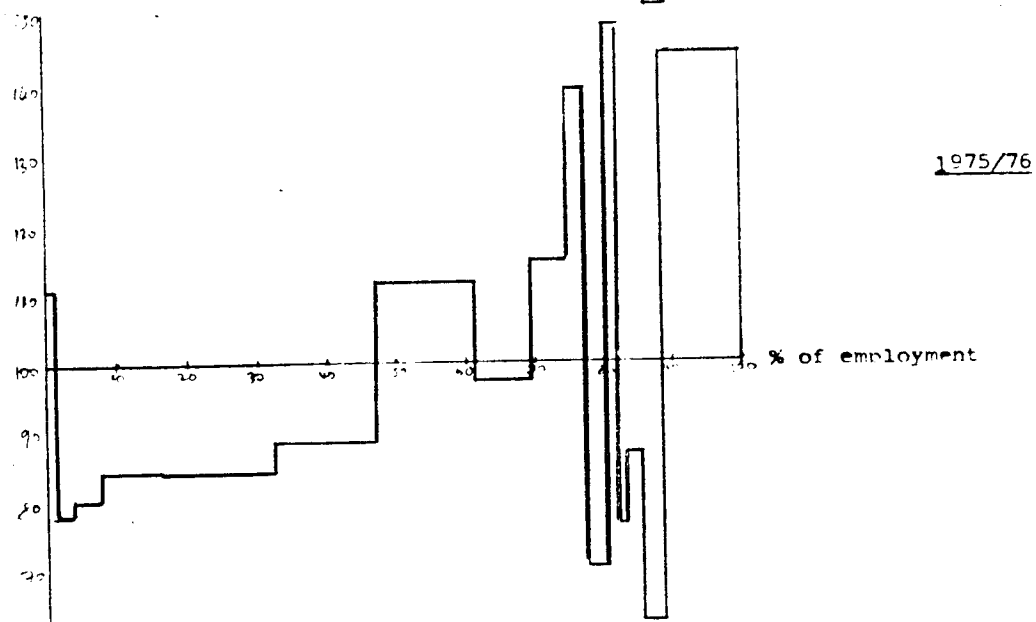
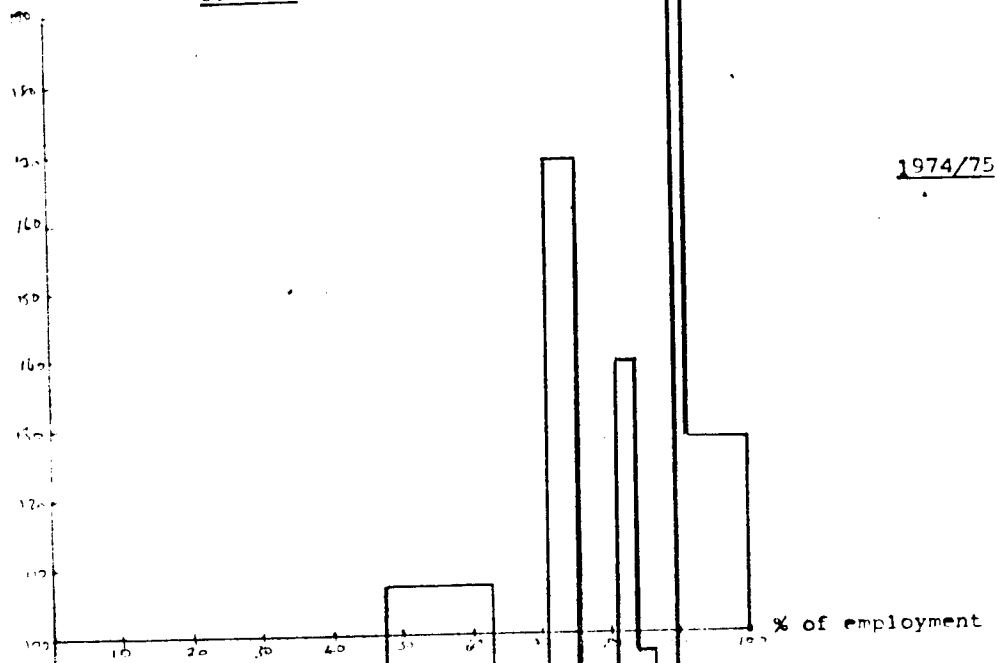
Firm size (Number employed)	1974/75				1975/76				1976/77			
	Depreciation ÷ employment \$	average ratio	% of total employ- ment	% of total employ- ment	Depreciation ÷ employment \$	average ratio	% of total employ- ment	% of total employ- ment	Depreciation ÷ employment \$	average ratio	% of total employ- ment	% of total employ- ment
Under 5	471	84.7	1.8	1.7	718	110.6	1.7	1.8	725	99.7	1.8	1.8
5-6	436	78.4	2.0	2.0	508	78.3	2.0	2.1	508	69.9	2.1	2.1
7-9	422	77.7	3.5	3.7	520	80.1	3.7	3.8	542	74.6	3.8	3.8
10-19	442	79.5	8.9	8.7	547	84.3	8.7	8.6	551	75.8	8.6	8.6
20-49	477	95.8	16.6	16.3	546	84.1	16.3	16.5	578	79.5	16.5	16.5
50-99	489	87.9	14.6	14.5	573	88.3	14.5	14.8	667	91.7	14.8	14.8
100-199	593	106.7	15.3	14.3	727	112.0	14.3	14.5	839	115.4	14.5	14.5
200-299	507	91.2	8.1	8.6	633	97.5	8.6	8.3	670	92.2	8.3	8.3
300-399	939	168.9	4.8	4.5	747	115.1	4.5	4.4	828	113.9	4.4	4.4
400-499	454	83.5	3.4	2.5	908	139.9	2.5	2.9	1,088	149.7	2.9	2.9
500-599	422	78.9	1.8	3.3	457	70.4	3.3	2.4	553	76.1	2.4	2.4
600-699	775	139.4	3.3	2.0	967	149.0	2.0	1.8	585	80.5	1.8	1.8
700-799	544	97.8	2.1	1.0	499	76.9	1.0	2.8	937	128.9	2.8	2.8
800-899	398	71.6	3.4	2.6	565	87.1	2.6	2.3	509	70.0	2.3	2.3
900-999	1,122	201.8	2.0	2.9	408	62.9	2.9	2.9	501	68.9	2.9	2.9
1,000+	712	128.1	8.5	11.4	942	145.1	11.4	10.1	1,172	161.2	10.1	10.1
Average	556	100.0			649	100.0			727	100.0		
Totals*			100.0	100.0			100.0					100.0

Source: As for Table 1.

FIGURE 5

Relative Capital/Labour Ratio by Size
of Firm.

14.



suggest, for example, that a unit of capital invested in small manufacturing creates more employment and earns a higher return than a unit of investment in large-scale manufacturing. In an economy plagued by unemployment and low profitability, such a redirection of investment would seem to have obvious attractions.

Before leaping to such conclusions, however, it is worth looking at the more detailed results reported in Tables 7 to 10. Different branches of manufacturing display very divergent trends, and the design of policy for manufacturing development should take these divergences into account. In many sectors, the application of the policy changes outlined would have effects opposite to those intended.

Table 7 shows that the positive relationship between labour productivity and size of firm is found in only 55 of our 123 sectors, accounting for 53% of total employment and 54% of value added. A further 14 sectors could not be classified for lack of data, and 21 sectors showed no relationship between labour productivity and firm size. This leaves 33 sectors (24% of employment and 21% of value added) which display an inverse relationship between labour productivity and firm size.

Table 8 shows that the positive relationship between average labour cost and size of firm holds true for only 89 sectors (72% of the total) while in 14 sectors (9% of employment, 9% of value added) the opposite trend is found.

Table 9 shows that the positive relationship between "capital productivity" and size of firm holds true for 53 sectors (45% of employment, 41% of value added). 25 sectors showed no relationship and 31 sectors (20% of employment, 19.8% of value added) showed the opposite trend.

Table 10 shows that the tendency for larger firms to be more capital intensive is confirmed in only 43 sectors (33% of employment, 34% of value added), while 18 sectors showed no trend and 48 sectors (51% of employment, 47% of value added) showed the opposite relationship. This last result is particularly striking: it makes it clear that the aggregate tendency for large firms to be more capital-intensive than small ones reflects a situation which is found in only a minority of sectors (even if we add the 14 sectors for which disaggregated data is not available because of the desire to conceal data on a few large firms).

It is important at this stage to make it clear that the results reported here are very much "a first look", as the title of this paper indicates. The detailed tables were derived casually, by inspection of data, and not rigorously by application of statistical techniques. We believe, nevertheless, that our results are significant, and that more sophisticated work along the same lines would be worth pursuing.

In Tables 11-15 we list, by their census codes, the individual sectors according to the relationship which each displays between size of firm and our various measures of economic performance. Besides giving a visual impression of the data on which we based Tables 7, 8, 9 and 10, these additional tables permit cross-correlations. For example, it is obvious that the tendency for larger firms to pay higher wages and salaries is far more widespread than the tendency for larger firms to display higher labour productivity; indeed, in a number of sectors, labour productivity and average labour costs move in opposite directions. This very wide tendency for wages and salaries to rise with firm size seems to us to provide evidence of elements in the labour market which distinguish larger from smaller firms: greater ease of organising unions, location in larger centres of employment, less use of female or part-time labour (the census data pre-date equal pay). Labour productivity on its own, thus, is by no means the only determinant of rates of pay. One consequence of this is that large firms, quite apart

TABLE 7

Results of Sector-by-Sector Analysis of Labour Productivity

Sectors in which a tendency for labour productivity to rise with increasing size of firm is:	Number of sectors	% of sectors	% of total employment	% of total value added	Average size of firm (number employed)
Clearly evident	23	18.7	17.2	19.2	29.1
Indicated	32	26.0	35.9	34.7	46.4
Absent (no trend)	21	17.1	18.2	16.8	24.5
Reversed if anything	13	10.6	8.7	9.1	30.3
Clearly reversed	20	16.3	15.3	11.8	32.0
Unknown for lack of data	14	11.4	4.7	8.5	110.4
Total/average	123	100.0	100.0	100.0	34.3

Source: Derived from worksheets on same pattern as those for net productivity in Appendix II.

TABLE 8

Results of Detailed Analysis of Labour Cost and Firm Size

Sectors in which tendency for average labour cost to rise with increasing size of firm is:	Number of sectors	% of sectors	% of total employment	% of total value added
Clearly confirmed	69	56.1	49.1	50.3
Indicated	19	15.4	23.2	19.3
Absent (no trend)	6	4.9	14.1	13.0
Reversed, if anything	10	8.1	6.7	6.9
Clearly reversed	5	4.1	2.2	2.1
Unknown for lack of data	14	11.4	4.8	8.5
Totals	123	100.0	100.0	100.0

Source: As for Table 7.

TABLE 9Results of Sector-by-Sector Analysis of Capital Productivity

Sectors in which a tendency for the ratio of value added to depreciation to increase with increasing size of firm is	Number of sectors	% of sectors	% of employment	% of value added
Clearly confirmed	17	13.8	12.9	13.7
Indicated	36	29.3	31.6	27.0
Absent (no trend)	25	20.3	30.6	30.9
Reversed if anything	18	14.6	11.4	12.7
Clearly reversed	13	10.6	8.9	7.1
Unknown for lack of data	14	11.4	4.6	8.7
Totals	123	100.0	100.0	100.0

Source: As for Table 7.

TABLE 10Results of Detailed Analysis of Capital/Labour Ratio

Sectors in which a tendency for capital intensity to increase with increasing size of firm is:	Numbers of sectors	% of sectors	% of total employment	% of total value added
Clearly confirmed	17	13.8	11.4	12.2
Indicated	26	21.1	21.6	22.0
Absent (no trend)	18	14.6	11.0	10.7
Reversed if anything	28	22.8	27.8	26.8
Clearly reversed	20	16.3	23.4	19.7
Unknown for lack of data	14	11.4	4.8	8.5
Totals	123	100.0	100.0	100.0

Source: As for Table 7.

from their relative productivity in use of resources, are probably put at a competitive disadvantage vis-a-vis smaller firms by institutional forces in the labour market.

It is noticeable also that capital productivity rises with firm size not only in sectors where larger firms are relatively capital-intensive, but also in many where no such trend in capital-intensity is evident. Capital intensity alone, thus, is only a moderately good predictor of capital productivity.

Although limitations of time and space prevent any more detailed search for patterns in Tables 11-15, we could not resist pointing out that it is possible to construct a short list of sectors in which small appears to be beautiful by even the most exacting criteria. Twelve of our 123 sectors show smaller firms having higher labour productivity, higher capital productivity and consequently higher net productivity than larger firms. Two of these twelve, in addition, show smaller firms paying higher wages and salaries than larger. These two are cooperative dairy factories (31121) and drugs and medicines (35220). The twelve are listed in Table 16.

Labour Productivity and the Business Cycle

In Figure 6 we present information on the relationship between firm size and labour productivity over a longer period than is possible for our other indicators. The most interesting feature to emerge is that, although the tendency for labour productivity to be positively related to firm size is generally true throughout the postwar period, it tends to be muted in booms and accentuated in slumps. We have not undertaken the necessary work to determine the reasons for this, but some possible hypotheses suggest themselves. It may be that ^{larger firms} are more ready to lay off workers in slumps, and to expand employment during booms; thus in slumps the labour-retaining smaller firms display a relative worsening of labour productivity. Alternatively, it may be the case that the prices charged for their output by small firms are more sensitive to market conditions, so that during slumps the smaller firms cut their prices relative to the larger firms in an attempt to hold their markets; whereas in booms the small firms raise their prices more than the large firms. Both of these possibilities correspond to popular feeling about small firms in New Zealand - the belief that smaller firms are more "socially responsible" in their hiring and firing practices, and the belief that they are more flexible in adjusting to market changes.

It must also be pointed out, though, that the strongest tendency to emerge from our data is the tendency for smaller firms to pay less for their labour, on average. The fact that they can continue to secure labour at these lower rates indicates that the perceived advantages of working in the smaller firm (better workplace atmosphere, more interesting work, work in the local community, and so on) enable it to compete effectively in the labour market: while the lower cost of its labour both leads to adoption of more labour-intensive techniques and enables the small firm to remain competitive in terms of profitability.

FIGURE 6: Relative Labour Productivity, 1966/7 to 1976/7

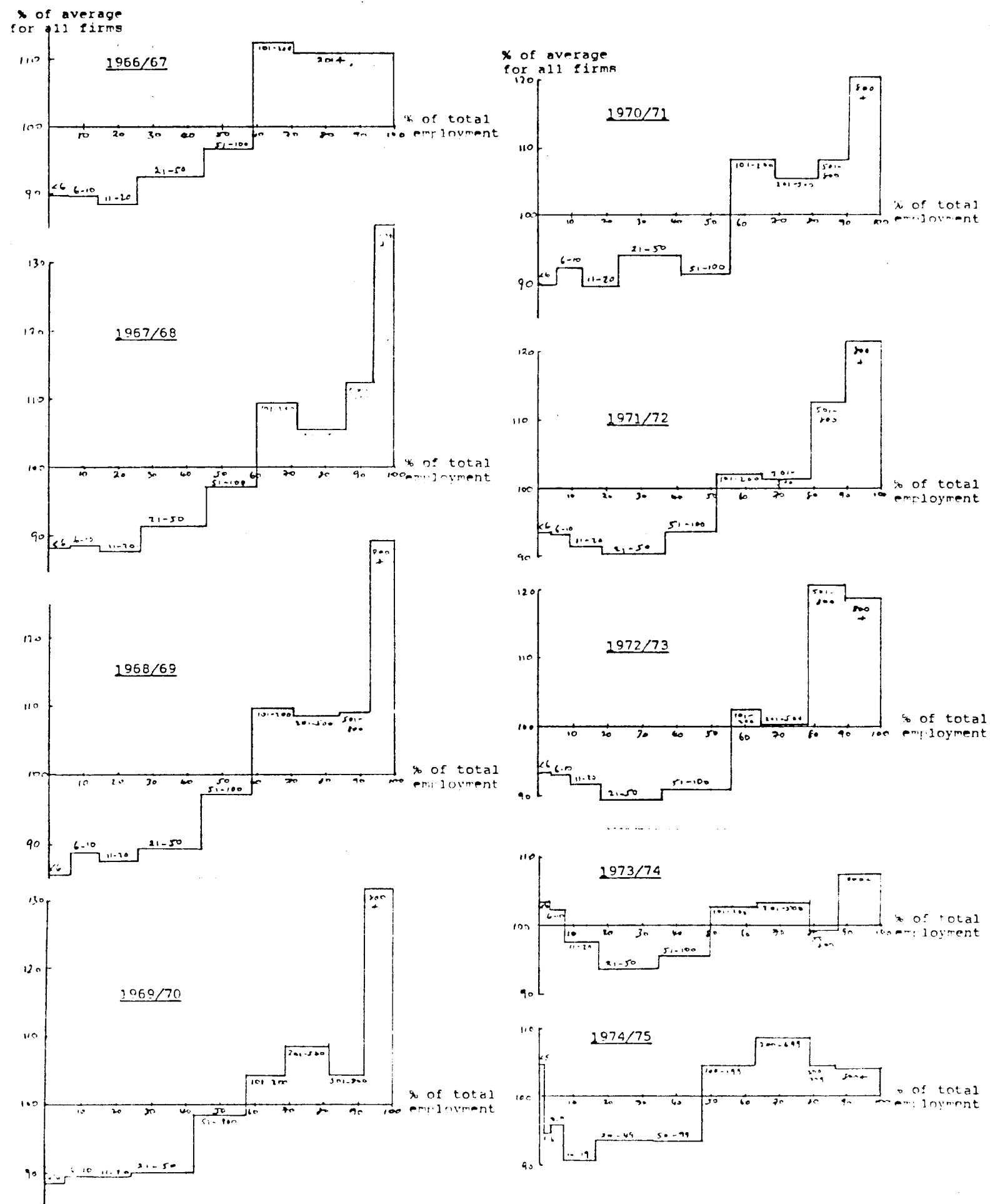


Fig. 6 continued

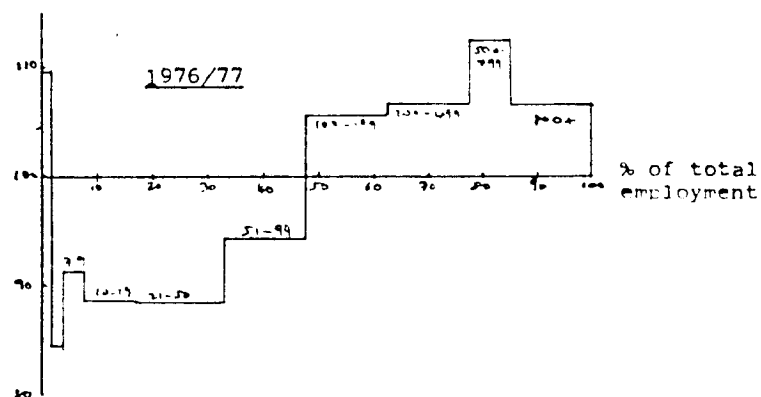
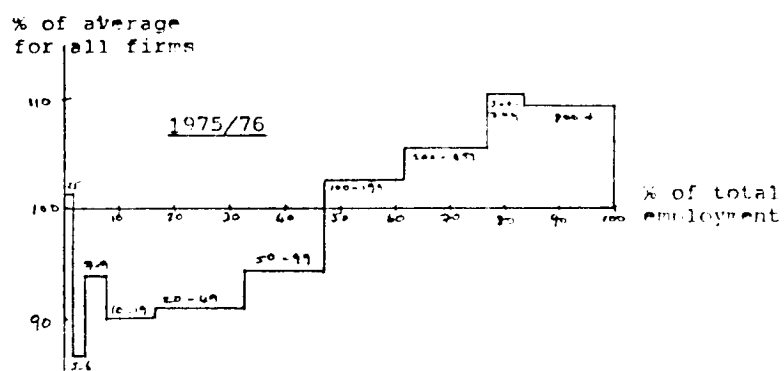


TABLE 11

Sectors in which, as Firm size increases, net productivity:

(1) Clearly rises	(2) Shows some upward trend	(3) Shows no clear trend	(4) Shows some downward trend	(5) Clearly falls	(6) Can't be analysed; no data
				31114	
21190	31130	31111	31112	31116	31174
32310	31150	31115	31113	31161/62	31310
33116	31210/175/180/124	31220	31119	31172	31321/32
36910	32211	32130	31121	31173	31400
36999	33112	32140	31122	31320	32117
	33202	32400	31123	31340	32212
	34191/199	35512	31141	32115	32321
	35232	37101/102	31171	32121	34110
	35401/409	38111	32111	32129	35231
	38239	38112	32112	32330	35300
	39030	38131	32114/150/190	33115	35511
		38320	32219	33201	38511
		38339	32329	33203/209	39020
		38433	33111	34121/122	39091
		38439	32114	34202	
			33121	34203	
			33122/190	35121	
			35110	35122	
			35600	35130	
			36200	35210	
			36991	35220	
			36993	35239	
			36994	35291/299	
			37201/202	35590	
			38133	36100	
			38191/192	38921/922/929	
			38194	36992	
			38198	36995	
			38199	38120	
			38250/299/290	38132	
			38310	34201	
			38331	38210	
			38399/391	38220	
			38450	38231	
				38240	
				38410	
				38420/440/490	
				38431	
				38519	
				38520	
				39010	
				39092	
				39099	

Net productivity calculated as
$$\frac{\text{Value Added}}{\text{Wages \& Salaries} + \text{Depreciation}}$$

TABLE 12

Sectors in which, as Firm Size increases, Labour productivity:

(1) Clearly rises	(2) Shows some upward trend	(3) Shows no clear trend	(4) Shows some downward trend	(5) Clearly falls	(6) Can't be analysed: no data
31119	31111	31115	31112	31114	31174
31150	31113	31130	31121	31116	31310
31171	31123	31172	31141	31122	31331/332
31190	31220	31173	32112	31161/162	31400
31210/175/180/124	31320	32111	32115	32115	32117
32140	31340	32129	34203	32121	32212
32211	32114/150/190	32330	35600	32219	32231
32329	32130	33201	36992	34191/199	34110
33112	32310	34121/122	36993	35121	35231
33122/190	32400	35291/299	36995	35122	35300
34202	33111	35512	38112	35130	35511
35110	33114	38133	38120	35210	38511
35232	33116	38250/299	38239	35220	39020
36100	33121	38310		35239	39091
36200	33202	38320		36921/922/929	
36991	33202/209	38331		38132	
36994	34201	38339		38210	
36999	35401/409	38432		38420/440/490	
37101/102	35590	39010		38519	
38131	36910	39030		38520	
38199	37201/202	39099			
38439	38111				
38450	38191/192				
	38194				
	38198				
	38220				
	38231				
	38240				
	38399/391				
	38410				
	38431				
	39092				

*Labour productivity calculated as $\frac{\text{Value Added}}{\text{Employment}}$

TABLE 13

Sectors in which, as Firm Size increases, Average Labour Cost*:

(1) Clearly rises	(2) Shows some upward trend	(3) Shows no overall trend	(4) Shows some downward trend	(5) Clearly falls	(6) Can't be analysed; no data
31119	31112	31111	31121	31116	31174
31123	31113	31122	32115	31130	31310
31141	31114	35130	32310	31161/162	31331/332
31150	31115	35512	34191/199	35239	31400
31171	32111	36993	35220	38519	32117
31172	32112	38432	36910		32212
31173	32129		38194		32231
31190	32211		38239		34110
31210/175/80/24	32219		38320		35231
31220	32400		39030		35300
31320	33116				35511
31340	33201				38511
32114/150/190	34203				39020
32121	35600				39091
32130	37201/202				
32140	38210				
32329	38250/299/290				
32330	38331				
33111	38439				
33112					
33114					
33115					
33121					
33122/190					
33202					
33203/209					
34121/122					
34201					
34202					
35110					
35121					
35122					
35210					
35232					
35291/299					
35401/409					
35590					
36100					
36200					
36921/922/929					
36991					
36992					
36994					
36995					
36996					
37101/102					
38111					
38112					
38120					
38131					
38132					
38133					
38191/192					
38198					

*Average Labour Cost calculated as

Salaries & Wages
Employment

→ 38199
38220
38231
38240
38310
38339
38399/391
38410
38420/440/490
38431
38450
38520
39010
39092
39099

TABLE 14Sectors in which, as Firm Size increases, Capital Productivity*,

(1) Clearly rises	(2) Shows some upward trend	(3) Shows no overall trend	(4) Shows some downward trend	(5) Clearly falls	(6) Can't be analysed; no data
31123	31119	31111	31113	31121	31174
31116	31130	31112	31141	31122	31310
32112	31150	31114	31171	32115	31331/332
32140	31172	31115	31340	35122	31400
32329	31173	32121	32129	35210	32117
33202	31190	31161/162	34121/122	35220	32212
34202	31210/175/180/24	31320	35121	35239	32231
35232	31220	32111	35130	35512	34110
35600	32114/150/190	32211	33115	36994	35231
36100	32130	32400	35401/409	37101/102	35300
36921/922/929	32219	33111	36991	37201/202	35511
36995	32310	33114	36992	38431	38511
36999	32330	33116	38191/192	38520	39020
38239	33112	33121	38331		39091
38250/299/290	33122/190	34191/199	38399/391		
38420/440/490	33201	34201	38439		
38432	33203/209	36200	38450		
	34203	38111	39092		
	35110	38112			
	35291/299	38131			
	35590	38199			
	36910	38210			
	36993	38220			
	38120	38310			
	38132	38339			
	38133				
	38194				
	38198				
	38231				
	38240				
	38320				
	38410				
	38519				
	39010				
	39030				
	39099				

*Capital Productivity calculated as

$$\frac{\text{Value Added}}{\text{Depreciation}}$$

TABLE 15Sectors in which, as Firm Size increases, Capital Intensity*:

(1) Clearly rises	(2) Shows some upward trend	(3) Shows no overall trend	(4) Shows some downward trend	(5) Clearly falls	(6) Can't be analysed; no data
31121	31113	31141	31111	31112	31174
31340	31115	31173	31114	31116	31310
32129	31130	31190	31122	31119	31331/332
32140	31150	31220	31123	32112	31400
33202	31171	32121	31161/162	32115	32117
32211	31210/175/180/24	32130	31172	32219	32212
35121	31320	32329	32111	33201	32231
35122	32400	33114	32114/150/190	34202	34110
35210	33111	33116	32310	35239	35231
35512	33115	33122/190	32330	35291/290	35300
36100	33121	33203/209	33112	35600	35511
36991	34201	34203	34121/122	36995	38511
36994	35110	35590	34191/199	38120	39020
37101/102	35220	36200	35130	38132	39091
38191/192	35401/409	38310	35232	38133	
38431	36992	38439	36910	38198	
38520	36999	39030	36921/922/929	38239	
	37201/202	39092	36993	38250/290/290	
	38111		38194	38420/440/490	
	38112		38199	38519	
	38131		38210		
	38220		38231		
	38331		38240		
	38339		38320		
	38399/391		38410		
	38450		38432		
			39010		
			39099		

* Capital-intensity calculated as $\frac{\text{Depreciation}}{\text{Employment}}$

TABLE 10

S - 11 and Beautiful? Sectors in which Smaller Firms have
Higher Labour Productivity, Higher Capital Productivity, and
Higher Net Productivity

		% of total firms	% of total employ- ment	% of total value added
31121* ⁺	Cooperative dairy factories	1.4	2.2	2.6
31122	Milk processing plants	5.3	0.4	a
31141	Land-based fish etc factories	0.6	0.4	0.4
32115 ⁺	Man-made fibres, spinning and weaving	0.1	0.2	0.2
35121*	Chemical fertilisers	0.2	0.5	0.5
35122*	Pesticides	0.1	0.2	0.2
35130	Synthetic resins, plastic materials and man-made fibres except glass	0.7	1.0	1.1
35210*	Paints, varnishes and lacquers	0.4	0.5	0.6
35220* ⁺	Drugs and medicines	0.2	0.5	0.5
35239 ⁺	Cleaning preparations, n.e.c.	0.1	0.2	0.1
36992*	Concrete masonry	0.8	0.4	0.4
38520*	Photographic and optical goods	0.2	0.1	0.1
		—	—	—
		10.1	6.6	6.7

* Also smaller firms are more labour-intensive

+ Also smaller firms pay higher average wages and salaries

a. Negative value added for total sector; hence not shown here.

TABLE 17

Big and Beautiful? Sectors in which Larger Firms have Higher
Labour Productivity, Higher Capital Productivity, and Higher
Net Productivity

		% of firms	% of total employ- ment	% of total value added
31150	Vegetable and animal oils and fats	0.2	0.2	0.3
31190	Cocoa, chocolate and sugar	0.4	0.8	0.8
31210/..	Food products n.e.c. ^a	0.8	1.1	1.3
32310	Tanneries and leather finishing	0.2	0.4	0.4
33112	Planing, preserving and seasoning timber	0.8	0.7	0.8
33202	Mattress making	0.2	0.2	0.2
35232	Toilet and cosmetic goods	0.4	0.4	0.4
36910	Structural clay products	0.4	0.3	0.3
36999	Non-metallic mineral products	0.2	0.3	0.6
		3.5	4.6	4.5

a. Includes 31124 (dairy products including processed cheese, excluding cooperatives; 31175 macaroni, vermicelli, spaghetti and noodles; 31180, sugar factories and refineries.

TABLE 18

Fourteen Dark Horses: the Sectors for which Data is Suppressed in the
Census

		% of firms	% of total employ- ment	% of total value added
31174	Biscuit factories	0.1	0.4	0.4
31310	Distilling, rectifying and blending spirits	0.05	0.05	0.07
31331/32	Breweries and malting	0.1	0.6	1.5
31400	Tobacco manufacture	0.07	0.5	0.7
32117	Dyeing, printing and finishing yarn and textiles	0.1	0.1	0.1
32212	Fur clothing	0.2	0.02	0.01
32321	Fellmongery	0.06	0.02	0.03
34110	Pulp, paper and paperboard	0.1	1.6	3.8
35231	Soap and detergent	0.1	0.3	0.3
35300	Petroleum refineries	0.2	0.1	0.4
35511	Tyres and tubes	0.1	0.6	0.8
38511	Medical, surgical equipment and supplies	0.05	0.1	0.1
39020	Musical instruments	0.05	0.02	0.02
39091	Brushes and brooms	0.1	0.2	0.2
		<u>1.5</u>	<u>4.6</u>	<u>8.4</u>

APPENDIX 1Data on Size Structure of New Zealand Manufacturing, 1944/45 - 1976/77

The available data is in three separate series, covering respectively 1944/45-1969/70; 1956/57-1973/74; and 1974/75-1976/77. The first of these (Series A below) is based on a rather broad definition of "manufacturing" which includes motor vehicle repair, electricity and gas production and distribution, and logging operations of sawmills. In the 1970/71 Industrial Production Statistics the definition of "manufacturing" was narrowed to exclude these activities, and retrospective data were prepared back to 1956/57. These data, carried forward to 1973/74, comprise Series B below. After 1973/74 the new census framework yielded Series C below; the changeover involves rather substantial reclassifications and a considerable increase in recorded employment.¹

SERIES AFACTORIES: SIZE OF ESTABLISHMENT ACCORDING TO NUMBER OF PERSONS ENGAGED

Year	Factories with Number of Persons Engaged as Under:-							Total
	Under 6	6 to 10	11 to 20	21 to 50	51 to 100	101 to 200	over 200	
Number of Persons Engaged								
1944-45 ..	8,152	10,230	15,547	25,787	18,809	43,889		122,414
1945-46 ..	8,705	11,108	17,519	28,343	17,886	44,647		128,208
1946-47 ..	9,759	12,215	18,297	31,516	19,992	42,656		134,435
1947-48 ..	10,079	13,165	20,877	32,189	19,934	44,023		140,267
1949-50 ..	9,916	14,565	20,608	34,386	21,304	43,530		144,309
..	10,484	14,549	22,725	35,267	20,205	15,726	29,984	148,940
..	11,216	15,265	21,775	32,899	19,976	17,725	25,496	144,352
..	11,553	15,392	22,403	31,026	19,945	16,197	26,648	143,164
..	10,782	16,042	22,433	31,254	20,781	18,171	27,025	146,488
..	10,946	16,260	21,432	31,650	21,808	17,254	34,225	153,575
..	11,163	16,017	22,969	32,184	20,319	17,587	37,999	158,238
..	11,203	16,101	22,033	31,879	20,209	18,645	36,682	156,752
..	11,114	16,128	22,651	33,341	21,346	16,823	41,582	162,985
..	10,828	16,527	23,501	33,819	22,095	18,018	43,954	168,742
1959-60	10,638	16,288	23,755	34,105	21,666	19,731	45,790	171,973
1960-61	10,653	16,788	24,392	35,731	23,359	20,965	49,458	181,346
1961-62	11,302	16,749	24,520	36,868	23,563	21,283	53,294	187,579
1962-63	11,277	16,898	24,433	37,334	23,142	23,825	54,606	191,515
1963-64	11,638	17,302	25,079	38,736	24,464	24,643	57,404	199,266
1964-65	12,208	17,416	26,504	40,399	28,091	24,821	61,611	211,050
1965-66	12,253	18,306	26,403	43,207	30,435	26,196	66,051	222,851
1966-67	13,100	19,163	26,231	44,082	32,528	26,734	67,464	229,302
1967-68	13,197	19,034	26,635	43,664	31,931	26,820	64,457	225,738
1968-69	13,816	18,414	26,401	42,196	32,557	27,356	68,335	229,074
1969-70	13,831	18,007	26,985	43,311	35,772	28,001	75,642	241,549*
1970-71	13,466	18,080	27,194	44,777	36,052	32,229	79,627	251,425

1. Some idea of the extent of the changes may be obtained by comparing the tables in Industrial Production Statistics 1973/74 pp.22-23 with the "Line Data" for 1973/74 in New Zealand Census of Manufacturing 1976/77 p.13.

Series A continued

Percentages of Total Persons Engaged

1944-45	..	6.66	8.36	12.70	21.07	15.36	35.85	100.00
1945-46	..	6.79	8.66	13.67	22.11	13.95	34.82	100.00
1946-47	..	7.26	9.09	13.61	23.44	14.87	31.73	100.00
1947-48	..	7.18	9.39	14.88	22.95	14.21	31.39	100.00
1949-50	..	6.87	10.10	14.28	23.83	14.76	30.16	100.0
1950-51	..	7.04	9.77	15.26	23.68	13.56	30.16	100.0
1951-52 ⁽¹⁾	..	7.77	10.57	15.09	22.79	13.84	20.13	100.0
1952-53 ⁽¹⁾⁽²⁾	..	8.07	10.75	15.65	21.67	13.93	17.66	100.0
1953-54 ⁽¹⁾⁽²⁾	..	7.36	10.95	15.31	21.34	14.19	18.62	100.0
1954-55 ⁽¹⁾⁽²⁾	..	7.13	10.59	13.96	20.61	14.20	18.45	100.0
1955-56 ⁽¹⁾⁽²⁾	..	7.05	10.12	14.52	20.34	12.84	22.29	100.0
1956-57 ⁽¹⁾⁽²⁾	..	7.15	10.27	14.06	20.34	12.89	24.02	100.0
1957-58 ⁽¹⁾⁽²⁾	..	6.82	9.89	13.90	20.46	13.10	23.40	100.0
1958-59 ⁽¹⁾⁽²⁾	..	6.42	9.79	13.93	20.04	13.09	25.51	100.0
							26.05	100.0
1959-60		6.19	9.47	13.81	19.83	12.60	100.00	
1960-61		5.87	9.26	13.45	19.70	12.88	100.00	
1961-62		6.03	8.93	13.07	19.65	12.56	100.00	
1962-63		5.89	8.83	12.76	19.49	12.06	100.00	
1963-64		5.84	8.68	12.58	19.44	12.28	100.00	
1964-65		5.79	8.25	12.56	19.14	13.31	100.00	
1965-66		5.50	8.21	11.85	19.39	13.66	100.00	
1966-67		5.71	8.36	11.44	19.22	14.19	100.00	
1967-68		5.85	8.43	11.80	19.34	14.15	100.00	
1968-69		6.03	8.04	11.53	18.42	14.21	100.00	
1969-70		5.73*	7.45	11.17	17.93*	14.81*	100.00	
1970-71		5.36	7.19	10.82	17.81	14.34	100.00	

SERIES BSIZE OF ESTABLISHMENTS,
ACCORDING TO NUMBER OF PERSONS ENGAGED

Year	Factory Size by Number of Persons Engaged						Total
	Under 6	6-10	11-20	21-50	51-100	101-200	

Number of Persons Engaged

1956-57	8,120	12,503	15,476	24,807	19,420	18,636	36,682	143,040
1957-58	7,966	12,343	19,151	30,509	20,485	16,605	41,582	148,641
1958-59	7,710	12,254	19,799	31,125	21,062	17,907	43,954	153,811
1959-60	7,379	12,111	20,135	31,226	20,517	19,620	45,790	156,778
1960-61	7,425	12,375	20,556	32,685	22,108	20,965	49,458	165,572
1961-62	7,659	12,278	20,661	33,540	22,502	21,174	53,294	171,108
1962-63	7,757	12,357	20,324	33,624	22,260	23,489	54,606	174,417
1963-64	8,106	12,525	20,838	34,905	23,231	24,390	57,404	181,399
1964-65	8,389	12,445	21,685	36,391	26,653	24,821	61,611	191,995
1965-66	8,278	12,931	21,392	39,128	29,415	25,970	66,361	203,165
1966-67	8,486	13,484	21,135	39,375	31,450	26,605	67,464	207,999
1967-68	8,557	13,310	21,591	38,545	30,954	26,696	64,457	204,510
1968-69	8,451	12,699	21,634	37,726	31,502	27,356	68,335	207,703
1969-70	8,306	12,416	22,089	39,031	34,762	27,862	75,642	229,106
1970-71	7,801	12,227	22,184	40,643	34,685	31,937	79,627	229,104
1971-72	8,257	12,914	21,373	41,669	34,717	31,889	81,605	232,424
1972-73	7,774	13,122	21,216	41,400*	35,398	32,367	84,371	235,648*
1973-74	7,788	12,684	21,738	41,241	37,358	33,975	89,738	244,522

Percentages of Total Persons Engaged

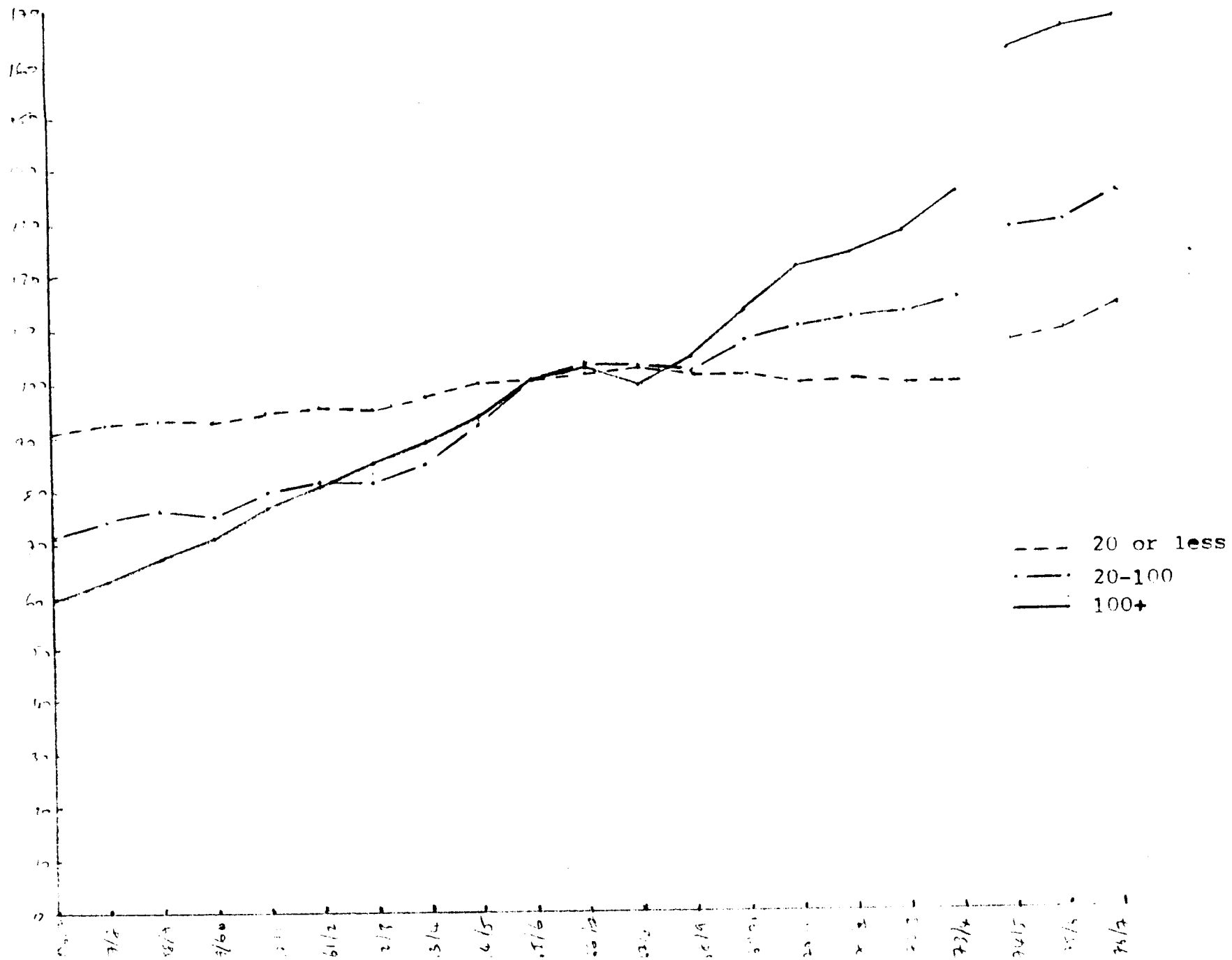
1956-57	5.68	8.74	12.91	20.56	13.58	12.89	25.60	100.00
1957-58	5.36	8.30	12.88	20.53	13.78	11.17	27.98	100.00
1958-59	5.01	7.97	12.87	20.24	13.69	11.64	28.58	100.00
1959-60	4.71	7.72	12.84	19.92	13.09	12.51	29.21	100.00
1960-61	4.48	7.47	12.42	19.74	13.35	12.66	29.88	100.00
1961-62	4.48	7.18	12.07	19.60	13.15	12.37	31.15	100.00
1962-63	4.45	7.08	11.65	19.28	12.76	13.47	31.31	100.00
1963-64	4.47	6.90	11.49	19.24	12.81	13.45	31.64	100.00
1964-65	4.37	6.48	11.29	18.96	13.88	12.93	32.09	100.00
1965-66	4.07	6.36	10.53	19.25	14.48	12.78	32.52	100.00
1966-67	4.08	6.48	10.16	18.93	15.12	12.79	32.44	100.00
1967-68	4.18	6.51	10.56	19.04	15.14	13.05	31.52	100.00
1968-69	4.07	6.11	10.42	18.16	15.17	13.17	32.90	100.00
1969-70	3.77	5.54	10.04	17.73	15.79	12.66	34.37	100.00
1970-71	3.41	5.34	9.58	17.74	15.14	13.94	34.75	100.00
1971-72	3.55	5.56	9.20	17.93	14.34	13.71	35.11	100.00
1972-73	3.30	5.57	9.00	17.57*	15.02	13.74	35.80*	100.00
1973-74	3.18	5.19	8.89	16.87	15.28	13.89	36.70	100.00

SERIES C

Size of Establishment by Number Engaged	1974/75		1975/76		1976/77	
	Number Employed	% of Total	Number Employed	% of Total	Number Employed	% of Total
Under 5	4,961	1.8	4,851	1.7	5,310	1.8
5-6	5,517	1.9	5,702	2.0	6,238	2.1
7-9	9,689	3.5	10,730	3.7	11,235	3.8
10-19	25,142	8.9	25,090	8.7	25,399	8.6
20-49	46,641	16.6	46,817	16.3	48,500	16.5
50-99	41,029	14.6	41,550	14.5	43,389	14.8
100-199	43,077	15.3	41,036	14.3	42,537	14.5
200-299	22,872	8.1	24,738	8.6	24,447	8.3
300-399	13,441	5.2	12,998	4.5	12,978	4.4
400-499	9,555	3.4	7,251	2.5	8,433	2.9
500-599	4,892	1.7	9,446	3.3	7,147	2.4
600-699	9,253	3.3	5,832	2.0	5,195	1.8
700-799	5,943	2.1	2,997	1.0	8,221	2.8
800-899	9,531	3.4	7,588	2.6	6,730	2.3
900-999	5,716	2.0	8,449	2.9	8,463	2.9
1,000+	23,958	8.5	29,842	10.4	29,526	10.0
Totals	281,217	100.0	286,863	100.0	293,798	100.0

* Figures exclude ancillary units.

Employment in Manufacturing, by Size of Firms, 1965/66 = 100



APPENDIX II

Net Productivity (Value Added/ Wages and salaries + Depreciation) by Size of Firm.

Industry Group	Size of firms by number employed										Ratio Value Added	Ratio
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+	
31111						1.76		1.17		a	1.26	III
31112	1.39	1.30	1.84			0.81					0.92	II
31113	1.99		2.69		1.47						1.65	II
31114	1.68	2.01	1.72	1.58	1.27		1.14				1.26	I
31115		1.95		1.32	0.99		1.84				1.53	III
31116		2.47		1.76							2.04	I
31119	2.12	1.49	1.45			1.51					1.51	II
31121		1.14	1.11	1.11	1.06	1.10		0.96			1.02	II
31122	1.71	0.53	1.34	-2.67	-1.77			-0.48			-1.00	II
31123		1.73		1.36				1.44			1.44	II
31161/62		1.76		1.61	1.59		1.60				1.61	I
31171		1.33	1.53	1.20	1.10	0.96					1.05	II
31172	2.35	1.98	1.39	1.12		1.19					1.23	I
31173	2.15	1.76	1.66	1.26	1.28						1.55	I
31174							1.53				1.53	VI
31150	1.12		1.13	1.45	1.61		0.59			1.66	1.52	IV
31141	2.12	1.89	2.29	2.41		1.35					1.55	II
31150		1.74			1.26			1.61			1.52	IV
31190		1.40	1.61					1.88			1.80	V
31210 ^b		1.44	1.25	1.41	1.42	1.59		1.46			1.54	IV
31220	1.50	1.74	1.30	1.83	1.70						1.67	III
31310						n.s.					2.55 ^c	VI

a. 400-599: 1.17. 600-799: 1.19. 800-999: 1.30. 1,000+: 1.25.

b. Incorporates 31124, 31175, 31180.

c. Estimate.

Industry Group	----- Size of firms by number employed -----											Overall	Classif- ication for analysis
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+		
31320	2.16	1.91	1.88	1.41	-----	1.52-----						1.53	I
31331/32					-----		2.32-----					2.32	VI
31340	-----	1.89-----		1.71	1.66	-----	1.62-----					1.66	I
31400				-----			1.74-----					1.74	VI
32111		-----	1.36-----		1.34		1.29					1.32	II
32112		-----	1.31-----		-----	1.18-----	-----	1.23	-----	1.20-----		1.21	II
32114/50/90	-----	1.46-----	-----	1.34-----	1.09		-----	1.39-----				1.36	II
32115		-----	1.67-----				-----	1.11-----				1.23	I
32117			-----	1.29-----								1.29	VI
32121	1.87	2.05	1.67	1.50	-----	1.38-----						1.51	I
32129	1.43	1.50	1.43	1.32	1.20	-----	1.17-----					1.25	I
32130	1.62	-----	1.15-----	1.25	1.34	1.26		-----	1.34-----			1.31	III
32140	-----	1.26-----	-----	1.16-----				-----	1.33-----			1.32	III
32211	-----	1.02-----	-----	1.38-----	-----	1.29-----						1.31	IV
32212		-----	1.93-----									1.93	VI
32219	1.02	1.38	1.36	1.26	1.18	1.20	1.24	-----	1.20-----			1.21	II
32310			-----	0.88-----		0.97		-----	1.26-----			1.17	V
32321			-----	1.28-----								1.28	VI
32329	-----	2.49-----	-----	0.94-----	-----	0.99-----						1.04	II
32330	1.72	1.64	1.77	1.43	1.31	-----	1.25-----					1.37	I
32400	-----	0.36-----		1.31	1.23	1.14	1.23	-----	1.22-----			1.18	III
33111	1.31	1.47	1.43	1.27	1.33	1.27		-----	1.49-----			1.38	II

Industry Group	Size of firms by number employed										Overall	Classification
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+	
33112	1.22	1.04	1.56	1.31	1.47	1.48	——	1.47	——		1.45	IV
33114	1.87	1.53	1.42	1.38	1.32	1.58					1.42	II
33115	1.61	1.97	1.81	1.57	——	1.32	——				1.46	I
33116	——	1.11	——	——	1.05	——	1.39	——			1.33	V
33121	2.23	——	1.78	1.08	——	1.96	——				1.30	II
33122/190	1.84	1.52	1.74	1.42	——	1.41	——				1.49	II
33201	1.96	1.56	1.50	1.32	1.16	1.27	——	1.32	——		1.30	I
33202	——	1.22	——	——	——	1.31	——				1.30	IV
33203	——	1.69	——	1.60	1.27						1.45	I
34110	——	——	——	——	——	1.53	——	——	——		1.53	VI
34121/22	——	1.59	——	1.68	1.63	——	1.35	——			1.43	I
34191/99	——	3.08	——	1.34	1.38	——	1.54	——			1.54	IV
34201	——	1.62	——	1.45	1.36	1.20	1.48	1.26	1.32	——	1.26	I
34202	1.82	1.82	1.56	1.37	1.31	——	——	1.40	——		1.39	I
34203	1.36	1.45	1.42	1.23	1.17						1.38	I
35110	——	1.63	——	1.70	——	1.56	——				1.58	II
35122	——	3.22	——	——	——	1.34	——				1.37	I
35130	——	1.53	——	1.71	1.43	1.61	1.03	——	1.29	——	1.20	I
35210	——	2.35	——	1.54	1.81	——	1.11	——			1.33	I
35220	——	1.52	——	——	1.27	——	1.20	——			1.22	I
35231	——	——	——	——	1.40	——	——				1.40	VI
35121	——	1.97	——	——	——	1.04	——				1.05	I

Industry Group	-----Size of firms by number employed -----											Overall	Classification
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+		
35232		1.33			1.12		1.43					1.37	IV
35239		1.69				1.11						1.17	I
35291/99	2.05		1.92	1.89	1.39		1.66					1.65	I
35300				2.36								2.36	VI
35401/09		1.18		1.93		1.34						1.44	IV
35511							1.40					1.40	VI
35512	1.47		1.45	1.27	1.46							1.38	III
35590	2.11	1.90		1.27	1.48		1.30		1.37			1.39	I
35600	1.24	1.67	1.51	1.11	1.46	1.30		1.25				1.34	II
36100		1.89						1.22				1.23	I
36200	1.01	1.84	1.42	1.20	1.26			1.36				1.36	II
36910	1.12		1.22			1.37						1.34	V
36921/22/29			1.76				1.55					1.57	I
36991	1.80	1.41	1.55	1.51	1.53	1.26						1.44	II
36992	2.19	1.79	1.13	1.35		1.13						1.22	I
36993	1.78	1.37	1.61	1.52		1.57						1.57	II
36994	1.52		1.46			1.34						1.38	II
36995	2.23		1.62									1.83	I
36999	1.53		1.53					2.06				2.04	V
37101/02		1.78			1.41			1.75				1.72	III
37201/02	2.02	1.44	1.40	1.48	1.71		1.32			1.14		1.24	II
38111	1.46		1.63	1.01		1.44						1.40	III

Industry Group	Size of firms by number employed											Overall	Classification
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+		
38112	————	1.47	————	2.33	1.54	————	1.31	————				1.48	III
38120	2.03	1.44	1.30	1.31	1.34	————	1.31	————				1.34	I
38131	1.81	1.68	1.54	1.37	1.39	————	1.59	————				1.48	III
38132	2.39	1.78	1.71	1.70	1.43	————	1.33	————				1.53	I
38133	0.37	1.58	1.55	1.40	1.38	1.24	————	1.03	————			1.27	II
38191/92	1.89	1.39	1.68	1.48	1.54	————	1.32	————				1.41	II
38194	1.69	————	1.40	————	————	1.45	————					1.46	II
38198	1.58	1.44	1.26	1.32	————	1.37	————					1.37	II
38199	1.96	1.61	1.60	1.35	1.41	1.31	1.58	————	1.42	————		1.46	II
38210	1.62	1.51	1.45	1.32	————	1.07	————					1.32	I
38220	1.79	1.61	1.72	1.48	1.38	————	1.38	————				1.46	I
38231	1.82	0.18	1.76	1.41	————	1.36	————					1.37	I
38239	————	1.26	————	1.35	————	1.34	————					1.34	IV
38240	1.83	1.45	1.54	1.38	1.33	————	1.28	————				1.33	I
38250/99	1.57	1.55	1.51	1.34	1.42	1.51	————	1.41	————			1.44	II
38310	1.88	1.73	1.73	1.50	1.63	1.47	————	1.52	————			1.55	II
38320	1.26	1.52	1.39	1.44	1.67	1.18	1.59	1.09	————	1.64	————	1.45	III
38331	————	1.62	————	1.83	————	0.89	————	1.32	————	1.30	————	1.29	II
38339	————	1.06	————	1.63	————	0.94	————	1.16	————			1.13	III
38399/91	————	1.67	————	1.48	1.49	1.75	1.75	1.20	1.25			1.41	II
38410	1.70	1.51	1.33	1.20	1.24	————	1.23	————				1.26	I
38420/40/90	2.39	————	1.24	————	————	————	1.01	————				1.02	I

Industry Group	-----Size of firms by number employed-----										Overall	Classification
	Under 5	5-6	7-9	10-19	20-49	50-99	100- 199	200- 299	300- 399	400- 499	500+	
38431				1.35					1.06		1.07	I
38432	1.66	1.20	1.41	1.62	1.39		1.34				1.39	III
38439	1.50	1.63	1.46	1.32	1.39	1.56	1.40				1.44	III
38450	0.89	1.25	1.20				1.13				1.13	II
38511				1.28							1.28	VI
38519	1.50			1.31							1.34	I
38520		1.64				1.34					1.44	I
39010	2.09	1.73	1.52	1.71		1.42					1.50	I
39020			n.a.									VI
39030	1.58	1.19	1.26	1.22		1.89					1.57	IV
39091				1.27							1.27	VI
39092	1.75		1.50			1.07					1.13	I
39099	1.79	1.91	1.90	1.35	1.02	1.48					1.37	I

Key to Industrial Classification Code Numbers

NZSIC Code	Industry		
31111	Meat export works (including export licensed abattoirs)	33114	Builders carpentry and builders joinery
31112	Other abattoirs and rural slaughter houses	33115	Prefabricated and precast buildings
31113	Meat packers and canners	33116	Plywood, veneer and board
31114	Ham, bacon and smallgoods	33121	Wooden containers
31115	Poultry slaughter houses	33122	Basket and cane ware
31116	Game packers	33190	Cork products; and wood products n.e.c.
31118	Meat pies and puddings		<i>Total 331 Wood and cork products:-</i>
31119	Casings of animal origin	33201	Wooden furniture and upholstery
31121	Co-operative dairy factories	33202	Mattress making
31122	Milk processing plants	33209	Blinds, window, all types including venetian and roller
31123	Ice cream factories		<i>Total 332 Furniture:-</i>
31124	Factories manufacturing dairy products including processed cheese, excluding co-op dairy factories	34110	Pulp, paper and paperboard
31130	Canning and preserving of fruit and vegetables	34121	Corrugated board; paperboard and corrugated board boxes, cases, cartons
31141	Land based fish, etc. factories	34122	Paper bags and sacks
31150	Vegetable and animal oils and fats	34191	Wallpaper factories
31161	Grain milling	34199	Pulp, paper and paperboard articles n.e.c.
31162	Prepared grain breakfast foods		<i>Total 341 Paper and paper products:-</i>
31171	Bread bakeries	34201	Printing and publishing-news papers, periodicals and books
31172	Cake, pastry and pie (other than meat) factories	34202	Job and general printing
31173	Cake and pastry kitchens	34203	Service industries for the printing trade
31174	Biscuit factories		<i>Total 342 Printing and publishing:-</i>
31175	Macaroni, vermicelli, spaghetti and noodles	35110	Basic industrial chemicals except fertilisers
31180	Sugar factories and refineries	35121	Chemical fertilisers
31190	Cocoa, chocolate and sugar confectionery	35122	Pesticides
31210	Food products, n.e.c.	35130	Synthetic resins, plastic materials and man-made fibres except glass
31220	Prepared animal feeds		<i>Total 351 Industrial chemicals:-</i>
	<i>Total 311-312 Food manufacturing:-</i>	35210	Paints, varnishes and lacquers
31310	Distilling, rectifying and blending spirits	35220	Drugs and medicines
31320	Wine	35231	Soap and detergents
31331	Breweries	35232	Toilet and cosmetic goods
31332	Malting	35239	Cleaning preparations, n.e.c.
31340	Soft drinks and cordials	35291	Ink
	<i>Total 313 Beverages:-</i>	35299	Chemical products, n.e.c.
31400	Tobacco manufactures		<i>Total 352 Other chemical products:-</i>
32111	Wool scouring	35300	Petroleum refineries
32112	Woollen fibres, spinning and weaving	35401	Bituminous mixtures and products
32114	Linen flax mills	35409	Petroleum and coal products, n.e.c.
32115	Man-made fibres, spinning and weaving		<i>Total 354 Petrol and coal products:-</i>
32117	Dyeing, printing and finishing yarns and textiles	35511	Tyres and tubes
32121	Canvas goods and similar articles of other fabrics	35512	Tyre retreading and vulcanising
32129	Other made up textile goods except clothing	35590	Rubber products, n.e.c.
32130	Knitting mills		<i>Total 355 Rubber products:-</i>
32140	Carpets and rugs	35600	Manufacture of plastic products, n.e.c., including ancillary units
32150	Cordage, rope and twine		<i>Total 356 Plastic products:-</i>
32190	Textiles, n.e.c.	36100	Manufacture of pottery, china and earthenware
	<i>Total 321 Textiles:-</i>	36200	Manufacture of glass and glass products
32211	Leather gloves and clothing	36910	Structural clay products
32212	Fur clothing	36921	Cement works
32219	Clothing other than leather and fur	36922	Lime kilns (not agricultural lime)
	<i>Total 322 Wearing apparel:-</i>	36929	Cement, lime and plaster, n.e.c.
32310	Tanneries and leather finishing	36991	Precast concrete
32321	Fellmongery	36992	Concrete masonry
32329	Fur dressing and dyeing, fur and skin articles n.e.c.	36993	Ready mixed concrete
32330	Leather and leather substitute products except footwear and clothing	36994	Plaster and fibrous plaster products
	<i>Total 323 Fur and leather:-</i>	36995	Monumental masonry and stone masonry
32400	Manufacture of footwear except rubber, plastic and wooden footwear	36999	Non-metallic mineral products, n.e.c.
33111	Sawmills		<i>Total 369 Non-metallic mineral products:-</i>
33112	Planing, preserving and seasoning timber	37101	Iron and steel basic products
		37102	Iron and steel forgings and castings (for sale as such), etc.,
			<i>Total 371 Iron and steel:-</i>
		37201	Non-ferrous basic metal products
		37202	Non-ferrous forgings and castings (for sale as such), extrusions etc.
			<i>Total 372 Non-ferrous metal:-</i>
		38111	Cutlery and handtools
		38112	Builders, joiners, etc. hardware
		38120	Furniture and fixtures primarily of metal
		38131	Architectural metal structures and fixtures
		38132	Sheet metal roofing and related products
		38133	Structural steel fabricating, and plate metal and boiler shop products
		38191	Wireworking
		38192	Nail and fastener manufacturing
		38194	Household and kitchen utensils
		38198	Servicing industries to the metal trades
		38199	Fabricated metal products (except machinery and equipment) n.e.c.
			<i>Total 381 Metal products:-</i>
		38210	Manufacture and reconditioning of engines and turbines
		38220	Agricultural machinery and equipment
		38231	Tool, die and jig making
		38239	Metal and woodworking machinery n.e.c.
		38240	Specialised industrial machinery and equipment
		38250	Office, computing and accounting machinery
		38290	Machinery and equipment, except electrical n.e.c.
			<i>Total 382 Machinery:-</i>
		38310	Electrical industrial machinery and apparatus
		38320	Radio, television and communication equipment and apparatus
		38331	Household durables and range making
		38339	Other electrical appliances and housewares n.e.c.
		38391	Electrical cables and wires
		38399	Other electrical apparatus and supplies, n.e.c.
			<i>Total 383 Electrical machinery, apparatus appliances and supplies:-</i>
		38410	Ship building and repairing
		38420	Railroad equipment
		38431	Motor vehicle assembly plants
		38432	Motor vehicle body building, caravans and trailers
		38439	Motor vehicle parts n.e.c.
		38440	Motor cycles and bicycles
		38450	Aircraft, including repairs
		38490	Transport equipment, n.e.c.
			<i>Total 384 Transport equipment:-</i>
		38511	Medical, surgical equipment and supplies n.e.c.
		38519	Laboratory and scientific equipment, measuring and controlling equipment n.e.c.
		38520	Photographic and optical goods
			<i>Total 385 Measuring and controlling equipment, etc.:-</i>
		39010	Jewellery and related articles
		39020	Musical instruments
		39030	Sporting and athletic goods
		39091	Brushes and brooms
		39092	Toys and games
		39099	Manufacturing industries, n.e.c.