

**COMMISSION OF THE EUROPEAN COMMUNITIES**

**A STUDY OF THE EVOLUTION  
OF CONCENTRATION  
IN THE DUTCH  
PAPER PRODUCTS INDUSTRY**

**November 1976**

In 1970 the Commission initiated a research programme on the evolution of concentration and competition in several sectors and markets of manufacturing industries in the different Member States (textile, paper, pharmaceutical and photographic products, cycles and motorcycles, agricultural machinery, office machinery, textile machinery, civil engineering equipment, hoisting and handling equipment, electronic and audio equipment, radio and television receivers, domestic electrical appliances, food and drink manufacturing industries).

The aims, criteria and principal results of this research are set out in the document "Méthodologie de l'analyse de la concentration appliquée à l'étude des secteurs et des marchés", (ref. 8756 - french version, September 1976).

This particular volume presents the results of the research on the paper products industry in the Netherlands. The Commission has also published several volumes concerning the paper industry in other Member States (United Kingdom), Germany, Italy).

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## PREFACE

The present volume is part of a series of sectoral studies on the evolution of concentration in the member states of the European Community.

These reports were compiled by the different national Institutes and experts, engaged by the Commission to effect the study programme in question.

Regarding the specific and general interest of these reports and the responsibility taken by the Commission with regard to the European Parliament, they are published wholly in the original version.

The Commission refrains from commenting, only stating that the responsibility for the data and opinions appearing in the reports, rests solely with the Institute or the expert who is the author.

Other reports on the sectoral programme will be published by the Commission as soon as they are received.

The Commission will also publish a series of documents and tables of syntheses, allowing for international comparisons on the evolution of concentration in the different member states of the Community.

REPORT  
on  
CONCENTRATION IN THE DUTCH PAPER-PRODUCTS INDUSTRY

UNIVERSITY OF AMSTERDAM  
DEPARTMENT OF BUSINESS ADMINISTRATION  
PREPARED by: W.J.C. Brouwer  
in collaboration with: T.N. Steijn

November 1976



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## Introduction

This study of the evolution of concentration in the Dutch paper-products industry was made at the request of the Directorate-General for Competition of the Commission of the European Communities.

It is a continuation and extension of an earlier report of november 1973 by the "Stichting voor Economisch Onderzoek" of the University of Amsterdam.

The latter report was a study of the total Dutch paper industry, including the paper-products, for the years 1963 up to 1969, by means of C.B.S. (Dutch Central Bureau of Statistics) figures.

The present report covers the years 1968 up to and including 1974. So there is an overlap for the years 1968 and 1969.

The report consists of two parts: the quantitative analysis of concentration, by means of a number of variables (e.g. turnover) for different product-markets within the industry and the qualitative part, with the accent on the individual firms within the industry.

In this second part there will, among other things, come up for discussion: mergers, ownership, integration, diversification, innovations, entry barriers and short historical outlines of the most important firms.



## I. Research Methodology

### Definition of the industry

The industrial sector of the paper products industry was defined according to the E.E.C. nomenclature NICE 272 (or NACE 472).

The classification of the Dutch C.B.S. was sufficiently similar to be used for the quantitative analysis.

The C.B.S. figures had to be used instead of the data of the individual firms, because of the large number of companies and the prevalence of medium-sized family firms in the industry. These figures comprise all firms with more than 10 employees. but for the variable investments where the mass of the firms considered consists of firms with more than 50 employees.

A firm was considered to be part of the industry if over 50% of its turnover was accounted for by NICE 272.

A lot of companies in the industry also belongs to other industries or is producing for more than one product-market. However, in most of these cases it was possible to partition the variables investigated for the different product-markets and to take into account the "internal" deliveries between different divisions of one company.

### Variables investigated

For reference with studies in other countries of the E.E.C. it was required to use the following variables for the quantitative analysis:

1. domestic turnover;
2. number of employees;
3. wage bill;
4. exports;
5. gross investment;
6. profit;
7. cash-flow;
8. own capital.

The first five variables could be obtained from C.B.S. statistics. The other three (financial) variables could only be obtained for the bigger companies, which publish annual accounts.

For these variables no groups of firms in descending order of sizes could be made so that it was impossible to calculate meaningful concentration indices.

As far as possible these variables will be analysed in the second part of the study together with the description of the individual companies.

In the quantitative analysis a ninth variable, market-share, was introduced to reflect the competition from imports. All other variables take no account of imports whereas during the period investigated almost 25% of the market of the total industry consisted of imports.

#### Choice of the sub-sectors

The choice of the sub-sectors or product-markets was based on the "relevant market" and the relative importance of the sub-sectors. The relevant market was considered to exist if the products of a particular sector were competitive and had no substitute in other sectors or industries.

The product groups analysed were as follows.

<u>Sector:</u>	<u>Turnover in 1974 (as % of total industry)</u>
Corrugated board and cases	25
Sanitary and household	10
Adhesive materials	7
Folding carton	7
Stationary and envelopes	4
Wallpaper	<u>3</u>
Total	56

Concentration indices used:

For reference with studies in other countries of the E.E.C. the following concentration indices were used:

1. Variance;
2. Gini coefficient;
3. Concentration ratio and concentration curve;
4. Herfindahl - Hirschmann index;
5. Entropy index;
6. Linda index and Linda curve.

In the next part we will discuss the definitions and basic properties of the above mentioned indices.



## II. Definitions and basic properties of concentration indices

### List of symbols

$n$  = total number of firms in the industry or in the sector;  
 $n^*$  = number of firms under study;

$x_i$  = the value of a variable for firm  $i$ , when firms are ranked in descending order with respect to that variable;

$X$  = the aggregate of the variable for the whole industry or sector:

$$X = \sum_{i=1}^n x_i \quad ;$$

$p_i$  = the proportion of the aggregate accounted for by firm  $i$ :

$$p_i = \frac{x_i}{X} \quad ;$$

$m$  = the arithmetic mean value of the variable:

$$m = \frac{X}{n} \quad ;$$

$s$  = standard deviation:  $s = \sqrt{\frac{\sum_{i=1}^n (x_i - m)^2}{n}}$

### a. Coefficient of Variation (V)

$$V = \frac{s}{m}$$

The coefficient of variation gives a first rough impression of the dispersion of the sizes of firms in the sector.

In general high values of  $V$  mean big differences between the small and the big firms and therefore high "relative concentration" (= dispersion of firms).

$V$  can easily be calculated or estimated from data on a random sample of firms in the sector.

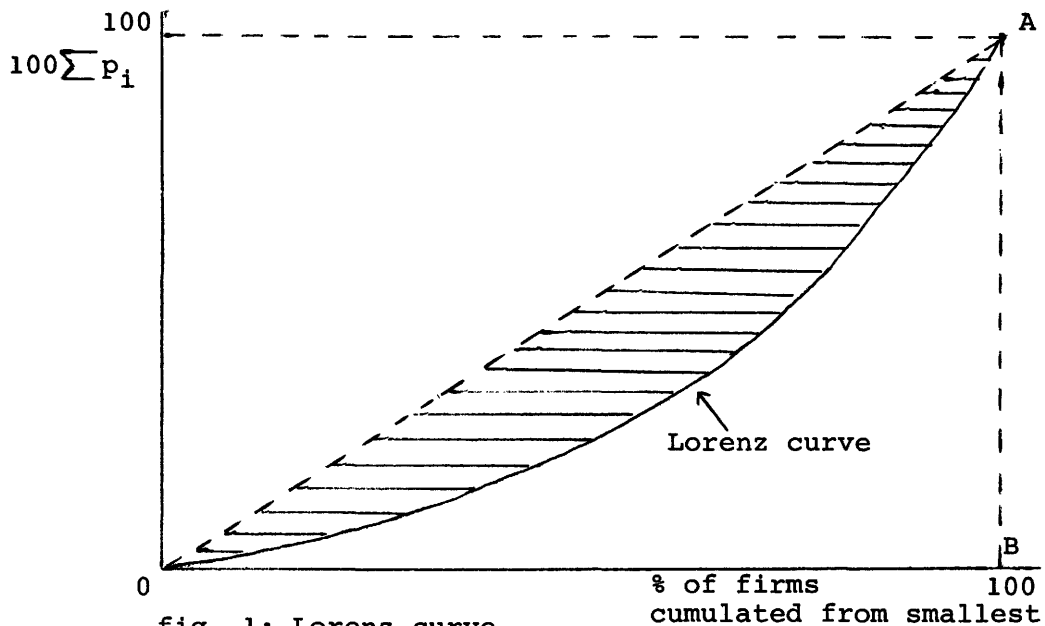
However,  $V$  gives no indication of the number of firms in the sector and therefore gives no information about the "absolute concentration" (= fewness of firms).



b. Gini Coefficient (G)

G is also independent of the number of firms in the sector. It measures relative concentration. This measure is based on the Lorenz curve (see fig. 1).

The Lorenz curve plots the percentage of firms cumulated from the smallest against their percentage in the total variable ( $100\sum p_i$ )



$$G = \frac{\text{Shaded Area}}{\text{Area OBA}}$$

The interrupted line OA indicates a dispersion of zero; all firms are equal in size ( $G=0$ ). The bigger the deviation from OA the higher G.

$$(0 \leq G \leq 1)$$

The method of calculation of the Gini coefficient is rather complex and requires complete data on the aggregate of the variable.

c. Concentration ratio (CR)

The concentration ratio measures absolute concentration (fewness of firms).

CR is the fraction of the total variable accounted for by the  $n^*$  largest firms.

The value of  $n^*$  is chosen by the user.

$$CR (\%) = \frac{100}{X} \sum_{i=1}^{n^*} x_i$$

CR is calculated for several values of  $n^*$ .

It has the advantage that the size of the whole industry and of the top few firms are sufficient for its calculation.

The disadvantage is that it does not measure the relative sizes of the  $n^*$  firms under study.

An example comparing V, G and CR

Table 1: Turnover of eight firms in five situations.

Situation $x_i$	A	B	C	D	E
x1	270	270	270	270	300
x2	180	180	180	210	180
x3	150	150	180	150	150
x4	120	150	120	120	120
x5	100	100	100	100	100
x6	80	80	80	80	80
x7	70	70	70	70	70
x8	30	-	-	-	-
Total turnover (X)	1000	1000	1000	1000	1000

The turnover of eight firms is classified in descending order. In situation A there are eight firms. In situation B, C, D and E firm eight is taken over by respectively firm four, three, two and one.

Table 2 shows the concentration indices for all five situations.

Table 2: Concentration indices

Index \ Situation	A	B	C	D	E
V	0.539	0.449	0.462	0.476	0.514
G	0.310	0.245	0.251	0.260	0.268
CR2	45	45	45	48	48
CR4	72	75	75	75	75

The basic properties of V, G and CR are now clearly demonstrated. CR shows an increase in (absolute) concentration since the dispersion of turnover decreases.

V and G are closely related and decrease compared with situation A, since the relative concentration decreases; the remaining seven firms are more equal than in situation A.

The indices V and G are, in contrast with CR, different for every different situation.

#### d. Herfindahl-Hirschmann Index (H)

$$H = 1000 \cdot \sum_{i=1}^n p_i^2 ; \quad \frac{1000}{n} < H \leq 1000$$

H is equal to the probability of two items of output (or another variable) of the sector chosen at random, both originating from the same firm, inflated by a multiple of 1000.

This probability depends on both the number and the relative sizes of the firms in the sector.

H combines the measurement of relative and absolute concentration; it measures both dispersion and fewness.

e. Entropy index (E)

$$E = 100 \cdot \sum_{i=1}^n p_i \cdot \log p_i; \quad -100 \log n \leq E \leq 0.$$

The entropy index is a variant version of H. It originated in information theory. This theory states that the information about the occurrence of an event has little value if the probability of occurring is high and has much value if that probability is low. By using the logarithm, E is negative and inversely proportional to the probability  $p_i$ .

The bigger  $p_i$  the lower the information content and the smaller the absolute value of E ( $0 \leq p_i \leq 1 \rightarrow \log p_i \leq 0$ ).

Thus E is inversely proportional to the concentration and to H. Say the variable under investigation is "number of employees". Out of the total number of employees in the sector we select at random two employees. If the concentration in this sector is high the probability that both employees are from the same (big) firm is high. This is indicated by H.

On the other hand the information content of the message that one of the employees is working with the biggest firm is low, thus E has a low absolute value.

Table 3 shows H and E for our example of eight firms in five situations (see table 1)

Table 3: Concentration indices H and E for fig. 2

Index \ Situation	Situation				
	A	B	C	D	E
H	164	172	173	175	181
·/· E	83.6	80.3	80.1	79.9	79.4

Both indices show an increase of concentration.

In this case the decrease of the number of companies is more important than the increase of the equality of the remaining firms. In other words, in this case the increase of absolute concentration is more important than the decrease of relative concentration.

f. Linda index ( $L_{n^*}$ )

Another effort to measure dispersion and fewness by means of one index is the Linda index.

The index is designed to measure the degree of inequality of the values of the variable included in a sub-sample of  $n^*$  units. The index is based on the principal of the "Oligopolistic Equilibrium" (EO).

EO can be measured for any number of firms from 2 to  $n$ , arranged in descending order of size.

$$EO_i = \frac{A_i}{1} : \frac{1 - A_i}{n^* - i}$$

where  $A_i$  is the share of the variable held by the top  $i$  firms. Thus  $EO_i$  is the average share of the variable held by the top  $i$  firms divided by the average share of the variable held by the other  $n^* - i$  firms.

In our example for situation A (see fig. 2)

$$EO_2 = \frac{.270 + .180}{2} : \frac{1 - .450}{6} = 2.45$$

or

$$EO_5 = \frac{.270 + .180 + .150 + .120 + .100}{5} : \frac{1 - .820}{3} = 2.73$$

The Linda index for  $n^*$  firms is the average of  $n^* - 1$  situations of oligopolistic equilibrium, divided by the number of firms in the sample ( $n^*$ ).

Thus it is defined as:

$$L_{n^*} = \frac{1}{n^*} \cdot \sum_{i=1}^{n^*} \frac{EO_i}{n^* - 1}$$

The index measures the degree of inequality (dispersion) and by dividing it by  $n^*$  it depends on the number of firms under consideration (fewness).

The values of  $L$  in our example are illustrated in table 4 on page 12.

Table 4:Linda index for table 1.

Situation \ Index	A	B	C	D	E
L4 ( $n^* = 4$ )	.428	.377	.411	.435	.461
L8 ( $n^* = n$ )	.365	.309	.316	.322	.330

L8 shows the same pattern as G. But L4 reflects the synthesis of absolute and relative concentration. In situation B and C, L4 is lower than in situation A; in situation D and E it is higher.

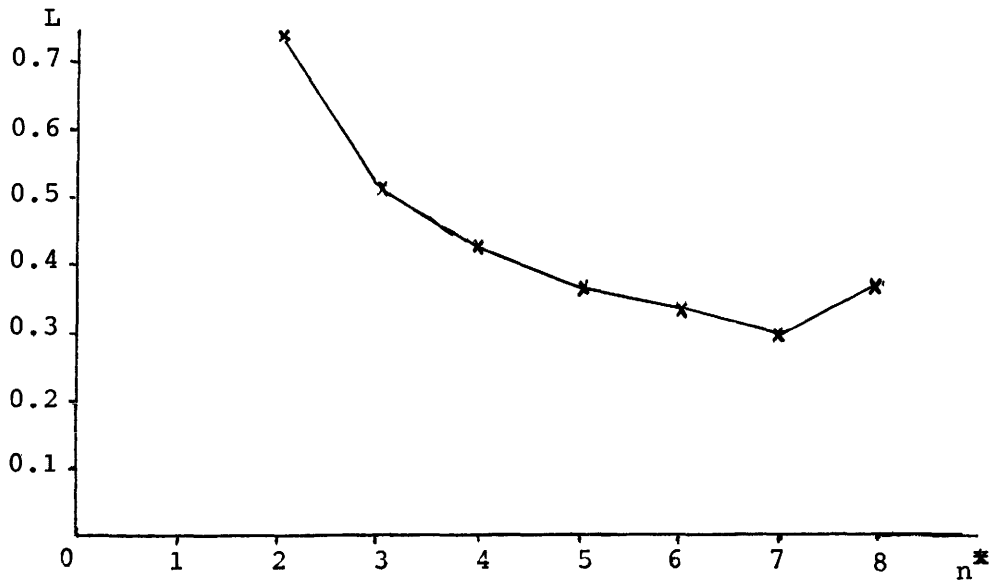
g. Linda - curve

For situation A in our example the L indices are:

- $L_2 = .75;$
- $L_3 = .52;$
- $L_4 = .43;$
- $L_5 = .37;$
- $L_6 = .34;$
- $L_7 = .31;$
- $L_8 = .37.$

For a graphical reflection see figure 2.

Fig. 2: Linda-curve in situation A.



The Linda curve rises if the relative difference between the top  $i$  firms and the rest of the firms strongly increases.

This "threshold" or discontinuity of size is observed at the minimum value of  $L_n^*$  ( $= L_{n^*m}^*$ ).

In our example this minimum occurs at  $n^* = 7$ . ( $L_{n^*m}^* = .31$ ;  $n^*m = 7$ ).

This minimum is defined as the boundary between the oligopolists and the other firms in the sector.

The Linda curve is a quantitative way of defining the "oligopolistic field" in terms of the variable concerned.

### III. Quantitative analysis

In this part of the study the concentration indices based on the CBS figures will be analysed. This will successively be done for the total industry and the six distinguished sub-sectors. So the analysis consists of seven parts. It ends with a summary.

Each of the seven parts starts with the following tables and graphs:

- a. overall figures;
- b. investigated total and percentage covered per variable;
- c. summary of the concentration indices;
- d. summary of the Linda indices;
- e. concentration curves and Linda curves.

sub a: the overall figures comprise all firms with more than 10 employees but for the variable investments where the mass of the firms considered consists of firms with more than 50 employees. The number of activity units equals the number of establishments or plants.

The number of firms equals the number of enterprises (establishments under common ownership or control). The variables domestic sales, wage bill, investments, exports and imports are deflated by one million dutch florins. The variable employees is deflated by one thousand. For the years 1968 and 1969 no detailed figures of the variable investments could be obtained.

For the sector folding carton only the variables domestic sales, employees and wage bill could be analysed.

sub b: these tables show the investigated total per variable.

This total depends on the number of firms studied ( $n^*$ ).

In all cases the figures are based on the top  $n^*$  firms.

By dividing the investigated total per variable by the overall figures we will find the percentage covered.

In general it is necessary to cover sixty to seventy percent of a variable for an adequate analysis.

The variable imports is not covered, since this study is limited to dutch firms.



The total imports are taken into account for the calculation of the variable market share.

The percentage of the variable market share covered by the investigation is equal to the domestic sales investigated divided by the total domestic sales plus the total imports.

sub c: the concentration indices for the variable market share are equal to the indices for the variable domestic sales but for CR. CR shows the market shares of the top  $n^*$  dutch firms in the dutch market.

sub d: these tables concern  $n^*_m$ ,  $L_{n^*_m}$  and  $L_s$ .  
 $L_{n^*_m}$  is the minimum value of  $L_{n^*}$  and  $n^*_m$  is the number of firms that belongs to the oligopolistic field.

$$L_s = \frac{\sum_{n^*_m}^{n^*} L_{n^*}}{n^*_m - 1} ;$$

thus  $L_s$  is the average value of  $L_{n^*}$  in the oligopolistic field.

sub e: the concentration curves and the Linda curves are graphical reflections of CR and  $L_{n^*}$  for the years 1968 and 1974 for the variables domestic sales and exports.

The CR-curves of the total sector for the year 1963 are derived from an earlier report by the "Stichting voor Economisch Onderzoek" of the University of Amsterdam.

### III. 1. Total industry

Table 5: Overall figures of the paper products industry.

year variable	68	69	70	71	72	73	74
Number of activity units	206	194	187	185	179	178	178
Number of firms	194	182	177	171	162	155	151
Domestic sales	914	951	1015	1105	1154	1293	1728
Employees	18.8	19.0	19.5	18.7	18.7	18.3	18.7
Wage bill	235	265	312	338	380	429	468
Investments	-	-	105	75	88	80	110
Exports	195	229	264	293	316	419	565
Imports	213	286	339	375	420	498	677

Table 6a: Investigated total per variable. Sector: total industry

year variable	68	69	70	71	72	73	74
Domestic sales	701	720	796	851	900	1021	1412
Employees	12.5	13.0	13.8	13.5	13.5	13.9	14.7
Wage bill	161	189	222	260	288	342	410
Investments	-	-	81	61	75	65	99
Exports	163	204	239	259	293	393	514
Market share	62.2	58.2	58.8	57.5	57.2	57.0	58.7

Table 6b: Percentage covered by the investigation.  $n^* = 40$ .

year variable	68	69	70	71	72	73	74
Domestic sales	76.7	75.7	78.4	77.1	78.0	78.9	81.7
Employees	66.4	68.6	70.5	72.0	72.5	76.1	78.7
Wage bill	68.8	71.5	71.2	77.0	75.7	79.6	87.6
Investments	-	-	77.2	81.1	84.9	81.2	90.1
Exports	83.7	89.3	90.5	88.3	92.7	93.7	91.0
Market share	62.2	58.2	58.8	57.5	57.2	57.0	58.7

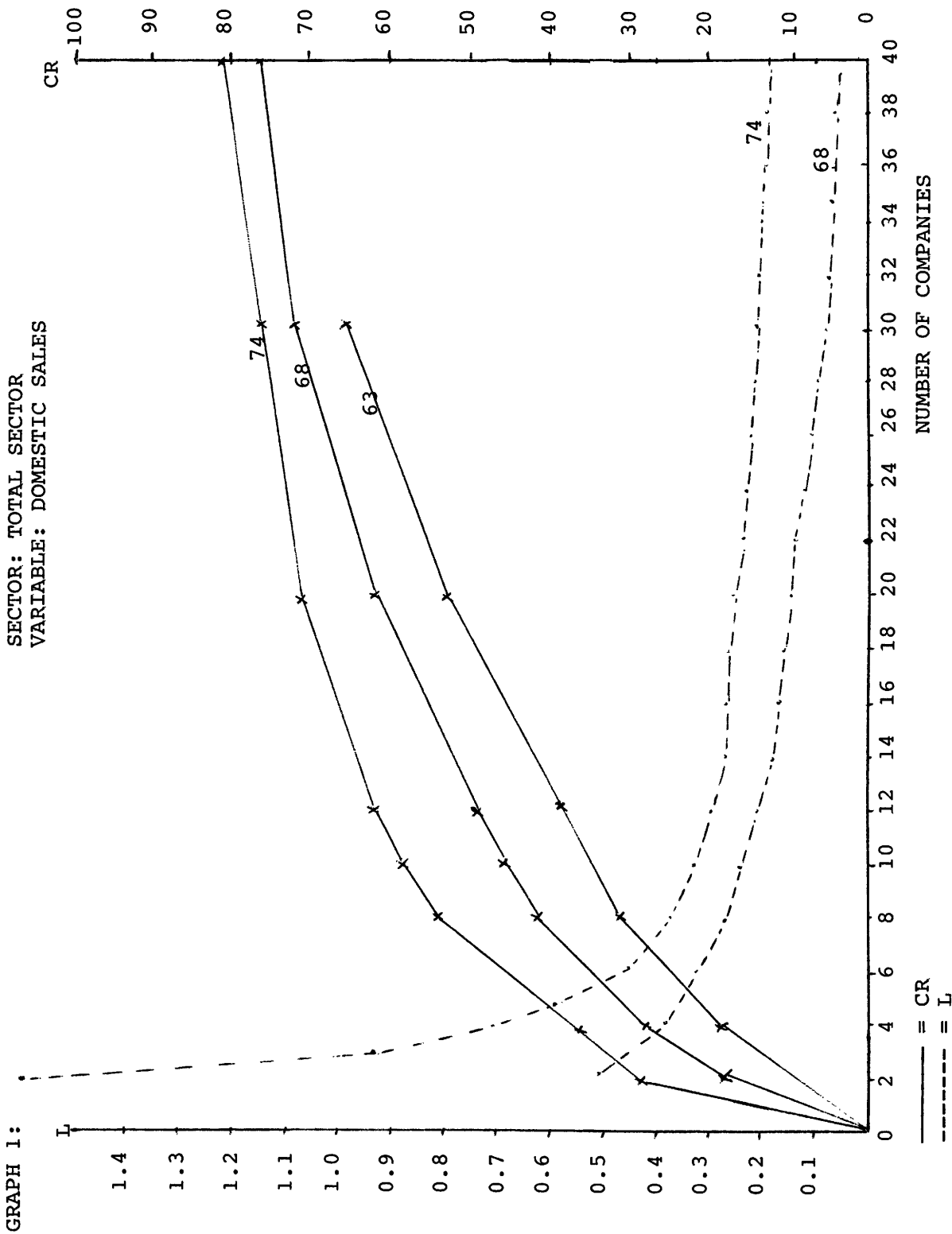
Table 7: CONCENTRATION COEFFICIENTS TOTAL SECTOR

Variable	Year	V	G	L	CR	L	CR	L	CR	L	CR	L	CR	L	CR	H	*/.E		
				4		8		10		12		20		30		40			
Domestic sales	68	2.25	.635	.381	28.7	.274	41.1	.237	45.7	.205	49.9	.144	62.6	.126	71.2	.113	76.7	31.22	184
	69	2.22	.617	.439	29.2	.290	41.5	.249	46.1	.222	49.9	.155	61.9	.131	70.2	.116	75.7	32.46	184
	70	2.24	.643	.416	29.7	.276	42.8	.232	48.0	.206	52.2	.160	64.2	.133	72.4	.114	78.4	34.00	180
	71	2.15	.623	.423	28.9	.279	41.5	.231	46.6	.204	50.9	.157	63.0	.130	71.3	.114	77.1	32.76	182
	72	2.08	.624	.429	28.6	.275	41.1	.229	46.5	.204	50.7	.146	63.7	.125	72.5	.115	78.0	32.79	180
	73	2.27	.635	.551	30.6	.286	44.8	.244	50.0	.211	54.7	.176	65.8	.144	73.8	.130	78.9	39.78	176
	74	2.97	.681	.690	39.0	.375	53.7	.325	58.4	.285	62.6	.253	71.3	.208	77.5	.177	81.7	65.20	163
Employees	68	1.82	.515	.474	22.7	.279	33.3	.242	37.0	.205	40.6	.140	51.5	.111	60.1	.091	66.4	22.31	198
	69	1.85	.532	.454	24.3	.289	34.8	.238	38.9	.201	42.8	.143	54.0	.115	62.3	.095	68.6	24.30	194
	70	1.87	.549	.433	25.2	.292	35.3	.234	39.8	.194	44.0	.138	55.9	.115	64.4	.097	70.5	25.33	192
	71	1.87	.560	.421	25.7	.281	36.5	.237	41.2	.194	45.4	.140	57.0	.115	65.7	.097	72.0	26.32	190
	72	1.77	.554	.422	24.6	.263	35.9	.212	40.8	.187	45.0	.135	56.7	.111	65.9	.093	72.5	25.40	189
	73	1.94	.594	.474	26.7	.260	40.0	.213	45.5	.190	50.0	.147	61.8	.127	70.1	.108	76.1	30.70	182
	74	2.35	.630	.566	31.9	.306	45.8	.250	51.4	.214	56.2	.192	66.0	.159	73.1	.131	78.7	43.22	174
Wage bill	68	2.04	.547	.480	25.0	.278	37.0	.240	41.3	.210	45.0	.155	55.4	.128	63.0	.106	68.8	26.52	194
	69	2.03	.569	.426	26.7	.284	38.9	.243	43.2	.214	46.9	.152	58.2	.131	65.9	.109	71.5	28.14	189
	70	1.94	.561	.407	25.8	.258	38.1	.220	42.8	.197	46.7	.150	58.0	.126	65.8	.110	71.2	26.84	190
	71	2.09	.621	.414	28.3	.270	40.9	.222	46.2	.200	50.4	.147	62.6	.126	71.1	.109	77.0	31.39	183
	72	1.94	.597	.412	26.8	.245	39.9	.205	45.4	.192	49.3	.143	61.4	.125	69.8	.107	75.7	29.51	184
	73	2.07	.637	.452	28.6	.255	42.3	.197	49.0	.177	54.0	.151	65.9	.135	73.9	.116	79.6	34.08	177
	74	2.67	.738	.544	36.4	.302	52.1	.236	59.1	.218	64.2	.195	75.1	.172	82.3	.146	87.6	53.65	161
Investments	70	2.05	.620	.515	25.8	.273	38.1	.223	43.1	.191	47.6	.140	60.2	.106	70.6	.097	77.2	29.45	185
	71	2.19	.669	.323	29.5	.240	44.2	.211	49.6	.185	54.3	.149	67.0	.129	75.5	.118	81.1	33.86	177
	72	2.66	.718	.484	37.8	.315	51.6	.262	57.2	.229	62.0	.188	73.0	.165	80.6	.163	84.9	49.78	165
	73	2.20	.657	.457	31.2	.301	44.4	.246	49.6	.224	53.5	.151	66.8	.128	76.5	.129	81.2	37.63	175
	74	3.29	.775	.851	40.9	.410	55.5	.336	60.8	.285	65.5	.193	79.2	.184	86.6	.191	90.1	78.22	151
Exports	68	3.26	.727	.660	38.6	.392	51.6	.329	56.4	.287	60.3	.215	71.0	.174	78.7	.153	83.7	60.00	166
	69	3.74	.795	.670	44.8	.385	61.1	.355	65.7	.323	69.4	.261	79.4	.224	85.5	.207	89.3	82.13	150
	70	3.58	.799	.639	43.7	.396	58.2	.331	63.6	.307	67.4	.225	78.8	.195	85.8	.177	90.5	77.91	151
	71	3.32	.774	.593	41.6	.351	57.5	.299	63.1	.267	67.6	.228	78.4	.205	85.0	.210	88.3	70.10	155
	72	3.13	.813	.541	40.6	.320	58.2	.280	64.0	.244	69.1	.203	82.0	.188	88.8	.187	92.7	66.72	149
	73	3.11	.819	.606	39.8	.310	58.7	.283	64.0	.250	68.8	.185	82.6	.189	89.9	.188	93.7	68.94	148
	74	2.95	.789	.549	40.7	.312	58.6	.280	64.1	.252	68.8	.198	81.0	.199	87.6	.211	91.0	64.32	151
Market share	68				23.3		33.4		37.1		40.5		50.8		57.8		62.2		
	69				22.5		32.0		35.4		38.4		47.6		54.0		58.2		
	70				22.3		32.1		36.0		39.1		48.1		54.3		58.8		
	71				21.6		31.0		34.8		38.0		47.0		53.3		57.5		
	72				21.0		30.3		34.1		37.2		46.7		53.1		57.2		
	73				22.1		32.4		36.1		39.5		47.5		53.3		57.0		
	74				28.0		38.6		42.0		45.0		51.2		55.7		58.7		

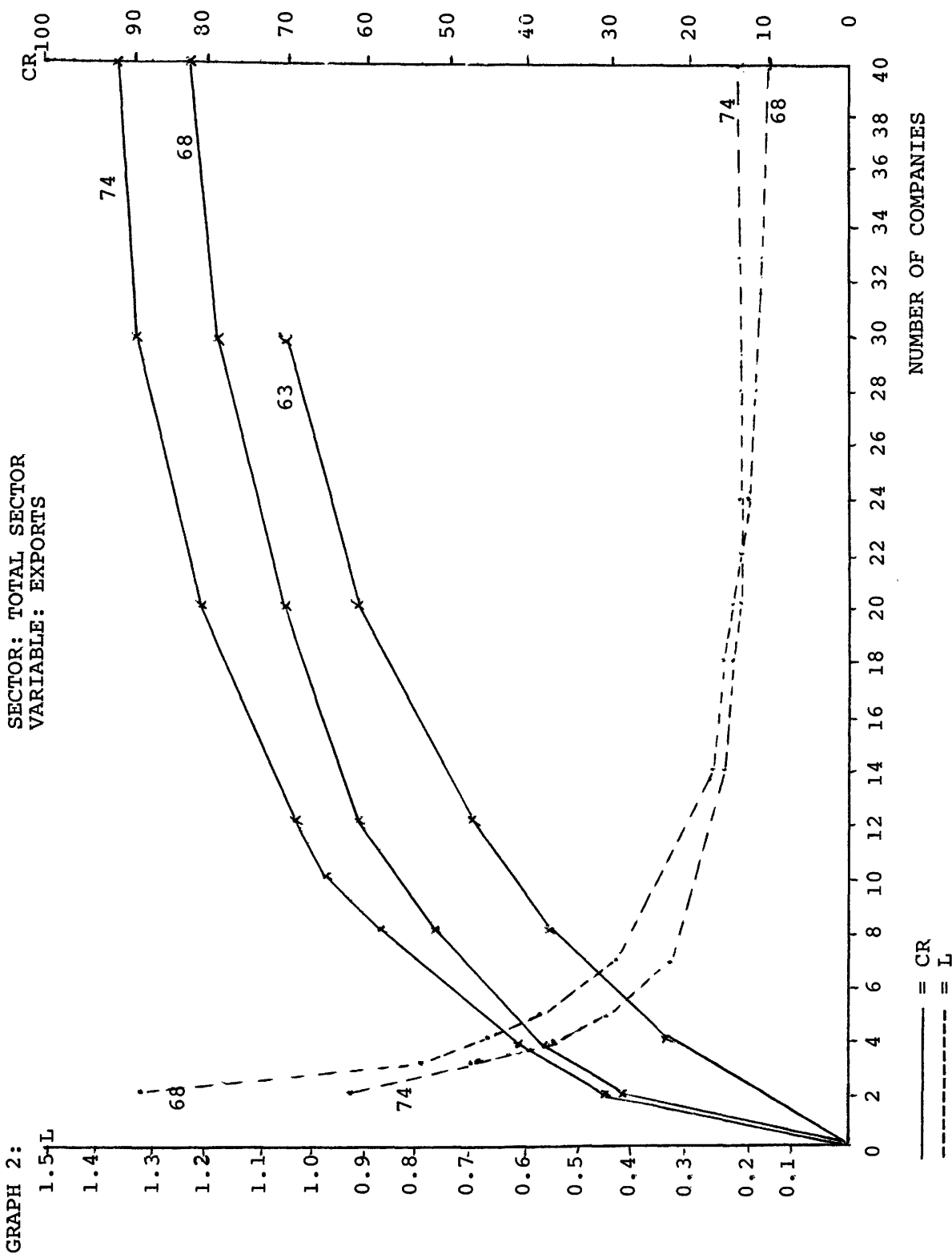
Table 8: Linda indices. Total industry.

Variable index year	domestic sales		employees		wage bill		investments		exports	
	$\frac{\$}{m}$	$\frac{Ln}{m}$ $\frac{\$}{L_s}$	$\frac{\$}{m}$	$\frac{Ln}{m}$ $\frac{\$}{L_s}$	$\frac{\$}{m}$	$\frac{Ln}{m}$ $\frac{\$}{L_s}$	$\frac{\$}{m}$	$\frac{Ln}{m}$ $\frac{\$}{L_s}$	$\frac{\$}{m}$	$\frac{Ln}{m}$ $\frac{\$}{L_s}$
68	40	.113 .189	40	.091 .194	40	.106 .211	-	-	40	.153 .291
69	40	.116 .206	40	.095 .188	40	.109 .198	-	-	40	.206 .333
70	40	.114 .204	40	.097 .186	40	.110 .191	40	.097 .194	39	.175 .318
71	40	.114 .205	40	.097 .187	40	.109 .192	40	.118 .179	34	.201 .320
72	40	.115 .202	40	.093 .182	40	.107 .186	35	.157 .238	35	.187 .284
73	40	.130 .235	40	.107 .199	40	.116 .195	36	.127 .216	22	.177 .352
74	40	.177 .322	40	.131 .254	40	.146 .250	30	.184 .365	21	.192 .333

SECTOR: TOTAL SECTOR  
 VARIABLE: DOMESTIC SALES



SECTOR: TOTAL SECTOR  
VARIABLE: EXPORTS



## Conclusions =====

V and G show an increase, which means a higher dispersion, especially compared with 1963, when V was 1.13 and G .505 (see earlier report of the University of Amsterdam).

The increase of the inequality and thus of relative concentration is most obvious over the last three years. This holds good for all variables but exports. The exports present a decrease in relative concentration over the last few years.

H and E confirm the above mentioned conclusions. The increase of H and the decrease of  $\frac{H}{E}$  indicate an increase in the relative importance of the biggest companies (this is also indicated by  $CR_4$ ). Here also the exports are divergent.

CR shows a rather strong increase especially as far as the top four firms are concerned.

In 1974  $CR_4$  rises about 10% compared with 1968 and 20% with respect to 1963. For the variable investments  $CR_4$  even rises 15% over the last four years.

Absolute concentration in exports also increases, not only for the top four but also for the medium-sized firms.

The increase of absolute concentration can also be illustrated by the evolution of the number of firms:

1963: 225

1968: 194

1974: 151

The number of activity units develops as follows:

1963: 229

1968: 206

1974: 178

The number of plants diminishes to a smaller extent than the number of companies or enterprises. This means that the increase of concentration is caused by mergers or take-overs, at which the plants have remained separate units.

The increase of concentration should be seen in true perspective by analysing CR for the variable market share. In that case

the degree of concentration is much lower. Imports become more important and exports grow faster than domestic sales. In 1974 the index figure for domestic sales is 189 and for exports 289 (1968 = 100).

These factors and the increase of firms from abroad producing in the Netherlands indicate the difficulties in defining the relevant market for one country.

$L$  shows an increase of dispersion among the top four firms. The  $L$ -curves are continuously decreasing for most variables except for exports and investments.

The oligopolistic arena as indicated by  $n^*_m$  diminishes to 30 firms for investments and 21 for exports.

The  $L_s$ -figures for exports show that relative concentration in the oligopolistic field remains rather constant on a moderate to low level. In general the  $L$ -indices are low but rising.

The relatively strong increase of concentration in investments may indicate a proceeding concentration in the years after 1974.

The absolute concentration in exports increases, whereas the relative concentration decreases or remains constant.

Medium-sized firms such as Fasson (sector adhesive materials) and Elopak (sector folding carton) are doing very well with regard to exports. The same holds good for other medium-sized companies, whereas the bigger companies have difficulties with exports or are buying firms abroad, which is true for Bührmann-Tetterode, the top firm in the total industry and in some sub-sectors. (Establishments of dutch firms, producing in other countries do not belong to the mass of the firms under study).

Can the increase of concentration and the mergers and take-overs be explained by means of economies of scale with regard to the production factor labour?

In itself the volume of production has increased by 50% from 1968 till 1974, using the same number of employees at doubled wages.



Economies of scale as a result of concentration should lead toward a lower increase in concentration for the variables employees and wage bill. However this is not the case.

That economies of scale are not very important is also shown by the relatively small decrease in the number of activity units.

### III. 2. Sector corrugated board and cases

Table 9: Overall figures. Sector: corrugated board and cases.

year variable	68	69	70	71	72	73	74
Number of activity units	19	17	17	17	17	17	17
Number of firms	18	16	16	16	16	13	11
Domestic sales	244	255	293	313	326	366	516
Employees	3.8	4.0	4.3	4.3	4.3	4.3	4.3
Wage bill	48.5	59.0	72.5	80.5	90.6	105	120
Investments	-	-	32.9	19.6	28.6	19.3	19.3
Exports	16.6	20.3	25.9	23.8	22.3	44.5	57.0
Imports	14.1	22.1	21.6	15.0	18.4	21.9	42.1

Table 10a: Investigated total per variable.  
Sector: corrugated board and cases

year variable	68	69	70	71	72	73	74
Domestic sales	220	226	268	287	300	360	513
Employees	3.3	3.6	3.9	3.9	3.9	4.2	4.3
Wage bill	44.1	53.2	66.0	74.2	83.6	104	120
Investments	-	-	31.5	18.8	26.7	18.9	19.3
Exports	15.8	19.4	25.4	23.0	21.7	44.4	56.9
Market share	85.1	81.9	85.4	87.5	87.2	92.8	91.8

Table 10b: Percentage covered by the investigation.  $n^* = 10$ .

year variable	68	69	70	71	72	73	74
Domestic sales	90.2	88.8	91.7	91.7	92.1	98.3	99.3
Employees	88.6	88.3	91.5	91.8	91.6	98.8	99.5
Wage bill	90.9	90.2	91.0	92.2	92.3	98.8	99.6
Investments	-	-	95.6	95.8	93.4	98.3	100
Exports	95.0	95.5	97.9	96.7	97.4	99.8	99.8
Market share	85.1	81.9	85.4	87.5	87.2	92.8	91.8

CONCENTRATION COEFFICIENTS. SECTOR: CORRUGATED BOARD AND CASES

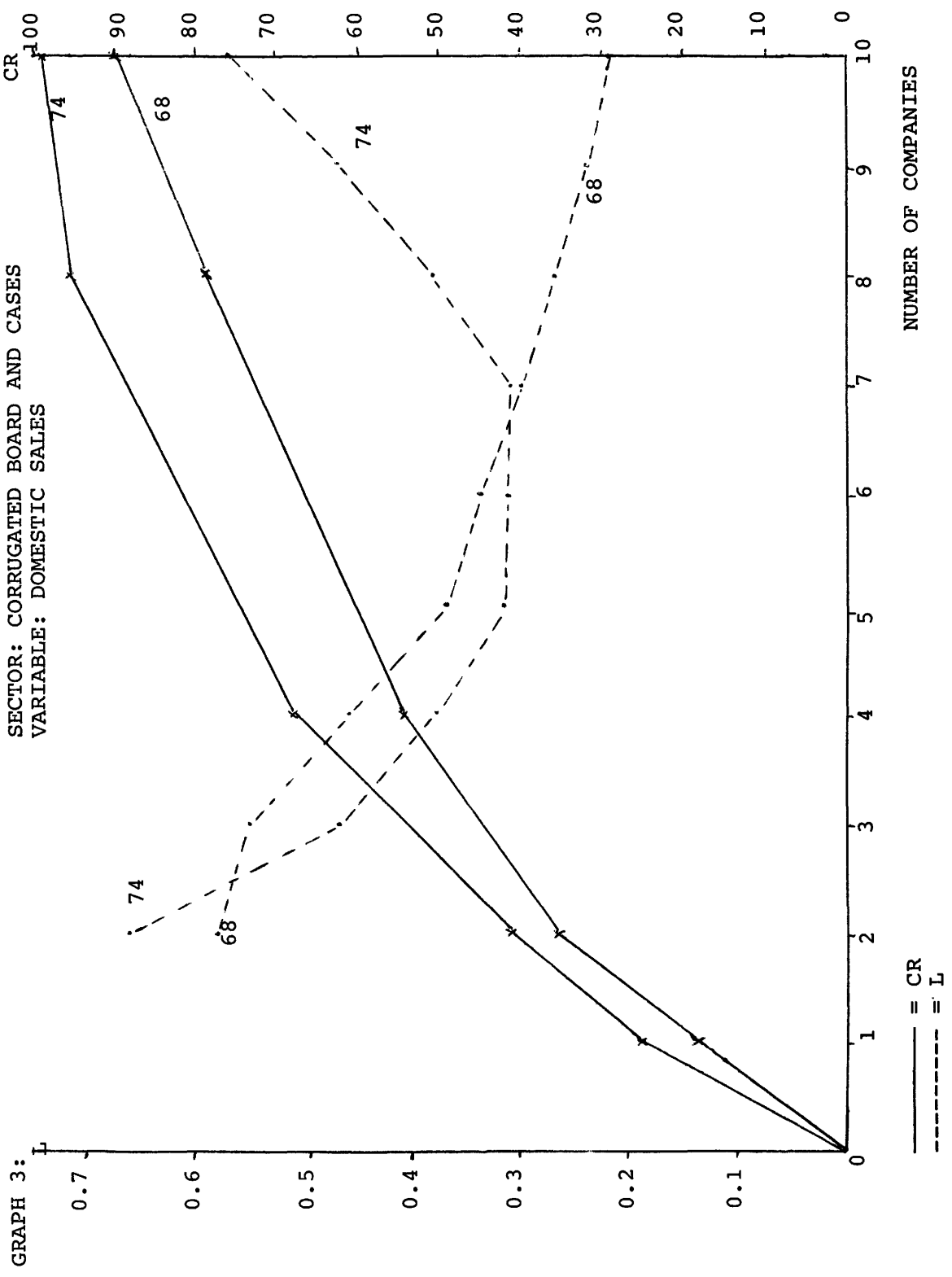
VARIABLE	YEAR	V	G	CR		CR		CR	L	L		H	% E
				4	8	8	10			L	10		
Domestic sales	68	.943	.478	54.1	79.7	90.2	.456	.268	.219	105.01	108.3		
	69	.782	.405	53.2	78.4	88.8	.430	.262	.215	100.73	108.5		
	70	.834	.440	54.7	82.3	91.7	.406	.244	.226	106.02	106.1		
	71	.836	.441	54.6	82.7	91.7	.413	.240	.229	106.19	106.0		
	72	.853	.452	56.4	83.2	92.1	.390	.250	.236	107.96	105.4		
	73	.742	.417	56.4	93.1	98.3	.336	.214	.276	119.25	97.2		
	74	.813	.455	69.7	96.9	99.3	.376	.384	.572	150.95	88.6		
Employees	68	.911	.464	52.9	79.9	88.6	.430	.256	.231	101.69	109.5		
	69	.786	.407	52.9	79.5	88.3	.424	.259	.232	101.11	108.4		
	70	.878	.458	55.7	83.6	91.5	.437	.273	.255	110.71	105.1		
	71	.885	.463	56.9	84.0	91.8	.413	.272	.258	111.53	104.8		
	72	.855	.457	56.6	84.1	91.6	.368	.256	.255	108.15	105.4		
	73	.800	.452	60.8	93.1	98.8	.347	.264	.300	126.16	95.4		
	74	.796	.447	70.8	96.2	99.5	.315	.389	.520	148.44	88.9		
Wage-bill	68	1.024	.509	57.2	82.6	90.9	.465	.289	.257	113.79	106.1		
	69	.887	.449	56.6	81.8	90.2	.469	.289	.257	111.62	105.6		
	70	.883	.457	57.1	83.3	91.0	.419	.278	.261	111.22	105.2		
	71	.937	.478	58.5	84.3	92.2	.474	.288	.270	117.35	103.5		
	72	.892	.470	58.3	84.6	92.3	.388	.269	.266	112.21	104.3		
	73	.798	.449	60.2	93.6	98.8	.354	.247	.298	123.91	95.5		
	74	.794	.449	70.4	96.6	99.6	.325	.388	.569	148.24	88.7		
Investments	70	1.424	.639	75.2	92.7	95.6	.630	.553	.646	189.28	88.1		
	71	1.250	.590	70.3	90.1	95.8	.566	.422	.395	160.19	93.6		
	72	1.384	.577	68.6	88.1	93.4	.716	.461	.465	182.18	93.2		
	73	1.157	.500	63.5	92.0	98.3	.767	.338	.374	179.89	89.7		
	74	1.079	.583	81.8	99.7	100.0	.448	1.414	26.330	196.78	76.7		
	68	1.255	.603	66.6	89.7	95.0	.463	.363	.368	143.04	97.6		
	69	1.306	.584	67.5	89.7	95.5	.709	.405	.389	169.13	93.4		
70	1.367	.647	77.3	94.9	97.9	.460	.463	.581	179.35	87.3			
71	1.272	.612	71.8	91.9	96.7	.545	.448	.447	163.64	91.8			
72	1.265	.617	71.0	92.8	97.4	.539	.431	.448	162.50	91.2			
73	1.557	.671	83.7	97.9	99.8	.679	.719	1.104	263.45	74.0			
74	1.283	.593	82.0	95.7	99.8	.900	.736	.646	240.63	76.5			

Table 11b: Concentration ratio. Sector: corrugated board and cases.  
Variable: market share

index year	CR <sub>4</sub>	CR <sub>8</sub>	CR <sub>10</sub>
68	51.1	75.3	85.1
69	49.1	72.4	81.9
70	50.9	76.7	85.4
71	51.2	78.9	87.5
72	53.4	78.8	87.2
73	53.3	87.8	92.8
74	64.4	89.5	91.8

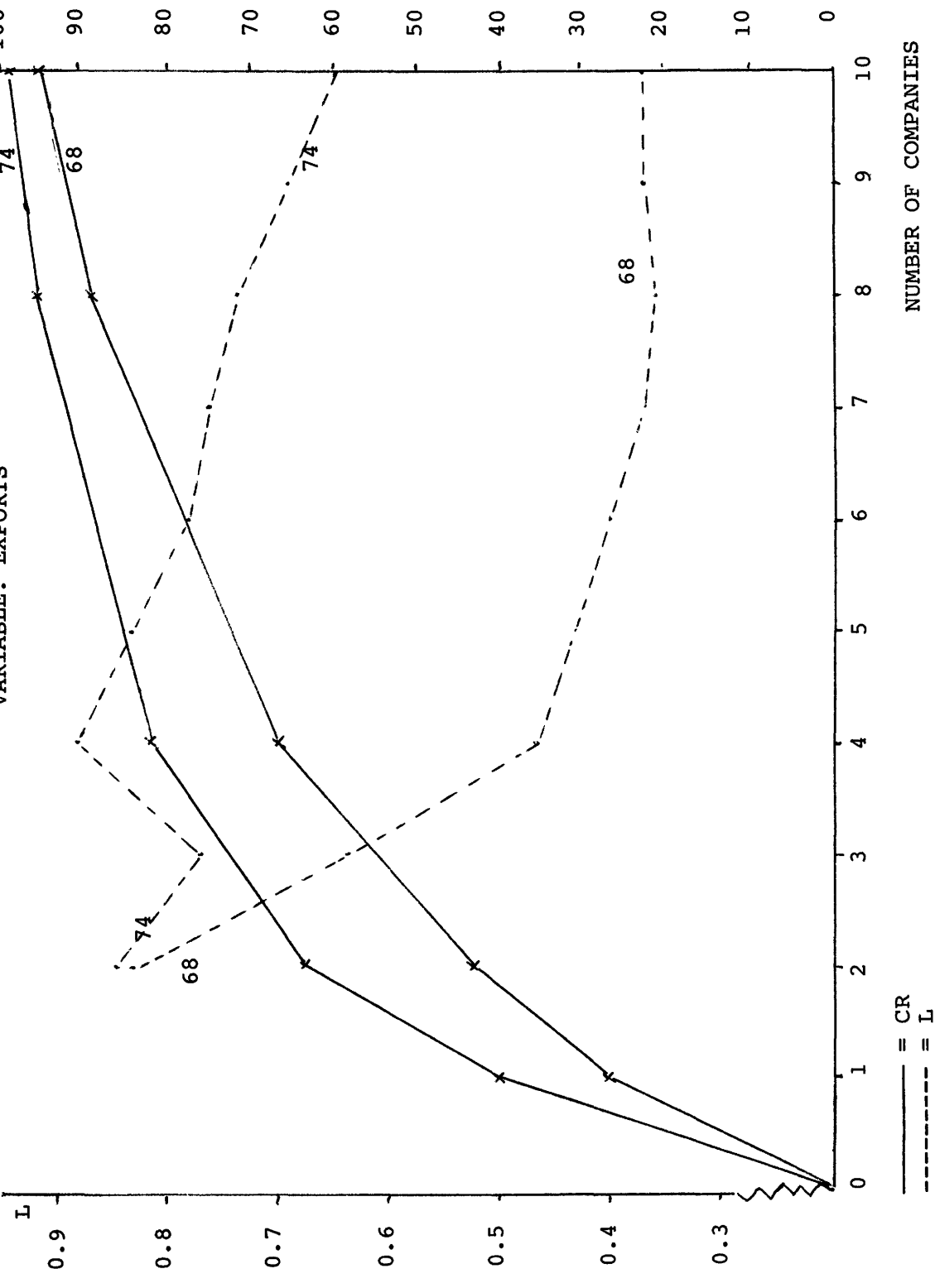
Table 12: Linda indices. Sector: corrugated board and cases.

Variable	domestic sales		employees		wage bill		investments		exports	
index year	n <sup>m</sup>	Ln <sup>m</sup> L <sub>s</sub>	n <sup>m</sup>	Ln <sup>m</sup> L <sub>s</sub>	n <sup>m</sup>	Ln <sup>m</sup> L <sub>s</sub>	n <sup>m</sup>	Ln <sup>m</sup> L <sub>s</sub>	n <sup>m</sup>	Ln <sup>m</sup> L <sub>s</sub>
68	10	.219 .370	10	.231 .349	10	.258 .405	-	-	8	.363 .498
69	10	.215 .357	10	.232 .347	10	.256 .384	-	-	10	.389 .582
70	9	.223 .357	10	.255 .364	10	.261 .363	5	.532 .679	4	.459 .652
71	9	.224 .358	10	.258 .352	9	.266 .394	10	.395 .514	10	.447 .512
72	9	.229 .352	9	.251 .345	9	.253 .366	9	.414 .699	6	.427 .551
73	8	.214 .323	7	.239 .340	7	.232 .347	9	.314 .694	5	.677 .993
74	7	.307 .409	5	.288 .387	6	.288 .371	5	.402 .496	10	.646 .774



SECTOR: CORRUGATED BOARD AND CASES  
 VARIABLE: EXPORTS

GRAPH 4:



## Conclusions =====

V and G show a small increase in the equality of the firms.

H and E point to increasing concentration especially over the last few years. The bigger companies become more important but are rather equal to each other.

This is also indicated by CR.

CR: in the first six years  $CR_8$  rises and in the last year  $CR_4$ . The number of firms drops from 18 to 11. This fall mainly takes place over the last two years.

L first diminishes and rises again in the last year. The oligopolistic field consists of five to seven firms in 1974 (1968 = 10).

The variable exports shows a different pattern with many more changes. This is due to the fact that exports are very small in this sector, since transportation of these voluminous goods is expensive compared to their value.

The same holds good for imports.

L<sub>s</sub> shows that relative concentration declines somewhat except for the last year.

In general this sector is developing into a sector with only four to seven equally big companies with 90% of the total market. All smaller companies have disappeared. At first eight to ten equally big firms developed, in the last few years the oligopolistic field has consisted of five (for investments) to seven (for domestic sales) firms.

Relative concentration is rather low, except for investments in 1974. However, the variable investments is a poor indicator of concentration, since the investments are high, differ from year to year and are irregular.

### III. 3. Sector sanitary and household

Table 13: Overall figures. Sector: sanitary and household

year variable	68	69	70	71	72	73	74
Number of activity units	10	10	10	9	9	9	9
Number of firms	10	9	9	8	8	8	8
Domestic sales	58.6	61.7	72.3	84.1	103	108	136
Employees	1.1	1.3	1.4	1.5	1.6	1.7	1.8
Wage bill	13.5	17.0	21.0	27.5	31.7	38.1	45.1
Investments	-	-	6.1	6.2	4.8	7.1	10.7
Exports	27.0	29.5	38.6	41.3	45.0	60.3	84.0
Imports	10.2	14.5	20.5	22.4	24.9	36.4	48.0

Table 14a: Investigated total per variable.  
Sector: sanitary and household

year variable	68	69	70	71	72	73	74
Domestic sales	56.0	61.6	72.2	84.0	98.9	104	129
Employees	1.1	1.3	1.4	1.5	1.5	1.6	1.7
Wage bill	13.1	17.0	21.0	27.5	30.3	36.4	43.0
Investments	-	-	6.0	6.2	4.7	7.0	10.2
Exports	26.7	29.5	38.6	41.3	44.5	57.3	80.5
Market share	84.2	81.1	77.6	78.5	77.9	71.7	70.3

Table 14b: Percentage covered by the investigation. n\* = 6.

year variable	68	69	70	71	72	73	74
Domestic sales	95.6	99.9	99.9	99.9	96.1	95.9	95.2
Employees	95.3	99.8	99.8	99.7	95.4	95.4	95.5
Wage bill	97.1	99.9	99.9	99.9	95.5	95.5	95.5
Investments	-	-	99.1	99.2	98.5	99.5	95.9
Exports	99.0	100	100	100	99.0	95.0	95.9
Market share	84.2	81.1	77.6	78.5	77.9	71.7	70.3



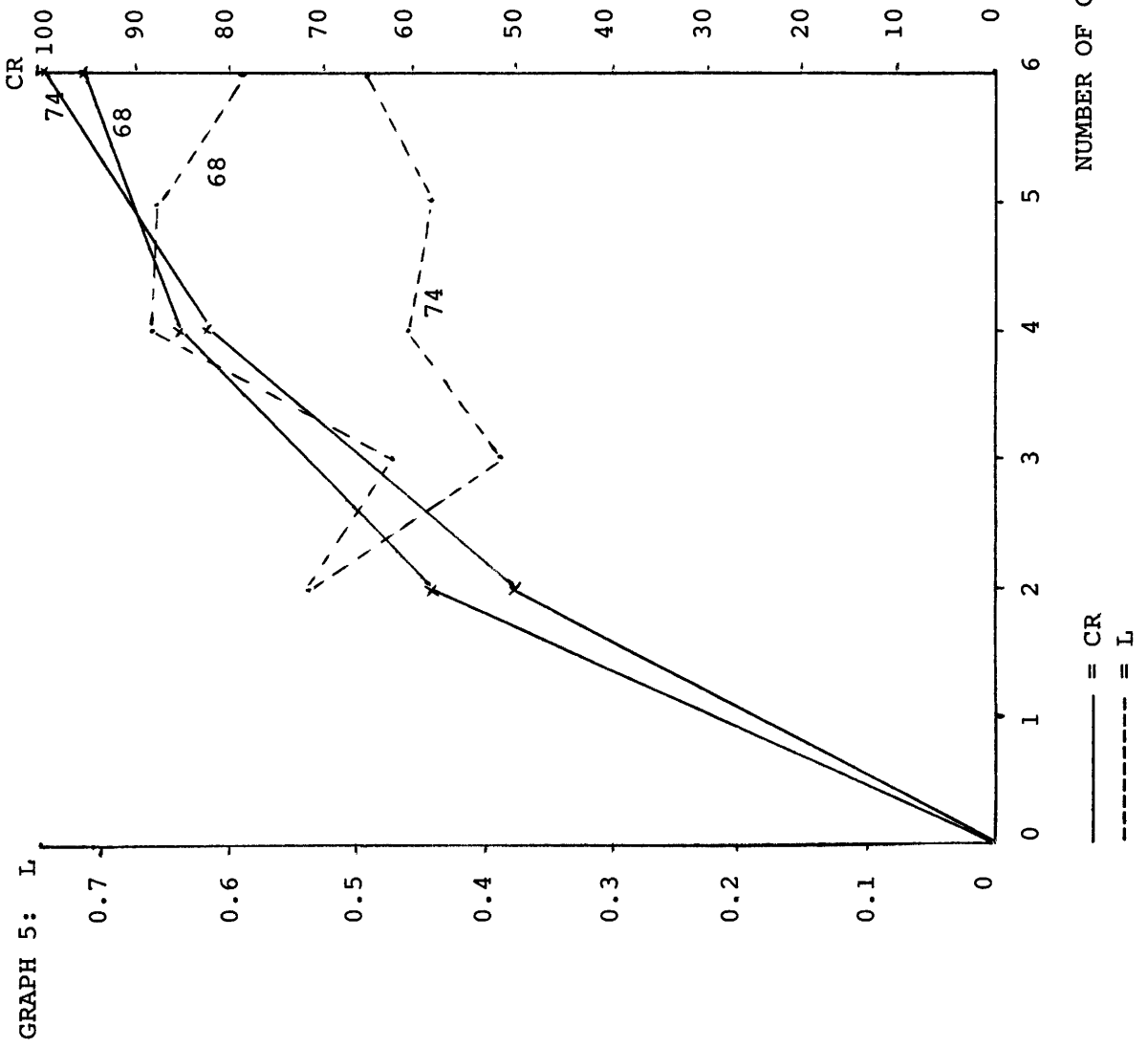
CONCENTRATION COEFFICIENTS. SECTOR: SANITARY AND HOUSEHOLD

VARIABLE	YEAR	V	G	CR 2	CR 4	L 2	L 4	H	%. E
Domestic sales	68	1.112	.566	59.3	85.15	.536	.667	223.58	74.9
	69	1.111	.589	63.2	89.55	.605	.662	248.20	67.2
	70	1.119	.593	62.4	90.03	.647	.670	250.20	66.7
	71	.973	.530	60.2	90.63	.584	.586	243.26	67.3
	72	.802	.437	52.4	83.95	.566	.493	205.34	75.7
	73	.765	.423	52.3	82.19	.552	.474	198.10	76.9
	74	.753	.411	50.6	82.08	.524	.462	195.91	77.4
Employees	68	1.224	.586	61.0	84.4	1.075	.796	249.83	73.3
	69	1.163	.606	65.5	92.2	.511	.691	261.52	65.1
	70	1.063	.575	60.5	90.7	.530	.498	236.76	68.3
	71	1.000	.536	63.9	89.7	.534	.690	249.90	67.1
	72	.887	.471	58.5	85.4	.607	.645	223.26	73.7
	73	.886	.469	56.9	85.5	.621	.656	223.22	73.5
	74	.875	.461	55.0	86.3	.558	.581	220.70	73.5
Wage-bill	68	1.282	.606	61.5	85.0	1.278	.775	264.35	70.9
	69	1.171	.609	66.3	91.5	.525	.745	263.53	64.7
	70	1.140	.601	64.8	91.2	.564	.652	255.38	66.0
	71	1.035	.546	66.2	90.1	.512	.746	258.85	65.9
	72	.907	.473	61.2	84.9	.524	.698	227.93	73.3
	73	.912	.478	59.9	84.9	.640	.738	228.92	73.1
	74	.897	.474	58.5	85.4	.618	.680	225.53	73.3
Investments	70	1.359	.657	65.3	97.1	1.214	.647	316.22	59.4
	71	1.500	.701	80.8	97.3	.989	2.043	406.36	49.3
	72	1.512	.660	73.1	93.9	1.987	1.263	410.61	54.1
	73	1.501	.706	79.3	98.8	1.064	1.651	406.54	48.3
	74	1.369	.595	73.4	89.0	1.521	1.181	359.11	61.4
	68	1.372	.641	63.0	91.1	1.453	.603	288.09	65.9
	69	1.227	.605	61.8	92.0	1.322	.560	278.30	54.7
Exports	70	1.333	.614	63.8	89.5	1.825	.703	308.59	63.1
	71	1.127	.550	62.0	89.6	1.495	.614	283.72	65.1
	72	1.114	.550	61.1	89.7	1.269	.641	280.05	66.6
	73	1.098	.521	64.8	86.8	1.211	.753	275.64	69.6
	74	1.002	.509	63.6	86.3	.889	.674	250.37	71.3
	68	50.4	75.1	50.4	75.1	50.4	75.1	50.4	75.1
	69	51.3	72.7	51.3	72.7	51.3	72.7	51.3	72.7
70	48.5	70.0	48.5	70.0	48.5	70.0	48.5	70.0	
71	47.3	71.3	47.3	71.3	47.3	71.3	47.3	71.3	
72	42.5	68.1	42.5	68.1	42.5	68.1	42.5	68.1	
73	39.1	61.5	39.1	61.5	39.1	61.5	39.1	61.5	
74	37.3	60.6	37.3	60.6	37.3	60.6	37.3	60.6	

Table 16: Linda indices. Sector: sanitary and household

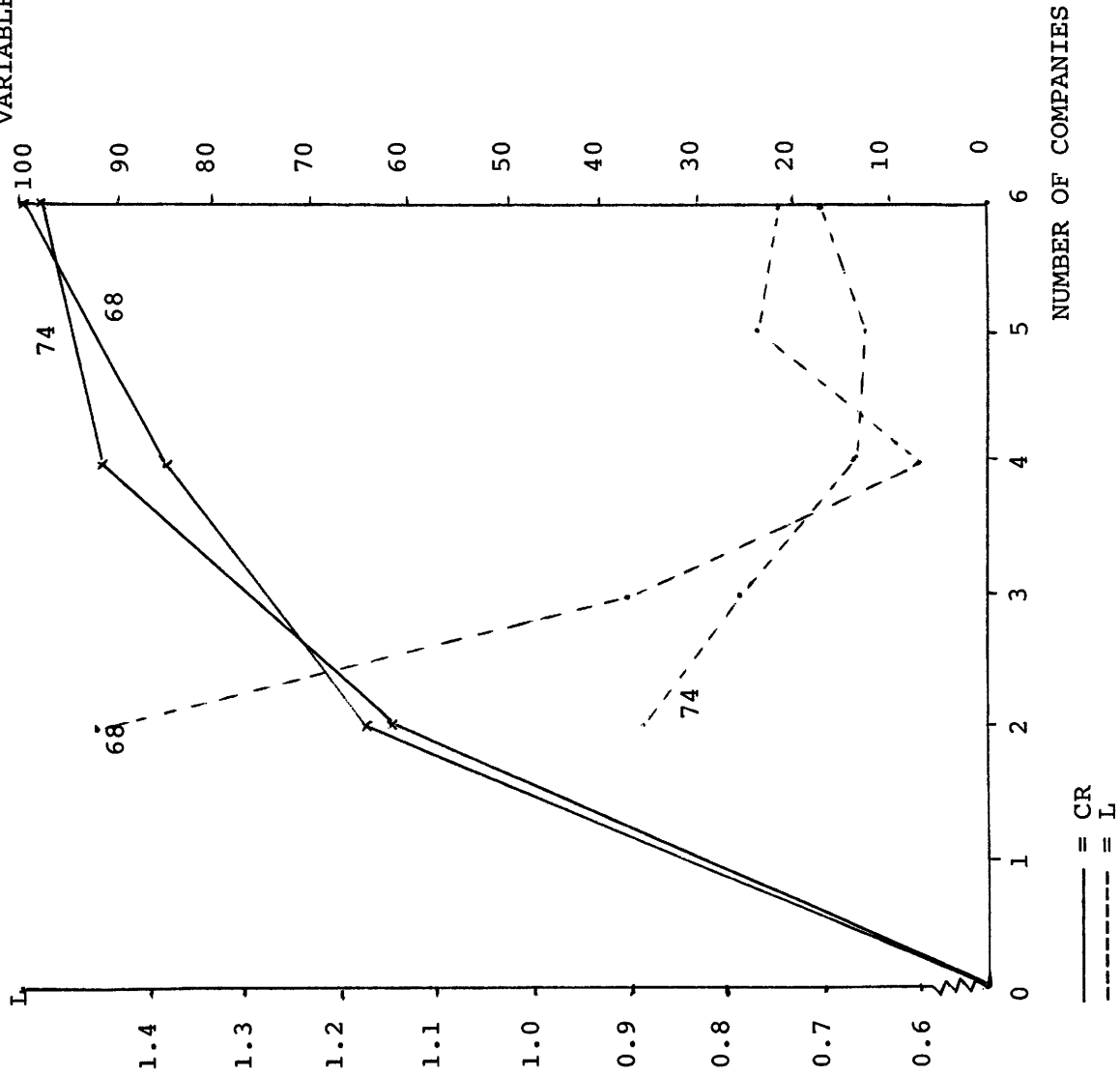
Variable year	domestic sales		employees		wage bill		investments		exports				
	$\frac{m}{n}$	$\frac{m}{L_s}$	$\frac{m}{n}$	$\frac{m}{L_s}$	$\frac{m}{n}$	$\frac{m}{L_s}$	$\frac{m}{n}$	$\frac{m}{L_s}$	$\frac{m}{n}$	$\frac{m}{L_s}$			
68	3	.470	6	.636	.785	6	.629	.822	-	-	4	.603	.981
69	3	.523	3	.485	.498	3	.512	.519	-	-	4	.560	.884
70	3	.499	3	.476	.504	3	.523	.543	4	.647	6	.687	.982
71	3	.441	3	.499	.517	2	.512	.512	2	.989	4	.614	.998
72	3	.391	3	.473	.540	3	.519	.521	3	1.21	4	.641	.929
73	3	.421	3	.435	.528	3	.509	.575	3	1.02	4	.753	.961
74	3	.375	3	.380	.469	3	.466	.542	6	1.09	5	.662	.754

SECTOR: SANITARY AND HOUSEHOLD  
 VARIABLE: DOMESTIC SALES



SECTOR: SANITARY AND HOUSEHOLD  
 VARIABLE: EXPORTS

GRAPH 6:



## Conclusions

=====

V and G point to a decrease of relative concentration since 1970. This holds good for all variables.

H and E also show a decrease of concentration since 1970.

CR is relatively high, especially for the top two firms. However, the absolute concentration decreases since 1970.

L is moderate and remains equal or shows a small decline since 1970. The oligopolistic arena diminishes to three firms but for the variables investments and exports.

For exports  $n^x_m$  is 4 to 5.

The level of investments rises strongly compared with the total industry. The investments are concentrated at the top four firms up to 1973. In 1974 they are concentrated at the top five firms. The oligopolistic arena also increases to five firms in this year.

L<sub>S</sub> shows a general decrease of concentration within the oligopolistic field.

The variable market share presents a relatively strong decline. This is caused by a big rise in imports and the fact that the export market becomes more important for the domestic producers. The rise of exports is enormous. The index figure for 1974 is 311 (1968 = 100).

The above mentioned developments in concentration can be explained by the two "newcomers" from abroad in this expanding sector. These two firms, Mölnlycke from Sweden and Kimberley Clark from the United States, increased their production in the Netherlands at about 1970 and especially Mölnlycke has been investing large amounts of money since then.

This, together with the rising exports, explains the strong decrease of concentration in the oligopolistic field and the fall of the market shares of the domestic producing countries, whereas the volume of domestic sales doubled over the years investigated.

III. 4. Sector adhesive materials

Table 17: Overall figures. Sector: adhesive materials

variable \ year	68	69	70	71	72	73	74
Number of activity units	15	15	12	11	12	12	12
Number of firms	14	14	11	10	10	10	10
Domestic sales	20.6	24.6	23.0	23.4	28.5	34.2	39.5
Employees	.66	.74	.78	.76	.78	.85	.87
Wage bill	9.5	11.8	13.8	15.2	18.4	22.4	24.3
Investments	-	-	5.5	6.9	11.1	5.3	8.5
Exports	42.0	58.7	65.4	67.0	66.7	91.2	110
Imports	15.8	22.6	26.3	36.2	38.9	46.8	52.5

Table 18a: Investigated total per variable. Sector: adhesive materials

variable \ year	68	69	70	71	72	73	74
Domestic sales	16.9	19.8	20.9	21.3	26.6	31.9	36.5
Employees	.62	.68	.74	.74	.76	.83	.85
Wage bill	9.0	10.9	13.2	14.8	18.0	22.0	23.8
Investments	-	-	5.2	6.5	10.9	5.1	8.5
Exports	42.0	58.7	65.4	67.0	66.7	91.2	110
Market share	46.2	45.4	43.2	36.8	40.4	40.4	40.9

Table 18b: Percentage covered by the investigation. n\* = 6.

variable \ year	68	69	70	71	72	73	74
Domestic sales	81.9	80.7	90.5	91.1	93.1	93.1	92.3
Employees	94.0	92.4	94.8	96.9	97.4	97.7	97.7
Wage bill	94.0	92.9	95.7	97.5	97.9	98.0	97.9
Investments	-	-	95.3	94.9	98.4	95.9	99.3
Exports	99.9	100	100	100	100	100	100
Market share	46.2	45.4	43.2	36.8	40.4	40.4	40.9

CONCENTRATION COEFFICIENTS. SECTOR: ADHESIVE MATERIALS

VARIABLE	YEAR	V		G		CR		CR		L		L		H	* / . E
						2	4	2	4	2	4	2	4		
Domestic sales	68	.955	.472	40.6	66.5	.770	.419	136.39	97.47						
	69	1.136	.488	46.2	67.3	1.302	.579	163.68	94.89						
	70	1.101	.512	51.1	75.3	1.358	.569	201.07	83.37						
	71	1.171	.536	59.8	79.9	1.169	.748	237.07	77.63						
	72	1.308	.581	64.3	82.9	1.283	.849	271.17	73.15						
	73	1.421	.603	68.7	84.4	1.331	1.023	301.87	70.06						
	74	1.403	.594	68.2	83.7	1.314	1.034	296.87	70.90						
Employees	68	1.787	.693	63.6	82.7	1.953	.921	299.52	72.29						
	69	1.967	.695	66.9	82.4	2.568	1.194	347.91	69.37						
	70	1.657	.658	68.6	84.8	2.029	1.079	340.52	66.54						
	71	1.637	.666	70.7	88.7	2.190	1.051	367.94	62.06						
	72	1.698	.676	71.0	89.1	2.636	1.072	388.24	59.97						
	73	1.801	.695	73.2	90.3	3.051	1.205	424.48	56.72						
	74	1.960	.714	76.0	90.1	4.283	1.566	484.03	52.05						
Wage-bill	68	1.964	.716	67.1	85.7	2.497	1.044	347.04	67.76						
	69	2.111	.715	69.3	84.5	3.416	1.296	389.61	65.22						
	70	1.814	.689	71.1	87.5	2.699	1.198	390.14	61.54						
	71	1.803	.703	74.1	90.7	2.793	1.314	424.98	56.29						
	72	1.943	.726	77.0	91.9	3.515	1.528	477.39	51.72						
	73	1.988	.734	77.7	92.5	3.889	1.566	495.14	50.17						
	74	2.018	.733	78.8	91.4	3.930	1.758	507.07	49.59						
Investments	70	1.930	.728	80.2	91.0	1.764	1.798	429.48	56.10						
	71	1.369	.637	71.3	91.7	.504	1.373	287.33	64.90						
	72	2.783	.852	91.4	97.3	32.503	12.019	874.78	16.22						
	73	2.489	.784	87.1	93.0	11.549	5.399	719.29	32.47						
	74	2.829	.876	93.9	98.9	13.914	29.142	900.26	11.86						
Exports	68	3.289	.904	95.2	98.9	13.267	7.169	843.93	17.08						
	69	3.328	.905	95.9	98.5	15.127	9.605	862.31	15.91						
	70	2.938	.882	96.5	98.5	15.787	11.325	875.52	14.64						
	71	2.755	.869	95.8	98.8	14.561	8.620	859.03	15.82						
	72	2.726	.865	94.6	98.8	16.048	6.828	843.25	17.26						
	73	2.765	.869	95.4	99.2	18.913	7.276	864.70	15.25						
74	2.775	.873	96.2	99.3	15.683	8.350	870.30	14.57							



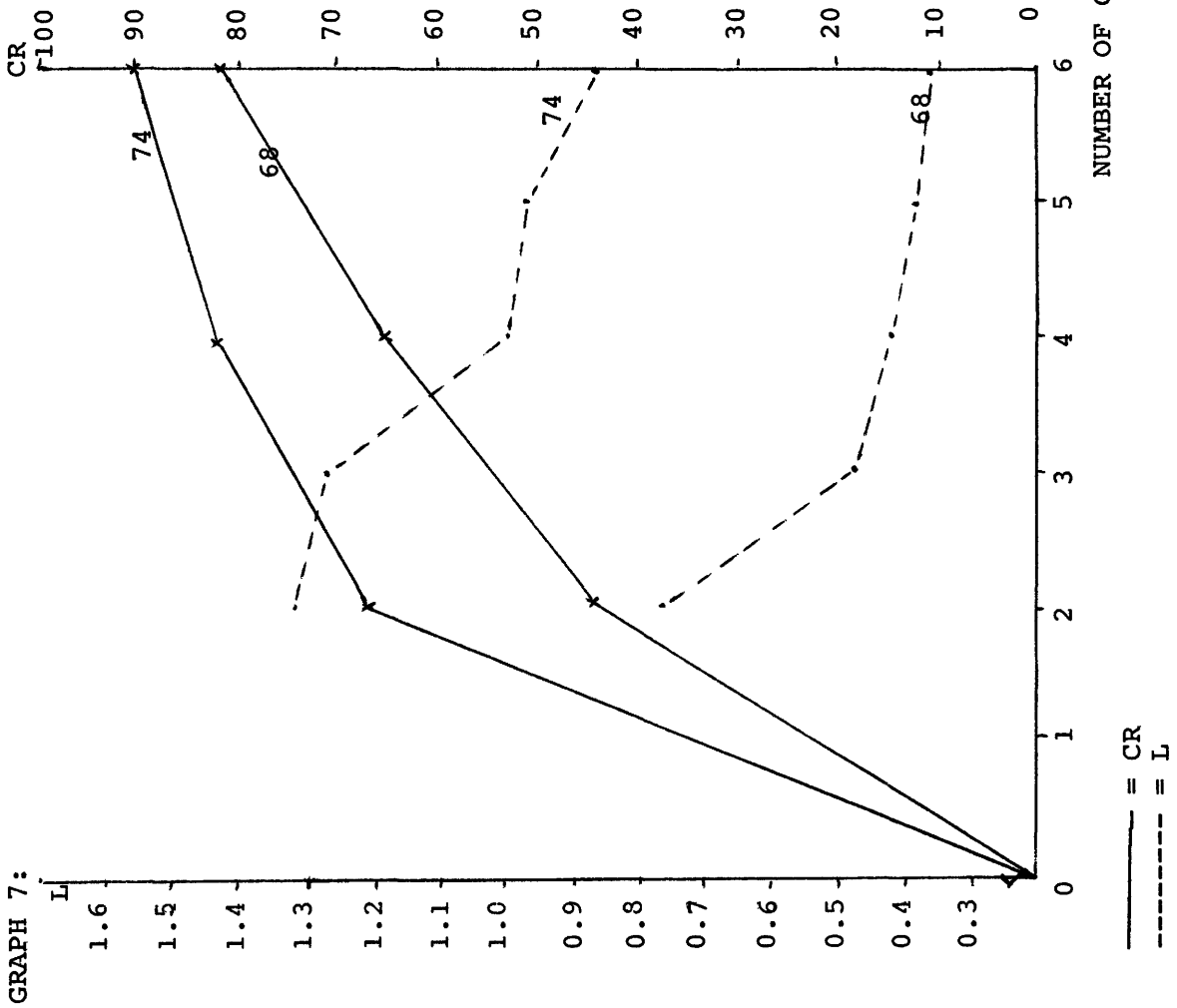
Table 19b: Concentration ratio. Sector: adhesive materials.  
Variable: market share

year	index	CR <sub>2</sub>	CR <sub>4</sub>
68		23.0	37.6
69		26.0	37.9
70		24.4	36.0
71		24.1	32.3
72		27.8	35.9
73		29.8	36.6
74		30.1	37.1

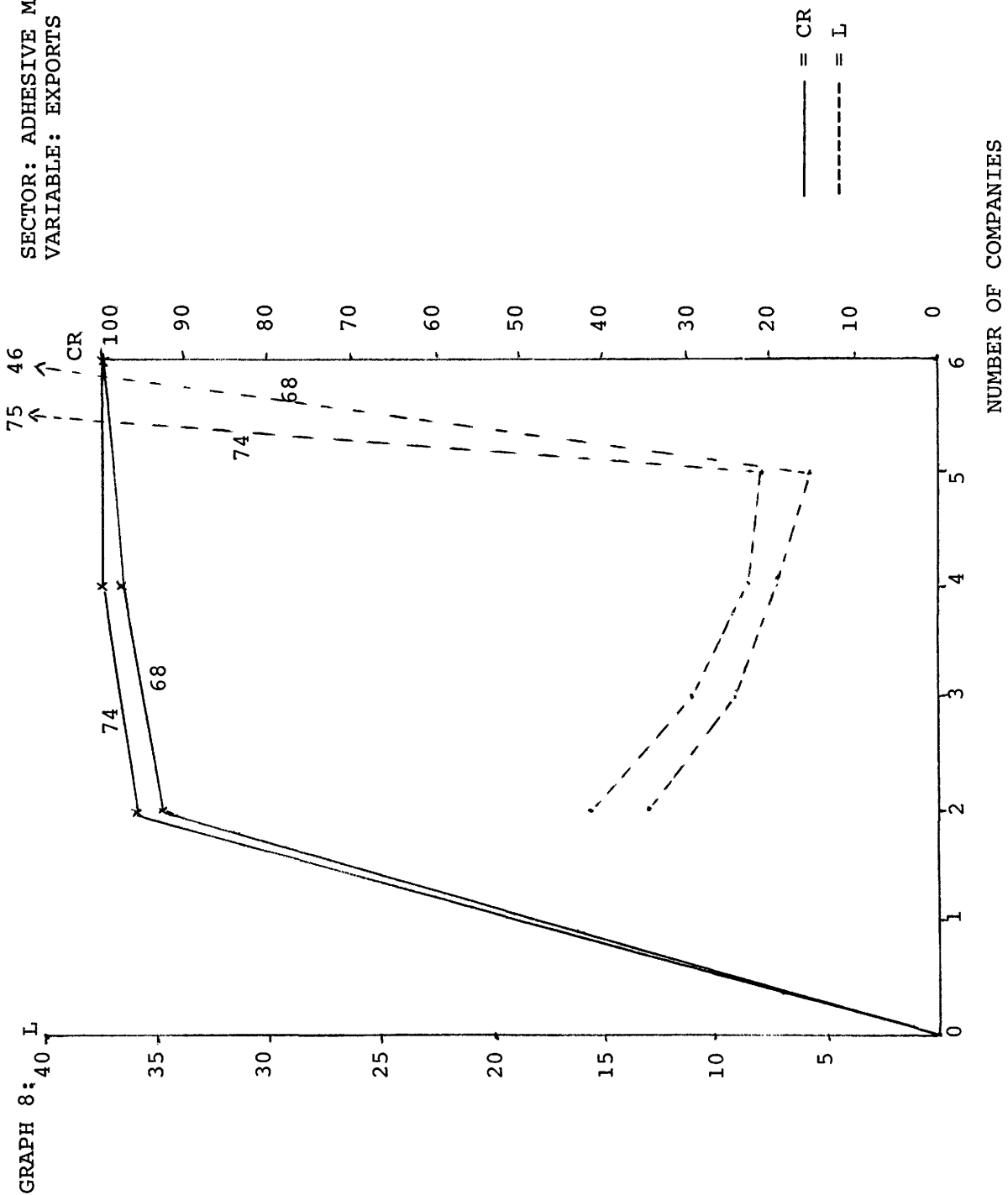
Table 20: Linda indices. Sector: Adhesive materials

Variable	domestic sales		employees		wage bill		investments		exports				
index	$\frac{L_n}{L_s}$	$\frac{L_m}{L_s}$	$\frac{L_n}{L_s}$	$\frac{L_m}{L_s}$	$\frac{L_n}{L_s}$	$\frac{L_m}{L_s}$	$\frac{L_n}{L_s}$	$\frac{L_m}{L_s}$	$\frac{L_n}{L_s}$	$\frac{L_m}{L_s}$			
year	$n^*$	$m^*$	$n^*$	$m^*$	$n^*$	$m^*$	$n^*$	$m^*$	$n^*$	$m^*$			
68	6	.349	5	.705	5	.888	1.45	-	5	6.11	8.91		
69	6	.445	5	.874	5	1.00	1.91	-	6	7.43	10.34		
70	6	.439	5	.818	5	.964	1.64	5	1.59	1.74	6	8.16	11.89
71	5	.625	5	.950	5	1.13	1.70	2	.504	.504	5	6.90	10.14
72	5	.720	5	.939	5	1.33	2.07	6	9.51	16.21	5	5.83	9.30
73	6	.845	5	1.10	5	1.41	2.23	6	3.80	6.34	5	6.89	11.08
74	6	.850	6	1.25	5	1.42	2.38	2	13.91	13.91	5	7.81	10.91

SECTOR: ADHESIVE MATERIALS  
VARIABLE: DOMESTIC SALES



SECTOR: ADHESIVE MATERIALS  
 VARIABLE: EXPORTS



GRAPH 8: L

## Conclusions

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V and G point to an increase of the inequality at a moderate level of relative concentration, except for the variables investments and exports, where the concentration is high.

H and E are also moderate for the variables domestic sales, employees and wage bill and high for investments and exports. The very high and rising value of H for the variable exports illustrates the position of the leading exporting firm Fasson.

CR shows the biggest increase at  $CR_2$ . The absolute concentration is rather high and rises, especially for exports and investments. The number of firms diminishes from 14 to 10. The absolute concentration is much lower when the imports are taken into account. In 1974  $CR_2$  for the variable domestic sales is 68.2, for the variable market share it is only 30.1.

L has relatively high values especially for exports. The oligopolistic arena consists of five to six firms. For the variable exports this is surprising, since there is in fact only one big exporting firm.

This is also illustrated by the high values of  $L_s$  for the variable exports. The relative concentration within the oligopolistic arena is high.

For the variable investments the oligopolistic arena differs from year to year. This is due to the fact that investments are high and irregular.

The position of the firm Fasson determines the image of this sector. It dominates the export market which is two to three times as big as the domestic market. The definition of the relevant market for only one country is difficult again.

The variables employees and wage bill are possibly the best indicators of concentration in this sector since the output on the domestic and on the export market are both reflected in these variables.

### III. 5. Sector folding carton

Table 21: Overall figures. Sector: folding carton

year variable	68	69	70	71	72	73	74
Number of activity units	47	51	50	51	48	47	47
Number of firms	46	50	49	50	47	46	45
Domestic sales	77.5	96.1	99.8	113	117	121	153
Employees	1.6	1.8	1.8	1.8	1.7	1.8	1.7
Wage bill	20.8	24.2	30.3	37.4	40.1	45.2	52.7

Table 22a: Investigated total per variable. Sector: folding carton

year variable	68	69	70	71	72	73	74
Domestic sales	74.1	82.5	83.1	98.2	99.4	111	140
Employees	1.5	1.7	1.6	1.6	1.6	1.6	1.5
Wage bill	19.7	22.8	27.9	34.9	37.1	42.1	49.7

Table 22b: Percentage covered by the investigation. n\* = 16.

year variable	68	69	70	71	72	73	74
Domestic sales	95.6	85.9	83.2	87.2	84.7	91.5	91.4
Employees	92.7	90.7	90.6	90.6	91.0	89.8	91.4
Wage bill	95.0	94.0	91.0	93.4	92.5	93.0	94.3

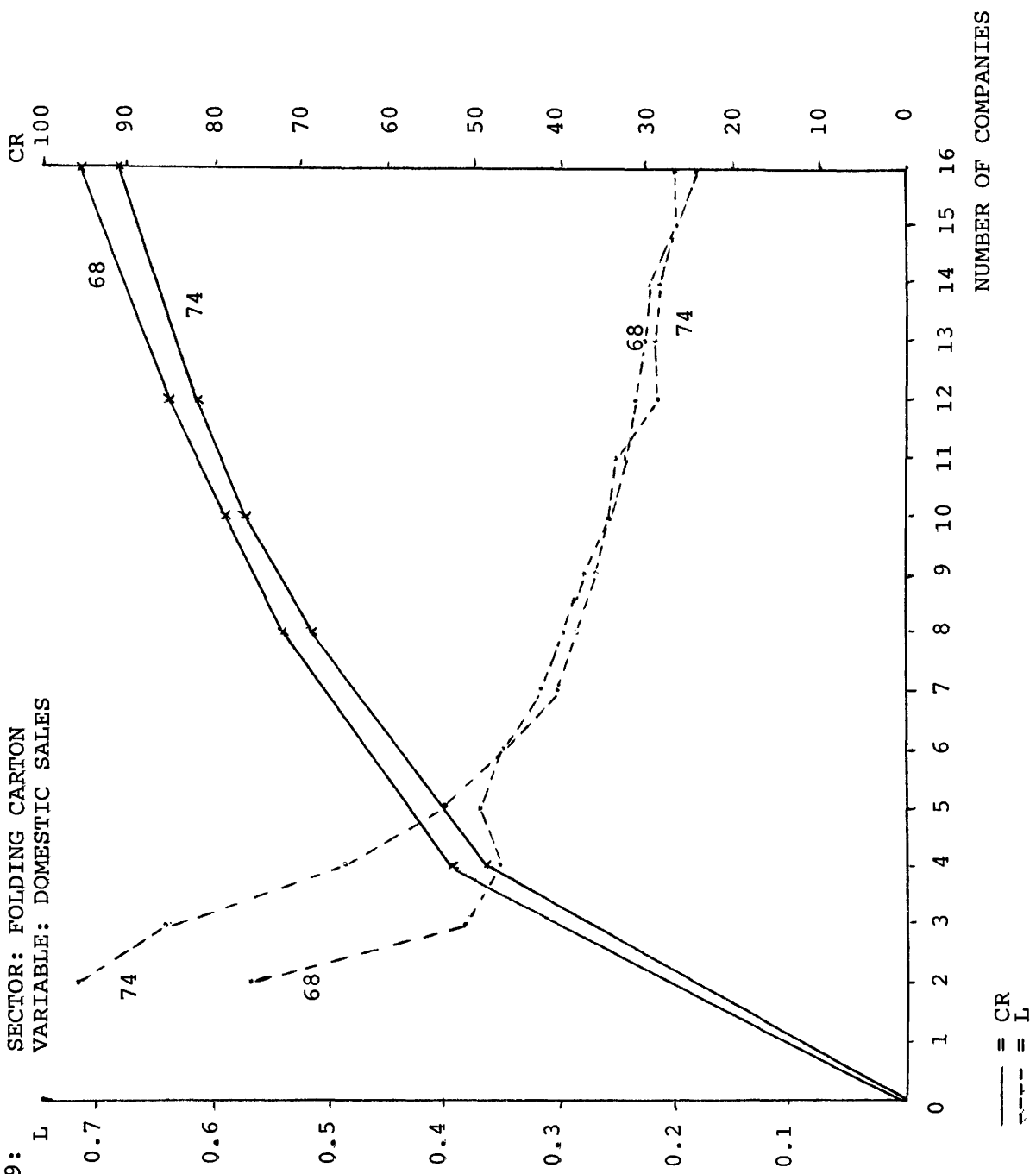
CONCENTRATION COEFFICIENTS SECTOR: FOLDING CARTON

VARIABLE	YEAR	V		G		L 4		L 8		L 10		L 12		H	/E
Domestic sales	68	1.754	.732	.357	52.5	.290	72.5	.260	79.7	.237	85.5	88.65	119.7		
	69	1.622	.639	.389	47.0	.301	64.6	.273	70.6	.238	76.1	72.61	134.0		
	70	1.497	.600	.343	45.0	.294	61.1	.248	67.8	.218	73.6	66.14	137.6		
	71	1.724	.659	.421	49.7	.335	65.9	.279	72.5	.248	78.1	79.47	131.1		
Employees	72	1.546	.611	.471	45.2	.318	62.4	.256	69.7	.227	75.5	72.11	134.8		
	73	1.712	.685	.455	49.4	.327	68.2	.279	75.1	.242	81.1	85.48	125.7		
	74	1.677	.681	.491	47.9	.297	69.3	.264	76.2	.235	82.1	84.72	125.7		
	68	1.537	.683	.346	43.9	.229	67.6	.201	76.3	.184	83.3	73.08	127.1		
Wage-bill	69	1.579	.676	.344	43.2	.247	65.2	.218	72.9	.194	79.4	69.89	130.7		
	70	1.529	.668	.302	42.6	.235	65.2	.208	72.8	.189	79.1	68.11	131.1		
	71	1.600	.677	.377	43.4	.255	65.3	.218	73.2	.194	79.8	71.20	130.5		
	72	1.564	.670	.378	44.5	.261	66.1	.223	74.1	.196	80.9	73.31	129.2		
Wage-bill	73	1.528	.651	.409	43.5	.263	65.3	.234	72.4	.200	79.2	72.50	130.5		
	74	1.504	.665	.342	43.9	.251	66.6	.217	74.5	.188	81.6	72.52	128.5		
	68	1.694	.725	.318	50.0	.262	72.5	.224	80.9	.220	86.6	84.14	121.2		
	69	1.843	.734	.316	53.5	.314	71.5	.271	78.4	.237	84.5	87.95	122.0		
Wage-bill	70	1.683	.698	.330	48.2	.301	68.2	.256	75.1	.222	81.4	78.23	126.8		
	71	1.812	.728	.372	50.4	.309	71.5	.274	78.0	.237	84.2	85.69	123.2		
	72	1.707	.701	.405	49.0	.297	69.7	.255	77.0	.231	83.0	83.28	124.9		
	73	1.700	.702	.419	48.3	.282	70.8	.252	77.9	.233	83.7	84.48	124.0		
74	1.629	.705	.396	47.1	.265	69.7	.223	78.2	.201	85.1	81.19	123.2			

Table 24: Linda indices. Sector: Folding carton

Variable		domestic sales			employees			wage bill		
year	index	n <sup>*</sup> m	Ln <sup>*</sup> m	L <sub>s</sub>	n <sup>*</sup> m	Ln <sup>*</sup> m	L <sub>s</sub>	n <sup>*</sup> m	Ln <sup>*</sup> m	L <sub>s</sub>
	68		16	.193	.298	14	.175	.275	15	.207
69		16	.189	.309	16	.159	.271	16	.203	.310
70		16	.178	.284	16	.154	.247	16	.181	.290
71		16	.204	.330	16	.163	.288	16	.204	.314
72		16	.191	.335	16	.174	.293	16	.199	.321
73		16	.192	.351	16	.170	.307	16	.198	.329
74		16	.201	.340	16	.175	.278	15	.188	.306

GRAPH 9:  
 SECTOR: FOLDING CARTON  
 VARIABLE: DOMESTIC SALES





## Conclusions

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V\_and\_G are moderate to small. They fluctuate at a rather constant level of relative concentration.

H\_and\_E diminish first and rise again later. In total there is not much change in the concentration.

CR shows a somewhat bigger absolute concentration. Twelve firms hold 82% of the total domestic sales in 1974. The other 18% is scattered over thirty three small firms.

The absolute concentration slightly decreases.

The number of firms slowly falls after a rise in 1969.

L shows a small increase in inequality of the bigger firms in the last few years. This is also demonstrated by  $L_g$ .

The oligopolistic field consists of sixteen firms and remains constant.

Imports and exports are very low in this sector.

There are only two important exporting firms i.e. Mead and Elopak.

Although no detailed figures are available it is clear that the absolute concentration of exports is high.

The only change in concentration that has appeared in this sector is the growth of a few smaller companies at the cost of some of the big ones.

### III. 6. Sector stationary and envelopes

Table 25: Overall figures. Sector: stationary and envelopes.

year variable	68	69	70	71	72	73	74
Number of activity units	16	16	16	17	16	16	16
Number of firms	15	15	15	16	15	15	14
Domestic sales	41.8	43.4	53.2	55.1	63.1	67.2	91.6
Employees	1.0	1.0	1.1	1.1	1.2	1.0	1.0
Wage bill	10.1	11.9	13.6	14.7	19.3	20.9	24.2
Investments	-	-	5.8	6.1	4.8	4.6	5.2
Exports	2.9	3.6	3.2	2.8	4.1	4.5	6.5
Imports	5.9	7.3	9.9	11.0	11.1	11.2	15.4

Table 26a: Investigated total per variable.  
Sector: stationary and envelopes.

year variable	68	69	70	71	72	73	74
Domestic sales	36.6	38.0	46.6	50.0	56.1	60.4	84.7
Employees	.90	.91	.98	1.01	1.05	.96	.98
Wage bill	8.8	10.3	12.2	13.1	17.3	19.4	22.4
Investments	-	-	5.5	5.9	4.7	4.4	5.1
Exports	2.8	3.5	3.2	2.7	4.0	4.5	6.5
Market share	76.6	74.8	75.1	75.7	75.6	77.0	79.2

Table 26b: Percentage covered by the investigation.  $n^* = 10$ .

year variable	68	69	70	71	72	73	74
Domestic sales	87.5	87.4	87.6	90.8	88.9	89.9	92.5
Employees	88.3	87.9	90.7	91.8	90.5	92.3	93.9
Wage bill	87.0	86.6	89.5	89.6	89.4	92.6	92.8
Investments	-	-	94.9	97.0	97.0	97.0	97.0
Exports	98.3	98.3	99.2	98.9	97.8	99.0	99.0
Market share	76.6	74.8	75.1	75.7	75.6	77.0	79.2

CONCENTRATION COEFFICIENTS, SECTOR: STATIONARY AND ENVELOPES

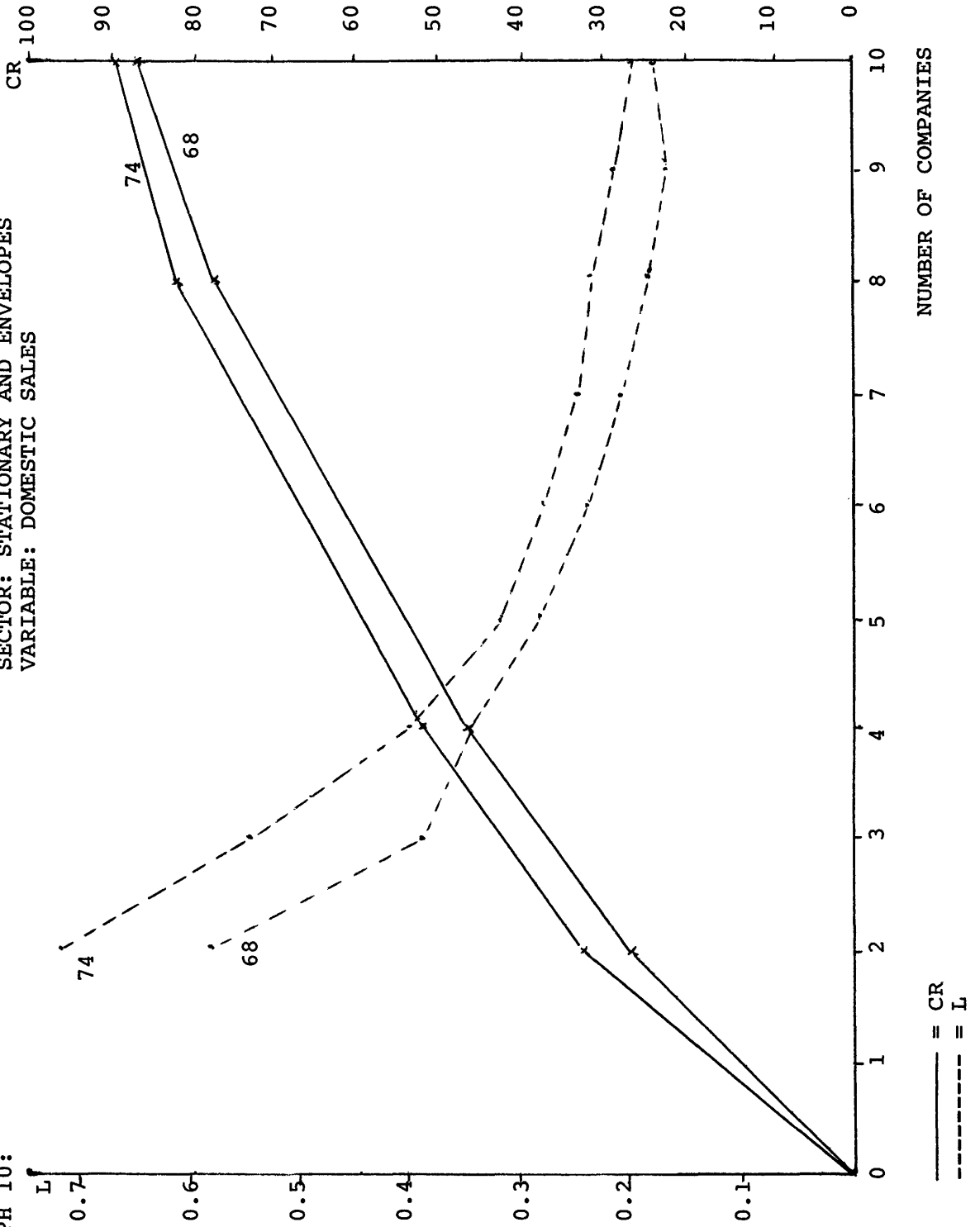
VARIABLE	YEAR	V	G	CR			CR			L	L	L	H	*/E
				4	8	10	4	8	10					
Domestic sales	68	.564	.313	46.4	76.8	87.5	.347	.192	.178	87.89	110.6			
	69	.551	.304	46.0	75.6	87.4	.356	.193	.166	86.93	110.9			
	70	.535	.296	44.8	75.1	87.6	.337	.183	.158	85.78	111.1			
	71	.806	.426	52.6	82.4	90.8	.405	.230	.223	103.06	107.1			
	72	.724	.372	52.9	78.2	88.9	.453	.259	.214	102.20	107.4			
	73	.720	.381	52.9	79.7	89.9	.418	.247	.213	101.65	107.2			
	74	.680	.367	52.6	82.3	92.5	.400	.239	.207	104.42	104.9			
Employees	68	.578	.325	47.3	77.7	88.3	.312	.197	.177	88.92	110.1			
	69	.608	.340	49.5	78.3	87.9	.320	.212	.199	91.30	109.6			
	70	.621	.348	48.6	78.8	90.7	.318	.203	.171	92.40	108.7			
	71	.893	.472	59.3	84.9	91.8	.354	.280	.277	112.38	104.3			
	72	.776	.409	57.7	81.3	90.5	.354	.275	.237	106.86	105.6			
	73	.808	.431	58.6	82.9	92.3	.365	.280	.236	110.17	104.2			
	74	.759	.413	58.1	84.9	93.9	.346	.273	.241	112.53	102.3			
Wage-bills	68	.533	.297	44.6	76.8	87.0	.327	.175	.168	85.63	111.2			
	69	.576	.315	48.2	76.0	86.6	.345	.214	.183	88.76	110.6			
	70	.579	.317	45.4	76.8	89.5	.363	.184	.159	89.03	109.9			
	71	.747	.401	51.6	79.6	89.6	.381	.233	.205	97.37	108.8			
	72	.723	.386	54.6	80.5	89.4	.382	.250	.226	101.59	107.1			
	73	.810	.425	56.3	83.0	92.6	.453	.254	.229	110.41	104.2			
	74	.744	.389	55.9	82.5	92.8	.443	.264	.222	110.97	103.6			
Investments	70	1.153	.550	71.1	88.7	94.9	.502	.424	.381	155.23	94.5			
	71	1.224	.610	73.7	92.4	97.0	.405	.445	.469	156.15	91.8			
	72	1.078	.561	68.5	92.7	97.0	.416	.352	.445	144.18	93.9			
	73	1.183	.578	67.0	93.4	97.0	.581	.387	.515	159.92	91.8			
	74	1.521	.630	76.1	93.9	97.0	1.008	.575	.657	236.84	81.8			
	68	1.535	.692	83.2	97.2	98.3	.580	.772	1.318	223.84	78.8			
	69	1.440	.682	81.6	97.4	98.3	.532	.758	1.327	204.84	79.9			
Exports	70	1.642	.735	90.4	98.9	99.2	.506	1.395	3.123	246.37	71.5			
	71	1.892	.752	88.1	97.1	98.9	.731	1.041	1.199	286.25	71.3			
	72	1.345	.640	77.1	95.3	97.8	.545	.538	.662	187.27	85.6			
	73	1.196	.618	72.6	96.6	99.0	.440	.427	.611	161.99	87.8			
	74	1.317	.647	81.6	97.8	99.0	.509	.573	.992	195.27	81.1			
	68			40.6	67.3	76.6								
	69			39.4	64.7	74.8								
Market shares	70		38.4	64.4	75.1									
	71		43.8	68.7	75.7									
	72		45.0	66.5	75.6									
	73		45.3	68.2	77.0									
	74		45.0	70.4	79.2									

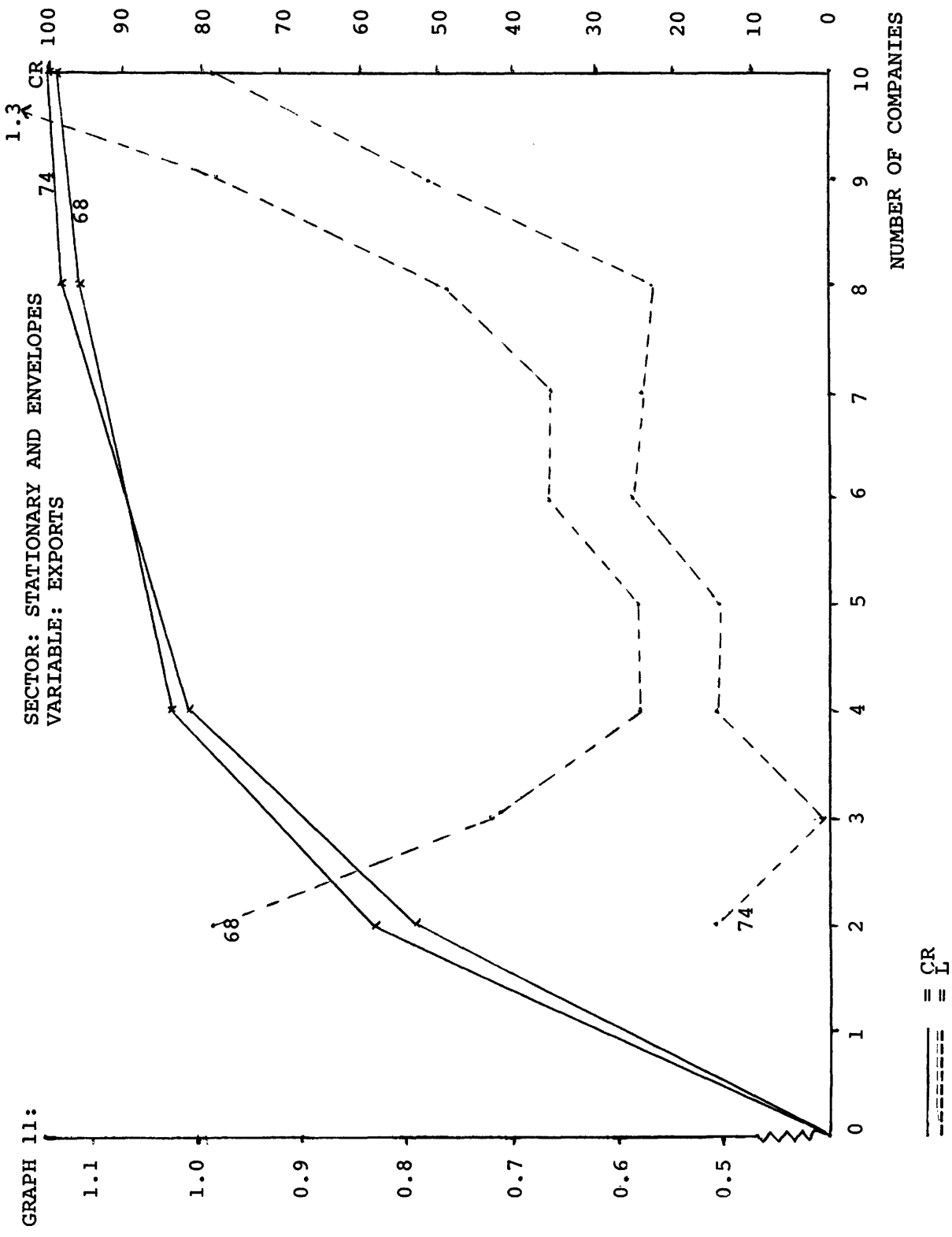
Table 28: Linda indices. Sector: stationary and envelopes.

Variable index year	domestic sales		employees		wage bill		investments		exports						
	$n^*m$	$Ln^*m$	$L_s$	$n^*m$	$Ln^*m$	$L_s$	$n^*m$	$Ln^*m$	$L_s$	$n^*m$	$Ln^*m$	$L_s$			
68	9	.173	.304	10	.177	.279	10	.168	.288	-	-	-	4	.580	.765
69	10	.166	.291	9	.194	.305	10	.183	.293	-	-	-	5	.459	.549
70	10	.158	.282	10	.171	.285	10	.159	.306	10	.381	.516	4	.506	.703
71	10	.223	.367	9	.277	.374	10	.205	.336	4	.405	.483	4	.731	1.01
72	10	.214	.372	10	.237	.361	10	.226	.344	7	.338	.430	6	.481	.575
73	10	.213	.365	10	.236	.341	10	.229	.359	7	.352	.559	6	.350	.455
74	10	.207	.353	10	.241	.349	10	.222	.384	8	.575	.851	3	.410	.460

SECTOR: STATIONARY AND ENVELOPES  
 VARIABLE: DOMESTIC SALES

GRAPH 10:





## Conclusions =====

V\_and\_G are rather low and increase slowly for all variables but for exports. The relative concentration of exports fluctuates and declines.

H\_and\_E show a small increase in concentration till 1971. After that the concentration rises more slowly or remains constant.

CR points to a moderate level of absolute concentration. This index also stabilizes after 1971. The absolute concentration of exports is high but fluctuating. The number of firms diminishes from fifteen to fourteen.

L indicates an increase in concentration till 1972, after that concentration decreases. The oligopolistic field comprises ten firms. For exports this number diminishes to three. In general  $L_s$  rises till 1971 and remains rather constant over the last few years. For the variable exports  $L_s$  declines after 1971.

The variable market share shows that the imports, just like exports, are relatively unimportant.

The overall picture of this sector shows a stabilization after the merger between Ubbens and Bührmann-Tetterode in 1971. At the end of 1974 Bührmann-Tetterode buys Esveha (turnover about 35 million dutch florins). This is not yet incorporated in the variables for 1974. This increase of concentration will show in 1975.

### III. 7. Sector wallpaper

Table 29: Overall figures. Sector: wallpaper

year variable	68	69	70	71	72	73	74
Number of activity units	4	4	4	4	4	4	4
Number of firms	4	4	4	3	3	3	3
Domestic sales	22.9	23.3	23.2	28.7	31.4	35.0	42.9
Employees	.52	.59	.74	.78	.84	.81	.84
Wage bill	7.1	9.1	11.2	13.4	17.0	18.7	22.2
Investments	-	-	2.4	2.7	3.5	4.0	5.5
Exports	8.1	8.0	11.4	11.5	17.5	19.3	27.4
Imports	10.2	11.1	16.8	19.8	26.6	32.8	41.4

Table 30a: Investigated total per variable. Sector: wallpaper.

year variable	68	69	70	71	72	73	74
Domestic sales	22.9	23.3	23.2	28.7	31.4	35.0	43.0
Employees	.52	.59	.74	.78	.84	.81	.84
Wage bill	7.1	9.1	11.2	13.4	17.0	18.7	22.2
Investments	-	-	2.4	2.7	3.5	4.0	5.5
Exports	8.1	8.0	11.4	11.5	17.5	19.3	27.4
Market share	69.2	67.3	57.9	59.2	54.2	51.6	50.9

Table 30b: Percentage covered by the investigation. n\* = n.

year variable	68	69	70	71	72	73	74
Domestic sales	100	100	100	100	100	100	100
Employees	100	100	100	100	100	100	100
Wage bill	100	100	100	100	100	100	100
Investments	-	-	100	100	100	100	100
Exports	100	100	100	100	100	100	100
Market share	69.2	67.3	57.9	59.2	54.2	51.6	50.9



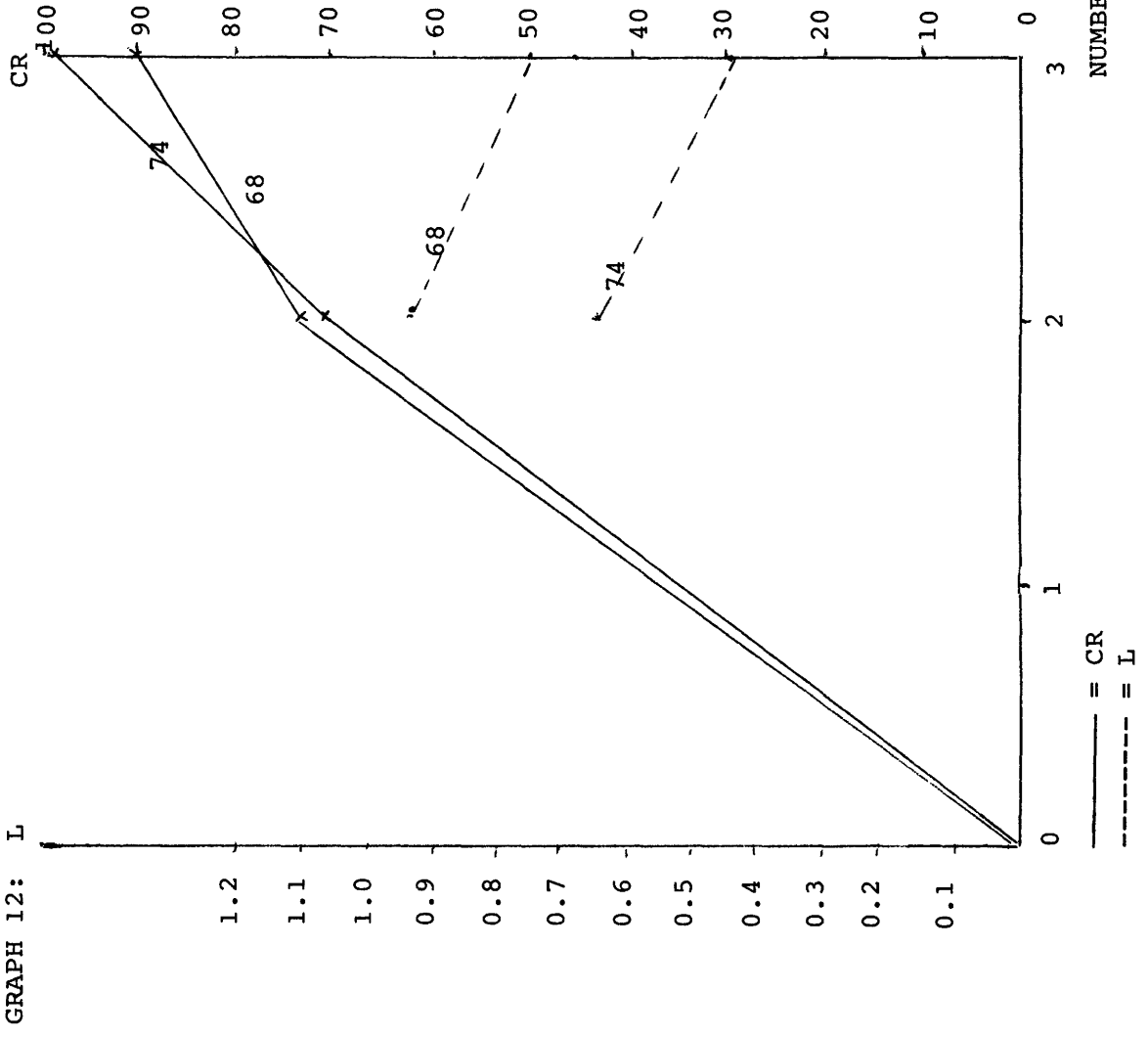
CONCENTRATION COEFFICIENTS. SECTOR: WALLPAPER

VARIABLE	YEAR	V	G	CR 2	CR 3	L 2	L 3	H	% E
Domestic sales	68	.799	.440	72.1	91.0	.935	.675	327.60	53.60
	69	.774	.418	69.8	87.8	1.029	.706	319.78	54.65
	70	.705	.386	66.7	86.5		.613	299.33	56.21
	71	.655	.352	79.2	100.0	.542	.551	357.41	46.03
	72	.639	.341	77.7	100.0	.543	.517	352.05	46.42
	73	.607	.312	74.1	100.0	.536	.446	342.00	47.14
	74	.604	.311	71.7	100.0	.647	.438	341.34	47.21
Employees	68	.689	.383	66.7	88.1	.831	.559	294.83	56.75
	69	.601	.334	64.1	85.1	.590	.483	272.26	58.58
	70	.577	.316	61.9	84.3	.575	.445	266.64	59.01
	71	.622	.334	75.3	100.0	.673	.492	346.91	47.12
	72	.609	.313	71.4	100.0	.697	.445	342.76	47.41
	73	.612	.322	73.2	100.0	.656	.464	343.73	47.35
	74	.613	.320	72.3	100.0	.691	.458	343.96	47.33
Wage-bill	68	.713	.385	65.7	86.9	1.003	.598	301.76	56.05
	69	.698	.388	71.4	88.1	.555	.602	297.40	55.94
	70	.608	.337	63.2	86.5	.602	.447	273.82	58.03
	71	.660	.361	79.1	100.0	.595	.568	358.97	45.96
	72	.656	.358	76.2	100.0	.738	.544	357.55	46.19
	73	.647	.353	76.4	100.0	.684	.534	354.70	46.34
	74	.626	.334	74.2	100.0	.680	.488	348.10	46.78
Investments	70	.935	.490	85.1	100.0	1.439	1.045	468.55	39.53
	71	.830	.434	91.0	100.0	.506	1.129	422.18	40.63
	72	1.132	.582	94.8	100.0	1.559	2.363	570.44	31.82
	73	1.033	.547	93.1	100.0	1.239	1.788	516.54	35.22
	74	.771	.410	77.8	100.0	1.147	.687	398.61	43.79
Exports	68	.808	.424	70.8	86.1	1.131	.826	330.71	54.01
	69	.828	.454	79.0	91.8	.593	.810	337.37	52.13
	70	.783	.439	74.5	94.0	.628	.580	322.46	52.97
	71	.904	.483	94.5	100.0	.613	1.803	454.34	37.49
	72	.933	.509	92.3	100.0	.910	1.485	467.59	37.90
73	.821	.452	89.3	100.0	.665	1.045	418.34	41.27	
74	.907	.496	92.8	100.0	.778	1.590	455.77	38.26	
Market shares	68			49.9	63.0				
	69			49.3	59.5				
	70			38.7	50.1				
	71			46.9	59.2				
	72			42.1	54.1				
73			38.2	51.6					
74			36.5	50.9					

Table 32: Linda indices. Sector: wallpaper

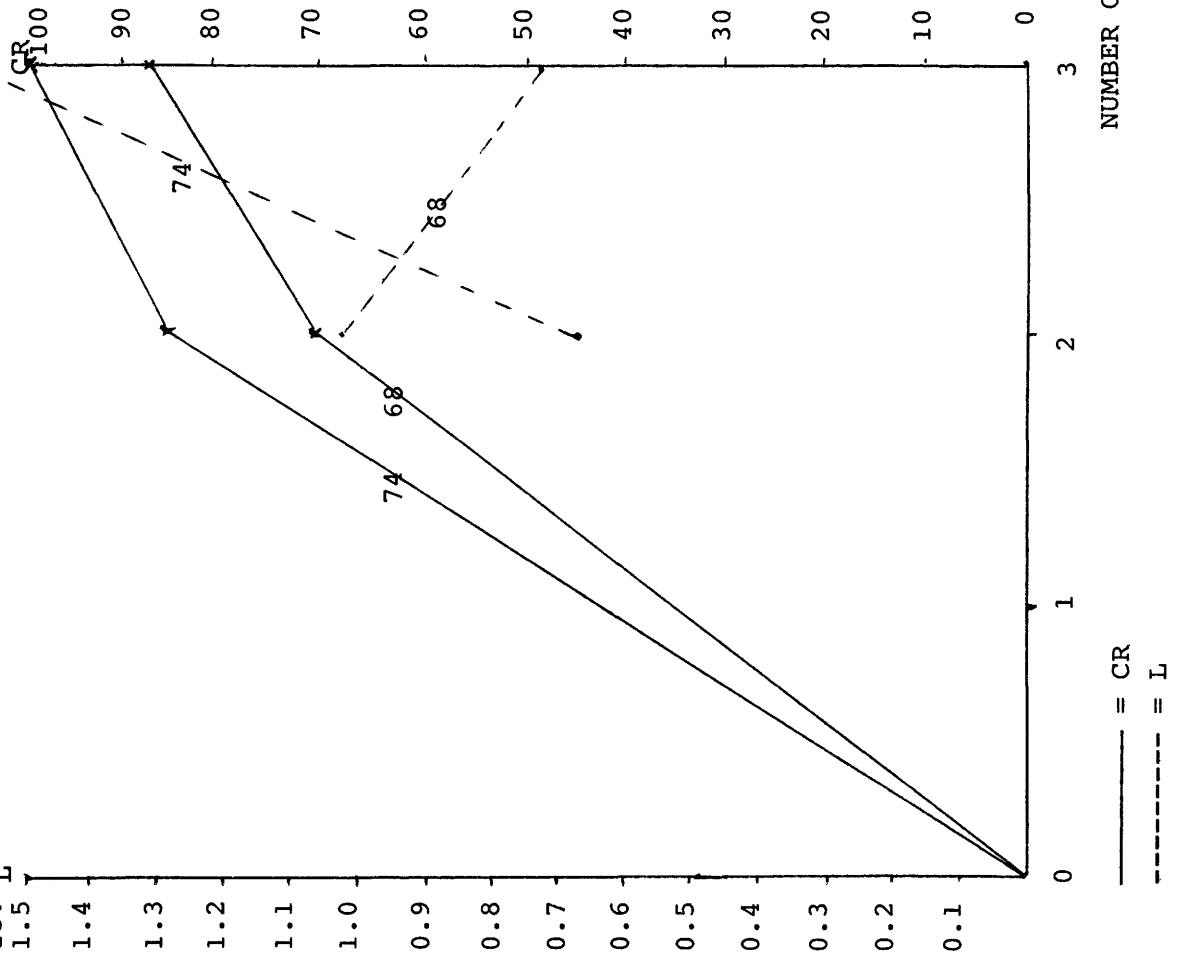
Variable	domestic sales		employees		wage bill		investments		exports						
index year	$\frac{m}{n}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$	$\frac{m}{Ln}$					
	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$	$I_s$					
68	3	.675	.805	4	.550	.646	4	.538	.712	-	-	4	.616	.857	
69	4	.613	.783	4	.441	.505	2	.555	.555	-	-	2	.593	.593	
70	4	.535	.689	4	.409	.476	3	.447	.525	3	1.05	1.24	3	.580	.604
71	2	.542	.542	3	.492	.558	3	.568	.581	2	.506	.506	2	.613	.613
72	3	.517	.530	3	.445	.571	3	.544	.641	2	1.56	1.56	2	.910	.910
73	3	.446	.491	3	.464	.560	3	.534	.609	2	1.24	1.24	2	.665	.665
74	3	.438	.542	3	.458	.575	3	.488	.584	3	.687	.917	2	.778	.778

GRAPH 12: L SECTOR: WALLPAPER  
 VARIABLE: DOMESTIC SALES



GRAPH 13: L

SECTOR: WALLPAPER  
VARIABLE: EXPORTS



## Conclusions

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This sector is characterized by a very low relative and a high absolute concentration.

V\_and\_G indicate a decrease of relative concentration especially since 1971 when the number of firms dropped from four to three.

H\_and\_E illustrate the low relative concentration. The minimum value of H in the case of three firms is  $1.000 : 3 = 333$ .

The calculated values for this sector are very close to 333.

CR points to the high absolute concentration. The rise of absolute concentration was big in 1971, the year of the take-over of ETBI by Sanders. After 1971 this rise comes to an end but for the variable exports where  $CR_2$  still increases.

The variable market share shows the relative importance of imports. Imports equal domestic sales.

The absolute concentration with regard to the variable market-share is much lower than the concentration of domestic sales.

L shows a decline since the three rather equal firms came into existence, except for the variable exports. All firms in the sector belong to the oligopolistic arena.

### III. 8. Summary of the quantitative analysis

In general concentration increases in the industry. This increase is rather small and has a rather low starting point.

Absolute concentration increases more than relative concentration. This is illustrated by the overall decline of the number of firms and by comparison of the CR- and L-curves plotted in the graphs 1 till 13.

The sectors that differ from the general pattern are the sectors sanitary and household and adhesive materials. The first shows a decrease of concentration, the second a rather big increase, especially as far as the variable exports is concerned.

In general the variables investments and exports indicate a stronger increase in absolute and relative concentration than the other variables.

For the exports this is explained by evaluating the total sector.

Though the variable investments is not a very reliable indicator of concentration since the top i firms with regard to this variable change every year, it indicates a further increase of concentration in the years after 1974.

The overall analysis of the H-index shows that the increase of concentration is mainly caused by the growth of the big firms. A good example of this is the firm Bührmann-Tetterode (see qualitative analysis).

For most sectors of the industry the im- and exports become more important. The market of the dutch producers becomes international and the dutch market becomes a part of the international (or european) market.

The problems which arise in defining the relevant market by studying the national industry have already been stressed before.



#### IV. Firm analysis and qualitative survey

In this part of the study the emphasis will be laid on the biggest companies in the different sectors. It is mainly based on the annual accounts of these firms.

In addition a short qualitative survey of each sector will be made.

##### IV.1. Total sector

The biggest companies in the total industry, measured by domestic sales are:

<u>1968</u>	<u>1974</u>
1. Bührmann-Tetterode	1. Bührmann-Tetterode
2. Van Gelder	2. De Hoop
3. De Hoop	3. Van Gelder
4. Philips	4. Kappa Holding
5. Schut Superieur	5. Philips

##### Bührmann-Tetterode

This company has been the top firm in the industry since 1968. As far as the variable employees is concerned, only Van Gelder was bigger up to 1973.

In 1968 the Bührmann-Tetterode company consisted of the following enterprises producing in the paper-products industry as defined by NICE 272:

- Papier-Metaal (packaging products of paper and aluminium);
- Placoti (coated materials);
- Waterpantser (waterproof paper products);
- Edelpapier (adhesive materials);
- Klompé (stationary and envelopes);
- Pillo-Pak (corrugated board and cases);
- Bates Cepro (bags for cement).



Acquisitions of production firms in the paper-products industry were:

1968: Celtona-Nefa	(sanitary and household);
1971: Ubbens	(stationary and envelopes);
1973: Vandra	(corrugated board and cases);
Brabantia	(corrugated board and cases);
De Zeeuw Eerbeek	(corrugated board and cases);
De Zeeuw Deventer	(corrugated board and cases);
1974: Sparreboom and Ceres	(board packaging);
Besin	(special board);
Gelria	(folding carton);
Rocarto	(board packaging);
Vrinten & Lohman	(board packaging);
Sjef Trimbach	(folding carton);
Esveha	(stationary and envelopes).

The policy of Bührmann-Tetterode is: growing by means of take-overs.

Bührmann not only grew in the production of paper-products but also in the wholesale of paper-products and graphical machinery (Tetterode), and in the production of paper itself. The structure of the total Bührmann-Tetterode concern at the end of 1974 is illustrated in figure 3 on page 63.

At this moment Bührmann-Tetterode still grows enormously. It has bought firms in the sector stationary and envelopes in France (e.g. Papeteries de Romainville in Paris). It owns 32 book-shops in Belgium and The Netherlands (e.g. Standaard Boekhandel in Antwerp with a turnover of 80 million dutch florins) and has participations in or owns publishing firms (e.g. Moussault, Van Kampen, Wereldvenster and Succes) and also took-over firms in the toy-industry (e.g. Otto Simon).

The management has announced an increase in take-overs, especially abroad. Most take-overs have been paid in cash and are both horizontal and vertical concentrations.

Fig. 3: Structure of the Bührmann-Tetterode concern at the end of 1974

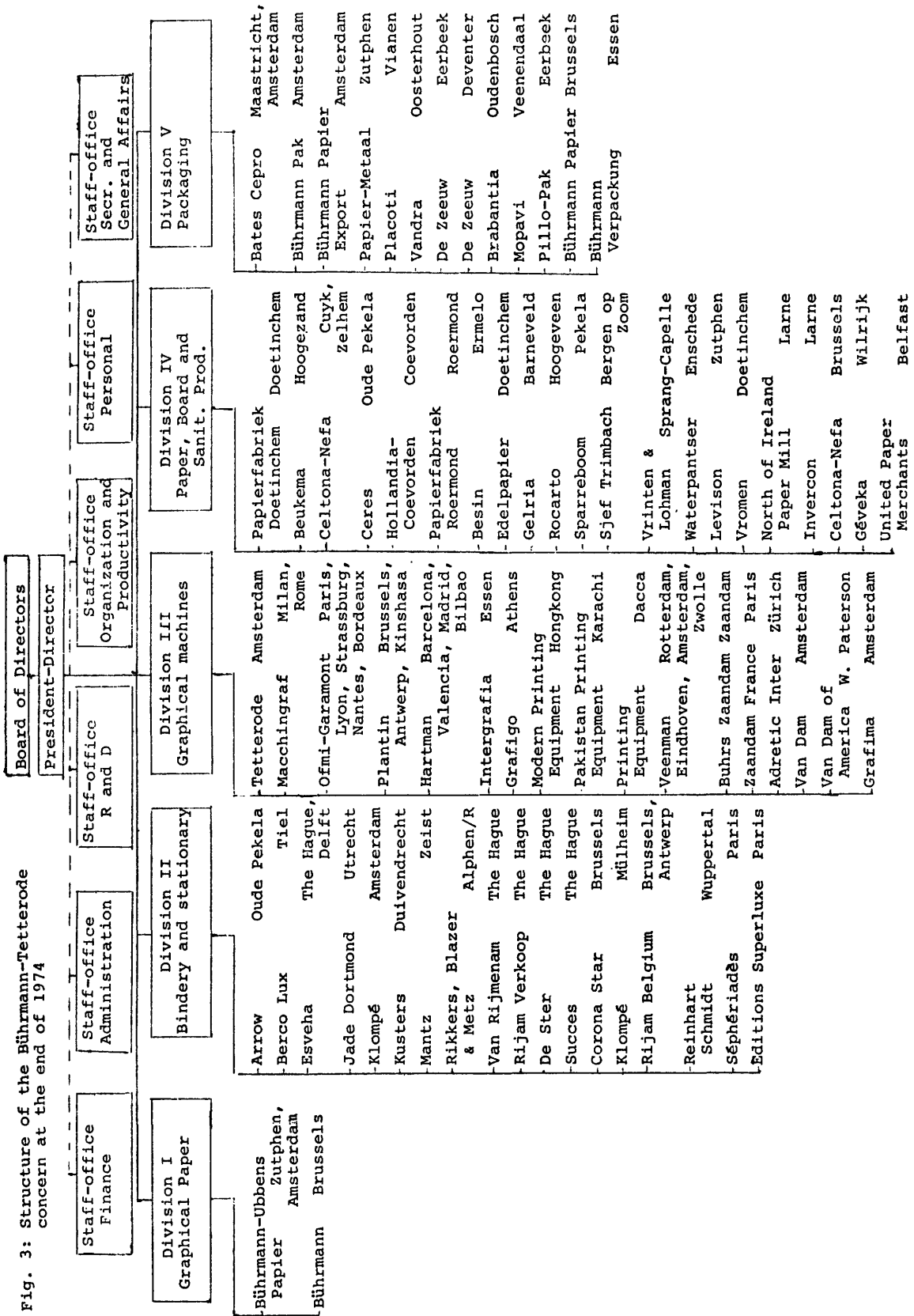


Table 33 shows some financial data and the number of employees of the company in the years 1968 up to 1975.

Table 33: Number of employees and financial data (x 1.000.000 dutch florins) of Bührmann-Tetterode.

year \ variable	68	69	70	71	72	73	74	75
Employees	4065	4150	4660	5235	5256	5831	7005	7223
Turnover	500	523	579	645	700	810	1182	1089
Cash-flow	27	27	30	30	34	41	60	65
Net profit	18	18	18	18	21	24	34	33
Own capital	157	168	180	202	208	229	292	297

### The Van Gelder concern

Van Gelder is the most important crude paper producer in the Netherlands, together with K.N.P.

In 1968 it penetrated deeper into the paper-products industry by taking over the Leeuwarder Papierfabriek N.V. (L.P.F.) in the sectors folding carton and flexible packaging.

At that time the Van Gelder packaging division consisted of the following firms:

- De Jong, Westzaan (bags and folding carton);
- Cats Neparofa, Rotterdam (flexible packaging materials);
- Mopavi, Veendam (folding carton, i.e. milk packaging).

Mopavi is a 75% participation; the other 25% is part of Bührmann-Tetterode.

After the take-over of L.P.F., Van Gelder became the second largest firm in the paper products industry.

In 1969 the production of bags was concentrated at L.P.F. The cooperation with Crown Zellerbach Switzerland (part of Crown America) was intensified by installing a second card-stock production unit (for the production of punched cards) at Crown Van Gelder S.A.

A backward integration in that year was the foundation of Flevohout (wood-pulp) together with K.N.P. and De Hoop.

In 1970 Van Gelder and K.N.P. stopped negotiations for a merger, which had been very serious. One of the reasons for this failure may have been the cooperation between Van Gelder and Crown Zellerbach and the fact that MacMillan Bloedel (Canada) has a participation in K.N.P.

It is clear that Crown did not like the idea of its know-how of card-stock production being indirectly transferred to a big competitor.

In 1971 Crown Zellerbach obtained a 50% participation in Van Gelder. The same year, Van Gelder, Schut Superieur and Van Meurs (part of the english Reed International Ltd.) founded the firm Intergum (sector adhesive materials) on an equal base.

In 1974 Van Gelder increased its participation in Intergum from 33 1/3% to 50%. Van Meurs obtained the other 50%.

The production of folding carton was concentrated at L.P.F., whereas the De Jong subsidiary continued as an independent company.

In contrast with Bührmann-Tetterode, Van Gelder is hardly horizontally concentrated, only vertically. The paper-products division started as a forward integration of the paper division. In the paper-products sector Van Gelder concentrated on folding carton, flexible packaging and adhesive materials.

This policy of vertical concentration can also be illustrated by the foundation of Flevohout in 1969, and of Van Gelder Recycling in 1975, both backward integrations to secure the supply of raw materials (in this case wood and waste paper).

In 1976 Van Gelder obtained a 51% participation in Tapesystems in England (sector adhesive materials).

At this moment the paper-products division is not doing very well. The last two years showed severe losses. Van Gelder and Schut Superieur are investigating the possibility to integrate their packaging activities.

Some financial figures about the total company are shown in table 34, together with the number of employees. For the year 1976 there will be severe losses again.

Table 34: Number of employees and financial data (x 1.000.000 dutch florins) of Van Gelder.

Year \ variable	68	69	70	71	72	73	74	75
Employees	6826	6538	6391	6396	6142	6072	6042	5949
Turnover	450	461	484	540	615	714	987	801
Cash-flow	37	40	23	17	25	36	68	9
Net profit	14	16	*/.4	*/.8	*/.1	8	39	*/.25
Own capital	321	334	222	213	213	241	296	283

#### De Hoop, Philips and Kappa

These firms mainly produce in the sector corrugated board and cases. They will be dealt with in IV.2.

#### Schut Superieur

Schut Superieur originated in 1967 out of the merger of two family firms, Schut (Eerbeek) and Superieur (Etten-Leur). In 1968 and 1969 it was the fifth firm in the industry. In 1973 and 1974 it ended up at the seventh place.

Schut Superieur has four divisions:

- paper production;
- folding carton and flexible packaging;
- adhesive materials;
- packaging machines.

The sector adhesive materials is covered by the establishments Supertape and Intergum.

Intergum was a 33 1/3% participation from 1971 up to 1974.

In 1974 this participation was sold to Van Gelder and Van Meurs. In 1975 the 55% participation in Supertape was extended to 100%.

Schut Superieur did not grow very fast; it remained relatively stable. No deep penetrations in other sectors than adhesive materials took place.

Some financial data of Schut Superieur during the years 1968 up to 1975 are presented in table 35.

Table 35: Financial data (x 1.000.000 dutch florins) of Schut Superieur.

year \ variable	68	69	70	71	72	73	74	75
Turnover	52	56	60	64	65	80	105	96
Cash-flow	5	6	4	5	7	8	12	5
Net profit	1.0	1.4	0.2	0.7	1.3	1.5	2.1	0.3
Own capital	11	13	14	14	16	18	22	18

### K.N.P.

K.N.P. does not belong to the top five firms in the industry. It is presented here for two reasons. First because it is the second big crude paper producer and second because it first penetrated into the paper-products market during the years investigated, the penetration took place in 1970.

In that year it took-over Gennep (trade-mark Page) together with the german Feldmühle concern (ratio 49-51).

Gennep ranks first in the sector sanitary and household.

In 1971 K.N.P. took over Mako, a producer of cardboard cylinders (tubular carton). In 1973 Mako founded Geha, a board packaging production unit.

K.N.P. is partly owned by MacMillan Bloedel (1972: 36%; 1974: 46%).

Some financial data and the number of employees during the years 1968 up to 1975 are presented in table 36.

Table 36: Number of employees and financial data (x 1.000.000 dutch florins) of K.N.P.

year \ variable	68	69	70	71	72	73	74	75
Employees	2836	2801	2816	2653	3721	4168	4326	4252
Turnover	179	233	270	283	359	491	678	562
Cash-flow	19	27	28	30	41	54	61	32
Net profit	5	8	8	8	15	21	31	*/.11
Own capital	123	132	141	144	163	191	240	243

Some big multinational firms participating in the paper-products industry

- The Bowater corporation (Eng.): - majority interest in Polak en van den Berg (wholesalers);  
- corrugated board plant in Gent (Belgium) together with Philips.
- Crown Zellerbach (U.S.A.) : - 50% in Van Gelder.
- Feldmühle (Germany) : - 51% in Gennep;  
- wholesale division F.B.P. Nederland.
- Kimberley Clark (U.S.A.) : - own plant.
- MacMilland Bloedel (Canada) : - 46% in K.N.P.
- Mölnlycke (Sweden) : - own plant.
- Philips (Netherlands) : - own plant;  
(see also IV. 2.) - 50% in Movi;  
- plant in Gent (Belgium) together with Bowater.
- Reed (England) : - majorities in:  
(see also IV. 2.) - Van Meurs (1970);  
- Firgos (wholesalers; 1972);  
- Céramique Sphinx, Maastricht (1974) (Sphinx owns Filtropa, a filter producer);  
- De Hoop (1975).
- Unilever (England/Netherlans) : - owns Drukkerij Reclame (folding carton);  
- own packaging division (trade-mark "4P" packaging) that produces in England, France, Austria, Italy and Nigeria (turnover approximately 450 million dutch florins);  
- 50% in Thomas Board Mills (Eng.).

#### IV. 2. Sector corrugated board and cases

The biggest companies in this sector, measured by domestic sales are:

<u>1968</u>	<u>1974</u>
1. Philips	1. Bührmann-Tetterode
2. De Hoop	2. De Hoop
3. De Zeeuw	3. Philips
4. Van Dam	4. Kappa Holding

The numbers 3, 4 and 5 (Van Meurs) of 1968 are all part of other companies in 1974.

De Zeeuw belongs to Bührmann-Tetterode (since 1973) and Van Dam to Kappa (since 1970); Van Meurs is part of the Reed concern (since 1970).

In 1975 Reed also acquired De Hoop.

Measured by domestic sales in 1974, Van Meurs and De Hoop together are bigger than Bührmann-Tetterode.

#### The top three firms

The Bührmann-Tetterode concern has already been discussed under IV. 1.

De Hoop does not publish annual accounts, so there is no detailed information available.

Philips produces to a great extent for its own use. This, among other things, makes it very difficult to derive detailed information for this sector from the consolidated annual accounts of the total Philips company.

During the period investigated Philips had a 50% participation in Movi at Rotterdam.

#### Kappa Holding

In 1968 the group consisted of Brittannia, De Kroon and Van Opstal Atlanta and was known as Verpak. In 1974 Scholten Carton (including Vedena and Debee Nazeppe) became part of the group which was henceforth called Kappa Holding.

In 1974 Schiekarton was taken-over.



In the sector folding carton Denca at Amersfoort became part of Kappa in 1975. In the same year Kappa started with the building of a very big new plant which produces high-quality board and testliner.

It was founded together with the Noordelijke Ontwikkelingsmaatschappij (NOM), a government agency for the development of the northern Netherlands, which holds 49% of the shares.

The production capacity of Kappa increases 60%.

This 115 million investment is an anticipation on future growth of demands. New markets for luxury packaging must be explored.

The management expects losses on this investment in the first two years. Till now Kappa did not invest more than approximately 10 million dutch florins. This big investment is based on economies of scale, for example with regard to the width and speed of the production.

The policy of Kappa is vertical concentration, diversification and geographical dispersion of output. An example of a related diversification based on the available raw materials is the production of board puzzles and other games.

Some financial data of Kappa Holding are presented in table 37.

Table 37: Financial data (x 1.000.000 dutch florins) of Kappa Holding.

year variable	68	69	70	71	72	73	74	75
Turnover	27	31	59	62	63	105	191	183
Cash-flow	2.3	3.2	4.7	4.4	4.9	7.1	10.5	10.5
Net profit	1.2	2.2	2.7	2.4	2.5	3.3	4.5	4.3
Own capital	11	13	19	22	24	40	44	48

Qualitative analysis of the sector corrugated board and cases

Turnover increases relatively much. The index figure for 1974 is 211 (1968 = 100).

The same holds good for the variable employees.

However, the increase of the production volume is somewhat lower. This can be deduced from the price-index figures in table 38.

Table 38: price-index figures sector corrugated board and cases.

Year	68	69	70	71	72	73	74
Price-index	100	92	100	103	105	115	168

The year 1974 was a top year for the paper and paper-products industry as far as prices and turnover are concerned.

In general, however, returns on investment are low.

Competition from alternative (plastic) products is high (e.g. shrink wrapping).

The investments decrease. The index figure for investments in 1974 is 58 (1968 = 100).

High investments and low margins are entry barriers for this sector together with the economies of scale in the supply of raw materials.

Innovations took place in production technique rather than in new products.

Corrugated board is produced in more layers now (as replacement of wood-packaging) and better testliner or duplexliner (the top layer or coating) is used for a better look and the possibility of printing.

In the production of liner and board more waste-paper is used instead of chemical fluting and/or vergin fibre (cellulose).

Waste-paper is cheaper and does not need to be imported.

This is important since approximately 50% of the total costs is caused by raw materials.

The production-width has increased from + 160 to + 245 centimetres because of economies of scale. A greater board or liner width also increases the flexibility, since different widths can more easily be combined and left-overs will be reduced.

All this requires high investments in machinery. This is illustrated in the by the investments of Kappa. The Van Gelder paper division, that also produces liner, decided not to invest in bigger machines at this moment.

One of the reasons for this is the 25% over-capacity in the dutch corrugated board and cases sector.

Not only width, but also production speed has increased.

Therefore growth of demand is necessary.

New markets may be found for luxury packaging and packaging of half-products and prefabricated materials.

Export is inevitable, but will not be easy. Scandinavian companies increase their production as well (e.g. Finnmap in Finland), are already big exporters and produce their own raw materials.

#### IV. 3. Sector sanitary and household

This sector expands relatively much. Domestic sales double over the years investigated. The level of investments and number of employees also rise strongly.

The biggest companies in this sector, measured by domestic sales are:

<u>1968</u>	<u>1974</u>
1. Bührmann-Tetterode (Celtona-nefa)	1. Gennep
2. Gennep	2. Bührmann-Tetterode
3. Mölnlycke	3. Mölnlycke

Gennep (49% K.N.P.; 51% Feldmühle) is one of the biggest producers of toilet-paper and tissues (trade-mark Page). It became the biggest firms in the sector in 1972.

Gennep and Bührmann-Tetterode (hygienic disposables) were almost equally big during the years investigated.

Mölnlycke was much smaller in 1968, but is now almost equal to the top two firms.

Mölnlycke was founded in the year 1849 in Sweden as a textile company. Shortly before world-war I it developed a highly absorbing fibre. This was the start of the non-woven hygienic disposables.

The search for new alternatives for the textile production was based on the know-how of fibres, weaving and chemicals. The most recent related diversification based on this know-how is the production of fibreglass yachts.

In 1975 the total turnover of the Mölnlycke group was + 620 million dutch florins, of which 120 million was produced in the Netherlands.

Since 1975 Mölnlycke is part of Svenska Cellulosa Aktiebolaget (SCA) which has a turnover of 2 milliard dutch florins.

At this moment the main products of Mölnlycke are hygienic disposables (hygienic bandages and napkins) and leisure products.

In June 1976 a new factory at Hoogezand was opened for the production of T-shaped napkins (an innovation).

The expansion of the sector sanitary and household was mainly at the cost of woven materials. It started in sanitary goods and is still going on (e.g. disposable sheets). However, the production of disposables is rather dependent on the business cycle.

Investments and know-how are entry barriers in this sector.

The price level was rather stable, except for the year 1974. This is illustrated in table 39.

Table 39: price-index figures for the sector sanitary and household. (1970 = 100).

product \ year	68	69	70	71	72	73	74
Toiletpaper	93	91	100	108	113	123	145
Cellulose products	99	97	100	107	110	110	124
Other sanitary products	94	94	100	107	110	111	128

#### IV. 4. Sector adhesive materials

This is, just as the sector sanitary and household, one of the expanding sectors in the industry.

At a very stable price level (see table 40) the production volume increased, especially in exports.

Table 40: price-index figures for the sector adhesive materials. (1970 = 100).

Year	68	69	70	71	72	73	74
Index	101	94	100	100	97	97	104

The growth of the domestic production-volume (+ 80%) did not show in the market shares of domestic producers.

This means that the domestic market expanded even more than domestic production. Other indications of growth are the increase of the variables employees and investments and the appearance of new companies (Intergum).

The use of adhesive materials still increases. One of the reasons for this is the (pre)labeling (e.g. in supermarkets).

The biggest companies in this sector, measured by domestic sales are:

<u>1968</u>	<u>1974</u>
1. Fasson	1. Fasson
2. Van Gelder	2. Van Gelder (incl. Intergum)

Fasson is by far the biggest firm in this sector.

Most of its products are sold by the firm Avery.

The exports of Fasson are approximately five times the domestic sales. It is the only big domestic exporter.

Van Gelder is the second exporter. It increased its interest abroad in 1976 by the participation in the english Tapesystems.

Economies of scale and know-how are entry barriers for this sector.

#### IV. 5. Sector folding carton

The biggest firms in this sector, measured by domestic sales are:

<u>1968</u>	<u>1974</u>
1. Van Gelder	1. Van Gelder
2. Schut Superieur	2. Drukkerij Reclame (Unilever)
3. Drukkerij Reclame (Unilever)	3. Schut Superieur
4. Schiekarton	4. Kappa (Schiekarton)
5. Mead	5. Elopak

The turnovers in this sector did not increase very much as compared

with other sectors.

The price level was relatively stable (see table 41), except for the year 1974.

Table 41: Price-index figures for the sector folding carton (1970 = 100).

Year	68	69	70	71	72	73	74
Index	95	93	100	106	108	114	148

The increase of the variable wage bill was big. It is one of the reasons for low returns on investment in this sector, that is relatively labour-intensive.

The production of bottle stock was one of the major innovations. The firm Elopak was very succesful with its product "Pure-Pak" both in the domestic and in the export market.

Pure-Pak is a single use, polyethene coated, milk packaging with a square bottom.

At this moment Elopak is building a new plant in Germany for the production of Pure-Pak.

In 1975 28 milliard units were sold, especially in the Scandinavian countries.

The demand in Central Europe still increases.

In the future bottle stock will perhaps be replaced by plastic bottles. The dutch company DSM developed a square polyethene bottle for milk packaging.

In general competition from plastics is high.

Another future development may be the production of a standardized packaging, especially made for self-service supermarkets, called "palletbox" which enables more rational handling of the packed products.

Low margins and patents are entry barriers for this sector.

#### IV. 6. Sector stationary and envelopes

During the period investigated Bührmann-Tetterode was the biggest company. The increase of domestic sales and production volume is above average.

Exports increase more than domestic sales. The index figure for exports in 1974 is 228 (1968 = 100).

Table 42 indicates a moderate rise of the price level.

Table 42: price-index figures for the sector stationary and envelopes (1970 = 100).

Year	68	69	70	71	72	73	74
Index	102	92	100	107	112	119	149

There were no important innovations in the years investigated.

The general picture is one of a steady growing balanced sector with only small changes.

#### IV. 7. Sector wallpaper

The three companies under investigation in this sector are:

Rath & Doodeheefver, Sanders and Cohen.

Rath & Doodeheefver is the biggest firms in the sector, measured by domestic sales.

At a continuously increasing price level the growth of production volume is relatively small.

The value of exports is low but increasing.

An innovation in production technique is the change from conventional printing with deeply engraved copper rollers to flexo printing with rubber rollers. As a result of this the production capacity more than tripled. However, this big investments caused an overcapacity that is still going on at this moment. Net profits were going down as is shown in table 43.

In this table some financial data of the firm Sanders are illustrated. Sanders started with flexo printing in 1974.

Table 43: some financial data (x 1.000.000 dutch florins) of the firm Sanders.

year variable	69	70	71	72	73	74	75	76
Turnover	16.5	23.2	32.3	42.6	45.5	50.7	52.3	?
Cash-flow	1.4	1.6	2.7	3.0	3.2	3.4	2.2	?
Net profit	0.5	0.7	1.0	1.2	1.3	1.5	·/.0.027	·/.0.6
Own capital	7.3	8.0	10.4	11.6	12.8	14.6	15.6	?

New products are washable wallpaper (by means of coating) and prepasted wallpaper.

At this moment strippable wallpaper is under development.

Investments are entry barriers for this sector.





## V. Summary

The paper-products industry shows a slow but steady increase of concentration.

This concentration is mainly caused by the growth of the bigger firms (e.g. Bührmann-Tetterode) and the disappearance of some smaller ones.

In some of the product markets concentration is above average; for example in the sectors adhesive materials and wallpaper (absolute concentration). In the sector sanitary and household concentration decreases.

Looking at very specific product markets, like bags for cement (made by Bührmann-Tetterode) or coffee filters (made by Filtropa), monopolistic tendencies can be discovered.

The measurement of concentration in the dutch paper-products industry is difficult.

Im- and exports increase. Multinational companies develop and competition from other products like plastics and tins increases.

Above that, lot of companies belong to more industries and are still diversifying after a long period of only vertical integration. A good example of this is Bührmann-Tetterode. The management of this firm supports the so-called roof-tile philosophy, which means expanding by means of related activities like roof-tiles slightly overlapping eachother.

Economies of scale enforce big investments, whereas in a lot of sectors return on investment is low.

The price and availability of raw materials are of vital importance. The use of waste-paper can be part of the solution of this problem.

Innovations took place in production technique rather than in new products.

In general entry barriers in the industry are investments and know-how.

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