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## Insurance and Concentration: The Change of Concentration in the Swedish and Finnish Insurance Market 1989 – 1993

von

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### **Abstract**

This paper investigates the concentration in the Swedish and Finnish insurance market. It considers the development of concentration over time and the differences between the two countries. The insurance industry is divided into life and non-life insurance companies. The concentration is computed for both parts separately and for the differences between them. Moreover the oligopolistic structure is explored by means of dominance measures and the oligopolistic group is defined.

### **Acknowledgment**

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## 1 Introduction

The phenomenon of concentration in an industry is a very complex issue. On the one hand side there is the concentration itself, i.e., how equal or unequal is the output of the industry distributed? This will be measured by the usual concentration indices. On the other side is the structure of oligopoly, i.e., the extent to which economic activity is controlled by a small number of large firms: Does an oligopoly or in extreme a monopoly exist and how many members has the dominant group? To interpret the structure, the disparity in the dominant and the pursuer group can also be of interest. The indices measuring the structure of the industry will be called dominance indices.

But these are only the static aspects of concentration. If there exist data for several years or areas the change in the industrial distribution of output is an interesting point. This effect can be divided into the change of concentration, measured by dynamic concentration indices, and exchange mobility of market shares between the individual companies, as indicated by mobility measures.

This paper looks at the concentration structure of the insurance market in Sweden and Finland in the years 1989–1993. The differences between the life and non–life insurance markets will be worked out. A comparison of the two countries will be made and the change over time will be investigated.

The second section gives a short overview about the measures used. Section 3 contains the description and analysis of the data. The last section concludes. The appendix deals with an exhaustive data analysis.

## 2 Concentration, dominance and dynamic measures

As mentioned above there are concentration indices, dominance measures, dynamic concentration indices and mobility measures. Among these four types of measures the concentration indices are best known. There are, e.g., the Rosenbluth–index (Rosenbluth (1961)), the entropy index (Theil (1967), p. 290), the Herfindahl–index (Hirschman (1945), Herfindahl (1950)), the Exponential–index (see, e.g., the E–index in Marfels (1971)) and the well known concentration ratios.

In addition to these indices Hannah and Kay (1977) proposed a one–parameter family of measures of concentration. It includes the Herfindahl– and the Exponential–index as special cases and is the only family of measures in the greater class of self–weighted quasilinear means which satisfies the replication principle (see Chakravarty and Eichhorn (1991)).

But which measure is the best? Marfels (1971, 1972) favours the Exponential–index. Hall and Tideman (1967) prefer the Herfindahl– and the Rosenbluth–index. Good (1987) proposes, as a compromise between Herfindahl– and Exponential–index, the Hannah–Kay–index with parameter  $\alpha = 1.5$ . This is the mean of the parameters from Herfindahl– and Exponential–index written as Hannah–Kay–measures.

Before we define the measures to be used we give some notations. Let

$$\mathbb{R}_+^n = \{x \in \mathbb{R}^n | x_i \geq 0\}$$

$$\mathcal{D}_+ = \bigcup_{n=2}^{\infty} \mathbb{R}_+^n.$$

Further let  $n$  be the number of firms in an industry. The output of firm  $i$  is  $x_i$ , so  $x$  is the vector of outputs. Let  $p$  be the vector of output shares associated with  $x$ , i.e.,

$$p_i = \frac{x_i}{\sum_{j=1}^n x_j} \quad \forall i = 1, \dots, n.$$

Except for the case of the mobility measures the individual elements of  $x$  and  $p$  should be ordered, i.e.,  $x_1 \geq x_2 \geq \dots \geq x_n$  and  $p_1 \geq \dots \geq p_n$ .

With these definitions a concentration ratio is

$$CR_k = \sum_{i=1}^k p_i. \quad (2.1)$$

This is a point measure which only takes the information of the  $k$  greatest firms into account. So its informational content is rather low. However, the curve through the points  $(k, CR_k)$ ,  $k = 1, \dots, n$ , the so called concentration curve, is a handy graphical instrument. Besides, the computation of the concentration ratio is very easy since it does not need information about the whole industry. Furthermore its economic interpretation is clear.

As to the other indices they are summary measures which achieve greater accuracy by using more detailed information. These measures are real-valued functions defined on  $\mathcal{D}_+$ . First there is the Rosenbluth-index:  $RB : \mathcal{D}_+ \rightarrow \mathbb{R}$  with

$$RB(x) = \frac{1}{2 \sum_{i=1}^n ip_i} \Leftrightarrow 1 \quad (2.2)$$

(see Rosenbluth (1961)). Two other measures are the Exponential-index (Marfels (1971))

$$Ex(x) = \prod_{i=1}^n p_i^{p_i} \quad (2.3)$$

and the Herfindahl-index (Herfindahl (1950))

$$H(x) = \sum_{i=1}^n p_i^2. \quad (2.4)$$

Hannah and Kay (1977) proposed their family as numbers equivalent measures, i.e., the indices give the number of firms which, if they all have the same market share, produce the same concentration like the actual industry. Although this is a very nice criterion to describe the degree of concentration, usually the reciprocal of this index is used to measure concentration, because the interpretation of the numbers equivalent is difficult if its value is not an integer.

The family of indices of Hannah and Kay (1977) is defined as

$$H_\alpha : \mathcal{D}_+ \rightarrow \mathbb{R}$$

$$H_\alpha(x) = \begin{cases} \left( \sum_{i=1}^n p_i^\alpha \right)^{\frac{1}{\alpha-1}} & \alpha > 0, \alpha \neq 1 \\ \prod_{i=1}^n p_i^{p_i} & \alpha = 1. \end{cases} \quad (2.5)$$

This means for  $\alpha = 1$  is the Hannah–Kay–index is just the Exponential–index. Choosing  $\alpha = 2$  one gets the Herfindahl–index and for  $\alpha \rightarrow \infty$  the Hannah–Kay–index converges to  $CR_1$ . On the other hand, if  $\alpha \rightarrow 0$ ,  $H_\alpha \rightarrow 1/n$  (see Chakravarty and Eichhorn (1991)). The behaviour of  $H_\alpha$  depends on  $\alpha$ . The higher  $\alpha$  the more a transfer of output from a small firm to a large firm increases concentration (Chakravarty and Eichhorn (1991)). Deffaa (1991) noticed that the Hannah–Kay–indices give large firms high weights which even increase with growing  $\alpha$ . Piesch (1994) remarked that  $H_\alpha$  is monotone increasing in  $\alpha$ . This means that the sensitivity of  $H_\alpha$  becomes

- higher with growing  $\alpha$  if the output of one or both of the firms are in the upper half of the ordered output values (they are higher than the median).
- lower with growing  $\alpha$  if the output of both firms are in the lower half of the ordered output values (they are smaller than the median).

This provides some help in interpreting the structure of change in concentration. If the dynamic Hannah–Kay measure decreases with growing  $\alpha$  the majority of the Pigou–Dalton–transfers is likely to occur in the lower half of the observations. If the dynamic index grows with increasing  $\alpha$  there will be mostly transfers involving one or both observations in the upper half of the values. To get the original measure of Hannah and Kay use the transformation  $1/H_\alpha(x)$ .

Another measure of concentration is the entropy (Theil (1967), p. 290)

$$Ent(x) = \sum_{i=1}^n p_i \ln \left( \frac{1}{p_i} \right). \quad (2.6)$$

It is an inverse measure of concentration, i.e., if the concentration rises the entropy–measure is falling. Because of the following connection between the Exponential– and the entropy–index the latter will only be used to calculate dominance measures.

$$Ent(x) = \Leftrightarrow \sum_{i=1}^n p_i \ln(p_i) = \Leftrightarrow \ln \left( \prod_{i=1}^n p_i^{p_i} \right)$$

$$\Leftrightarrow \Leftrightarrow e^{Ent(x)} = \prod_{i=1}^n p_i^{p_i} = Ex(x).$$

Dominance measures give a quantitative index of monopolistic and oligopolistic structures. They determine the oligopoly group and the influence which this group has on the market. For more details see Deffaa (1982) and Hühn (1994).

Deffaa (1982) proposed a dominance measure based on the Herfindahl-index (2.4)

$$D_k^H(x) = \frac{CR_k^2}{k} + \frac{(1 \Leftrightarrow CR_k)^2}{n \Leftrightarrow k}. \quad (2.7)$$

Hühn (1994) pointed out that a measure based on the entropy measure (2.6) has better qualities, namely the inverse index

$$D_k^{Ent}(x) = \frac{CR_k \ln\left(\frac{k}{CR_k}\right) + (1 \Leftrightarrow CR_k) \ln\left(\frac{n-k}{1-CR_k}\right)}{\ln(n)}. \quad (2.8)$$

To find the oligopoly group the dominance index is calculated for  $k = 1, \dots, n$ . The  $k^*$  with

$$D_{k^*}^H(x) = \max_{k=1, \dots, n} D_k^H(x) \quad \text{or} \quad D_{k^*}^{Ent}(x) = \min_{k=1, \dots, n} D_k^{Ent}(x)$$

separates the oligopoly group from the pursuer group. The  $k^*$  largest firms build the oligopoly group and the remaining firms are the pursuers. The value of the dominance measure is  $D_{k^*}^H(x)$  or  $D_{k^*}^{Ent}(x)$ .

Additionally, the disparity in the oligopoly and pursuer group as well as a weighted mean of both can be computed for  $D_{k^*}^H(x)$ . The first values show the disparity in the two groups. The latter is the share of the concentration which cannot be explained by the dominance structure. To calculate the disparities the normalized quadratic coefficient of variation is used (see Piesch (1975), p.149)

$$I^H = \frac{V^2}{V^2 + 1} \quad V^2 := \frac{\sigma^2}{\mu^2}$$

with variance  $\sigma^2$  and mean  $\mu$  of  $x$ . With this definition we get (the subscript  $o$  characterizes the oligopoly and  $u$  the pursuer group)

$$I_o^H = \frac{V_o^2}{V_o^2 + 1} \quad \text{and} \quad I_u^H = \frac{V_u^2}{V_u^2 + 1}. \quad (2.9)$$

The weighted disparity is

$$\bar{I}^H = gI_o^H + (1 \Leftrightarrow g)I_u^H \quad (2.10)$$

with

$$g = \frac{\sum_{i=1}^{k^*} x_i^2}{\sum_{i=1}^n x_i^2}.$$

More details can be found in Deffaa (1982).

It would be nice if there are similar formulae for the Entropy dominance measure. But there is no such simple connection. The calculations of Deffaa took advantage of the decomposition of the Herfindahl-Index. Choosing this starting point we get the following result for the normalized Entropy index, which is the basis the Entropy dominance measure is built on.

Let the market be divided into two parts with market shares  $p_o$  and  $p_u = 1 \Leftrightarrow p_o$ , frequency  $k$  and  $n \Leftrightarrow k$ , and Entropy measures  $Ent_o(x)$  and  $Ent_u(x)$ . The market shares of the members of the groups should be  $p_{oj}$  respectively  $p_{uj}$ . Then the following decomposition holds (see Piesch (1975), p.217) no matter in which way the observations are ordered.

$$\begin{aligned}
\frac{Ent(x)}{\ln(n)} &= \frac{\sum_{i=1}^n p_i \ln\left(\frac{1}{p_i}\right)}{\ln(n)} \\
&= \frac{\sum_{j=1}^k \frac{p_{oj}}{p_o} \ln\left(\frac{p_o}{p_{oj}}\right)}{\ln(k)} \frac{\ln(k)}{\ln(n)} p_o + \frac{\sum_{j=k+1}^n \frac{p_{uj}}{p_u} \ln\left(\frac{p_u}{p_{uj}}\right)}{\ln(n \Leftrightarrow k)} \frac{\ln(n \Leftrightarrow k)}{\ln(n)} p_u \\
&\quad + \frac{p_o \ln\left(\frac{1}{p_o}\right)}{\ln(n)} + \frac{p_u \ln\left(\frac{1}{p_u}\right)}{\ln(n)} \\
&= \frac{Ent_o(x)}{\ln(k)} \frac{\ln(k)}{\ln(n)} p_o + \frac{Ent_u(x)}{\ln(n \Leftrightarrow k)} \frac{\ln(n \Leftrightarrow k)}{\ln(n)} p_u \\
&\quad + \frac{p_o \ln\left(\frac{1}{p_o}\right)}{\ln(n)} + \frac{p_u \ln\left(\frac{1}{p_u}\right)}{\ln(n)}. \tag{2.11}
\end{aligned}$$

Now assume that the first group contains the  $k$  largest companies. This means  $p_o = CR_k$  and thus  $p_u = 1 \Leftrightarrow CR_k$ . Inserting in (2.11) yields

$$\begin{aligned}
\frac{Ent(x)}{\ln(n)} &= \frac{Ent_o(x)}{\ln(k)} \frac{\ln(k)}{\ln(n)} CR_k + \frac{Ent_u(x)}{\ln(n \Leftrightarrow k)} \frac{\ln(n \Leftrightarrow k)}{\ln(n)} (1 \Leftrightarrow CR_k) \\
&\quad + \frac{CR_k \ln\left(\frac{1}{CR_k}\right)}{\ln(n)} + \frac{(1 \Leftrightarrow CR_k) \ln\left(\frac{1}{1-CR_k}\right)}{\ln(n)} \\
&= \frac{Ent_o(x)}{\ln(k)} \frac{\ln(k)}{\ln(n)} CR_k + \frac{Ent_u(x)}{\ln(n \Leftrightarrow k)} \frac{\ln(n \Leftrightarrow k)}{\ln(n)} (1 \Leftrightarrow CR_k) \\
&\quad + \underbrace{\frac{CR_k \ln\left(\frac{k}{CR_k}\right)}{\ln(n)} + \frac{(1 \Leftrightarrow CR_k) \ln\left(\frac{n-k}{1-CR_k}\right)}{\ln(n)}}_{=D_k^{Ent}(x)} \\
&\quad \Leftrightarrow CR_k \frac{\ln(k)}{\ln(n)} \Leftrightarrow (1 \Leftrightarrow CR_k) \frac{\ln(n \Leftrightarrow k)}{\ln(n)} \\
&= \underbrace{D_k^{Ent}(x)}_{=:I_o^{Ent}} \Leftrightarrow \underbrace{\left(1 \Leftrightarrow \frac{Ent_o(x)}{\ln(k)}\right)}_{=:I_u^{Ent}} \frac{\ln(k)}{\ln(n)} CR_k \Leftrightarrow \underbrace{\left(1 \Leftrightarrow \frac{Ent_u(x)}{\ln(n \Leftrightarrow k)}\right)}_{=:I_u^{Ent}} \frac{\ln(n \Leftrightarrow k)}{\ln(n)} (1 \Leftrightarrow CR_k). \\
&\hspace{15em} := A
\end{aligned}$$

In terms of information theory,  $I_o^{Ent}$  and  $I_u^{Ent}$  are the relative redundancies for the oligopoly and the pursuer group (see Theil (1977) p. 92), i.e., disparity measures. These

are the measures corresponding to  $I_o^H$  and  $I_u^H$ . But there is no analogy to  $\bar{I}^H$  because term  $A$  is negative and so there is no possibility to express it as a share of the concentration which is not explained by the dominance measure. The simple reason is that the Entropy is an inverse concentration index.

If there exist data for more than one period not only the concentration in one point of time but also the change in concentration and market structure is of interest. Let  $y$  be the vector of outputs in the second period with share vector  $q$ .

Stich (1995) derived a class of dynamic inequality measures. The members of this class should be less than or equal to 0 if  $y$  is created by a Pigou–Dalton transfer from  $x$ . To alleviate the interpretation of the measures they should be normalized. The indices should be 1 if the increase in concentration is maximal and -1 if the decrease is maximal. If  $x$  does not change the measures should be 0. Swapping the two arguments does not alter the size of change in concentration but only the direction. So the indices should merely change their sign. Furthermore, if the observation period is decomposable, the overall change in concentration is the sum of the concentration changes of the individual periods: that is, the measures should be additive,  $\Delta(x, y) = \Delta(x, z) + \Delta(z, y)$ . Stich (1995) shows that any dynamic concentration index fulfilling these axioms is of the form

$$\Delta(x, y) = \frac{K(y) \Leftrightarrow K(x)}{\sup_{z \in \mathcal{D}_+} K(z) \Leftrightarrow \inf_{z \in \mathcal{D}_+} K(z)} \quad (2.12)$$

where  $K : \mathcal{D}_+ \rightarrow \mathbb{R}$  is a concentration index. All measures considered in this paper have the maximum 1 and (for  $n \rightarrow \infty$ ) the infimum 0. So the dynamic index is simply the difference between the concentration in the two periods

$$\Delta(x, y) = K(y) \Leftrightarrow K(x). \quad (2.13)$$

But it is possible that the market structure changes without changing the concentration, e.g., if the largest and the smallest firm interchange their market shares. In order to measure this effect König (1961) proposed the sum of the absolute difference of the shares of the two periods, i.e., the sum of the market shares which are won or lost of some firm. It is important that the second vector is ordered like the first, i.e., the output of firm  $i$  have to be found in both vectors at the same place (e.g., the  $i$ -th element). Königs measure of mobility is

$$\rho = \sum_{i=1}^n |p_i \Leftrightarrow q_i|. \quad (2.14)$$

We use a simple transformation of  $\rho$  because of its good interpretation

$$M = \frac{1}{2} \sum_{i=1}^n |p_i \Leftrightarrow q_i| = \frac{1}{2} \rho. \quad (2.15)$$

$M$  is just the share of the output sum which the firms had lost or, equivalently, the share of the output sum which the firms had won in the last period.

### 3 The data and application

In order to calculate the measures for the Swedish and Finnish insurance industry in the years 1989 – 1993 we took the premium income of the individual companies from the Svensk Försäkringsårsbok 1990 – 1994 and from The Insurance Companies 1989 – 1993 (1991-1995) separately for life and non-life insurance companies. For convenience the four groups will be named in the following: life Sweden, non-life Sweden, life Finland and non-life Finland. The usage of this notation is clear, e.g., life Sweden is the group of the life insurance companies in Sweden.

Between the years 1989 and 1993 we observed 32 Swedish life companies and 101 non-life. The former group encloses the traditional life insurance companies. For 1992 – 1993 the unit linked companies are also considered. In the latter group are the nationwide Swedish companies, the major local companies and foreign companies. About 350 minor local companies are not taken into account because their premium income is less than 0.5%.

The life group in Finland consists of 18 companies, the non-life group of 46. This group contains the nationwide Finnish companies and two foreign companies. It does not include 120 or so minor local companies.

Of course the exclusion of the minor local companies produces errors in the calculation of the indices. But these will be so small that they can be neglected.

The whole data can be found in tables 59, 60, 61 and 62 in the appendix. The total premium incomes are given in table 63. We used the premium income because this is the equivalent to output in other industries. The following indices were computed:

#### I. Concentration measures

- $CR_k$ ,  $k = 1, 3, 5, 10$
- $H_\alpha$ ,  $\alpha = 0, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.5$  (Historical)<sup>1</sup>
- $H_\alpha$ ,  $\alpha = 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10$
- $RB$

#### II. Dominance measures

- $D_{k^*}^H$ ,  $k^*$ ,  $I_o^H$ ,  $I_u^H$ ,  $\bar{I}^H$
- $D_{k^*}^{Ent}$ ,  $k^*$ ,  $I_o^{Ent}$ ,  $I_u^{Ent}$

#### III. Dynamic concentration measures for all indices from I.

- over time
- between life and non-life companies in both countries
- between Sweden and Finland for life and non-life companies

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<sup>1</sup>We named the second point in I "Historical" because Hannah and Kay used these values in their 1977 study. All results can be found in the appendix.



## IV. Mobility measures

- *M*

At first we will look at the number of firms and the growth of the different groups in the five years.

**Table 1: Numbers of firms 1989 – 1993**

Country	Group	1989	1990	1991	1992	1993
Sweden	life	19	19	19	29	31
Sweden	non-life	75	75	77	75	84
Finland	life	16	17	17	16	17
Finland	non-life	37	39	39	39	38

Table 1 shows that the number of companies in Sweden is higher than in Finland. This is true for both groups life and non-life. Except in 1993 in non-life Sweden and in 1992 and 1993 in life the number of Swedish members in the markets remains constant. The second exception can be explained by the entry of the unit linked companies to the market in these years.

**Table 2: Entries and exits in the insurance markets 1989 –1993**

Country	Group	1990		1991		1992		1993	
		Entries	Exits	Entries	Exits	Entries	Exits	Entries	Exits
Sweden	life	0	0	0	0	10	0	2	0
Sweden	non-life	3	3	5	3	4	6	11	2
Finland	life	1	0	0	0	0	1	1	0
Finland	non-life	4	2	2	2	0	0	2	1

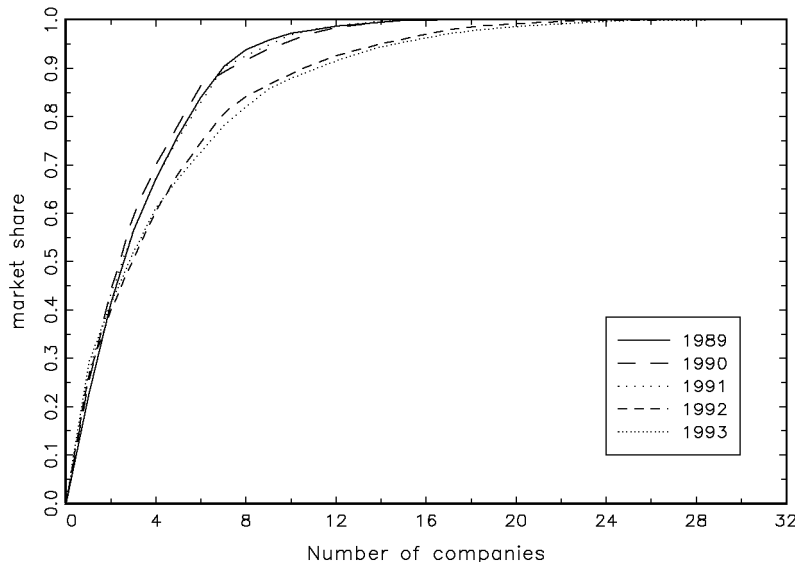
A slightly different figure is shown by the number of entries and exits in the markets (table 2). In Finland the market structure is constant whereas in Sweden the effect of the unit linked companies in life Sweden can be seen. Moreover, in non-life Sweden the market is in motion. Although the number of companies in the first four years is constant there are entries into and exits out of the market.

**Table 3: Increase of market volume 1989 – 1993 in %**

Country	Group	1989–1993	1989–1990	1990–1991	1991–1992	1992–1993
Sweden	life	5.61	-10.36	10.19	3.99	2.82
Sweden	non-life	55.40	17.72	12.59	14.5	2.40
Finland	life	19.27	26.23	3.01	-14.67	7.49
Finland	non-life	4.92	8.63	3.02	-3.12	-3.22

It is obvious that the growth in Sweden and Finland is very different. While in Sweden the non-life group with 55.40% clearly grows more than the life group (5.61%) the life group in Finland is in a better situation than the non-life group. It can be seen also that

Figure 1: Concentration curves for life insurance companies Sweden 1989 – 1993



1990 for life Sweden, 1992 for life Finland and 1992 and 1993 for non-life Finland were bad years.

To get a more detailed overview we computed the increase of the greatest 1, 3, 5, and 10 companies from 1989 to 1993.

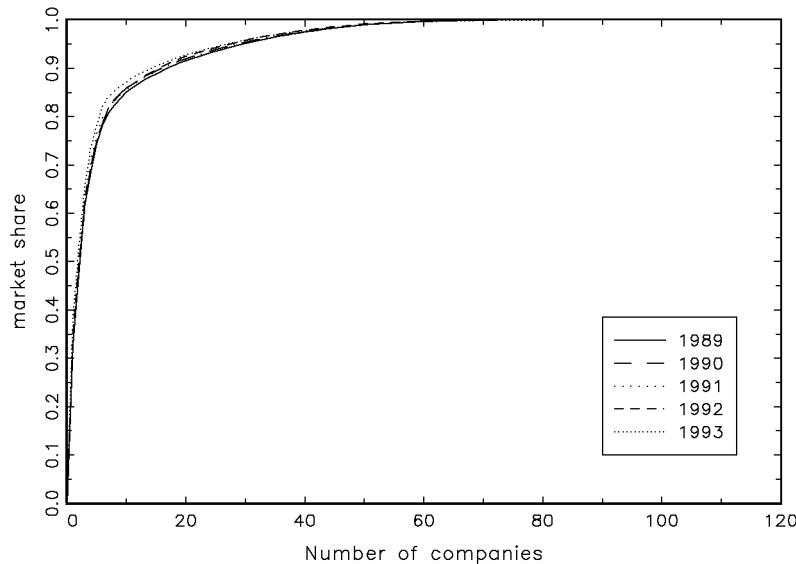
**Table 4: Increase of the market volume of the largest 1, 3, 5, 10 companies 1989–1993 in %**

Country	Group	Number of companies			
		1	3	5	10
Sweden	life	37.14	-2.54	-6.67	-4.49
Sweden	non-life	79.44	66.94	62.91	59.26
Finland	life	20.43	18.77	19.25	19.86
Finland	non-life	-1.58	-1.01	1.26	4.34

In life Sweden the largest company grows more than the market but the 3, 5, 10 largest companies decrease whereas the market grows. In non-life Sweden the 1, 3, 5 and 10 largest companies increase more than the market while in non-life Finland the increase is less than the whole market. In life Finland the groups behave differently. The 1 and 10 largest firms have a growth greater than that of the market, the 3 largest firms grow less than the market, and the 5 largest firms have the same increase as the market. This means that in life Sweden and non-life Finland the concentration in the 5 years probably decreased whereas in non-life Sweden it increased.

Before computing concentration measures we plotted the concentration curves for the individual groups to get an overview. The curves can be found in Figures 1 – 4.

Figure 2: Concentration curves for non-life insurance companies Sweden 1989 – 1993



Having a look at the figures one can see that all curves intersect each other. Because of this it is necessary to compute concentration measures to describe concentration effects. Beside this a lower concentration in the years 1992 and 93 in life Sweden caused by the units linked companies is found. In the markets for life insurance the curves differ more than in the non-life markets.

As to the interpretation of the concentration measures the concentration ratios (tables 12 – 15) reveal that the largest company holds a market share of more than 20%. The biggest 3 have at least 50% and the largest five 70%. Accurately speaking in life Sweden (table 12) the market share of the largest company grows from 22% to 29%. The share of the biggest 3 vary between 56% and 59%. Because of the unit linked companies 1992 the share falls to 50%. The largest 5 fluctuate between 75% and 78% and fall to 68% in 1992. The market share of the largest 10 fluctuates between 95% and 97% in 1989 – 1991 and decreases to 88% in 1992.

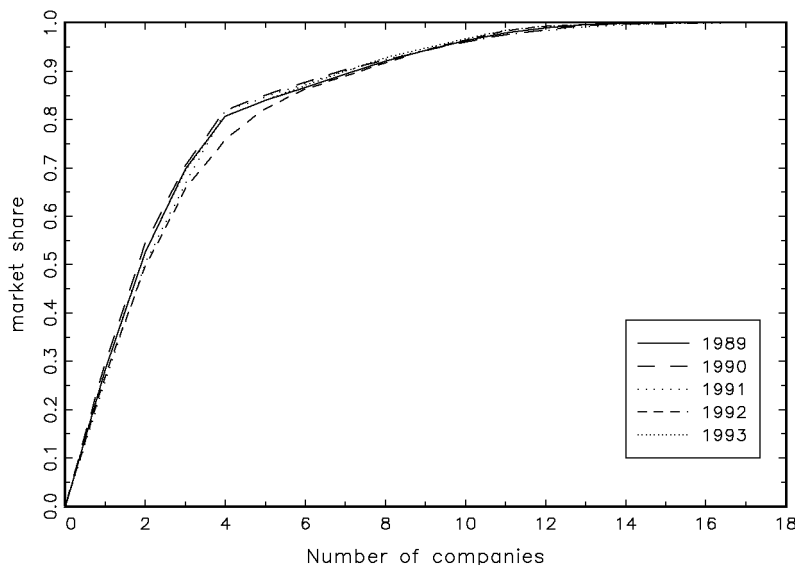
In life Finland the market shares are concentrated more clearly at the top 5 companies. These hold a share of 82% – 85% (see table 14).

The largest market share of all companies has the market leader of non-life Sweden in 1993. It is 38.03%. In general the concentration ratios of the largest 5 firms in non-life Sweden are greater than the corresponding values for life Sweden (table 13). This holds although there are much more companies in non-life Sweden. Their market share is around 74% – 78%.

In Finland the reverse is true. The concentration ratios of non-life Finland are always lower than the concentration ratios of life Finland (table 15).

This means (tables 31 – 32) the concentration ratios of life Finland are almost always

Figure 3: Concentration curves for life insurance companies Finland 1989 – 1993



higher than the ratios of life Sweden and except for  $k = 10$  the market shares of non-life Finland are always lower than the shares of non-life Sweden. At  $k = 10$  the higher number of firms in non-life Sweden becomes noticeable. Furthermore (tables 33, 34) the concentration ratios of life Finland are always higher than in non-life Finland. In Sweden the following constellation arises

$$\begin{array}{llll}
 \text{non-life Sweden} & > & \text{life Sweden} & k = 1, 3 \\
 \text{non-life Sweden} & >< & \text{life Sweden} & k = 5 \\
 \text{non-life Sweden} & < & \text{life Sweden} & k = 10.
 \end{array}$$

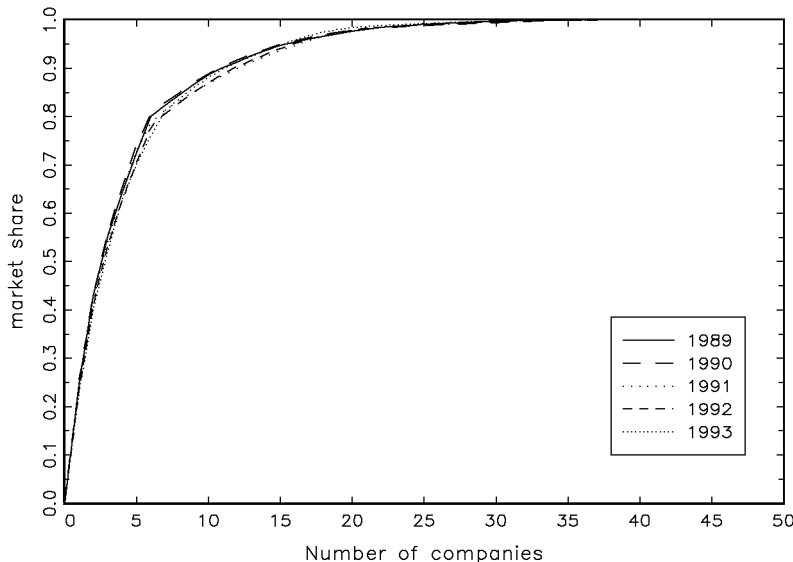
This effect can also be explained by the higher number of firms in non-life Sweden.

Having done the inter-group comparison we now make a temporal analysis (tables 27 – 30). The decrease of the concentration ratios in life Sweden from 1991 to 1992 can be seen here. Also the ratios for  $k = 5$  and  $k = 10$  decrease most of the time. On the other hand the shares increase in non-life Sweden (except for  $k = 10$  in 1990/91 and  $k = 5$  in 1991/92). In life Finland we have a non uniform figure. In 1990/91 the shares fall for  $k = 1, 3, 5$ , and in 1991/92 for  $k = 3, 5$  whereas for  $k = 10$  it only falls in 1989/90. So there are some changes in the first 10 firms.

While in 1989/90 all concentration ratios increase all shares are decreasing in non-life Finland in 1990/91. In the next two years the ratios for  $k = 1, 3, 5$  are falling, while the share for  $k = 10$  is growing. This means that the firms on the places 6 to 10 had won market shares.

Concerning the interpretation of the summary concentration indices, we consider only the measures of Herfindahl, Rosenbluth and the Exponential-index. All other values can be

Figure 4: Concentration curves for non-life insurance companies Finland 1989 – 1993



found in the appendix and will be used only to describe the structure of the change in concentration. The values of the Hannah–Kay–indices are summarized in figures 5 – 8. Besides the dynamic values are tabulated in tables 39 – 42 and 47 – 50 in the appendix.

However interpreting merely these three indices one can already see great differences in the order of the degrees of concentration in the individual groups. Until 1991 the Exponential– and the Rosenbluth–index show the same order. Only the Herfindahl–Index orders differently. But since 1992 all measures rank the four groups differently. The values are summarized in tables 5 – 9. They are ranked by the strength of concentration, i.e., 1  $\hat{=}$  highest concentration and 4  $\hat{=}$  lowest concentration.

**Table 5: The values and order of the concentration measures of Herfindahl, Rosenbluth and the Exponential–index 1989**

1989	Sweden life		Sweden non-life		Finland life		Finland non-life	
	value	rank	value	rank	value	rank	value	rank
<i>H</i>	0.14073	<b>3</b>	0.16089	<b>2</b>	0.18479	<b>1</b>	0.13246	<b>4</b>
<i>Ex</i>	0.11464	<b>2</b>	0.08053	<b>4</b>	0.13754	<b>1</b>	0.08825	<b>3</b>
<i>RB</i>	0.15163	<b>2</b>	0.08515	<b>4</b>	0.17879	<b>1</b>	0.11548	<b>3</b>

**Table 6: The values and order of the concentration measures of Herfindahl, Rosenbluth and the Exponential-index 1990**

1990	Sweden life		Sweden non-life		Finland life		Finland non-life	
	value	rank	value	rank	value	rank	value	rank
<i>H</i>	0.15014	<b>3</b>	0.13092	<b>2</b>	0.19265	<b>1</b>	0.13580	<b>4</b>
<i>Ex</i>	0.11692	<b>2</b>	0.08355	<b>4</b>	0.14109	<b>1</b>	0.08987	<b>3</b>
<i>RB</i>	0.15558	<b>2</b>	0.08815	<b>4</b>	0.18390	<b>1</b>	0.11740	<b>3</b>

**Table 7: The values and order of the concentration measures of Herfindahl, Rosenbluth and the Exponential-index 1991**

1991	Sweden life		Sweden non-life		Finland life		Finland non-life	
	value	rank	value	rank	value	rank	value	rank
<i>H</i>	0.14727	<b>3</b>	0.16897	<b>2</b>	0.18053	<b>1</b>	0.12897	<b>4</b>
<i>Ex</i>	0.11552	<b>2</b>	0.08513	<b>4</b>	0.13607	<b>1</b>	0.08530	<b>3</b>
<i>RB</i>	0.15270	<b>2</b>	0.08872	<b>4</b>	0.17545	<b>1</b>	0.11103	<b>3</b>

**Table 8: The values and order of the concentration measures of Herfindahl, Rosenbluth and the Exponential-index 1992**

1992	Sweden life		Sweden non-life		Finland life		Finland non-life	
	value	rank	value	rank	value	rank	value	rank
<i>H</i>	0.12714	<b>3</b>	0.17143	<b>1</b>	0.16943	<b>2</b>	0.12542	<b>4</b>
<i>Ex</i>	0.08756	<b>2</b>	0.08575	<b>3</b>	0.12825	<b>1</b>	0.08373	<b>4</b>
<i>RB</i>	0.11629	<b>2</b>	0.09084	<b>4</b>	0.17010	<b>1</b>	0.10984	<b>3</b>

**Table 9: The values and order of the concentration measures of Herfindahl, Rosenbluth and the Exponential-index 1993**

1993	Sweden life		Sweden non-life		Finland life		Finland non-life	
	value	rank	value	rank	value	rank	value	rank
<i>H</i>	0.13352	<b>3</b>	0.19443	<b>1</b>	0.18560	<b>2</b>	0.12263	<b>4</b>
<i>Ex</i>	0.08601	<b>3</b>	0.09566	<b>2</b>	0.13859	<b>1</b>	0.08406	<b>4</b>
<i>RB</i>	0.11272	<b>2</b>	0.09624	<b>4</b>	0.18123	<b>1</b>	0.11215	<b>3</b>

Obviously, the concentration in life Finland is the highest. But then it becomes noticeable that the Herfindahl-index gives higher weights to high market shares. So it orders the four groups in a different way. 1989–1991 one can fix the following order: The highest concentration holds in life Finland followed by life Sweden and non-life Finland. The lowest concentration can be found in non-life Sweden. In 1992 and 1993 one has to decide whether to weight the biggest firms high or low. Depending on the weights one gets different orders. Choosing the Herfindahl-index non-life Sweden is number one because of its high market shares in the first 5 firms. On the other hand the Rosenbluth-index puts non-life Sweden on place 4. For this period no overall statement is possible.

Although there exist great differences in the ordering the three indices show the change in concentration in the same way.

Figure 5: Hannah–Kay–indices for life insurance companies Sweden 1989 – 1993

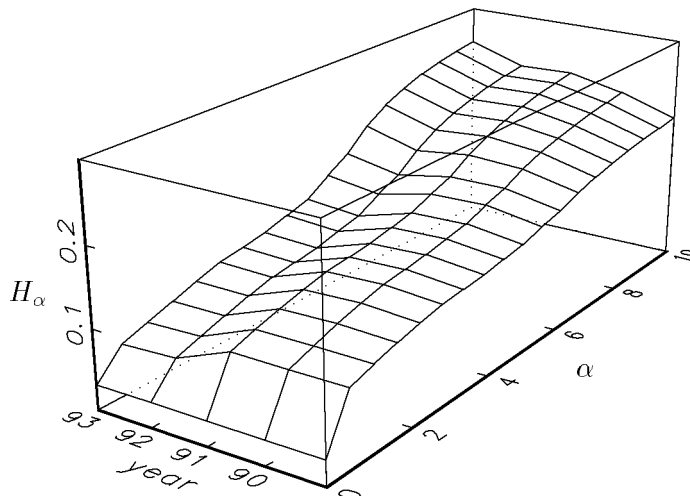


Table 10: Change in concentration 1989 – 1993 (dynamic indices)

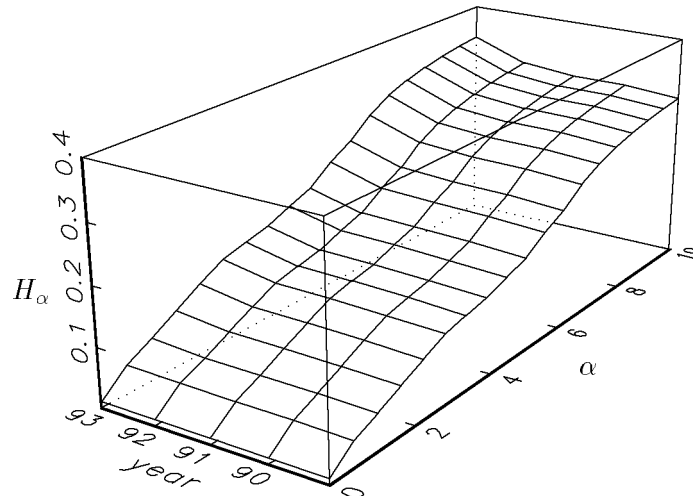
Measure	Sweden life	Sweden non–life	Finland life	Finland non–life
$H$	-0.02977	0.03354	0.00081	-0.00983
$Ex$	-0.02863	0.01513	0.00105	-0.00419
$RB$	-0.03891	0.01109	0.00244	-0.00333

This table shows that the change in concentration in Sweden is greater than in Finland. Besides, it can be seen that the concentration in life Sweden and non–life Finland decreases while it increases in non–life Sweden and life Finland. This is in concordance with our interpretation of the market growth.

To make the analysis exact look at tables 25, 35–38 and 43–46. The dynamic Rosenbluth–index shows the increase of the concentration in life Sweden in the first year and the decrease in the others.

Whereas in non–life Sweden the growth in concentration is continuous. In Finland the concentration increases in both groups in the years 1990 and 1993. In the remaining years it decreases. Looking at the Hannah–Kay–indices it can be seen that the transfers of market shares in life Sweden essentially took place in the upper half of the firms. In 1990/91 there are Pigou–Dalton–transfers in the lower half and concentration–transfers (anti–Pigou–Dalton–transfers) in the upper range. This follows from the behaviour of the Hannah–Kay–indices which show up to  $\alpha = 4$  decreasing concentration and then increasing concentration. This is the effect of the growing weight of the high market shares with growing  $\alpha$ . In 1991/92 the absolute value of the dynamic index falls with growing  $\alpha$ , i.e., in the upper tail one can find concentration–transfers getting higher weight with increasing  $\alpha$ . This means there is decreasing concentration which is weakened through

Figure 6: Hannah–Kay–indices for non–life insurance companies Sweden 1989 – 1993



concentration–transfers in the upper area. In 1992/93 there is an effect similar to the one in 1990/91 but even weaker (from  $\alpha = 1.4$  an increasing concentration is measured). Concentration–transfers in the upper part produce the increasing concentration in non–life Sweden. Only in 1990/91 there are concentration effects in the lower group (the dynamic measure decreases with growing  $\alpha$ ).

In 1989 life Finland shows an increase in concentration caused by concentration–transfers in the upper area and in 1990/91 a decrease caused by Pigou–Dalton–transfers in the same group. In 1991/92 there are Pigou–Dalton–transfers in the lower half which are weakened by concentration–transfers in the other half. But these concentration effects are not very strong. An increase is shown not before  $\alpha = 7$ . In 1992/93 another turn–around can be found. The dynamic index increases up to  $\alpha = 2.5$ , then it decreases. This means the concentration increases, dampened by Pigou–Dalton–transfers in the upper part.

In the first years the group of the non–life insurance companies in Finland show the same behaviour as life Finland. Since 1991/92 this changes. The absolute value of the dynamic measure grows up to  $\alpha = 3$  and then it falls. Here the concentration is decreasing with obstructing concentration–transfers in the upper group. In 1992/93 a decrease in concentration caused by Pigou–Dalton–transfers in the upper tail can be seen.

In addition to the change of concentration the mobility is of considerable interest. The values can be found in table 11



Figure 7: Hannah–Kay–indices for life insurance companies Finland 1989 – 1993

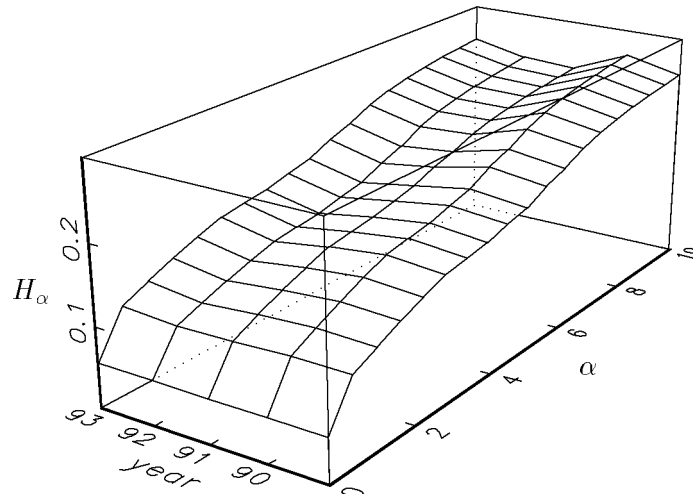


Table 11: Mobility 1989 – 1993

Country	Group	1989/90	1990/91	1991/92	1992/93
Sweden	life	0.12206	0.08715	0.10374	0.06988
Sweden	non-life	0.02565	0.03761	0.05494	0.08979
Finland	life	0.02867	0.04868	0.08618	0.06900
Finland	non-life	0.09874	0.03451	0.04543	0.05695

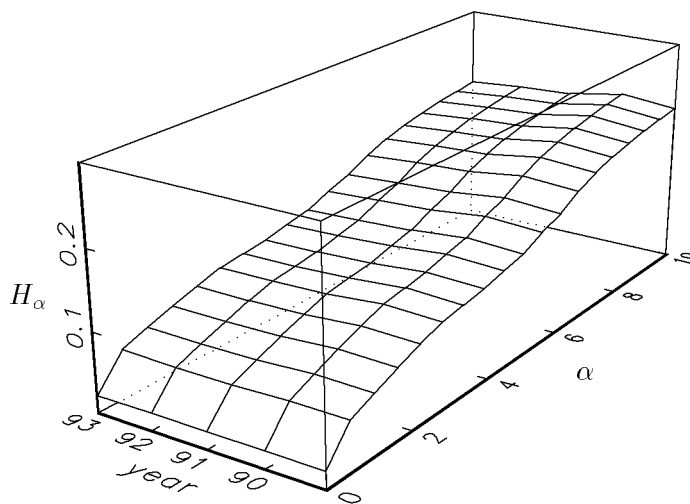
A continuous growth of mobility in non-life Sweden can be seen. In life Finland it is just the same in the first four years. Only in 1992/93 the mobility decreases a little. The mobility in the life markets is always higher than in the non-life markets. The share of the lost market shares of the companies lies between 2.5% and 12.2%.

Finally some remarks concerning dominance (see tables 51 – 54 and 55 – 58). The highest dominance is found in life Finland followed by non-life Sweden, life Sweden and non-life Finland. It is constant in life Finland and the oligopoly group consists of 3 firms. In life Sweden and non-life Finland the dominance decreases over time, although the oligopoly group is reduced from 6 to 1 firm and from 6 to 4 firms, respectively. The dominance in non-life Sweden increases while the oligopoly group reduces from 3 to 1 company. At least 70% of the concentration in Sweden and 80% in Finland can be explained by the dominance measure. Astonishingly, the share of the unexplained concentration  $\bar{I}^H$  is highest in non-life Sweden and lowest in life Finland. This means that most of the concentration in non-life Sweden is explained by the dominance measure (75% – 80%). Also for life Sweden, non-life Sweden and non-life Finland the disparity in the oligopoly group ( $I_o^H$ ) is small while it is large in the pursuer group ( $I_u^H$ ). In life Finland these values are closer to 0.5 and the disparity in the oligopoly group is (except for 1989) higher than in the pursuer group.

Looking at the Entropy dominance measure the oligopoly group is always larger than if determined by the Herfindahl dominance measure. Also the order of dominance is changed. The greatest dominance is found for non-life Sweden followed by non-life Finland, life Sweden and life Finland. Except life Sweden (6 – 9 members) the oligopoly groups are constant. The disparity in the oligopoly groups of life Sweden, life Finland and non-life Finland is low and in the pursuer groups it is high. Only in non-life Sweden the difference between these values is smaller. This is in accordance to the decision of the Herfindahl dominance measures which show the same effect in life Finland.

It can be remarked that all groups have very small oligopoly groups so that one can speak of an oligopoly in the insurance market of Sweden and Finland.

Figure 8: Hannah–Kay–indices for non-life insurance companies Finland 1989 – 1993



## 4 Conclusion

The concentration of the companies in a market is of considerable interest. It gives information about the market structure, the control of the leading companies and monopolistic or oligopolistic structures. These are needed by the government to decide whether two companies can consolidate or not and by the companies to determine their future strategy.

This paper investigates the concentration in the Swedish and Finnish insurance market divided in the life and non-life sector. Looking at the two countries the insurance markets behave differently. In Finland the concentration in the non-life market decreases while in the life market it increases. In Sweden the reverse is true. Furthermore, in both countries the concentration in the life sector is higher than in the non-life sector. The mobility is rather low.

The most interesting result is the oligopolistic structure. An oligopoly can be found in all markets. Although the mobility is low, i.e., market shares are hardly exchanged, one has to look at the concentration processes in the insurance market in order to stop a further strengthening of the oligopolistic group. This is most important in the life insurance market in Finland and the non-life market in Sweden where the concentration and mobility increases.

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## Appendix

**Table 12: Concentration ratios for life insurance companies Sweden 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.22340	0.25011	0.26765	0.26569	0.29010
$CR_3$	0.56414	0.59701	0.56502	0.50643	0.52061
$CR_5$	0.76160	0.78464	0.75534	0.68268	0.67302
$CR_{10}$	0.97195	0.95692	0.96908	0.88901	0.87900

**Table 13: Concentration ratios for non-life insurance companies Sweden 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.32935	0.33689	0.33709	0.34570	0.38030
$CR_3$	0.61346	0.61932	0.63328	0.63363	0.65899
$CR_5$	0.74501	0.75267	0.76397	0.75181	0.78097
$CR_{10}$	0.85071	0.85904	0.85609	0.85764	0.87182

**Table 14: Concentration ratios for life insurance companies Finland 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.28233	0.29978	0.26075	0.27145	0.28507
$CR_3$	0.69758	0.70682	0.66827	0.65752	0.69465
$CR_5$	0.83991	0.85104	0.84664	0.82322	0.83972
$CR_{10}$	0.96278	0.96022	0.96110	0.96507	0.96753

**Table 15: Concentration ratios for non-life insurance companies Finland 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.24563	0.25339	0.23994	0.23678	0.23040
$CR_3$	0.55368	0.56057	0.54306	0.53415	0.52239
$CR_5$	0.72577	0.74130	0.72929	0.70408	0.70042
$CR_{10}$	0.88589	0.88849	0.86864	0.86986	0.88102

**Table 16: Historical Hannah–Kay–indices for life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.03125	0.03125	0.03125	0.03125	0.03125
0.6	0.09691	0.09663	0.09674	0.06788	0.06482
0.8	0.10658	0.10742	0.10681	0.07801	0.07552
1.0	0.11464	0.11692	0.11552	0.08756	0.08601
1.2	0.12143	0.12531	0.12319	0.09653	0.09623
1.4	0.12725	0.13270	0.13005	0.10493	0.10614
1.6	0.13231	0.13922	0.13628	0.11281	0.11568
1.8	0.13676	0.14500	0.14198	0.12020	0.12482
2.0	0.14073	0.15014	0.14727	0.12714	0.13352
2.5	0.14909	0.16085	0.15904	0.14275	0.15330

**Table 17: Historical Hannah–Kay–indices for non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.00990	0.00990	0.00990	0.00990	0.00990
0.6	0.04311	0.04448	0.04478	0.04557	0.04769
0.8	0.06079	0.06300	0.06387	0.06461	0.07037
1.0	0.08053	0.08355	0.08513	0.08575	0.09566
1.2	0.10017	0.10383	0.10608	0.10670	0.12043
1.4	0.11830	0.12243	0.12517	0.12601	0.14287
1.6	0.13440	0.13887	0.14190	0.14316	0.16251
1.8	0.14851	0.15326	0.15639	0.15822	0.17956
2.0	0.16089	0.16587	0.16897	0.17143	0.19443
2.5	0.18601	0.19151	0.19418	0.19822	0.22444

**Table 18: Historical Hannah–Kay–indices for life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.05556	0.05556	0.05556	0.05556	0.05556
0.6	0.10954	0.10953	0.10684	0.10470	0.10968
0.8	0.12405	0.12594	0.12219	0.11700	0.12486
1.0	0.13754	0.14109	0.13607	0.12825	0.13859
1.2	0.14972	0.15461	0.14817	0.13844	0.15078
1.4	0.16046	0.16640	0.15848	0.14759	0.16144
1.6	0.16980	0.17654	0.16715	0.15575	0.17070
1.8	0.17786	0.18521	0.17442	0.16300	0.17869
2.0	0.18479	0.19265	0.18053	0.16943	0.18560

$\alpha$	1989	1990	1991	1992	1993
2.5	0.19831	0.20713	0.19206	0.18257	0.19919

**Table 19: Historical Hannah–Kay–indices for non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.02174	0.02174	0.02174	0.02174	0.02174
0.6	0.06254	0.06262	0.06043	0.05986	0.06140
0.8	0.07579	0.07670	0.07320	0.07219	0.07325
1.0	0.08825	0.08987	0.08530	0.08373	0.08406
1.2	0.09952	0.10168	0.09631	0.09418	0.09372
1.4	0.10946	0.11203	0.10611	0.10349	0.10228
1.6	0.11816	0.12104	0.11474	0.11172	0.10987
1.8	0.12577	0.12890	0.12231	0.11898	0.11661
2.0	0.13246	0.13580	0.12897	0.12542	0.12263
2.5	0.14612	0.14991	0.14250	0.13868	0.13516

**Table 20: Hannah–Kay–indices for life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.11464	0.11692	0.11552	0.08756	0.08601
1.5	0.12986	0.13606	0.13324	0.10894	0.11096
2.0	0.14073	0.15014	0.14727	0.12714	0.13352
3.0	0.15585	0.16934	0.16921	0.15617	0.17020
4.0	0.16626	0.18216	0.18590	0.17761	0.19620
5.0	0.17391	0.19152	0.19876	0.19329	0.21422
6.0	0.17975	0.19871	0.20868	0.20481	0.22693
7.0	0.18434	0.20443	0.21642	0.21343	0.23618
8.0	0.18805	0.20908	0.22253	0.22003	0.24314
9.0	0.19110	0.21294	0.22743	0.22520	0.24854
10.0	0.19367	0.21620	0.23143	0.22934	0.25284

**Table 21: Hannah–Kay–indices for non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.08053	0.08355	0.08513	0.08575	0.09566
1.5	0.12661	0.13092	0.13383	0.13486	0.15303
2.0	0.16089	0.16587	0.16897	0.17143	0.19443
3.0	0.20526	0.21120	0.21330	0.21863	0.24720

$\alpha$	1989	1990	1991	1992	1993
4.0	0.23284	0.23944	0.24062	0.24756	0.27906
5.0	0.25139	0.25836	0.25902	0.26676	0.29970
6.0	0.26444	0.27161	0.27202	0.28013	0.31377
7.0	0.27395	0.28123	0.28153	0.28983	0.32381
8.0	0.28113	0.28847	0.28871	0.29711	0.33128
9.0	0.28670	0.29408	0.29430	0.30275	0.33703
10.0	0.29113	0.29854	0.29874	0.30723	0.34157

**Table 22: Hannah–Kay–indices for life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.13754	0.14109	0.13607	0.12825	0.13859
1.5	0.16530	0.17166	0.16301	0.15179	0.16624
2.0	0.18479	0.19265	0.18053	0.16943	0.18560
3.0	0.20804	0.21763	0.20012	0.19253	0.20908
4.0	0.22118	0.23211	0.21086	0.20654	0.22262
5.0	0.22987	0.24189	0.21800	0.21600	0.23163
6.0	0.23619	0.24909	0.22325	0.22290	0.23819
7.0	0.24104	0.25466	0.22730	0.22820	0.24322
8.0	0.24492	0.25912	0.23053	0.23243	0.24723
9.0	0.24811	0.26278	0.23315	0.23590	0.25050
10.0	0.25079	0.26584	0.23532	0.23881	0.25324

**Table 23: Hannah–Kay–indices for non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.08825	0.08987	0.08530	0.08373	0.08406
1.5	0.11396	0.11669	0.11057	0.10773	0.10619
2.0	0.13246	0.13580	0.12897	0.12542	0.12263
3.0	0.15673	0.16089	0.15291	0.14903	0.14505
4.0	0.17240	0.17722	0.16814	0.16438	0.15981
5.0	0.18357	0.18896	0.17896	0.17537	0.17038
6.0	0.19194	0.19781	0.18709	0.18364	0.17834
7.0	0.19843	0.20470	0.19341	0.19006	0.18455
8.0	0.20360	0.21017	0.19846	0.19519	0.18952
9.0	0.20781	0.21462	0.20258	0.19936	0.19357
10.0	0.21129	0.21829	0.20599	0.20282	0.19693



**Table 24: Rosenbluth-indices 1989 – 1993**

Country	Group	1989	1990	1991	1992	1993
Sweden	life	0.15163	0.15558	0.15270	0.11629	0.11272
Sweden	non-life	0.08515	0.08815	0.08872	0.09084	0.09624
Finland	life	0.17879	0.18390	0.17545	0.17010	0.18123
Finland	non-life	0.11548	0.11740	0.11103	0.10984	0.11215

**Table 25: Dynamic Rosenbluth-indices**

Country	Group	1989/90	1990/91	1991/92	1992/93
Sweden	life	0.00395	-0.00288	-0.03641	-0.00358
Sweden	non-life	0.00301	0.00057	0.00212	0.00540
Finland	life	0.00512	-0.00845	-0.00536	0.01114
Finland	non-life	0.00192	-0.00637	-0.00119	0.00231

**Table 26: Dynamic Rosenbluth-indices 1989 – 1993**

between	and	1989	1990	1991	1992	1993
non-life Sweden	life Sweden	0.06648	0.06743	0.06398	0.02545	0.01648
non-life Finland	life Finland	0.06330	0.06650	0.06442	0.06026	0.06909
life Finland	life Sweden	-0.02715	-0.02832	-0.02275	-0.05381	-0.06851
non-life Finland	non-life Sweden	-0.03034	-0.02925	-0.02231	-0.01900	-0.01591

**Table 27: Dynamic concentration ratios for life insurance companies Sweden 1989 – 1993**

	1989/90	1990/91	1991/92	1992/93
$CR_1$	0.02671	0.01754	-0.00196	0.02441
$CR_3$	0.03288	-0.03199	-0.05859	0.01418
$CR_5$	0.02304	-0.02930	-0.07266	-0.00966
$CR_{10}$	-0.01503	0.01216	-0.08007	-0.01001

**Table 28: Dynamic concentration ratios for non-life insurance companies Sweden 1989 – 1993**

	1989/90	1990/91	1991/92	1992/93
$CR_1$	0.00753	0.00020	0.00861	0.03460
$CR_3$	0.00586	0.01396	0.00035	0.02536
$CR_5$	0.00767	0.01130	-0.01217	0.02917
$CR_{10}$	0.00834	-0.00295	0.00155	0.01418

**Table 29: Dynamic concentration ratios for life insurance companies Finland 1989 – 1993**

	1989/90	1990/91	1991/92	1992/93
$CR_1$	0.01745	-0.03902	0.01070	0.01362
$CR_3$	0.00924	-0.03855	-0.01075	0.03713
$CR_5$	0.01113	-0.00440	-0.02342	0.01650
$CR_{10}$	-0.00257	0.00088	0.00397	0.00246

**Table 30: Dynamic concentration ratios for non-life insurance companies Finland 1989 – 1993**

	1989/90	1990/91	1991/92	1992/93
$CR_1$	0.00776	-0.01345	-0.00316	-0.00638
$CR_3$	0.00689	-0.01751	-0.00891	-0.01177
$CR_5$	0.01552	-0.01201	-0.02520	-0.00366
$CR_{10}$	0.00260	-0.01985	0.00123	0.01115

**Table 31: Dynamic Concentration ratios for life insurance companies Sweden – Finland 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.05893	0.04967	-0.00690	0.00577	-0.00503
$CR_3$	0.13344	0.10981	0.10325	0.15109	0.17404
$CR_5$	0.07830	0.06640	0.09130	0.14054	0.16670
$CR_{10}$	-0.00917	0.00330	-0.00798	0.07606	0.08853

**Table 32: Dynamic Concentration ratios for non-life insurance companies Sweden – Finland 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	-0.08373	-0.08350	-0.09715	-0.10893	-0.14991
$CR_3$	-0.05977	-0.05874	-0.09022	-0.09948	-0.13660
$CR_5$	-0.01923	-0.01137	-0.03469	-0.04772	-0.08055
$CR_{10}$	0.03518	0.02945	0.01255	0.01223	0.00919

**Table 33: Dynamic Concentration ratios for life – non-life insurance companies Sweden 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	0.10596	0.08678	0.06944	0.08001	0.09021
$CR_3$	0.04932	0.02230	0.06826	0.12720	0.13838
$CR_5$	-0.01660	-0.03197	0.00863	0.06912	0.10795
$CR_{10}$	-0.12125	-0.09788	-0.11299	-0.03137	-0.00717

**Table 34: Dynamic Concentration ratios for life – non-life insurance companies Finland 1989 – 1993**

	1989	1990	1991	1992	1993
$CR_1$	-0.03671	-0.04639	-0.02082	-0.03468	-0.05467
$CR_3$	-0.14390	-0.14625	-0.12521	-0.12337	-0.17226
$CR_5$	-0.11413	-0.10974	-0.11736	-0.11914	-0.13930
$CR_{10}$	-0.07689	-0.07173	-0.09246	-0.09520	-0.08651

**Table 35: Historical dynamic Hannah–Kay–indices for life insurance companies Sweden 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
0.0	0.00000	0.00000	0.00000	0.00000
0.6	-0.00027	0.00011	-0.02886	-0.00306
0.8	0.00084	-0.00061	-0.02880	-0.00250
1.0	0.00229	-0.00141	-0.02796	-0.00155
1.2	0.00388	-0.00212	-0.02666	-0.00029
1.4	0.00545	-0.00264	-0.02512	0.00121
1.6	0.00691	-0.00294	-0.02347	0.00287
1.8	0.00824	-0.00301	-0.02178	0.00462
2.0	0.00941	-0.00287	-0.02013	0.00638
2.5	0.01177	-0.00182	-0.01629	0.01056

**Table 36: Historical dynamic Hannah–Kay–indices for non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
0.0	0.00000	0.00000	0.00000	0.00000
0.6	0.00137	0.00030	0.00079	0.00213
0.8	0.00221	0.00087	0.00074	0.00576
1.0	0.00302	0.00157	0.00062	0.00991
1.2	0.00366	0.00224	0.00062	0.01373
1.4	0.00413	0.00274	0.00084	0.01686
1.6	0.00447	0.00303	0.00127	0.01934
1.8	0.00474	0.00313	0.00183	0.02134
2.0	0.00498	0.00309	0.00247	0.02300
2.5	0.00550	0.00267	0.00404	0.02623

**Table 37: Historical dynamic Hannah–Kay–indices for life insurance companies Finland 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
0.0	0.00000	0.00000	0.00000	0.00000
0.6	-0.00001	-0.00269	-0.00214	0.00498
0.8	0.00190	-0.00375	-0.00520	0.00786
1.0	0.00356	-0.00502	-0.00782	0.01034
1.2	0.00490	-0.00644	-0.00973	0.01233
1.4	0.00593	-0.00792	-0.01089	0.01385
1.6	0.00673	-0.00938	-0.01140	0.01494
1.8	0.00735	-0.01079	-0.01142	0.01569
2.0	0.00785	-0.01212	-0.01109	0.01617
2.5	0.00882	-0.01506	-0.00949	0.01662

**Table 38: Historical dynamic Hannah–Kay–indices for non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
0.0	0.00000	0.00000	0.00000	0.00000
0.6	0.00007	-0.00219	-0.00056	0.00154
0.8	0.00091	-0.00350	-0.00101	0.00106
1.0	0.00162	-0.00458	-0.00157	0.00033
1.2	0.00216	-0.00537	-0.00213	-0.00047
1.4	0.00257	-0.00591	-0.00262	-0.00121
1.6	0.00288	-0.00630	-0.00303	-0.00184
1.8	0.00313	-0.00659	-0.00333	-0.00237
2.0	0.00334	-0.00684	-0.00355	-0.00279
2.5	0.00379	-0.00741	-0.00383	-0.00352

**Table 39: Historical dynamic Hannah–Kay–indices for life insurance companies Sweden – Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.02431	0.02431	0.02431	0.02431	0.02431
0.6	0.01264	0.01289	0.01010	0.03682	0.04486
0.8	0.01746	0.01853	0.01538	0.03898	0.04934
1.0	0.02290	0.02417	0.02055	0.04069	0.05258
1.2	0.02828	0.02930	0.02498	0.04192	0.05454
1.4	0.03321	0.03370	0.02843	0.04266	0.05530
1.6	0.03750	0.03732	0.03088	0.04294	0.05502
1.8	0.04110	0.04022	0.03244	0.04280	0.05388
2.0	0.04406	0.04251	0.03326	0.04229	0.05208
2.5	0.04922	0.04627	0.03303	0.03982	0.04589

**Table 40: Historical dynamic Hannah–Kay–indices for non–life insurance companies Sweden – Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	0.01184	0.01184	0.01184	0.01184	0.01184
0.6	0.01944	0.01814	0.01565	0.01430	0.01371
0.8	0.01499	0.01369	0.00933	0.00758	0.00288
1.0	0.00772	0.00632	0.00017	-0.00202	-0.01160
1.2	-0.00065	-0.00216	-0.00977	-0.01252	-0.02672
1.4	-0.00884	-0.01040	-0.01905	-0.02252	-0.04059
1.6	-0.01624	-0.01783	-0.02716	-0.03145	-0.05264
1.8	-0.02274	-0.02436	-0.03408	-0.03924	-0.06295
2.0	-0.02843	-0.03007	-0.04000	-0.04601	-0.07180
2.5	-0.03989	-0.04160	-0.05168	-0.05954	-0.08928

**Table 41: Historical dynamic Hannah–Kay–indices for life – non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	-0.02135	-0.02135	-0.02135	-0.02135	-0.02135
0.6	-0.05380	-0.05216	-0.05197	-0.02231	-0.01713
0.8	-0.04579	-0.04441	-0.04294	-0.01340	-0.00515
1.0	-0.03410	-0.03337	-0.03039	-0.00181	0.00965
1.2	-0.02126	-0.02148	-0.01711	0.01017	0.02420
1.4	-0.00895	-0.01027	-0.00489	0.02107	0.03673
1.6	0.00209	-0.00035	0.00562	0.03035	0.04683
1.8	0.01176	0.00826	0.01441	0.03802	0.05474
2.0	0.02017	0.01573	0.02170	0.04429	0.06091

$\alpha$	1989	1990	1991	1992	1993
2.5	0.03693	0.03066	0.03514	0.05547	0.07114

**Table 42: Historical dynamic Hannah–Kay–indices for life – non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
0.0	-0.03382	-0.03382	-0.03382	-0.03382	-0.03382
0.6	-0.04700	-0.04691	-0.04641	-0.04484	-0.04828
0.8	-0.04826	-0.04925	-0.04899	-0.04480	-0.05161
1.0	-0.04928	-0.05122	-0.05077	-0.04452	-0.05453
1.2	-0.05020	-0.05294	-0.05186	-0.04426	-0.05706
1.4	-0.05100	-0.05437	-0.05237	-0.04410	-0.05916
1.6	-0.05164	-0.05550	-0.05241	-0.04404	-0.06083
1.8	-0.05209	-0.05631	-0.05211	-0.04402	-0.06208
2.0	-0.05233	-0.05684	-0.05156	-0.04402	-0.06297
2.5	-0.05218	-0.05721	-0.04956	-0.04389	-0.06403

**Table 43: Dynamic Hannah–Kay–indices for life insurance companies Sweden 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
1.0	0.00229	-0.00141	-0.02796	-0.00155
1.5	0.00620	-0.00282	-0.02430	0.00202
2.0	0.00941	-0.00287	-0.02013	0.00638
3.0	0.01350	-0.00014	-0.01303	0.01402
4.0	0.01590	0.00374	-0.00830	0.01859
5.0	0.01761	0.00724	-0.00547	0.02094
6.0	0.01896	0.00996	-0.00387	0.02212
7.0	0.02008	0.01199	-0.00299	0.02275
8.0	0.02103	0.01345	-0.00250	0.02312
9.0	0.02184	0.01449	-0.00224	0.02335
10.0	0.02253	0.01523	-0.00209	0.02350

**Table 44: Dynamic Hannah–Kay–indices for non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
1.0	0.00302	0.00157	0.00062	0.00991
1.5	0.00431	0.00291	0.00103	0.01817
2.0	0.00498	0.00309	0.00247	0.02300
3.0	0.00594	0.00210	0.00533	0.02857

$\alpha$	1989/90	1990/91	1991/92	1992/93
4.0	0.00659	0.00118	0.00695	0.03149
5.0	0.00697	0.00066	0.00773	0.03294
6.0	0.00717	0.00041	0.00811	0.03364
7.0	0.00728	0.00029	0.00830	0.03399
8.0	0.00734	0.00024	0.00840	0.03417
9.0	0.00738	0.00022	0.00845	0.03428
10.0	0.00741	0.00020	0.00848	0.03435

**Table 45: Dynamic Hannah–Kay–indices for life insurance companies Finland 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
1.0	0.00356	-0.00502	-0.00782	0.01034
1.5	0.00636	-0.00866	-0.01122	0.01445
2.0	0.00785	-0.01212	-0.01109	0.01617
3.0	0.00960	-0.01751	-0.00759	0.01656
4.0	0.01092	-0.02124	-0.00432	0.01607
5.0	0.01202	-0.02389	-0.00200	0.01563
6.0	0.01291	-0.02585	-0.00035	0.01529
7.0	0.01362	-0.02736	0.00090	0.01502
8.0	0.01419	-0.02859	0.00191	0.01480
9.0	0.01466	-0.02963	0.00275	0.01460
10.0	0.01506	-0.03052	0.00349	0.01444

**Table 46: Dynamic Hannah–Kay–indices for non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989/90	1990/91	1991/92	1992/93
1.0	0.00162	-0.00458	-0.00157	0.00033
1.5	0.00273	-0.00612	-0.00284	-0.00154
2.0	0.00334	-0.00684	-0.00355	-0.00279
3.0	0.00416	-0.00798	-0.00388	-0.00398
4.0	0.00483	-0.00908	-0.00376	-0.00458
5.0	0.00540	-0.01000	-0.00359	-0.00499
6.0	0.00588	-0.01073	-0.00345	-0.00529
7.0	0.00627	-0.01128	-0.00334	-0.00551
8.0	0.00657	-0.01171	-0.00327	-0.00567
9.0	0.00681	-0.01204	-0.00322	-0.00579
10.0	0.00700	-0.01230	-0.00318	-0.00588

**Table 47: Dynamic Hannah–Kay–indices for life insurance companies Sweden – Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.02290	0.02417	0.02055	0.04069	0.05258
1.5	0.03544	0.03560	0.02977	0.04286	0.05528
2.0	0.04406	0.04251	0.03326	0.04229	0.05208
3.0	0.05219	0.04829	0.03092	0.03635	0.03889
4.0	0.05493	0.04998	0.02496	0.02894	0.02642
5.0	0.05596	0.05038	0.01924	0.02272	0.01741
6.0	0.05644	0.05038	0.01456	0.01809	0.01126
7.0	0.05670	0.05024	0.01088	0.01477	0.00704
8.0	0.05688	0.05004	0.00800	0.01241	0.00408
9.0	0.05701	0.04983	0.00572	0.01070	0.00196
10.0	0.05712	0.04964	0.00389	0.00947	0.00040

**Table 48: Dynamic Hannah–Kay–indices for non–life insurance companies Sweden – Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	0.00772	0.00632	0.00017	-0.00202	-0.01160
1.5	-0.01265	-0.01423	-0.02326	-0.02713	-0.04684
2.0	-0.02843	-0.03007	-0.04000	-0.04601	-0.07180
3.0	-0.04853	-0.05031	-0.06039	-0.06960	-0.10215
4.0	-0.06045	-0.06222	-0.07248	-0.08318	-0.11925
5.0	-0.06782	-0.06940	-0.08007	-0.09139	-0.12932
6.0	-0.07250	-0.07379	-0.08493	-0.09649	-0.13542
7.0	-0.07552	-0.07654	-0.08811	-0.09976	-0.13926
8.0	-0.07753	-0.07830	-0.09025	-0.10192	-0.14176
9.0	-0.07889	-0.07946	-0.09172	-0.10339	-0.14346
10.0	-0.07984	-0.08025	-0.09275	-0.10441	-0.14464

**Table 49: Dynamic Hannah–Kay–indices for life – non–life insurance companies Sweden 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	-0.03410	-0.03337	-0.03039	-0.00181	0.00965
1.5	-0.00326	-0.00514	0.00059	0.02592	0.04207
2.0	0.02017	0.01573	0.02170	0.04429	0.06091
3.0	0.04941	0.04186	0.04410	0.06245	0.07700
4.0	0.06659	0.05728	0.05472	0.06996	0.08286
5.0	0.07748	0.06684	0.06026	0.07347	0.08547
6.0	0.08469	0.07290	0.06333	0.07532	0.08683



$\alpha$	1989	1990	1991	1992	1993
7.0	0.08961	0.07681	0.06511	0.07640	0.08763
8.0	0.09308	0.07939	0.06618	0.07708	0.08814
9.0	0.09560	0.08114	0.06687	0.07755	0.08848
10.0	0.09747	0.08234	0.06732	0.07789	0.08874

**Table 50: Dynamic Hannah–Kay–indices for life – non–life insurance companies Finland 1989 – 1993**

$\alpha$	1989	1990	1991	1992	1993
1.0	-0.04928	-0.05122	-0.05077	-0.04452	-0.05453
1.5	-0.05135	-0.05498	-0.05244	-0.04406	-0.06005
2.0	-0.05233	-0.05684	-0.05156	-0.04402	-0.06297
3.0	-0.05131	-0.05674	-0.04721	-0.04350	-0.06403
4.0	-0.04879	-0.05488	-0.04273	-0.04216	-0.06281
5.0	-0.04630	-0.05293	-0.03905	-0.04063	-0.06125
6.0	-0.04425	-0.05128	-0.03616	-0.03926	-0.05985
7.0	-0.04261	-0.04996	-0.03389	-0.03814	-0.05867
8.0	-0.04132	-0.04894	-0.03207	-0.03724	-0.05771
9.0	-0.04030	-0.04815	-0.03057	-0.03654	-0.05693
10.0	-0.03949	-0.04755	-0.02932	-0.03599	-0.05631

**Table 51: Entropy dominance measures for life Sweden 1989 – 1993**

year	$D_{k^*}^{Ent}$	$k^*$	$I_o^{Ent}$	$I_u^{Ent}$
1989	0.78603	7	0.04750	0.27136
1990	0.77942	6	0.05034	0.20275
1991	0.78826	7	0.05795	0.24914
1992	0.78934	7	0.07093	0.18612
1993	0.79693	9	0.10937	0.17475

**Table 52: Entropy dominance measures for non–life Sweden 1989 – 1993**

year	$D_{k^*}^{Ent}$	$k^*$	$I_o^{Ent}$	$I_u^{Ent}$
1989	0.66014	5	0.11758	0.17542
1990	0.65238	6	0.14131	0.15132
1991	0.64124	5	0.12051	0.17201
1992	0.65427	5	0.13645	0.19285
1993	0.61271	6	0.16906	0.15351

**Table 53: Entropy dominance measures for life Finland 1989 – 1993**

year	$D_{k^*}^{Ent}$	$k^*$	$I_o^{Ent}$	$I_u^{Ent}$
1989	0.75352	4	0.04073	0.12456
1990	0.73079	4	0.04586	0.12988
1991	0.73252	4	0.02039	0.12350
1992	0.79473	4	0.04362	0.17326
1993	0.74245	4	0.04107	0.16451

**Table 54: Entropy dominance measures for non-life Finland 1989 – 1993**

year	$D_{k^*}^{Ent}$	$k^*$	$I_o^{Ent}$	$I_u^{Ent}$
1989	0.72581	6	0.05629	0.16392
1990	0.71432	6	0.06088	0.17583
1991	0.72861	6	0.05828	0.16925
1992	0.73473	6	0.05266	0.17984
1993	0.74481	7	0.06648	0.19822

**Table 55: Herfindahl dominance measures for life insurance companies Sweden 1989 – 1993**

year	$D_{k^*}^H$	$k^*$	$I_o^H$	$I_u^H$	$\bar{I}^H$
1989	0.12010	4	0.08256	0.66037	0.16540
1990	0.12896	3	0.05436	0.63603	0.15810
1991	0.11999	4	0.15081	0.64630	0.21621
1992	0.09787	4	0.20880	0.65070	0.26915
1993	0.10096	1	0.00000	0.66729	0.24671

**Table 56: Herfindahl dominance measures for non-life insurance companies Sweden 1989 – 1993**

year	$D_{k^*}^H$	$k^*$	$I_o^H$	$I_u^H$	$\bar{I}^H$
1989	0.12752	3	0.21855	0.82995	0.26439
1990	0.12986	3	0.23050	0.84075	0.27645
1991	0.13550	3	0.21167	0.84182	0.25403
1992	0.13569	3	0.23340	0.82348	0.26933
1993	0.14926	1	0.00000	0.90812	0.23261

**Table 57: Herfindahl dominance measures for life insurance companies Finland 1989 – 1993**

year	$D_{k^*}^H$	$k^*$	$I_o^H$	$I_u^H$	$\bar{I}^H$
1989	0.16924	3	0.05296	0.59406	0.10138
1990	0.17267	3	0.07884	0.64750	0.12787
1991	0.16980	4	0.06950	0.36512	0.07589
1992	0.15313	3	0.06085	0.54749	0.11571
1993	0.16751	3	0.06327	0.63705	0.11742

**Table 58: Herfindahl dominance measures for non-life insurance companies Finland 1989 – 1993**

year	$D_{k^*}^H$	$k^*$	$I_o^H$	$I_u^H$	$\bar{I}^H$
1989	0.10805	3	0.09450	0.75266	0.20959
1990	0.11187	5	0.17839	0.71697	0.20539
1991	0.10853	5	0.15941	0.67281	0.18511
1992	0.10303	6	0.19464	0.57741	0.20498
1993	0.10281	4	0.11492	0.72137	0.18544

**Table 59: Premium income figures for Finnish life insurance companies 1989 – 1993**

### Finish insurance companies life

Premium income in 1000 mk						
No	Name	1989	1990	1991	1992	1993
1	Apollo	11810	37308	95070	46034	23593
2	Eläke-Kansa	607134	725561	685961	549381	710364
3	Eläke-Sampo	3188383	3774892	3913281	3270919	3646897
4	Eläke-Tapiola	2008027	2619475	3576059	2067487	2468990
5	Eläke-Varma	4441622	5666437	5823778	4600175	5329351
6	Henki-Kansa	189299	229581	183743	186699	194024
7	Henki-Tapiola	360276	400790	413838	421417	375821
8	Ilmarinen	5187683	6953204	6230390	5534372	6247495
9	Kaleva	308914	359947	355297	811531	421877
10	Liv-Alandia	51458	66104	68298	59735	63958
11	Nova	418909	457681	671116	1310859	610146
12	Salama	497276	467520	456174	551111	441576
13	Suomi	496851	577589	566239	388912	680096
14	Tarmo	121883	206006	199261	0	0
15	Verdani	484414	628820	627395	558488	647344

### Finish insurance companies life

Premium income in 1000 mk						
No	Name	1989	1990	1991	1992	1993
16	Viva	554	21752	22688	26977	29008
17	Otava	0	1990	5131	3864	2270
18	Stella	0	0	0	0	22941

in: The Insurance Companies 1989 – 1993 (1991–1995).

**Table 60: Premium income figures for Finnish non-life insurance companies 1989 – 1993**

### Finish insurance companies non-life

Premium income in 1000 mk						
No	Name	1989	1990	1991	1992	1993
NATIONWIDE FINISH COMPANIES						
1	Alandia	22298	25792	18439	22290	22430
2	A-Vakuutus	289486	306512	321699	327071	313499
3	Efoa	1048	640	602	1865	3414
4	Eurooppalainen	154859	182300	173641	159787	146542
5	Finska-Sjö	70331	82911	112487	105962	0
6	Hamnia	13487	13920	16340	17644	17145
7	Hämeen Vakuutus	119944	134323	142703	112858	135286
8	Jälleen-Kansa	74810	22535	23884	18322	10851
9	Jälleen-Patria	3413	2639	3845	3086	4088
10	Jälleen-Varma	12757	15957	19335	17969	15160
11	Kansa International	1005099	71867	205113	230654	134872
12	Lähivakuutus	229786	253432	272472	279416	260059
13	Meijerien	19967	20040	19872	20108	20692
14	Osuuspankkien	81106	88564	172911	295194	636345
15	Otso	257099	270466	251693	246000	287252
16	Palonvara	8708	8760	9386	9502	10193
17	Pankavara	12426	13941	12860	14849	17721
18	Pohjola	2914894	3266518	3186621	3046380	2868844
19	Redarnas	27425	33011	45655	63311	95683
20	Sampo	2154701	2303675	2382775	2243426	2147156
21	Sampo International	243783	243341	223121	22340	3247
22	Suomen Eläin	8799	0	0	0	0
23	Suomen Vakuutus	15308	21392	38851	53282	49903
24	Svensk-Finland	133766	137354	144894	153795	154106
25	Säästöpankkien	56301	53760	88326	168115	211884
26	Tapiola International	51196	13486	4685	7969	1668

**Finish insurance companies non-life**

Premium income in 1000 mk						
No	Name	1989	1990	1991	1992	1993
27	Teollisuusvakuutus	879962	1203243	1333546	1195981	1321351
28	Tulensvara	4752	4978	6359	6436	5297
29	Työväen Turva	170983	189138	198072	198698	181612
30	Vahinko-Kansa	0	823773	781754	990330	751503
31	Vahinko-Patria	1182	0	0	0	0
32	Vahinko-Tapiola	1501105	1656439	1643055	1582655	1488600
33	Vahinko-Varma	147693	153237	147876	136257	108043
34	Vastuu	27552	20194	17275	11412	9116
35	Veritas	5566	5882	4933	3003	3085
36	Wärtsilä	42893	19878	0	0	0
37	Yrittäjien-Fennia	1037143	1126586	1139737	985294	895503
38	Ålands	65612	69455	71362	72767	68486
39	Apollo	0	0	68	377	2993
40	Cabanco	0	2220	0	0	0
41	Metra	0	0	15823	11131	0
42	Bothnia International	0	0	0	0	0
43	Teva-Re	0	0	0	0	8936
44	Yritys-Sampo	0	0	0	0	0
FOREIGN COMPANIES						
45	Ingosstrakh	0	13910	11865	11428	12236
46	New Hampshire	0	15445	17144	19110	26860

in: The Insurance Companies 1989 – 1993 (1991–1995).

**Table 61: Premium income figures for Swedish life insurance companies 1989 – 1993**

**Swedish insurance companies life**

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
1	Skandia Liv	10785000	8278000	7911000	6675000	6365000
2	SPP	9270000	10824000	12763000	13175000	14791000
3	Trygg	7180000	6735000	6269000	5263000	4600000
4	WASA Liv	5212000	3633172	3369000	3223000	2711309
5	AMF-Pension	4321138	4486695	5088636	4909726	5388091
6	AMF-sjuk	3792224	1110647	3986794	2932847	2761500
7	Folksam Liv	3072700	3427900	3596900	3830300	3170800
8	RKA / Handelsb. Liv	1658956	999962	998801	846116	901429
9	Länsförs Liv	990800	1203390	1069054	985325	944900
10	AFA	640363	713914	1158298	1176463	794550

### Swedish insurance companies life

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
11	KFA	378796	707545	324741	450867	488302
12	Sverige	348815	236402	107215	113945	136506
13	LIVIA	223175	490515	547100	561400	681400
14	Ansvar Liv	190556	183874	192097	191500	197300
15	Förenade Liv	186428	221474	275598	296469	319406
16	Salus	12802	13031	13836	15946	16714
17	Änke-och Pupill	10179	8045	10241	9947	9853
18	Järnvägen	2302	2430	2735	3026	3015
19	Järnvägsm Olycksf	1000	983	966	947	925
20	T-H SPP Livf. AB	0	0	0	1721000	1847000
21	Sparliv Livsförs AB	0	0	0	493445	471383
22	Idea Liv	0	0	0	9743	18006
23	S-E-B Fondförs. AB	0	0	0	1178014	2036953
24	Skandia Link	0	0	0	639367	1145018
25	Trygg-Hansa Fri Plac	0	0	0	517656	422810
26	WASA Fondförs AB	0	0	0	131338	238883
27	Länsförs. Fondliv	0	0	0	121432	136400
28	SparFond Livf. AB	0	0	0	59663	156822
29	Handelsb. Liv Fondförs	0	0	0	55799	98600
30	Lantbrukarnas Trygghetsförsäki	0	0	0	0	123809
31	SEB Försäkring	0	0	0	0	8545

in: Svensk Försäkringsårsbok 1990 – 1994.

**Table 62: Premium income figures for Swedish non-life insurance companies 1989 – 1993**

### Swedish insurance companies non-life

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
NATIONWIDE SWEDISH COMPANIES						
1	Skandia Group	13213000	15910000	17924000	21048000	23710000
2	Trygg-Hansa-Holding	5708000	6595000	7470000	8524000	9215000
3	Folksam sak	5689600	6742900	8279200	9006500	8159700
4	WASA sak	2944080	3732769	3970000	3726000	2585964
5	LFAB	2333400	2565200	2979500	3469100	4808800
6	Sirius	1460135	1787274	955431	2134872	2795988
7	Ansvar	1034540	1067100	1043958	1127500	1164800
8	Stockholm Re	710241	1034984	1754931	1953900	0
9	Volvia	523834	587061	572046	637745	667659

### Swedish insurance companies non-life

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
10	Altlanica	511680	547100	571800	505800	531100
11	Holmia	362931	420117	461496	503139	566588
12	AGRIA	357209	378080	420185	521105	0
13	Assuransföreningen	259634	306816	412428	473008	679030
14	Svenska Kredit	256395	286426	329922	0	0
15	FPG	150165	110196	126696	212486	299585
16	Njord	104945	172564	0	0	0
17	Victoria	101927	103958	116010	139146	286402
18	Brandkontoret	80023	89654	93352	39844	21900
19	International Credit	64117	102128	0	0	0
20	Saab-Scania Re / Vabis Frskr.	60929	36505	36505	26382	54781
21	SKF-Re	51869	63444	76526	95990	102158
22	Sleipner	29495	40069	0	0	0
23	Svensk djur och hagel	26511	27934	33030	37127	40762
24	Atlas Copco / Industria	23527	36172	43926	48465	66523
25	Electrolux	19915	17710	42336	110370	88988
26	Prosec	21483	35780	63800	71727	88364
27	AMFK	14688	9441	9098	18111	50220
28	AGA Re	13436	14374	15297	13714	20730
29	Anticimex	12512	14409	17311	21668	26707
30	Brandförsäkringsverket	9188	7233	10826	3234	1531
31	KRA	6620	14816	13030	22529	23914
32	Sockenbolagens	0	59538	74511	91326	70093
33	S:t Erik Re	0	12129	10502	12272	14108
34	Försäkrings AB Göta Lejon	0	0	33763	34694	31709
35	KFF Kreditförsäkrings AB	0	0	836	1444	4467
36	Aktsam	0	0	6790	29921	70313
37	Safe International	0	0	2471	9830	19171
38	Europeiska	0	0	0	589601	188758
39	Lantbr. trygghetsförsäkr.	0	0	0	0	254378
40	HSB Försäkr. AB	0	0	0	0	13260
41	Swe Re	0	0	0	0	3208
42	Svenska Brand	0	0	0	114490	129219
MAJOR LOCAL COMPANIES						
43	Stockholm	277775	274831	341565	370026	380430
44	Östgöta Brand	262752	282717	324463	348041	338597
45	Dalarna	245591	272066	332378	341675	348475
46	Älvsborg	233758	256283	283819	302629	347889

**Swedish insurance companies non-life**

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
47	Uppsala	178549	196715	225103	241206	197704
48	Jönköping	171093	188952	226245	239852	228515
49	Göteborg	164320	184098	217725	239136	236337
50	Nordvästra Skane	157103	178885	209420	0	0
51	Södermanland	156106	171070	199140	184991	182627
52	Kalmar	147094	171867	205408	222701	190617
53	Södra Skane	144466	161211	178740	0	0
54	Halland	133574	148574	164436	169291	148574
55	Skaraborg	131140	151163	174386	175032	174746
56	Värmland	128745	142421	165476	183826	182376
57	Västerbotten	126245	138509	160374	172423	163911
58	Gälvborg	110226	126079	139108	144956	124063
59	Västernorrland	109007	109582	124284	124223	125064
60	Västmanland	103225	114015	135870	0	0
61	Örebro	94578	111990	131460	0	0
62	Blekinge	77425	78196	86800	93157	87000
63	Jämtland	77363	83148	96041	102563	101193
64	Kronoberg	67872	83463	95010	98736	101103
65	Villands Gärd och Albo	54499	66813	75360	74025	71794
66	Norrbottn	53252	62978	74369	85239	85045
67	Göinge	50800	58373	67470	70571	66101
68	Gotland	41597	46350	53967	59833	55158
69	Ingelstad och Järrestad	30978	32490	36897	0	0
70	Lidköpingsorten	11568	13042	15504	16953	17165
71	Piteorten	8075	8664	9649	11034	11376
72	Habo	5577	6105	7448	9330	9499
73	Mellersta Västergötland	5479	5845	6698	7407	8167
74	Acklinga-Fagelas	4257	4548	5246	5494	6712
75	Bohuslänska Strandlägena	4233	4860	6074	6468	6618
76	Bergslagen	0	0	0	280877	283268
77	Skane	0	0	0	402732	407543
78	Ölands Försäkr. bol	0	0	0	0	12043
79	Skydd i Bollnäs	0	0	0	0	7618
80	Varabygden	0	0	0	0	6419
81	Nordmarks Härad	0	0	0	0	6048
82	Bohusl. allm. sjöf	0	0	0	0	5621
83	Akerbo Härad	0	0	0	0	4730
84	Orusts Brandförs bol.	0	0	0	0	4610



**Swedish insurance companies non-life**

Premium income in 1000 SEK						
No	Name	1989	1990	1991	1992	1993
85	Sv. Skogsförs. bol.	0	0	0	0	1074
FOREIGN COMPANIES						
86	Guardian Royal Exchange	91412	0	134091	122442	93896
87	Yorkshire	69515	97952	101427	101313	107624
88	L'Union / UAP Sverige	64486	69519	151686	172207	176667
89	UNAT / AIG Europe	43485	50482	56918	57787	69655
90	Royal	26899	0	0	0	0
91	United Kingdom	25687	0	0	0	0
92	Skuld	22235	22235	22852	23416	23416
93	Allianz Nordeuropa	20162	30471	44632	54116	56137
94	Zürich	18780	43862	53302	142355	158101
95	Commercial Union	8706	4081	9649	22269	23344
96	Phoenix	2093	705	866	1369	3514
97	Cigna Europe	0	42062	50046	28182	40736

in: Svensk Försäkringsårsbok 1990 – 1994.

**Table 63: Total premium income figures for Swedish and Finnish insurance companies 1989 – 1993**

<b>Total premium income</b>						
For Sweden 1000 SEK for Finland in 1000 mk						
Country	Group	1989	1990	1991	1992	1993
Sweden	non life	40117811	47226153	53172915	60884923	62344798
Sweden	life	48277234	43276979	47685012	49588281	50986229
Finland	non life	11867240	12891514	13281079	12866074	12451661
Finland	life	18374493	23194657	23893719	20387961	21915751