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## Long-Term Concentration in the Dutch Audit Market: The Use of Auditor Association Membership Lists in Historical Research

This article provides an empirical description of the complete Dutch audit market from its inception, in the late nineteenth century, to the present day. Specifically, it documents the development of the structure of the Dutch audit industry in terms of the number of audit firms and the audit firm size distribution. The audit firm size measure used is the number of auditors affiliated with an audit firm. Central in the collection of the audit firm data are the membership lists of Dutch auditor associations. These, with additional information from Dutch financial directories, permit the calculation, with two-year intervals, of the size of each existing audit firm with the number of auditors as firm-size measure. The data so obtained give the opportunity to extend existing research on audit market concentration. The level of concentration in the Dutch audit market is determined over a long period, at a large number of points in time. The results show concentration levels that are low and stable for a long period. Only in the past two decades have these levels increased substantially. Potential explanations for this pattern are: (a) increasing regulation of the demand side of the Dutch audit market, (b) increasing technological complexity of the audit process, (c) increasing (international) client concentration, and (d) mergers of the international affiliates of the Dutch audit firms. The article concludes that auditor association membership lists provide a rich data set and create other opportunities for further historical audit (market) research.

**Key words:** Audit; Concentration; History.

Professional organizations of auditors have many important functions, one of which — little noted in research so far — is that they usually provide lists of their membership with regular intervals. These lists of members are rich sources of data for studies of the development of audit markets. Remarkably, however, these lists

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have hardly been used in audit market research. Maijoor (1994) is an exception, although only auditor-level data were used. This article uses membership lists to generate and study audit firm-level data.

There are some clear benefits of using membership lists. First, they might contain data that allow a view of the complete audit market at a given point in time, and of its development through time. Previous audit market studies using audit-fee and/or client-data focus on the larger audit firms and larger clients because audit fees and client data are only available for such firms and clients. The demand for audit services by smaller clients, and the supply by smaller audit firms, is neglected in these studies. Also, studies using audit-fee and/or client-data for truncated samples of larger firms seldom contain information on, for instance, entry by audit firms (because entering audit firms are in general small). Yet the level of entry is an important characteristic of a market. Second, because membership lists are more easily available than audit fee and/or client data, especially for earlier periods, these lists give the opportunity to obtain information on audit market characteristics for longer periods, for more points in time and for more countries.

In this article, membership lists will be used to address the issue of concentration in the Dutch audit market and its evolution. In 1990 there were 505 audit firms in the Netherlands, with a total of 2,770 affiliated Dutch auditors, and which generated total sales of Dfl 3.3 billion (about US\$1.65 billion; See Centraal Bureau voor de Statistiek, 1992). The four largest audit firms accounted for about 60 per cent of total audit market sales (Meuwissen, 1992), and this relatively high degree of market share concentration has raised concerns about the competitiveness of the Dutch audit market (see, e.g., Langendijk and Deetman, 1990). High supply-side concentration is also common in audit markets in other countries, and has raised similar concerns. For example, the European Community has commissioned research to assess the level of competition in the audit markets in member countries (NERA, 1992). Other studies providing evidence on concentration levels in audit markets include Moizer and Turley (1989) on the U.K. audit market and Tomczyk and Read (1989) with results for the U.S.

The structure of the Dutch audit market is the result of a long-term process of audit firms entering and exiting the market, internal growth of firms, and mergers between them. Some of the larger current firms had their origins in the nineteenth century, but there are few data bases on their history. Such data bases would expand the current body of research in this area and create opportunities for a type of audit market research that, as yet, hardly exists (Previts *et al.*, 1990b).

The article provides three major contributions. First, to explain and test theories about the factors shaping the structure of the Dutch audit market, data describing the long-term history of audit firms will be expected to be useful. In this article a first attempt is made to explain observed changes in that market. Second, and related to the first, the data allow an examination of the effects of regulation on the structure of the Dutch audit market. Hence, research on the history of audit firms and markets in Holland is relevant for the formulation of audit market policy generally and, specifically, its likely impact on audit market functioning (Previts *et al.*, 1990a). Third, this article is a response to the observation that historical accounting and auditing

research are increasingly limited to practices in English-speaking countries (Parker, 1993, p. 108).

Audit market concentration measurement has already received considerable attention in the audit research literature and developments in the level of concentration are documented in many studies (see, e.g., Zeff and Fossum, 1967; Schiff and Fried, 1976; Gilling and Stanton, 1978; Dopuch and Simunic, 1980). However, membership list data provide an opportunity to calculate concentration indices over a longer period, at more points in time, and for a (nearly) complete audit market. Hence, this study substantially extends existing audit market concentration research.

Audit market concentration is only one research issue that may benefit from the use of membership list data; many other audit market research topics can be addressed with these data. Two other examples, albeit related, are: (a) the factors that drive the demand for audit services; and (b) successful growth strategies of audit firms.

## MEASUREMENT OF AUDIT FIRM SIZE AND AUDIT MARKET STRUCTURE

### *Audit Firm Size Measurement*

To measure the size of an audit firm, we rely on the number of affiliated auditors, either as an employee or as a partner. Arguably, audit-fee income would provide a 'better' firm size measure than data on the number of auditors. However, such income was, and to a large extent remains, unobservable; certainly in the Dutch audit market. Thus, audit firm size in terms of audit fee-income can be conveniently proxied by the number of auditors affiliated with firms. There are two main arguments for using this proxy.

First, assuming that audit firm size is not directly observable and cannot be measured objectively, fee income can be viewed as a proxy of firm size. There is no *a priori* reason to expect that fee-income is a better proxy of audit firm size than a headcount measure. A further argument in favour of the headcount measure is that the employment of auditors makes an audit firm a player in the audit market.

Second, as labour is the major production factor in the audit industry, it is likely that the number of partners and employed auditors is directly related to an audit firm's size and fee-income. Differences in efficiency and technology between firms and over time might also affect this relationship, but empirical research reports high correlations between the two measures. Meuwissen (1992) presents these correlations for the Netherlands for a number of recent years (i.e., 1986, 1988 and 1990) and for firms for which data on both fee income and number of auditors are available. Correlation measures are calculated for both total fee income and audit fee income; all being higher than 0.970. A study on the Canadian audit industry by Zind and Zéghal (1989) also shows high correlations between headcount measures and audit fee-income.

Note also that proxying firm size by an employment measure is well-established in studies of (the evolution of) measured market structure in other industries. This holds in both industrial organization (see, e.g., Dunne *et al.*, 1989) and organization studies (see, e.g., Brüderl and Schüssler, 1990). Again, the general result is that the employment-sales correlation is nearly perfect (see, e.g., Boone and De Brabander, 1993).

#### *Audit Market Structure Measurement*

To measure supply-side concentration, this study employs two measures that are generally used in audit market concentration studies and also in the general field of industrial organization (for an overview see, e.g., Schmalensee, 1989). The two measures are the concentration ratio  $C_n$  and the Hirschman-Herfindahl index (H-index). Both are briefly introduced below.

An  $n$ -firm concentration ratio is defined as the market share of the largest  $n$  firms in an industry. A conventional number for  $n$  is 4. The formula to calculate the concentration ratio is

$$C_n = \sum_{i=1}^n S_i, \quad (1)$$

where  $S_i$  is the market share of firm  $i$ . Hence,  $C_n$  is the cumulative market share of the  $n$  largest firms in the industry at a given point in time. Obviously,  $C_n$  does not capture information on the size distribution of firms that do not belong to the largest  $n$  firms. The maximum value of  $C_n$  is one. The higher the value of  $C_n$ , the more unequal is the industry's firm size distribution and so the higher is the supply-side concentration.

The H-index is based on the summed squared market shares of all firms in an industry at a given point in time. Its value is between 0 and 1. The nearer to 1, the more unequal is an industry's size distribution and the higher is the level of supply-side concentration. The H-index is defined as

$$H = \sum_{i=1}^N S_i^2, \quad (2)$$

where  $N$  refers to the total number of firms in an industry. Note that the H-index is a weighted sum of market shares, where the weights are the market shares themselves. This weighting scheme implies that smaller firms influence the H-index to a lesser extent than large ones. The H-index is sensitive to both the number of firms in the market and the variation in the firms' market shares.

#### CONTRIBUTIONS OF THE STUDY: LONG PERIOD, MANY MEASUREMENT POINTS, AND COMPLETE MARKET

In the audit market literature supply-side concentration is considered to be an important indicator of competitive behaviour (see, e.g., Dopuch and Simunic, 1980;

Moizer and Turley, 1989). Since the pioneering study of Zeff and Fossum (1967), many studies have tried to measure supply-side concentration of audit markets. However, compared with this study they cover shorter time periods, concentration is measured at fewer points in time, and concentration is only calculated for a subset of the audit market (i.e., only larger audit firms are included).

Danos and Eichenseher (1986) study the U.S. audit market concentration measurement over the longest period of time (1950–80). Most other studies cover shorter time periods, generally restricted to a subset within the past two decades. The Danos and Eichenseher study also goes back the furthest in time.

Within the periods covered by the audit market concentration studies, concentration is only measured at a few points in time. For example, Danos and Eichenseher (1986) report concentration levels at four points. Tomczyck and Read (1989) has the largest number of observations over time, measuring concentration in the U.S. audit market in each year of the five-year period 1983–87.

Concerning the audit market samples included in concentration studies, all studies examine a subset of the supply side of the audit market. Only audit firms that serve larger clients or clients listed on the relevant stock exchange are included. This is because audit-firm size is in general measured on the basis of client data such as assets, revenues and market value. For larger and listed clients, these data are frequently readily available. The studies by Tomczyck and Read (1989) and Zind and Zéghal (1989) do not use client data, but directly measure the fees of audit firms. However, again only larger audit firms are included in the sample. Against this, the current study goes back to 1880 and measures concentration with approximately two-year intervals for the (nearly) complete audit market.

Additionally, interest in long-term longitudinal studies into the historical evolution of industries is expressed by industrial organization and organization studies scholars (see, e.g., Bresnahan and Reiss, 1991; Carroll and Hannan, 1989). This type of longitudinal research — covering the complete history of an industry on the basis of a large number of measurement points — is extremely valuable, as it permits the search for causal explanations of long-term competitive processes without the flaws implied by sample bias.

## DATA COLLECTION

Data were collected from three main data source categories: (a) membership lists of all auditor associations which eventually merged into the current Dutch association for auditors, Nederlands Instituut van Registeraccountants (NIVRA); (b) national Dutch financial directories and financial directories of Dutch cities; and (c) other data sources such as histories of individual audit firms and journals of auditor associations. These categories of data sources are discussed below. A more detailed description of the data collection process is given in Buijink *et al.* (1993).

Membership lists of Dutch auditor associations are convenient for providing the required data because these, (a) have been published ever since the founding of auditor associations, and (b), often contain detailed information on auditors and, after 1920, the audit firms to which they belong. Appendix A gives a genealogy of the

NivRA and its preceding associations. The other Dutch professional organization of accountants, Nederlandse Orde van Accountants-Administratieconsulenten (NOvAA) and its preceding associations are not included in this study and are therefore not depicted in the genealogy. NOvAA members provide mainly review, compilation and tax services to small businesses. In 1993, they also received the right to provide audit services.

Membership lists generally provide the following auditor information: name, address, education, industry (whether an auditor is active in public practice or in other industries) and level (whether the auditor is partner or employee of the firm). After 1920 the membership lists contain data on the audit firms where members of the association work, comprising the name and address of the audit firm plus a list of affiliated auditors.

Financial directories also provide information relating to auditors and audit firms. There are two types of directories: national directories and directories for individual Dutch cities. The information is often less detailed than in membership lists. National directories provide the name and address of all Dutch auditors who are members of an auditor association. They also often list the name and address of Dutch audit firms with more than one auditor (though not for the years prior to 1899). Unfortunately, the national directories often fail to provide the names of audit firms with only one auditor.

City directories include the names of large audit firms located in the city. They also include an alphabetical list of the name and job of all city inhabitants, thereby enabling determination of the names of all auditors living in that city and their occupation (i.e., whether they are active in public practice or in other industries). If auditors are employed by an audit firm with more than one auditor, the auditors' names are also included in the audit firm lists in the national directories. If an auditor works in public practice according to the city directory, but is not included in the national directories, he is classified as a sole-practitioner. Hence, the national and city financial directories provide complementary information.

The final category of data sources used are books and articles about audit firms and auditor associations, annual reports of auditor associations, minutes of meetings of such associations, and their professional journals. For example, de Vries (1985) is a detailed description of the Dutch audit history in the 1895–1935 period, and Metzemaekers and van Maastrigt (1983) and Sluyterman (1993) present the history of the pioneering Dutch audit firm Moret & Limperg.

To give an indication of the extensiveness of the data material collected, Table 1 gives a numerical overview of the data sources consulted for this article. The overview makes a distinction between the three categories identified above. As shown, 224 membership lists were used plus 179 financial directories and 362 other publications. Hence, 765 archival pieces were accessed. More precise information on the titles of the materials involved, their year of publication and their physical location is given in Buijink *et al.* (1993).

Three time periods can be distinguished in terms of the relevance of those data sources, and thereby the implied degree of completeness of the data set: pre-1895, 1895–1920 and 1920–1990. Note that missing data is not a serious problem for at least

A B A C U S

TABLE 1

NUMERICAL OVERVIEW OF DATA SOURCES, 1880–1990

Data source	Number
<b>Membership lists</b>	
Nationale Organisatie van Accountants	18
Nederlands Instituut van Registeraccountants	14
Nederlandsch College van Accountants	1
Nederlandsch Genootschap van Accountants	3
Nederlandsch Instituut van Accountants	72
Nederlandsche Academie van Accountants	14
Nederlandsche Accountants Associatie	3
Nederlandsche Accountants Vereeniging	9
Nederlandsche Associatie van Accountants	1
Nederlandsche Bond van Accountants	29
Nederlandsche Broederschap van Accountants	19
Nederlandsche Organisatie van Accountants	7
Nederlandsche Unie van Accountants	6
Vereeniging van Nederlandsche Accountants	9
Vereeniging van Academisch Gevormde Accountants	19
<b>Total</b>	<b>224</b>
<b>Financial directories</b>	
National directories	21
City directories:	
Amsterdam	41
Rotterdam	35
The Hague	41
Utrecht	41
<b>Total</b>	<b>179</b>
<b>Other data sources</b>	
Books and articles about audit firms and auditor associations	15
Annual reports of auditor associations	64
Minutes of auditor association meetings	276
Professional journals	7
<b>Total</b>	<b>362</b>

two reasons. First, the calculation of the  $C_4$ -ratio requires size measures of the four largest firms only, whereas in all likelihood all missing firms are small. Second, for the years where the data set is complete the correlation between the  $C_4$ -ratio and the H-index proves to be (nearly) perfect. The data collection process for each of these three periods is discussed in more detail below, and summary tables with the data for these three periods are also given.

*Pre-1895*

The first independent auditor's signature to appear below the financial statements of a company in the Netherlands was that of B. F. van Ysselstein (Metzemaekers and van Maastricht, 1983, p. 53), the year being 1879 and the company the Nieuwe Afrikaansche Handelsch Vereeniging in Rotterdam. The first Dutch auditor association, Nederlandsch Instituut van Accountants (NivA), was founded sixteen years later in 1895.

In contrast to the early years of the accounting profession in other countries such as the United Kingdom, little bankruptcy and insolvency work was undertaken by Dutch auditors, who had no legal function in bankruptcy and insolvency procedures. In the Netherlands, demand for auditors had its origin in a demand for audited financial statements. The largest part of the work of Dutch auditors has always consisted of auditing (see, e.g., Brown, 1968, p. 287; and Zeff *et al.*, 1992, p. 14). However, it should be noted that a number of bankruptcy cases clearly showed a need by investors to monitor the performance of companies by means of audited financial statements (de Vries 1985, p. 34; Brandenburg, 1993, p. 13). Hence, bankruptcy cases indirectly stimulated the demand for audit services.

For this period, without the publication of auditor association membership lists, the following strategy was pursued to gather data on the number and size of audit firms. A list was compiled with the names of all auditors in the first (1895) NivA membership list. Names were traced backward in time in the financial directories of the four largest (in terms of auditors living there) Dutch cities. Audit firm affiliation of the auditors found in these directories was then used to construct an audit firm name and size list for the period up to 1895. This was done on a bi-annual basis. From the data in Appendix B we estimate that for 1880–95 the data set covers about 80 per cent of the audit market in terms of the number of auditors. As far as audit firms are concerned, it is likely that the coverage is complete for the period 1880–88, whereas for the years 1890–94 about 30 per cent of the audit firms are estimated to be missing.

The results on the number and size of audit firms for the period 1880–94 are given in Table 2. Not surprisingly, in its infancy the Dutch audit industry comprised a small number of auditors (2 in 1880 to 16 in 1894) employed by a small number of audit firms (1 in 1884 to 8 in 1894) associated with a high relative net entry figure (-1 in 1884 to 3 in 1890). The first audit firm employing more than one auditor was founded on 1 January 1883 (de Vries, 1985, p. 36). Its name was the Bureel voor Boekhouding. A few years later *Confidentia* was added. Other early audit firms were *Silentium* and *Bureau voor Boekhouden Vertrouwen*. Interestingly, *Confidentia* grew to become the Moret, Ernst & Young giant. *Silentium* became the audit firm of Burgmans that was taken over by Frese, Hogeweg, Meyer & Hürchner in 1964, which in its turn merged into one of the market leaders, KPMG Klynveld.

*1895–1920*

In principle, collection of data for the 1895–1920 period should have been easier, provided that auditor association membership lists give the audit firm affiliation of their members in public practice. This proved not to be the case until 1921.



TABLE 2

## NUMBER AND SIZE OF AUDIT FIRMS IN THE NETHERLANDS, 1880-94

Year	Total number of auditors	Number of audit firms	Mean size <sup>a</sup>	Maximum size <sup>a</sup>	Net entry
1880	2	2	1.00	1	2
1882	2	2	1.00	1	0
1884	5	1	5.00	5	-1
1886	6	2	3.00	5	1
1888	6	2	3.00	5	0
1890	10	5	2.00	5	3
1892	11	6	1.83	5	1
1894	16	8	2.00	5	2

<sup>a</sup> Audit firm size is measured in terms of total number of auditors affiliated with the firm.

Therefore, the same data collection strategy as for the pre-1895 period was pursued. However, there is the added convenience that it is now possible to combine information in annual membership lists with data in directories. Again, data are collected on a bi-annual basis. In this period, as in the earlier one, only auditors living in the four largest Dutch cities were considered. In addition, information from all the available auditor association lists was taken into consideration. The data in Appendix B reveal the estimate that this procedure captures 66 per cent (in 1903) to 83 per cent (in 1908) of the audit market in terms of the number of auditors, and 61 per cent (in 1901) to 80 per cent (in 1908) of the number of audit firms.

The results on the number and size of audit firms in the period from 1895 to 1920 are presented in Table 3. After the founding of NIVa in 1895, the number of audit firms increased sharply (from 23 in 1896 to 160 in 1920). A likely reason is that in the first years of its existence, the executive committee of NIVa worked hard to make the services of its members more widely known. For example, they contacted newly established companies and recommended the hiring of an auditor (de Vries, 1985, p. 47). Also, the membership lists of NIVa were mailed to potential clients among existing companies. At the same time, NIVa had a loose policy in terms of new members entering the organization. In the first years, individuals could enter without a formal examination (de Vries, 1985, pp. 42-8).

Hence, the founding of NIVa started the process of developing an audit profession, which produced an uninterrupted increase in the number of professional auditors (from 32 in 1896 to 213 in 1920). The number of audit firms also continued to grow, being associated with high levels of net entry (up to 26 in 1916). Especially towards the end of this period, and after the First World War, the number of audit firms increased. Possibly this was due to the introduction of the first business income tax law in 1915 in the Netherlands. Note that tax consultancy as a profession did not yet exist (de Vries, 1985).

*DUTCH AUDIT CONCENTRATION*

TABLE 3

NUMBER AND SIZE OF AUDIT FIRMS IN THE NETHERLANDS, 1896-1920

Year	Total number of auditors	Number of audit firms	Mean size <sup>a</sup>	Maximum size <sup>a</sup>	Net entry
1896	32	23	1.39	5	15
1898	38	29	1.31	5	6
1899	41	33	1.24	5	4
1901	58	49	1.18	4	16
1903	59	49	1.20	4	0
1906	77	64	1.20	3	15
1908	95	82	1.16	3	18
1909	109	86	1.27	8	4
1913	123	95	1.29	7	9
1914	125	98	1.28	7	3
1916	160	124	1.29	8	26
1918	185	149	1.24	7	25
1920	213	160	1.33	8	11

<sup>a</sup> Audit firm size is measured in terms of total number of auditors affiliated with the firm.

*1921-90*

For the post-1921 period data collection became easier as auditor association membership lists contain the audit firm affiliation for members active in public practice. Unfortunately not all membership lists of all Dutch auditor associations could be traced; gaps in the data remain, particularly in the 1928-1934 period (with a percentage of 51 up to 58 of the number of auditors being included in the data set, and 44 to 48 per cent of the number of audit firms). In any case, all NIVa, 'Bond' and VAGA members (VAGA after 1934) are included, and all firms with more than two auditors. The data base is complete for the period 1967-90. Appendix B indicates that the data set is nearly complete for the years 1937-66 in terms of both auditors (covering 68 to 93 per cent of the market) and audit firms (including 59 to 78 per cent of the market).

The results on the number and size of audit firms in the period 1921-90 are given in Table 4. In these years the number of audit firms rose until 1947 (from 131 in 1921 to 288 in 1947). After 1947 the numbers fluctuated until 1974 (with a peak of 350 firms in 1968 and a minimum of 265 firms in 1974), after which the number has been growing until 1990 (to a level of 505 firms). The average size of audit firms also grew until 1975, but thereafter fluctuated. In 1990 the average size lay between the 1971 and 1972 levels. The maximum size has grown almost every year. Especially between 1988 and 1990 this growth rate has been substantial (from a maximum of 393 to 524 affiliated auditors), explained by the large mergers occurring in that period. As far as net entry is concerned, a workable distinction can be made between the 1921-60,

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TABLE 4

NUMBER AND SIZE OF AUDIT FIRMS IN THE NETHERLANDS, 1921-90

Year	Total number of auditors	Number of audit firms	Mean size <sup>a</sup>	Maximum size <sup>a</sup>	Net entry
1921	178	131	1.37	9	-29 <sup>b</sup>
1923	178	132	1.35	9	1
1925	199	146	1.36	9	14
1928	238	171	1.39	10	25
1930	259	185	1.40	11	14
1932	300	197	1.52	14	12
1934	329	216	1.52	12	19
1937	395	250	1.58	15	34 <sup>c</sup>
1939	419	251	1.67	16	1
1941	429	255	1.68	18	4
1946	489	286	1.71	18	31
1947	519	288	1.80	22	2
1948	546	285	1.92	24	-3
1950	574	278	2.06	37	-7
1951	600	291	2.06	39	13
1953	660	296	2.23	43	5
1954	679	300	2.26	49	4
1956	765	306	2.50	62	6
1958	833	320	2.60	67	14
1960	923	331	2.79	76	11
1962	992	327	3.03	83	-4
1964	1,085	317	3.42	107	-10
1966	1,142	286	3.99	118	-31
1968	1,350	350	3.86	132	64 <sup>d</sup>
1970	1,427	306	4.66	185	-44
1971	1,479	284	5.21	206	-22
1972	1,553	270	5.75	250	-14
1973	1,649	267	6.18	272	-3
1974	1,699	265	6.41	271	-2
1975	1,774	271	6.55	292	6
1978	1,874	301	6.23	295	30
1980	1,971	307	6.42	306	6
1982	2,099	320	6.56	367	13
1984	2,185	373	5.86	365	53
1986	2,269	413	5.49	358	40
1988	2,523	448	5.63	393	35
1990	2,770	505	5.49	524	57

## DUTCH AUDIT CONCENTRATION

TABLE 4 (contd)

- <sup>a</sup> Audit firm size is measured in terms of total number of auditors affiliated with the firm.
- <sup>b</sup> This large negative net entry level is caused by the fact that after 1920 only audit firms are included with members who belonged to the NIVa or Nederlandsche Bond van Accountants. This is caused by data restrictions.
- <sup>c</sup> Net entry is high due to the initial inclusion of audit firms with auditors who were members of the Nederlandsche Organisatie van Accountants. Before 1937 these audit firms are not included due to data restrictions.
- <sup>d</sup> Net entry is high due to the initial inclusion of audit firms with auditors who were members of the Nederlandsche Broederschap van Accountants or Nederlandsche Unie van Accountants. Before 1968 these audit firms are not included due to data restrictions.

1960–74 and 1974–90 periods. Net entry is positive in the first and the third periods, but negative in the second one. In the first period the net entry figure fluctuated. In the second period there were many mergers resulting in negative net entry. In the last period net entry is much higher compared with previous periods.

### RESULTS: LONG-TERM CONCENTRATION IN THE DUTCH AUDIT MARKET

This section presents the results of the descriptive statistics of the evolution of the supply-side concentration levels in the Dutch audit market from 1880 to 1990. As noted, compared to previous audit market concentration research this study covers a much longer time period, measures concentration at more points in time, and covers the (nearly) complete audit market.

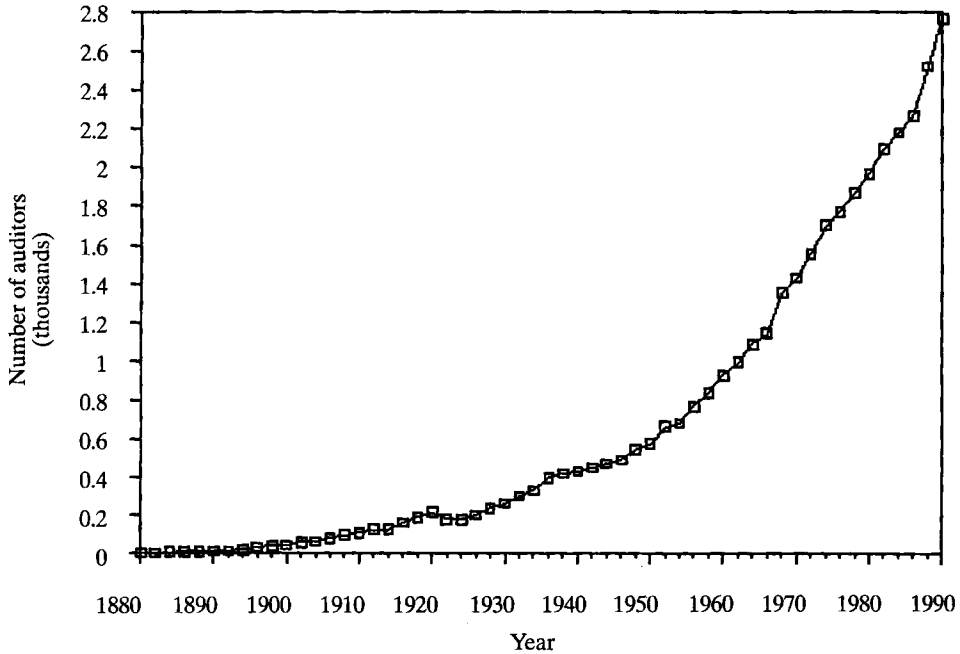
Potential explanations for observed changes in the level of concentration include: changing economies of scale in the production of audit services, more significant barriers to enter the audit market, and mergers of the international networks of Dutch audit firms. Economies of scale in audit markets might be affected by regulation, audit technology and client concentration. Although important, the explanations serve illustrative purposes only. Future research will require more in-depth analysis of many potential explanatory variables. Before examining our explanations, three figures are presented that summarize the most important data from the tables presented in the previous section.

Figure 1 gives the total number of auditors active in public practice for the whole period under study. The number of auditors active in public practice may increase as a result of the entry by newly certified or licensed auditors and by auditors switching to auditing from other industries. The number of auditors may decrease as a result of auditors switching from public practice to other industries, or of expulsion, retirement and death. As Figure 1 shows, the total number of auditors in public practice increased almost every year.

Figure 2 shows the total number of audit firms for the period under examination. We included all audit firms with one or more affiliated auditors being a member of an auditor association. The number of audit firms may have grown as a result of entry by new audit firms, while it may have declined as a result of the exit of audit firms.

FIGURE 1

TOTAL NUMBER OF DUTCH AUDITORS IN PUBLIC PRACTICE, 1880-1990



Modes of entry are spin-offs from existing firms, auditors from other industries starting a firm in the audit industry, and newly certified auditors starting an audit firm; those of exit are the retirement of all auditors of the firm, all auditors moving to other firms, and acquisition by another audit firm.

The total number of audit firms grew from the inception of the industry up until 1990, with few interruptions. Given the nearly continuous growth in the total number of auditors documented in Figure 1, a reduction in the number of audit firms goes hand in hand with increasing concentration. The interruption in the period 1968-74 is associated with high merger activity, which induced the exit of the merger partners. In this period the Dutch Big Five firms were formed by mergers of about forty-five firms.<sup>1</sup> The growth of the total number of audit firms after 1974 resulted from the entry of a large number of small audit firms.

Figure 3 shows the net entry of audit firms during the period under study and reveals the underlying changes in the level of the total number of audit firms depicted in Figure 2. Prior to 1962 net entry was nearly always positive. Thereafter net entry is negative up to and including 1974. This is mainly caused by the formation

<sup>1</sup> These five firms were Klynveld Kraayenhof & Co, Moret & Limperg, Dijker & Doornbos/register-accountants, Nederlandse Accountants Maatschap, and Van Dien & Co.

## DUTCH AUDIT CONCENTRATION

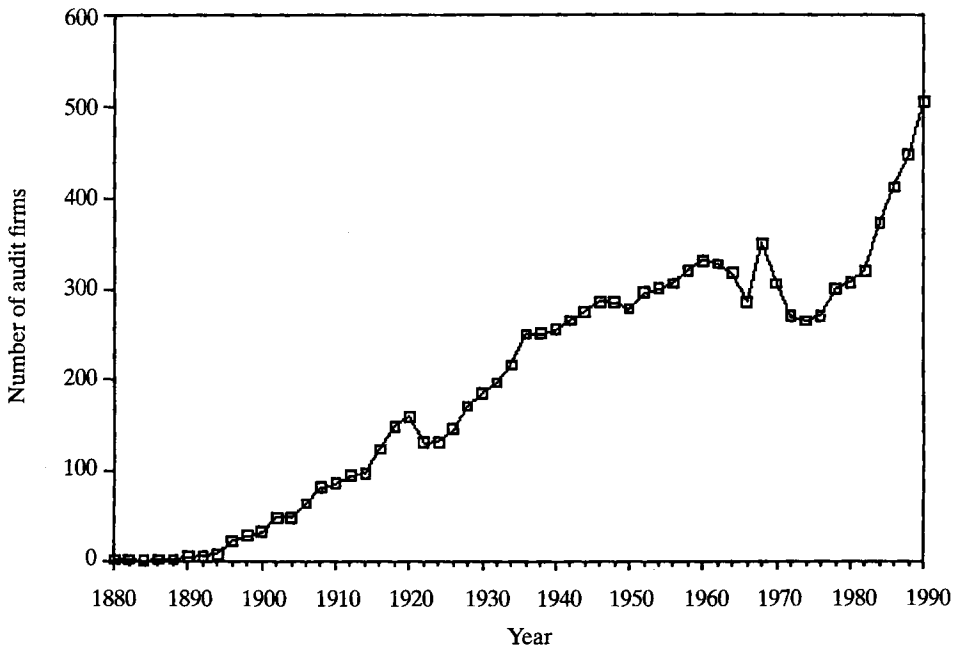
of the Dutch Big-Five firms and the resulting merger exits. Beginning in 1975, net entry is increasingly positive. Net entry by small audit firms is especially high in the 1980s. A potential explanation for this is the enforcement of regulation which required small- and medium-sized firms to disclose and audit financial statements. This regulation was the result of the Fourth European Directive, which was enforced in 1984. The total number of financial statements disclosed by companies increased from 2,883 in 1982 to 68,100 in 1987 (Maijoor, 1991, p. 173). The demand by small auditees induced by regulatory measures may have increased the opportunities for small firms to supply services.

Figures 4 and 5 show the evolution of the  $C_4$ -ratio and H-index measures. Not surprisingly, the two measures show similar patterns. As a result of the low number of firms in the industry's infancy, both measures have high values at the beginning of the period under study. After 1888 the size of the measures decline rapidly as a result of the growing number of audit firms. From 1906 until 1960 the concentration measures are remarkably stable. The sharp increases in concentration levels in the 1960s and early 1970s clearly reflect the formation of the Dutch Big-Five firms.

As the figures show, in the period 1988–90 there is again an increase in the level of concentration. This occurs despite the fact that there is a high net entry level in this period (Figure 3). The total number of audit firms increased by fifty-seven in this

FIGURE 2

TOTAL NUMBER OF FIRMS ACTIVE IN THE DUTCH AUDIT MARKET, 1880–1990

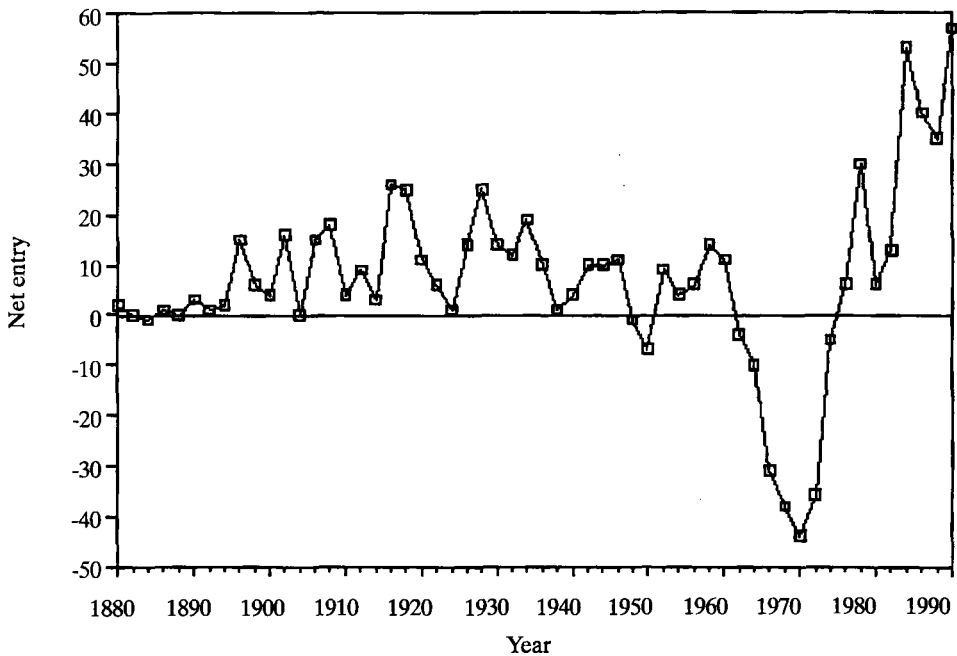


period. As noted in the second section, the H-index is sensitive to both the number of audit firms and the size variance of firms. The significant increase in the size variance is explicable by the mergers of five large audit firms into three large firms. An exemplary merger in this period involved the two giant firms Dijker & Doornbos/ register-accountants and Van Dien & Co.<sup>2</sup>

A benchmark for the level of concentration in the Dutch audit market exists in the limited data about concentration levels for audit markets in other (European) countries.<sup>3</sup> Using the square root of net turnover of clients to proxy audit fee, Loft and Sjöfors (1993) report a 1990 C<sub>4</sub>-ratio of 0.200 for Sweden and 0.262 for Denmark. Moizer and Turley (1987) report concentration levels for the U.K. audit

FIGURE 3

NET ENTRY BY FIRMS IN THE DUTCH AUDIT MARKET, 1880-1990



*Note.* For the years that net entry was affected by a change in the membership lists that are available (i.e., 1921, 1937, and 1968, see Table 4), net entry is estimated by the average of the results for the previous period and the next period.

<sup>2</sup> The new name after the merger was Deloitte Dijker Van Dien.

<sup>3</sup> The NERA report on competition in member countries of the EC provides concentration indices for all EC member countries. However, these concentration figures are based only on the part of the audit market serviced by the largest, mostly Big Six, audit firms. Because our data are based on the complete audit market, it is not valid to use them as a benchmark.

## DUTCH AUDIT CONCENTRATION

market, using three measures of audit fee. When audit fee is measured on the basis of the square root of client's sales, the  $C_4$ -ratio is 0.416 for 1972, and 0.492 for 1982. These results are lower than the results for the Dutch audit market for 1972 (0.490), 1982 (0.527) and 1990 (0.587). However, it should be noted that these other studies use a different measure for audit firm fee, and do not take the complete audit market into account. If they had covered the complete audit market, the difference with our results would have been larger.

Three major explanations for increasing concentration are suggested in the audit market literature: (a) an increase of audit firm size as a result of more pronounced economies of scale in the production of audit services; (b) a reduction in the number of firms entering the audit market as a result of more significant entry barriers; and (c) the mergers of national audit firms induced by the mergers of their international networks.

FIGURE 4

THE FOUR-FIRM CONCENTRATION RATIO ( $C_4$ ) FOR THE DUTCH AUDIT MARKET, 1880-1990

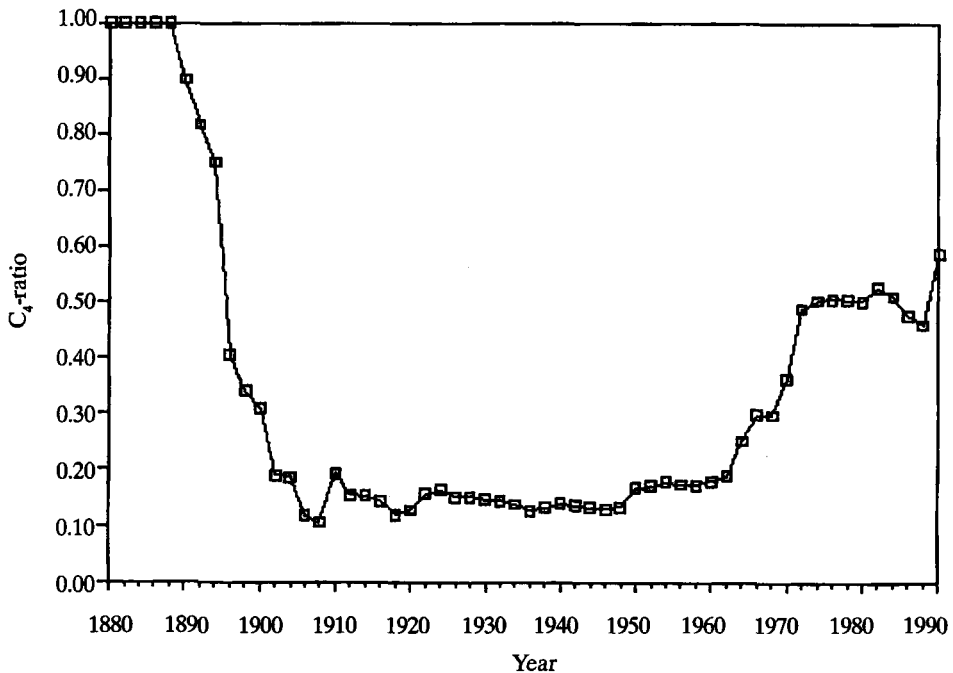
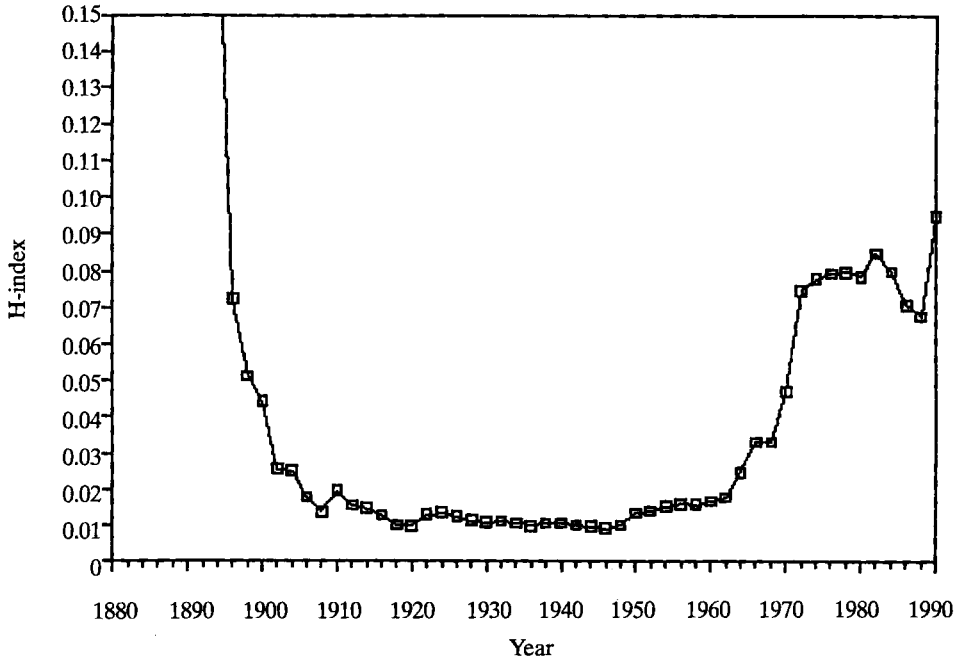




FIGURE 5

## THE HIRSCHMAN-HERFINDAHL INDEX (H-INDEX) FOR THE DUTCH AUDIT MARKET, 1880-1990



*Note.* For the period prior to 1886 the H-index is not presented. As a result of the infancy stage of the audit industry, the number of firms is very low and the value for the H-index very high.

### *More Pronounced Production Economies of Scale*

Concerning the first explanation, more pronounced production economies of scale would result in a larger, efficient audit firm size, implying that concentration can be expected to increase. This explanation assumes competitive (or contestable) audit markets — that is, audit firms need to adjust their size to the efficient scale in order to survive (Baumol, 1982). Three main factors have been proposed as likely to affect economies of scale in the public accounting sector: financial accounting regulation, audit technology and client concentration (see Eichenseher and Danos, 1981; Yardley *et al.*, 1992).

More complex financial accounting regulation requires substantial sunk investment in expertise. Without a minimum level of investment in expertise on financial accounting regulations, audit services cannot be provided. Hence, the advent of greater regulation and the subsequent need for sunk expertise would increase the efficient size of an audit firm. In the Netherlands the first substantial financial accounting regulation was introduced in 1971 (for an extensive discussion of the development of this regulation see Zeff *et al.*, 1992). That regulation contained both mandatory audit requirements and detailed disclosure rules, for all public

limited liability companies, for large private limited liability companies and for large cooperative societies (NIVRA, 1972). A second major increase in financial accounting regulation for firms occurred in 1984, with the number of firms subjected to a mandatory audit requirement increasing further, and more detailed disclosure rules being established (Burgert and Timmermans, 1987, pp. 29–30). Both the 1971 and 1984 regulations can be expected to increase the level of expertise required to conduct an audit, and could therefore provide a potential explanation for the observed increase in levels of concentration.

Two other effects of the increased (regulatory) demand are worth noting. First, the number of lower skilled employees in the audit industry increased rapidly around the periods those regulations were introduced (see Maijoor, 1994). Hence, in the short term audit firms coped with the increased amount of audit work by means of hiring employees at the assistant level. It takes a number of years for those assistants to obtain their qualification as auditors. This might explain the increased growth of the total number of (qualified) auditors at the end of the 1980s depicted in Figure 1. Second, as a result of the increased amount of audit work there was increasing political pressure to enforce the requirement that the members of NOvAA also received the right to provide audit services. With a delay, this right was granted to NOvAA members in 1993.

Changes in technology, which increase the efficiency of an audit firm, might have also increased the average firm size and therefore provide a potential explanation of the increase in concentration in the past two decades. A similar line of reasoning as for financial accounting regulation can be given for audit technology. The development and implementation of innovations in the audit process require substantial sunk investments in staff. Only audit firms of a minimum size level have the capacity to fund this sunk investment. In the past two decades, there have been a number of significant changes in audit technology. These innovations include risk analysis, statistical sampling, and structured audit approaches (see Maijoor, 1994).

Concerning client concentration, Benston (1985) hypothesized that large audit firms, relative to small audit firms, can more efficiently supply services to large client firms. In the audit market, one-to-one buyer–seller relationships are common and there is hardly any subcontracting. One explanation for both phenomena is that large clients, with numerous (inter)national branches, can only be serviced efficiently by large audit firms. DeAngelo (1981) provides another reason why only large audit firms can provide high-quality services to large clients. She argues that the larger a client's share in the total client portfolio of an auditor, the smaller is the chance that the auditor can resist client pressure and maintain independence. Large clients demanding high-quality services — because of a high degree of separation of ownership and control — would only consider buying services from large audit firms. Hence, there are numbers of reasons to expect that if the size of auditees increases, then the efficient size of audit firms will increase as well.

There is only limited systemic empirical evidence on the long-term level of concentration in Dutch industries. Casual observation indicates that after the Second World War and up until 1960 the level of industry concentration in the Netherlands was relatively stable (de Jong, 1988). During the 1960s, and especially towards the

end of that decade, there was a very substantial increase in the level of concentration of Dutch industry. For example, from 1965 to 1975 the annual number of mergers and acquisitions in the Netherlands increased from about fifty in 1965 to 400 in 1974. This increase in client concentration can be a potential explanation for the increasing levels of audit market concentration. Further, empirical evidence suggests that concentration in Dutch (client) industries is, in general, higher than in other countries (Bloemen *et al.*, 1993, compare both U.K. and Dutch data).

### *Entry Barriers*

The economies of scale explanation given above assumes a competitive (contestable) market. However, increasing concentration may also follow from reduced competition as a result of increased barriers for potential competitors to enter an audit market (see, e.g., Dopuch and Simunic, 1980). The typical entry barrier for auditing services is the licensing regime. Licensing may make entry more costly, and may decrease the level of competition in the audit industry (Young, 1986). In the Netherlands a licensing regime for auditors was first introduced in 1967 (Hulshoff Pol, 1988). As a result of this regime, only a monopolist — NIVRA — has the right to license auditors. Before 1967 there was only a certification regime,<sup>4</sup> and certification was conducted by a number of auditor associations.

The establishment of a licensing regime does not, however, seem to have caused higher entry barriers and, as a result, higher concentration. Under the licensing regime, net entry into the Dutch market has been substantial, and on average higher than in the pre-licensing period. Especially in the last decade net entry into the audit market has been high (see Table 4 for the years 1980 to 1990). The fact that many firms entered the market negates the idea of a substantial entry barrier. Perhaps this is because, while there is a licensing regime, there are still many opportunities to obtain a licence. There is a large number of educational routes. Apparently, there are no substantial barriers to start a (small) audit firm. Hence, concentration has increased *despite* substantial entry in the last decade.

### *Mergers of International Networks*

The third explanation for changes in the concentration levels in (national) audit markets is the incidence of mergers of international networks (see, e.g., Christiansen and Loft, 1992; Loft and Sjöfors, 1993). If that explanation holds, the increasing concentration would not be related to changes in the national audit market, but be more or less an exogenous effect as a result of a decision made at an international level.

An analysis of mergers where audit firms were involved with international networks shows that this explanation is valid for the increase in concentration at the end of the '80s. The merger between Peat Marwick and KMG in 1986, and that between Arthur Young and Ernst & Whinney in 1989, are apposite. Both mergers

<sup>4</sup> Young (1986) describes certification and licensing as follows. Certification does not prevent anyone from supplying audit services, but the use of particular titles in the market is limited to persons who have a certificate. Licensing prohibits the supply of audit services without a licence.

were followed by their Dutch counterparts. However, it should be noted that not all international mergers are implemented on a national level. In the case of the international merger of Deloitte Haskins & Sells and Touche Ross in 1989, the Dutch counterparts of Deloitte (Deloitte Dijker van Dien) did not support the international merger, preferring to quit the network (Sluyterman, 1993, p. 108). It should be noted that the international network explanation is not relevant for the increase in concentration at the beginning of the '70s. That increase was the result of large audit firms, which were in a number of cases affiliated with an international network, acquiring smaller audit firms without an international affiliation.

In sum, the increase in the level of concentration in the Dutch audit market occurred during a period of time in which: (a) financial accounting regulation was introduced, (b) there were rapid changes in audit technology, (c) a licensing regime for auditors was initiated, (d) client concentration increased, and (e) there were a number of mergers of international networks. Supply-side regulation, in the form of a licensing regime, does not seem to be an important variable explaining the increase in audit market concentration. However, further research and stronger evidence is needed to assess whether the other variables caused the increase in the level of concentration.

#### SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The main purposes of this article are: (a) to show how auditor association membership lists can be used to create a longitudinal data base on the number and size of firms in an audit market; (b) to illustrate how these data can be exploited for audit market research issues, in this case the calculation of the level of supplier concentration; and (c) to give possible explanations for observed changes in the level of supplier concentration. The results for the supply side of the Dutch audit market show concentration levels that are low and stable for a long period. Only in the past two decades have concentration levels increased substantially. This increasing concentration coincides with increasing regulation of the demand and supply side of the Dutch audit market, increasing technological complexity of the audit process, increasing client concentration, and the mergers of international networks. However, supply-side regulation does not seem to be a major factor contributing to the high concentration levels. Concentration has increased despite higher levels of entry into the audit market. Further research is needed to assess whether financial statement regulation, audit technology and client concentration caused these changes in the level of concentration.

The data in this article can also be used for a large number of other audit (market) research issues. One example is the demand for auditing. The data give an indication of the development of the total size of the audit market in the past century. Hence, they can be used in tests of explanations of the demand for auditing. Potential variables for explaining changes in the size of the audit market are: (a) the growth of firms with a high degree of separation of ownership and control, and (b) the enforcement of government regulations that require auditor's services. The first

variable can be proxied by the number of listed corporations, and the second by a careful review of the Dutch history of (financial) regulation (see Buijink *et al.*, 1993).

A second audit (market) research issue that may benefit from the membership list data is understanding what constitutes successful growth strategies of audit firms. In the past century a number of small audit firms managed to grow and acquire a substantial share of the market. Other small audit firms failed to grow and even exited from the audit market in an early stage. Two potential key explanatory factors are reflected in the following questions: (a) does an audit firm have an internal growth strategy, or a merger and acquisition growth strategy; and (b) does the audit firm have an extensive national and international audit firm network? Data on the first factor can be retrieved directly from the membership lists. Concerning the second factor, most Dutch membership lists provide data on the number of offices of audit firms, including their geographical dispersion, and reveal information on whether the audit firms have an international network. Combining this information with the data in this article provides the opportunity to test the two suggested explanations of successful growth strategies of audit firms.

Finally, data in this article are especially interesting given that membership lists are available in other countries as well, thus providing many opportunities for comparative research. For example, further work could analyse whether increasing regulation in other countries is also associated with increasing levels of concentration. This would provide more insight into regulation as an explanatory variable of audit market structure.

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## DUTCH AUDIT CONCENTRATION

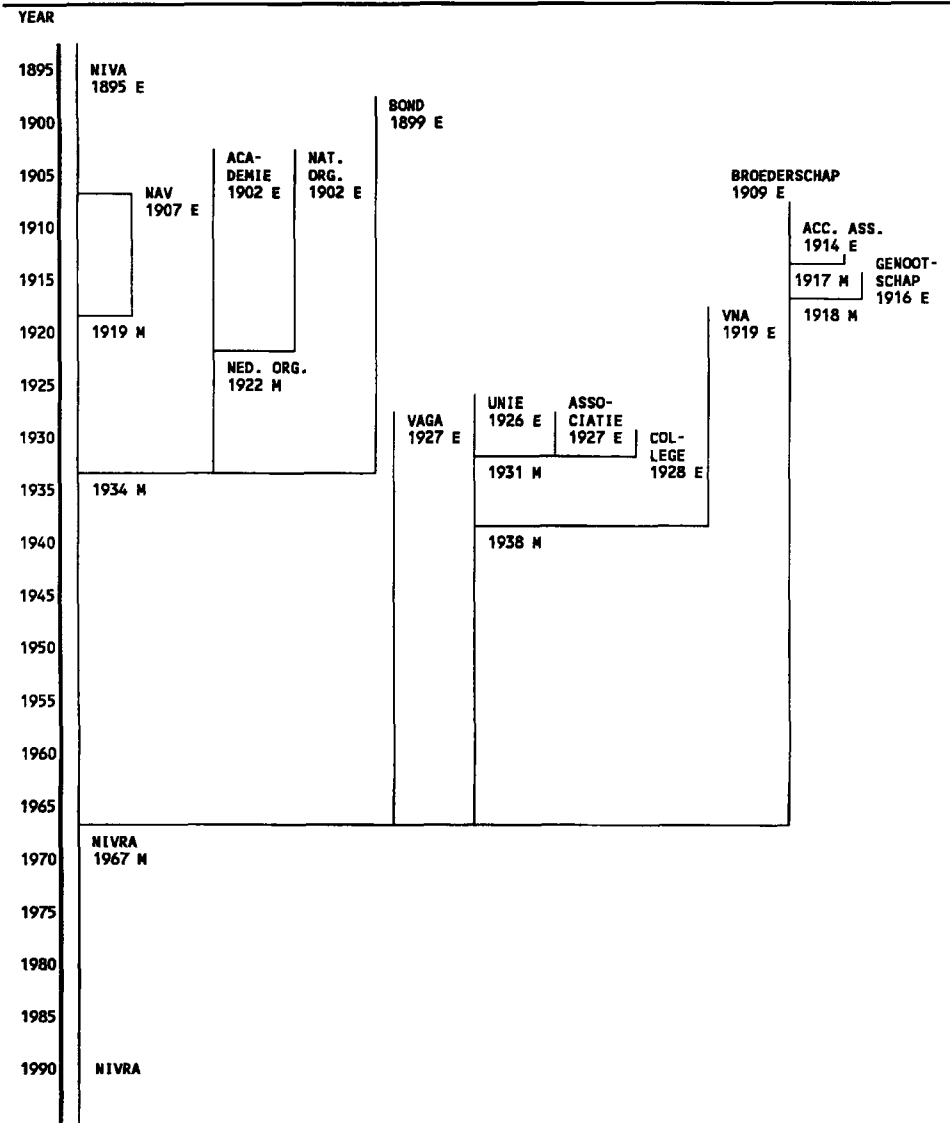
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DUTCH AUDIT CONCENTRATION

APPENDIX A

GENEALOGY OF THE DUTCH AUDITOR ASSOCIATION NIVRA AND ITS PREDECESSORS, 1895-1990





A B A C U S

APPENDIX A (CONTD.)

NAT. ORG.	Nationale Organisatie van Accountants
NIVRA	Nederlands Instituut van Registeraccountants
COLLEGE	Nederlandsch College van Accountants
GENOOTSCHAP	Nederlandsch Genootschap van Accountants
NIVa	Nederlandsch Instituut van Accountants
ACADEMIE	Nederlandsche Academie van Accountants
ACC. ASS.	Nederlandsche Accountants Associatie
NAV	Nederlandsche Accountants Vereeniging
ASSOCIATIE	Nederlandsche Associatie van Accountants
BOND	Nederlandsche Bond van Accountants
BROEDERSCHAP	Nederlandsche Broederschap van Accountants
NED. ORG.	Nederlandsche Organisatie van Accountants
UNIE	Nederlandsche Unie van Accountants
VNA	Vereeniging van Nederlandsche Accountants
VAGA	Vereeniging van Academisch Gevormde Accountants

*Note.* Only branches of auditor associations which merged into the present day NIVRA are included.

Of each auditor association the date of establishment (E) and date of merger (M) are given.

In case of a merger of auditor associations, the name of the new auditor association is only used if it differs from the name of the largest previous auditor association.

APPENDIX B

AVAILABLE AND MISSING DATA

The available and estimated missing data for the 1880–1966 period in terms of both the number of auditors and the number of firms.

Year	No. (%) auditors in data set	No. (%) of missing auditors	No. (%) firms in data set	No. (%) of missing firms
1880	2 (100%)	0 (0%)	2 (100%)	0 (0%)
1882	2 (100%)	0 (0%)	2 (100%)	0 (0%)
1884	5 (83%)	1 (17%)	1 (100%)	0 (0%)
1886	6 (86%)	1 (14%)	2 (100%)	0 (0%)
1888	6 (86%)	1 (14%)	2 (100%)	0 (0%)
1890	10 (83%)	2 (17%)	5 (71%)	2 (29%)
1892	11 (79%)	3 (21%)	6 (67%)	3 (33%)
1894	16 (80%)	4 (20%)	8 (67%)	4 (33%)
1896	32 (80%)	8 (20%)	23 (74%)	8 (26%)
1898	38 (79%)	10 (21%)	29 (74%)	10 (26%)
1899	41 (76%)	13 (24%)	33 (72%)	13 (28%)
1901	58 (74%)	20 (26%)	49 (71%)	20 (29%)
1903	59 (66%)	31 (34%)	49 (61%)	31 (39%)

*DUTCH AUDIT CONCENTRATION*

Appendix B (cont.)

Year	No. (%) auditors in data set	No. (%) of missing auditors	No. (%) firms in data set	No. (%) of missing firms
1906	77 (79%)	21 (21%)	64 (75%)	21 (25%)
1908	95 (83%)	20 (17%)	82 (80%)	20 (20%)
1909	109 (81%)	25 (19%)	86 (77%)	25 (23%)
1913	123 (75%)	40 (25%)	95 (70%)	40 (30%)
1914	125 (74%)	43 (26%)	98 (70%)	43 (30%)
1916	160 (75%)	52 (25%)	124 (70%)	52 (30%)
1918	185 (73%)	67 (27%)	149 (69%)	67 (31%)
1920	213 (72%)	81 (28%)	160 (66%)	81 (34%)
1921	178 (65%)	97 (35%)	131 (58%)	96 (42%)
1923	178 (62%)	111 (38%)	132 (55%)	109 (45%)
1925	199 (61%)	129 (39%)	146 (54%)	126 (46%)
1928	238 (51%)	226 (49%)	171 (44%)	218 (56%)
1930	259 (51%)	249 (49%)	185 (44%)	240 (56%)
1932	300 (54%)	260 (46%)	197 (44%)	248 (56%)
1934	329 (58%)	241 (42%)	216 (48%)	230 (52%)
1937	395 (68%)	183 (32%)	250 (59%)	175 (41%)
1939	419 (69%)	184 (31%)	251 (59%)	176 (41%)
1941	429 (74%)	149 (26%)	255 (64%)	143 (36%)
1946	489 (77%)	148 (23%)	286 (67%)	138 (33%)
1947	519 (78%)	149 (22%)	288 (67%)	139 (33%)
1948	546 (80%)	140 (20%)	285 (69%)	130 (31%)
1950	574 (80%)	143 (20%)	278 (67%)	134 (33%)
1951	600 (81%)	142 (19%)	291 (69%)	129 (31%)
1953	660 (83%)	134 (17%)	296 (71%)	122 (29%)
1954	679 (84%)	127 (16%)	300 (72%)	115 (28%)
1956	765 (87%)	119 (13%)	306 (74%)	106 (26%)
1958	833 (88%)	115 (12%)	320 (76%)	102 (24%)
1960	923 (89%)	112 (11%)	331 (77%)	100 (23%)
1962	992 (90%)	106 (10%)	327 (78%)	94 (22%)
1964	1085 (92%)	100 (8%)	317 (78%)	89 (22%)
1966	1142 (93%)	97 (7%)	286 (77%)	86 (23%)

The methods by which the numbers are calculated differ from period to period and are explained in Buijink *et al.* (1993). Here the remarks on the collection process made in the main text suffice. Note that the membership lists of the post-1966 monopolist NIVRA cover the complete audit market.